

5. Participants

Two hundred two (202) families participated in Project PRISM, the majority of whom were still identified by Project Evaluators as active when the project ended (n = 159, 78.7%). Those families that were inactive and withdrew from the project did so because: They moved (n = 24, 11.9%); the child died (n = 8, 4.0%); or the visual impairment resolved and the child was no longer eligible for services (n = 2, 1.0%). Nine (9) families (4.5%) withdrew voluntarily, for unknown reasons. Efforts were made to link families to participating agencies when they moved to a participating state.

Most of the participants lived in Arizona (n = 63, 31.2%); the second largest group of participants lived in Colorado (n = 36, 17.8%), followed by New Mexico (n = 29, 14.4%), Kentucky (n = 27, 13.4%), Texas (n = 23, 11.4%), Massachusetts (n = 13, 6.4%), and California (n = 11, 5.4%). Massachusetts (n = 12, 92.3%), Texas (n = 21, 91.3%), California (n = 10, 90.9%) and Colorado (n = 32, 88.9%) demonstrated above-average retention rates for participants. Kentucky (n = 5, 18.5%), New Mexico (n = 5, 17.2%), and Arizona (n = 10, 15.9%) lost a larger proportion of participants due to moving. End of project status for each state is listed in Table 15.

Table 15. Participants and End-of-Project Status, by State

	Status at Project End						Total					
	Active		Moved		Deceased		Withdrew		Resolved			
	n	%	n	%	n	%	n	%	n	%		
Arizona	46	73.0	10	15.9	2	3.2	3	4.8	2	3.2	63	31.2
California	10	90.9	1	9.1							11	5.4
Colorado		88.9	2	5.6	2	5.6					36	17.8
Kentucky	18	66.7	5	18.5	2	7.4	2	7.4			27	13.4
Massachusetts	12	92.3					1	7.7			13	6.4
New Mexico	20	69.0	5	17.2	2	6.9	2	6.9			29	14.4
Texas	21	91.3	1	4.3			1	4.3			23	11.4
Total	159	78.7	24	11.9	8	4.0	9	4.5	2	1.0	202	100.0

Family Demographics

Information about family demographics was obtained by Project Evaluators and submitted on the Family Demographic Questionnaire.

Ethnicity

Parent participants identified the ethnicity of each child's parents, and that information was coded into child's ethnicity (see Table 16). Both parents were usually members of the same ethnic group; when parents reported different ethnic groups, we classified the child's ethnicity as mixed. In Table 16, we divided this mixed ethnicity group (n = 31, 17.0%) into those where both parents were minority group members (n = 4, 7.2%), and those where one parent was Caucasian (n = 27, 14.8%), thinking that the experiences of these two latter groups of children might be different. The majority of participants had at least one Caucasian parent (n = 138, 75.8%).

Table 16. Participants' Self-identified Ethnicity

	n	%
Caucasian	111	61.0
Hispanic	29	15.9
African American	9	4.9
Native American	2	1.1
Mixed ethnicity:		
One parent Caucasian	27	14.8
Both parents minority	4	2.2
Total:	182	99.9

The distribution of ethnicity across agencies is shown in Table 17. As might be expected, the agencies in Arizona, California, Colorado, and New Mexico enrolled larger proportions of ethnic minorities than did agencies in the three other states. Kentucky enrolled the greatest proportion of African-American participants, at 20.0% (n = 4). New Mexico enrolled the largest proportion of Hispanic participants (31.8%, n = 7). No Asian-American participants were enrolled in this study.

Language Spoken in Home

The vast majority of participants came from English-speaking homes (n = 168, 88.0%) (see Table 18). Eleven families (5.8%) spoke only Spanish in the home, while five families (2.6%) spoke both English and Spanish. Another seven families (3.6%) spoke other languages with some degree of English.

Table 17. Participants' Ethnicity, by Participating Agency

	Caucasian		Hispanic		African American		Native American		Mixed Ethnicity	
	n	%	N	%	n	%	n	%	n	%
Arizona	34	54.8	12	19.4	1	1.6	1	1.5	4	22.6
California	6	54.5	2	18.2	1	9.1			2	18.2
Colorado	21	60.0	5	14.3					9	25.7
Kentucky	15	75.0			4	20.0			1	5.0
Massachusetts	11	84.6	1	7.7	1	7.7				
New Mexico	12	54.5	7	31.8			1	4.5	2	9.1
Texas	12	63.2	2	10.5	2	10.5			3	15.8
Total	111	61.0	29	15.9	9	4.9	2	1.1	31	17.0

Table 18. Primary Language Spoken in Participants' Homes

	n	%
English	168	88.0
Spanish	11	5.8
English/Spanish	5	2.6
English/Danish	1	.5
Primarily English (> 50%)	5	2.6
Primarily Non-English (< 50%)	1	.5
	191	100.0

Parent Age

Parents' ages at the time of the participant child's birth ranged from 17 to 67 years for fathers (mean = 29.7 years, s.d. = 7.16) and 14 to 44 years for mothers (mean = 27.3 years, s.d. = 6.3) (see Table 19). The majority of fathers were 30 years old or less (n = 94, 53.1%) at their children's birth; almost 10% were 20 years old or less (n = 17, 9.6%). The majority of mothers were also 30 years old or less at the birth of their child with a visual disability (n = 122, 65.2%), with 16.6% (n = 31) ages 20 years or less.

Table 19. Parents' Ages at Time of Child's Birth

	Fathers		Mothers	
	%	n	%	n
20 years or less	9.6	17	16.6	31
21-30 years	43.5	77	48.6	91
31-40 years	40.1	71	33.7	63
41 years or more	6.8	12	1.1	2
Total	100.0	177	100.0	187
Mean	29.67	27.31		
s.d.	7.16	6.30		
Median	30.00	27.00		
Youngest age	17	14		
Oldest age	67	44		

Parent Education

The sample of parents reported fairly high levels of education, with more than half reporting at least some college (see Table 20). Mean years of education for fathers was 13.6 years (s.d. = 3.1) and ranged from 2 to 24 years; for mothers, mean years of education was 13.4 years (s.d. = 2.8) and ranged from 4 to 26 years.

Table 20. Parents' Years of Education

	Fathers		Mothers	
	%	n	%	n
8 years or less	4.0	7	3.1	6
9-12 years	40.3	71	42.4	81
13-16 years	43.8	77	45.1	86
17 years or more	11.9	21	9.4	18
Total	100.0	176	100.0	191
Mean	13.58	13.42		
s.d.	3.10	2.82		
Median	13.00	13.00		
Fewest years	2	4		
Most years	24	26		

Household Income

Information on household income was collected in two ways. Initially, Project Evaluators requested information on whether or not the family was receiving any form of public assistance. These results are shown in Table 21. The large proportion of participants on public assistance (47.8-70.6%) raised questions for the Technical Advi-

sory Committee, however, and during the second project year we added a new form to the parent packet that asked parents to report their annual household income within \$10,000 categories. The results from this source are indicated in Table 22. The response rate for both sources was often no greater than two-thirds of the possible responses over all age intervals. Response rates are greater if they are computed based on the best parent return at that age interval.

Table 21. Proportion of Participant Families Receiving Public Assistance at Each Age Interval

	0-5 mos.		6-11 mos.		12-17 mos.		18-23 mos.		24-35 mos.		36-47 mos.		48-59 mos.	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Receiving public assistance	11	47.8	80	63.5	50	66.7	47	70.1	52	65.0	24	70.6	12	70.6
Not receiving public assistance	12	52.2	46	36.5	25	33.3	20	29.9	28	35.0	10	29.4	5	29.4
Total	23	100	125	100	75	100	67	100	80	100	34	100	17	100
Response rate	47.2		74.0		60.5		59.3		73.4		54.0		60.7	
Response rate by parent forms returned	82.1		99.2		80.6		88.2		100.0		94.4		94.4	

Household income of responding participant families appears to be distributed across income levels. For age intervals when the most responses are available (6-11 months through 24-35 months), one-fifth to one-fourth of the respondents indicated incomes below \$10,000, and one-fourth to one-third indicated incomes greater than \$40,000. The response rate for this item parallels the low rate of response generally for information from the parent packet.

