

# Chapter 7

## WIC Participants with Special Diets or Food Allergies

One objective of this study is to determine whether WIC cost-containment practices have differential impacts on participants with special diets or food allergies, compared with other WIC participants. Those with special diets or food allergies have dietary restrictions that limit the foods they can eat. Often, they must verify food product ingredients to ensure that the product is safe and appropriate.

To address this objective, the study examined several types of special diets and food allergies, based on responses to the Survey of WIC Participants. The study identified those households with special diets in which at least one WIC member:

- modified their diet for a health-related reason,
- followed a diet restricted by religious practice, or
- followed a vegetarian diet.

The study also identified those households having food allergies in which at least one WIC member:

- had a food allergy diagnosed by a physician, or
- had experienced a severe allergic reaction within an hour after eating.

Survey respondents from households with special diets or food allergies were asked whether their dietary restriction posed problems with finding appropriate foods when shopping for WIC items. In addition, the study examines whether respondents with dietary restrictions in States with food-item restrictions had different views about brand satisfaction, or exhibited different behaviors with respect to purchase and consumption of prescribed foods, than respondents with dietary restrictions in States without food-item restrictions.

### Possible Effects of Cost-Containment Practices

Food-item restrictions on product size or packaging will not create additional problems for participants with special diets or food allergies. They can still purchase food brands and types known to be appropriate for them. When State WIC agencies restrict which food brands or types may be purchased with WIC food instruments, however, they may inadvertently eliminate food items that participants know to be appropriate. Such restrictions can occur whenever federally approved WIC food items are not included in the State agency's list of approved foods.

It is also possible for vendor restrictions to affect participants with special diets or food allergies. If WIC participants have to shop at a different store as a result of State agency requirements that WIC vendors have competitive prices, they may find that the new store does not stock the food items they know to be safe and appropriate. When that happens, the participants must make sure that an alternative allowed food brand is appropriate. For instance, those with food allergies may need to check cereal labels to ensure that offending ingredients are not included in an allowed brand. Because food labels do not always list all ingredients, participants may further need to contact manufacturers to

check on actual ingredients. They could also decide to simply do without a prescribed food item rather than risk eating an offending ingredient.

Food-item restrictions, however, should not affect WIC participants' ability to find WIC-approved foods when either (1) most WIC food items already meet the dietary restriction, or (2) substitute foods are available on the WIC food list. For example, participants on a low-fat diet may choose skim or 1-percent milk rather than whole milk. In addition, food package tailoring at the WIC clinic can accommodate certain allergies (for instance, substitution of dried beans or peas for peanut butter for participants with a peanut allergy). Finally, given the availability of food substitutes, vendor restrictions on higher price stores are also unlikely to affect participants on most special diets, even if higher price stores carry a larger selection of approved WIC foods than authorized stores.

Of course, participants may not be as satisfied with the taste or texture of a substitute food item as with an item restricted due to cost-containment, even though the item can still meet their dietary restrictions.<sup>1</sup>

## Research Approach

The study originally planned to over-sample families with WIC members on special diets or with food allergies to provide a sufficient sample for examining whether cost-containment practices had a disproportionate effect on them. Review of available data from the WIC certification files of the six case study States, however, indicated that consistent data identifying participants special diets or food allergies were not available. WIC families were therefore randomly selected within each sampling stratum, and the Survey of WIC Participants included a series of questions asking about the presence of special diets and food allergies.<sup>2</sup> A sufficient number of families on special diets or with food allergies were sampled ( $n = 528$ ) to address whether cost-containment practices had a disproportionate effect on them.

Most of the chapter presents tabular analyses of the survey data. The last analysis section describes a set of multivariate models used to assess whether families on special diets or with food allergies had different responses to cost-containment practices than other WIC families.

## Special Diets

The Survey of WIC Participants asked respondents about three types of special diets: diets modified for health reasons (such as low-calorie for weight loss, low-sodium, and low- or high-fiber); vegetarian diets; and religious diets, specifically Kosher, Muslim, and Seventh-Day Adventist diets. Table 7-1 presents the percentage of survey respondents in each State reporting that they or a WIC family member were on a special diet.

