Evaluation of the First 5 California Children of Migrant and Seasonal Farm Workers Project

The Migrant Education Even Start Component

Report submitted to the
First 5 California Children and Families Commission

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January 2007

Acknowledgements

Many contributed to this report. At each migrant education region, parents allowed their children to participate and be tested, the home visitors/teachers administered the Brigance, the regional migrant education staff reported the data online, and MEES coordinators and staff ensured that the information reported was accurate and complete.

Adriana Simmons, Yolanda Mendoza, and the state MEES Office staff guided and helped the regions report complete and accurate information. The MEES Online Reporting System guru, Dave Sommer, network specialist with the Butte County Office of Education Information Technology Department, developed and maintained the MEES Online Reporting System and provided the evaluation data.

Butte County Office of Education leaders Superintendent Don McNelis, and Marilynn Keeble, Assistant Superintendent, Student Programs and Services, provided unflagging support to the MEES program and to the development of the online reporting system.

Maria Trejo, Child Development Division, and Ernesto Ruiz, Migrant Education Office, of the California Department of Education, guided and supported the MEES program and accountability efforts.

The staff of the First 5 California Children and Families Commission, Gretchen Williams and Elisa Bupara supported the evaluation activities. Along with Margaret Behan, Monica Regalado, Tina Fitzgerald, and Bill Madison, they read and provided helpful comments on the report drafts. Sims associates Helen Steel, Esther Papacoulis, and Danielle Costello contributed to this report through data analyses and document reviews, as did Editor Linda Moore.

Thank you all!

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INTRODUCTION

In October 2003 the First 5 California Children and Families Commission (CCFC) initiated a collaboration with the Butte County Office of Education, the California Department of Education-Migrant Education Program and the Migrant Education Even Start Program (MEES), and La Union del Pueblo Entero (LUPE) to provide family literacy services and a demonstration project to evaluate the impact of outreach activity.

The MEES program serves migrant families and provides them with early childhood development and kindergarten readiness skills for migrant children (birth to seven years of age) and classes on literacy, parenting and English as a second language, coordinating with local school districts, adult education programs, community colleges and other agencies to provide the services. MEES delivers early childhood education services through two models:

- The Home Based Model, where MEES teachers and aides work in the home with migratory parents and their children providing parenting skills and early childhood education services. The visiting teachers instruct the children while modeling practices for the parents to use in supporting their children's development.
- The Center-Based Model, where parents and children together attend classes at a school or center. Classes include English as a second language, literacy (English and native language), and parenting skills for parents, plus early childhood education and kindergarten readiness skills for their children.

The CCFC committed to provide funds annually for a period of four years to allow the MEES programs to serve an estimated 4,700 additional children zero to five years old and allow for enhancement and expansion of the current parent

component and family literacy services by creating additional school/center based programs and increasing the home based services component.

MEES Tasks

The First 5 MEES component was enhanced to accomplish the following tasks quoted from the MEES contract.

1. Augment licensed child care services during non-traditional hours especially during farm labor seasons.
    - *During the labor seasons, increase the hours of services to migrant children in order to reflect the farm labor working hours of their parents; and support the increase of child-care slots for migrant children.*
    - *The activities will be conducted with existing Preschool and Child Development Programs conducted under the Child Development Division in the California Department of Education.*
2. Increase capacities in order to serve more children and families.
3. Provide additional Early Childhood Education Programs to children ages 0-5.
4. Provide additional education services to migrant and seasonal farm worker parents.

Tasks 2, 3, and 4 include the following actions:

- *Expanding hours of service to current participants by at least 25%.*
- *Performing outreach activity to enroll an estimated 4,700 additional children ages 0-5 and their parents in the program.*
- *Creating a minimum of 60 new approved project sites statewide.*
- *Providing services through center-based models.*

5. Provide additional outreach and educational efforts in order to provide migrant parents with information and encouragement that will lead to their participation not only in MEES services, but also in all CCFC funded county services such as Universal Health, Preschool for All, School Readiness Initiative and other local, state and federal programs and services for which they are eligible.
6. Provide increased transportation services in isolated rural areas.
    - *These efforts will be conducted by coordinating services with local transportation providers such as: school districts, county education offices, public transportation entities and other local programs.*

LUPE

LUPE is a nonprofit, grassroots, community-based organization. The LUPE accomplishments will be reported in a separate document.

Purpose of This Evaluation

This report presents the findings from the evaluation of the MEES component of the **First 5 California Children of Migrant and Seasonal Farm Workers Project** as it affected the three- and four-year-old children served.

The children included in this study received services provided through the First 5 Enhancement funds exclusively or in combination with regular MEES funds.

The evaluation served two purposes: (a.) accountability for CCFC, MEES, and CDE decision makers and (b.) program improvement.

CCFC enabled MEES to serve 7,224 more children and parents.

