



***The Pennsylvania Early Intervention Outcomes Study
(PEIOS):***

A Phase 1 Pilot Study

**Exploratory Research to Document the Impact and Outcomes of CenClear
Child Services Early Intervention Programs
as a Model for Future State-wide Evaluation Initiatives**

STEPHEN J. BAGNATO, Ed.D.

Professor of Pediatrics & Psychology

Director, Early Childhood Partnerships

Director, SPECS Program Evaluation Research Team

PEIOS Pilot Study Principal Investigator

Children's Hospital of Pittsburgh

The UCLID Center at the University of Pittsburgh

steve.bagnato@chp.edu

www.uclid.org

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Co-Authors and Investigators

Candace Hawthorne, Ph.D., OTR/L, Project Coordinator
Antonio Fevola, MSW, Data Manager
Hoi Suen, Ph.D., Research Design and Statistical Analysis (Penn State)
Margie Matesa, M.Ed.
Elizabeth Williams, B.A.
Sherl Smith
Jill Springer
Eugene Kephart, Ph.D.

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**WHAT IS THE NEED FOR EARLY INTERVENTION
OUTCOMES RESEARCH?**

Importance of Interagency Partnerships

Enhancing the quality of early childhood intervention programs requires reform that extends beyond a single classroom or program to community partnerships and linkages (Buysee, Wesley, Skinner, 1999). Researchers and practitioners in all the interdisciplinary fields that emphasize early childhood education advocate for system changes that enable agencies, schools, and public and private organizations to pool human and financial resources and to form innovative partnerships for integrated services. Such partnerships are viewed as the most effective and efficient vehicle to augment their capacity and to integrate their resources to serve all infants and young children including those at developmental risk or with developmental disabilities and behavioral problems and their families across the early childhood period (0-8 years).

Some of the most promising of these collaborative ventures in community settings has occurred within the federal Head Start Program and in the school-linked healthcare services and mental health services movement as well as in various states' integrated technical assistance networks focusing on young children (Ramey, 1999; Takanishi & DeLeon, 1994; Melaville & Blank, 1997; Bagnato, 1999). Each of these programmatic efforts addressed the specialized needs of children with developmental disabilities or chronic medical and mental health problems

Despite these few model development efforts, the benefits of the few field-validated University-Hospital-Community partnerships have not been universally realized in the regular early childhood education system. Advocates stress the need for broader initiatives for all young children and families and the professionals who support them (Hurd, Lerner, & Barton, 1999). Four areas of need are most prominent: (1) continuing professional development training and ongoing consultation for early childhood teachers, caregivers and administrators; (2) ongoing consultation regarding "best practices" in early childhood intervention; and (3) the integration of consultation and services to facilitate the management of young children with challenging behaviors and special medical and educational needs in regular early childhood settings; and, very importantly, (4) the use of sensitive, developmentally-appropriate methods to assess the status and progress of children and families and to document the impact and outcomes of quality early childhood intervention programs.

Quality Early Learning and School Readiness

The national debate about preventing school failure for young children at developmental risk has renewed interest in the quality, cost, efficacy, and outcomes of early care and education programs in the United States (Bryant & Maxwell, 1997; Christian, Morrison, & Bryant, 1998; Clifford, Peisner-Feinberg, Culking, Howes, & Kagan, 1998; Gil & Reynolds, 2000; NICHD, 1999). The accumulated research results of thirty years of studies in early childhood intervention indicate clearly that young children at developmental risk from impoverished circumstances face progressive declines in their patterns of developmental, behavioral, and learning skills and an early and continuing future of school failure in the absence of structured early care and education experiences which can enhance developmental and early school success (Barnett, 1995; Bryant & Maxwell; Campbell & Ramey, 1995; Farran, 2000; Marcon, 1999; Schweinhart & Weikart, 1997). Unfortunately, much of the debate about the value of early childhood intervention programs for children of poverty surrounds not the issue of quality intervention, itself, but rather the cost of quality (Clifford, et.al., 1998). It is clear, but not universally accepted, that comprehensive early care and education programs are necessary in order to prevent school failure for children at developmental risk, because the cost of such intensive programs exceeds the typical cost of daycare. Much interest and debate surrounds the issue of accountability and its assessment in early childhood intervention programs (Bagnato, Neisworth, & Munson, 1997; Meisels, Bickel, Nicholson, Xue, & Atkins-Burnett., 2001; Meisels, Burnett, et.al., in press;). Advocates in the fields of early childhood and early intervention eschew the tendency to extend downward both the academic standards and traditional testing methods that pervade school-age practices. It is urgent for the field to conduct research on both assessment and early care and education practices that are developmentally-appropriate and rigorous in documenting child progress and the acquisition of precursor skills for early school success.

Finally, the early childhood fields must present evidence-based research on those elements of early care and education practice that best promote positive child outcomes, especially for children at developmental risk and with developmental delays/disabilities (Head Start Bureau, 2000). Two areas of focus are germane to the current study: the impact of ongoing, onsite consultation and mentoring on program quality improvements, and the implementation of “best practice” standards to establish and maintain program quality.

Both OSEP and the Institute for Education Science (IES) are promoting the development of child outcome benchmarks and measurement rubrics and strategies to document progress during intervention for all children in early childhood intervention programs.

Research on Effective Early Childhood Interventions for Children at Developmental Risk

Ramey and Ramey (1998) summarized the major experimental studies in the fields of early childhood education and early intervention since the early 1970's that have resulted in measurable beneficial outcomes for children at developmental risk. From their analysis, they extracted 7 common elements of effective intervention programs that have been associated with initial and long-term positive outcomes for children and families. The seven core features are:

(1) longitudinal interventions starting in infancy and monitored through functional benchmarks; (2) intensive, comprehensive, and individualized programs and supports; (3) integral parent program participation; (4) frequent monitoring of high quality programs; (5) direct child interventions; (6) community-directed programs and integrated services; and (7) follow-through of child and family supports and program evaluation into the primary grades.

The Movement for Early Intervention Outcomes Research

No Child Left Behind has been a clear impetus for educational accountability; while the movement emphasized initially the performance of schools to increase child learning and performance, the expansion of the law now focuses upon the quality, impact, and outcomes of early intervention services for young children with disabilities and their families. The Office of Special Education Programs, US Department of Education has funded the Early Childhood Outcomes (ECO) Center in California (Hebbeler, 2002) to design a child outcomes framework and benchmarks that can be used nationally to enable legislators, funders and consumers to determine the costs and benefits of services for our most vulnerable children.

While early intervention has a long history of promoting single-subject evaluation of research of young children with disabilities and has conducted some national longitudinal studies (e.g., NIELS study, National Collaborative Study), little attention has been focused on measurement and design issues for conducting impact and outcomes evaluations in the field on a national basis. Such uniform outcomes frameworks pose special problems for researchers, including the use of uniform measures that are sensitive and adequate for the task; non-traditional research design issues; and the development of measurable and functional outcome categories and benchmarks specific to disabilities.

CHAPTER 2

WHAT ARE CENCLEAR CHILD SERVICES EARLY INTERVENTION PROGRAMS?

Cen-Clear Child Services, Inc. (CCS) was established in 1980 as a private, non-profit corporation providing the Head Start Program in Centre and Clearfield Counties. Today, the agency is comprised of three divisions: the Early Childhood Division, the Mental Health Division, and the Support Programs Division. CCS provides quality services to children and families, builds community health initiatives, encourages parent and volunteer action, establishes collaborative partnerships with agencies such as MH/MR and Early Intervention to provide better services and to best identify family/child needs, and engages in ongoing evaluation of various program outcomes for the early childhood programs. CCS employs over 500 persons and operates more than 20 sites in Centre, Clearfield, Jefferson, Blair and Elk Counties in North Central Pennsylvania. The agency serves over 2,400 children and 1,700 families each year.

Centre and Clearfield Counties are primarily rural, encompassing 1,147 and 1,108 square miles respectively. The mountainous terrain, long valleys, smaller “hollows”, and marginal road conditions have resulted in a population representative of the Appalachian sub-culture. The rural nature of the area and its inherent obstacles not only define, but also serve to exacerbate some of the problems for these counties. The children and families participating in the CCS Head Start and Early Head Start programs live in primarily rural areas of the counties of Centre and Clearfield. The majority of families and children are Caucasian; less than 2% of the general population are considered to be minorities. The CCS service area has been identified as having a significant number of risk factors, summarized in the following table. The **bold** indicates those factors which are worse than the Pennsylvania rate.

Risk Factors for Clearfield and Centre County Families			
Indicator	Clearfield County	Centre County	State Comparison
Lack of Early Prenatal Care	10.7%	16.2%	14.0%
Population under age 18 in Poverty	19.0%	11.0%	15.0%
Population under age 5 in Poverty	21.2%	13.1%	16.2%
Unemployment Rate (January 2003)	5.9%	3.6%	4.9%
Per Capita Income (2000)	\$21,262	\$25,250	\$29,508
Average Weekly Wage	\$467.85	\$557.06	\$650.17

Table information taken from various sources (U.S. Census, PA Department of Labor and Industry, Center for Rural PA) and compiled by the CCS Grants Department.