Depending on the State, from 28.5 to 48.5 percent of survey respondents reported that they were on a special diet for health-related reasons (though not necessarily prescribed by their physician). North Carolina had the highest percentage, and Texas the lowest. There is no single type of special diet that

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<sup>1</sup> Participant satisfaction with prescribed foods was described in chapter 6.

<sup>2</sup> These questions are contained in section F of the survey questionnaire. A copy of the survey questionnaire and a description of the survey's sample design are contained in appendix A.

explains the variation among States. For instance, for almost all of the health-related special diets listed in table 7-1, WIC participants in North Carolina were more likely than their counterparts in the other States to be on such a diet.

**Table 7-1—WIC families with special diets**

	CA	CT	NC	OH	OK	TX	All States
	<i>Percent</i>						
Health-related special diet							
High-fiber	18.3	16.5	24.9	14.7	30.3	18.5	20.5
Sugar-free or low-sugar	18.2	17.3	23.1	12.6	21.7	17.8	18.4
Low-fat or low-cholesterol	13.2	13.8	20.9	13.1	15.8	10.8	14.6
Low-sodium	11.5	12.6	19.6	14.8	16.5	12.6	14.6
High-calorie or high-protein	6.7	14.0	15.4	14.0	11.9	8.3	11.8
Low-calorie	11.4	12.4	16.3	10.4	9.1	4.8	10.8
Low-fiber	4.3	6.7	9.2	6.9	4.6	2.0	5.6
Other (health related)	0.9	1.8	1.6	0.6	2.6	1.1	1.4
Any health-related special diet	30.6	36.8	48.5	35.2	46.5	28.5	37.7
Religious	0.0	3.8	2.6	4.8	2.0	1.1	2.4
Vegetarian	2.8	2.6	1.7	2.2	1.6	0.2	1.8
Any special diet	31.6	40.8	49.0	38.4	46.8	29.4	39.3
<i>Sample size (number)</i>	<i>222</i>	<i>222</i>	<i>222</i>	<i>215</i>	<i>206</i>	<i>203</i>	<i>1,285</i>

Weighted estimates for States were obtained with SUDAAN software. Group estimates gave equal weight to each State in the group. Component percentages may not sum to within-State totals because of rounding or indication of more than one dietary restriction.

Source: Survey of WIC Participants.

A cross-State average of 37.7 percent of respondents reported the presence of one or more health-related special diets. The most common diet was a high-fiber diet (20.5 percent of respondents), followed by a sugar-free or low-sugar diet (18.4 percent). The next most common restrictions, at 14.6 percent each, were low-sodium and low-fat or low-cholesterol diets. A small number of respondents (an average of 1.8 percent among the six States) said they or their WIC child were on a vegetarian diet, and 2.4 percent said they followed a Kosher, Muslim, or Seventh-Day Adventist diet. When all dietary restrictions are considered, an average of nearly 40 percent of the WIC families said they had at least one of the identified special diets. The range varied from 29.4 percent in Texas to 49.0 percent in North Carolina.

For reasons described below, cost-containment practices that restrict food choice are unlikely to have a disproportionate adverse impact on most WIC participants on special diets.

### Health-Related Special Diets

As noted earlier, food-item restrictions should not affect WIC participants' ability to find WIC-approved foods when either (1) most WIC food items already meet the dietary restriction, or (2)

substitute foods are available on the WIC food list. With regard to the special diets listed in table 7-1, the following WIC food substitutes or accommodations are available:

