Appendix C

Detailed Tables on Meals and Snacks Consumed by CACFP Participants

Exhibit C.1

Mean Portion Sizes of CACFP Breakfast Foods Taken by Children

	CACFP	Children Receiving Care In			
		Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
		Mean Portion Taken at Breakfast[1]			
Milk					
Ages 1 - 2	.50 cups	.64 cups	n/a	.56 cups	.56 cups
3	.75	.65	.84 cups	.67	.71
4	.75	.76	.83	.76	.80
5	.75	.69	.82	.77	.80
Fruits, Vegetables, or Juices					
Ages 1 - 2	.25 cups	.47 cups	n/a	.47 cups	.47 cups
3	.50	.66	.46 cups	.49	.49
4	.50	.69	.51	.58	.54
5	.50	.59	.56	.56	.56
Breads or Bread Alternates[2]					
Ages 1 - 2	14 gm[3]	31 gm	n/a	26 gm	26 gm
3	14	32	28 gm	30	29
4	14	35	28	33	31
5	14	30	33	36	34
Number of Child Observations (Unweighted)					
Ages 1 - 2		132	2	114	116
3		69	97	137	234
4		49	386	140	526
5		45	327	134	461

n/a = Fewer than 25 child observations.

Note: Data for six- to ten-year-olds not shown because fewer than 25 children were observed in each mode of care.

[1]Breakfast portion defined as total amount taken, including second helpings in family-style service.

[2]Mean gram weight of breads and bread alternates taken; dry weight used for items such as hot cereal, pasta, and rice.

[3]Approximate gram weight of required one-half slice of bread (1 slice of bread = 28 gm).

Exhibit C.2

Mean Percentage of Breakfast Portions Consumed by Age Group[1]

	All Children	Children Receiving Care in: Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Milk					
Ages 1 - 2	75%	76%	n/a	73%	72%
3	72	75	61%	74	71
4	73	82	70	70	70
5	77	85	74	76	75
6 - 10	90	93	n/a	n/a	n/a
All Ages	75	80	70	73	72
Fruits, Vegetables, and Juices					
Ages 1 - 2	73	72	n/a	75	75
3	73	70	65	79	75
4	78	95	76	69	72
5	80	86	80	77	79
6 - 10	92	93	n/a	n/a	n/a
All Ages	77	80	76	75	75
Breads and Bread Alternates					
Ages 1 - 2	75	77	n/a	73	73
3	73	80	66	71	70
4	75	82	73	71	72
5	76	84	72	77	74
6 - 10	92	93	n/a	n/a	n/a
All Ages	76	81	71	73	72
Noncreditable Foods[2]					
Ages 1 - 2	75	76	n/a	n/a	n/a
3	80	89	77	72	73
4	77	84	76	73	74
5	78	87	72	82	75
6 - 10	97	n/a	n/a	n/a	n/a
All Ages	79	83	74	74	74
Number of Child Observations (Unweighted)[3]					
Ages 1 - 2	248	132	2	114	116
3	303	69	97	137	234
4	575	49	386	140	526
5	506	45	327	134	461
6 - 10	57	44	6	7	13
All Ages	1689	339	818	532	1350

[1]Breakfast portions defined as total amount taken, including second helpings in family-style service.

[2]Foods that do not contribute to satisfying the CACFP meal pattern.

[3]Total number of child observations. Actual sample size varies for each meal component because children did not necessarily receive all components.

Exhibit C.3

Mean Percentage of Available Breakfast Nutrients Actually Consumed[1]

	All Children	Children Receiving Care in: Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Total Energy					
Ages 1 - 2	75%	75%	n/a	75%	75%
3	74	79	66%	74	72
4	76	84	73	72	72
5	79	85	76	79	77
6 - 10	91	93	n/a	n/a	n/a
All Ages	77	81	73	75	74
Macronutrients					
Total Fat					
Ages 1 - 2	75	75	n/a	76	75
3	74	78	66	75	72
4	75	82	73	72	72
5	77	84	75	76	76
6 - 10	91	93	n/a	n/a	n/a
All Ages	76	80	72	74	74
Saturated Fat					
Ages 1 - 2	76	76	n/a	76	75
3	74	77	65	74	72
4	74	82	72	71	72
5	77	84	75	76	75
6 - 10	90	93	n/a	n/a	n/a
All Ages	76	80	72	74	73
Carbohydrate					
Ages 1 - 2	75	75	n/a	75	75
3	74	78	66	74	72
4	76	85	74	71	73
5	79	85	76	79	78
6 - 10	91	93	n/a	n/a	n/a
All Ages	77	81	73	75	74
Protein					
Ages 1 - 2	75	76	n/a	73	73
3	73	77	65	73	71
4	74	82	72	71	72
5	78	85	74	77	76
6 - 10	90	92	n/a	n/a	n/a
All Ages	76	80	71	74	73
Vitamins and Minerals					
Vitamin A					
Ages 1 - 2	76	78	n/a	72	71
3	73	78	65	71	70
4	74	83	71	71	71
5	78	86	74	78	76
6 - 10	90	92	n/a	n/a	n/a
All Ages	76	82	71	73	72

Exhibit C.3
(continued)

	All Children	Children Receiving Care in: Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Vitamin C					
Ages 1 - 2	77%	76%	n/a	80%	80%
3	74	72	69%	78	76
4	78	88	74	73	73
5	80	85	78	81	79
6 - 10	91	93	n/a	n/a	n/a
All Ages	78	81	75	77	76
Calcium					
Ages 1 - 2	75	76	n/a	74	73
3	73	78	64	73	71
4	74	82	71	71	71
5	77	86	74	76	75
6 - 10	90	93	n/a	n/a	n/a
All Ages	76	81	71	73	72
Iron					
Ages 1 - 2	76	76	n/a	75	75
3	73	76	67	73	71
4	75	83	73	71	72
5	78	84	75	79	77
6 - 10	90	91	n/a	n/a	n/a
All Ages	76	80	73	74	74
Other Dietary Constituents					
Cholesterol					
Ages 1 - 2	75	77	n/a	71	71
3	73	76	63	74	71
4	75	82	72	72	72
5	78	84	76	76	76
6 - 10	89	91	n/a	n/a	n/a
All Ages	76	80	72	73	73
Sodium					
Ages 1 - 2	76	77	n/a	72	72
3	73	79	66	70	69
4	75	81	72	72	72
5	78	85	74	79	76
6 - 10	91	93	n/a	n/a	n/a
All Ages	76	81	72	73	73
Number of Child Observations (Unweighted)					
Ages 1 - 2	248	132	2	114	116
3	303	69	97	137	234
4	575	49	386	140	526
5	506	45	327	134	461
6 - 10	57	44	6	7	13
All Ages	1689	339	818	532	1350

n/a = Fewer than 25 child observations.

[1]Available nutrients defined as nutrients in total amount of food taken, including second helpings in family-style service.

Exhibit C.4

Mean Energy and Nutrient Intake from CACFP Breakfasts Consumed by Age Group

	All Children	Children Receiving Care in: Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Total Energy (kcal)					
Ages 1 - 2	201	218	n/a	162	161
3	202	231	186	186	186
4	245	278	238	227	233
5	254	323	257	216	237
6 - 10	322	332	n/a	n/a	n/a
All Ages	232	259	236	199	214
Macronutrients					
Total Fat (gm)					
Ages 1 - 2	6.0	6.7	n/a	4.5	4.5
3	6.1	7.5	5.6	5.3	5.4
4	6.6	7.2	6.9	5.8	6.4
5	7.6	10.2	8.2	5.7	6.9
6 - 10	7.8	8.0	n/a	n/a	n/a
5 - 10	7.6	9.0	8.2	5.6	6.9
Saturated Fat (gm)					
Ages 1 - 2	2.8	3.2	n/a	2.0	2.0
3	2.8	3.4	2.7	2.4	2.5
4	3.2	3.5	3.3	2.9	3.1
5	3.6	4.5	3.8	2.9	3.4
6 - 10	3.3	3.4	n/a	n/a	n/a
5 - 10	3.5	3.9	3.8	2.9	3.3
Carbohydrate (gm)					
Ages 1 - 2	30.4	32.4	n/a	25.7	25.6
3	30.5	33.9	27.4	29.0	28.6
4	38.9	45.8	35.7	37.0	36.3
5	38.4	48.2	37.4	34.6	36.0
6 - 10	53.2	54.9	n/a	n/a	n/a
5 - 10	41.5	51.9	37.4	34.3	35.8
Protein (gm)					
Ages 1 - 2	7.2	7.9	n/a	5.5	5.4
3	7.0	8.1	7.3	6.2	6.5
4	8.8	9.3	9.0	8.0	8.6
5	9.1	11.2	9.4	7.7	8.6
6 - 10	10.9	11.2	n/a	n/a	n/a
5 - 10	9.4	11.2	9.3	7.7	8.5
Vitamins and Minerals					
Vitamin A (mcg RE)					
Ages 1 - 2	170	186	n/a	136	135
3	158	192	157	135	140
4	185	220	169	175	172
5	187	251	162	181	172
6 - 10	322	332	n/a	n/a	n/a
All Ages	184	220	165	156	160

Exhibit C.4
(continued)

	All Children	Children Receiving Care in: Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Vitamin C (mg)					
Ages 1 - 2	16	14	n/a	21	21
3	16	13	22	16	18
4	24	23	21	29	25
5	25	22	24	27	25
6 - 10	27	28	n/a	n/a	n/a
All Ages	21	18	22	23	23
Calcium (mg)					
Ages 1 - 2	181	203	n/a	131	131
3	188	206	183	177	178
4	223	243	209	223	215
5	231	272	229	212	221
6 - 10	287	294	n/a	n/a	n/a
All Ages	211	230	212	189	198
Iron (mg)					
Ages 1 - 2	2.4	2.4	n/a	2.5	2.5
3					
4	2.4	2.7	2.3	2.4	2.3
5	2.3	2.8	1.9	2.6	2.2
6 - 10	4.0	4.0	n/a	n/a	n/a
All Ages	2.4	2.8	2.0	2.2	2.1
Other Dietary Constituents					
Cholesterol (mg)					
Ages 1 - 2	37	44	n/a	19	19
3	35	51	40	23	27
4	34	40	37	26	32
5	35	50	40	22	31
6 - 10	51	53	n/a	n/a	n/a
5 - 10	38	52	40	22	31
Sodium (mg)					
Ages 1 - 2	271	297	n/a	211	210
3	264	314	254	230	236
4	301	327	307	272	291
5	335	453	348	264	306
6 - 10	438	451	n/a	n/a	n/a
5 - 10	356	452	347	263	305
Number of Child Observations (Unweighted)					
Ages 1 - 2	248	132	2	114	116
3	303	69	97	137	234
4	575	49	386	140	526
5	506	45	327	134	461
6 - 10	57	44	6	7	13
All Ages	1689	339	818	532	1350

n/a: Fewer than 25 child observations.

Note: For macronutrients, cholesterol, and sodium, aggregation across age groups has been limited to five-year-olds and six- to ten-year-olds (see Chapter Two).

Exhibit C.5

Mean Percentage of RDAs Provided in CACFP Breakfasts Consumed by Age Group

	All Children		Children Receiving Care in:							
			Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Total Energy										
Ages 1 - 2	15.4	0.8	16.8	1.0	n/a	n/a	12.4	0.9	12.4	0.9
3	15.5	0.9	17.8	1.1	14.3	1.5	14.3	1.6	14.3	1.1
4	13.6	0.7	15.5	1.6	13.2	0.7	12.6	1.3	12.9	0.6
5	14.1	1.0	18.0	3.2	14.3	0.7	12.0	1.4	13.2	0.9
6 - 10	16.8	0.8	17.3	0.8	n/a	n/a	n/a	n/a	n/a	n/a
All Ages	14.8	0.6	17.0	0.7	13.8	0.6	13.0	0.9	13.3	0.6
Protein										
Ages 1 - 2	44.8	3.1	49.5	4.1	n/a	n/a	34.2	2.1	34.0	2.2
3	44.0	2.7	50.4	4.8	45.6	4.0	38.8	3.3	40.5	2.6
4	36.5	2.5	38.8	4.1	37.5	3.7	33.5	3.7	35.6	2.2
5	37.8	3.2	46.5	7.0	39.1	2.0	32.1	4.7	35.6	2.8
6 - 10	41.7	2.6	42.6	2.7	n/a	n/a	n/a	n/a	n/a	n/a
All Ages	40.6	2.1	46.5	2.9	39.3	2.8	35.0	3.0	36.7	2.1
Vitamin A										
Ages 1 - 2	42.6	3.8	46.4	4.7	n/a	n/a	34.0	4.9	33.8	4.9
3	39.6	2.8	47.9	6.9	39.4	3.3	33.7	3.1	35.1	2.9
4	37.0	2.0	44.0	3.1	33.8	2.5	34.9	2.6	34.3	1.9
5	37.4	4.1	50.1	6.1	32.4	4.8	36.3	5.3	34.3	4.3
6 - 10	52.2	6.5	53.5	7.2	n/a	n/a	n/a	n/a	n/a	n/a
All Ages	39.8	1.7	47.6	2.6	34.2	3.0	34.6	2.4	34.5	2.2
Vitamin C										
Ages 1 - 2	39.5	4.9	33.9	5.7	n/a	n/a	52.7	8.9	52.5	8.8
3	40.5	4.5	33.4	5.1	55.1	6.9	40.7	7.4	44.3	6.8
4	53.9	4.5	51.2	7.6	45.9	4.5	65.5	10.0	54.9	5.8
5	55.1	4.6	49.4	8.0	53.7	4.7	59.4	12.1	56.5	6.4
6 - 10	59.3	11.3	61.6	12.7	n/a	n/a	n/a	n/a	n/a	n/a
All Ages	48.2	2.7	42.4	4.0	50.4	3.3	53.3	5.0	52.2	3.5

Exhibit C.5
(continued)

	All Children		Children Receiving Care in:							
			Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Calcium										
Ages 1 - 2	22.6	1.8	25.3	2.5	n/a	n/a	16.4	1.4	16.3	1.4
3	23.5	1.3	25.7	2.8	22.8	1.2	22.1	1.5	22.3	1.2
4	27.8	2.2	30.4	3.8	26.1	1.3	27.8	4.1	26.9	2.0
5	28.8	3.0	34.0	4.9	28.6	1.6	26.6	4.7	27.6	2.7
6 - 10	35.8	2.6	36.8	2.7	n/a	n/a	n/a	n/a	n/a	n/a
All Ages	26.4	1.7	28.8	2.0	26.4	1.3	23.6	2.4	24.7	1.7
Iron										
Ages 1 - 2	24.1	2.9	23.8	3.4	n/a	n/a	24.9	5.4	24.8	5.4
3	19.8	2.2	28.3	5.1	15.4	2.9	15.1	2.9	15.2	2.2
4	24.3	2.7	27.1	7.4	22.6	2.6	23.9	3.9	23.2	2.6
5	23.3	2.9	27.7	5.5	18.7	2.9	25.8	4.6	22.2	3.3
6 - 10	40.2	6.9	39.6	7.3	n/a	n/a	n/a	n/a	n/a	n/a
All Ages	23.9	1.5	27.9	2.9	20.0	2.1	21.9	2.5	21.2	1.9
Number of Child Observations (Unweighted)										
Ages 1 - 2	248		132		2		114		116	
3	303		69		97		137		234	
4	575		49		386		140		526	
5	506		45		327		134		461	
6 - 10	57		44		6		7		13	
All Ages	1689		339		818		532		1350	

n/a = Fewer than 25 child observations.

Exhibit C.6

Mean Macronutrient, Cholesterol, and Sodium Content of CACFP Breakfasts Consumed by Age Group

	All Children		Children Receiving Care in:							
			Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Percent of Energy from Fat (%)										
Ages 1 - 2	25.8	1.2	26.9	1.5	n/a	n/a	23.3	2.2	23.3	2.2
3	26.4	1.5	29.3	2.0	24.3	3.0	24.9	2.1	24.8	1.8
4	23.5	0.9	23.9	2.2	24.0	1.4	22.6	0.6	23.4	0.9
5	24.3	1.0	26.4	2.3	26.6	1.0	20.9	1.7	23.8	1.1
6 - 10	20.6	2.0	20.6	2.1	n/a	n/a	n/a	n/a	n/a	n/a
5 - 10	23.5	1.1	23.2	1.9	26.4	1.0	21.0	1.7	23.8	1.1
Percent of Energy from Saturated Fat (%)										
Ages 1 - 2	12.1	0.5	12.9	0.7	n/a	n/a	10.3	0.9	10.3	0.9
3	13.0	0.6	13.9	1.0	12.7	0.9	12.5	0.8	12.5	0.7
4	11.9	0.5	11.6	1.2	12.1	0.7	11.8	0.8	12.0	0.5
5	12.1	0.5	12.1	1.0	12.9	0.5	11.1	1.0	12.0	0.6
6 - 10	9.0	1.0	8.9	1.1	n/a	n/a	n/a	n/a	n/a	n/a
5 - 10	11.4	0.5	10.3	1.0	12.8	0.5	11.1	1.0	12.0	0.5
Percent of Energy from Carbohydrate (%)										
Ages 1 - 2	61.6	1.8	59.9	2.1	n/a	n/a	65.6	3.7	65.6	3.7
3	60.3	1.8	58.0	3.2	62.1	3.0	61.4	2.2	61.6	2.0
4	63.7	1.3	64.8	3.1	62.1	2.1	64.5	1.4	63.2	1.3
5	62.8	1.2	60.7	2.4	60.1	0.8	66.9	2.6	63.4	1.3
6 - 10	67.4	2.1	67.5	2.2	n/a	n/a	n/a	n/a	n/a	n/a
5 - 10	63.8	1.2	64.4	2.0	60.3	0.9	66.7	2.5	63.4	1.3
Percent of Energy from Protein (%)										
Ages 1 - 2	14.4	0.6	14.8	0.8	n/a	n/a	13.4	1.1	13.4	1.1
3	15.0	0.6	14.6	1.0	15.8	1.1	15.1	1.2	15.3	0.8
4	14.7	0.5	13.8	1.0	15.3	0.7	14.9	0.9	15.1	0.6
5	14.5	0.4	14.6	1.0	14.9	0.3	13.9	0.9	14.4	0.4
6 - 10	13.5	0.5	13.4	0.5	n/a	n/a	n/a	n/a	n/a	n/a
5 - 10	14.3	0.4	13.9	0.6	14.9	0.3	14.0	0.9	14.4	0.4

Exhibit C.6
(continued)

	All Children		Children Receiving Care in:							
			Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Cholesterol (mg)										
Ages 1 - 2	36.7	7.0	44.3	9.3	n/a	n/a	19.2	3.3	19.1	3.3
3	35.4	5.6	50.7	11.4	40.2	16.6	22.9	1.6	27.1	3.7
4	34.1	3.8	39.5	12.1	37.4	5.1	25.9	3.1	32.1	2.7
5	35.0	4.0	50.3	17.2	40.1	3.7	22.3	4.0	31.3	2.4
6 - 10	51.2	16.0	52.9	16.9	n/a	n/a	n/a	n/a	n/a	n/a
5 - 10	38.4	5.6	51.8	13.6	40.2	3.5	22.1	3.9	31.2	2.3
Sodium (mg)										
Ages 1 - 2	271.0	13.9	297.5	16.5	n/a	n/a	210.7	14.5	210.2	14.5
3	263.5	14.7	314.2	23.3	253.7	30.9	230.2	22.7	236.0	18.3
4	300.7	15.9	326.6	26.1	306.9	17.2	272.1	29.7	290.9	15.1
5	335.1	26.6	453.2	92.6	347.7	22.7	264.0	40.0	306.3	24.3
6 - 10	438.1	27.4	450.8	26.5	n/a	n/a	n/a	n/a	n/a	n/a
5 - 10	356.5	24.1	451.9	44.6	346.9	23.1	263.2	39.0	305.3	24.0
Number of Child Observations (Unweighted)										
Ages 1 - 2	248		132		2		114		116	
3	303		69		97		137		234	
4	575		49		386		140		526	
5	506		45		327		134		461	
6 - 10	57		44		6		7		13	
5 - 10	563		89		333		141		474	

n/a = Fewer than 25 child observations.

Note: Aggregation across age groups has been limited to five-year-olds and six- to ten-year-olds (see Chapter Two).

Exhibit C.7

Mean Portion Sizes of CACFP Lunch Foods Taken by Children

	CACFP	Children Receiving Care in:			
		Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
		Mean Portion Taken at Lunch[1]			
Milk					
Ages 1 - 2	.50 cups	.68 cups	n/a	.61 cups	.61 cups
3	.75	.63	.84 cups	.66	.69
4	.75	.72	.82	.73	.78
5	.75	.69	.84	.79	.81
Fruits, Vegetables, or Juices					
Ages 1 - 2	.25 cups	.51 cups	n/a	.51 cups	.51 cups
3	.50	.57	.65 cups	.56	.57
4	.50	.55	.64	.67	.65
5	.50	.43	.67	.62	.65
Breads or Bread Alternates[2]					
Ages 1 - 2	14 gm[3]	33 gm	n/a	25 gm	25 gm
3	14	31	28 gm	29	29
4	14	31	31	30	31
5	14	29	33	31	32
Meats or Meat Alternates					
Ages 1 - 2	28 gm[4]	40 gm	n/a	45 gm	45 gm
3	42	42	55 gm	44	46
4	42	47	50	51	51
5	42	45	55	46	51
Number of Child Observations (Unweighted)					
Ages 1 - 2		167	2	143	145
3		90	113	188	301
4		72	509	190	699
5		54	420	171	591

n/a = Fewer than 25 child observations.

Note: Data for six- to ten-year-olds not shown because fewer than 25 children were observed in each mode of care.