Census data reveal that almost 40% of Clearfield County households and 33% of Centre County households are low-income. And unfortunately, this means a greater number of children are living below or only slightly above the poverty line. Indeed, almost 12% of Centre County children and over 19% of Clearfield County children live in poverty (*The State of the Child in Pennsylvania* 2002). More than 21% of the population under age 5 in Clearfield County and over 13% of the Centre County under-5 population are in poverty. This is corroborated by the percentage of public school students eligible for free and reduced school lunches: almost 20% in Centre County and 42% in Clearfield County (Center for Rural Pennsylvania). There are 613 children who are below poverty in the bi-county area. In addition, there are 227 children age 3-5 in Clearfield County who have a disability and 216 in Centre County. Current Pennsylvania Department of Health data (2001) indicates that more than 11% of pregnancies in Clearfield County were reported by teenage mothers. In Centre County, 6.7% of reported pregnancies involve teens. At the time of this writing, specific information was not available for Jefferson County, but CCS staff describe this county as experiencing very similar economic, mental health and child/family needs.

The mission statement describes the CCS approach to service delivery: *"We are an organization dedicated to leading our community with superior quality and innovative services to children and families by providing physical, social, emotional, educational, and leadership development."* The CCS operating philosophy is *"Reaching Children Through Families."*

The agency's first priority is the provision of direct services to children and families. To accomplish this, CCS staff utilize a strong collaborative approach that involves several professionals from other agencies. These include Shirley Smith, Director of CCS Early Head Start; Tracey Campanini, CCS Child Development Coordinator; Amy Wible, CCS Head Start Child Care Partnership Coordinator; Jill Springer, CCS Director of Special Projects; Carol Niznick, Preschool Supervisor of Riverview IU #6; Sue Willis, Assistant Special Educator and Preschool Director for Central Intermediate Unit IU # 10; Carol Waltz, Administrator for Centre County Mental Health/Mental Retardation Base Service Unit, and Collette Dushac, Administrator for Jefferson-Clearfield County Mental Health /Mental Retardation Base Service Unit. Data for this study were primarily taken from programs under the direction of Shirl Smith, Sue Willis, Amy Wible and Tracey Campanini. The majority of Early Childhood services are provided through six program/options: Head Start, Head Start Child Care Partnership, Head Start-School Collaboration Project, Full-Day/Full-Year Head Start, Early Head Start, Early Head Start Child Welfare Services Initiative, Early Head Start Enhanced Home Visiting, Family Centers, and Step-by-Step (Early Intervention).

Volunteer Programs and Collaboration

The second element of the CCS approach is building community parent and volunteer involvement. Volunteers are an important facet of all CCS programs; in

each program year over 30,000 hours are contributed by *parent* volunteers alone.

The next element of CCS program model is collaboration among agencies to best meet the needs of children and families. Collaboration involves communication through Local Interagency Coordinating Council (LICC) meetings, the team approach used in transitions (i.e., from the birth-to-three program to the preschool program, and from the preschool program to Kindergarten) and of course the IFSP and/or IEP meetings with families that include continued service involvement of Head Start and when appropriate Early Head Start staff.

Another example of such collaboration occurred when CCS, in conjunction with the Clearfield County Area Agency on Aging, Inc., received a two-year grant for the expansion of the Family Training Program (described under "Collaboration with Mental Health and Child Welfare Agencies") into other Head Start homes. Funding was used to train senior volunteers to deliver the home-based services. Although grant funding has ended, senior volunteers remain a tremendous asset to CCS Head Start centers. This program was honored in 1991 and received an appreciation award from the Retired and Senior Volunteer Program for the training and placement of its volunteers.

Education Collaboration

CCS has in place program assessment protocols that utilize common assessment instruments to follow children and determine long-term outcomes. The agency uses the R-client data software program to collect and analyze outcomes. This is done through naturalistic and authentic assessment model from the Early Childhood Partnership.

Early Childhood Division services are based on the Head Start model. Over 500 Head Start children and their families are served in a year round program that principally uses a "Combination Model." This model combines two weekly half-day classroom or socialization experiences for children with at least 20 annual adult-centered home visits each year. However, to better serve the needs of its diverse service area, CCS has adopted an eclectic approach to the provision of Head Start services. To better address the needs of low-income working families, CCS established the **Head Start and Child Care Partnership (HSCCP)** in 1997. Through this partnership, services meeting Head Start performance standards are offered through participating child care providers. This has led to valuable collaborations and shared training opportunities for Head Start and Child Care staff.

In 2000, CCS built on the success of the HSCCP to establish a **Full Day/Full Year Head Start** option that provides 5 days each week of classroom activities with day care services offered before and/or after the Head Start classroom. With this option, at least two home visits are provided each year. In 2002, CCS was awarded funding from the Pennsylvania Head Start State Collaboration Office to create the "Bridge Subsidy Program" that assists working parents in Full-Day/Full-Year Head Start to pay for child care until they qualify for the state child care subsidy system.

In 2004, CCS was awarded state funding through the Pennsylvania Department of Education to establish the Head Start-School Collaboration Project. Through this initiative, 87 additional 4-year-olds are provided Head Start services in closer collaboration with local school districts. Classrooms are housed on the school campus, and Head Start teachers are afforded the opportunity to participate in in-service trainings and faculty meetings with “regular” school teachers. Curricula used in Head Start are better coordinated with the Kindergarten curriculum in the host school district, and CCS staff work with Kindergarten teachers to individualize the transition from Head Start to public school.

Regardless of the option, CCS Head Start offers the following:

- Monthly opportunities to participate in adult-focused activities such as Policy Council, Parent Center Committees, trips, trainings
- Monthly opportunities to participate in family-focused activities which are determined by parents
- A focus on the component areas of child development, health, nutrition, and addressing the social service challenges of families
- Opportunities for parent involvement

In May 1998 CCS began the **Early Head Start** Program to serve 120 families beginning during pregnancy to age 3. Special expansion funding under the Early Head Start Child Welfare Services initiative and the Enhanced Home Visiting Pilot Project now allows services to be provided to 176 infants, toddlers, or pregnant women. Program services are provided using a home-based model and address all the developmental areas for infants and toddlers.

The tremendous growth of CCS Head Start/Early Head Start is due in large part to the emphasis the agency places on collaborative partnerships. One of the longest agency consultative/contractual relationships is with the Central Intermediate Unit #10. Geographically it serves most of the Child and Family Centers and provides itinerant teachers, speech, vision, hearing and psychological services. This collaboration provides four integrated four-day classes and one four-day Autistic/Communication Related Disorder Class. Collaborative efforts also exist with the other two Intermediate Units (IU # 6 and IU# 28) that serve the bi-county area. The Riverview Intermediate Unit #6 provides therapeutic services for individual children that are enrolled in Head Start. The also offer their own intensified special education services at off-site locations. Arin Intermediate Unit #28 provides speech therapists to the one CCS Head Start center in their service area.

CCS has been effectively transitioning program children into the public schools for many years. In 1984, CCS began meeting with personnel from twelve school districts to formalize the transition process. In 1989, CCS was selected by the National Association for the Education of Young Children to present these procedures at the NAEYC national conference. In October of 1991, CCS was selected to administer the **Pennsylvania Transition Project**, one of 32 in the United States funded by the National Head Start Bureau, to provide

Head Start-like services to kindergarten, first, second, and third grade children in randomly selected public schools in the two-county area. The research compared children in treatment schools who received the services to children in control schools who did not. It was conducted by a team of professionals from the Pennsylvania State University led by Dr. Joseph French in coordination with the National Research Team from the University of Alabama.

Integrated Collaboration with Mental Health and Child Welfare Agencies

The CCS philosophy of “Reaching Children Through Families” requires close collaboration with both providers of mental health services and local child welfare agencies, especially given the high involvement of CCS Head Start and Early Head Start families in these services systems.

Local Offices of Children and Youth Services (CYS, the local child welfare agencies) serve a large number of children in both counties. In 2003, Children and Youth Service agencies served 1,126 children in Clearfield County and 3,013 children in Centre County. In Clearfield County, 51% of Early Head Start families and 9% of Head Start families were involved with child welfare. In Centre County 27% of Early Head Start and 12% of Head Start families were involved. Younger children seem to be more at risk. All Early Head Start Home Visitors report families involved with the local County Child Welfare Agency, in some cases as high as 67% of the families on a caseload. In fact, a large number of these families were referred to EHS from Child Welfare.

These numbers have led to innovative collaborations between CCS Head Start and child welfare. For several years, CCS staff have provided monitoring information to the Clearfield County Office of Children and Youth. The previously discussed Early Head Start Child Welfare Services initiative has allowed a CCS staff person to be assigned on a part-time basis to work from the local CYC offices.

In the current fiscal year, 33% of Early Head Start families and 29% of Head Start families in Clearfield County had at least one family member who is receiving mental health services. In Centre County, 4% of EHS families and 8% of Head Start families are involved with mental health services. Again, mental health involvement is more prevalent among EHS families. Early Head Start home visitors report that as many as 50% of the families they work with are involved with the Mental Health/Mental Retardation systems in Clearfield and Centre Counties.

In a number of instances, collaboration with mental health service providers has led to CCS establishing programs and services to address unmet needs for children and their families. In 1984 the Clearfield-Jefferson Mental Health/Mental Retardation Program offered CCS ongoing funding to provide **Early Intervention** services for younger disabled children (birth to 3 years old) in Clearfield County. The CCS "Step-by-Step" Early Intervention Program was expanded in 1994 through a competitive process to include Jefferson County. In 2001, the program was further awarded a contract to provide Early Intervention services in Centre County as well. Another example of service collaboration was

when Clearfield-Jefferson MH/MR approached CCS with the opportunity to create an additional program specifically for families with a mentally retarded member. This became the **Family Training Program**, to provide direct, home-based instruction in the areas of homemaking skills, parenting and child care, health and safety, nutrition education and basic cooking, and methods for obtaining transportation and recreation.