- A cross-State average of 20.5 percent of survey respondents said they or their sampled children were on high-fiber diets. WIC foods that provide fiber include dried beans/peas and many cereals, especially bran and other whole grain cereals. Changing brands for these food items would not materially affect fiber content, and State agencies take care to make sure that their food-item restrictions do not eliminate major cereal grain categories.
- An average of 18.4 percent of surveyed families reported that a WIC member was on a sugar-free or low-sugar diet. Most WIC food items are already low in added sugar, so food-item restrictions should not materially affect participants on low-sugar diets. Cereals, in particular, are restricted to types with no more than 21.2 grams of sucrose or other sugars per 100 grams of dry cereal. Although it is possible that allowable brands or types of cereal might have somewhat higher sugar content than restricted brands or types, the differences are likely to be small.
- In addition to infant formula, WIC foods high in fat or cholesterol are milk (whole and 2-percent), eggs, cheese, and peanut butter. None of the case study States precluded purchase of skim or 1-percent milk. In addition, WIC clinics can tailor food packages to reduce amounts of prescribed cheese, eggs, and peanut butter, and increase amounts of milk and dried beans/peas. Clinics can also prescribe low-fat or low-cholesterol cheese. Thus, food restrictions imposed by State WIC agencies should not affect the 14.6 percent of WIC families who said they were on low-fat or low-cholesterol diets.
- A cross-State average of 14.6 percent of survey respondents said they or a WIC family member were on a low-sodium diet. Except for some cereals (for example, puffed wheat and rice, shredded wheat), most WIC foods are not low in sodium. Thus, to avoid causing problems for WIC participants on low-sodium diets, State WIC agencies might want to include low-sodium cereals on their lists of approved foods.
- WIC participants needing high-calorie or high-protein foods can buy cheese, peanut butter, dried beans/peas, or whole milk with their WIC food instruments. Food-item restrictions do not eliminate these high-protein and generally calorie-rich choices, so they should not affect the nearly 12 percent of WIC participants with these special diets.
- An average of 10.8 percent of survey respondents said they were on a low-calorie diet for weight loss. As with participants on low-fat or low-cholesterol diets, and for the same reasons, State WIC food restrictions should not affect the ability of participants to select and purchase lower calorie types of prescribed foods, such as skim or reduced-fat milk.
- Between 5 and 6 percent of respondents said they were on a low-fiber diet; they would need to avoid buying high-fiber foods like bran or whole-grain cereals. State agencies try to ensure that their food-item restrictions do not eliminate major cereal grain categories, so these restrictions should not limit participants' ability to choose low-fiber alternatives.

### **Religious and Vegetarian Diets**

Cost-containment practices may, under some circumstances, make it more difficult for participants with special diets to observe those diets. For example:

- A cross-State average of 2.4 percent of survey respondents said they or a WIC family member adhered to a religious diet. Food-item restrictions may impact those on Kosher or Muslim diets by eliminating brands that have been certified as meeting the dietary specifications. Similarly, restrictions on higher price vendors may reduce the availability of WIC stores that stock foods meeting Kosher or Muslim diet needs.
- Fewer than 2 percent of survey respondents said they or a WIC family member were on a vegetarian diet. State food-item restrictions should not affect the food choices of these participants because WIC does not prescribe meats (except tuna fish for breastfeeding mothers) or foods that may contain meat ingredients. It is not known if any of these WIC participants were strict vegan vegetarians, but if these participants choose not to consume dairy products, fish, or eggs, they may require tailored food packages. Again, however, the food-item restrictions imposed for cost-containment purposes would not change their ability to follow a vegetarian diet.

## Food Allergies

The survey asked WIC participants whether a doctor had ever told them that they (or another WIC member of the family) had a food allergy, celiac disease or sprue, lactose or milk intolerance, or sulfite sensitivity. It also asked whether, within an hour after eating something, the respondent or her WIC child or infant had ever had a severe reaction, such as itching all over, trouble breathing, flushing, hives, or swelling of the face or hands or feet. This chapter treats all respondents who replied “yes” to either the food allergy or severe reaction question as having a food allergy.