[1]Lunch portion defined as total amount taken, including second helpings in family-style service.

[2]Mean gram weight of breads and bread alternates taken; dry weight for items such as pasta and rice.

[3]Approximate gram weight of required one-half slice of bread (1 slice of bread = 28 gm).

[4]Approximate gram weight of required 1 oz (one- to two-year-olds) and 1.5 oz (three- to five-year-olds) of meat, fish, poultry, or cheese.

Exhibit C.8

Mean Percentage of Lunch Portions Consumed by Age Group[1]

	All Children	Children Receiving Care in: Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Milk					
Ages 1 - 2	81%	80%	n/a	83%	83%
3	77	75	74%	80	79
4	82	83	81	82	81
5	88	94	84	90	87
6 - 10	96	99	n/a	n/a	n/a
All Ages	83	82	81	84	83
Fruits and Juices					
Ages 1 - 2	76	75	n/a	79	79
3	75	70	77	77	77
4	76	68	79	79	79
5	85	93	78	87	83
6 - 10	89	96	n/a	n/a	n/a
All Ages	78	76	78	80	80
Vegetables					
Ages 1 - 2	58	59	n/a	56	56
3	50	48	53	51	51
4	58	57	57	59	58
5	68	78	60	73	67
6 - 10	77	84	n/a	n/a	n/a
All Ages	59	60	58	60	59
Breads and Bread Alternates					
Ages 1 - 2	67	73	n/a	60	60
3	67	63	73	67	68
4	69	80	60	72	66
5	76	94	69	77	73
6 - 10	79	n/a	n/a	n/a	n/a
All Ages	70	76	66	69	68
Meats and Meat Alternates					
Ages 1 - 2	74	79	n/a	65	66
3	75	72	63	79	76
4	73	73	67	80	73
5	80	83	72	88	80
6 - 10	84	n/a	n/a	n/a	n/a
All Ages	76	78	69	79	75
Mixed Entrees[2]					
Ages 1 - 2	74	73	n/a	75	75
3	69	73	82	64	67
4	72	72	66	77	72
5	79	89	66	81	76
6 - 10	n/a	n/a	n/a	n/a	n/a
All Ages	73	75	69	73	72

Exhibit C.8
(continued)

	All Children	Children Receiving Care in: Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Noncreditable Foods[3]					
Ages 1 - 2	60%	60%	n/a	61%	62%
3	82	88	83%	78	79
4	76	74	75	78	77
5	85	n/a	80	86	83
6 - 10	74	n/a	n/a	n/a	n/a
All Ages	76	74	79	76	77
Number of Child Observations[4] (Unweighted)					
Ages 1 - 2	312	167	2	143	145
3	391	90	113	188	301
4	771	72	509	190	699
5	645	54	420	171	591
6 - 10	55	29	6	20	26
All Ages	2174	412	1050	712	1762

[1]Lunch portions defined as total amount taken, including second helpings in family-style service.

[2]Entree items including two or more components, most often meat and bread.

[3]Foods that do not contribute to satisfying the CACFP meal pattern.

[4]Total number of child observations. Actual sample size varies for each meal component because children did not necessarily receive all components.

Exhibit C.9

Mean Percentage of Available Lunch Nutrients Actually Consumed[1]

	Children Receiving Care in:				
	All Children	Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Total Energy					
Ages 1 - 2	74%	74%	n/a	72%	72%
3	72	72	73%	71	72
4	75	76	71	77	74
5	81	89	76	84	80
6 - 10	87	93	n/a	n/a	70
All Ages	76	77	73	76	75
Macronutrients					
Total Fat					
Ages 1 - 2	74	75	n/a	71	71
3	73	74	73	72	72
4	74	74	71	77	74
5	82	89	76	84	80
6 - 10	88	95	n/a	n/a	68
All Ages	76	77	73	76	75
Saturated Fat					
Ages 1 - 2	75	76	n/a	74	74
3	74	75	74	74	74
4	76	77	74	79	76
5	83	90	78	85	82
6 - 10	90	96	n/a	n/a	75
All Ages	78	78	75	78	77
Carbohydrate					
Ages 1 - 2	73	74	n/a	72	72
3	71	70	73	71	71
4	75	77	72	77	74
5	81	89	75	83	79
6 - 10	86	92	n/a	n/a	70
All Ages	75	77	73	75	75
Protein					
Ages 1 - 2	74	74	n/a	72	72
3	72	72	73	72	72
4	76	77	72	78	75
5	82	89	77	84	81
6 - 10	88	94	n/a	n/a	70
All Ages	76	77	74	77	76
Vitamins and Minerals					
Vitamin A					
Ages 1 - 2	69	69	n/a	70	70
3	68	66	72	67	68
4	74	78	71	74	72
5	78	87	73	79	76
6 - 10	84	88	n/a	n/a	72
All Ages	73	73	72	73	72

Exhibit C.9
(continued)

	Children Receiving Care in:				
	All Children	Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Vitamin C					
Ages 1 - 2	68%	67%	n/a	69%	69%
3	65	67	70%	63	65
4	72	71	70	74	72
5	78	87	70	83	76
6 - 10	82	89	n/a	n/a	62
All Ages	71	72	70	72	71
Calcium					
Ages 1 - 2	76	76	n/a	78	78
3	75	76	74	76	75
4	79	81	77	79	78
5	84	91	80	86	83
6 - 10	92	96	n/a	n/a	81
All Ages	79	80	78	80	79
Iron					
Ages 1 - 2	71	72	n/a	68	68
3	69	69	71	68	69
4	71	74	67	74	70
5	79	88	72	81	77
6 - 10	84	91	n/a	n/a	65
All Ages	73	75	69	73	72
Other Dietary Constituents					
Cholesterol					
Ages 1 - 2	75	76	n/a	73	73
3	74	74	73	74	74
4	76	77	72	79	75
5	83	90	77	85	82
6 - 10	88	94	n/a	n/a	72
All Ages	77	79	74	78	77
Sodium					
Ages 1 - 2	71	72	n/a	69	69
3	69	71	71	68	69
4	73	75	69	76	72
5	80	88	74	82	78
6 - 10	85	92	n/a	n/a	66
All Ages	74	76	71	74	73
Number of Child Observations (Unweighted)					
Ages 1 - 2	312	167	2	143	145
3	391	90	113	188	301
4	771	72	509	190	699
5	645	54	420	171	591
6 - 10	55	29	6	20	26
All Ages	2174	412	1050	712	1762

n/a = Fewer than 25 child observations.

[1]Available nutrients defined as nutrients in total amount of food taken, including second helpings in family-style service.

Exhibit C.10

Mean Energy and Nutrient Intake from CACFP Lunches Consumed by Age Group

	All Children	Children Receiving Care in: Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Total Energy (kcal)					
Ages 1 - 2	301	310	n/a	279	279
3	333	344	346	322	327
4	365	364	346	387	365
5	408	423	380	426	405
6 - 10	473	505	n/a	n/a	382
All Ages	357	353	360	360	360
Macronutrients					
Total Fat (gm)					
Ages 1 - 2	12.2	12.7	n/a	10.8	10.8
3	13.1	13.9	13.8	12.4	12.7
4	14.1	13.9	13.1	15.4	14.2
5	16.5	17.4	14.8	17.6	16.3
6 - 10	18.6	20.4	n/a	n/a	13.4
5 - 10	16.8	18.6	14.8	17.3	16.2
Saturated Fat (gm)					
Ages 1 - 2	5.1	5.3	n/a	4.7	4.7
3	5.5	5.8	6.0	5.2	5.4
4	5.9	5.7	5.6	6.2	5.9
5	7.0	6.7	6.2	7.9	7.1
6 - 10	7.7	8.5	n/a	n/a	5.4
5 - 10	7.1	7.4	6.2	7.7	7.0
Carbohydrate (gm)					
Ages 1 - 2	35.0	35.9	n/a	32.8	32.8
3	38.0	38.4	39.3	37.4	37.7
4	42.7	42.7	40.8	44.7	42.6
5	45.9	46.6	44.2	47.0	45.7
6 - 10	56.0	59.2	n/a	n/a	47.2
5 - 10	47.2	51.6	44.3	47.0	45.8
Protein (gm)					
Ages 1 - 2	14.0	14.1	n/a	13.8	13.9
3	16.6	17.2	16.7	16.2	16.3
4	17.8	17.8	17.2	18.6	17.9
5	20.3	21.3	18.9	21.2	20.1
6 - 10	22.0	22.9	n/a	n/a	19.4
5 - 10	20.5	22.0	18.9	21.1	20.1
Vitamins and Minerals					
Vitamin A (mcg RE)					
Ages 1 - 2	219	228	n/a	197	197
3	249	288	317	205	228
4	304	221	360	312	338
5	331	310	306	360	335
6 - 10	269	278	n/a	n/a	243
All Ages	278	252	331	272	294

Exhibit C.10
(continued)

	All Children	Children Receiving Care in: Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Vitamin C (mg)					
Ages 1 - 2	12	12	n/a	14	14
3	14	14	13	14	14
4	15	11	15	18	17
5	17	15	17	18	17
6 - 10	19	21	n/a	n/a	13
All Ages	15	13	16	16	16
Calcium (mg)					
Ages 1 - 2	231	238	n/a	213	213
3	245	254	269	233	240
4	284	291	280	282	281
5	319	302	299	343	322
6 - 10	355	369	n/a	n/a	314
All Ages	274	268	286	273	278
Iron (mg)					
Ages 1 - 2	1.8	1.8	n/a	1.7	1.7
3	2.1	2.2	2.0	2.1	2.1
4	2.2	2.1	2.2	2.3	2.2
5	2.5	2.6	2.4	2.5	2.5
6 - 10	2.7	3.0	n/a	n/a	2.0
All Ages	2.2	2.1	2.3	2.2	2.2
Other Dietary Constituents					
Cholesterol (mg)					
Ages 1 - 2	39	38	n/a	40	40
3	47	45	49	47	48
4	48	43	49	53	50
5	55	54	50	60	55
6 - 10	57	59	n/a	n/a	51
5 - 10	55	56	50	59	55
Sodium (mg)					
Ages 1 - 2	579	581	n/a	574	575
3	666	695	607	660	649
4	704	684	639	797	713
5	758	779	679	820	754
6 - 10	872	922	n/a	n/a	733
5 - 10	772	836	682	812	753
Number of Child Observations (Unweighted)					
Ages 1 - 2	312	167	2	143	145
3	391	90	113	188	301
4	771	72	509	190	699
5	645	54	420	171	591
6 - 10	55	29	6	20	26
All Ages	2174	412	1050	712	1762

n/a = Fewer than 25 child observations.

Note: For macronutrients, cholesterol, and sodium, aggregation across age groups has been limited to five-year-olds and six- to ten-year-olds (see Chapter Two).

Exhibit C.11

Mean Percentage of RDAs Provided in CACFP Lunches Consumed by Age Group

	All Children		Children Receiving Care in:							
			Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Total Energy										
Ages 1 - 2	23.1	0.9	23.8	1.0	n/a	n/a	21.5	1.9	21.5	1.8
3	25.6	1.3	26.4	1.9	26.6	2.0	24.8	2.1	25.1	1.8
4	20.3	0.8	20.2	1.4	19.2	0.9	21.5	1.2	20.3	0.8
5	22.6	1.0	23.5	2.5	21.1	0.8	23.7	1.3	22.5	0.9
6 - 10	25.5	1.5	27.1	1.6	n/a	n/a	n/a	n/a	20.9	1.1
All Ages	22.9	0.6	23.9	0.8	21.0	0.6	23.1	1.1	22.3	0.8
Protein										
Ages 1 - 2	87.8	2.7	88.1	3.4	n/a	n/a	86.5	5.0	86.8	5.0
3	103.8	5.3	107.4	12.0	104.1	6.9	101.4	9.2	101.9	7.9
4	74.3	3.0	74.2	6.2	71.8	2.3	77.4	5.0	74.4	2.8
5	84.6	4.2	88.8	10.6	78.7	3.0	88.4	6.3	83.8	4.3
6 - 10	87.9	6.1	91.0	8.1	n/a	n/a	n/a	n/a	79.0	8.0
All Ages	87.2	1.7	89.9	4.1	79.1	2.3	89.5	4.5	85.6	3.3
Vitamin A										
Ages 1 - 2	54.8	5.8	57.0	7.4	n/a	n/a	49.3	6.8	49.1	6.7
3	62.3	8.3	72.1	16.5	79.1	23.3	51.4	8.4	56.9	8.9
4	60.9	7.1	44.2	4.2	72.0	16.6	62.4	9.9	67.5	10.2
5	66.1	9.3	62.0	10.7	61.3	10.2	71.9	15.8	66.9	10.2
6 - 10	49.2	6.0	50.1	7.4	n/a	n/a	n/a	n/a	46.4	4.6
All Ages	60.8	4.1	57.8	6.5	68.4	10.1	59.1	8.6	62.6	7.3
Vitamin C										
Ages 1 - 2	31.1	2.1	29.3	2.5	n/a	n/a	35.7	4.7	35.6	4.7
3	34.8	5.1	35.7	9.8	33.2	3.0	34.6	7.1	34.3	5.8
4	33.5	2.0	24.3	2.6	33.7	2.6	41.1	3.5	37.2	2.4
5	37.4	3.1	33.1	4.8	37.3	4.2	39.0	4.2	38.2	3.4
6 - 10	42.7	10.1	47.3	12.5	n/a	n/a	n/a	n/a	29.7	3.3
All Ages	34.5	1.3	31.3	2.9	35.1	2.3	37.3	2.9	36.5	2.1

Exhibit C.11
(continued)

	All Children		Children Receiving Care in:							
			Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Calcium										
Ages 1 - 2	28.8	1.3	29.7	1.6	n/a	n/a	26.6	2.0	26.6	2.0
3	30.6	2.1	31.7	2.6	33.6	2.6	29.1	3.3	30.0	2.5
4	35.5	1.7	36.4	4.3	35.0	1.0	35.3	2.2	35.1	1.1
5	39.9	2.3	37.8	3.9	37.3	1.3	42.9	4.2	40.3	2.5
6 - 10	44.3	2.8	46.1	3.5	n/a	n/a	n/a	n/a	39.2	6.1
All Ages	34.2	1.4	33.5	1.9	35.7	0.9	34.1	2.5	34.7	1.7
Iron										
Ages 1 - 2	17.7	0.9	18.0	0.9	n/a	n/a	17.0	2.0	17.1	2.0
3	21.1	1.7	21.8	4.3	20.4	2.1	20.9	2.1	20.8	1.8
4	22.0	1.0	21.5	1.3	21.7	1.6	22.8	1.6	22.2	1.3
5	25.0	1.2	25.9	2.8	24.3	1.8	25.2	1.6	24.8	1.3
6 - 10	27.1	3.5	29.8	3.6	n/a	n/a	n/a	n/a	19.5	2.2
All Ages	21.8	0.6	21.2	1.0	22.6	1.1	21.9	1.1	22.1	1.0
Number of Child Observations (Unweighted)										
Ages 1 - 2	312		167		2		143		145	
3	391		90		113		188		301	
4	771		72		509		190		699	
5	645		54		420		171		591	
6 - 10	55		29		6		20		26	
All Ages	2174		412		1050		712		1762	

n/a = Fewer than 25 child observations.

Exhibit C.12

Mean Macronutrient, Cholesterol, and Sodium Content of CACFP Lunches Consumed by Age Group

	All Children		Children Receiving Care in:							
			Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Percent of Energy from Fat (%)										
Ages 1 - 2	35.6	0.8	36.5	1.1	n/a	n/a	33.1	1.0	33.2	1.0
3	34.3	1.3	35.8	1.4	34.5	1.1	33.1	1.9	33.4	1.5
4	33.6	0.6	33.4	1.7	32.5	0.6	35.1	1.0	33.7	0.5
5	35.5	1.3	35.1	1.8	34.3	0.9	36.6	2.4	35.5	1.6
6 - 10	34.8	1.6	36.2	1.9	n/a	n/a	n/a	n/a	30.9	0.8
5 - 10	35.4	1.3	35.6	1.3	34.4	0.9	36.1	2.4	35.3	1.6
Percent of Energy from Saturated Fat (%)										
Ages 1 - 2	15.4	0.4	15.6	0.4	n/a	n/a	14.9	0.7	14.9	0.7
3	15.0	0.6	15.4	1.0	14.9	0.7	14.7	1.0	14.7	0.8
4	14.3	0.3	14.0	0.9	14.3	0.2	14.5	0.4	14.4	0.2
5	15.4	0.8	13.9	0.9	14.8	0.4	16.4	1.4	15.6	0.9
6 - 10	14.7	0.6	15.0	0.7	n/a	n/a	n/a	n/a	13.9	0.6
5 - 10	15.3	0.8	14.3	0.7	14.7	0.4	16.2	1.4	15.6	0.9
Percent of Energy from Carbohydrate (%)										
Ages 1 - 2	47.4	0.8	47.1	0.9	n/a	n/a	48.0	1.8	47.9	1.8
3	47.0	1.4	45.7	1.5	47.2	1.1	47.8	2.1	47.7	1.6
4	47.6	0.5	47.6	1.6	48.6	0.7	46.5	0.6	47.6	0.4
5	45.7	1.7	46.2	2.3	46.4	1.2	44.9	2.9	45.6	2.0
6 - 10	47.3	1.5	46.8	1.9	n/a	n/a	n/a	n/a	48.7	2.4
5 - 10	45.9	1.6	46.5	1.6	46.3	1.2	45.2	2.9	45.7	2.0
Percent of Energy from Protein (%)										
Ages 1 - 2	18.9	0.6	18.2	0.5	n/a	n/a	20.5	1.0	20.6	1.0
3	20.0	0.4	19.7	1.0	19.3	0.9	20.4	0.7	20.1	0.5
4	20.0	0.4	19.9	0.8	20.3	0.5	19.6	0.7	20.0	0.4
5	20.2	0.4	20.1	1.5	20.6	0.4	19.8	0.6	20.2	0.4
6 - 10	19.2	0.7	18.4	1.1	n/a	n/a	n/a	n/a	21.5	1.5
5 - 10	20.1	0.4	19.4	1.0	20.6	0.4	20.0	0.6	20.3	0.4

Exhibit C.12
(continued)

	All Children		Children Receiving Care in:							
			Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Cholesterol (mg)										
Ages 1 - 2	39.1	1.7	38.5	2.0	n/a	n/a	40.4	2.7	40.5	2.7
3	46.7	3.2	45.2	3.3	49.4	5.6	47.1	5.6	47.6	4.6
4	48.4	2.5	43.4	3.4	48.5	2.2	52.5	4.7	50.4	2.7
5	55.1	3.7	54.2	6.0	50.2	1.9	59.7	5.7	55.3	3.7
6 - 10	56.9	4.1	59.0	5.1	n/a	n/a	n/a	n/a	51.0	6.6
5 - 10	55.3	3.3	56.2	4.0	50.3	1.9	59.1	5.7	55.1	3.7
Sodium (mg)										
Ages 1 - 2	579.3	18.8	581.0	23.0	n/a	n/a	574.5	33.5	575.2	33.4
3	665.6	53.3	695.3	121.4	606.6	58.6	660.0	62.2	649.4	52.3
4	704.5	26.0	684.3	51.9	639.0	35.2	796.6	40.7	712.5	28.9
5	757.9	28.8	779.5	61.1	678.9	39.2	819.8	38.6	753.7	32.8
6 - 10	872.1	73.7	921.7	92.0	n/a	n/a	n/a	n/a	733.1	78.4
5 - 10	772.5	26.8	836.4	50.2	681.5	39.3	811.9	39.0	752.8	32.7
Number of Child Observations (Unweighted)										
Ages 1 - 2	312		167		2		143		145	
3	391		90		113		188		301	
4	771		72		509		190		699	
5	645		54		420		171		591	
6 - 10	55		29		6		20		26	
5 - 10	700		83		426		191		617	

n/a = Fewer than 25 child observations.

Note: Aggregation across age groups has been limited to five-year-olds and six- to ten-year-olds (see Chapter Two).

Exhibit C.13

Mean Percentage of Available Morning Snack Nutrients Actually Consumed[1]

	All Children	Children Receiving Care in: Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Total Energy					
Ages 1 - 2	84%	82%	n/a	96%	96%
3	86	92	n/a	77	77
4	81	n/a	86%	75	77
5	88	n/a	92	88	89
6 - 10	n/a	n/a	n/a	n/a	n/a
All Ages	85	87	89	83	84
Protein					
Ages 1 - 2	83	81	n/a	95	95
3	84	90	n/a	74	74
4	80	n/a	85	74	76
5	91	n/a	89	92	91
6 - 10	n/a	n/a	n/a	n/a	n/a
All Ages	85	86	86	84	84
Vitamin A					
Ages 1 - 2	83	81	n/a	96	96
3	83	92	n/a	70	70
4	79	n/a	84	72	74
5	92	n/a	88	94	93
6 - 10	n/a	n/a	n/a	n/a	n/a
All Ages	85	87	85	84	84
Vitamin C					
Ages 1 - 2	87%	85%	n/a	95%	95%
3	85	93	n/a	74	74
4	84	n/a	80%	82	82
5	91	n/a	95	94	94
6 - 10	n/a	n/a	n/a	n/a	n/a
All Ages	87	87	87	87	87
Calcium					
Ages 1 - 2	83	80	n/a	95	95
3	82	90	n/a	71	71
4	80	n/a	87	73	76
5	93	n/a	93	93	93
6 - 10	n/a	n/a	n/a	n/a	n/a
All Ages	85	86	89	84	85
Iron					
Ages 1 - 2	84	82	n/a	96	96
3	88	94	n/a	79	80
4	82	n/a	82	77	78
5	88	n/a	91	89	89
6 - 10	n/a	n/a	n/a	n/a	n/a
All Ages	86	87	88	85	85
Number of Child Observations (Unweighted)					
Ages 1 - 2	86	57	0	29	29
3	101	43	7	51	58
4	132	21	63	48	111
5	97	10	54	33	87
6 - 10	15	6	0	9	9
All Ages	431	137	124	170	294

n/a = Fewer than 25 child observations.