In 1995, CCS was provided with an award grant from Clearfield/Jefferson Mental Health and Mental Retardation to offer home-based services to families with the purpose of keeping children out of mental health institutions. The **Family Based Mental Health Program** has five teams of professionals who are available to families on a 24-hour basis, seven days per week. FBMH services are provided over a 32-week period.

Through EPSDT funding for the **CHAMPS** (Children's Health and Mental Health Preservation Service) Program started in 1996. Intensive intervention is offered to children of elementary school age in their homes, schools and other sites through this program. Each child requires a diagnosis of some type of mental health problem that requires additional support for the child to be functional in the community. It is felt these programs such as CHAMPS and Family Based Mental Health save the community large amounts of tax dollars by avoiding institutionalization.

In the summer of 1999, CCS was granted a special license to operate **Family Services**, a children's outpatient mental health clinic. With this program, CCS obtained the services of a pediatric psychiatrist.

Community Collaboration

In the Support Programs Division, a comprehensive range of services provided by CCS includes the **Clearfield County Family Centers** and **Family Service System Reform (FSSR)**, both funded by the Pennsylvania Department of Public Welfare/Office of Children and Families. CCS originally provided Family Center programs for Clearfield County children age birth to school age from sites in the West Branch Area and Harmony Area School Districts. This program has now been expanded countywide. This program serves approximately 200 children per year in collaboration with other programs such as Early Head Start, Head Start, Even Start and Early Intervention.

In 1998, CCS received approval to establish a local program of the **National Youth Project Using Minibikes (NYPUM)**. NYPUM is a delinquency prevention program that utilizes a behavior modification approach. At risk youth age 10-15 work with their parents and a youth counselor to develop a behavior contract. Progress toward achieving contract goals earns the youth minibike riding privileges. The program began operations on the 300-acre farm owned by CCS. American Honda Motor Company, Inc. donates all minibikes.

In 1998 and 1999, CCS was awarded two grants from the Pennsylvania Commission on Crime and Delinquency. The first grant established the **Collaborative Approach to Reducing Delinquency (CARD)**. This initiative represented a collaborative effort of five human service agencies: Children's Aid

Society; Clearfield County Department of Probation Services - Juvenile Division; Clearfield County Office of Children, Youth and Families; Gateway Institute and Clinic; and CCS. CARD is based on a team approach to screening, intervention planning, and service delivery. Comprehensive services included Big Brothers, Big Sisters, the Aftercare Program, and NYPUM. CCS was awarded a second grant that added outdoor adventure learning opportunities to the NYPUM program and expanded services into Jefferson County. The combined program was known as **Project PEAK (Positive Experiences through Adventure for Kids)**.

In February 1999, CCS began working with a consortium of seven Clearfield County School Districts to develop **Project SUCCESS (Schools United in Clearfield County to Empower Students to Succeed)**. Funded through the U.S. Department of Education 21st Century Community Learning Centers Program, the project created after-school centers in each of the school districts offering students and community residents opportunities for academic enrichment and support; career awareness; learning opportunities in computer technology; leadership development; and recreation. CCS has provided staffing and management for the learning centers.

**HOW DOES SPECS CONDUCT THE RESEARCH
FOR THE PEIOS PILOT?**

Scaling Progress in Early Childhood Settings (SPECS) is an authentic assessment and program evaluation research approach which has an evidence-base through its field-validation in numerous studies, particularly its use over a 7-year time period to evaluate the impact and outcomes of the Heinz Pennsylvania Early Childhood Initiatives, encompassing nearly 4000 children and families in diverse early care and education programs in Allegheny County, Erie, York, Lancaster, and Central PA (Bagnato, 2002; Bagnato, et al, 2002; Bagnato et al, 2004). A version of the SPECS model was field-validated in the Pennsylvania Preschool Integration Initiative (PAPII) from 1989-1993 with nearly 2000 children.

SPECS' evaluation approach—authentic assessment and program evaluation research—helps community-based programs demonstrate “how good they are at what they do.” It has been validated in the field through evidence-based research conducted through “natural experiments” in real-life community settings rather than laboratory settings.

SPECS' strategies are unique and effective because they:

1. Use a collaborative research model with community partners for the formative and summative research phases.
2. Ask whether the program works in a natural setting rather than a laboratory setting.
3. Infuse computer-based evaluation methods into typical, everyday work routines of the program's teachers and staff;
4. Assess *all* children, families, and programs in the study without exclusions.
5. Apply the developmentally appropriate quality guidelines of the National Association for the Education of Young Children, the Division for Early Childhood, Council for Exceptional Children, and the Head Start Performance Standards.
6. Rely on observations of natural child behavior and learning competencies in everyday play and work routines, home, preschool, and community
7. Do not use traditional “tabletop testing” and remove the child, teachers, or parents from their natural situation or “developmental ecology.”
8. Rely on ongoing observational assessments from consistent caregivers-teachers in the child's life.
9. Sample skills within the preschool's developmental curriculum that are teachable and predictive of future kindergarten success and that match the state's pre-K standards.
10. Offer ongoing feedback to teachers, parents, and the community about children's learning and needed program refinements.

11. Operationally implement a longitudinal repeated-measures, regression design using HLM and path analysis strategies.

Since 1998, CenClear Child Services has been collaborating with the SPECS team to conduct longitudinal research on early childhood intervention outcomes. The measures below were used to archive already existing data on children collected three times each year: September, January, and May.

SPECS combines a formative and summative evaluation and measurement model as outlined previously as the overarching structure to document the quality, impact, and outcomes of PEIOS. The measures used in the PEIOS *pilot* study consist of the following:

MEASURE	OUTCOME CATEGORY	DOMAINS	AGE RANGE
Developmental Observation Checklist System (DOCS)	Child	Cognitive Language Social Motor Overall	0-6
Preschool and Kindergarten Behavior Scale (PKBS)	Child	Social Skills; Problem Behaviors	3-5
Basic School Skills Inventory (BSSI-3)	Child	Spoken Language; Reading; Writing, Math; Classroom Behavior; Daily Living Skills	4-9
Parent Behavior Checklist (PBC)	Family/Parent	Nurturing; Expectations	1-5
Parenting Stress Index (PSI)	Family/Parent	Self and Family Stress Levels	1-5
System to Plan Early Childhood Services (SPECS)	Program	Program Intensity	0-K Transition

The DOCS consists of ***The Developmental Observation Checklist System (DOCS; Hresko, etal, 1994)*** is the primary child development observation assessment instrument used in the SPECS battery. DOCS is a unique norm-based measure whose 475 developmental competencies are naturally-occurring child skills (e.g., recognizes the McDonald's sign; finds the correct toy at the bottom of the toy box; can read simple signs) which are teachable curricular competencies and predictive of school success and sensitive to the effects of intervention. DOCS samples child skills in the following domains: Cognitive, Language, Social, Motor, and Overall. DOCS was nationally (33 states) normed on nearly 1,100 children from birth to 6 years of age. Concurrent, criterion, and predictive validity data are strong (.78-.94) as well as interobserver (parent-teacher= .81) and rating-rerating reliability (.95). Our first 16 months of SPECS/ECI data on 910 children reconfirms and provides additional support for the valid use of DOCS with a low SES and high-risk population. For the current study, statistical analyses were conducted on the graduated scoring of the *DOCS* (e.g., 0= No-not achieved; 1= Sometimes-getting there or emerging skill; and 2= Yes-fully achieved). Descriptive standard score data reflect the national norms based only on the total "Yes" scores in each domain.

The manual for the *DOCS* shows concurrent validity data and interrater reliability data. Interrater reliability data shows strong overall intercorrelations between parents and teacher/caregivers ($r = .94$). Concurrent validity studies with various traditional measures of language, developmental, and cognitive skills show moderate to high interrelationships ($r_s = .35$ to $.83$). Since the *DOCS* scoring scheme was modified for the purpose of the ECI statistical analysis, the SPECS team conducted generalizability analyses on the *DOCS* to determine the reliability of the composite scores under the modified scoring scheme.

The *DOCS* is a comprehensive developmental assessment system composed of 475 items covering the birth to 6 year age range, and normed on nearly 1100 children in 30 states. Developmental competencies on the *DOCS* are organized into five major functional domains: cognitive, language, social, and motor, and an overall developmental level. Raw scores and normative (percentiles, and standard scores: $M = 100$; $SD = 15$) and age scores are derived in the five domains. The format of the measure recognizes the interactive or transactional nature of development and the interrelatedness of child functioning among the domains (i.e., language and social skills), and allows scoring of skills in more than one domain.

The *DOCS* uses an observational strategy of observing and recording (Yes, No) the natural occurrence of "authentic" developmental skills reflective of each domain (i.e., recognizes the McDonald's sign; finds the right toy hidden in the toy box; opens containers to get something inside; identifies the letter B; follows rules in group games). All *DOCS* items are important and teachable functional skills that align with content in the developmental curricula of most programs.

SPECS Evaluation Team members have produced (with publisher permission) a computerized version of the *DOCS* with simplified observational and recording forms that include an additional emerging skill ("getting there") scoring category for curricular planning and feedback purposes. Integral to the computerized *DOCS* format is a letter written in the "child's voice" ("Hi Mrs. Jones; I'm Jimmy; I'm 3 years old; next time I need help doing these things") that summarizes for the teacher and parent the achievements and next step skills for the child. The SPECS Team generates such individualized letters for each child for the teacher and parent each quarter (e.g., September, January, May).