The MEES First 5 Program

Accomplishments: The First 5 MEES personnel reported the following accomplishments as of June 30, 2006:

- According to the state coordinator of the MEES program, the regions referred from 350 to 400 First 5 children to existing preschool and child development programs conducted under the Child Development Division of the California Department of Education and other licensed child care services.
- MEES staff reported that the hours of service had increased by 30% statewide.
- Regions reported increasing enrollment of children and parents by 7,224. These included 117 one-year-old children, 268 two-year olds, 1933 children three or four years old, and 581 five-year olds. The remaining 4,268 were family members, including parents and 57 children older than five (the latter were to be moved out of the First 5 program into the regular MEES program).
- MEES programs established 99 new project sites statewide.
- Despite efforts to explore ways of providing center-based programs, nearly three in four study children received services through a home-based program. Past evaluations of the MEES program found that children who received home-based services demonstrated higher achievement than center-based

models. MEES administrators cited several reasons for offering home-based services: greater personal attention to children and parents and greater opportunity to model helpful supportive practices to parents during home visits. Several factors hindered the use of center-based models: lack of facilities, high cost of facilities, lack of transportation and parental preferences for home-based services.

- Regional staff reported expanding transportation services in isolated rural areas through local transportation providers such as subcontracts with school districts and transportation agencies and public transportation vouchers for buses, taxis, etc., plus mileage paid to staff for home visitations and instruction. For example, Region 10 in Los Angeles County provides taxi vouchers to parents to bring their children to a center to receive MEES services. The state MEES office reported that regions provided transportation services to 3,198 parents and 2,952 Children for a total of 6,150 clients.

MEES exceeded all the target number of children served, number of sites and hours of service.

EVALUATION METHODOLOGY

Determining Program Effect

To evaluate the effect of a program, we need an estimate of how participants would have performed if they had not participated in that program. The best estimate of program effect comes from a multimethod study that examines program implementation in conjunction with randomized control trials—a study with experimental and control groups randomly selected from the same student population. A quasi-experimental design also can provide an estimate of program effect by comparing program students to a group of similar students without random assignment.

Since random assignment was not feasible for the MEES program, this evaluation used a quasi-experimental approach to estimate program effect. The design included forming three comparison cohorts of migrant children based on the Brigance assessment forms for three-, four-, and five-year-old children. This is described further below.

Use of the Brigance Developmental Screens

MEES serves children from birth to seven years of age but focused its evaluation on its legislative mandate to help migrant children start kindergarten ready for school. A committee of MEES coordinators recommended that the state MEES program assess MEES children ages three and four to determine the effectiveness of MEES services.

To select an assessment instrument for this purpose, the committee reviewed numerous commercially available assessments using five criteria. The instrument had to

- align with the curriculum of MEES programs across more than 20 regions,
- be cost effective,
- minimize disruption of current regional program activities and practices,
- require minimal staff time to learn to administer and score;
- assess skills and knowledge parents and others would readily understand and support.

In 1998, the committee selected the Brigance Preschool Screen[1]. This brief inventory assesses early childhood general knowledge and comprehension (e.g., identification of body parts), speech and language (e.g., picture vocabulary, plural *s* and *–ing*), gross motor skills (e.g., standing and walking), fine motor skills (e.g., block tower building and drawing shapes), and counting by rote.[2]

[1] Curriculum Associates, *Brigance Screens*, 1998. See www.curriculumassociates.com
[2] State and regional MEES administrators and staff considered replacing the Brigance screens several times since they originally adopted this measure. They analyzed several alternatives, but none fit the needs of the MEES program.

Data Collection and Reporting Process

The state MEES office has facilitated and managed the data collection, provided training on the Brigance, collaborated with regional staff on the design and monitoring of the data collection, and funded and maintained the online reporting system used by the regions to submit the Brigance and related data.

Study Children

The evaluation plan called for regions to administer the Brigance screens to all three- and four-year-old children. To determine the effect of the program, the study sample included only the children reported as having received at least four hours of service between their pretest and post-test. In a home-based program, the four hours translated into four weekly visits by a MEES program home teacher.

As is to be expected with research that deals with large numbers of participants collected across multiple sites, the numbers reported for the children will vary from table to table due to missing and unreasonable data. For example, information such as type of service was missing for some children. In a few instances, the information provided was unreasonable; such as the case where seven of the home-based children were reported to receive more hours of service than likely, according to regional data personnel; this led to the elimination of those seven cases for the analyses dealing with hours of service.

The state MEES office reported that the regions enrolled **1,933** three- and four-year-old children in the MEES First 5 program. Eighteen regions submitted test data for **1,462** children funded through CCFC. Of these, **1,089** children fell within the study age span (36 months of age up to but not including 60 months old at pretest). Of these 1,089, **684** children (34.4%) met all the other criteria for inclusion in the study group: They received at least four hours of service (about one month in a home-based program), and had **both pretest *and* post-test scores** obtained from an **age-appropriate** Brigance Screen.

Regional Enrollment Versus Study Representation:

The study sample provides an estimate of performance of the First 5 three- and four-year-old children across the state but does not represent regions to the same extent that each region contributes to the total population of enrolled three- and four-year olds.