[1]Available nutrients defined as nutrients in total amount of food taken, including second helpings in family style service.

Exhibit C.14

Mean Percentage of Available Afternoon Snack Nutrients Actually Consumed[1]

	All Children	Children Receiving Care in: Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Total Energy					
Ages 1 - 2	80%	80%	n/a	82%	82%
3	75	72	78%	77	78
4	84	91	78	81	80
5	84	91	83	82	82
6 - 10	89	96	n/a	83	83
All Ages	82	84	79	81	81
Protein					
Ages 1 - 2	78	78	n/a	79	79
3	74	71	76	76	76
4	82	90	76	80	78
5	84	89	82	83	83
6 - 10	90	97	n/a	83	83
All Ages	81	84	78	80	80
Vitamin A					
Ages 1 - 2	80	81	n/a	78	78
3	78	73	80	82	82
4	82	85	79	82	81
5	80	88	82	76	78
6 - 10	91	96	n/a	87	87
All Ages	82	84	80	81	81
Vitamin C					
Ages 1 - 2	84%	82%	n/a	89%	89%
3	74	74	80%	74	75
4	83	89	82	79	80
5	82	90	86	77	79
6 - 10	88	96	n/a	83	83
All Ages	82	85	83	79	80
Calcium					
Ages 1 - 2	79	78	n/a	81	81
3	75	71	75	77	77
4	84	91	80	81	81
5	84	89	80	83	82
6 - 10	89	97	n/a	82	82
All Ages	82	84	79	81	80
Iron					
Ages 1 - 2	81	80	n/a	82	82
3	75	71	77	76	76
4	82	89	74	81	78
5	83	91	83	80	81
6 - 10	89	95	n/a	84	84
All Ages	81	84	78	80	80
Number of Child Observations (Unweighted)					
Ages 1 - 2	277	141	2	134	136
3	312	79	60	173	233
4	473	64	251	158	409
5	371	52	178	141	319
6 - 10	131	63	4	64	68
All Ages	1564	399	495	670	1165

n/a = Fewer than 25 child observations.

[1]Available nutrients defined as nutrients in afternoon snacks taken, including second helpings in family-style service.

Exhibit C.15

Mean Energy and Nutrient Intake from CACFP Morning Snacks by Age Group

	All Children	Children Receiving Care in: Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Total Energy (kcal)					
Ages 1 - 2	151	151	n/a	150	150
3	147	166	n/a	125	120
4	143	n/a	124	125	125
5	191	n/a	158	199	193
6 - 10	n/a	n/a	n/a	n/a	n/a
All ages	161	165	136	162	158
Protein (gm)					
Ages 1 - 2	3.6	3.7	n/a	3.1	3.1
3	3.9	4.2	n/a	3.6	3.5
4	4.1	n/a	3.7	3.7	3.7
5	5.4	n/a	2.9	5.6	5.2
6 - 10	n/a	n/a	n/a	n/a	n/a
All ages	4.7	4.4	3.3	4.8	3.6
Vitamin A (mcg RE)					
Ages 1 - 2	45	41	n/a	65	65
3	45	44	n/a	46	45
4	41	n/a	52	25	31
5	71	n/a	33	76	70
6 - 10	n/a	n/a	n/a	n/a	n/a
All Ages	51	49	41	54	53
Vitamin C (mg)					
Ages 1 - 2	11	11	n/a	15	15
3	13	13	n/a	16	15
4	23	n/a	15	27	25
5	25	n/a	36	24	26
6 - 10	n/a	n/a	n/a	n/a	n/a
All Ages	19	13	25	23	24
Calcium (mg)					
Ages 1 - 2	99	101	n/a	89	89
3	102	114	n/a	88	84
4	75	n/a	91	48	56
5	135	n/a	52	142	128
6 - 10	n/a	n/a	n/a	n/a	n/a
All Ages	104	117	66	100	95
Iron (mg)					
Ages 1 - 2	0.9	0.8	n/a	1.6	1.6
3	0.8	0.9	n/a	0.8	0.8
4	0.8	n/a	0.6	0.7	0.7
5	0.9	n/a	1.1	0.9	1.0
6 - 10	n/a	n/a	n/a	n/a	n/a
All ages	0.9	0.9	0.8	0.9	0.9
Number of Child Observations (Unweighted)					
Ages 1 - 2	86	57	0	29	29
3	101	43	7	51	58
4	132	21	63	48	111
5	97	10	54	33	87
6 - 10	15	6	0	9	9
All Ages	431	137	124	170	294

n/a = Fewer than 25 child observations.

Exhibit C.16

Mean Percentages of RDAs Provided in CACFP Morning Snacks Consumed by Age Group

	All Children		Children Receiving Care in:							
			Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Total Energy										
Ages 1 - 2	11.6	0.9	11.6	1.0	n/a	n/a	11.6	2.4	11.6	2.4
3	11.3	0.9	12.8	1.3	n/a	n/a	9.6	1.5	9.2	1.4
4	8.0	1.0	n/a	n/a	6.9	1.1	6.9	1.0	6.9	0.9
5	10.6	0.6	n/a	n/a	8.8	1.4	11.1	0.8	10.7	0.7
6 - 10	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
All Ages	10.4	0.4	11.7	0.7	7.7	1.1	9.7	0.8	9.4	0.7
Protein										
Ages 1 - 2	22.7	3.7	23.3	4.3	n/a	n/a	19.1	3.3	19.1	3.3
3	24.5	2.3	26.3	4.3	n/a	n/a	22.7	3.0	21.9	3.0
4	17.1	3.0	n/a	n/a	15.5	2.7	15.3	4.5	15.4	3.7
5	22.3	1.8	n/a	n/a	12.1	2.8	23.4	1.4	21.6	2.0
6 - 10	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
All Ages	21.8	1.6	24.6	3.2	13.3	2.6	20.7	1.9	19.6	1.9
Vitamin A										
Ages 1 - 2	11.2	1.8	10.3	1.5	n/a	n/a	16.3	6.5	16.3	6.5
3	11.2	1.6	11.0	3.1	n/a	n/a	11.5	2.0	11.4	1.9
4	8.2	1.1	n/a	n/a	10.5	3.1	5.1	1.5	6.1	1.6
5	14.2	2.3	n/a	n/a	6.7	2.9	15.3	2.2	13.9	2.3
6 - 10	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
All Ages	11.2	1.1	11.3	1.5	8.4	2.9	11.6	1.9	11.1	1.8
Vitamin C										
Ages 1 - 2	28.3	4.6	26.6	4.9	n/a	n/a	37.2	8.8	37.2	8.8
3	33.7	6.0	31.3	7.6	n/a	n/a	39.7	10.2	37.0	9.3
4	51.7	6.8	n/a	n/a	33.6	11.5	60.7	8.4	55.6	6.9
5	55.3	14.9	n/a	n/a	80.5	18.4	52.8	15.8	57.2	15.1
6 - 10	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
All Ages	44.1	6.1	31.7	6.5	55.5	16.9	53.2	8.6	53.5	8.4

Exhibit C.16
(continued)

	All Children		Children Receiving Care in:							
			Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Calcium										
Ages 1 - 2	12.4	2.6	12.6	3.1	n/a	n/a	11.1	2.3	11.1	2.3
3	12.7	1.6	14.3	2.7	n/a	n/a	11.0	2.6	10.5	2.5
4	9.4	1.0	n/a	n/a	11.4	2.4	6.1	1.1	7.1	1.2
5	16.9	2.7	n/a	n/a	6.5	2.3	17.8	2.0	16.0	2.4
6 - 10	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
All Ages	13.1	1.7	14.6	2.6	8.2	2.4	12.5	2.0	11.9	1.9
Iron										
Ages 1 - 2	9.0	1.4	7.6	0.6	n/a	n/a	16.3	7.1	16.3	7.1
3	8.5	0.9	8.7	1.0	n/a	n/a	8.5	1.3	8.1	1.3
4	8.1	1.4	n/a	n/a	6.1	1.6	7.0	2.0	6.8	1.6
5	9.5	1.2	n/a	n/a	11.0	3.3	9.5	1.4	9.7	1.4
6 - 10	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
All Ages	8.8	0.8	8.6	0.6	8.4	2.3	9.0	1.4	9.0	1.2
Number of Child Observations (Unweighted)										
Ages 1 - 2	86		57		0		29		29	
3	101		43		7		51		58	
4	132		21		63		48		111	
5	97		10		54		33		87	
6 - 10	15		6		0		9		9	
All Ages	431		137		124		170		294	

n/a = Fewer than 25 child observations.

Exhibit C.17

Mean Energy and Nutrient Intake from CACFP Afternoon Snacks by Age Group

	All Children	Children Receiving Care in: Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Total Energy (kcal)					
Ages 1 - 2	145	147	n/a	142	142
3	155	154	135	160	156
4	169	191	154	161	158
5	173	228	146	164	159
6 - 10	224	242	n/a	210	209
All Ages	172	182	147	169	164
Protein (gm)					
Ages 1 - 2	3.7	3.8	n/a	3.5	3.5
3	3.9	4.5	4.2	3.3	3.5
4	4.9	5.0	4.5	5.3	4.9
5	5.2	6.9	3.5	5.2	4.7
6 - 10	6.8	7.5	n/a	6.2	6.2
All ages	4.6	4.8	4.3	4.2	4.1
Vitamin A (mcg RE)					
Ages 1 - 2	53	56	n/a	45	45
3	62	73	97	48	55
4	63	57	70	63	66
5	65	106	41	59	54
6 - 10	150	191	n/a	118	118
All Ages	76	90	66	67	67
Vitamin C (mg)					
Ages 1 - 2	10	8	n/a	13	13
3	8	7	9	9	9
4	14	16	15	10	12
5	13	23	16	8	10
6 - 10	23	16	n/a	28	27
All Ages	13	13	14	13	14
Calcium (mg)					
Ages 1 - 2	103	109	n/a	90	89
3	101	125	112	82	87
4	123	117	104	143	126
5	136	190	70	142	122
6 - 10	175	201	n/a	156	155
All Ages	126	139	94	123	117
Iron (mg)					
Ages 1 - 2	0.9	0.9	n/a	0.7	0.7
3	0.8	0.9	0.7	0.7	0.7
4	0.8	1.0	0.8	0.7	0.8
5	0.9	1.4	0.8	0.8	0.8
6 - 10	0.9	1.0	n/a	0.8	0.8
All Ages	0.9	1.0	0.8	0.8	0.8
Number of Child Observations (Unweighted)					
Ages 1 - 2	277	141	2	134	136
3	312	79	60	173	233
4	473	64	251	158	409
5	371	52	178	141	319
6 - 10	131	63	4	64	68
All Ages	1564	399	495	670	1165

n/a = Fewer than 25 child observations.

Exhibit C.18

Mean Percentage of RDAs Provided in CACFP Afternoon Snacks Consumed by Age Group

	All Children		Children Receiving Care in:							
			Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Total Energy										
Ages 1 - 2	11.2	0.7	11.3	0.8	n/a	n/a	10.9	1.3	10.9	1.3
3	11.9	0.8	11.8	1.2	10.4	1.0	12.3	1.0	12.0	0.9
4	9.4	0.4	10.6	0.8	8.5	0.4	8.9	0.5	8.8	0.4
5	9.6	0.9	12.7	1.4	8.1	0.5	9.1	1.1	8.8	0.9
6 - 10	11.4	1.0	12.4	0.6	n/a	n/a	10.6	1.7	10.6	1.7
All Ages	10.7	0.5	11.6	0.4	8.7	0.3	10.5	0.8	10.1	0.7
Protein										
Ages 1 - 2	23.1	1.8	23.6	2.1	n/a	n/a	21.9	3.0	21.8	3.0
3	24.1	2.5	28.4	3.3	26.5	3.7	20.9	3.4	21.7	3.3
4	20.6	1.6	20.6	3.0	18.6	1.8	22.0	3.0	20.6	2.0
5	21.6	2.7	28.7	3.6	14.7	2.8	21.6	3.3	19.7	2.8
6 - 10	25.1	3.9	28.2	2.1	n/a	n/a	22.7	6.9	22.6	6.9
All Ages	22.8	1.7	25.4	1.9	18.7	2.0	21.7	2.9	21.1	2.4
Vitamin A										
Ages 1 - 2	13.2	2.3	14.1	3.1	n/a	n/a	11.2	2.5	11.3	2.4
3	15.4	1.9	18.2	3.7	24.2	7.9	12.0	2.7	13.8	2.3
4	12.6	1.7	11.4	2.4	14.0	4.7	12.5	2.5	13.2	2.6
5	13.0	2.4	21.3	4.4	8.2	2.8	11.9	2.2	10.9	1.9
6 - 10	22.7	4.4	29.5	8.7	n/a	n/a	17.3	2.8	17.3	2.7
All Ages	15.2	1.3	18.0	2.5	13.9	4.8	13.1	1.3	13.3	1.1
Vitamin C										
Ages 1 - 2	24.9	5.0	21.0	4.6	n/a	n/a	33.4	7.2	33.4	7.2
3	20.4	3.5	17.6	4.1	22.8	6.4	21.8	5.8	22.0	4.9
4	30.4	6.2	36.3	16.5	32.9	8.0	23.0	5.7	27.2	3.1
5	28.8	5.4	51.1	15.3	35.3	7.5	18.0	5.2	22.9	3.9
6 - 10	50.2	8.1	36.4	8.5	n/a	n/a	61.5	10.3	61.1	10.2
All Ages	30.2	3.4	29.0	6.7	31.7	6.5	30.8	4.6	31.0	3.8

Exhibit C.18
(continued)

	All Children		Children Receiving Care in:							
			Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Calcium										
Ages 1 - 2	12.9	1.1	13.7	1.3	n/a	n/a	11.2	1.7	11.2	1.7
3	12.6	1.5	15.6	1.8	14.1	2.9	10.3	2.0	10.9	2.0
4	15.4	1.5	14.6	2.9	13.0	1.3	17.9	2.6	15.8	1.7
5	17.0	2.6	23.7	4.2	8.7	2.3	17.8	3.0	15.2	2.5
6 - 10	21.9	3.8	25.1	2.7	n/a	n/a	19.5	6.5	19.4	6.4
All Ages	15.7	1.4	17.3	1.6	11.8	1.6	15.3	2.4	14.6	1.9
Iron										
Ages 1 - 2	8.7	1.6	9.4	2.3	n/a	n/a	7.3	1.1	7.3	1.1
3	7.8	0.8	9.0	1.9	6.8	1.0	7.2	0.7	7.2	0.7
4	8.5	0.7	10.3	1.6	7.7	0.4	7.4	0.7	7.5	0.5
5	9.1	1.5	14.2	4.3	7.7	0.8	7.8	1.1	7.8	1.0
6 - 10	9.1	0.7	10.4	1.0	n/a	n/a	8.1	0.8	8.0	0.8
All Ages	8.6	0.7	10.1	1.2	7.5	0.4	7.6	0.5	7.6	0.4
Number of Child Observations (Unweighted)										
Ages 1 - 2	277		141		2		134		136	
3	312		79		60		173		233	
4	473		64		251		158		409	
5	371		52		178		141		319	
6 - 10	131		63		4		64		68	
All Ages	1564		399		495		670		1165	

n/a = Fewer than 25 child observations.

Exhibit C.19

Mean Energy and Nutrient Intake from All CACFP Meals and Snacks Consumed by Children in Care Four to Eight Hours per Day by Age Group

	All Children	Children Receiving Care in: Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Total Energy (kcal)					
Ages 1 - 2	453	415	n/a	529	529
3	533	n/a	586	482	520
4	591	n/a	614	484	571
5	581	n/a	650	388	548
6 - 10	545	n/a	n/a	n/a	446
All Ages	560	596	625	456	550
Total Fat (gm)					
Ages 1 - 2	16.6	15.9	n/a	17.9	18.0
3	18.1	n/a	20.6	16.2	17.8
4	20.4	n/a	21.2	18.1	20.2
5	20.0	n/a	23.0	12.4	18.9
6 - 10	20.2	n/a	n/a	n/a	16.1
All Ages	20.0	31.9	23.0	12.4	18.9
Saturated Fat (gm)					
Ages 1 - 2	7.3	7.0	n/a	8.0	8.0
3	7.5	n/a	9.0	6.6	7.5
4	8.6	n/a	9.3	7.1	8.6
5	8.4	n/a	9.6	5.0	7.8
6 - 10	9.0	n/a	n/a	n/a	7.8
All Ages	8.4	14.2	9.6	5.0	7.8
Carbohydrate (gm)					
Ages 1 - 2	59.8	52.9	n/a	74.4	74.0
3	73.4	n/a	76.9	67.0	70.7
4	80.0	n/a	81.5	62.3	75.1
5	78.2	n/a	85.7	55.3	73.9
6 - 10	70.2	n/a	n/a	n/a	58.6
All Ages	78.2	122.8	85.7	55.3	73.9
Protein (gm)					
Ages 1 - 2	18.1	17.0	n/a	20.3	20.5
3	21.1	n/a	25.0	18.9	21.1
4	24.2	n/a	26.4	20.0	24.3
5	24.3	n/a	27.6	15.6	22.9
6 - 10	23.1	n/a	n/a	n/a	19.4
All Ages	24.3	38.4	27.6	15.6	22.9
Vitamin A (mcg RE)					
Ages 1 - 2	346	326	n/a	391	387
3	343	n/a	571	225	353
4	408	n/a	501	259	421
5	365	n/a	436	207	346
6 - 10	374	n/a	n/a	n/a	363
All Ages	375	363	482	247	378

Exhibit C.19
(continued)

	All Children	Children Receiving Care in: Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Vitamin C (mg)					
Ages 1 - 2	29	24	n/a	41	41
3	29	n/a	36	25	29
4	41	n/a	40	40	40
5	41	n/a	46	32	40
6 - 10	43	n/a	n/a	n/a	43
All Ages	38	36	42	33	38
Calcium (mg)					
Ages 1 - 2	370	350	n/a	415	411
3	390	n/a	496	330	391
4	445	n/a	496	347	447
5	449	n/a	503	274	414
6 - 10	481	n/a	n/a	n/a	439
All Ages	427	446	498	325	422
Iron (mg)					
Ages 1 - 2	3.2	2.5	n/a	4.5	4.5
3	3.3	n/a	3.8	2.8	3.2
4	4.0	n/a	4.4	3.0	3.9
5	3.8	n/a	4.3	2.6	3.6
6 - 10	3.0	n/a	n/a	n/a	2.3
All Ages	3.7	3.7	4.3	3.0	3.7
Cholesterol (mg)					
Ages 1 - 2	57	55	n/a	60	61
3	67	n/a	98	53	70
4	73	n/a	85	55	75
5	70	n/a	84	38	66
6 - 10	67	n/a	n/a	n/a	47
All Ages	70	112	84	38	66
Sodium (mg)					
Ages 1 - 2	693	617	n/a	845	847
3	781	n/a	897	678	759
4	906	n/a	962	767	897
5	893	n/a	1008	575	839
6 - 10	817	n/a	n/a	n/a	656
All Ages	893	1449	1008	575	839
Sample Size (unweighted)					
Ages 1 - 2	62	26	2	34	36
3	173	20	100	53	153
4	525	21	436	68	504
5	440	13	366	61	427
6 - 10	54	24	8	22	30
All Ages	1200	80	904	216	1120

n/a = Fewer than 25 child observations.

Note: School-age-children (six- to ten-year olds) not included in part-day tabulations.