The Preschool and Kindergarten Behavior Scales (PKBS; Merrell, 1994) is an observation rating scale that emphasizes the focused assessment of social skills and problem behaviors in young children from 2.5 to 6 years (see Exhibit 15). The PKBS stresses social and self-control behaviors that are sensitive to the effects of intervention and predictive of early school success (e.g., shares toys and other belongings; waits, takes turns; plays with several different children; attempts new tasks before looking for help). PKBS is a norm-based scale whose behaviors are curricular or instructional in content. It was nationally normed on 2,855 children and is appropriate for a variety of evaluative and clinical purposes. Validity and reliability data on the PKBS are the strongest of any currently available preschool measure of social skills and behavior (.81-.98).

The Basic School Skills Inventory (BSSI-R; Hammill, 1998) is a norm-based curricular measure of early learning and basic competencies that are predictive of school success (see Exhibits 15-19). The BSSI-R is completed by teachers based on their observation, knowledge of children, and reviews of the childrens' work performance and portfolios. The scale samples preacademic and academic skills in such areas as reading, math, spoken language, writing, classroom behavior, daily living skills, and social skills. The BSSI-R was normed nationally on over 1,000 children; its shows reliability and validity data that is adequate for evaluative purposes (.64-.93). The BSSI-3 (Basic School Skills Inventory, 3rd Edition) is a standardized, norm-referenced measure used with preschoolers (48 months and older) through second grade (eight years of age), to identify various skills in young children. Items focus on six domains: 1) Spoken Language, 2) Reading, 3) Writing, 4) Mathematics, 5) Classroom Behavior and 6) Daily Living Skills. Items are completed independently by the child's teachers, in relation to all students of the same age known by the teacher. This measure is completed using the following rating options: "0" does not perform, "1" beginning to perform, "2" performs most of the time, "3" performance indicates mastery. For example a rating of "2" should be given if the child demonstrates the specific skill about 50% of the time; "3" should be given if the child demonstrates the skill about 80% of the time. (Please note these are rough estimates; a rating of "3" must mean the child is doing extremely well in that area).

The Parent Behavior Checklist –Short Form (PBC; Fox, 1995) is a parent-completed report scale designed to determine parenting skills and

knowledge and beliefs (20 items) in three core areas: Expectations (child development); Nurturing (child care, interactions, teaching); and Discipline (behavior management) (see Exhibits 20-23). The PBC was nationally normed on 3,000 parents and includes competencies that are amenable to parent education and support. Validity and reliability data are moderately strong and sufficient for evaluative purposes.

The Parenting Stress Index- Short Form (PSI; Abidin, 1995) is a parent self-report measure of perceived parent, child, and family stress (see Exhibit 24). The PSI has been validated in numerous research and clinical studies with disadvantaged and disabled populations. Stress indexes are generated in the areas of Total, Child, Parent, and Life Stress (e.g., my child is so active that I am exhausted; I feel trapped by my responsibilities as a parent). Family Support Scale (FSS) Dunst & Trivette, 1992) offers a survey of parent perceptions regarding the type and extent of personal and social support that is provided to parents of children with special needs.

The System to Plan Early Childhood Services (SPECS) Program Specs (Bagnato, Neisworth, Gordan & McCloskey, 1990) uses a program specifications instrument to determine the intensity of the child's instructional and therapeutic need in 10 intervention areas. This tool was used to identify "intensity" ratings for child programs as another source of more discrete data to understand outcomes of programs. It is an alternative design option for collection of data. This system was used with 155 children from the CCS programs to examine more specifically the child outcomes for children who received additional services from early intervention. Current data on the reliability and validity of the tool is ongoing. In addition, the tool use was a means to examine how outcomes might be explored through use of the early intervention system by existing data collection. It is hoped that this procedure with modifications to the process might be a helpful addition to outcome measurement. The methodology through which data was gathered is described below in chart review procedures.

Chart Review Methodology to Document Program Services and Intensity

The following is a summary of chart review procedures related to the PEIOS project and collection of data from child Individual Education Plan (IEP) and Individual Family Support Plan (IFSP) information in child charts from the CenClear Early Intervention, Early Head Start and Head Start programs. Each procedure is related to both the accurate collection of information for the PEIOS pilot project as well as insuring appropriate use and respect of the CenClear program chart system. The following procedures were employed:

1. A list of children was identified through the R-client software management system that have three or more time points of data on DOCS and PKBS (either outcome is sufficient) with involvement in the CenClear SPECS study. This was submitted to Jill Springer, special projects coordinator.

The list was further modified to include not only adequate time points but also only those children with IEP and/or IFSP information.

2. This list was provided to the PEIOS data collection team. This team consisted of experienced staff and one graduate student. The ECP staff have 25 + years each in the fields of early intervention for birth to three and for 3-5 years. Training for the graduate student was completed by prior practice with chart review to data collection. Agreement regarding intensity ratings was completed by prior training and clarification of definitions for collection items.
3. The children's charts from this list were pulled by staff at CenClear and provided to the PEIOS team for review on site, after signed parent consents were ensured and approval letters were received from agency partners.
4. PEIOS team members who reviewed the charts followed CenClear procedures for signing out the chart, first finding the consent form and copying the consent form for EI records. With children having more than one consent (may be in the program for longer than a year and which translates to enrollment in the SPECS evaluation study.) All consents for children having IEPs were copied for record keeping by the IU # 10. This is to insure all families of children have agreed to consent throughout the time of Early Intervention involvement, when an IEP or IFSP was developed and the child was enrolled in the SPECS evaluation study from Cen-Clear.
5. Specific steps for chart review are as follows:
 - a. Sign the chart to indicate reviewer name and program (PEIOS review)
 - b. Identify and pull all consents
 - c. Review chart for identification of related IEP or IFSP information, mark with post-it to be able to return for review.
 - d. Review chart for related information (e.g test results from Battelle, behavior plan if part of IEP, transition plan for K, etc.) and mark with post it.
 - e. From list of time points and knowledge of dates for IEPs, a representative IEP or IFSP is chosen to use to complete program intensity ratings and the completion of preschool or infant developmental specs form and transition if appropriate. Representativeness is determined by: time point (needs to be past the second or third time point), amount of information available in chart (e.g. should the last IEP after 10 time points not have sufficient information to understand service intensity may need to chose an earlier IEP,) and reviewer's clinical opinion as to appropriateness of the information for completion of intensity and developmental forms, etc.)
 - f. PEIOS team kept a separate comment section for additional comments and questions related to use of IEP and IFSP

information (this will be used later for analysis and recommendations in the study.)

6. After review all charts were returned to medical records department. All consents were copied and sent to representative program directors, Sue Willis for preschool and Shirl Smith, director of Early Head Start, for infants 0-3).
7. The completion of a smaller study analysis on 154 children with IEPs and IFSPs required the use of a third set of measures. Tool used for this was the System to Plan Early Childhood Services (SPECS) Program Specs. This involved the completion of program, developmental and transition intensity ratings requires assignment of a numerical rating to each question in categories of intensity. For example, for the category of speech/language therapy, the question of “what is the best setting for speech/language therapy” is answered by choosing one category rating. The category ratings are not needed = 0; within classroom activities = 1; separate small groups = 2; and/or individual sessions = 3. The numerical rating for this question is then added to other questions for the category and summed to create one “intensity” rating sum or IRS. For children 0-3 two intensity ratings of infant and program SPECS. For children 3-5 two or three intensity ratings using a developmental, program and if the child was near transition to K a transition rating SPECS forms. See appendix for SPECS intensity ratings forms.

Research Objectives, Questions, Design and Statistical Analysis

SPECS has developed a measurement, outcomes, and evaluation framework for use in its evaluation initiatives and with CenClear. It forms the basis of this PEIOS Pilot study. Using functional, observational measures, data is collected by informed teachers and other caregivers in natural everyday settings (i.e., home, classroom) on the performance of children and families. The following missions and objectives formed the basis of the PEIOS Pilot at CenClear:

1. To document child developmental and behavioral progress for children in Part C and Part B early intervention programs and services
2. To document parent/family progress and
3. To document program intensity
4. To document accomplishment of early school success indicators associated with the PA New Early Learning Standards
5. To determine the predictive relationship among programmatic variables (e.g., length of intervention; intensity of services; and child progress (e.g., actual-expected growth curves; efficiency indices; raw and standard score changes) and family progress and success
6. To classify PA EI outcomes according to the OSEP/ECO benchmarks and criteria

The primary program evaluation research questions in the PEIOS Pilot are:

- Is participation in CenClear Services early intervention programs associated with and predictive of positive and functional child and family progress?

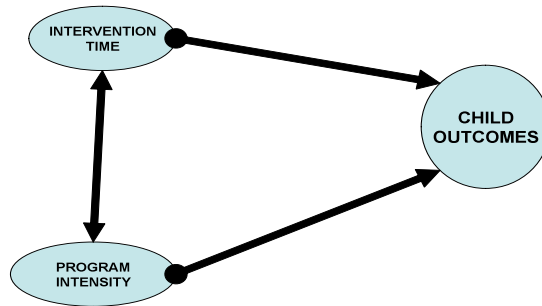
- Is the impact and success of CenClear Services Early Intervention Programs able to be demonstrated through one or more of the following major outcome or benchmark categories established by ECO and OSEP:
 1. Outpacing maturational expectancies
 2. Maintaining previous rate (preventing regression)
 3. Increasing skill acquisition
 4. Preventing further delays

The SPECS team implemented a one-group, pre/post-test regression research design that involves a longitudinal, repeated measures model. Our team employed various descriptive and summative statistical analytic procedures that have been field-validated in numerous early childhood and early intervention research studies in which a randomized control group was not feasible or not desired. This is typical in much community-based research focusing on “natural experiments” (Yoshikawa et al., 2004); PEIOS is one such effort.