Ideally, a region's presence in the state population of enrolled three- and four-year olds should be the same as its presence in the study sample. In this study, regions differed in their contributions to the ***enrolled*** population and ***studied***.

Table 1 presents the numbers and percentages of the MEES First 5 three- and four-year-old children **enrolled** and the **study** children by region. It displays the differences in the regional composition of the target children funded by CCFC and the final group that comprised the study group for the evaluation.

The percentages show shift in the regional presence in the children funded and children studied. For example, Regions 2 and 3 served 23.9% and 15.3% of the MEES First 5 three- and four-year olds across the state respectively. However, after refining the study sample to meet all the selection criteria, Region 2 contributed 10% of the study sample and Region 3 contributed 46% of the study sample, giving Region 3 a greater presence in the study findings.

Table 1

Number and Percent of MEES First 5 Three- and Four-Year-Old Children Enrolled and Tested and in the Study Group

	3- & 4-Year-Olds Enrolled			Study Children	
Region	**N**	**% of State**	**% Tested**	**N**	**% of Study Sample**
1	45	**1.4%**	0%	0	**0%**
2	796	**23.9%**	43%	71	**10%**
3	509	**15.3%**	63%	312	**46%**
4	231	**6.96%**	55%	7	**1%**
5	323	**9.7%**	76%	62	**9%**
6	89	**2.7%**	62%	8	**1%**
7	69	**2.1%**	48%	28	**4%**
8	226	**6.8%**	66%	50	**7%**
9	129	**3.9%**	17%	4	**1%**
10	187	**5.6%**	80%	77	**11%**
11	26	**0.8%**	62%	6	**1%**
13	96	**2.9%**	0%	0	**0%**
14	1	**0.0%**	0%	0	**0%**
18	66	**2.0%**	7%	2	**0%**
19	30	**0.9%**	65%	0	**0%**
20	7	**0.2%**	58%	0	**0%**
21	57	**1.7%**	69%	11	**2%**
22	51	**1.5%**	67%	17	**2%**
23	352	**10.6%**	100%	29	**4%**
24	36	**1.1%**	8%	0	**0%**
Totals	3,326	**100%**	55%	684	**100%**

* According to data provided by the state MEES office, Regions 12, 16, and 17 did not report enrolling any MEES First 5 three- and four-year-old children.

Age of Study Children

Study children ranged from 36 to 59.96 months of age, with an average of 47.2 months, and a median of 46.7 months. Table 2 presents basic descriptive statistics—the average age, oldest, youngest, median age (the age in the middle of the range with half the children older and half younger than the median), the mode (the most frequently occurring age), and the standard deviation.

Table 2

Age in Months of the 2005–2006 MEES First 5 Children at Pretest

Statistic	Months
Average	47.2
Oldest	59.96
Youngest	36.0
Median	46.7
Mode	53.0
Standard Deviation	6.6
Number of Children	684

Gender of Study Children

The study sample included slightly more girls than boys: The regions identified 357 or 52.2% as girls and 317 or 46.3% as boys and left this item blank for 10 children.

Type of Early Childhood Education Services

Almost four in five of the study children received **home-based** services, one in five received **center-based** services, and one child received both home-based and center-based services. Table 3 presents the number and percent reported as receiving the types of service.

Table 3

Types of Service Reported at Post-Test

Service Type	Number	Percent
Home-Based	541	79.1%
Center-Based	142	20.8%
Both	1	.1%
Total	683	100%

Since only one study child reportedly received both home- and center-based services, no further details will be reported for that category.

Hours of MEES First 5 Service

The study children received an average of 35.4 hours of service for the year, with a median of 21 hours and a range of 4 to 600 hours. Children who received **home-based** service averaged 23 hours of service, with a median of 19 hours and a range of 4 to 170 hours. On average these children received *1.1 hours of service per week.*

Those who received **center-based** service received an average of 80.1 hours, with a median of 52.5 and a range of 5 to 600 hours. These children averaged *5.4 hours of service per week and 24 weeks in the program for the year.*

Table 4 presents the descriptive statistics for the hours of service reported for each of the three service groups.

Table 4

Number of Hours of Service and Brigance Score Gain by Service Type

Statistic	Home-Based	Center-Based
Number	534	142
Average	23	80.1
Maximum	170	600
Minimum	4	5.0
Median	19	52.5
Mode	21	21.0
Standard Deviation	18	106.3

Enrollment Dates

The regions reported that the 684 study children enrolled in the MEES First 5 programs from July 2004 through July 2006. Half the children enrolled before October 7, 2005.

Comparison Cohorts

The comparison children met all the requirements met by the study group (three or four years old, age-appropriate test form). They differed from the study group in that they could have enrolled in a program funded through either MEES or the CCFC and they had received fewer than four hours of service. We divided these children into three age cohorts by test form: Form 3 for three-year olds, Form 4 for four-year olds, and Form K or 5 for five-year old children.