Table 22. Annual Household Income of Participants at Each Age Interval

	0-5 mos.		6-11 mos.		12-17 mos.		18-23 mos.		24-35 mos.		36-47 mos.		48-59 mos.	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
< \$10,000	2	11.8	26	28.0	15	24.2	13	25.0	14	20.0	2	6.5	1	5.9
\$10,001-20,000	3	17.6	20	21.5	18	29.0	17	32.7	12	17.1	11	35.5	3	17.6
\$20,001-30,000	2	11.8	17	18.3	13	21.0	4	7.7	10	14.3	4	12.9	3	17.6
\$30,001-40,000	3	17.6	6	6.5	1	1.6	7	13.5	9	12.9	7	22.6	6	35.3
\$40,001-50,000	1	5.9	10	10.8	5	8.1	2	3.8	9	12.9	2	6.5	3	17.6

> \$50,000	6	35.3	14	15.1	10	16.1	9	17.2	16	22.9	5	16.1	1	5.9
Total:	17	100.0	93	100.0	62	100.0	52	100.0	70	100.0	31	100.0	17	100.0
Response Rate	47.2		55.0		50.0		46.0		64.2		49.2		60.7	
Response rate by parent forms returned	60.7		73.8		66.7		68.4		87.5		86.1		94.4	

Using U.S. Census Bureau data (1997) for median household income in each of the seven states where collaborating agencies were located, respondents' last submission was recategorized into "below interval containing state median income," "same interval containing state median income," and "above interval containing state median income." Based on a subgroup of 149 (73.8% of the total PRISM sample), 56.4% (n = 84) reported incomes below their state median, 13.4% (n = 20) reported incomes within the same interval as their state median, and 30.2% (n = 45) reported incomes above their state median. Because respondents were asked to report income categories rather than exact income, thus prohibiting precise categorization, this analysis suggests that PRISM participants generally reflected the income distribution of their states. Slightly more of the PRISM participants may have incomes below their state medians. Table 23 indicates the distribution of recategorized responses by agency and suggests that Colorado and Kentucky had greater representation from families below the median income, while Massachusetts and New Mexico had greater representation from families at or above the median income.

Table 23. Distribution of Household Income Compared to State Median Income

	Income reported in \$10,000 intervals						
	Median income (1995)	Interval below median		Interval including median		Interval above median	
		n	%	n	%	n	%
Arizona	\$30,863	22	53.4	6	14.3	14	33.3
California	\$37,009	5	55.6	0	0.0	4	44.4
Colorado	\$40,706	21	70.0	3	10.0	6	20.0
Kentucky	\$29,810	17	70.8	2	8.3	5	20.8
Massachusetts	\$38,574	4	33.3	1	8.3	7	58.3
New Mexico	\$25,991	8	40.0	5	25.0	7	35.0
Texas	\$32,039	7	58.3	3	25.0	2	16.7
Total	\$34,076 (national)	84	56.4	20	13.4	45	30.2

A similar analysis was applied to participant families by ethnic group. The results in Table 24 indicate that all participant families who identified as African-American reported incomes below their state’s median. Participant families who identified as Caucasian reported a larger proportion of their incomes in intervals above their state’s median. A larger proportion of participant families who identified as Hispanic reported incomes below their state’s median, and a smaller proportion reported their incomes in intervals above their state’s median. Only one Native American family reported its income. Families who identified themselves as mixed ethnicity reported incomes within intervals in proportions fairly equal to that reported by the total group.

Table 24. Distribution of Household Income Compared to State Median Income, by Ethnic Group

	Income reported in \$10,000 intervals					
	Interval below median		Interval including median		Interval above median	
	n	%	n	%	n	%
African-American	7	100.0	0	0.0	0	0.0
Caucasian	42	47.7	14	15.9	32	36.4
Hispanic	16	80.0	1	5.0	3	15.0
Native American	0	0.0	1	100.0	0	0.0
Mixed Ethnicity	15	62.5	2	8.3	7	29.2
Total	80	57.1	18	12.9	42	30.0

For another perspective on participant income, responses of the 104 participants who submitted income data more than once were examined to determine whether income increased, decreased, or remained stable over the course of the project (see Table 25). The majority of these participants (55.8%, n = 58) reported their income as stable, while 29.8% (n = 31) reported that their income grew during the project. A smaller proportion (14.4%, n = 15) indicated that their income decreased during the project. Table 25 provides the distribution of these data by state. Participants residing in Texas reported a larger proportion of incomes that decreased over time, while residents of California and Massachusetts reported a larger proportion of incomes that remained stable over time. Kentucky and New Mexico residents reported a larger

proportion of incomes that increased over time.

Table 25. Stability of Income During Project, by State

	Income status over 2 or more assessment intervals					
	Decreased		Remained stable		Increased	
	n	%	n	%	n	%
Arizona	4	14.3	16	57.1	8	28.6
California			5	100.0		
Colorado	3	13.6	11	50.0	8	36.4
Kentucky	3	17.6	7	41.2	7	41.2
Massachusetts			8	88.9	1	11.1
New Mexico	2	12.5	8	50.0	6	37.5
Texas	3	42.9	3	42.9	1	14.3
Total	15	14.4	58	55.8	31	29.8

Table 26 examines the distribution of these data by ethnic group. African-American participants for whom information is available over time generally reported that their incomes increased. Families of mixed ethnicity reported a slightly greater proportion of incomes that remained stable over time, while Caucasian and Hispanic families reported generally similar changes in income over time.

Table 26. Stability of Income During Project, by Ethnic Group

	Income status over 2 or more assessment intervals					
	Decreased		Remained stable		Increased	
	n	%	n	%	n	%
African-American			1	25.0	3	75.0
Caucasian	11	17.2	37	57.8	16	25.0
Hispanic	2	15.4	7	53.8	4	30.8
Native American					1	100.0
Mixed ethnicity	1	5.6	12	66.7	5	27.8
Total	14	14.0	57	57.0	29	29.0

Family Stability

The great majority of families (88.4%, n = 160) experienced no changes in the adult constellation during the course of the project. The 11.6% (n = 21) that did experience change did so in a variety of ways: 2-parents decreasing to 1-parent (n = 5); 2-parents increasing to 2-parents with extended family (n = 5); 1-parent increasing to 2-parents (n = 4); 2-parents decreasing to 1-parent then increasing to 2-parents again (n

= 3); 2-parents with extended family decreasing to 2-parents only (n = 2); extended family only to 2-parents (n = 1); and 1-parent with extended family to 1-parent only (n = 1). Interestingly, while Caucasian families reported the least change in family status over the course of the project (90.0% did not experience change over time), Caucasian families generally were more creative in their adult relationships, reporting both a greater variety of adults in the home and more frequent changes than reported by other ethnic groups.

At the time the project ended, most PRISM children were living with two parents (85.6%, n = 154); 14.4% (n = 26) were living with one parent; and one child (n = .5%) remained in the custody of extended family members. There were some differences in the number of parents in the home at project end when examined by ethnic group (see Table 27), primarily for African-American families, which tended to report a smaller proportion of two-parent homes and a larger proportion of one-parent homes when compared to the total group.

Child Demographics

Gender

The majority of participants in the project were males (n = 118, 58.4%). Females comprised 41.6% (n = 84) of the sample.