For the summative evaluation research, SPECS used various statistical techniques to document child/family progress and program success. The approach views each child as its own “control” so that previous performance is the individual referent for future performance and progress. Data are aggregated across large numbers of children, families, and programs to increase power and to increase the likelihood of significant regression effects—predictive power that participation in EI is associated with positive outcomes. These statistical techniques include but are not limited to:

- Hierarchical Linear Modelling (Bryk & Raudenbush, 2002)
- The Expected-Actual Progress Solution/Constructed Comparison Group (Bagnato, Suen, Brickley, Smith-Jones, & Dettore, 2002; Sangha, Bagnato, Suen, 2005; McCall & Green, 1999)
- Dosage analysis
- The Intervention Efficiency Index (IEI; Bagnato et al., 1981)

The design for PEIOS posits a predictive relationship among programmatic and child/family outcome variables. In the design, we hypothesize that time-in-intervention and program intensity will be predictive of positive and functional child outcomes. This design schematic follows:



Expected child outcomes will be based on at least three forms of outcomes:

- A. Descriptive progress data (e.g., standard scores; raw scores, intervention efficiency indexes) on DOCS; PKBS; BSSI-3; PBC; PSI and ProgramSpecs measures;
- B. Statistical analyses of predictive relationships among program intensities, including family dimensions and childrens' developmental and behavioral progress;
- C. Achievement of dependent measure content on the BSSI-3 associated with the New Pennsylvania Early Learning Standards for 4 and 5 year olds.
- D. Achievement of major benchmarks on the proposed OSEP-funded SRI Early Childhood Outcomes Center (ECO)

CHAPTER 4

WHO ARE THE CENCLEAR CHILDREN IN EARLY INTERVENTION?

The dependent measures for the PEIOS Pilot study were obtained on a sample of 438 children from now on referred to as the Pennsylvania Early Intervention Outcome Study (PEIOS) sample. For children with IFSPs, the following numbers of assessments were conducted overtime for each dependent measure: DOCS (183); BSSI (46); PBC (306); and PKBS (899). For children with IEPs, the numbers of repeated assessments were: DOCS (309); BSSI (138); PBC (383); and PKBS (975). Overall, this pilot research is very intensive and representative of these children reflecting longitudinal data from 3239 repeated assessments of children's everyday behavior and progress in natural settings. This analysis omits all children who had only one evaluation time point. At the first DOCS evaluation date the median age of the children was 37 months and the median age at the last evaluation date was 57 months (range= 3 months to 66 months). The data were collected between August 1999 and August 2004. On average the children were in the program for 18.6 months and a standard deviation of 12.0 months with a range of program participation of between 5 and 51 months at the time of this analysis. In terms of participation in the program the children were distributed as follow:

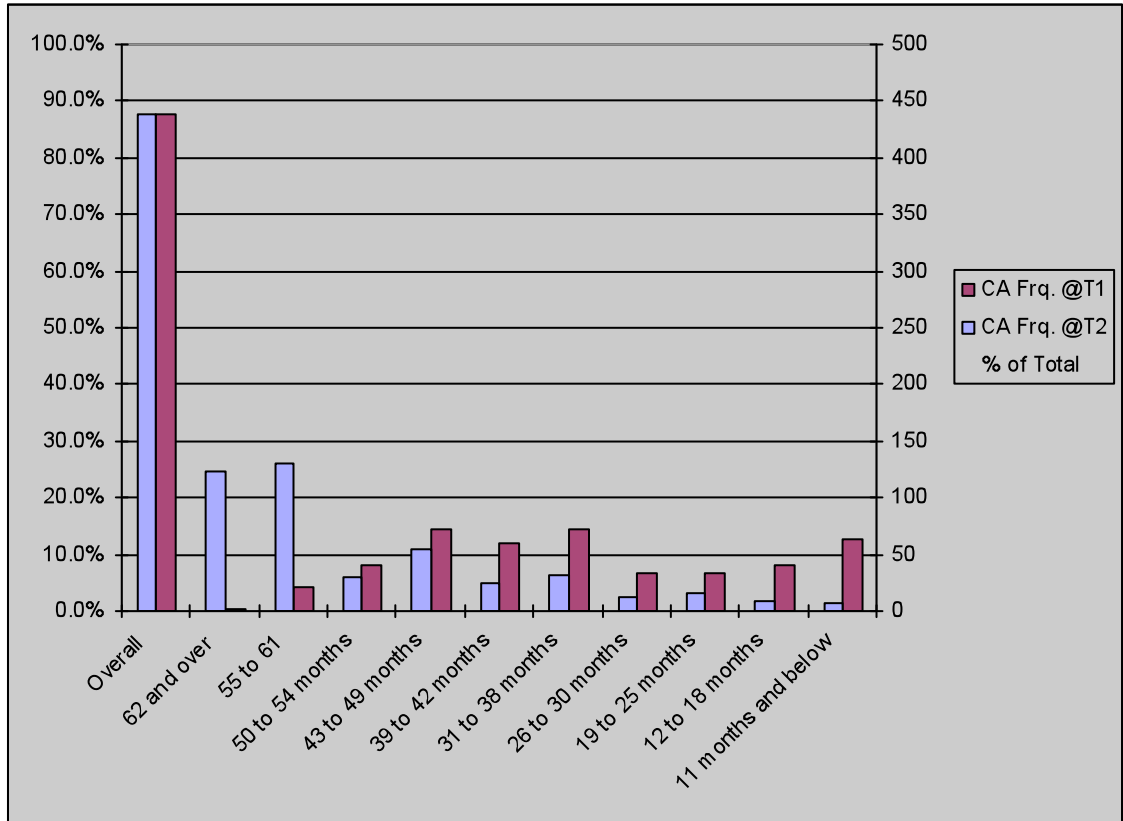
1. 45.2% (n=198) of the children were in the program for 13 months or less (Averaged group means=9.2; min=5.3; max=13.8;and Std=4.5 months)
2. 39.4% (n=173) of the children ranged between 19 to 28 months (Averaged group means=22.7; min=19.1; max=28.5; and Std=6.2 months)
3. 15.3% (n=67) of the children were in the program 34 month or more (Averaged group means=41.7; min=34.2; max=51; and Std=4.9 months)

In terms of age at the first and last evaluation the distribution is as follow. At the first evaluation (i.e., T1), the mean chronological age was 32.7 months (std=16.0; median=37; mode=38). About 42% (n=184) of the children were 32 months or younger at T1. At time 2 (or last evaluation), 83.6% (n=366) of the children were 37 months or older. Exhibit 1 compares the distribution of children by their chronological age in months between the two time points being considered.

In order to gain more insight on the spread of the sample by their age, the sample was divided in four subgroups (Exhibit 2). About 70% (n=302) of the PEIOS sample was 48 months or older. This group of children also had a higher mean time in the program ranging between a mean stay of 18.4 (std=12.31) to

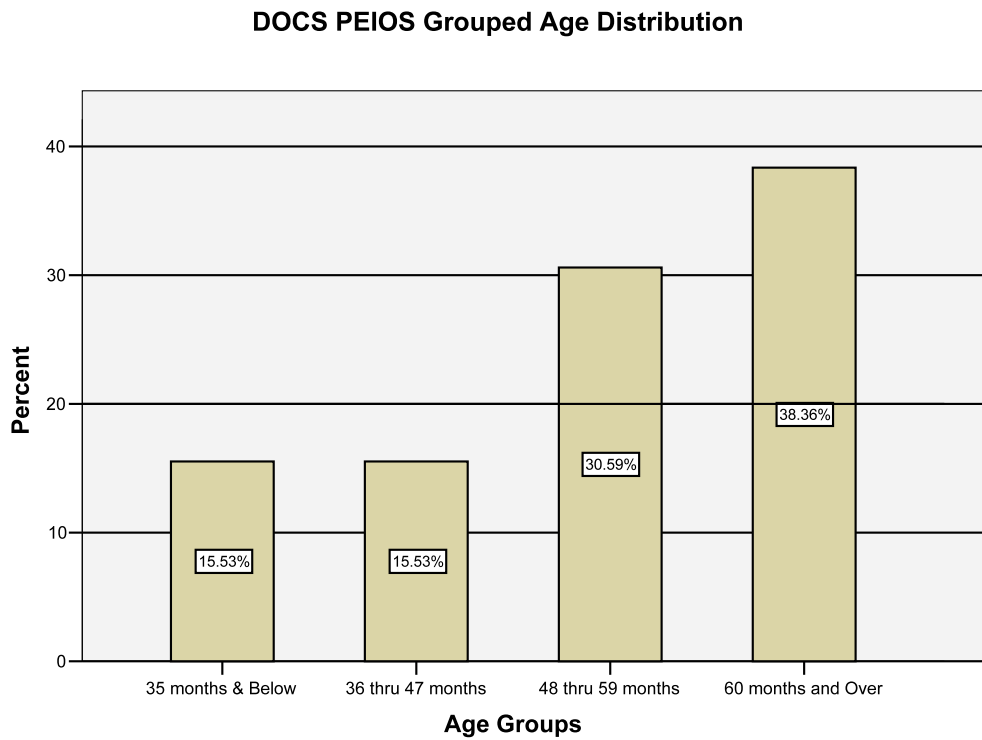
21.4 (std=12.5) months compared to the mean stay of 12.1 (std=7.5) to 18.2 (std=12.3) months for the children 47 month and younger.