Table 7-2 presents the percentages of WIC respondents indicating a food allergy or other condition causing food sensitivity. The percentages of respondent families with a food allergy varied from 4.6 percent in Texas to 13.4 percent in North Carolina. The cross-State average was 9.4 percent.<sup>3</sup> Lactose intolerance or milk intolerance was reported by an average of 10.8 percent of the respondents, with a particularly high percentage of them in Oklahoma (21.7 percent). Cost-containment practices should not affect participants with lactose or milk intolerance because their food packages can be tailored to avoid cow’s milk. Furthermore, there were very few reported instances of celiac disease or sulfite sensitivity in any State. The rest of this section therefore focuses on participants with food allergies.

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<sup>3</sup> This percentage is high compared to national figures. For example, in the *National Survey of WIC Participants: Final Report*, nutritional risk data indicate that 1.8 percent of participants have a food allergy (a weighted average of category-specific rates in exhibits 3-31 through 3-35). The presence of a food allergy was not always assessed by the WIC clinic, however, so the 1.8 percent figure may be an underestimate. The percentages in table 7-2 refer to any WIC member of the family. The average number of WIC members per family was 1.65, so the 9.4 percent figure in table 7-2 corresponds to 5.7 percent of **participants** having a food allergy, which is still substantially higher than indicated by the nutritional risk data.

**Table 7-2—WIC families with food allergies or intolerances**

	CA	CT	NC	OH	OK	TX	All States
				<i>Percent</i>			
Any food allergy or intolerance	9.6	15.1	21.2	13.8	25.2	10.8	16.0
Food allergy <sup>a</sup>	8.3	12.5	13.4	7.9	9.8	4.6	9.4
Lactose or milk intolerance	4.3	8.3	12.3	10.3	21.7	7.9	10.8
Sulfite sensitivity	0.0	0.4	0.9	0.3	0.6	0.0	0.4
Celiac disease, or sprue	0.0	0.1	0.0	0.0	0.0	0.0	0.0
<i>Sample size (number)</i>	<i>208</i>	<i>231</i>	<i>222</i>	<i>215</i>	<i>206</i>	<i>203</i>	<i>1,285</i>

a Respondents with food allergies include those for whom a doctor said they or their child had an allergy.

Weighted estimates for States were obtained with SUDAAN software. Group estimates gave equal weight to each State in the group. Component percentages may not sum to within-State totals because of rounding or indication of more than one food allergy or intolerance.

Source: Survey of WIC Participants.

About 71 percent of the respondents in table 7-2 with a food allergy said that a doctor had indicated that they or their child had the allergy. (The remaining 29 percent are in the table because they indicated a severe reaction after eating.) Respondents who had been told by a doctor that they or their children had an allergy were asked to identify the allergenic food or foods. Table 7-3 presents their responses. The food most commonly cited was cow’s milk, with 3.2 percent of all respondents indicating the allergy. Very few respondents indicated any other specific food allergy, although just over 3 percent reported a food allergy that was recorded as “other.” Most of these other food allergies were to chocolate, certain fruits (peaches, strawberries, lemons, bananas, tomatoes), or certain vegetables (mushrooms, lettuce, peppers).<sup>4</sup>

Participants with food allergies may be able to find other WIC foods that do not cause problems, or they may be able to have their food packages tailored, substituting foods that are not generally WIC approved for regular WIC food items they should not eat. Such food-package tailoring requires a doctor’s note confirming the presence of the food allergy. Specific food alternatives include the following:

- The few respondents who reported egg allergies (0.3 percent) can rely on cheese from their regular WIC prescription as a source of protein. WIC regulations, however, do not permit cheese to be **substituted** for eggs, so these participants cannot receive extra cheese as a result of their egg allergy.
- Wheat and corn are found in some cereals, but only about 0.1 percent of survey respondents said they were allergic to wheat or corn. Neither food-item nor vendor restrictions should prevent these participants from purchasing safe or appropriate cereals from among WIC-approved cereals, but they may still need to check labels or contact manufacturers to confirm the absence of wheat or corn. When restricting cereal brands or types, State WIC agencies try not to delete entire grain groups.

<sup>4</sup> Most of these specified “other allergies” may be food intolerances rather than true food allergies.