Table 27. Number of Parents in Home at Project End, by Ethnic Group

	Two-parent families		One-parent families	
	n	%	n	%
African American	5	62.5	3	37.5
Caucasian	100	90.9	10	9.1
Hispanic	23	79.3	6	20.7
Native American	1	50.0	1	50.0
Mixed Ethnicity	25	80.6	6	19.4
Total	154	85.6	26	14.4

Birth Order

The majority of participating children reporting this variable (n = 98, 51.3%) were the first-born child in their families. Approximately one-fourth (n = 50, 26.2%) were the second-born child, and 12.6% (n = 24) were the third-born child in their family. Eighty-

eight (88) participants (46.1%) were only children at the time the study ended. A Spearman correlation conducted to examine differences in birth order between male and female participants was not significant ($r = .137, p = .057$). Birth order of participants by gender is shown in Table 28.

Table 28. Birth Order by Gender

	Males		Females		Total	
	n	%	n	%	n	%
First-born	51	46.4	47	58.0	98	51.3
Second-born	30	27.3	20	24.7	50	26.2
Third-born	15	13.6	9	11.1	24	12.6
Fourth-born	14	12.7	3	3.7	17	8.9
Seventh-born			1	1.2	1	.5
Eighth-born			1	1.2	1	.5
Total	110	100.0	81	100.0	191	100.0

($r = .137, p = .057$)

Table 29 shows the relationship between total number of children in the family and birth order of the PRISM child. Almost half of the children ($n = 88, 45.1%$) were the only child in their families during this study. The great majority of families ($n = 160, 82.0%$) had no further children after the child with the visual disorder was born, at least during the course of the study.

Table 29. Birth Order and Number of Children in Family

		Birth Order of PRISM Participant									Total (n=195)
Number of children in family		1st	2nd	3rd	4th	5th	6th	7th	8th	Un- known	
One	n	88	2	1							91
	%	46.1	1.0	.5							47.6
Two	n	6	38	2	1						47
	%	3.1	19.9	1.0	.5						24.6
Three	n	4	9	20	1						34
	%	2.1	4.7	10.5	.5						17.4
Four	n		1		13						14
	%		.5		6.8						7.3
Five	n			1						1	2
	%			.5						.5	1.
Six	n				1						1
	%				.5						.5
Seven	n							1			1
	%							.5			.5
Eight	n								1		1
	%								.5		.5
Total (n=195)		98	50	24	16			1	1	1	191
Percent of Total		51.3	26.2	12.6	8.4			.5	.5	.5	100.0

Two sets of twins were participants in this study, and two siblings of a set of triplets also participated (the third sibling died). Another 10 participants were reported as one member of a twin or triplet birth whose siblings did not participate in the project, either because they did not survive or because they were not visually impaired.

Birth Weight

Mean birth weight for participants was 2609.2 grams (s.d.=1136.9), with a median of 2986.5 grams (converted to pounds, mean = 5.7 lbs., s.d. = 2.5, median = 6.6). Figure 3 shows a distribution of children’s birth weights for all participant children. Birth weight was further examined by grouping individual weights: (a) under 1000 grams (2.2 lbs.), considered very low birth weight; (b) 1000 to 2499 grams, considered low birth weight; and (c) 2500 grams (5.5 lbs.) and over, or normal birth weight. Table 30 indicates that over one-fifth of participants in this study were born at very low birth weights, although over two-thirds of participants (67.7%) were born at normal birth weights. - square analysis demonstrated no significant difference in birth weight groups based on gender.

Figure 3. Histogram of Participants’ Birth Weights

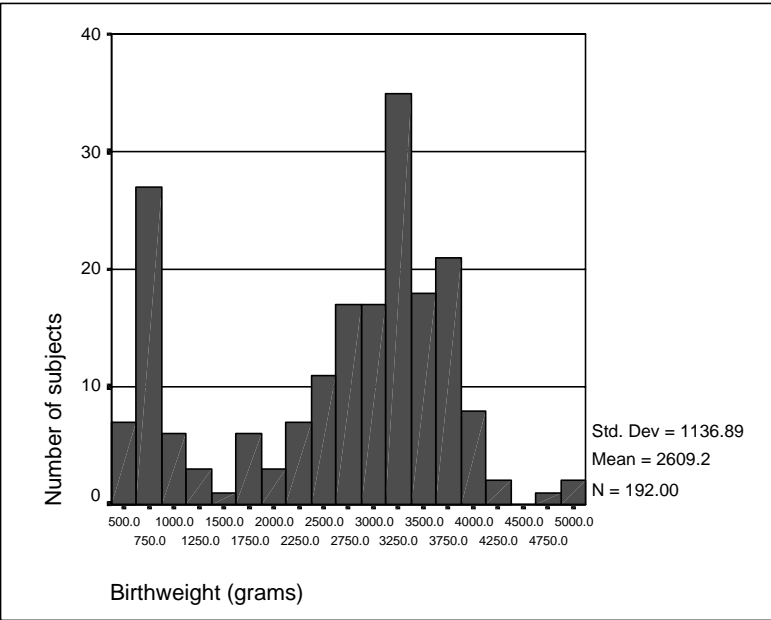


Table 30. Birth Weights of Participants, by Gender

	Males		Females		Total	
	n	%	n	%	n	%
Less than 1000 grams	24	21.6	16	19.8	40	20.8
1000-2499 grams	12	10.8	10	12.3	22	11.5
2500 grams or more	75	67.6	55	67.9	130	67.7
Total	111	100.0	81	100.0	192	100.0
Mean	2612.7	2604.4	2609.2			
s.d.	1179.8	1082.6	1136.9			
Median	2997.0	2976.0	2986.5			

($F = 2.176$, $df = 2$, $p = .916$)

An examination of birth weights by ethnic group (see Table 31) revealed that African-American participant children were less likely when compared to the total group to be born at birth weights of < 1000 grams and more likely to be born at birth weights between 1000-2499.9 grams. Hispanic participant children were more likely when compared to the total group to report birth weights < 1000 grams, and less likely to report normal birth weights (2500 grams). One-way analysis of variance of birth weights by ethnicity (excluding the 2 Native American participants) revealed significant differences between groups ($F = 3.106$, $df = 3$, $p = .028$). Post-hoc analysis did not reveal the source of the difference.

Gestational Age

Mean gestational age of participants at birth was 35.6 weeks (s.d. = 6.1), approximately one month pre-term. Figure 4 shows the distribution of gestational ages across participant children. Median gestational age at birth was 39 weeks, and indeed, approximately three-fifths of participants (61.6%) experienced full-term gestations (38 weeks or more). One-fifth of participants were born at