Table 5 provides descriptive information on each of the comparison cohorts. The publisher of the Brigance designates Form 3 for children 33 to 44 months and Form K for children 57 to 68 months of age; however, since that the study sample included only three- and four-year-old children, the comparison cohorts included only children within the same age ranges.

Table 5

Number of Comparison Cohorts per Developmental Screen Form

Brigance Form	Age in Months	Numbers	Average Age in Months
3 A & Y	36 to 44	912	40.2
4 A & Y	45 to 56	1,325	50.9
K	57 to 60	330	60.8

Home and Test Languages

The regions identified Spanish as the home language of all but one of the 684 study children and identified “Other” for the remaining child.

The Brigance screens are not language tests but assess developmental skills and knowledge. MEES test administrators were instructed to use the language of the test form (either English or Spanish) in administering the screens but to accept responses in any language the child used.

Most testers administered the pretest in Spanish (670 or 98.4%), with 11 tests in English. At post-test, the regions reported administering 655 or 96.5% in Spanish and 23 in English. They may have changed due to the child’s English dominance or district policy.

MAJOR FINDINGS

The children **very significantly** improved from **pretest** to **post-test**.

The Brigance screens include test forms to assess children from infancy to elementary school age, enabling users to track children's development over time. With time, children may require different forms appropriate for their ages at post-test. Curriculum Associates publishes a process for transforming pretest scores and producing "normalized" scores to allow technically sound comparison of scores across test forms.

We followed publisher instructions[3] in transforming the pretest scores of the children with different pretest and post-test forms. The report presents the results of all initial pretest scores **plus** the normalized pretest scores. To determine growth or *change* from pretest to post-test, the normalized scores are used for the children with different pretest and post-test forms.

Average Brigance Scores of All First 5 Children

The study children **significantly** improved their performance on the Brigance screens from **pretest** to **post-test**. Of the 684 study children, 95.2% scored higher at post-test than at pretest.

Table 6 presents the basic statistics describing the pretest and post-test scores for all 684 study children and the change from pretest to post-test. On average children scored 23.1 points higher at post-test than at pretest. The changes ranged from a maximum of 101 points by a child with a normalized

[3] Curriculum Associates, *Brigance PreSchool Screen Technical Manual*, Appendix D, pages 57-58.

pretest score less than 0 to a decline of 48 points from pretest to post-test by another child. Half the changes exceeded 21 points and half the changes fell below 21.

Table 6

2005-2006 Basic Descriptive Statistics of the

Pretest and Post-Test Brigance Scores and Change from Pretest to Post-Test

Statistic	Pretest	Post-Test	Change*
Average	58.7	81.7	23.1
Maximum	98.0	100.0	101.0
Minimum	-14.0	2.0	-48.0
Median	60.0	85.0	21.0
Mode	64.0	90.0	15.0
Standard Deviation	19.3	13.4	16.3
Number	684		

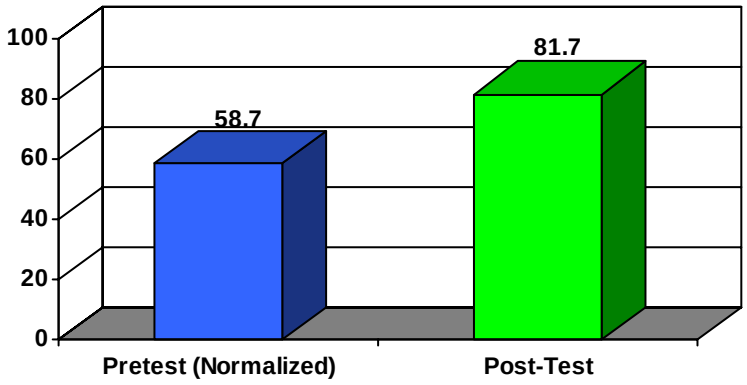
* Pretest scores were normalized as necessary. The Change column is based on the post-test score minus the normalized pretest score.

Figure 1 illustrates the average Brigance scores of these children at pretest and post-test.

Figure 1

Average Pretest and Post-Test Brigance Screen Scores of

2005-2006 MEES First 5 Study Children



The program cut the percentage of at-risk scores almost in half:
76% at pretest to 46% at post-test.

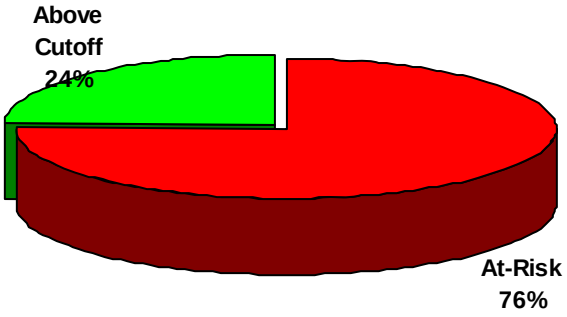
At-Risk Scores

At pretest, three in four of the study children (76%) scored at or below the cutoff score used by the publisher to identify children "at-risk of developmental or academic delays." On the post-test, 205 of the children with at-risk *pretest* scores raised their post-test scores above that cutoff, dropping the percentage of all at-risk scores to 46%.