**Table 7-3—WIC families with food allergies**

	CA	CT	NC	OH	OK	TX	All States
	<i>Percent</i>						
Any food allergy <sup>a</sup>	5.0	10.2	8.2	6.2	7.2	3.3	6.7
Cow's milk	3.6	5.2	3.0	3.8	3.3	0.2	3.2
Eggs	0.0	1.5	0.0	0.0	0.0	0.2	0.3
Wheat	0.0	0.2	0.0	0.0	0.0	0.2	0.1
Peanuts	0.0	1.2	0.0	0.0	0.0	0.5	0.3
Soy	0.8	1.6	0.4	0.0	0.0	0.0	0.5
Corn	0.0	0.0	0.0	0.0	0.0	0.2	0.0
Other nuts	0.0	1.1	0.7	0.0	0.0	0.0	0.3
Fish	0.5	0.4	0.0	0.5	0.0	0.0	0.2
Shellfish	0.5	0.4	0.0	0.0	0.0	0.0	0.2
Other	0.8	3.0	4.5	2.4	5.7	2.4	3.2
<i>Sample size (number)</i>	<i>222</i>	<i>222</i>	<i>222</i>	<i>215</i>	<i>206</i>	<i>203</i>	<i>1,285</i>

a Respondents with food allergies include those for whom a doctor said they or their child had an allergy.

Weighted estimates for States were obtained with SUDAAN software. Group estimates gave equal weight to each State in the group. Component percentages may not sum to within-State totals because of rounding or indication of more than one food allergy.

Source: Survey of WIC Participants.

- About 0.3 percent of WIC families in the six States had a WIC member allergic to peanuts, so these participants cannot eat peanut butter. Instead, they can purchase dried beans or peas as an alternative protein source.
- Nuts other than peanuts (for example, almonds) are sometimes found in WIC-approved cereals. Because there are many other approved cereals that do not contain nuts, cost-containment practices should not affect food choices for the 0.3 percent of respondents who said they were allergic to other nuts. These participants, however, may still need to check food labels or contact manufacturers to determine whether specific cereals contain nuts.
- The few survey respondents with a soy allergy (0.5 percent) may have some difficulties finding an appropriate cereal to buy when State agencies restrict cereal brands. It is sometimes difficult to determine if soy is used as an ingredient in store-brand or private-label cereals.
- About 0.3 percent of respondents indicated an allergy to fish. This would affect only breastfeeding participants, whose food package usually includes tuna. If a breastfeeding mother were allergic to tuna, it would be dropped from her food package. Cost-containment practices would not affect her food choices.
- Food products containing shellfish are not WIC approved, so the 0.2 percent of WIC families with this allergy would not be affected by WIC cost-containment practices.
- Finally, the 3.2 percent of WIC families with a reported allergy to cow's milk do not have a ready substitute in the WIC prescription, because WIC clinics may not prescribe soy-

based beverages.<sup>5</sup> Furthermore, these participants may also be allergic to milk protein, an ingredient found in such foods as cheese, cereal, and peanut butter. Such participants need to avoid foods containing milk protein, so State restrictions on allowed brands and types of food may impose extra burden on them to check food labels of allowed cheese, cereal, and peanut butter.

Thus, for the reasons described above, most WIC participants with food allergies should not be affected by cost-containment practices that limit food choice or remove higher priced stores from approved vendor lists. WIC participants, however, may need to check food labels or contact manufacturers to determine whether products include dairy protein, eggs, wheat, corn, soy, or nuts.

## Problems Finding Appropriate Food Items

The expectation that cost-containment practices will not have a disproportionate adverse effect on most WIC participants with special diets or food allergies is borne out by survey evidence. For all survey respondents who indicated that they had a dietary restriction, the survey asked whether their special diet posed problems with finding appropriate food items when shopping for WIC foods. Table 7-4 displays the results. Of the 528 WIC families in which at least one WIC participant had a dietary restriction, a cross-State average of only 2.5 percent reported that their special diet posed “problems” with finding appropriate food items among WIC foods. When asked a follow-up question about the nature of the problem, 7 of the 16 respondents said they either could not find out what ingredients were in a food item or did not know whether approved brands were safe to eat.