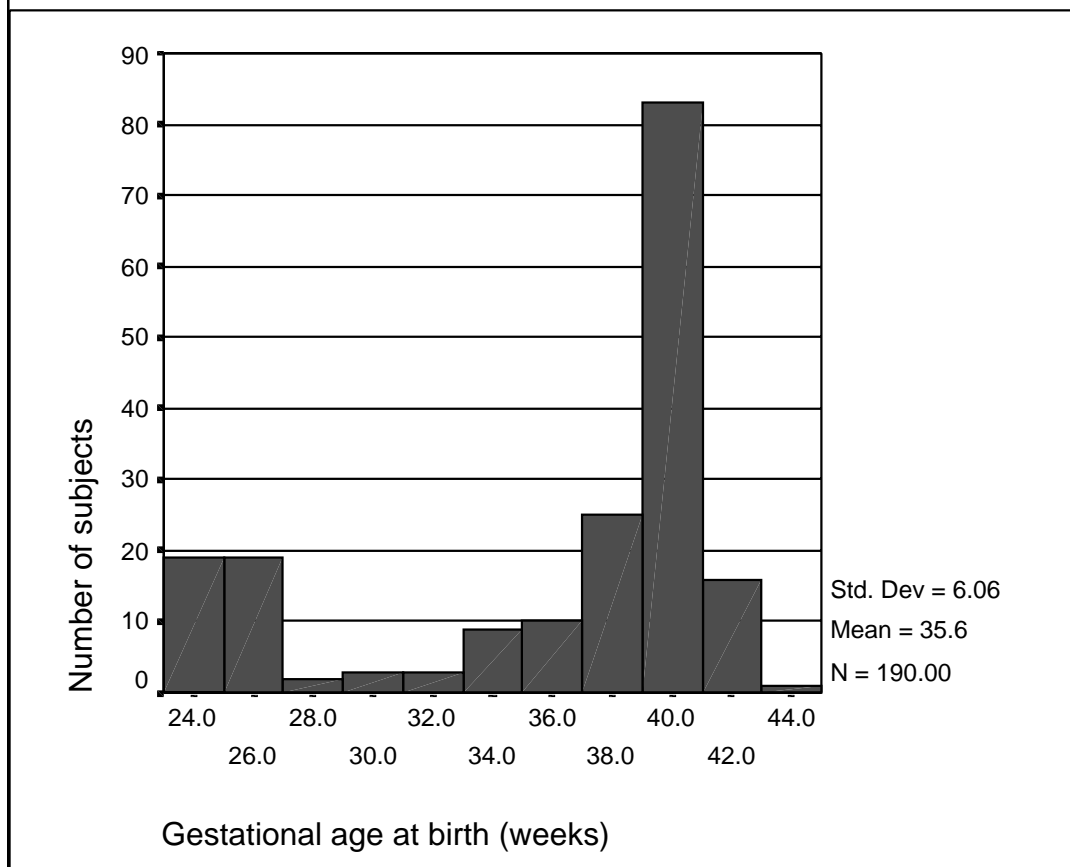
Table 31. Birth Weights of Participant Children from Ethnic Subgroups

	African-American		Caucasian		Hispanic American		Native-ethnicity		Mixed		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
< 1000 grams	1	11.1	22	19.6	11	37.9			6	16.7	39	21.4
1000-2499.9 grams	3	33.3	12	10.7	5	17.2			2	6.7	22	12.1
2500 grams	5	55.6	78	69.6	13	44.8	2	100.0	23	76.7	121	66.5
Total	9	100.0	112	100.0	29	100.0	2	100.0	30	100.0	182	100.0
Mean	2686.00		2674.46		2010.93		3302.50		2801.37		2597.13	
s.d.	990.52		1141.68		1223.38		432.04		1037.86		1148.65	
Median	2528.00		3096.50		2006.00		3302.50		3168.00		3004.00	

extremely young gestational ages (26 weeks or less). Table 32 provides the number and proportion of participants in each of three gestational groups (26 weeks; 26.1-37.9 weeks; 38 weeks), analyzed by gender. -square analysis again failed to detect significant differences between male and female participants based on gestational age ($\chi^2 = .139, df = 2, p = .933$).

One-way analysis of variance of gestation by ethnic subgroup detected significant differences among groups ($F = 3.696, df = 3, p = .013$). Post-hoc analysis attributed the difference to Hispanic and mixed ethnicity subgroups; the mean gestation of Hispanic participant children was significantly shorter than that of children with mixed ethnicity. Examination of gestational groups by ethnicity (see Table 33) revealed similar patterns to those found by birthweight: African-American participant children reported no gestations of 26 weeks or less, while Hispanic children reported a higher proportion of children with gestations of 26 weeks or less and a smaller proportion born at term.

Figure 4. Histogram of Participants' Gestational Ages



	Males		Females		Total	
	n	%	n	%	n	%
26 weeks or less	23	20.9	15	18.8	38	20.0
26.1 to 37.9 weeks	21	19.1	14	17.5	35	18.4
38 weeks and more	66	60.0	51	63.8	117	61.6
Total	110	100.0	80	100.1	190	100.0
Mean	35.6	35.7	35.6			
s.d.	6.2	5.9	6.1			
Median	39.0	39.0	39.0			

($\chi^2 = .139$, $df = 2$, $p = .933$)

Table 33. Gestational Age of Participants, by Ethnic Subgroups

	African-American	Caucasian	Hispanic American	Native-ethnicity	Mixed	Total
	N %	N %	N %	N %	N %	N %
less than 26 weeks		22 19.8	11 39.3		4 13.3	37 20.6
26.1-37.9 weeks	3 33.3	19 17.1	6 21.4		7 23.3	35 19.4
less than 38 weeks	6 66.7	70 63.1	11 39.3	2 100.0	19 63.3	108 60.0
Total	9 100.0	111 100.0	28 100.0	2 100.0	30 100.0	180 100.0
Mean	37.44	35.75	32.21	40.00	36.82	35.51
s.d.	3.71	5.95	7.28	.00	5.19	6.10
Median	39.00	39.00	34.00	40.00	38.35	39.00

A Pearson correlation of birth weight by gestational age at birth yielded a high positive correlation ($r = .902, p = .000, n = 190$), demonstrated in Table 34, and indicating that participants with low birth weight were also born at young gestational ages and vice versa. No participants born at full-term weighed under 1000 grams; similarly, no participants born at 26 weeks or less gestation weighed over 2500 grams at birth (and only one weighed between 1001 and 2500 grams).

Table 34. Birth Weights by Gestational Age

Birth weight (in grams)	Gestational age							
	26 wks.		26.1-37.9 wks.		38 wks.		Total	
	n	%	n	%	n	%	n	%
Less than 1000	37	97.4	3	8.6			40	21.1
1000-2499	1	2.6	15	42.9	6	5.1	22	11.6
2500 or more			17	48.6	111	94.9	128	67.4
Total	38	100.0	35	100.0	117	100.0	190	100.0
Mean	730.6		2479.0		3271.4		2609.2	
s.d.	146.2		888.1		507.2		1136.9	
Median	724.5		2472.0		3239.0		2986.5	

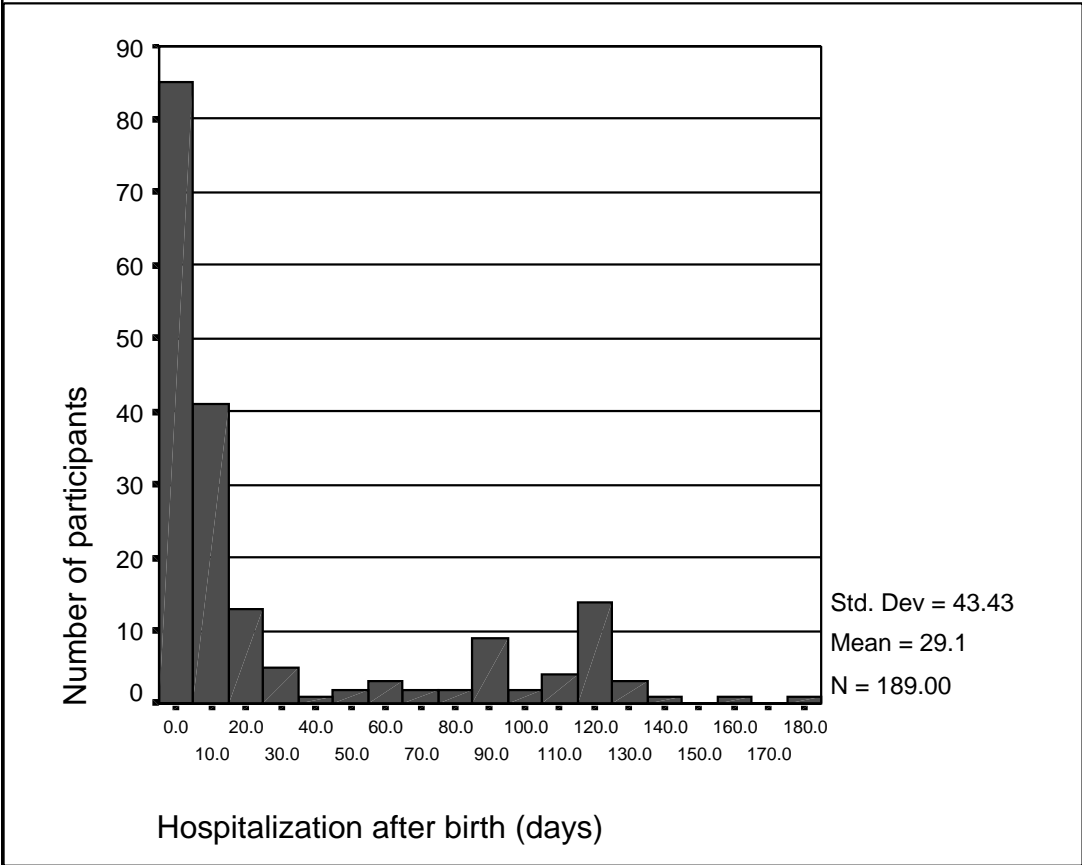
($r = .902, p = .000, n = 190$)