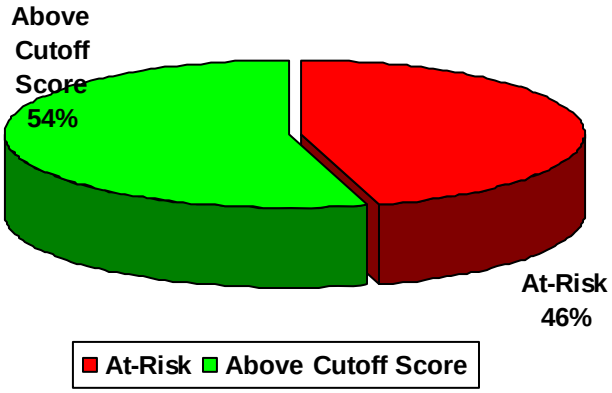
Figure 2 illustrates the percent of these scores that were at or above the at-risk cutoff at pretest and post-test.

Figure 2

Percent of 2005-2006 "At-Risk" Scores at Pretest



Percent of 2005-2006 "At-Risk" Scores at Post-Test



Comparison Group

Statisticians have developed tests to help us determine whether there are statistically significant differences between the means of two or more groups. Statistically significant differences identify meaningful relationships. They indicate the likelihood that a "true" difference exists between groups instead of a difference occurring by coincidence or chance.

These statistical tests report the likelihood of a "true" difference in the form of probability or p values. A p-value of .001 means that the probability is 1 in 1,000 that the difference between groups is due to chance or coincidence. In other words, we would expect that the difference between groups would be due to coincidence for no more than 1 instance in 1,000 instances.

The smaller the p-value, the less probable that the difference would occur by chance and the more confident we can be that a "true" difference between the groups exists. In most social science research, only p-values less than .05 (representing 1 chance in 20) are considered statistically significant.

Comparisons of the post-test scores of study and comparison cohorts yielded **hugely significant** differences across all three test forms (p<.0001 or smaller).

Three-year-old study children outscored their nonserved age mates an average Brigance score of 83.9 to 65.7, the four-year-olds 80.5 to 67.6, and the five-year-old study children 83.6 versus 68.7. A "*t* test" of the statistical significance of these differences yielded a chance probability of less than .0001. (See the Appendix for the detailed statistical results.)

Table 7 provides the numbers of the study and comparison groups.

Table 7

Average Brigance Scores of First 5 and Comparison Cohorts

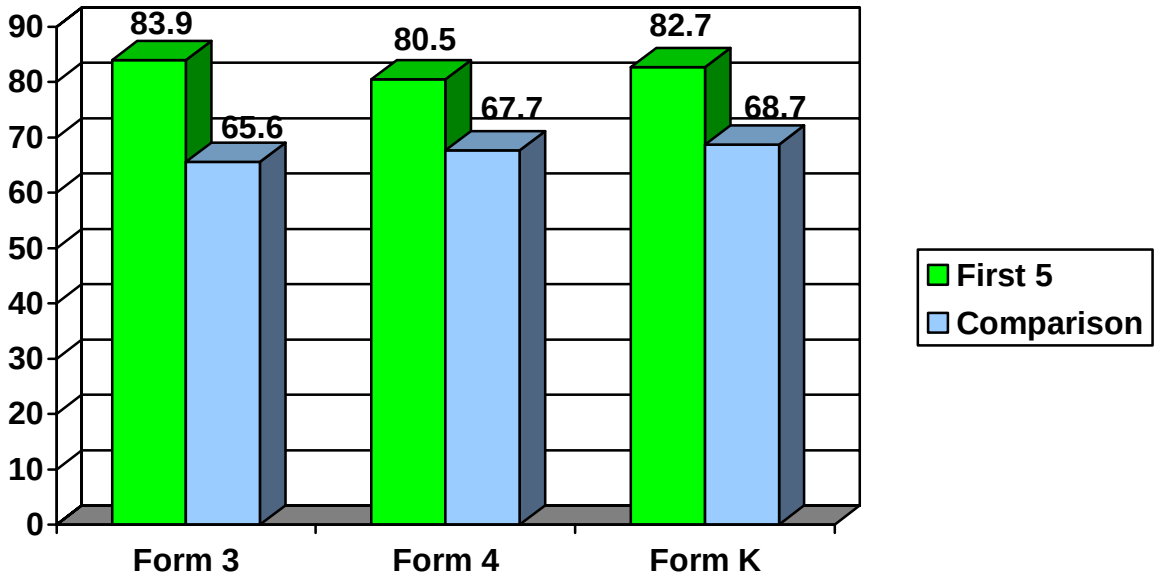
Form	First 5	Comparison	Difference
3 Years	83.9	65.6	18.3*
4 Years	80.5	67.7	12.8*
K- 5 Years	82.65	68.7	13.95*

* Probability <.0001

Figure 3 presents a bar graph of these MEES First 5 and comparison scores by test form.