Exhibit 1. Frequency Distribution of DOCS PEIOS Sample By Age Groups at First (T1) and Last Evaluation.



Measure of central tendency for the developmental age equivalent (DAE) at time 1 (i.e., 1st DOCS evaluation) and at last evaluation (i.e., last DOCS evaluation date) was also investigated. The mean DAE at the first DOCS evaluation was 28.8 months (std=14.2; median=29; mode=9) contrasted with a DAE mean of 46.4 months by the last evaluation (std=14.5; median=50; mode=61).

Exhibit 2. DOCS-PEIOS Grouped Age Distribution



Beside age, other demographic information (e.g., race, gender, income etc.) on the sample was not collected and hence not considered at this time.

WHAT IS THE DEVELOPMENTAL PROGRESS OF CENCLEAR CHILDREN?

It is clear that CenClear children in both 0-3 and 3-5 early intervention services have made observable and functional progress in development. Progress has been observed in each of the outcome categories identified by the Office of Special Education Programs (OSEP) through the Early Childhood Outcomes (ECO) center. Some children have shown significant progress in acquiring new developmental competencies; some children have maintained their developmental rates, thus preventing regressions; some children have moved from a delayed classification to a non-delayed classification. A few children with more significant developmental disabilities showed some skill acquisition, while experiencing apparent slight declines in developmental rates.

The following sections blend descriptive, functional, and statistical analysis data to portray the developmental outcomes of CenClear children in early intervention.

Acquisition of Functional Curriculum-based Competencies

The curricular progress of children in both 0-3 and 3-5 programs was calculated using the raw score data from the *Developmental Observation Checklist System (DOCS)*. Figures 1-3 profile the specific skill attainment between entrance into CenClear EI and transition of children across the major developmental domains: cognitive, language, social, motor, and overall. For example, the overall frequency of skill attainment of children in acquiring observable and functional skills in overall development was statistically significant ($p > .001$) with a pre-intervention level of 299 and a post-intervention level of 403. Everyday problem-solving skills (cognitive) increased from 142 to 200.

Children entering early intervention at an early age and remaining longer (>2 years) showed the greatest increase in specific skill acquisition (125 to 433). Irrespective of early intervention “program” (IFSP vs. IEP), children showed the same magnitude of progress in acquiring functional competencies ($p > .001$; 48-263; 331-433).

Normative Developmental Progress

Figures 4 and 5 profile the normative developmental progress of CenClear EI children on the DOCS based on standard scores ($X=100$; $Sd=15$). Since standard scores are much less sensitive to change than raw scores and are based on a typical standardization sample only, it is rare to find statistically significant changes in developmental rate using such scores. The CenClear sample shows this phenomenon.

The profile in Figure 4 reveals that the majority of the EI children (75%; n=328) are children with mild developmental delays who show speech/language delays and challenging social behaviors and social delays. While progress is evident, overall, children maintained their expected developmental “rates” or longitudinal trajectories eventhough they gained specific functional competencies. Greater gains are observed in language and social developmental rates. For children with mild to moderate delays and disabilities (25%; n=110), the profile reveals a pattern of maintaining developmental rates with some apparent declining developmental rates despite gaining in specific functional competencies, particularly in language and social skills. The “apparent” declines are not statistically significant and are within the standard error of the DOCS (i.e., 6 points).

IS PARTICIPATION IN CENCLEAR EARLY INTERVENTION SERVICES ASSOCIATED WITH DEVELOPMENTAL PROGRESS?

Program evaluation outcomes research rarely has the opportunity to conduct randomized clinical trials (experimental-control group designs) to determine the presumed efficacy of intervention. Various researchers, however, have criticized the exclusive focus on randomized trials, especially with community-based initiatives and for particular populations and programs (i.e., disabilities, prevention, interagency partnerships) since the need to vary and individualize treatments across diverse settings and people and the need to eliminate exclusion for services and supports override the need for high internal validity (Yoshikawa et al., 2003; McCall, 2005). Thus, alternative designs and analytic strategies are necessary to balance rigor with practical needs. In this study, we combine several techniques to estimate the impact of CenClear services on child developmental outcomes. Overall, the functional and descriptive measures suggest an impact from program participation on promoting developmental gains while the statistical analyses only support maintenance of developmental course, thus, preventing regression.

A Functional & Descriptive Measure of Intervention Impact

A common strategy in early intervention outcome studies over the past 20 years has been the use of functional, non-statistical metrics which attempt to estimate the relationship between amount of developmental progress and time-in-intervention, both expressed in months. These indices have been termed “efficiency indexes and represented by the Intervention Efficiency Index (IEI; Bagnato & Neisworth, 1980) and the Proportional Change Index (PCI; Wolery, 1981). The ratio formulae for both are detailed below and were used to portray the progress of children while participating in CenClear EI services:

IEI= Developmental age (in months) at transition-developmental age at entrance/number of months in early intervention

PCI= IEI/Developmental rate (DQ) at entrance

The IEI describes extent of progress during the intervention period compared to a theoretical typical rate of 1 month of progress for each 1 month of program participation or 1.00. The PCI adjusts this estimate by “individualizing” for each child’s own pre-intervention rate or disability level.

Figure 6 profiles the estimated performance/progress of EI children during participation in CenClear services using both IEI and PCI indices. Both indices reveal that participation in CenClear services is associated with accelerations in

the acquisition of developmental competencies (represented by developmental age scores) in overall development, cognitive, language, and motor skills. For example, overall developmental progress is estimated to be 1.06 or essentially a typical developmental rate of 1 month of progress for each month of program participation. This suggests the increase in skill acquisition shown by previous metrics but basically a maintenance of rate (range= -.21 to 2.44). Thus, children with delays in EI showed a typical developmental rate during participation in CenClear.

Figure 6 also uses the PCI as a “fair” adjustment of expected progress using each child’s pre-intervention rate. In this respect, the estimate of program impact is higher for each child and the group. For example, in overall development the mean PCI is 1.25 or 125% the typical or expected rate of progress (range= -.24 to 4.19) or 1.2 months of progress for each month of program participation. Mean PCI rates in the other domains were: cognitive (2.90); language (1.31); social (.73), and motor (1.21).

Expected Developmental Progress as a Function of Length of Intervention

Based on a thorough review of 12 studies covering more than 60 studies in the meta-analytic literature on the effectiveness of early childhood intervention for both children at developmental risk and those with developmental disabilities (to be described in larger future report), the target of effectiveness--educationally significant or relevant progress was a statistical effect size of .46 or an associated standard score increment or an average overall gain of 6.8 points on the DOCS. This is higher than the criterion recommended by Cohen (1979) of .25-.33 for educationally significant intervention effects and those quoted in much of the EI/ECE outcomes research.

To determine “dosage”, polynomial regression analyses were performed on the CenClear EI data (Bagnato, Suen et al, 2002) to estimate the number of days of treatment needed to attain an increase of 6.8 points on the DOCS scale. In addition, for those children showing progress beyond the criterion in the literature toward more typical functioning, the graphs portray the “dosage” of time-in-intervention associated with this progress.

The regression formula for this dosage study is as follows:

Model for children with delays:

$$\text{Expected DOCS} = 79.1697 + 0.081228(\text{TRT}) - 0.0000656(\text{TRT}^2)$$

$$\text{Multiple } R = 0.60; R^2 = 36\%, F_{(2, 126)} = 34.91, p < .01$$

Figure 7 profiles the fact that on average children in the CenClear EI group (mild to moderate/severe delays-disabilities; n=438) took 387 days to progress 6.8 standard score points in overall developmental competencies on the DOCS. For some children, 800 days of participation in EI were necessary to enable them to attain typical levels of functioning.

Figures 8-10 focus on children with significant delays/disabilities. For such children, a range of between 136 and 191 days of program participation were necessary to effect changes of 6.8 standard score points on the DOCS in respective functional areas: language (136 days); cognitive (191 days); and social (143 days). Again, in nearly all instances, some children required nearly 800 days of program participation and interventions in order to attain near typical levels of functioning.

Duration of intervention was a significant predictor of DOCS post-test transition competencies in the several developmental domains:

- Overall Development: $R^2 = 0.587$; Adjusted $R^2 = 0.491$; $F_{13, 56} = 6.122$; $p < .01$ [1 point of raw score gain for every 9 days of intervention]
- Language: $R^2 = 0.726$; Adjusted $R^2 = 0.664$; $F_{13, 57} = 11.619$; $p < .01$ [1 point of raw score gain for every 15 days of intervention]
- Cognitive: $R^2 = 0.615$; Adjusted $R^2 = 0.526$; $F_{13, 56} = 6.886$; $p < .01$ [1 point of gain for every 15 days of intervention]
- Motor: $R^2 = 0.545$; Adjusted $R^2 = 0.440$; $F_{13, 56} = 5.169$; $p < .01$ [1 point of gain for every 29 days of intervention]
- Social: $R^2 = 0.568$; Adjusted $R^2 = 0.467$; $F_{13, 56} = 5.656$; $p < .01$ [1 point of gain for every 31 days of intervention]

While this regression analysis estimates and suggests intervention effectiveness, no control group was used; only each child was used as his/her own control; moreover, since the following constructed comparison group regression analysis did not document progress for children which exceeded their pre-intervention expectancies, this “dosage” analysis must be regarded as suggestive rather than definitive of the impact of intervention on outcomes.