Hospitalization at Birth

The mean length of hospitalization at birth was 29.1 days (s.d. = 43.4). However,

the median length was 6 days, and the modal length of hospitalization was 2 days. The majority of children (n = 142, 75.9%) were hospitalized for 30 days or less, and over half of those were actually hospitalized for 3 days or less (n = 72, 38.5% of total). Almost one-fourth of the group (n = 45, 24.1%) were hospitalized longer than one month. The longest hospitalization reported was 180 days. A histogram showing the distribution of length of hospitalization across participant children is given in Figure 5.

Figure 5. Histogram of Participants' Hospitalization at Birth



Cross-tabulation of hospitalization groups (3 days, 4-30 days, and more than 30 days) by gestational groups (26.0 weeks, 26.1-37.9 weeks, 38.0 weeks) revealed differences among groups, demonstrated in Table 35. All extremely pre-term children

remained in the hospital more than 30 days, and most full-term children (except one) remained in the hospital less than 30 days. A Pearson correlation of gestational age and length of hospitalization yielded a high negative correlation ($r = -.900, p = .000, n = 187$). Participants born at younger gestational ages tended to spend longer periods of time in the hospital after birth.

Table 35. Hospitalization by Gestational Age Group

Hospitalization	Gestational Age Group						Total	
	≤26 weeks		26.1-37.9 weeks		≥38.0 weeks		n	%
	n	%	n	%	n	%		
<3 days			9	25.7	63	54.8	72	38.5
4-30 days			19	54.3	51	44.3	70	37.4
> 30 days	37	100.0	7	20.0	1	.9	45	24.1
Total	37	100.0	35	100.0	115	100.0	187	100.0

($r = -.900, p = .000, n = 187$).

A cross-tabulation of hospitalization groups by birth weight also revealed differences among groups (see Table 36), with all but one of the very low birth weight children remaining in the hospital over 30 days, and almost all of the children with normal birth weight remaining in the hospital 30 days or less. A Pearson correlation of length of hospitalization and birth weight yielded a high negative correlation ($r = -.842, p = .000, n = 189$), indicating that participants with low birth weights tended to spend longer periods of time in the hospital after birth.

Table 36. Hospitalization by Birth Weight Group

Hospitalization	Birth Weight Group						Total	
	≤1000 g.		1001-2500 g.		≥2501 g.		n	%
	n	%	n	%	n	%		
3 days			3	13.6	70	54.7	73	38.6
4-30 days	1	2.6	14	63.6	56	43.8	71	37.6
> 30 days	38	97.4	5	22.7	2	1.6	45	23.8
Total	39	100.0	22	100.0	128	100.0	189	100.0

($r = -.842, p = .000, n = 189$)

One-way analysis of variance of hospitalization after birth by ethnic subgroup (excluding the Native American group of 2) also revealed significant differences among groups ($F = 3.015$, $df = 3$, $p = .031$), but the source of the difference was not determined by post hoc analysis. As Table 37 indicates, Hispanic participant children tended to be hospitalized longer after birth than participant children in other ethnic subgroups.

Table 37. Hospitalization after Birth by Ethnic Subgroups

	African-American		Caucasian		Hispanic American		Native-ethnicity		Mixed		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
≤3 days	4	44.4	50	45.5	4	13.8	1	100.0	11	36.7	70	39.1
4 - 30 days	4	44.4	35	31.8	13	44.8			13	43.3	65	36.3
> 30 days	1	4.1	25	22.7	12	41.4			6	20.0	44	24.6
Total	9	100.0	110	100.0	29	100.0	1	100.0	30	100.0	179	100.0
Mean	10.11		29.02		48.93		1.00		20.68		29.74	
s.d.	19.58		44.82		49.45				32.19		43.58	
Median	4.00		5.00		14.00				6.00		7.00	

Additional Disability

-square analysis of multiple disability status by participating agency indicated a significant difference among agencies in the proportion of participant children with additional disabilities ($\chi^2 = 15.617$, $df = 6$, $p = .016$) (see Table 38). Arizona tended to enroll more children with additional disabilities, while Texas and Colorado tended to enroll more children without additional disabilities. There were no significant differences among ethnic groups in the proportion of children with additional disabilities.

Table 38. Proportion of Participants with Additional Disabilities, by Agency

	None		Additional	
	n	%	n	%
Arizona	16	25.4	47	74.6
California	4	36.4	7	63.6
Colorado	21	58.3	15	41.7
Kentucky	9	33.3	18	66.7
Massachusetts	6	46.2	7	53.8
New Mexico	11	37.9	18	62.1
Texas	14	60.9	9	39.1
Total	81	40.1	121	59.9

($\chi^2 = 15.617$, $df = 6$, $p = .016$)

Diagnosis of Additional Disability/Health Conditions

The additional disabilities and health conditions reported for each participant are given in Table D-5 in Appendix D. A total of 90 different diagnoses were reported, based on information obtained by the Project Evaluators from medical reports. The frequency and proportion of additional disabilities and health conditions recorded for this sample is given in Table D-6 in Appendix D. The most frequently reported condition was developmental delay (n = 81, 40.1%), followed by seizures (n = 43, 21.3%), cerebral palsy (n = 37, 18.3%), neurological impairment (n = 32, 15.8%), and hearing impairment (n = 24, 11.9%). Participants were often identified as having multiple diagnoses, all of which could be categorized, for example, as an eating disorder or a central nervous system disorder. We thus collapsed diagnoses in order to obtain a more accurate estimate of the frequency of various disorders in this sample. The results are given in Table 39 (Table D-7 in Appendix D shows how diagnoses were organized into the categories shown in Table 39). Central nervous system disorders were reported for 42.1% of the participants, while developmental delay was reported for 40.1% of the participants. Eating disorders, hearing disorders, and physical anomalies were reported in 16.3%, 12.4% and 10.9% of the sample, respectively.

Table 39. Frequency of Additional Disability and Health Categories

Disability	N	%
Central Nervous System Disorders	85	42.1
Developmental Delay	81	40.1
Eating Disorders	33	16.3
Auditory Disorders	25	12.4
Anomalies	22	10.9
Pulmonary Disorders	16	7.9
Cardiac Disorders	14	6.9
Infections	9	4.5
Endocrine Disorders	8	4.0
Genetic Syndromes	8	4.0
All others, not classified	60	29.7

We examined each disability/health category to determine if one category was more frequently associated with other categories. The results are found in Table 40. Of the 85 children with central nervous system disorders, 76.5% were also diagnosed with developmental disability; 28.2%, with eating disorders; and 21.2%, with auditory disorders. Few of the children diagnosed with central nervous system disorders also received diagnoses of genetic (3.5%), endocrine (5.9%), or cardiac (7.1%) disorders.