Exhibit C.20

Mean Percentages of RDAs Provided in All Meals and Snacks Consumed by Children in Care Four to Eight Hours per Day by Age Group

	All Children		Children Receiving Care in:							
			Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Total Energy										
Ages 1 - 2	34.8	2.7	31.9	3.9	n/a	n/a	40.7	5.3	40.7	5.2
3	41.0	2.3	n/a	n/a	45.1	2.9	37.1	3.4	40.0	2.6
4	32.8	2.3	n/a	n/a	34.1	1.1	26.9	4.2	31.7	2.2
5	32.3	4.9	n/a	n/a	36.1	2.1	21.6	6.1	30.4	4.1
6 - 10	28.6	5.7	n/a	n/a	n/a	n/a	n/a	n/a	22.6	7.4
All Ages	34.4	2.4	38.6	2.7	36.3	1.0	29.4	5.1	33.2	2.8
Protein										
Ages 1 - 2	113.3	9.6	106.2	14.6	n/a	n/a	127.1	16.6	127.9	16.3
3	131.6	8.3	n/a	n/a	156.4	9.8	117.9	13.5	132.1	10.0
4	100.9	6.5	n/a	n/a	109.9	3.4	83.3	15.5	101.1	7.9
5	101.4	16.9	n/a	n/a	115.2	5.1	65.2	24.3	95.6	14.7
6 - 10	88.6	24.0	n/a	n/a	n/a	n/a	n/a	n/a	70.8	31.9
All Ages	108.3	8.1	115.6	5.6	118.0	3.4	91.3	19.6	106.2	10.6
Vitamin A										
Ages 1 - 2	86.6	18.0	81.5	25.5	n/a	n/a	97.7	19.7	96.9	19.3
3	85.7	11.4	n/a	n/a	142.8	24.8	56.1	5.8	88.2	13.7
4	81.7	7.1	n/a	n/a	100.2	8.0	51.8	12.2	84.2	9.3
5	73.0	12.3	n/a	n/a	87.1	9.0	41.4	14.8	69.3	10.7
6 - 10	61.5	13.2	n/a	n/a	n/a	n/a	n/a	n/a	54.2	15.3
All Ages	80.2	5.2	81.3	8.5	100.0	6.7	54.5	11.4	79.8	8.1
Vitamin C										
Ages 1 - 2	73.6	11.0	59.8	9.0	n/a	n/a	102.1	21.3	101.7	20.8
3	73.1	7.9	n/a	n/a	89.8	8.6	62.8	13.0	72.8	9.8
4	91.7	7.2	n/a	n/a	88.8	6.1	88.0	14.5	88.5	6.3
5	91.2	10.0	n/a	n/a	101.5	13.7	70.4	7.7	89.4	9.1
6 - 10	95.7	15.8	n/a	n/a	n/a	n/a	n/a	n/a	96.3	20.2
All Ages	85.9	5.3	83.6	12.0	94.3	6.9	76.8	7.0	86.5	5.2

Exhibit C.20
(continued)

	All Children		Children Receiving Care in:							
			Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Calcium										
Ages 1 - 2	46.2	4.5	43.7	7.0	n/a	n/a	51.9	6.1	51.4	6.0
3	48.7	2.6	n/a	n/a	62.0	4.5	41.3	4.5	48.9	2.9
4	55.6	3.6	n/a	n/a	62.0	2.2	43.4	7.6	55.8	4.4
5	56.1	9.2	n/a	n/a	62.9	2.2	34.2	10.0	51.7	6.9
6 - 10	60.2	18.4	n/a	n/a	n/a	n/a	n/a	n/a	54.9	25.4
All Ages	53.4	4.0	55.8	5.4	62.3	1.6	40.7	6.5	52.7	4.2
Iron										
Ages 1 - 2	31.7	3.5	25.2	4.1	n/a	n/a	45.3	8.9	45.2	8.7
3	33.4	1.6	n/a	n/a	37.5	2.7	28.1	2.9	31.5	2.2
4	39.6	4.2	n/a	n/a	44.0	3.9	29.5	6.8	39.2	4.8
5	38.0	6.3	n/a	n/a	43.0	2.3	26.2	8.7	36.4	5.1
6 - 10	30.4	6.7	n/a	n/a	n/a	n/a	n/a	n/a	23.5	8.1
All Ages	37.0	3.3	36.9	3.5	42.8	2.3	29.8	5.4	37.0	3.6
Sample Size										
Ages 1 - 2	62		26		2		34		36	
3	173		20		100		53		153	
4	525		21		436		68		504	
5	440		13		366		61		427	
6 - 10	54		24		8		22		30	
All Ages	1200		80		904		216		1120	

n/a = Fewer than 25 child observations.

Note: School-age children (six- to ten-year-olds) not included in part-day tabulations.

Exhibit C.21

Mean Macronutrient, Cholesterol, and Sodium Content of All CACFP Meals and Snacks Consumed by Children in Care Four to Eight Hours per Day by Age Group

	All Children		Children Receiving Care in:							
			Family Day Care Centers		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Percent of Energy from Fat (%)										
Ages 1 - 2	33.6	1.4	35.3	1.5	n/a	n/a	30.2	1.7	30.3	1.6
3	29.4	1.4	n/a	n/a	30.7	1.1	29.2	1.6	29.7	1.1
4	29.6	0.9	n/a	n/a	29.9	0.7	29.0	2.1	29.6	0.8
5	29.3	1.3	n/a	n/a	31.6	1.0	25.3	1.7	29.1	1.3
6 - 10	30.6	3.9	n/a	n/a	n/a	n/a	n/a	n/a	29.6	5.8
All Ages	29.3	1.3	n/a	n/a	31.6	1.0	25.3	1.7	29.1	1.3
Percent of Energy from Saturated Fat (%)										
Ages 1 - 2	15.3	0.7	16.0	0.8	n/a	n/a	13.9	0.9	13.9	0.9
3	12.3	0.5	n/a	n/a	13.5	0.5	12.0	0.7	12.6	0.4
4	12.6	0.5	n/a	n/a	13.2	0.3	11.6	1.0	12.7	0.4
5	12.2	0.7	n/a	n/a	13.5	0.6	9.8	0.9	12.1	0.7
6 - 10	14.4	2.3	n/a	n/a	n/a	n/a	n/a	n/a	15.1	3.3
All Ages	12.2	0.7	n/a	n/a	13.5	0.6	9.8	0.9	12.1	0.7
Percent of Energy from Carbohydrates (%)										
Ages 1 - 2	51.9	1.9	49.9	2.1	n/a	n/a	56.2	2.2	55.9	2.2
3	56.3	1.6	n/a	n/a	53.7	0.9	56.7	2.3	55.6	1.3
4	56.0	1.6	n/a	n/a	54.6	0.9	57.8	4.1	55.6	1.6
5	56.4	2.2	n/a	n/a	52.3	1.4	63.2	3.2	56.6	2.3
6 - 10	57.8	6.1	n/a	n/a	n/a	n/a	n/a	n/a	60.2	8.9
All Ages	56.4	2.2	n/a	n/a	52.3	1.4	63.2	3.2	56.6	2.3
Percent of Energy from Protein (%)										
Ages 1 - 2	16.4	0.5	16.7	0.6	n/a	n/a	15.8	0.8	15.9	0.8
3	15.9	0.7	n/a	n/a	17.1	0.6	15.7	1.1	16.2	0.8
4	16.1	0.7	n/a	n/a	17.2	0.3	15.1	1.8	16.5	0.8
5	16.2	0.9	n/a	n/a	17.6	0.5	13.9	1.6	16.1	1.0
6 - 10	14.5	2.4	n/a	n/a	n/a	n/a	n/a	n/a	13.8	3.3
All Ages	16.2	0.9	n/a	n/a	17.6	0.5	13.9	1.6	16.1	1.0

Exhibit C.21
(continued)

	All Children		Children Receiving Care in: Family Day Care Centers		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Cholesterol (mg)										
Ages 1 - 2	56.9	5.4	55.1	7.0	n/a	n/a	60.0	9.2	60.5	9.0
3	67.4	7.0	n/a	n/a	98.3	23.2	53.2	7.1	69.9	9.0
4	73.5	5.9	n/a	n/a	85.0	5.3	55.2	10.2	75.1	5.8
5	70.0	13.0	n/a	n/a	83.7	4.0	38.2	16.3	65.9	11.2
6 - 10	67.5	15.7	n/a	n/a	n/a	n/a	n/a	n/a	46.7	17.5
All Ages	70.0	13.0	n/a	n/a	83.7	4.0	38.2	16.3	65.9	11.2
Sodium (mg)										
Ages 1 - 2	692.7	59.1	616.9	100.6	n/a	n/a	845.1	94.9	847.3	92.8
3	781.0	54.4	n/a	n/a	897.0	67.5	678.2	76.3	759.0	59.0
4	906.1	73.7	n/a	n/a	961.7	55.6	766.6	157.0	897.2	87.7
5	893.1	149.9	n/a	n/a	1007.7	62.5	574.6	223.6	838.5	129.2
6 - 10	817.4	200.6	n/a	n/a	n/a	n/a	n/a	n/a	655.5	274.8
All Ages	893.1	149.9	n/a	n/a	1007.7	62.5	574.6	223.6	838.5	129.2
Sample Size										
Ages 1 - 2	62		26		2		34		36	
3	173		20		100		53		153	
4	525		21		436		68		504	
5	440		13		366		61		427	
6 - 10	54		24		8		22		30	
All Ages	440		13		366		61		427	

n/a = Fewer than 25 child observations.

Note: School-age children (six- to ten-year-olds) not included in part-day tabulations.

Exhibit C.22

Mean Energy and Nutrient Intake from All CACFP Meals and Snacks Consumed by Children in Care Eight or More Hours per Day by Age Group

	All Children	Children Receiving Care in: Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Total Energy (kcal)					
Ages 1 - 2	653	687	n/a	562	562
3	709	781	n/a	662	660
4	793	800	854	778	788
5	839	877	n/a	830	827
1 - 5	743	763	750	722	724
Macronutrients					
Total Fat (gm)					
Ages 1 - 2	22.7	24.1	n/a	19.1	19.1
3	25.0	28.3	n/a	22.8	22.8
4	26.2	25.6	29.5	26.3	26.7
5	30.1	32.3	n/a	29.6	29.4
Saturated Fat (gm)					
Ages 1 - 2	9.7	10.3	n/a	8.1	8.1
3	10.7	11.9	n/a	9.7	9.8
4	11.4	11.1	13.5	11.4	11.6
5	13.5	12.7	n/a	13.8	13.7
Carbohydrate (gm)					
Ages 1 - 2	90.6	95.0	n/a	78.7	78.7
3	95.1	102.8	n/a	90.8	89.9
4	110.2	113.7	110.0	107.3	107.6
5	111.4	114.7	n/a	110.5	110.4
Protein (gm)					
Ages 1 - 2	24.6	25.6	n/a	21.7	21.7
3	28.4	31.8	n/a	25.9	26.0
4	32.3	31.8	39.6	31.8	32.7
5	34.5	35.8	n/a	34.2	34.0
Vitamins and Minerals					
Vitamin A (mcg RE)					
Ages 1 - 2	411	438	n/a	339	339
3	467	581	n/a	393	389
4	529	472	535	577	572
5	628	677	n/a	618	613
1 - 5	501	519	462	487	485
Vitamin C (mg)					
Ages 1 - 2	37	34	n/a	47	47
3	40	40	n/a	40	41
4	54	45	49	61	60
5	55	57	n/a	54	54
1 - 5	46	41	48	50	50

Exhibit C.22
(continued)

	All Children	Children Receiving Care in: Family Day Care Homes	Head Start Centers	Child Care Centers	All Centers
Calcium (mg)					
Ages 1 - 2	504	540	n/a	406	406
3	541	618	n/a	485	489
4	646	645	747	633	647
5	694	633	n/a	718	714
1 - 5	588	600	634	572	576
Iron (mg)					
Ages 1 - 2	4.9	5.0	n/a	4.5	4.5
3	5.0	5.9	n/a	4.4	4.3
4	5.5	5.7	5.5	5.3	5.3
5	5.5	6.4	n/a	5.3	5.3
1 - 5	5.2	5.6	4.6	4.9	4.9
Other Dietary Constituents					
Cholesterol (mg)					
Ages 1 - 2	83	89	n/a	69	69
3	91	108	n/a	81	80
4	90	85	108	91	93
5	98	104	n/a	94	95
Sodium (mg)					
Ages 1 - 2	978	1009	n/a	876	876
3	1123	1234	n/a	1054	1047
4	1223	1153	1314	1270	1276
5	1244	1322	n/a	1228	1219
Number of Child Observations (Unweighted)					
Ages 1 - 2	256	146	0	110	110
3	218	68	14	136	150
4	201	54	25	122	147
5	170	42	18	110	128
1 - 5	845	310	57	478	535

n/a = Fewer than 25 child observations.

Note: For macronutrients, cholesterol, and sodium, aggregation across age groups has been limited to five-year-olds and six- to ten-year-olds (see Chapter Two).

Exhibit C.23

Mean Percentage of the RDA Provided in All Meals and Snacks Consumed by Children in Care Eight or More Hours per Day by Age Group

	All Children		Children Receiving Care in:							
			Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Total Energy										
Ages 1 - 2	50.2%	1.6	52.8%	2.1	n/a	n/a	43.3%	3.0	43.3%	3.0
3	54.5	1.8	60.0	2.5	n/a	n/a	50.9	3.4	50.7	3.1
4	44.1	2.7	44.4	3.0	47.4%	2.7	43.2	3.6	43.8	3.3
5	46.6	3.4	48.7	3.4	n/a	n/a	46.1	3.6	45.9	3.6
1 - 5	49.5	1.6	52.6	1.9	47.0	2.7	46.6	2.6	46.6	2.4
Protein										
Ages 1 - 2	153.7	5.8	160.3	7.9	n/a	n/a	135.7	7.5	135.7	7.5
3	177.2	7.4	198.4	15.9	n/a	165.1	161.7	10.8	162.7	10.1
4	134.7	9.6	132.4	8.9	165.1	19.2	132.3	12.9	136.4	12.7
5	143.5	10.9	149.0	13.6	n/a	n/a	142.5	11.6	141.8	12.1
1 - 5	154.6	4.7	163.5	7.5	160.5	16.2	145.5	8.4	146.6	8.5
Vitamin A										
Ages 1 - 2	102.8	6.4	109.5	9.0	n/a	n/a	84.7	6.5	84.7	6.5
3	116.8	9.7	145.3	22.8	n/a	n/a	98.2	11.0	97.2	10.0
4	105.8	9.3	94.4	10.4	107.1	11.3	115.3	18.7	114.3	17.2
5	125.7	21.5	135.4	21.4	n/a	n/a	123.6	25.1	122.6	24.5
1 - 5	112.1	6.1	118.3	8.0	99.3	10.6	107.1	13.3	106.5	12.8
Vitamin C										
Ages 1 - 2	92.7	7.5	84.0	6.9	n/a	n/a	116.3	12.9	116.3	12.9
3	100.9	8.2	100.3	14.1	n/a	n/a	100.3	10.9	101.3	10.2
4	119.1	9.5	101.0	14.1	107.9	23.6	136.3	14.7	132.7	12.6
5	121.2	24.8	127.0	16.6	n/a	n/a	119.5	32.7	119.3	30.8
1 - 5	106.3	6.6	95.7	7.3	111.4	9.5	116.3	11.0	115.9	10.2

Exhibit C.23
(continued)

	All Children		Children Receiving Care in:							
			Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Calcium										
Ages 1 - 2	63.0%	3.6	67.5%	4.7	n/a	n/a	50.7%	4.7	50.7%	4.7
3	67.7	3.3	77.2	5.1	n/a	n/a	60.7	4.3	61.1	3.9
4	80.7	7.4	80.6	6.2	93.3%	8.4	79.1	9.8	80.9	9.4
5	86.7	9.1	79.1	6.9	n/a	n/a	89.8	10.4	89.2	10.5
1 - 5	72.8	4.4	73.7	3.7	79.3	8.3	71.5	6.6	72.1	6.4
Iron										
Ages 1 - 2	48.7	2.7	49.9	3.6	n/a	n/a	45.4	4.9	45.4	4.9
3	49.8	2.9	59.3	5.5	n/a	n/a	43.6	4.0	43.3	3.6
4	54.8	4.4	56.7	9.3	55.4	4.4	53.1	3.7	53.4	2.8
5	55.3	5.8	63.7	8.1	n/a	n/a	53.4	6.2	52.7	5.9
1 - 5	51.6	1.8	55.0	3.1	46.3	6.4	48.8	2.8	48.6	2.6
Number of Child Observations (Unweighted)										
Ages 1 - 2	256		146		0		110		110	
3	218		68		14		136		150	
4	201		54		25		122		147	
5	170		42		18		110		128	
1 - 5	845		310		57		478		535	

n/a = Fewer than 25 child observations.

Note: School-age children (six- to ten-year-olds) not included in full-day tabulations.

Exhibit C.24

Mean Macronutrient, Cholesterol, and Sodium Content of All Meals and Snacks Consumed by Children in Care Eight or More Hours per Day by Age Group

			Children Receiving Care in:							
	All Children		Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Percent of Energy from Fat (%)										
Ages 1 - 2	30.9	0.5	31.4	0.6	n/a	n/a	29.7	0.9	29.7	0.9
3	31.4	1.0	32.4	0.9	n/a	n/a	30.3	1.5	30.6	1.4
4	29.7	0.8	28.7	1.8	31.0	0.5	30.4	0.5	30.4	0.4
5	32.4	0.8	32.4	1.1	n/a	n/a	32.6	1.3	32.4	1.2
Percent of Energy from Saturated Fat (%)										
Ages 1 - 2	13.2	0.3	13.5	0.4	n/a	n/a	12.5	0.6	12.5	0.6
3	13.5	0.5	13.7	0.7	n/a	n/a	13.1	0.7	13.3	0.6
4	12.9	0.4	12.4	0.8	14.1	0.2	13.1	0.4	13.2	0.3
5	14.5	0.8	12.9	0.8	n/a	n/a	15.1	0.9	15.0	0.9
Percent of Energy from Carbohydrate (%)										
Ages 1 - 2	55.8	0.6	55.5	0.7	n/a	n/a	56.6	1.6	56.6	1.6
3	54.1	1.3	53.1	1.4	n/a	n/a	55.2	1.8	54.8	1.8
4	55.7	1.1	57.0	2.3	52.1	1.8	55.2	0.6	54.8	0.7
5	52.7	1.1	53.2	1.1	n/a	n/a	52.4	1.8	52.5	1.6
Percent of Energy from Protein (%)										
Ages 1 - 2	15.2	0.4	15.0	0.5	n/a	n/a	15.6	0.7	15.6	0.7
3	16.0	0.5	16.0	1.0	n/a	n/a	15.8	0.5	16.0	0.6
4	16.3	0.5	15.9	0.8	18.2	1.4	16.3	0.5	16.5	0.6
5	16.7	0.6	16.3	1.3	n/a	n/a	16.8	0.7	16.8	0.6

Exhibit C.24
(continued)

	All Children		Children Receiving Care in:							
			Family Day Care		Head Start Centers		Child Care Centers		All Centers	
	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err	Mean	Std Err
Cholesterol (mg)										
Ages 1 - 2	83.2	7.2	88.6	9.7	n/a	n/a	68.7	3.9	68.7	3.9
3	91.5	6.2	108.1	12.2	n/a	n/a	80.7	5.4	80.1	5.0
4	89.5	8.3	84.8	14.7	107.5	2.2	91.0	10.0	93.1	8.4
5	97.6	8.7	104.4	16.1	n/a	n/a	94.3	9.4	95.4	9.0
Sodium (mg)										
Ages 1 - 2	973.1	28.8	1009.0	39.3	n/a	n/a	876.1	51.5	876.1	51.5
3	1122.8	62.8	1234.1	119.7	n/a	n/a	1054.1	71.1	1046.6	65.9
4	1223.0	46.5	1152.9	85.1	1313.8	132.1	1270.1	45.3	1275.6	39.1
5	1243.7	63.5	1322.2	81.9	n/a	n/a	1227.8	58.2	1218.6	64.7
Number of Child Observations (Unweighted)										
Ages 1 - 2	256		146		0		110		110	
3	218		68		14		136		150	
4	201		54		25		122		147	
5	170		42		18		110		128	

n/a = Fewer than 25 child observations.

Note: School-age children (six- to ten-year-olds) not included in full-day tabulations.

Appendix D

Study Design

Appendix D presents a nontechnical summary of the study design for the Early Childhood and Child Care Study. A discussion of the procedures that were used to identify, select, and recruit study participants is presented in Appendix F, which also discusses survey implementation and response rates.

A multistage cluster sample design was used in this study to take advantage of the nested hierarchy of the populations of interest. The hierarchical structure is as follows: each State administers the CACFP through sponsors; sponsors[1] in turn administer the program through child care providers; child care providers, which may include family day care homes, child care centers, and Head Start centers, care for children; and finally, participating children are served CACFP-reimbursable meals and snacks by providers. Consequently, the sample was processed in four stages:

- Stage 1: Selection of States;
- Stage 2: Selection of sponsors;
- Stage 3: Selection of child care providers; and
- Stage 4: Selection of children and families.

An overview of the sample design structure for the Early Childhood and Child Care Study is shown in Exhibit D.1. Each stage of sample selection is discussed in the following sections.

[1]For the purposes of this study, independent child care centers are considered sponsors.

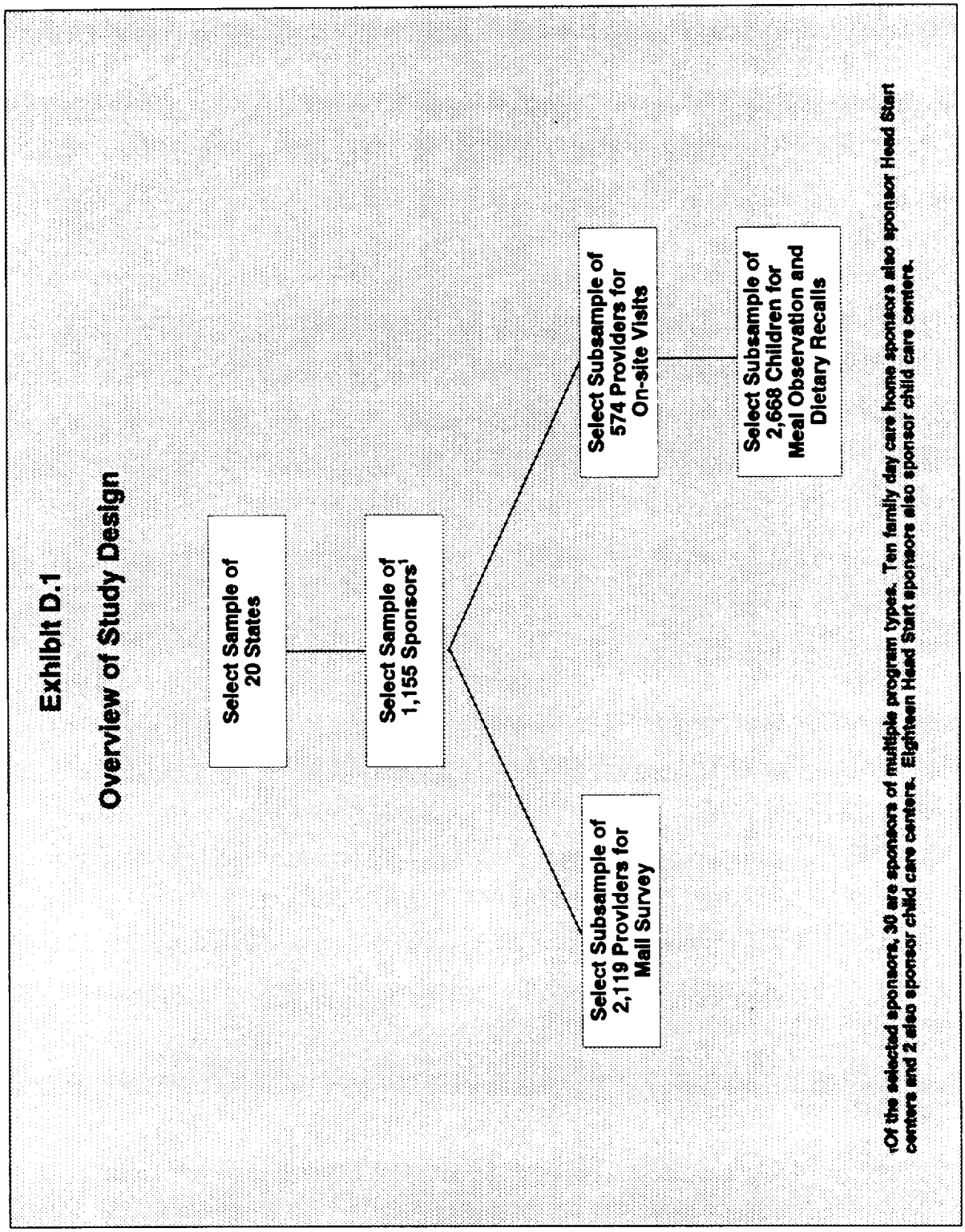


Exhibit D.1
Overview of Study Design
Select Sample of 20 States
Select Sample of 1,155 Sponsors[1]
Select Subsample of 2,119 Providers for Mail Survey
Select Subsample of 574 Providers for On-site Visits
Select Subsample of 2,668 Children for Meal Observation and Dietary Recalls
[1]Of the selected sponsors, 30 are sponsors of multiple program types. Ten family day care home sponsors also sponsor Head Start centers and 2 also sponsor child care centers. Eighteen Head Start sponsors also sponsor child care centers.