Figure 3

Average MEES & First 5 and Comparison Scores by Brigance Form



Type of Service and Change from Pretest to Post-Test

Almost four in five of the study children received home-based services. The remainder attended a center-based program, and one child received both types of services.

The following section reports on (a) the performance and changes in average scores of each group and (b) the number and percent of at-risk scores observed at pretest and post-test in the two groups.

Both home-based and center-based groups gained significantly from pretest to post-test, but the home-based children gained significantly more.

Type of Service and Change from Pretest to Post-Test

Average Scores: We conducted two types of statistical analyses to determine whether the home-based and center-based groups differed significantly—repeated measures analysis of variance and *t* tests (see the Appendix). The differences in the average ***pretest*** scores of the two groups failed to attain statistical significance; this means that the two groups were probably similar at a similar level when they started the program.

Two other differences, however, attained statistical significance:

- The pretest to post-test change for both home-based and center-based groups (p<.0001), meaning that both groups showed **significantly higher post-test scores,**
- An interaction between the service type and test (<.0011), meaning that the home-based group **improved** significantly better than the center-based group; the improvement of 24.1 points by the home-based group was significantly greater than the improvement of 19.2 points by the center-based group.

Table 8 provides the average pretest and post-test scores and change or average gain from pretest to post-test for the two service groups.

Table 8
Average Pretest and Post-Test Scores
of Home-Based and Center-Based Groups

	Number	Pretest	Post-Test	Gain*
Home-Based	541	58.3	82.4	24.12**
Center-Based	142	60.1	79.3	19. 15**

* The difference between the pretest and post-test reached a p<.0001.
** p<.0011 for the difference between the gains of the two groups.

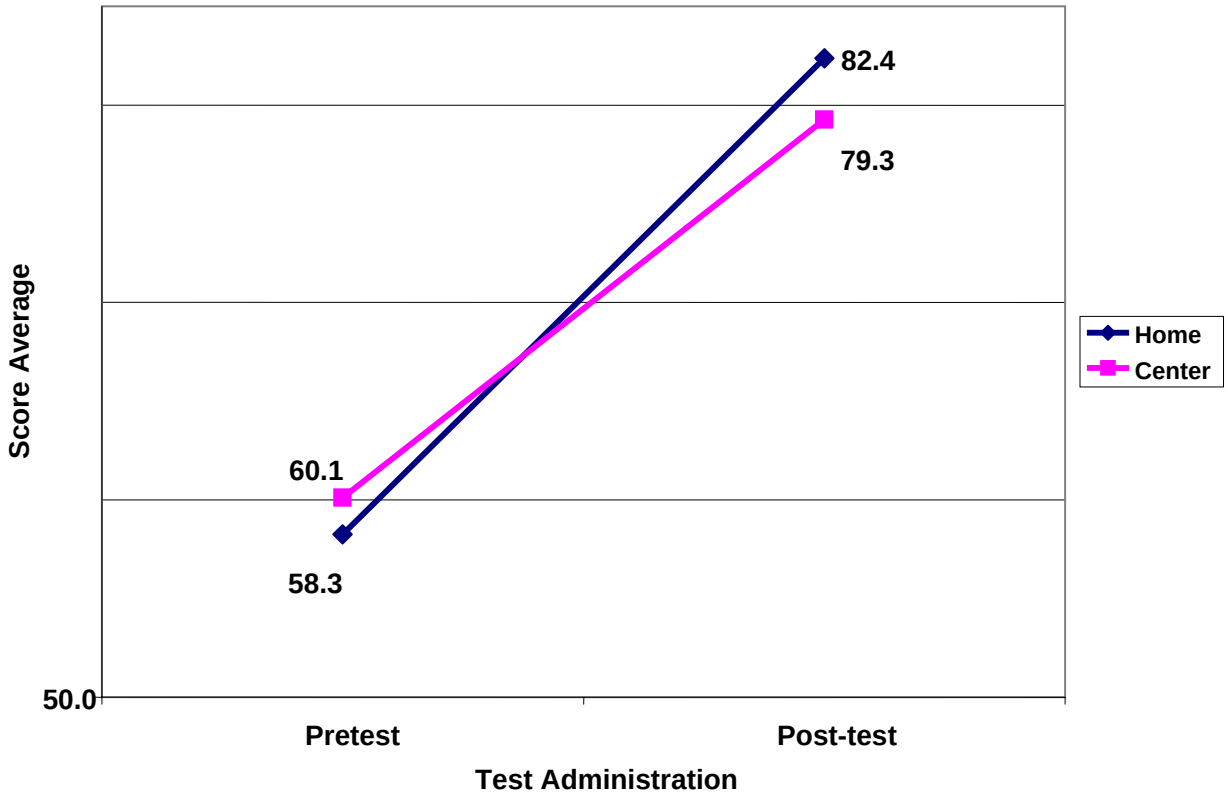
Figure 4 illustrates the change in these average pretest and post-test scores of the two service groups. It shows the significantly greater improvement

by the home-based group. That group started off lower than the center-based group at pretest but significantly outperformed the center-based group at post-test.