Table 40. Cross-tabulation of Additional Disability/Health Categories

	Proportion of children with this condition									
	CNS (n=85)	DD (n=81)	Eating (n=33)	Audi- tory (n=25)	Anom- alies (n=22)	Pulmon- ary (n=16)	Cardiac (n=14)	Infec- tions (n=9)	Endo- crine (n=8)	Gen- etic (n=8)
Who also reported the condition below:										
CNS		81.3	72.7	72.0	63.6	62.5	42.9	92.9	62.5	37.5
DD	76.5		75.8	76.0	59.1	62.5	50.0	85.7	50.0	50.0
Eating	28.2	31.3		32.0	36.4	31.3	14.3	42.9	25.0	37.5
Auditory	21.2	23.8	24.2		27.3	12.5	21.4	14.3		37.5
Anomalies	16.5	16.3	24.2			12.5	21.4	21.4	25.0	37.5
Pulmonary	11.8	12.5	15.2	8.0	9.1		14.3	21.4		
Cardiac	7.1	8.8	6.1	12.0	13.6	12.5		14.3	25.0	25.0
Infections	15.3	15.0	18.2	8.0	13.6	18.8	14.3			
Endocrine	5.9	5.0	6.1		9.1		14.3			
Genetic	3.5	5.0	9.1	12.0	13.6		14.3			

Similarly, the 81 children with developmental disabilities were more likely to be diagnosed with central nervous system disorders (81.3%), than they were with cardiac (8.8%), genetic, or endocrine disorders (5.0% each). The 33 children with eating disorders were more likely to also have central nervous system disorders (72.7%) and developmental disabilities (75.8%). Central nervous system disorders and developmental disabilities, eating disorders, anomalies, and cardiac disorders were found in combination with each disability category. Auditory disorders were not found in combination with anomalies or endocrine disorders. Pulmonary conditions and infections were not found in combination with endocrine disorders or genetic conditions. Endocrine disorders were not found in combination with auditory disorders, pulmonary disorders, infec-

tions, and genetic conditions. Genetic conditions were not found in combination with pulmonary disorders, infections, or endocrine disorders. Some conditions were never found in combination with each other. These included: auditory and endocrine disorders; pulmonary and endocrine disorders; pulmonary disorders and genetic conditions; infections and endocrine disorders; infections and cardiac disorders; infections and genetic conditions; endocrine disorders and genetic conditions.

Severity of Additional Disability/Health Conditions

The severity of additional disability/health conditions was assigned by the Principal Investigator at the end of the project after examination of each child's history. Assignments took into account type and frequency of conditions recorded on the Child Medical Questionnaire (completed by Project Evaluators at each assessment) and utilized the Principal Investigator's clinical judgment regarding the functional implications of the various combinations of disabilities and health conditions. The assigned code was reviewed by Stuart Teplin, M.D., a developmental pediatrician who served on the Technical Advisory Committee. There were 20 disagreements (9.9%), with the Principal Investigator generally attributing greater functional severity to the additional disability than did Dr. Teplin (see Table 41). The nature of the disagreement varied, and no pattern was obvious. (See Table D-5 in Appendix D for a list of visual, medical, and health conditions by participant.) The Principal Investigator's code was thereafter used for all analyses related to additional disabilities.

In this study, therefore, 59.9% of participants were judged to have additional disabilities. This proportion seems to align with previous estimates of the proportion of children with visual disabilities who also have additional disabilities reported in the literature.

Table 41. Number, Proportion, and Severity of Participant Children with Additional Disabilities, as Assigned by Principal Investigator and Pediatrician

	Principal Investigator		Pediatrician	
	n	%	n	%
No additional disabilities	81	40.1	87	43.1
Mild additional disabilities	45	22.3	43	21.3
Severe additional disabilities	76	37.6	72	35.6
Total:	202	100.0	202	100.0

Severity of Additional Disability by Ethnic Subgroups

While all 202 participant children could be classified into groups based on additional disabilities, ethnic group data were available only for 183 children (see Table 42). The classification of additional disability by ethnic subgroup generally followed the same pattern as the total sample. African-American participant children may exhibit more mild and less severe additional disability, and children of Hispanic and mixed ethnicity may exhibit more disability generally, but the size of the sample necessitates caution in generalizing from these data.

Table 42. Severity of Additional Disability by Ethnic Subgroups

	None		Mild		Severe		Total	
	N	%	N	%	N	%	N	%
African-American	4	44.4	3	33.3	2	22.2	9	100.0
Caucasian	44	39.3	30	26.8	38	33.9	112	100.0
Hispanic	9	31.0	7	24.1	13	44.8	29	100.0
Native American	1	50.0			1	50.0	2	100.0
Mixed ethnicity	9	29.0	4	12.9	18	58.1	31	100.0
Total	67	36.6	44	24.0	72	39.3	183	100.0
All subjects	81	40.1	45	22.3	76	37.6	202	100.0

Visual Disorder

Visual disorder is defined for this study as anatomical changes to the organs responsible for vision (Visual Performance Scales, 1997). Fifty-eight (58) different diagnoses of visual disorders or combinations thereof were reported for 199 participant children (98.5% of the total sample). These 58 diagnoses were reduced by the Principal Investigator for purposes of analysis into 11 categories of visual disorders, shown in Table 43 with the frequency and proportion of each. At the conclusion of the project,

cortical visual impairment (CVI) comprised the largest proportion of the sample, at 20.6% (n = 41). Children with retinopathy of prematurity (ROP) were close behind, at 19.1% (n = 38), followed by optic nerve hypoplasia (ONH) at 16.6% (n = 33). Over the 5 years of this study, CVI and ROP alternated as the leading cause of visual impairment for PRISM participants.

Table 43. Distribution of Visual Disorders Among PRISM Children

	n	%
Cortical visual impairment (CVI)	41	20.6
Retinopathy of prematurity (ROP)	38	19.1
Optic nerve hypoplasia (ONH)	33	16.6
Structural anomalies	22	11.1
Albinism	16	8.0
Retinal disorders	15	7.5
Anophthalmia/microphthalmia	10	5.0
Cataracts	6	3.0
Glaucoma	5	2.5
All other	11	5.5
Resolved	2	1.0
Total	199	100.0

Age at Diagnosis of Visual Disorder

Medical records were consulted to determine the age at which a visual disorder was initially diagnosed. Data for 181 children (89.6% of the total sample) indicated that the diagnosis of visual impairment was made at or prior to the age of 3 months for at least half of the participants (see Table 44 for an analysis of age of diagnosis by severity of additional disability). The oldest age at which a diagnosis of visual disorder occurred was 13 months. However, participants over the age of 12 months at the time of referral were generally excluded from this study. (During the first project year, 7 participants were older than 12 months at project entry. These children had been referred to the participating agency prior to 12 months, but initial assessment was delayed until testing materials were received.) Children without additional disabilities or health conditions appeared to be diagnosed with a visual disorder earlier than children with mild or severe additional disabilities.