STAGE 1: SELECTION OF STATES

The study was conducted in a nationally representative sample of 20 States. The sampling frame comprised the 48 contiguous States and the District of Columbia. Alaska and Hawaii were excluded because they account for a very small percentage of providers and participating children and the cost of collecting on-site data in these States was prohibitive.

The sample of States was selected with probability proportional to the number of CACFP meals served at homes and centers in each State. That is, States serving relatively large numbers of meals had a greater probability of being included in the sample than States serving relatively small numbers of meals. To avoid the increase in sampling variances that would result from leaving the inclusion of large States to chance, eight States with relatively large numbers of meals served were included in the sample with certainty. These large States had programs that were at least 2.5 times as large as the national average. Other States were grouped into 12 strata of approximately equal size according to region, the relative importance of homes versus centers, the relative importance of Head Start, and the ratio of reimbursements to meals served. One State was then selected from each stratum with probability proportional to the measure of size. This resulted in a sample that included States from each of the seven FCS regions (Exhibit D.2).

Exhibit D.2

States Included in Study Sample by FCS Region

FCS Region	States
Mid-Atlantic	Maryland
Midwest	**Michigan, Minnesota, Ohio, Illinois,** Indiana
Mountain Plains	**Kansas**, Iowa, Missouri
Northeast	Massachusetts, Maine, **New York**
Southeast	Georgia, Mississippi, Tennessee, North Carolina
Southwest	**Texas**, New Mexico
Western	**California**, Washington

Note: States in bold were included in the sample with certainty.

STAGE 2: SELECTION OF SPONSORS

A second-stage sample of sponsoring agencies was selected from the sample of 20 States. Sponsoring agencies were stratified by type of provider agency (homes, Head Start centers, and child care centers), and within each stratum, sponsors were selected with probability proportional to size (i.e., agencies that sponsor relatively large numbers of providers had greater probability of selection than sponsoring agencies with fewer providers).[2] As with States, the largest sponsors were selected with certainty in order to reduce the sampling variance.

An initial sample of 180 family day care sponsors, 419 Head Start center sponsors, and 596 child care center sponsors was drawn. Since State agencies do not distinguish between independent (i.e., self-sponsoring) child care centers (ICCCs) and sponsoring organizations that sponsor more than one center, the ICCCs were treated as sponsors for purposes of sampling at the sponsor level. The sample of 596 sponsors of child care centers included 431 ICCCs and 165 "true" sponsors. All of the sampled sponsors (including the ICCCs) were included in the Study of Sponsors and Providers.

STAGE 3: SELECTION OF CHILD CARE PROVIDERS

A third-stage sample of child care providers was selected from within each of the sampled sponsoring agencies. These providers were selected with probability proportional to size. That is, providers receiving relatively high monthly reimbursements for meals served in the CACFP had a greater probability of selection than providers receiving lower monthly meal reimbursements. A total sample of 872 homes, 1,063 Head Start centers, and 758 child care centers (including 376 ICCCs) was selected at this stage, and all were included in the Study of Sponsors and Providers.

[2]Practical considerations led to the use of the number of providers (within each stratum) as the measure of size. It was easier for States to provide counts of each type of provider for each sponsoring agency than other potential measures of size such as the number of meals or reimbursements by type of provider.

STAGE 4: SELECTION OF CHILDREN AND FAMILIES

The fourth and final stage of sampling involves the selection of children (and their families) to be included in the Study of Children and Families. The sample of children was selected from a subsample of the providers included in the third-stage sample. Geographic clustering was used in the selection of this subsample of providers in order to reduce data collection costs associated with site visits to observe children. To accomplish this, providers were aligned by ZIP code and then a sample of providers was selected using probability proportional to size. A total of 239 homes, 169 Head Start centers, and 166 child care centers was selected for the Study of Children and Families.

Family Day Care Homes

The selection of a sample of children from homes was straightforward. Because the number of children enrolled in homes is usually quite low, we attempted to include all children from the sample of homes. However, in cases where more than 10 children were enrolled in a home, we selected a random sample of 10 children for inclusion in the study.

Child Care Centers and Head Start Centers

Because child care centers and Head Start centers are much larger than homes, the process of sampling children in centers was somewhat more complicated. Most centers divide the children into age-specific groups (classes), with infants almost always cared for separately in child care centers. Consequently, the need to observe in-care food consumption made it impractical to select a random sample of children from across the centers as the sampled children might end up in different rooms during meal times. (Infants are almost always fed in a separate room.) To deal with this situation, an intermediate stage of sampling was used in centers—an "age-specific" group. If infants were cared for at a center, one infant was sampled and a sample of five children from one other age group were selected. If there were no infants, six children were selected from a single age group. The sample included a total of 576 children in homes, 1,188 children in Head Start centers, and 904 children in child care centers.

Appendix E

Weighting Methodology

Sampling for the Early Childhood and Child Care Study followed a multistage, multiphase design. Consequently, weights were developed for multiple sampling units, resulting in six distinct weights for data analysis. This appendix identifies the weights required for tabulating data and explains how those weights were developed.

The weights are named with the variable W and subscripts are used to denote the sample to which they apply. For example, $W_{sponsor}$ is the weight that corresponds to the Sponsor Survey. We use Q to denote a sampling probability and add a subscript to denote where that probability applies. For example, Q_j denotes probability of selection for the j^{th} State, and $Q_{i|j}$ denotes the conditional probability of selection for the i^{th} sponsor in the j^{th} State, given that the j^{th} State was selected for the sample. These sampling probabilities were adjusted for nonresponse and other factors. The adjusted sampling probabilities are denoted by P with subscripts that match their Q counterparts. This and additional notation used in this appendix are summarized below.

W	W denotes a sampling weight. A subscript is added to indicate the survey to which that weight applies. For example, $W_{sponsor}$ is the weight for the Sponsor Survey.
Q	Q denotes the conditional sampling probability. Subscripts indicate the sampling stage at which the probability applies. For example, $Q_{i\|hj}$ denotes the conditional probability of selection for the i^{th} provider given that the sample was of the h^{th} provider type and was drawn from the j^{th} State.
P	P denotes the conditional sampling probability after applying an adjustment for nonrespondents and other special sampling issues. Subscripts conform to conventions established with Q.
h	Subscript that denotes the type of sponsor (family day care home sponsor, Head Start center sponsor, or child care center sponsor).
i	Subscript that denotes the i^{th} sponsor given the sponsor type (h) and State (j).
j	Subscript that denotes the j^{th} State.
k	Subscript that denotes the k^{th} program in the full provider sample given the State (j), sponsor type (h), and specific sponsor (i).

m Subscript that denotes the m^{th} program in the on-site provider sample given the State (j), sponsor type (h), sponsor (i), and selection into the full program sample (k). Programs selected for on-site observations were a subset of all programs in the full provider sample.

c Subscript that denotes the child selected for study given the State (j), sponsor type (h), sponsor (i), and selection into the on-site provider sample.

Preparing each of the weights described in this appendix required a development cycle. The first step was to assign a weight that was the inverse of the sampling probability: $1/Q$. The second step was to adjust the sampling probability for various special conditions. For example, Massachusetts was used for the pretest, and this required adjusting the sampling probability somewhat. The third step was to make nonresponse adjustments to these sampling probabilities. Generally, this was done by stratifying respondents and nonrespondents into reasonably homogenous cells and then inflating the inverse of the conditional sampling probabilities for respondents within each cell to account for missing observations from nonrespondents within that same cell. As a final step, when the resulting weight was unreasonably large, we truncated the inflation factor and used a proportional spreading procedure so that the weights yielded the number in the population. The resulting adjusted version of Q was P, and the final weight was based on P.

SPONSOR WEIGHTS

States were the primary sampling units. Eight States were selected with certainty and another twelve States were selected with probability proportional to size. Call the probability of selection Q_j. There were no nonrespondents among the States, so there was no need for nonresponse adjustments to Q_j; hence $P_j = Q_j$.

Within States, sponsors were stratified by type of provider sponsored (FDCHs, child care centers, and Head Start centers), and sponsors were then selected with probability proportional to size. Call this conditional probability of selection $Q_{i|hj}$, where h designates the type of sponsor and j designates the State. The sampling probability $Q_{i|hj}$ has to be adjusted for

nonrespondents. To explain this adjustment, let $Q_{i|hj}$ represent the original, unadjusted conditional sampling probability. We stratified the sponsors by type of sponsor and then by State groups and number of providers to form cells. Let $\Sigma_R Q_{i|hj}$ represent the sum of the sampling probabilities for all respondents within a cell, let $\Sigma_N Q_{i|hj}$ represent the sum of the sampling probabilities for all nonrespondents within that same cell, and define $A_{i|hj}=\Sigma_R Q_{i|hj}/(\Sigma_R Q_{i|hj}+\Sigma_N Q_{i|hj})$. Then $P_{i|hj}=Q_{i|hj}A_{i|hj}$.

Each sampled sponsor was asked to complete a Sponsor Survey. Tabulation of data from the Sponsor Survey requires the weight $W_{\text{sponsor}} = 1/(P_{i|hj}P_j)$. When selecting the sponsor sample, independent child care centers (ICCCs) were treated as sponsors. This choice was necessitated because the State lists of sponsors did not distinguish between "true" sponsors and ICCCs, but in fact ICCCs are child care providers, not sponsors. For them, $W_{\text{sponsor}} = 0$, or equivalently, the ICCCs are excluded from any tabulations at the sponsor level. These ICCCs do enter the provider sample, where they are assigned appropriate weights for purposes of tabulation.

PROVIDER AND MENU WEIGHTS

From the sponsor sample, we next sampled child care providers (the full provider sample) and asked them to answer a Provider Survey. Tabulation of the Provider Survey requires the weight W_{provider}. Providers were also asked to complete a Menu Survey and a Food Preparer Interview. To adjust for differences in the nonresponse patterns for the Provider Survey, the Menu Survey, and the Food Preparer Interview, we developed one additional weight: W_{menu}. This weight is intended for use with both the Menu Survey and the Food Preparer Interview.

The provider and menu weights would be identical except that their response patterns differed somewhat and, consequently, so did the nonresponse-adjusted final weights. Given this similarity, we only discuss the provider weights. The provider sample was drawn from sample sponsors only. The conditional probability of selection for a provider was larger for small sponsors and smaller for large ones, assuring that providers from small sponsors would not be underrepresented in the sample. Let $Q_{k|hij}$ represent the conditional probability of selection for

the k^{th} provider given the State, sponsor, and sponsor type. $P_{k|hij}$ reflects the adjustment for nonrespondents. Except for ICCCs, nonresponse adjustments were done by stratifying the sample by type of sponsor, then by whether they were public or private (with or without a corporate affiliate in the latter case), by type of sponsoring organization (school district, public social service agency, etc.), by percentage of revenue from CACFP reimbursement, and by whether or not they planned menus. The stratification varied somewhat by type of provider. Because nonresponding ICCCs had no corresponding sponsor, the nonresponse adjustments for ICCCs were based exclusively on State groupings with no more than two States per group. Then $W_{provider} = 1/(P_{k|hij} P_{i|hj} P_j)$.

WEIGHTS FOR ON-SITE OBSERVATIONS

A subset of the full provider sample was selected for the on-site observations (the on-site provider sample). From that subset, we selected children and observed their meal consumption, interviewed their parents about their meal consumption while not in child care, and interviewed their parents to obtain household characteristics. Selection into the on-site provider group resulted in three additional surveys and three new weights. The weight W_{meals} is suitable for tabulating data about on-site meal consumption, the weight W_{recall} is used for tabulating data from the recall interviews, and the weight $W_{household}$ applies to household interviews.

While children in FDCHs are usually fed together, children in centers tend to be fed in small groups whose composition is homogenous with respect to age. To allow the observers at centers to watch the food consumption of the sampled children, we first chose a group of noninfant children and then selected six children from that group. (If the center served infants, we instead selected one infant and five children from the chosen non-infant group.) In FDCHs, we simply selected six non-infant children (if the number of eligible children was as many as six), or five non-infants and one infant (if any eligible infants were enrolled). Children ineligible to be sampled included infants who were exclusively breastfed, children who were not enrolled for both of the scheduled observation days, and siblings of sample members. The first two groups were deemed outside of scope. The siblings were represented by other children enrolled with the same provider, i.e., by increasing the child weights of the other children in the same group proportionally.

Let $P_{m|hijk}$ represent the adjusted probability that the m^{th} program was selected for on-site observation given that the k^{th} program of the i^{th} sponsor of sponsor type h in the j^{th} State was selected for the provider survey, and let $P_{c|hijkm}$ represent the adjusted probability that a child was selected given that a provider appeared in the on-site provider sample. Then the weight is $W = 1/(P_{c|hijkm}\ P_{m|hijk}\ P_{k|hij}\ P_{i|hj}\ P_j)$. As stated earlier, there are distinct versions of W for meal observations, recalls, and families.

Several nonresponse adjustments are required. The probability that a provider is selected into the sample, conditional on its sponsor's selection, is $Q_{m|hijk}\ Q_{k|hij}$. The nonresponse adjustment procedure is identical to that used earlier to adjust $Q_{k|hij}$. However here the respondents and nonrespondents are only those programs that were selected for the on-site sample, and the stratification was less complicated than for the nonresponse adjustment to the full provider sample because of the smaller number of on-site providers. The nonresponse adjustment corresponding to $Q_{c|hijkm}$ looks quite different from the nonresponse adjustment for other selection probabilities. Instead of stratifying the data into cells based on sponsor characteristics, we conducted all nonresponse adjustments within a provider. Call the intended sample size of non-infants N_I, and the observed sample size N_O. When N_O was less than N_I, we adjusted the preadjusted sampling probability $Q_{c|hijkm}$ to get $P_{c|hijkm} = Q_{c|hijkm}N_O/N_I$. (In one instance, none of the sampled children were present to be observed—that is, N_O was equal to zero. In this case, the provider was collapsed with a similar provider and the nonresponse adjustment was repeated.) A similar, but somewhat simpler procedure, was used for infant children.

The analysis of meals consumed in care is intended to describe *children in care on a typical day*—not all children enrolled in care. Hence, children who were selected into the sample but absent on one or both observation days were not nonrespondents for purposes of constructing the corresponding weights (W_{meals}), but rather outside of scope. Because no attempt was made to contact the parents of children who were absent on both days, however, these families were deemed nonrepondents in constructing the household weights ($W_{household}$).

Appendix F

Study Implementation

SUMMARY

Meeting the research objectives of the Early Childhood and Child Care Study required the use of a variety of data collection instruments, to obtain information from several categories of respondents, and the direct observation of children's meals. The study design incorporated two interrelated studies—a Study of Sponsors and Providers and a Study of Children and Families. Exhibit F.1 links the data collection strategy to each of the study objectives. This appendix provides a detailed description of survey instrumentation, study implementation (including the recruiting of study participants), and data collection activities. Finally, it shows the disposition of the study sample.

At the outset it is important to present an overview of the response rates for the various components of the study. While the response rates for the Study of Sponsors and Providers were good, the response rates for the Study of Children and Families were relatively low.

Sponsors and Providers

Sponsoring agencies were asked to complete a self-administered mail survey. Response rates for this survey ranged from 83 percent for family day care sponsors to 72 percent for Head Start sponsors and 71 percent for child care center sponsors.

Providers were asked to complete two self-administered mail surveys. In addition, an attempt was made to conduct a telephone interview with the individual with primary responsibility for food preparation (food preparer). Among family day care homes, 91 percent completed at least one of the three surveys. Similarly, 97 percent of Head Start centers and 92 percent of child care centers completed at least one of the three surveys. Response rates for each of the three surveys always exceeded 80 percent.

Exhibit F.1

Data Collection Strategy by Study Objective

Objective	Data Collection Strategy
Study of Sponsors and Providers	
Describe CACFP program characteristics.	• Mail survey of sponsors.
	• Mail survey of providers.
Examine the nutrient content of meals offered in participating homes and centers.	• Mail survey of providers to collect descriptions of meals offered for a five-day period.
Assess the nutrition knowledge and food service practices of providers.	• Telephone/in-person interview of food preparers to assess nutrition knowledge and obtain information on menu planning, food purchasing, and food preparation practices.
Study of Children and Families	
Describe the characteristics of participating children and their families.	• Telephone interview with parents to collect demographic information.
Determine the contribution of CACFP meals and snacks consumed to participating children's nutrient intake while in care and over 24 hours.[1]	• On-site observation of meals and snacks consumed in child care.
	• Telephone interviews with parents regarding foods and beverages consumed while child was not in care.[1]

[1]As discussed below, response rates for the parent interviews conducted to obtain information on children's intake while not in care were unacceptably low, raising the issue of potential nonresponse bias. For this reason, data on children's out-of-care consumption, and therefore nutrient intake over 24 hours, have not been analyzed.

Children and Families

In this component of the study, a sample of children at participating child care sites was to be observed on two separate days during a target week. Parents were scheduled to be interviewed on the day following each observation to provide information on what the child ate when not in child care on the observation day (Dietary Recall Interview). During one of the interviews with parents, a Household Survey was to be administered to obtain information on household characteristics.

The Study of Children and Families proved to be problematic. The primary problem was reaching parents prior to the target week in order to gain their cooperation, obtain permission to observe their children, and schedule the post-observation interviews. Although we were able to contact and schedule observations for 80 percent of the sample of children in homes, we were only able to schedule observations for 58 percent of the sample of children in Head Start centers and 62 percent of the sample of children in child care centers. The difficulty in contacting parents during the recruiting phase effectively capped the overall response rates for the Study of Children and Families.

Absenteeism was also a serious problem in all three child care settings. Some children scheduled to be observed were not in care on one or both observation days. In homes, 91 percent of the children scheduled for observations were observed on one of the scheduled days; only 67 percent, however, were observed on both scheduled days. In Head Start centers the figures were 95 percent and 72 percent, respectively, and in child care centers, 90 percent and 73 percent, respectively. Overall response rates for the child observations (i.e., the proportion of eligible children that were observed at least once) were 72 percent for homes, 55 percent for Head Start centers, and 56 percent for child care centers. Note that since the analysis of meals consumed in care is intended to describe *children in care on a typical day*—not all children enrolled in care—children who were selected into the sample but absent on one or both observation days were not nonrespondents for purposes of constructing the corresponding weights (W_{meals}), but rather outside of scope.

Finally, there was a problem reaching parents to conduct the post-observation interviews. Nonresponse to the post-observation interviews further reduced overall response rates for the Dietary Recall Interviews to 58 percent for homes, 36 percent for Head Start centers, and 39 percent for child care centers. These response rates were deemed to be unacceptably low, so the information obtained in the Dietary Recall Interviews has not been used in this study.

INSTRUMENTATION

The study employed three self-administered surveys, three interviews, and an observation protocol. Each is briefly described below.

Sponsor Survey

The self-administered Sponsor Survey collected descriptive information on the characteristics of the sponsoring agency, such as agency type (e.g., government entity versus community agency), size, and structure; number and type of programs sponsored; and nutrition education and training programs offered to the staff.

Provider Survey

The Provider Survey had three versions: one for homes, another for sponsored centers, and a third for independent centers.[1] The surveys collected information on provider characteristics (i.e., the number and ages of children served); weeks, days, and hours of operation; meals provided (i.e., breakfast, lunch, or dinner; and morning, afternoon, and/or evening snacks); funding sources; and nutrition education. Center instruments included questions on the types of child care or early childhood programs offered. The Provider Survey was generally self-administered. However, in some cases, a field observer conducted the survey if the provider had been unable to complete it prior to the observation visit.

[1]While family day care providers must be sponsored in order to participate in the CACFP, child care centers may participate either under the aegis of a sponsoring agency or as independent centers.