Expected-Actual Progress Analysis: Exceeding Maturation Expectancies

Bagnato and colleagues (2002; in press) adapted and improved a metric by McCall and Green (1999), the “constructed comparison group” to estimate the extent to which each child outpaces maturational expectations in early childhood intervention studies. The Expected-Actual Progress Solution (EAPS; Sangha, Bagnato, Suen, in press) charts expected developmental trajectories or longitudinal developmental progress curves on children in large databases. The EAPS establishes pre-intervention attainment levels on children at each age point from 1 year to 6 years based on their assessment levels at program entrance. Thus, the EAPS establishes an expectancy paradigm for all children in a “local norm group” by which to compare the actual progress of the same children which may exceed these pre-intervention expectancies. The EAPS establishes a “constructed comparison group” by which intervention effects can be determined if actual progress exceeds maturation, thus attributing progress to intervention when maturation as a variable is controlled through regression statistics.

Figures 11-14 profile the progress curves of CenClear EI children based on DOCS overall raw scores during their participation in the programs. For all major developmental domains over three progress timepoints (2-3 years of intervention; n=105), the results document the fact that children's *progress did not exceed their maturational expectancies* (exceed chance at the 95 percent confidence interval) in cognitive, language, social, and overall development. However, the curves do appear to coincide with the results of other metrics previously reported which suggest that the majority of EI children continued their developmental trajectories, preventing regression while they attained specific functional competencies which did not alter their test-identified rates. Note that the developmental trajectories in all profiles show an upward trend of increasing skill acquisition.

CHAPTER 7

DID CENCLEAR EI CHILDREN ATTAIN COMPETENCIES FOR EARLY SCHOOL SUCCESS?

Once CenClear EI children reach the approximate age of 5 years and are ready to transition to school, preschool teachers and kindergarten teachers (after 4 months of K) complete the *Basic School Skills Inventory-3 (BSSI-3)* to document the early learning skills of children compared to national peers. The BSSI-3 relies on natural observations and performance records to document the skill attainment of children in the areas of spoken language, reading, writing, math, classroom behavior, and daily living skills.

Figure 15 profiles the early learning competencies of 146 CenClear EI children at the end of their preschool experience between May and September before transition to public school kindergarten; for comparative purposes, these children have been separated into two groups; those with mild to moderate delays and those with moderate to severe delays. The mean overall standard score for the entire group is 94.7(Sd= 7.23) indicating that the children show early learning skills within the low average range for their age.

For children with mild delays, all standard scores were within the average range across all pre-academic skill areas (92.74-99.47). In this range, language and math skills were the most well-developed. Children's pre-academic competence appears to be associated with their length of participation in the CenClear EI programs. Overall, CenClear EI children with mild delays show early learning skills compared to national norms that are at approximately the 45th-51st percentile. Despite the "readiness" skill levels for this group, wide variations and heterogeneity are characteristic of their individual functional levels over a range of 75 SS points (SS range from 70-145)

For children with moderate delays, as might be expected, pre-academic skills are comparatively less well-developed. For this group, standard scores ranged from 73.53 (Sd=7.30) to 80.42 (Sd=6.60). While children gained specific early learning competencies in all areas, their overall level of performance suggests continuing mild deficits. Highest areas of functioning are indicated in writing and math areas. Such delays at kindergarten entrance suggest the continuing need for Title 1 or learning support services. The mean DOCS cognitive level for this group was 83.2 suggesting the majority of children would demonstrate learning disabilities at school-age entrance. Nevertheless, the moderate group shows wide variability in early learning skills over a range of 43 points (SS range from 55 to 97.5).

Overall, 70% of the CenClear EI children at transition demonstrated early learning skills that would enable them to be successful in kindergarten, some with likely support services. Specific percentages of selective Early Learning Standards mapped to the content of the BSSI-3 were attained by CenClear children in the following domains: Expressive Language (60%); Receptive Language (75%); Comprehension (75%); Literacy (66%); Logical-Mathematical (75%); Personal-Social (88%).

DO CENCLEAR EI CHILDREN SHOW PROGRESS IN ACQUIRING SOCIAL BEHAVIORS VITAL TO EARLY SCHOOL SUCCESS?

Nearly every national study and teacher survey regarding kindergarten “readiness” and early school success demonstrates that social skills and self-control behaviors are the most important indicators of successful transition and adaptation to the classroom environment.

All SPECS studies including the PEIOS Pilot employ *The Preschool and Kindergarten Behavior Scale 2 (PKBS)* in order to monitor status and change in social behavior and to document response to intervention for children 3 to 5 years of age. While the DOCS social scale samples personal-social behaviors, the PKBS records observations of specific social skills that are predictive of early school success (e.g., waiting, sharing, turn-taking, using language, following directions, making friends, seeking adult help) and behavior problems (e.g., aggression, inattention) which are barriers to developing self-control skills.

Overall, children in the CenClear EI program demonstrate particular benefits in acquiring important social and self-control behaviors even after entering the program with serious social skill delays and challenging and interfering behaviors that did or would have qualified them for mental health diagnoses. Overall, approximately 31% of 211 children (65 children) showed serious social skill delays and clinically significant behavior problems. After participating in the CenClear EI program for 18 to 36 months (including behavioral health support from CenClear), the average child made significant and functional progress in acquiring social behaviors that were vital for school success.

Figure 16 profiles the respective social skill and behavior problem levels (standard scores) at program entrance (time 1) and at program transition (time 2) for two comparative groups: those without delays/problems (n=146) and those with delays/problems (n=65). For children with no delays/problems, social skills continued to develop overtime in the program (95.6-102.5) and showed significant changes ($p > .01$). Similarly, behaviors for the no delay/problem group showed no significant change (91.7-96.6).

For children with delays and clinically significant behavior problems, social skill levels at entrance into EI services were significantly delayed (77.6) but showed significant progress during intervention so that functional levels at transition were within the average range (93.1), a change of more than 1 standard deviation. Social skills for the problem group were extremely variable (42-120) indicating that this group encompassed children with severe social skill deficits as well as those with higher level social skills for their age. Similarly, clinically significant behavior problems for this group (123.7) indicate the severity of their self-control behavior deficits in that less than 1% of children nationally showed behavior problems worse than the CenClear children! After 18-36 months of intervention, the same children on average showed typical levels of

behavior problems (109.3) within the expected range for their age—a change of 1 standard deviation.

Overall, the social behavior changes in the CenClear EI children fit the OSEP/ECO center category of “moving from delay or problem to no delay or problem” as the result of intervention. Moreover, the children gained critical social skills and self-control behaviors that underpinned their readiness for successful kindergarten transition. These changes on the PKBS coincide with the classroom behavior levels on the BSSI-3 showing social behavior skills within the low average range.

Social-Behavioral Response to Intervention

The graph in figure 17 compares the efficiency of and response-to-intervention of both the problem/no problem groups. IEI and PCI indices were calculated (as with the DOCS) to determine the amount of functional progress demonstrated by the children during the average 14-month period of intervention (14.7 for no problem; 14.1 for problem group; range= 18-36 months). The graph shows that for both groups IEI and PCI rates for social skill progress are well above typical expectations. With the expected rate of progress set at 1.00, IEI/PCI rates range from 1.55 for the no problem group to 2.30 for the problem group. These rates estimate progress that is 1.5 to more than 2 times the expected rate. For reduction of behavior problems, IEI/PCI rates range from .48 for the problem group to 1.15 for the no problem group. All rates approximate typical expectations except the problem group. However, the statistical analysis of increasing social skills and decreasing problem behavior is significant.

A one-way ANOVA and effect size analysis were conducted on the two social-behavior groups. Both within and between group differences were significant for social skill progress and behavior problem reduction (F test range= 15.64 to 218.1; $p > .0001$). Effect sizes for the impact of intervention were moderate for social skill progress of the no problem group (.42) and high for the problem group (.82). Moderate impact was determined for the behavior reductions of the no problem group (.44) and moderate to high for the problem group (.76). All effect sizes are significant and exceed the intervention impact indices of most reported early intervention studies that are with the range of .20-.40.

Simply, for a representative sample of EI children with social behavioral needs (delays/problems) in CenClear EI services, the combined early intervention and behavioral support were significantly associated with and predictive of increases in social skills and decreases in problem behaviors to near typical levels of functioning at transition into kindergarten.

HOW ARE FAMILY AND PROGRAM ELEMENTS RELATED TO CHILD PROGRESS?

Family Outcome Elements

It is clear that family-centered practices are the conceptual and practical foundation for early intervention. Individualized intervention plans for infants and toddlers (IFSP) place family needs and priorities at the center of services; for preschool children, IEPs may place less emphasis on family goals, yet professionals understand that family-centered practices are “best practice” in the field. Regarding early intervention outcomes, both OSEP and its collaborator, the ECO Center, view family outcomes as central to the mission of early intervention. Many children with severe disabilities may show only small, incremental changes in developmental course, but improvements in family and parent functioning (e.g., improved parenting behaviors, increased coping skills, reduced parent stress) are critical benchmarks for success and clearly relate to the activities of professionals in early intervention.