Table 44. Age at Diagnosis of Visual Disorder, by Severity of Additional Impairment

	Additional Disability			
	None	Mild	Severe	Total
Mean	2.92	3.21	3.72	3.30
s.d.	2.39	1.96	2.75	2.51
25th percentile	1.00	2.00	1.00	1.00
50th percentile	2.00	3.00	3.00	3.00
75th percentile	4.00	4.25	5.00	4.25
Earliest	Birth	Birth	Birth	Birth
Latest	13.00	9.00	11.00	13.00

Visual Disorders and Severity of Additional Disability

Visual disorders were examined by severity of additional disability categories to investigate whether specific disorders might be more commonly associated with additional disabilities. The distribution of visual disorders by severity of additional disabilities is shown in Table 45. Although most visual disabilities were represented across severity of additional disability categories, some patterns are worth noting (indicated by the shaded areas in Table 45):

- Children with CVI were predominantly classified with severe additional disabilities, although almost one-fifth were classified with no additional disabilities.
- Children with albinism were predominantly classified with no additional disabilities, and no children with albinism were classified with severe additional disabilities.
- Children with anophthalmia or microphthalmia were predominantly classified with no additional disabilities, and no children with anophthalmia or microphthalmia were classified with severe additional disabilities.
- Both children whose visual impairment resolved were classified with severe additional disabilities.

Table 45. Frequency of Visual Disorders, by Severity of Additional Disability

	Severity of Additional Disability					
	None		Mild		Severe	
	n	%	n	%	n	%
Cortical visual impairment (CVI)	8	19.5	4	9.8	29	70.7
Retinopathy of prematurity (ROP)	11	28.9	16	42.1	11	28.9
Optic nerve hypoplasia (ONH)	16	38.5	7	21.2	10	30.3
Structural anomalies	10	45.5	4	18.2	8	36.4
Albinism	13	81.3	3	18.8	0	0.00
Retinal disorders	7	46.7	4	26.7	4	26.7
Anophthalmia/microphthalmia	8	80.0	2	20.0	0	0.00
Cataracts	3	50.0	1	16.7	2	33.3
Glaucoma	2	40.0	1	20.0	2	40.0
All other	1	9.1	2	18.2	8	72.7
Resolved					2	100.0
Total	79	39.7	44	22.1	76	38.2

Visual Disorders and Ethnicity

Differences in the distribution of visual disorders among ethnic groups did not reach statistical significance, but some patterns are worthy of examination. Table 46 presents the number and proportion of visual disorders by ethnic subgroup for the 182 children for whom data are available.

The most frequent visual disorder differs among ethnic subgroups. For African-American children, the most frequent visual disorder was colobomas or structural anomalies. For Caucasian children, the most frequent visual disorder reported was cortical visual impairment, while Hispanic children reported retinopathy of prematurity as the most frequent visual disorder. Children of mixed ethnicity reported optic nerve hypoplasia as the most frequent visual disorder. The high proportion of Hispanic children with retinopathy of prematurity is most likely related to previous findings of a high proportion of Hispanic participants with very low birth weight (37.9% < 1000 grams) and young gestational age (39.3% 26 weeks). Reasons for the differences in other ethnic subgroups are not immediately discernible and require further study.

Visual Impairment

Visual impairment for this study is defined as the functional changes resulting

from a visual disorder (Visual Performance Scales, 1997). We measured visual impairment using the Teller Acuity Cards (Vistech Consultants, 1991), a forced-choice preferential looking technique that measures resolution (grating) acuity. In a study of 342 children, Mash, Dobson, and Carpenter (1995) found that the acuity assessments obtained from the Teller card assessment were as reliable as other available testing procedures for children between the

Table 46. Frequency of Visual Disorders, by Ethnic Subgroups

	African-American		Caucasian		Hispanic American		Native ethnicity		Mixed		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
CVI	2	22.2	23	20.5	2	7.1	1	50.0	6	19.4	34	18.7
ROP	1	11.1	21	18.8	11	39.3			4	12.9	37	20.3
ONH			15	13.4	5	17.9			10	32.3	30	16.5
Albinism			13	11.6					1	.5	14	7.7
Cataracts			4	3.6	2	7.1					6	3.3
Other			7	6.3	3	10.7			1	3.2	11	6.0
Retinal diseases			10	8.9	2	7.1			1	3.2	13	7.1
Colobomas or structural anomalies	4	44.4	12	10.7	1	3.6	1	50.0	3	9.7	21	11.5
Anophthalmia/Microphthalmia	1	11.1	4	3.6					4	12.9	9	4.9
Glaucoma	1	11.1	2	1.8	1	3.6			1	3.2	5	2.7
Vision resolved			1	.9	1	3.6					2	1.1
Total	9	100.0	112	100.0	28	100.0	2	100.0	31	100.0	182	100.0

ages of 4 and 48 months. Using the Teller card assessment allowed us to standardize the procedure and to have some confidence in the results. Mash et al. suggest that the Teller card procedures may actually underestimate true acuity scores.

All administrations of the Teller acuity cards were made at a distance of 38 cm. In some cases (particularly for children with nystagmus), the cards were held vertically rather than horizontally; most assessments were made in the child's home environment. Project Evaluators generally administered the Teller card assessment first, before any of the other assessments, in order to obtain the best possible estimate of acuity for individual children on individual days. Project Evaluators were given the

option of not administering the Teller card assessment if they had first determined that there was no evidence of a behavioral response to light, or if the participant was anophthalmic. Participant children who did not demonstrate a behavioral response to light, as well as those who demonstrated no responses to the Teller acuity cards, were coded as “blind, no light perception” (indicated hereinafter as “NLP”).

The Teller card assessment yields a measure of cycles per centimeter (cy/cm). Cy/cm measures the width of the stripes on the card and must be converted to cycles per degree (cy/deg) to determine the resolution acuity on the retina surface. The number and percent of children responding to the individual cards is shown in Table 47. Snellen equivalents are provided only as a familiar measure of comparison, but since Snellen charts measure recognition acuity (response to a symbol), rather than the resolution acuity measured by the Teller card assessment, these Snellen equivalents must be interpreted cautiously.

Participants' mean visual function appeared to improve as children grew older. However, participants' vision was substantively different from normal acuity ranges, beginning in the 6-11 month age interval (the normal acuity range is indicated in Table 47 by a box at each age interval). The proportion of children whose visual function fell into normal range (see footnote 10) decreased from 48.5% at age 0-5 months (n = 31), to 0.0% at age level 36-47 months (n = 53). Approximately 30% of participants at each age interval demonstrated no behavioral response to the Teller assessment procedure and were classified as having no light perception (NLP).

Changes in Visual Impairment During the Study

To examine changes in visual impairment within individual children over time, Teller card assessment scores at project entry were compared to scores at project end. Results for the entire sample are provided in Table 48. Comparison of these two scores indicate that some change occurred. Each child's scores were subsequently examined to determine in which direction the change, if any, occurred. Forty-seven (n

= 47, 24.9% of the total sample) received only 1 Teller card assessment, and change could not be determined. Over one-third of the children (n = 67, 35.5%) experienced an improvement in visual impairment over the course of the project (see Table 49). Over one-fourth of the group (n = 53, 28.0%), however, experienced no change over the course of their participation in this project, and 11.6% (n = 22) experienced a decline in visual impairment.