Menu Survey

The Menu Survey collected information on meals *offered* to children in care over a five-day period. This information included the name and description of all foods and beverages offered and the age groups to whom each item was offered. If recipes were readily available, providers were asked to include information on the ingredients used and the preparation techniques followed. The Menu Survey was self-administered. In some cases, providers in the on-site sample were assisted in completing the Menu Survey by field observers.

Food Preparer Interview

Information on the nutrition knowledge, food preparation, and purchasing practices of providers was collected through the Food Preparer Interview. The interview addressed issues such as the food preparer's knowledge of nutrition, including awareness of strategies for implementing the *Dietary Guidelines for Americans;* menu planning; food purchasing; and meal preparation. Most Food Preparer Interviews were conducted by telephone. However, food preparers in the on-site sample were interviewed in person during the site visit.

Meal Observation

To gather information on foods *consumed* by children in the child care setting, meal observations were conducted on two separate days during the target week (i.e., the week covered in the Menu Survey). Prior to meal service, field observers weighed representative samples of each food to be served. During meal time, observers estimated the amount of food each child received and the amount of food left over using visual estimation techniques.[2]

[2]Information on food intake of sampled infants was collected through a vehicle that combined elements of both the child observations and the Menu Survey. The person responsible for feeding the infant recorded the kind and amount of foods and beverages consumed. Detailed descriptions of foods (and ingredients) were gathered by the field observer.

Dietary Recall Interview

To gather information on children's food consumption outside of care, Dietary Recall Interviews were conducted with parents. Parents were asked to describe foods and beverages consumed by the child while not in child care, during the specific 24-hour period which included the child care meal observation.[3] Interviews were conducted by telephone within two days of the observation day.

Household Interview

Information on characteristics of families of children participating in the CACFP was collected through the Household Interview. This instrument gathered data such as age of the child, race and ethnicity of the child and the family, family participation in other Federal assistance programs, and household size and income. The interview was conducted by telephone, usually in tandem with one of the Dietary Recall Interviews.

STUDY IMPLEMENTATION

The study was conducted in a nationally representative sample of 20 States. These States were selected with probability proportional to size, based on the size of the CACFP in each state in Fiscal Year 1994. Food and Consumer Service Regional Offices and State agencies were contacted in January 1994 to assemble the information needed to select the samples of sponsors and providers. Actual data collection activities began in January 1995 and continued through June 1995. This section describes the procedures used in recruiting sampled sponsors, providers, and households, as well as the administration of survey instruments.

Recruiting Study Participants

To construct the samples of sponsors and providers, the State agency responsible for the administration of the CACFP in each of the 20 sampled States was asked to furnish lists of agencies sponsoring each of the three types of CACFP providers: family day care, Head Start

[3]For children age 10 and older, the Dietary Recall Interview was conducted with the child rather than the parent.

centers, and child care centers. A sample of sponsors was selected from each of these lists.[4] State agencies were then provided with the lists of selected sponsors in their State and requested to furnish a list of providers associated with each sponsor, including the dollar value of each provider's October 1993 claim for reimbursement. The claim information was requested as a measure of program size. Only 2 of the 20 States were able to furnish provider-level information. In the other 18 States, sponsors were contacted directly for provider data. Most sponsors were able to supply the information; however, some were not able to furnish it. Some sponsors did not maintain the information requested, others did not have it in an easily retrievable form.

The recruiting phase of the study required gaining the cooperation of sponsors, providers, and households. Recruiting activities for each are described in the following three sections.

Sponsors. Recruiting activities began with a series of sponsor contacts in the summer of 1994:

- A sponsor mailing including:
  - an individually signed letter on study stationery;
  - a brief overview of the study;
  - a toll-free telephone number for inquiries; and
  - a request for a list of sponsored providers in States where the administering agency was unable to furnish lists of providers.
- A telephone followup to:
  - ensure receipt of materials;
  - encourage sponsors to support the study;
  - respond to questions about the study; and
  - prompt sponsors to return provider lists.

[4]Independent child care centers were included on the lists of center sponsors, as State agencies do not distinguish between independent centers and sponsoring organizations.

Following receipt of the provider lists, a sample of providers was selected for the Study of Sponsors and Providers and a subsample of these providers was selected for the Study of Children and Families. Sponsors were notified of this selection and asked to help secure the cooperation of sampled providers. In particular, sponsors were asked to contact sampled providers *before* we contacted them.

Providers. Provider recruiting was conducted on a rolling basis. Each provider was assigned its own "target week" during which it was to complete the Menu Survey. Each provider had the following contacts:

- Approximately six weeks before the scheduled target week, a mailing with:
  - an overview of the study and a cover letter;
  - target-week information;
  - a Menu Survey; and
  - a Provider Survey.
- Two weeks after the mailing, a first followup telephone call to:
  - confirm receipt of materials;
  - ensure understanding of survey questions and requirements;
  - identify appropriate respondents for each survey instrument;
  - confirm the target week or, when necessary, negotiate a new target week; and
  - to assess the likelihood of the provider's completing the survey without further prompting.
- One week prior to the target week, a second telephone call to:
  - reassess the provider's willingness and ability to complete the Provider Survey and Menu Survey during the target week; and
  - to schedule an appointment to complete the Food Preparer Interview during the target week.

For the subsample of providers included in the Study of Children and Families, the recruiting phase was somewhat more complex. Providers were asked to furnish information about families and children and to allow observers to visit on two nonconsecutive days during the target week (Monday and Thursday or Tuesday and Friday). In addition to these activities, Head Start centers and child care centers were asked to supply the names and ages of each group of children at the center. This information was then used to select a sample of children for observation.

Households. Gaining parent cooperation was the final step in recruiting. Household recruiting included the following activities:

- Providers were asked to distribute a brochure explaining the study to parents in the selected group and, in the case of family day care, to all parents. The brochure included an implied consent form (i.e., parents were asked to return the form if they did *not* want their names and telephone numbers released).
- Providers were asked to forward parent names and telephone numbers.
- Parents were subsequently contacted by telephone and asked to participate in the study. It was explained to parents that participation included:
  - allowing their child to be observed at mealtime on two separate days;
  - recording foods consumed by the child while not in care on the two observation days;
  - completing two Dietary Recall Interviews, one following each observation day; and
  - completing the Household Interview.

Once parents of sampled children had agreed to participate in the study, the site was scheduled for on-site visits. The original data collection plan called for scheduling the target week, receiving names of parents, and scheduling interviews during the planned week. However, receiving the parent lists in time to schedule interviews prior to the target week proved to be problematic. Delays by the provider in returning the parent information often required changing the target week to a later date. Consequently, we altered our procedures so that the target weeks were not assigned until after the parent lists were received. This alternate plan provided more

time for scheduling parent interviews prior to the target week. Despite this, we were still unable to reach many parents prior to the target week.

Data Collection Activities

Data for the Study of Sponsors and Providers were collected by mail surveys, telephone interviews, and in-person interviews. Information for the Study of Children and Families was gathered through on-site visits and telephone interviews.

The Study of Sponsors and Providers. Sponsor Surveys were mailed to sampled sponsors in January 1995. In addition to the survey, the mailing included an introductory letter and study overview; information about the toll-free help number; and a business reply envelope for return of the survey. Sponsors whose surveys were not returned on schedule were contacted by telephone at biweekly intervals and asked to return the survey. A few surveys were ultimately conducted by telephone.

As indicated above, each provider in the sample was assigned a target week for completing the Menu Survey. The target weeks were spread out over a four-month period, January 1995 through May 1995. The Menu and Provider surveys were mailed to providers several weeks prior to the target week. A brochure, *Guidelines for Describing Foods,* accompanied the Menu Survey. This brochure detailed the information to be provided about each food offered. In the 1988 Study of the Child Care Food Program, illiteracy proved to be an obstacle to completion of survey instruments, particularly for the family day care provider population. For this study, a linguist reviewed and revised the Menu Survey and the Provider Survey to meet the needs of adults with low literacy skills.

To ensure completion of the surveys and to provide assistance as needed, a series of provider contacts were made. A target-week call was made during the target week to:

- prompt the provider to complete the Menu Survey;
- assist the provider, if necessary, in completing the Menu Survey;

- conduct the Food Preparer Interview; and
- to remind the provider to return the materials at the end of the week.

A post-target-week call was made to prompt providers who had not returned surveys.

Additional reminder telephone calls were made at biweekly intervals until all survey materials were received. When providers had misplaced business reply envelopes, they were instructed to return materials by Federal Express, charged to Abt Associates Inc. An incentive of $25.00 for return of a completed Menu Survey was offered to nonresponding providers. This incentive was offered in recognition of the significant time commitment required for completion of the survey. As a gesture of good will, responding providers working under the same sponsor as the nonresponding providers were also sent incentive payments.

The Study of Children and Families. Each provider in this component of the study was visited by a field observer on two separate days during the target week, Monday and Thursday or Tuesday and Friday.[5] During each of these visits, the field observer weighed reference portions of all foods offered and estimated the amounts of food taken and left over by sampled children. Children were observed for all meals and snacks they consumed. To facilitate observations, group size was limited to six children. To avoid reactive influences on food consumption, centers were asked to have sampled children sit together during meals and snack times for several days prior to the first observation.

While on-site, the field observer provided technical assistance as needed, to help the provider complete the Menu Survey. He/she also interviewed the food preparer and, if the Provider Survey had not been completed, interviewed the center director or FDCH provider.

[5]As in the Study of Sponsors and Providers, the subsample of providers included in this component were assigned a target week between January 1995 and June 1995. Providers were asked to complete the Menu Survey and the Provider Survey during the target week.

To gather information on food consumed while children were not in child care, two Dietary Recall Interviews were conducted with parents.[6] The Household Interview was conducted in tandem with one of the Dietary Recall Interviews. Prior to the Dietary Recall Interviews, parents were sent a packet of materials to assist them in the interview. These materials included a log in which to record the child's food intake as well as a 2-dimensional food model chart to use in estimating amounts of food consumed.

The Dietary Recall Interviews were scheduled to be conducted the evening following the day of observation (e.g., on Tuesday evening for a Monday observation). Repeat attempts were made to conduct the Dietary Recall Interview with parents who were not available at the scheduled time. However, interviews were not attempted if two days had elapsed since the day of observation because of concern about deterioration in respondents' abilities to recall information.

A number of parents did not have access to telephones and were therefore unable to participate in the Dietary Recall Interview and the Household Interview. To address this situation, field observers visited providers and intercepted parents as they were dropping off or picking up their children. The parents were offered a $10 incentive to call us at our toll-free number to complete the telephone interviews.

DISPOSITION OF THE STUDY SAMPLE

The Early Childhood and Child Care Study included numerous survey instruments that collected data from a variety of respondents. Providers were responsible for completing several different instruments, children in the Study of Children and Families were to be observed on two separate days, and two Dietary Recall Interviews were to be conducted with parents of observed children. Because there were multiple occasions for sample members to "complete" a study instrument or protocol, it is necessary to consider response rates separately for each instrument. Response rates for each of the various study instruments are described in the following sections.

[6]For children age 10 and older, the Dietary Recall Interviews were conducted with the child rather than the parent.

The discussion is framed in terms of the hierarchical nature of the sample (i.e., the sample of providers is nested within the sponsor sample, and the sample of children is nested within the provider sample) and the three types of providers (family day care homes, Head Start centers, and child care centers) included in the study.

It is important to point out that, at each level of the sampling frame (sponsors, providers, and children), some sampled units were found to be ineligible for inclusion in the study. Reasons for ineligibility included:

- **Sponsors:** Sampled sponsors were considered ineligible for the study if they no longer sponsored (or were incorrectly listed by the State as a sponsor of) the type of provider (homes, Head Start centers, or child care centers) for which they were selected or if they were no longer a CACFP sponsor.

- **Providers:** Sampled providers were considered ineligible for the study if they no longer participated (or were not currently participating) in the CACFP or were not in operation during the data collection period.

- **Children:** Sampled children were considered ineligible for the study if they did not regularly attend child care on both of the scheduled observation days (Monday and Thursday or Tuesday and Friday), had a sibling that was included in the sample,[7] or were being breastfed.

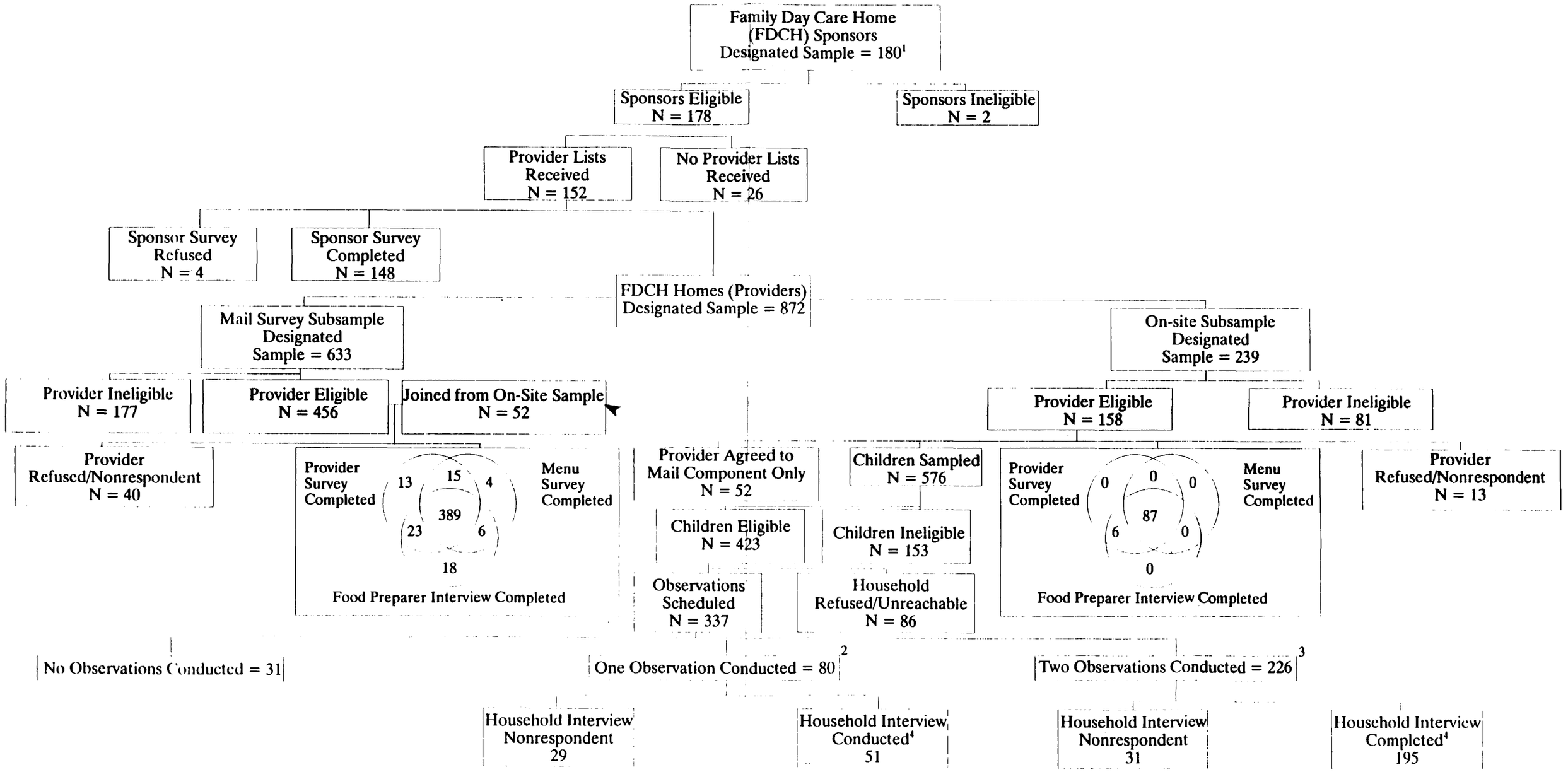
Family Day Care Homes

Exhibit F.2 displays the disposition of each component of the family day care sample—sponsors, providers, and children.

[7]Only one child from each family was included in the study.

Exhibit F.2

SAMPLE DISPOSITION: FAMILY DAY CARE HOME SPONSORS, PROVIDERS, AND CHILDREN



[1]Of the 180 FDCH sponsors, 12 are also included in the samples of Head Start or child care center sponsors.
[2]Seven of the observed children are not included in nutrition analyses because of age (<1 or >10 years) or incomplete data.
[3]Seventeen of the observed children are not included in nutrition analyses because of age (<1 or >10 years) or incomplete data.
[4]A total of 382 Household Interviews were conducted, including 136 conducted as part of followup surveys of nonresponders.

Family Day Care Sponsors. A total of 180 FDCH sponsors[8] was initially selected into the study sample. Of these, 2 were ineligible for the study, leaving a total of 178 eligible FDCH sponsors. Of the 178 eligible sponsors, 152 (85%) supplied provider lists and 26 (15%) did not. Of the 152 sponsors providing lists, 148 (97%) completed the Sponsor Survey, representing 83% of the total eligible sponsor sample.[9]

Family Day Care Providers. A sample of 872 family day care homes was selected from all of the homes sponsored by the 152 eligible FDCH sponsors that provided lists. This sample was then randomly divided into two subsamples: 633 homes were allocated to the mail survey subsample, and 239 homes were allocated to the on-site subsample. Of the initial sample, 177 homes in the mail survey subsample and 81 homes in the on-site subsample were found to be ineligible for the study. This left a total of 456 sampled homes eligible for the mail survey and 158 homes eligible for the on-site study.

Of the 158 sampled homes that were eligible for the on-site study, 52 refused to allow site visits but agreed to participate in the mail component. This increased the number of homes eligible for the mail survey from 456 to 508 and decreased the on-site sample from 158 to 106. While most of the eligible homes in each subsample completed all three survey instruments, some completed only one or two. The number completing each combination of instruments is shown in the Venn diagrams in Exhibit F.2. Response rates for each instrument are shown in Exhibit F.5.

Family Day Care Children. Each of the 106 eligible homes that agreed to participate in the on-site study provided lists of enrolled children. From these lists, an initial sample of 576 children was selected for observations and Dietary Recall Interviews; of these, 153 were found to be ineligible, leaving an eligible sample of 423 children. Of the eligible children, 337 were

[8]Of the 180 FDCH sponsors, 12 are also included in the samples of Head Start sponsors or child care center sponsors.

[9]All of the sponsors of multiple program types (FDCHs, Head Start centers, and child care centers) completed the Sponsor Survey. The survey returns of these sponsors are reported again under each appropriate program type.

scheduled for observations. Of those not scheduled, most (84%) were not scheduled because their parents could not be reached.

Absenteeism was a serious problem in all three child care settings. In the family day care setting, of the 337 children for whom observations were scheduled, only 226 (67%) were present for two observations. An additional 80 (24%) were present for one, but not both, observations. When children were not present for the observation, no attempt was made to conduct the Dietary Recall Interview with parents.

Frequently, parents were unavailable for the scheduled telephone interview and, despite repeated attempts, the Dietary Recall Interviews were not completed for some of the observed children. Exhibit F.2 shows the number of children observed once, twice, and not at all, and the number of Household Interviews completed. Response rates for each component are shown in Exhibit F.5.

Head Start Centers

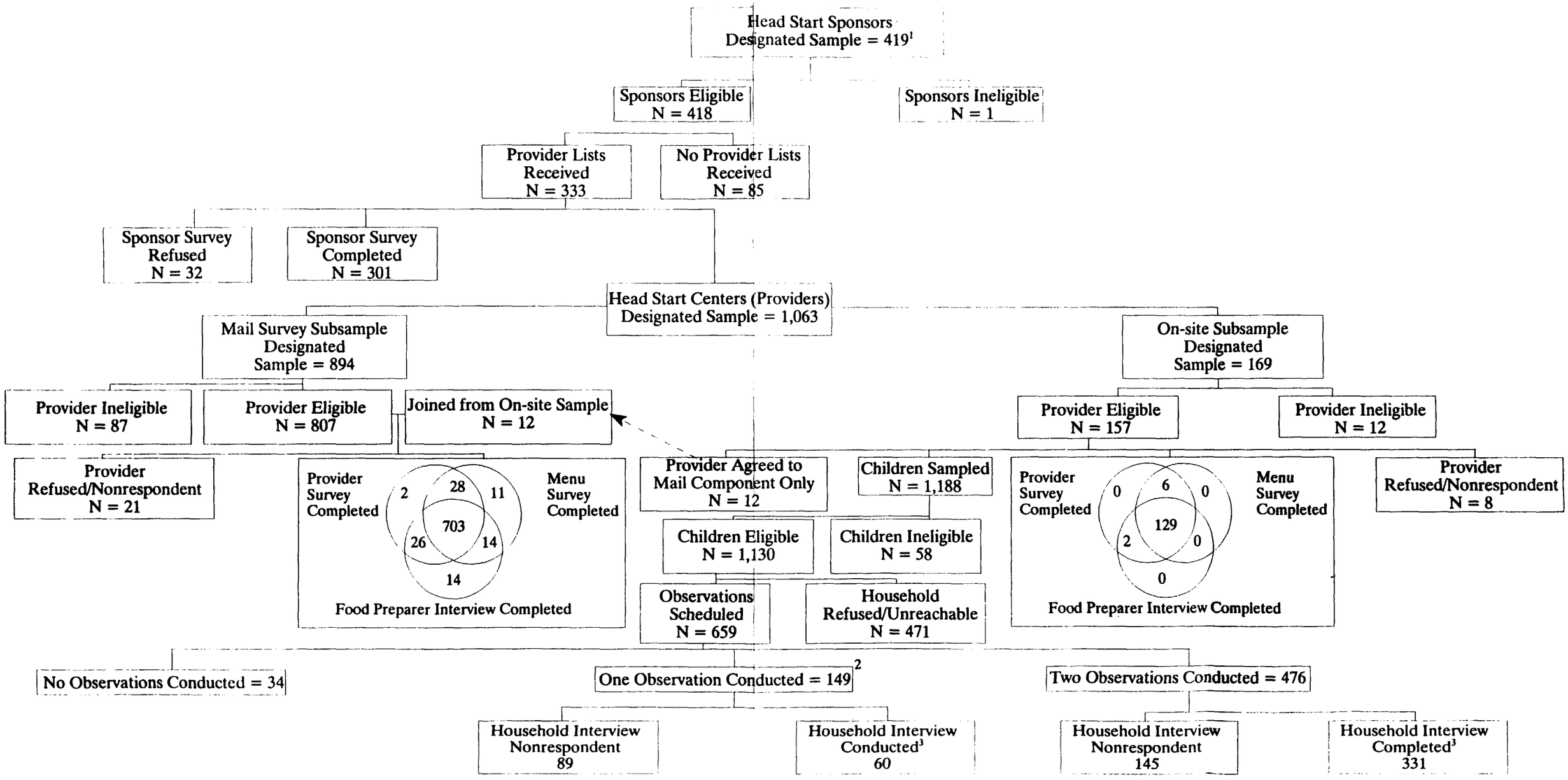
Exhibit F.3 presents the disposition of the samples of sponsors, providers, and children for the Head Start center segment of the study sample.