The SPECS evaluation model for CenClear employs two primary family/parent-report scales to document status and change in these characteristics: *The Parent Behavior Checklist (PBC)* and *the Parenting Stress Index (PSI)*. The PBC focuses on two aspects of parenting behavior: Expectations and Nurturing. The PSI examines various aspects of parent stress within the family and with their child in two areas: Stress related to raising a Difficult Child (DC) and stress related to difficult interactions with their child (PCDI).

Program Outcome Elements

Programmatic dimensions have been largely ignored in early childhood intervention research. Researchers have presumed that separating groups of study children based on the type of program in which enrolled was sufficient. Increasing interest is focusing on documenting specific programmatic aspects that are likely related to child outcome (e.g., quality, intensity, type of services). New generation early intervention studies conducted in natural settings without control groups or randomization use sophisticated regression techniques which rely on such measures of programmatic aspects to examine possible predictive relationships between positive child outcomes and the type, quality, and intensity of services and supports that may be responsible for the successful outcomes.

The SPECS model uses the *Program Specifications (P-Specs)* to quantify these various early intervention programmatic and service elements in the following categories: Early intervention, adaptive services, behavior therapy, speech/language therapy, occupational therapy, physical therapy, vision services, hearing services, medical support and transition support.

Parent/Family Outcomes

The CenClear family/parent results reflect both the high needs of the families as well as their resiliency (n=382). Median family income is approximately \$17-22,000 per year in a high-risk, rural poverty area.

Figure 18 reveals that 58% of the CenClear early intervention sample parents report mean levels of stress that exceed national norms even at entry into the program. In fact, mean reported stress levels approach a cut-off at program entry and exceed it during treatment that is considered a “clinical” range. This indicates the high need of parents for counseling and support from professionals. The significant increase overtime ($p > .013$; .008), based on other family intervention studies, reflects the increasing trust that families have with the CenClear staff to disclose their personal and family needs during counselling. In this sample, the major needs are in raising a child with a delay, disability, or challenging behavior and in managing their interactions with a difficult child to foster developmental and behavioral progress.

Figure 19 illustrates the resiliency of these very same parents. CenClear parents show a significant and positive improvement in their expectations for their children and in their nurturing behaviors to manage and promote progress in their children ($p > .001$) during their involvement in early intervention services which include a combination of family-based services and individual counseling and behavioral support. In fact, parent’s expectations increased significantly ($p > .003$) for their children with delays and disabilities the younger they were when they started in early intervention and the longer they participated in the program into the preschool years. Figure 20 profiles the comparative progress of families of children with IFSP or IEP plans. Both groups show significant progress in acquiring more effective and supportive parenting behaviors between program entry and transition ($p > .05$) which match or exceed national norms as well.

The progress of families in improving their parenting behaviors can be seen in specific ways. A significant difference was observed between DOCS levels at entrance into the program and parent expectations for their child at followup ($p > .05$) as well as DOCS levels at transition and parent nurturing behaviors at transition ($p > .001$). Also, the regression analysis linked children’s transition or post-test evaluation scores on the DOCS to several indicators (maturation was not controlled): pre-test levels, time-in-program, family data on the PBC, and program intensity information.

The major result was that positive child outcomes in developing social skills and self-control behaviors and gaining motor skills were associated with and predicted by length of intervention, and the parents increasing ability to nurture their children and manage and model appropriate behavior. *Every 23-point gain in parent nurturing behaviors were associated with an 18-point gain in social skills and self-control behaviors.*

Program Intensity

Overall, program intensity ratings based on chart reviews of 152 children (50 with IFSPs and 100 with IEPs) indicate that services and supports for children are of low to medium intensity for the average child in early intervention; however, the wide range of intensity ratings indicates the variability of infants, toddlers, and preschoolers in the programs with complex needs in specific service categories.

For preschool children (mean CA= 41 months; range= 33-66 months), Figure 21 provides a descriptive profile of the services in 9 service areas: Early Intervention (EI); Adaptive Services (AS); Behavior Therapy (BT); Speech/Language Therapy (ST); Physical Therapy (PT); Occupational Therapy (OT); Vision Services (VS); Hearing Services (HS); and Medical Services (MS); and Total Service Intensity (TOT). The average early intervention or instructional services is classified as 35% indicating low medium intensity reflecting the inclusive approach in CenClear Head Start; yet, this reflects a range of 0 to a high of 75% indicating the need for some children to have intensive and individualized supports. Similarly, speech/language therapy services have an average of low medium intensity of 35%, but range to 90%. Some behavioral support was needed for the average child (8%); yet, reflecting the numbers of children with social behavioral difficulties, relatively high intensity behavioral support was needed for some children (40%). Both PT and OT services are relatively low intensity overall, but are required for some children at the 50-60% level. It is worth noting that while the average medical support required is of very low intensity, some children required medical support at the 30% level. Overall, total program intensity for children 3-5 years of age is at the low medium level (32%).

For infants and toddlers (mean CA= 24 months; range= 3-31 months) in Part C (0-3 services), a similar pattern is noted with low medium intensity on average (30%). Developmental support is provided in the home as the natural environment, thus services are relatively low intensity (20%) as was communication support (30%). Behavioral support was also low intensity overall, but some children required high intensity supports (25%). Transition support, level of teamwork, and family support were rated as low intensity overall (12%), but were rated as high for nearly 25% of the children.

The major statistical result indicates that speech/language therapy and duration of intervention in the program, both in therapy and in the classroom, were positive predictors of DOCS language levels at transition for children ages 3-5 years. This translates into an expectation of 1-point gain in the DOCS

language raw score for every 15 days of intervention. Additionally, every 4-point increase in the speech/language intensity scale (type and amount of speech/language support) on the ProgramSpecs was associated with a 7-point gain on the DOCS language competencies at transition.

For infants and toddlers, duration of intervention reflecting a medium level of program intensity was related to significant gains in DOCS competencies in all developmental areas: cognitive, language, social, motor at transition to preschool. This translates into a 1-point of DOCS raw score gain for between 5 and 17 days of intervention ($p > .01$).

**WHAT DOES THIS PILOT RESEARCH TELL US ABOUT
FUTURE EARLY INTERVENTION OUTCOME STUDIES**

Succinct Summary of the Meaning of the PEIOS Pilot Results

The PEIOS Pilot study of CenClear Child Services is a unique example of a program that has made a commitment, both in terms of funding and personnel, to the ongoing documentation of child, family, and program outcomes for quality improvement and summative purposes.

“Worts and all”—the study demonstrates the challenges of conducting program evaluation research in community-based early childhood intervention programs, both logistically and technically. Many times results are somewhat equivocal. Overall, the descriptive results, and some statistical results, are quite positive in demonstrating how children have benefited from a program like CenClear. Some data in this study support the hypothesis that “dosage” (time-in-intervention) and program intensity as well as other factors (i.e., parent commitment and competence) are associated with positive child outcomes, especially in the social behavioral skill area. However, many studies fail to meet all the criteria necessary to support direct impact relationship between program and outcome; similarly, CenClear children in early intervention services did not outpace their maturational expectations, in statistical terms, although their actual skill acquisition showed statistically significant progress overtime. Basically, in statistical terms, their pattern of progress showed steady increases over time and age without regressions. Their rate did not change, but their specific skills acquisition did. Yet, this does meet the valid OSEP/ECO criteria of maintaining developmental rate and showing skill attainment.

The success of program evaluation outcomes research cannot always be judged in purely traditional, statistical terms. As the OSEP/ECO criteria show, several metrics and categories of success for outcomes are necessary to do justice to early childhood intervention programs that must fulfill the needs of children with diverse disabilities, parents with pressing needs and priorities, and service arrangements which are delivered in widely variable settings (Harbin, Rous, McLean, 2005).

“Take-Home Points” for Future Early Intervention Research for Pennsylvania

Derived as implications from the PEIOS Pilot study results, the following topics and issues are offered as essential components and considerations in future Pennsylvania early intervention outcomes research. *The full PEIOS Proposal sent to IU #11 on June 5, 2005 in response to the RFP on Early Intervention Outcomes encompasses these subsequent elements and provides solutions.*

1. Use an authentic assessment approach in which seasoned teachers and caregivers who know the child well conduct the repeated assessments
2. Rely on the use of a single, multidimensional authentic assessment measure that is comprehensive, yet relatively easy to use.
3. Choose a uniform assessment measure across different types of programs to ensure comparability of data and outcomes
4. Ensure that the teachers are receiving effective initial, booster, and followup trainings on the assessment procedures to ensure reliability and validity.
5. Employ longitudinal, repeated measures assessments at least 2 times per year (baseline-----followup) for each child targeted in the research so that multiple timepoints can be compared and a “developmental growth curve” charted to track actual vs. expected progress, controlling for maturation.
6. Devise a research design that hypothesizes the expected “paths” or interrelationships among several mediating variables regarding child outcomes, including time-in-program (“dosage”); program intensity; family needs; and external criteria such as meeting OSEP outcome standards
7. Define probes that enable researchers to collect, structure, and quantify clinical judgments regarding **extant** child, family, and program data in agency charts and on IFSP and IEP documents
8. Conduct ratings based on IFSP and IEP documents (random selection) to quantify program intensity in various service areas
9. Analyze interrelationships among program intensity and service elements and specific child outcome such as acquisition of early school success competencies; increasing social skills/decreasing problem behaviors; and extent of family needs
10. Categorize outcome results in reference to the PA Early Learning Standards and the OSEP/ECO early intervention outcomes framework.

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