Figure 4

2005-2006 Average Pretest and Post-Test Scores for

Home-Based and Center-Based Children



At- Risk Scores by Service Type

At pretest, almost four in five or 417 of the 541 home-based children scored at or below the at-risk cutoff. At post-test 182 of these children raised their scores above the cutoff, an improvement of 34%.

Among the 142 center-based children, seven in 10 or 100 scored at-risk at pretest. Of these, 23 children raised their post-test scores above the cutoff, an improvement of 24%. Table 9 provides the numbers for these changes.

Table 9

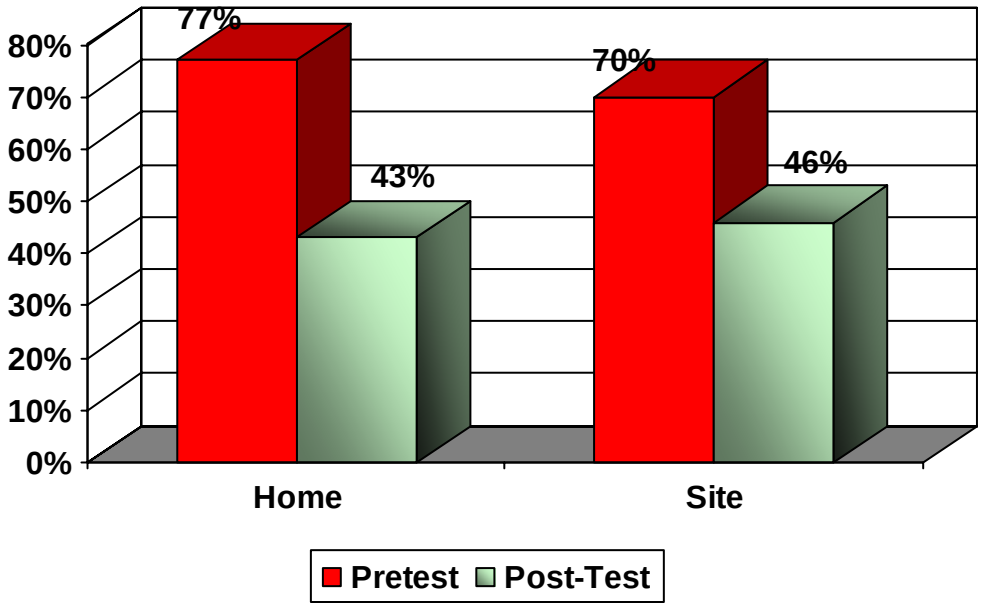
Number and Percent of Scores at or below the At-Risk Cutoff

AT-RISK	Pretest			Post-Test		Change	
	Number	Percent		Number	Percent	Number	Percent
Home-Based							
At/Below 0:	417	77%		235	43%		
Above 0:	**124**	**23%**		**306**	**57%**	**182**	**34%**
	541	100%		541	100%		Improved
Center-Based							
At/Below At Risk	100	70%		77	54%		
Above At-Risk	**42**	**30%**		**65**	**46%**	**23**	**16%** Improved
	142	100%		142	100%		

Figure 5 illustrates the differences in the percent of at-risk scores at pretest and post-test in the two service groups. In both home-based and center-based programs, the percentage of at-risk scores dropped substantially; however, the home-based children improved more.

Figure 5

Percent of Scores at or below the At-Risk Cutoff by Service Type



Service Reported by Type of Programs

Home-based children participated in the program an average of 24.7 weeks and averaged 23 hours of service, with a median of 19 hours. Center-based children attended their centers an average of 22.1 weeks and averaged 80.1 hours of service, with a median of 52.5 hours.

Home-based children received fewer hours of service and gained more on the Brigance than center-based children.

Pretest to Post-Test Changes and Hours of Service

Table 10 provides information on the hours of service and gain on the Brigance Developmental Screen. Analyses of the correlation between gains and hours of service yielded no significant finding for either the home- or center-based programs.

Table 10

Hours of Service and Brigance Score Gain by Service Type at Post-Test

Service Type	Number	Average Hours	Median Hours	Average Gain
Home	541	23	19	24.1
Center	142	80.1	52.5	19.1

The lack of a relationship between hours of service and gains on the Brigance tests may be due to differences in the quality of service—teacher qualifications or curriculum and related services may contribute more to gains than hours of service. With home-based programs, the number of hours reported includes those that a visiting teacher spends a home plus preparation time but does not include the hours that the parents devote to homework, to extending the lessons or applying the principles they learn from the visiting teacher.

SUMMARY AND CONCLUSION

The MEES First 5 component met or exceeded the specific targets contracted with the CCFC. The MEES First 5 programs

- increased the hours of service to children and their caregivers by 30%.
- enrolled 2,524 more children and parents in the program than the targeted 4,700.
- created 99 new project sites statewide instead of the targeted 60 sites.
- helped an estimated 350 to 400 families receive licensed child care.
- provided transportation to 2,952 children and 3,198 parents or to program staff to visit them.
- continued to provide services through home-based programs instead of center-based programs since that fit the needs of the client farmworker families and enabled the program to provide the services more effectively.