Head Start Center Sponsors. An initial sample of 419 Head Start center sponsors was selected for participation in the study; of these, 1 was found to be ineligible, leaving a total eligible sample of 418 sponsors.[10] Provider lists were received from 333 (80%) of the 418 sponsors. The Sponsor Survey was completed by 301 (90%) of these sponsors, representing 72 percent of the eligible sponsor sample.

[10]Of the 418 Head Start center sponsors, 28 are also included in the samples of FDCH or child care center sponsors.

Exhibit F.3

SAMPLE DISPOSITION: HEAD START CENTER SPONSORS, PROVIDERS, AND CHILDREN



[1]Of the 419 Head Start sponsors, 28 are also included in the samples of FDCH or center sponsors.
[2]One of the observed children is not included in nutrition analyses because of age (<1 or >10 years) or incomplete data.
[3]A total of 915 Household Interviews were conducted, including 524 conducted as part of followup surveys of nonresponders.

Head Start Center Providers. An initial sample of 1,063 Head Start centers was selected from among the eligible 333 sponsors who had provided lists. This initial sample was then randomly divided into the two subsamples: 894 centers were allocated to the mail survey subsample and 169 centers were allocated to the on-site subsample. Of the 894 centers in the mail survey subsample, 87 were found to be ineligible, leaving a total of 807 eligible centers for this component. Similarly, of the initial sample of 169 centers in the on-site study subsample, 12 were ineligible, leaving a total of 157 centers eligible for this component of the study.

As in the case of family day care homes and child care centers, some (12) Head Start centers refused to allow on-site visits but agreed to participate in the mail survey component of the study. This increased the number of Head Start centers eligible for the mail survey from 807 to 819 and reduced the number for the on-site study from 157 to 145. The Venn diagrams in Exhibit F.3 show the number of eligible providers in each study component that completed various combinations of the three survey instruments. Response rates for each instrument are shown in Exhibit F.5.

Head Start Center Children. An initial sample of 1,188 children was selected from among the 145 Head Start centers that agreed to participate in the on-site study. Of the initial sample of children, 58 were found to be ineligible, leaving a sample of 1,130 eligible children for this component of the study. Of the eligible sample of 1,130 children, 659 were scheduled for observations. Of those not scheduled, most (79%) were not scheduled because parents could not be reached.

Of the 659 children scheduled for observations, 476 (72%) were present and observed on the two scheduled nonconsecutive days. Another 149 (23%) were present on just one observation day. Exhibit F.3 shows the number of children observed once, twice, and not at all, and Household Interviews completed for these children. Response rates are shown in Exhibit F.5.

Child Care Centers

The disposition of the child care center study component is shown in Exhibit F.4.

Child Care Center Sponsors. A total of 596 sponsors of child care centers was initially sampled for participation in the study; of these 165[11] are sponsoring organizations and 431 operate as self-sponsored independent centers. Of the 165 sponsoring organizations, 144 (87%) supplied provider lists; independent centers were not asked to provide lists as they are self-sponsored, single units. Sponsor Surveys were completed by 117 (81%) of the sponsors that had provided lists, representing 71% of the sponsors; 2 sponsors were found to be ineligible.

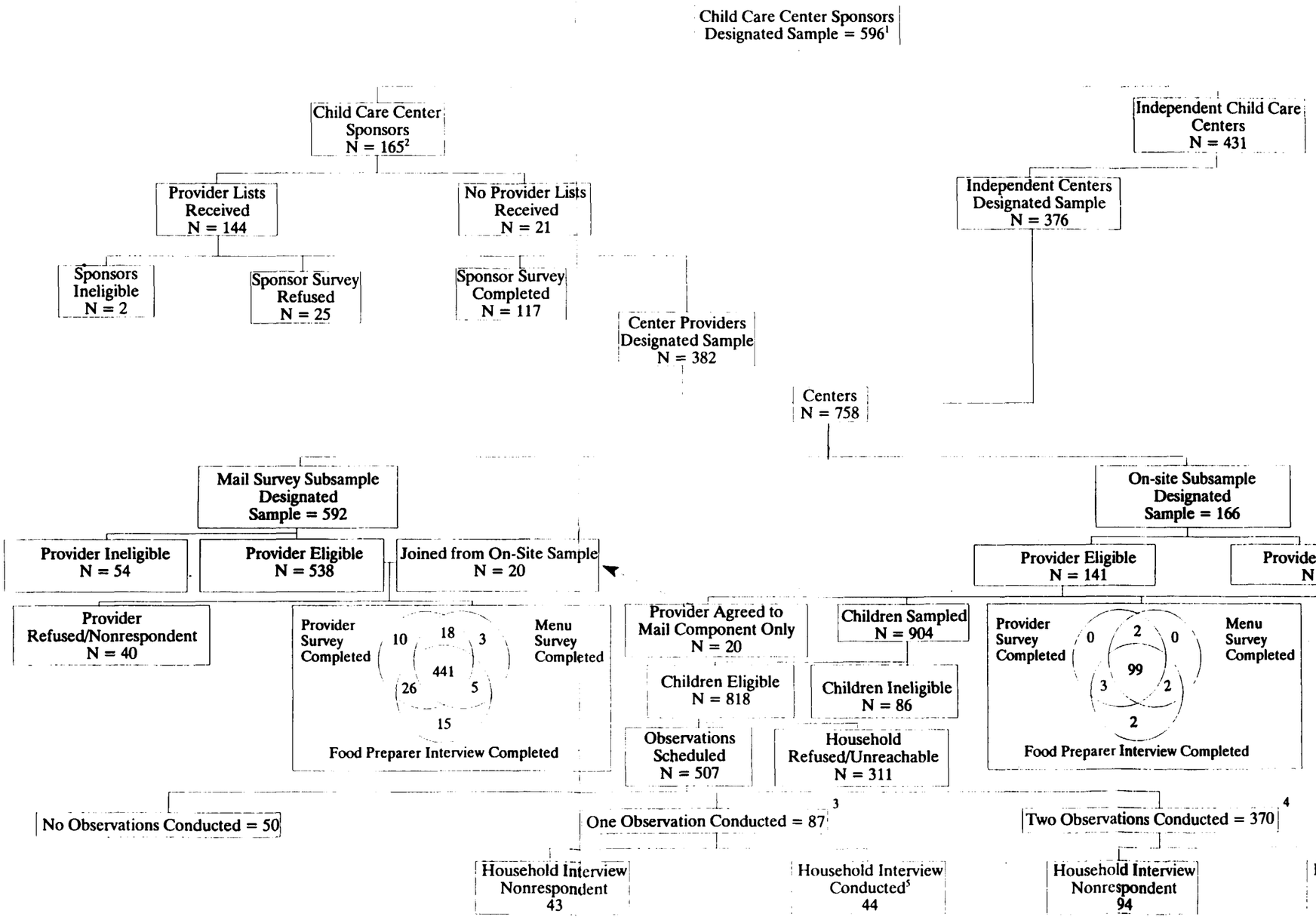
Child Care Center Providers. From all of the child care centers sponsored by the 144 sponsors that supplied provider lists, a sample of 382 child care centers was initially selected for participation in the study. Because centers may operate as independent entities, we also selected a sample of 376 child care centers for whom there is no sponsor, yielding a total of 758 centers. This sample was then randomly divided into two subsamples; 592 centers were allocated to the mail survey component and 166 centers were allocated to the on-site component.

Of the 166 centers initially included in the on-site sample, 25 were found to be ineligible, leaving a total of 141 centers eligible for this component of the study. As with the FDCH and Head Start provider samples, a number of providers selected for the on-site component refused to allow site visits but agreed to participate in the mail component (20 centers). This increased the child care center mail sample from 538 centers to 558 centers and decreased the on-site sample from 141 centers to 121 centers. As shown in the Venn diagrams in Exhibit F.4, the majority of providers in both components completed all three survey instruments. Response rates for each instrument are shown in Exhibit F.5.

[11]Of the 165 child care sponsors, 20 are also included in the samples of FDCH or Head Start center sponsors.

Exhibit F.4

SAMPLE DISPOSITION: CHILD CARE CENTER SPONSORS, PROVIDERS, AND CHILDREN



[1]The 596 sponsors include organizations that sponsor child care centers for the CACFP *plus* independent child care centers (ICCCs), which are self-sponsored.

[2]Of the 165 child care center sponsors, 20 are also included in the samples of FDCH or Head Start sponsors.

[3]Five of the observed children are not included in nutrition analyses because of age (<1 or >10 years) or incomplete data.

[4]Eleven of the observed children are not included in nutrition analyses because of age (<1 or >10 years) or incomplete data.

[5]A total of 654 Household Interviews were conducted, including 334 conducted as part of followup surveys of nonresponders.

Child Care Center Children. A sample of 904 children was initially selected from among the 121 child care centers that participated in the on-site study. Of these, 86 were found to be ineligible, leaving a sample of 818 eligible children. Observations were scheduled with 507 of the 818 eligible children. Among children not scheduled, most (83%) were not included because their parents could not be reached.

Of the 507 children scheduled for observation, two observations were conducted with 370 (73%) children; another 87 children (17%) were present for just one observation. Exhibit F.4 shows the number of children observed once, twice, and not at all, and Household Interviews completed for these children. Response rates are shown in Exhibit F.5.

FOLLOWUP SURVEY OF NONRESPONDERS

One of the principal goals of the Early Childhood and Child Care Study was to collect reliable income data for FCS' legislative initiatives that involve the CACFP. A key FCS initiative is implementing the CACFP provisions of the Personal Responsibility and Work Opportunity Act of 1996 (P.L. 104-193). Household incomes of (a) providers who operate family day care homes and (b) families of CACFP children play pivotal roles in FCS' proposals to improve operations and hold down costs. While the response rates to the Provider Surveys were quite good (Exhibit F.5), ranging from 87 percent for FDCHs to 93 percent for Head Start centers, the response rates for the Household Survey were unacceptably low, ranging from 35 percent for Head Start centers to 58 percent for FDCHs. The primary reason for the low response rates for the Household Survey was the inability to reach parents by telephone during the recruitment phase of the study and within two days of the meal observations rather than parents' refusal to participate. Therefore, a Followup Survey of all nonresponders to the original Household Survey was conducted in an effort to raise response rates to a level sufficient for FCS to make critical budgetary estimates on welfare reform issues.

The Followup Survey focused narrowly on household income, household size, and participation in the WIC and food stamps programs. The Followup Survey was conducted between December

Exhibit F.5

Response Rates for Sponsors, Providers, and Children

	All Providers	Family Day Care Homes	Head Start Centers	Child Care Centers
Sponsors				
Provider Lists	83%	85%	80%	87%
Sponsor Survey				
All eligible sponsors	74	83	72	71
Sponsors supplying provider lists	90	97	90	81
Providers				
Provider Survey	90	87	93	88
Menu Survey	87	82	92	84
Food Preparer Interview	89	86	92	87
Children and Households				
Observations[1]	59	76	54	57
Household Interview	39	58	35	39
Dietary Recall Interviews				
At least 1 interview	41	58	36	39
Two interviews	19	30	15	19

[1]Note that since the analysis of meals consumed in care is intended to describe *children in care on a typical day*—not all children enrolled in care—children who were selected into the sample but absent on one or both observation days were not nonrespondents for purposes of constructing the corresponding weights (W_{meals}), but rather outside of scope. The response rate for child observations is equal to:

Number of Child-Days Observed ÷ [(2x Number of Eligible Children) - Child-Days Absent]

1996 and April 1997 and collected retrospective data for the period corresponding to the original Household Survey (Spring 1995).

Data Collection Procedures

No sampling was employed in the Followup Survey. Rather, attempts were made to contact all nonresponders to the original Household Survey. An intensive effort was made to locate and contact the nonresponders. The data collection for the Followup Survey used a combination of telephone, mail, and in-person surveys. The procedures used to locate and contact the nonresponders are described below.

Locating Respondents. As indicated above, the primary reason for nonresponse to the original Household Survey was the inability to reach respondents by telephone. While we had addresses for nearly all nonresponders, we had telephone numbers for only 30 percent of nonresponders. Therefore, our initial efforts were directed towards obtaining current telephone numbers and addresses for the nonresponders. The entire sample file of nonresponders was sent through the National Change of Address Directory to obtain the most current known addresses. An *advance mailing*, describing the study and the purpose for conducting the Followup Survey, was sent to all nonresponders. This advance mailing asked respondents to fill out an information sheet giving their current telephone number and address and return it in an enclosed Business Reply Envelope. Respondents were also given the option of calling a toll-free 800 number to supply the necessary information.[12] A $1 incentive was included in the advance mailing. The advance mailing also informed respondents that they would receive an additional $5 after completing the survey.

Tracking Procedures. Several steps were taken to locate those nonresponders whose advance mailings were returned as undeliverable as well as to locate those households that did not return the mailing or call the toll-free number. The first step was *telematching* the nonresponder file

[12]An attempt was made to administer the survey over the telephone to those people calling in on the toll-free number.

against an electronic version of all telephone listings throughout the United States. The next sources were *Credit Bureau of Information* and *Trans Union* searches. Both of these sources allowed us to search for individuals who have applied for credit. These searches sometimes provided new telephone numbers, addresses, and social security numbers.

Telephone Survey. The field period for the telephone effort was approximately 10 weeks. Calls were made at diverse times in the evenings (between 5:00 p.m. and 9:00 p.m. respondent time) and on weekends (Saturday 11:00 a.m.-5:00 p.m., Sunday 2:00 p.m.-9:00 p.m.). Those cases that were consistently "no answer" in the evenings and on weekends were also attempted during daytime hours Monday through Friday. Not set limit was made on the number of attempts made on each case; rather, all non-final cases were reviewed on a daily basis to determine the next step for reaching the household.

Mail Survey. All households for which we did not have a telephone number along with all households who could not be reached in the telephone survey were included in the mail survey. These cases were sent a letter explaining the study and the purpose of the Followup Survey along with self-administered questionnaire. As in the case of the advance mailing, respondents were given the option of calling a toll-free 800 number to provide the requested information. The letter also reminded respondents that they would receive $5 if they returned the questionnaire or called the toll-free number to provide the information.

Field Component. All cases that could not be reached in the telephone survey and did not respond to the mail survey were assigned to field interviewers. Field interviewers attempted to locate prospective respondents and conduct in-person or telephone interviews. When necessary, field interviewers contacted child care providers that participated in the study to obtain locating information.

Response Rates

Exhibit F.6 summarizes the response rates for the Followup Survey. The response rates for the Followup Survey were sufficiently large to bring the overall response rates up to acceptable levels. When combined with the responses from the original Household Survey, the Followup Survey brought the overall response rate up to 82 percent. The combined response rate ranged from a high of 90 percent for FDCHs to a low of 80 percent for child care centers.

Exhibit F.6

Sample Size, Number of Completed Interviews, and Response Rates

	All Providers	Mode of Care		
		FDCHs	Head Start Centers	Child Care Centers
Number of eligible households for original survey	2,371	423	1,130	818
Total number of household interviews originally completed[1]	1,181	284	495	402
Number of remaining nonresponders	1,190	139	635	416
Response rate for Followup Survey	65%	71%	66%	60%
Number of completed interviews in Followup Survey	770	98	420	252
New total number of completed interviews	1,951	382	915	654
New total response rate for survey	82%	90%	81%	80%

[1]Includes 224 respondents to earlier nonresponse survey.

Appendix G

Reference Tables for Approximate Confidence Intervals

Appendix G provides reference tables for calculating the approximate confidence intervals for the estimates presented in this report. Assuming that the population is large, a 95 percent confidence interval for a population proportion P using a sample proportion p based on a simple random sample of n units from this population is given by

$$p \pm 1.96\sqrt{\frac{p(1-p)}{n}} \quad . \tag{1}$$

If the sample is selected using a multistage design, then the variance of the sample proportion is larger than the variance under simple random sampling. The variance under a multistage design is usually estimated by multiplying the variance under simple random sampling by a value known as the design effect (*deff*). The design effect is the ratio of the variance obtained from the complex survey sample to the variance of the estimate obtained from a simple random sample of the same size. Under a multistage design, the 95 percent confidence interval is given by

$$p \pm 1.96\sqrt{deff}\sqrt{\frac{p(1-p)}{n}} \quad . \tag{2}$$

The exhibits presented in this appendix provide approximate confidence intervals for population proportions for each of the provider types. Exhibits G.1a through G.1c provide confidence intervals for characteristics of children. Exhibits G.2a through G.2c provide confidence intervals for characteristics of homes and centers. Exhibits G.3a through G.3c provide confidence intervals for characteristics of sponsoring agencies (presented in Volume I). These intervals were obtained by first computing the variance under simple random sampling and then multiplying the variance by an average design effect for each of the provider types. The size of the confidence interval is presented for various sample sizes and estimated proportions. The value used as the square root of the average design effect for computing the confidence intervals

is given at the bottom of each exhibit. The average design effect was computed in each instance as the average across several variables of ratio of the variance under the design, estimated using SUDAAN, to the variance under simple random sampling, estimated using equation (1).

These tables can also be used to estimate the confidence intervals for sample sizes and proportions that do not exactly correspond to the values given in the exhibits. Use the column that approximates the estimated proportion and then use the row that most closely approximates the sample size upon which the sample estimate is based to determine the approximate size of the confidence interval for the population proportion that is being estimated. For example, if the estimated percentage of child care centers with a certain characteristic is 31 percent and this is based on a sample of 290 (see Exhibit G.2a), then the confidence interval for the population percentage is obtained by taking 31 $\pm$ 8.7. Consequently, we have 95 percent confidence that the population proportion is contained in the interval 22.3 to 39.7 percent.

A 95 percent confidence interval for a sample mean is given by

$$\bar{x} \pm 1.96 \, se(\bar{x}) \qquad (3)$$

where $se(\bar{x})$ is the standard error of the sample estimate of the mean. Note that the standard errors presented in this report incorporate the design effect.

Exhibit G.1a

Confidence Intervals for Proportions Based on a Sample from Children in FDCHs

Sample Size	Percentage of Sample with Characteristic				
	10% or 90%	20% or 80%	30% or 70%	40% or 60%	50%
50	±14.1	±18.8	±21.6	±23.1	±23.6
100	10.0	13.3	15.2	16.4	16.6
200	7.0	9.4	10.8	11.5	11.7
300	5.7	7.7	8.8	9.4	9.6
400	5.0	6.7	7.7	8.1	8.3
500	4.4	5.9	6.8	7.3	7.5
600	4.1	5.5	6.2	6.7	6.8

A value of **1.70** was used as the square root of the average design effect for the sample of FDCH children in computing the confidence intervals.

Exhibit G.1b

Confidence Intervals for Proportions Based on a Sample from Children in Head Start Centers

Sample Size	Percentage of Sample with Characteristic				
	10% or 90%	20% or 80%	30% or 70%	40% or 60%	50%
50	±16.4	±21.8	±25.0	±26.7	±27.3
100	11.6	15.4	17.7	18.9	19.3
200	8.2	10.9	12.5	13.3	13.6
300	6.7	8.9	10.2	10.9	11.1
400	5.8	7.7	8.8	9.4	9.6
500	5.2	6.9	7.9	8.4	8.6
600	4.7	6.3	7.2	7.7	7.9

A value of **1.97** was used as the square root of the average design effect for a sample of Head Start children in computing the confidence intervals.

Exhibit G.1c

Confidence Intervals for Proportions Based on a Sample from Children in Child Care Centers

Sample Size	Percentage of Sample with Characteristic				
	10% or 90%	20% or 80%	30% or 70%	40% or 60%	50%
50	±14.6	±19.5	±22.4	±23.9	±24.3
100	10.3	13.7	15.8	16.9	17.2
200	7.3	9.8	11.1	11.9	12.2
300	5.9	8.0	9.2	9.8	10.0
400	5.1	6.9	7.9	8.4	8.6
500	4.6	6.2	7.1	7.5	7.7
600	4.2	5.7	6.5	6.9	7.0

A value of **1.76** was used as the square root of the average design effect for a sample of children in child care centers in computing the confidence intervals.