Table 47. Frequency of Visual Impairment Across Age Intervals, Using Teller Card Assessment

	0-5 mos.		6-11 mos.		12-17 mos.		18-23 mos.		24-35 mos.		36-47 mos.		48-59 mos.	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
.00 cy/cm NLP	7	22.6	52	33.8	26	29.5	30	33.0	33	33.7	19	35.8	12	42.9
.23 cy/cm .18 cy/deg Low vision card; no Snellen equivalent	1	3.2	3	1.9	1	1.1			1	1.0				
.32 cy/cm deg 20/2700	4	12.9	7	4.5	5	5.7	1	1.1	2	2.0			1	3.6
.64 cy/cm deg 20/1400	2	6.5	10	6.5	4	4.5	2	2.2	2	2.0			1	3.6
1.3 cy/cm deg 20/670	2	6.5	23	14.9	7	8.0	4	4.4	6	3.0	2	3.8	1	3.6
2.4 cy/cm cy/deg 20/360	6	19.4	29	18.8	19	21.6	23	25.3	9	9.2	10	18.9	2	7.1
4.8 cy/cm 3.30 cy/deg 20/180	7	22.6	24	15.6	17	19.3	16	17.6	21	21.4	12	22.6	6	21.4
9.8 cy/cm deg 20/89	2	6.5	5	3.2	8	9.1	14	15.4	18	18.4	9	17.0	2	7.1
19.0 cy/cm cy/deg 20/45			1	.6	1	1.1	1	1.1	6	6.1			1	3.6
38.0 cy/cm 27.0 cy/deg 20/23			1	.6	1	1.1	1	1.1	6	6.1			1	3.6

Total:	31	100.0	154	100.0	88	100.0	91	100.0	98	100.0	53	100.0	
28	100.0												
Mean log (based on cy/deg)	1.27		1.34		1.76		2.55		3.06		3.24		3.23
s.d. (in octaves)	1.68		1.37		1.47		1.14		1.46		1.03		1.89
Mean expressed as Snellen equivalent	20/472		20/448		20/341		20/235		20/196		20/185		20/186
Normal acuity range (cy/deg) at this age interval	1.7-6.8		2.2-9.1		2.2-9.1		4.7-13.0		6.4-26.0		13.0-38.0		not available
Proportion of PRISM children within normal range	48.5		18.8		28.4		16.5		12.2		0.0		not available

Note. Means exclude children with NLP.

Table 48. Teller Card Assessment at Project Entry and Project End

cy/cm	cy/deg	Project entry		Project end	
		n	%	n	%
.00	NLP	61	32.3	62	32.8
.23	.18	4	2.1	1	.5
.32	.22	10	5.3	4	2.1
.64	.44	13	6.9	10	5.3
1.30	.90	27	14.3	12	6.3
2.40	1.70	33	17.5	37	19.6
4.80	3.30	30	15.9	33	17.5
9.80	6.80	8	4.2	26	13.8
19.00	13.00	1	.5	3	1.6
38.00	27.00	1	.5	1	.5
Not tested		1	.5		
Total		189	100.0	189	100.0

Table 49. Change in Teller Card Assessment Between Project Entry and Project End

	n	% of Ss with 2 assessments (n = 142)	% of total sample (n = 189)
No change	53	37.3	28.0
Improved	67	47.2	35.5
Declined	22	15.5	11.6
Only 1 assessment	47		24.9
Total	189	100.0	100.0

In order to examine these changes more closely, responses in cy/deg were converted to log₁₀ for statistical analysis. The Teller Acuity Card Handbook (Vistech, 1990) recommends this procedure because visual acuity is a logarithmic (ratio), rather than a linear scale. However, children with NLP were dropped from any further analysis, because the log₁₀ of .00 is unknown. Means and standard deviations for resolution acuity at project entry and project end are given in Table 50. Standard deviations are expressed in octaves, a doubling of the measure at any point on the scale.

Table 50. Measures of Central Tendency for Teller Card Assessment at Project Entry and Project End (n = 127; children with NLP excluded)

	Mean log	Mean as cy/deg	Mean as Snellen equivalent	s.d. (octaves)
Project entry	.1334	1.36	20/441	1.47
Project end	.3509	2.24	20/267	1.41
25th percentile				
	log ₁₀	cy/deg	Snellen equivalent	
Project entry	-4.6E-02	1.05	20/571	
Project end	.2304	1.70	20/353	
50th percentile				
	log ₁₀	cy/deg	Snellen equivalent	
Project entry	.2304	1.70	20/353	
Project end	.2304	1.70	20/353	
75th percentile				
	log ₁₀	cy/deg	Snellen equivalent	
Project entry	.5185	3.30	20/181	
Project end	.5185	3.30	20/181	

In general, resolution acuity improved over the course of the project, for those participants who responded to the Teller card assessment. A t-test for paired samples found that project end scores were significantly higher than project entry scores ($t = -.5150$, $df = 115$, $p = .000$) (see Table 51). Efforts to determine a reason for this difference identified age as the only explanation: As children grew older, their visual impair-

ment improved.

Table 51. Paired Samples t-Test for Project Entry and Project End Teller Card Assessment Results (children with NLP excluded)

	n	mean	s.d.	t	df	sig.
Project entry	116	.1850	.4015	-.5150	115	.000
Project end	116	.3827	.4079			

Visual Disorders and Changes in Visual Impairment

Changes in visual impairment between Teller card assessment results at project entry and project end were examined by type of visual disorder for the 142 children with more than one Teller card assessment (see Table 52). Children with visual disorders of CVI, albinism, or structural anomalies tended to experience improved vision over the course of the study. Children with ROP, ONH, and anophthalmia or microphthalmia tended not to experience any change in visual impairment over time.

Table 52. Changes in Visual Impairment During Project, by Type of Visual Disorder (children with NLP excluded)

	No change		Improved		Declined	
	n	%	n	%	n	%
CVI	6	30.8	14	53.8	4	15.4
ROP	13	52.0	9	36.0	3	12.0
ONH	13	52.0	7	28.0	5	20.0
Structural anomalies	4	28.6	9	64.3	1	7.1
Albinism	1	10.0	9	90.0		
Retinal disorders	6	42.9	5	35.7	3	21.4
Anophthalmia/microphthalmia	4	66.7	1	16.7	1	16.7
Cataracts	2	40.0	3	60.0		
Glaucoma	2	40.0	2	40.0	1	20.0
All others	2	18.2	8	72.7	1	9.1
Resolved			1	100.0		
Total	53	100.0	67	100.0	22	100.0

6. Limitations of the Study

The data, conclusions, interpretations, and findings included within all reports of Project PRISM outcomes require that consumers of this research honor the objectives of the investigators and also the participant families who gave willingly of their time over the five-year period of the study. The data collected through this project represents

information about one of the most vulnerable low incidence disability groups and their families possible. Given the nature of the research design, all of the data is shadowed by the process of participant selection. All of the participant children in the study were receiving specialized services from an agency specializing in serving individuals with visual impairments.

This factor was an unavoidable artifact of participant availability and the data collection procedure conducted by project-trained evaluators. In an effort to avoid (a) misinterpretation of the findings, (b) oversimplification of results, or (c) unclear generalizations about the delicate interactions between children's development and other variables under investigation, we request that at all times the conclusions be presented with the caveats listed below.

Participants

(a) All participants in this study were receiving services from early intervention and early childhood programs.

(b) None of the children in this study were without services, although the intensity, duration, and frequency of services differed across participants.

(c) Each of the infants in the study was being served by one of seven agencies specializing in serving children and adults with visual impairments. The services differed across sites and included center-based services, home-based services, a combination of the two, consulting services to generic and/or special education service providers, and testing/evaluation services only.

(d) The investigators hope to account for differences in individual cases as an ongoing part of the research, by exploring the effects of these service variables on outcomes rather than minimizing them or controlling for them.

Research Sites

(e) Each of the seven sites included in this study specialized in serving individuals with visual impairments.

(f) Sites were selected to represent a cross-section of geographic, cultural, ethnic, and socio-economic factors.

(g) Both urban and rural services were represented.

(h) The relative failure of this study to attribute differences in development to degree of visual loss may have occurred because the services provided by the specialized agencies minimized the effects of visual disability.

(i) Sites differed in terms of public/private funding, resources available, licensing and certification requirements for teachers in each state, and age span served.

Diagnosis of Visual Disability

(j) Each child in the study was initially deemed visually impaired and thus eligible for services by the host agency.

(k) The seven host agencies followed guidelines in their states for definitions of vision impairment, eligibility, and additional disability. These definitions varied somewhat across sites.

Assessment Procedures

(l) All assessment instruments were selected for their technical soundness and to optimize efficiency of testing and ease of communicating results to broad audiences.