This study revealed additional information about the MEES First 5 Program:

- nearly three in four study children received services through a home-based program.
- regardless of the type of service received, the MEES First 5 children improved significantly from pretest to post-test on the Brigance Developmental Screens. At pretest, 76% of the children scored in the at-risk category; at post-test this percentage dropped to 46%.
- children in home-based programs demonstrated significantly greater gains than children in center-based programs.
- MEES First 5 children dramatically and significantly scored higher than their same-age comparison counterparts both in average score and in the “at-risk” status of their scores.

RECOMMENDATIONS

The above study of the 2005-2006 MEES First 5 Program leads to several recommendations:

- Study the children whose scores dropped from pretest to post-test to identify interventions that may help the children improve along with their peers.
- Compare programs that produced the highest and lowest gains to identify factors that contributed to the greatest achievement.
- Continue providing home-based services, especially to the neediest migrant children in isolated rural areas.
- Continue assessing and monitoring program effect and ensure that all regions funded for three- and four-year olds administer and report evaluation data.

Appendix

STATISTICAL ANALYSES: *t*-Test for Independent Samples

Analyses computed at http://faculty.vassar.edu/lowry/VassarStats.html

Summary Data:
Comparison between Form 3 F5 and Comparison Scores

	A	B	Total
n	108	913	1021
Σ X	9058	59935.5	68993.5
Σ X^2	781450	4292084	5073534.25
SS	21752.1852	357512	411337.3428
mean	83.8704	65.6468	67.5744

MeanA—MeanB	*t*	df
18.2236	+Infinity	0
	one-tailed	<.0001
P	**two-tailed**	<.0001

Summary Data: **Comparison between Form 4 F5 and Comparison Scores**

	A	B	Total
n	357	1324	1681
Σ X^2	28750	89586.2	118336.2
Σ X^2	2381518	6528913	8910430.64
SS	66216.8796	467215	579998.6171
mean	80.5322	67.6633	70.3963

MeanA—MeanB	*t*	df
12.8689	+Infinity	0
	one-tailed	<.0001
P	**two-tailed**	<.0001

Summary Data: **Comparison between Form K F5 and Comparison Scores**

	A	B	Total
	219	330	549
Σ X	18100.5	22663.5	40764
Σ X^2	1529638.75	1663857	3193496
SS	33620.0274	107390	166713.3115
Mean	82.6507	68.6773	74.2514

$Mean_A$—$Mean_B$	*t*	df
13.9734	+Infinity	0
P	**one-tailed**	<.0001
	two-tailed	<.0001

t-Test for Independent Samples

Summary Data: Comparison between Home- and Center-Based Post-Tests

	Home-Based	Center-Based	**Total**
N	541	142	683
Σ	44564.5	11253	55817.5
Σ^2	3755604.3	928722	4684326
SS	84634.453	36960.9	122696
Mean	82.3743	79.2465	81.724

$Mean_A$—$Mean_B$	t	df
3.1278	2.48	681
P	**one-tailed**	0.00669
	two-tailed	0.01338

ANALYSIS OF VARIANCE FOR SERVICE TYPE

VassarStats Printable Report
2x2 Factorial ANOVA with Repeated Measures on One Factor

Number for Cells, Rows, Columns, and Total

	Pretest	Post-Test	Totals
Home	541	541	1082
Center	142	142	284
Totals	683	683	1366
Means			
Home	58.25	82.37	70.31
Center	60.1	79.25	69.67
Totals	58.635	81.724	70.18

ANOVA Summary: 2 rows x 2 columns

A = groups: the between-subjects variable delineated by the rows					
B = the repeated-measures variable delineated by the columns					
Source	**SS**	**df**	**MS**	**F**	**P**
Between Subjects	**287007.75**	**682**			
A: Service Type	**91.59**	**1**	**91.59**	**0.22**	**0.63919**
Subjects within A	**286916.16**	**681**	**421.32**		
Within Subjects	**272243.88**	**683**			
B: Pretest/Post-test	**182047.68**	**1**	**182048**	**1396.1**	**<.0001**
A x B	**1394.45**	**1**	**1394.5**	**10.69**	**0.0011**
B x Subjects within A	**88801.75**	**681**	**130.4**		

Conclusions: Significant difference between pretest to post-test. No statistically significant difference between home and center-based groups at pretest.

Summary Data Comparing Home- and Center-Based Post Scores

	Home	Center	Total
N	541	142	683
X Σ	44564.5	11253	55817.5
X^2 Σ	3755604.25	928721.5	4684326
SS	84634.4529	36960.8732	122696
Mean	82.3743	79.2465	81.724

$Mean_A$—$Mean_B$	***t***	**df**
3.1278	+2.48	681
P	**one-tailed**	0.0066895
	two-tailed	0.013379

Post-test scores of home- and center-based groups differ statistically