**Table 7-4—WIC families with dietary restrictions who report problems finding appropriate foods when shopping for WIC<sup>a</sup>**

	CA	CT	NC	OH	OK	TX	All States
Percent of total caseload	4.2	2.4	2.5	0.8	4.9	0.0	2.5
<i>Sample size (number)</i>	63	108	119	87	92	59	528

a Excludes respondents whose only dietary restriction was a food intolerance.

Weighted estimates for States were obtained with SUDAAN software. Group estimates gave equal weight to each State in the group.

Source: Survey of WIC Participants.

On a percentage basis, most of the shopping problems were centered on families who followed religious or vegetarian diets. Small sample sizes preclude presenting State-level estimates for the different categories. For the 29 WIC families in the overall sample following religious diets, however, 12.8 percent said they had problems finding appropriate food items when shopping for WIC foods, and 9.7 percent of the 22 families following a vegetarian diet reported problems. In contrast,

<sup>5</sup> If the milk “allergy” is actually an intolerance to lactose, however, the WIC clinic may prescribe lactose-free milk as a substitute for cow’s milk.



6.0 percent of families with food allergies and 2.3 percent of families with health-related special diets said they had problems shopping for WIC foods.

As displayed in table 7-4, Oklahoma had the highest rate (4.9 percent) of survey respondents who said they had problems finding appropriate food items. This high rate is somewhat surprising because Oklahoma had a relatively low percentage of WIC families who were on a religious (2.0 percent) or vegetarian (1.6 percent) diet. As reported in table 7-2, however, Oklahoma did have the highest percentage of families (21.7 percent) with food allergies, and this may help explain the relatively high rate of shopping problems within the State. It is also the case that of the seven WIC families in Oklahoma who reported difficulty in shopping, three said the problem was in not knowing how to find out about ingredients in store-brand food items. With the small sample, it is not possible to conclude that these problems were related to Oklahoma's previous exclusion of national-brand cereals in its WIC food packages.

## Satisfaction With and Use of Prescribed Foods

To examine whether WIC participants with special diets or food allergies were less satisfied with allowed brands of food, or less likely to purchase or consume all their WIC food, the study specified and estimated a series of logit models. Each model had the following general form:

$$Y = \beta_0 + \beta_1 * \text{RESTRICT} + \beta_2 * \text{RACE} + \beta_3 * \text{GRAD} + \beta_4 * \text{NUMBER} + \beta_5 * \text{DIET} + \beta_6 * (\text{DIET} * \text{RESTRICT}),$$

where Y is one of three outcome measures, RESTRICT indicates whether the survey respondent resided in a State with restrictions for the food category being examined, RACE is a vector of racial/ethnic categories, GRAD indicates whether the survey respondent is a high school graduate, NUMBER is the number of WIC participants in the family,<sup>6</sup> and DIET is a vector indicating whether the respondent had a special diet or food allergy. The interactive terms DIET\*RESTRICT are included in the model as well. The  $\beta$ s are the estimated coefficients of the model.<sup>7</sup>

The specific variables representing each vector in the models are:

- RACE (African-American, Hispanic)
- DIET (vegetarian diet or special diet for health or religious reasons, food allergy).

Too few respondents indicated that they followed a vegetarian or religious diet to include these diets as separate variables in the models.

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<sup>6</sup> The number of WIC members in the family is included to test the hypothesis that, as the number of WIC family members increases, the total amount of prescribed food may exceed the family's demand for WIC foods. If so, the estimated coefficient should be zero (that is, insignificant) in the models of brand satisfaction, but negative in the models of food purchase and food consumption.

<sup>7</sup> Variables indicating location (urban, suburban, rural) and whether any of the WIC members were pregnant, an infant, or a child were included in alternative model specifications. Estimated coefficients for the location variables were never statistically significant, and these variables were dropped from model specification. The variables indicating certification category were dropped because of collinearity between these variables and presence of special diets and food allergies.