Exhibit G.2a

Confidence Intervals for Proportions Based on a Sample from FDCH Providers

Sample Size	Percentage of Sample with Characteristic				
	10% or 90%	20% or 80%	30% or 70%	40% or 60%	50%
50	±13.9	±18.5	±21.2	±22.7	±23.2
100	9.8	13.1	15.0	16.1	16.4
150	8.0	10.7	12.3	13.1	13.4
200	6.9	9.3	10.6	11.4	11.6
250	6.2	8.3	9.5	10.2	10.4
300	5.7	7.6	8.7	9.3	9.5
400	4.9	6.6	7.5	8.0	8.2
500	4.4	5.9	6.7	7.2	7.3

A value of **1.67** was used as the square root of the average design effect for the sample of FDCH providers in computing the confidence intervals.

Exhibit G.2b

Confidence Intervals for Proportions Based on a Sample from Head Start Centers

Sample Size	Percentage of Sample with Characteristic				
	10% or 90%	20% or 80%	30% or 70%	40% or 60%	50%
50	±12.6	±16.8	±19.3	±20.6	±21.0
100	8.9	11.9	13.6	14.5	14.8
150	7.3	9.7	11.1	11.9	12.1
200	6.3	8.4	9.6	10.3	10.5
250	5.6	7.5	8.6	9.2	9.4
300	5.1	6.9	7.9	8.4	8.6
400	4.4	5.9	6.8	7.3	7.4
500	4.0	3.5	6.1	6.5	6.6
800	3.1	4.2	4.8	5.1	5.2

A value of **1.51** was used as the square root of the average design effect for a sample of Head Start centers in computing the confidence intervals.

Exhibit G.2c

Confidence Intervals for Proportions Based on a Sample from Child Care Centers

Sample Size	Percentage of Sample with Characteristic				
	10% or 90%	20% or 80%	30% or 70%	40% or 60%	50%
50	±10.5	±14.0	±16.1	±17.2	±17.5
100	7.4	9.9	11.4	12.1	12.4
150	6.1	8.1	9.3	9.9	10.1
200	5.2	7.0	8.0	8.6	8.8
250	4.7	6.3	7.2	7.7	7.8
300	4.3	5.7	6.6	7.0	7.1
400	3.7	4.9	5.7	6.1	6.2
500	3.3	4.4	5.1	5.4	5.5
600	3.0	4.0	4.6	4.9	5.0

A value of **1.26** was used as the square root of the average design effect for a sample of child care centers in computing the confidence intervals.

Exhibit G.3a

Confidence Intervals for Proportions Based on a Sample from FDCH Sponsors

Sample Size	Percentage of Sample With Characteristic				
	10% or 90%	20% or 80%	30% or 70%	40% or 60%	50%
50	±16.8	±22.4	±25.6	±27.4	±27.9
100	11.8	15.8	18.1	19.3	19.7
200	8.4	11.2	12.8	13.7	14.0
300	6.8	9.1	10.5	11.2	11.4
400	5.9	7.9	9.1	9.7	9.9
500	5.3	7.1	8.1	8.7	8.8
600	4. 8	6.5	7.4	7.9	8.1

A value of **2.02** was used as the square root of the average design effect for the sample of FDCH sponsors in computing the confidence intervals.

Exhibit G.3b

Confidence Intervals for Proportions Based on a Sample from Head Start Sponsors

	Percentage of Sample with Characteristic				
Sample Size	**10% or 90%**	**20% or 80%**	**30% or 70%**	**40% or 60%**	**50%**
50	±12.4	±16.5	±18.9	±20.2	±20.6
100	8.7	11.7	13.4	14.3	14.6
200	6.2	8.3	9.5	10.1	10.3
300	5.0	6.7	7.7	8.3	8.4
400	4.4	5.8	6.7	7.1	7.3
500	3.9	5.2	6.0	6.4	6.5
600	3.6	4.7	5.5	5.8	6.0

A value of **1.49** was used as the square root of the average design effect for a sample of Head Start sponsors in computing the confidence intervals.

Exhibit G.3c

Confidence Intervals for Proportions Based on a Sample from Child Care Center Sponsors

Sample Size	Percentage of Sample with Characteristic				
	10% or 90%	20% or 80%	30% or 70%	40% or 60%	50%
50	±10.1	±13.4	±15.4	±16.4	±16.8
100	7.1	9.5	10.9	11.6	11.8
200	5.0	6.7	7.7	8.2	8.4
300	4.1	5.5	6.3	6.7	6.8
400	3.5	4.7	5.4	5.8	5.9
500	3.2	4.2	4.9	5.2	5.3
600	2.9	3.9	4.4	4.7	4.8

A value of **1.21** was used as the square root of the average design effect for a sample of child care center sponsors in computing the confidence intervals.

Appendix H

Reliability of Visual Estimation of Food Intake

The Early Childhood and Child Care Study collected information on the types and amounts of food consumed by children while in care using visual estimation. This method was chosen because it is less likely to interrupt children's meal routines and affect food intake than methods requiring actual weighing or measuring of food portions. Although prior research suggests that trained observers can achieve high levels of accuracy in estimating food intake (Comstock 1981; Thompson et al. 1987; Simons-Morton 1991), there was some concern that the observers' reliability might deteriorate over the study's extended field period (22 weeks).[1] Because of this concern, a substudy was conducted to examine the reliability of the visual estimation technique used in this study and to see if the reliability deteriorated over the extended field period.

The first section of this appendix describes the methodology used in the reliability substudy, including training of field observers and validators, data collection, and analyses used to assess reliability. The second section includes a summary of results and conclusions.

METHODOLOGY

Training of Field Observers and Validators

Two groups of people were trained in the visual estimation procedures to be used in this study. The first group consisted of the 60 field observers that would be conducting the actual data collection. The second group consisted of two people with previous experience in visual estimation of food intake who would serve as validators for the reliability substudy. The validators were used to establish a criterion in the field against which the reliability of the field observers could be assessed.

[1]Bolland et al. (1990) found that observers' reliability deteriorated after training and suggested either periodic retraining or minimizing the time between training and data collection. It is important to note, however, that observers in the Bolland study received only 10 minutes of training in visual estimation of food intake. Observers in the Early Childhood and Child Care Study received at least 8 hours of training.

Field observers received a minimum of eight hours training in visual estimation techniques conducted by registered dietitians. Because of the large number of field observers, this training was conducted in groups of 20. Training included weighing and measuring foods to establish reference portion sizes; visual estimation of portion sizes served to or taken by children; and visual estimation of the amounts of food left over. Real foods, rather than food models or pictures, were used to teach field observers to recognize portion sizes and estimate plate waste. The training also included a dry run in an actual child care setting and a group debriefing.[2]

The training of the validators was far more intensive. Each validator received 12 hours of training conducted by registered dietitians, including several hours of one-on-one training. This training included extensive amounts of practice and testing. The validators were given immediate feedback on their accuracy after each practice/testing session. At the end of training, the two validators were tested to establish their reliability. The test and its results are described later in this appendix.

Data Collection

The validators accompanied selected field observers on visits to child care sites and double coded all dietary data collected during these site visits. These site visits took place between four and 19 weeks after the field observers were trained. A total of 36 field observers were included in the reliability substudy, with observations being conducted on a total of 157 children.

Prior to each meal or snack served during a site visit, the validator and field observer independently weighed and measured reference portions of each food to be offered.[3] During each meal or snack, validators and field observers each recorded the types and amounts of foods selected and consumed by each child.

[2]The large number of field observers being trained precluded intensive one-on-one practice and feedback.

[3]See Appendix A for a more detailed description of the observation protocol.

Analysis

The reliability analysis was based on the nutrient content of the meals consumed by the 157 children observed during the 36 site visits. Following the procedures described in Appendix A, the Food Intake Analysis System (FIAS) was used to calculate the nutrient content of the food consumed by each sampled child. The analysis was based on the nutrient content of all meals and snacks consumed by each child while in care on the observation day. The reliability analysis included the following nutrients: total energy, protein, vitamin A, thiamin, riboflavin, niacin, vitamin B_6, folate, vitamin B_{12}, vitamin C, calcium, phosphate, magnesium, iron, and zinc.

Measures. Three measures were used to assess the reliability of the field observers.

- **Mean differences** between the nutrient content of meals and snacks recorded by field observers and validators. This measure provides an indication of the potential *bias* in the field observers' measures. Do field observers systematically over or under report the amount of nutrients consumed by children by a meaningful amount?

- **Mean absolute differences** between the nutrient content of meals and snacks recorded by field observers and validators. This measure provides an indication of the *precision* of the field observers' estimates. The mean absolute difference does not allow overestimates by some observers to offset underestimates by other observers. For example, if a field observer overestimates food energy by 15 percent on two children and underestimates food energy by 10 percent and 20 percent in two other children, then the mean absolute error is 15 percent, indicating that on average the field observer misses the mark by 15 percent. In this example, there is no indication of potential bias since the mean difference is 0 percent.

- **Pearson correlation coefficients** between the nutrient content as measured by field observers and validators provides another indication of the degree of association between the two measures.

Establishing Reliability of the Validators

The validators were tested at the end of the training to establish the accuracy of their visual estimates. Six meals or snacks were prepared, each of which contained between two and six

individual food items, for a total of 20 individual food items. Each of the validators estimated the portion sizes of the 20 food items, and the nutrient content of these estimates was compared with the results obtained from actual weighing of each food item (the "gold standard") using the three measures described above.

Changes in Reliability over the Field Period

Linear regression models were used to determine if the field observers' reliability deteriorated over the extended field period. The dependent variable in this analysis was the absolute difference between nutrient intake recorded by validators and field observers. Separate regressions were run for each of the 15 nutrients included in the analysis. Three explanatory variables were included in these models:

- **Number of days elapsed since field observer training**. If field observers' reliability deteriorates over time, then one would expect the magnitude of the absolute difference between validator and field observer estimates to increase with the number of days elapsed since field observer training.

- **Number of children observed**. One would expect the number of children observed during a site visit to affect the difficulty of conducting the meal observations. The more children being observed, the less attention the observer can devote to each child.

- **Experience conducting meal observations**. Experience may be expected to improve the accuracy of meal observations. The number of previous site visits conducted by the field observer was included as a measure of experience.

RESULTS

Reliability of Validators' Estimates

Exhibit H.1 compares the validators' estimates to the gold standard, or weighed portion sizes. Examination of the mean differences (weighed minus validator's estimates) and mean percentage differences indicates that the validators tended to underestimate portion sizes slightly. For the first validator, 13 of the 15 mean differences were positive (underestimates). Similarly, for the second validator, 9 of the 15 mean differences were positive. While this indicates a potential

Exhibit H.1

"Gold Standard" and Validators' Estimates of the Nutrient Content of Foods

	Weighed Samples	First Validator's Estimates	Second Validator's Estimates	Differences for Validator 1 (weighed minus validator estimates)				Differences for Validator 2 (weighed minus validator estimates)			
	Mean	Mean	Mean	Mean Diff	% Diff	Mean Abs Diff	% Abs Diff	Mean Diff	% Diff	Mean Abs Diff	% Abs Diff
Total Energy (kcal)	334.47	320.11	327.83	14.37	4.3%	31.24	9.3%	6.64	2.0%	31.07	9.3%
Protein (gm)	11.56	11.30	11.45	.26	2.2	.96	8.3	.11	1.0	2.04	17.6
Vitamin A (mcg RE)	161.48	152.27	157.33	9.22	5.7	19.07	11.8	4.15	2.6	24.12	14.9
Thiamin (mg)	.27	.26	.26	.02	7.4	.02	7.4	.01	3.7	.02	7.4
Riboflavin (mg)	.34	.34	.34	.00	--	.04	11.8	-.01	-2.9	.04	11.8
Niacin (mg NE)	2.89	2.65	2.74	.24	8.3	.31	10.7	.15	5.2	.35	12.1
Vitamin B_6 (mg)	.19	.18	.19	.01	5.3	.03	15.8	.01	5.3	.03	15.8
Folacin (mcg)	46.21	46.50	44.29	.29	-.6	4.54	9.8	1.92	4.2	3.14	6.8
Vitamin B_{12} (mcg)	.57	.56	.59	.01	1.8	.07	12.3	-.02	-3.5	.09	15.8
Vitamin C (mg)	17.5	16.49	16.62	1.02	5.8	2.79	15.9	.89	5.1	1.93	11.0
Calcium (mg)	179.39	185.30	189.20	-5.91	-3.3	18.04	10.1	-9.81	-5.5	33.8	18.8
Phosphorus (mg)	224.38	221.90	227.70	2.49	1.1	22.32	9.9	-3.32	-1.5	33.06	14.7
Magnesium (mg)	34.63	33.61	34.67	1.01	2.9	3.90	11.3	-.04	-.1	3.64	10.5
Iron (mg)	2.17	2.02	2.08	.15	6.9	.20	9.2	.09	4.1	.15	6.9
Zinc (mg)	1.22	1.21	1.22	.02	1.6	.11	9.0	.00	--	.20	16.4

Note: Number of food items = 20

downward bias in the validators estimates, the magnitude of this bias is relatively small; all of the percentage differences were less than 9 percent.

Examination of the mean absolute differences indicates that the magnitude of the errors recorded by the validators was relatively small. All of the mean absolute differences were less than 19 percent. This is considerably less than the errors reported by Bolland et al. (1990). Bolland tested her observers immediately following a 10-minute training session and reported a mean absolute error of 51 percent. The greater relative accuracy of the validators in this study probably reflects the more intensive training they received.

The correlation between the gold standard and validators' estimates were quite high (Exhibit H.2). All of the correlations were at least .80. Mean correlations were .95 for the first validator and .92 for the second validator. These correlations are consistent with those reported by other investigators (Thompson et al., 1987).

These analyses indicate that the validators achieved a sufficiently high degree of accuracy in visual estimation of portion sizes to serve as the criterion in the field against which the reliability of the field observers could be assessed.

Reliability of Field Observers' Estimates

Exhibit H.3 compares the field observers' and validators' estimates. The mean differences show a clear pattern. Using the validators' estimates as a benchmark, the field observers consistently overestimated the amount of food consumed by children. However, the magnitude of the overestimation is relatively small; the mean percentage difference is less than 7.5 percent for all of the 15 nutrients examined. Furthermore, the true differences are probably even smaller because, as shown above, the validators themselves tended to slightly underestimate portion sizes. Only for calcium, and, to a lesser extent, phosphorus, did the validators tend to overestimate nutrient amounts. In all other nutrients, the field observers' error relative to the validators' estimates tended to counterbalance the validators' small error relative to the weighed portion sizes. Hence, the potential bias in the field observers' estimates is probably quite small.

Exhibit H.2

Correlations Between "Gold Standard" and Validators' Observations of Nutrient Content of Foods

	Pearson Correlation Coefficient[1]	
	Validator 1	**Validator 2**
Total Energy (kcal)	.94	.93
Protein (gm)	.96	.80
Vitamin A (mcg RE)	.98	.95
Thiamin (mg)	.95	.97
Riboflavin (mg)	.91	.89
Niacin (mg NE)	.91	.90
Vitamin B_6 (mg)	.97	.94
Folate (mcg)	.99	1.00
Vitamin B_{12} (mcg)	.96	.93
Vitamin C (mg)	.97	.99
Calcium (mg)	.95	.89
Phosphorus (mg)	.93	.83
Magnesium (mg)	.87	.92
Iron (mg)	.97	.98
Zinc (mg)	.96	.83
Average Correlation	.95	.92

Note: Number of food items = 20

[1]All associations significant at the $p \leq .001$ level.

The magnitude of the mean absolute differences between field observers' and validators' estimates is also relatively small (Exhibit H.3). The percent absolute differences ranged from 17 percent to 23 percent. These are somewhat larger than the absolute differences between the validators and the gold standard, which ranged from 7 percent to 19 percent. This probably reflects the more intensive training received by the validators (and possibly, level of experience). However, the magnitude of the errors recorded by the field observers is still considerably less than those reported by Bolland.

Correlations between validator and field observer estimates are shown in Exhibit H.4. The correlations range from .84 to .94, with an overall mean correlation of .90. These correlations indicate a high degree of agreement between validators and field observers. These analyses indicate that the average level of reliability of the field observers over the course of the field effort was quite good.

Reliability of the Field Observers over the Field Period

Exhibit H.5 presents the results of the regression analysis. The results clearly show that the field observers' reliability did not deteriorate over the course of the extended field effort. In only one of the 15 regression models (zinc) is the number of days elapsed since field observer training statistically significant at the .05 level of confidence.

There is some evidence that the number of children being observed (at one time) affects the accuracy of the observations. In six of the models (thiamine, riboflavin, niacin, vitamin B_6, folate, and iron) the number of children being observed had a significant positive relationship to the absolute difference between field observers' and validators' estimates.

There is also some evidence that practice reduces the size of the observation errors. The coefficient of the number of previous site visits conducted is always negative, providing some indication that experience reduces the magnitude of errors. However, the coefficient is statistically significant at the .05 level of confidence in only 3 of the 15 regressions.

Exhibit H.3

Differences Between Field Observers' and Validators' Estimates of Nutrient Intake

	Overall Means		Differences (validator minus observer)			
	Observers	Validators	Mean Difference	% Diff	Mean Abs Diff	% Abs Diff
Total Energy (kcal)	590.65	548.29	-42.36	-7.2%	97.53	17.8%
Protein (gm)	23.49	22.14	-1.35	-6.1	3.91	17.7
Vitamin A (mcg RE)	381.77	357.31	-24.46	-6.4	83.37	23.3
Thiamin (mg)	0.55	0.52	-0.02	-3.6	.10	19.2
Riboflavin (mg)	0.85	0.80	-0.05	-5.9	.15	18.8
Niacin (mg NE)	5.40	5.12	-0.27	-5.0	1.13	22.1
Vitamin B6 (mg)	0.60	0.58	-0.02	-3.3	.11	19.0
Folacin (mcg)	87.41	83.87	-3.54	-4.0	19.47	23.2
Vitamin B12 (mcg)	1.48	1.38	-0.09	-6.1	.29	21.0
Vitamin C (mg)	40.32	37.36	-2.96	-7.3	8.67	23.2
Calcium (mg)	458.19	425.80	-32.38	-7.1	84.21	19.8
Phosphorus (mg)	492.73	464.62	-28.11	-5.7	80.28	17.3
Magnesium (mg)	95.55	90.50	-5.05	-5.3	14.86	16.4
Iron (mg)	4.32	4.25	-0.06	-1.4	.97	22.8
Zinc (mg)	2.85	2.68	-0.17	-6.0	.49	18.3

Note: Number of children observed = 157

Exhibit H.4

Correlations Between Validator and Field Observer Estimates of Nutrient Intake

Nutrient	Pearson Correlation Coefficient[1]
Total Energy (kcal)	.90
Protein (gm)	.91
Vitamin A (mcg RE)	.89
Thiamin (mg)	.90
Riboflavin (mg)	.89
Niacin (mg NE)	.88
Vitamin B_6 (mg)	.94
Folate (mcg)	.86
Vitamin B_{12} (mcg)	.89
Vitamin C (mg)	.84
Calcium (mg)	.90
Phosphorus (mg)	.92
Magnesium (mg)	.92
Iron (mg)	.89
Zinc (mg)	.90
Average Correlation	.90

Note: Number of children observed = 157

[1]All associations significant at the $p \leq .001$ level.

Exhibit H.5

Regression Results Predicting Overall Absolute Differences Between Validator and Observer Estimates of Nutrient Intake

		Predictor Statistics								
		Elapsed Days			Average Number of Children Observed			Number of Sites Observed Previously		
	Prob > F	Coeff	Std Err	Prob > |T|	Coeff	Std Err	Prob > |T|	Coeff	Std Err	Prob > |T|
Total Energy (kcal)	.10	.32	.26	.22	10.07	6.17	.10	-26.94	15.03	.08
Protein (gm)	.65	.01	.01	.39	.20	.27	.46	-.21	.21	.30
Vitamin A (mcg RE)	.00	.07	.33	.83	6.22	7.72	.42	-65.62	18.81	.00
Thiamin (mg)	.10	.00	.00	.45	.02	.01	.03	-.02	0.02	.27
Riboflavin (mg)	.05	.00	.00	.58	.02	.01	.04	-.04	.02	.07
Niacin (mg NE)	.01	.00	.00	.30	.26	.09	.00	-.22	.21	.28
Vitamin B_6 (mg)	.01	.00	.00	.09	.03	.01	.00	-.02	.02	.41
Folate (mcg)	.18	.01	.07	.90	3.82	1.76	.03	-2.06	4.29	.63
Vitamin B_{12} (mcg)	.11	.00	.00	.93	.01	.02	.63	-.12	.05	.03
Vitamin C (mg)	.81	-.03	.05	.51	-.37	1.15	.75	2.37	2.79	.40
Calcium (mg)	.28	-.13	.25	.59	7.90	5.96	.19	-14.60	14.52	.32
Phosphorus (mg)	.21	.04	.22	.86	4.94	5.21	.34	-22.74	12.70	.08
Magnesium (mg)	.56	.02	.04	.66	1.24	.97	.20	-1.36	2.37	.57
Iron (mg)	.00	.00	.00	.63	.23	.07	.00	-.56	.18	.00
Zinc (mg)	.02	-.40	.20	.04	-3.03	4.67	.52	-14.21	11.37	.21

Note: Number of children observed = 157

CONCLUSIONS

After receiving intensive training, including at least eight hours devoted to the visual estimation of portion sizes, field observers attained a high level of reliability in conducting visual estimation of food consumed by children in child care. There is no evidence that reliability deteriorated over the 22-week field period. Hence, it does not appear that retraining is warranted over the course of an extended field period provided that field observers are adequately trained at the outset. Finally, there is some evidence that field observers' accuracy decreases as increasing numbers of children are observed. While the results of this study suggest that field observers can accurately estimate the amount of food consumed by up to six children in a child care setting, the design of future studies should carefully consider the number of children being observed.

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