The excluded category in each model is White participants living in a State without food restrictions (for the food category examined) who do not have a high school education and special diet or food allergy.

Separate models were fit to the survey data for three outcome measures: whether or not the respondent was “very satisfied” with allowed brands of a WIC food item, whether the respondent purchased “all” of the prescribed WIC item, and whether WIC members of the family consumed “all” of the item that was purchased. The two models on purchase and consumption behavior were specified for each of the eight food categories discussed in chapter 6 and appendix I:

- milk
- eggs
- cheese
- juice
- cereal
- infant cereal
- peanut butter
- dried beans or peas

The model on brand satisfaction was specified for all food categories except eggs, peanut butter, and dried beans/peas. For these three categories, the survey did not ask about satisfaction with allowed brands.

If survey respondents with special diets or food allergies were less satisfied with allowed brands than other survey respondents, the estimated coefficients on the DIET variables will be negative and statistically significant. Similarly, the estimated coefficients will be negative in the respective models if survey respondents with dietary restrictions were less likely to purchase all the prescribed food in a category or to consume all the food purchased.

A significant negative estimated coefficient on a variable indicating a special diet or food allergy, however, does not mean that food-item restrictions are related to the decreased satisfaction or purchase or consumption behavior. One must also consider the estimated coefficients for the interactive terms in each model. If the estimated coefficients on any interactive terms are negative and statistically significant, this evidence would support a hypothesis that food-item restrictions have a disproportionate impact on WIC participants with special diets or food allergies.

Appendix J presents the estimated coefficients for the 24 models specified. Two separate sets of models are specified for breakfast cereals. The first set includes both California and Oklahoma as States with food-item restrictions; the second set includes only Oklahoma in the restricted group. This repetition acknowledges the very different types of restrictions used in the two States: limiting types of allowed cereals in California versus allowing only store and private-label brands in Oklahoma.

Using the 0.05 confidence level as the threshold for assessing statistical significance, only one of the estimated coefficients for an interaction term is statistically significant, and its sign is positive rather than negative. Survey respondents in California and Oklahoma with special diets were more likely to eat all the prescribed cereal they purchased than respondents with special diets in the other States

(table j-46 in the appendix). Thus, there is no evidence that food-item restrictions in the six case study States had a disproportionate adverse effect on WIC participants with special diets or food allergies. This finding is consistent with the evidence that very few respondents with special diets or food allergies (a cross-State average of 2.5 percent) experienced problems finding appropriate food items when shopping for WIC foods.

The above models were re-specified with their interaction terms omitted in order to estimate the overall relationship between having a special diet or food allergy and satisfaction with allowed brands, amount purchased, and amount consumed. In only two of the new models were the estimated coefficients of the special diet variable statistically significant: respondents on special diets were less likely than others to buy all their prescribed cheese and to eat all the peanut butter they purchased. None of the estimated coefficients for the food allergy variable were significant in the re-estimated models.

Based on these analyses, there is no evidence that States' efforts to control food package costs through food-item restrictions created special problems for WIC respondents with food allergies or special diets. This is not to say that a few WIC participants with food allergies or special diets may not have been adversely affected by food-item restrictions. If an effect existed, however, it likely affected only a small percentage of participants.

## Summary

Averaged over the six case study States, 37.7 percent of survey respondents said they or their WIC child followed a special diet for specified health reasons. In addition, an average of 9.4 percent reported a food allergy. Finally, 2.4 percent of the surveyed respondents followed a religious diet, and 1.8 percent of the sample followed a vegetarian diet.

In its legislation authorizing this study, Congress identified WIC participants with special diets or food allergies as a group of special concern with regard to the possible impacts of WIC cost-containment practices. This chapter's discussion of dietary restrictions, WIC foods, and substitute foods suggests that cost-containment practices are not likely to have disproportionately greater impacts on participants with dietary restrictions than other participants, and survey evidence supports this discussion; only 2.5 percent of WIC families with dietary restrictions said their special diets posed problems with finding appropriate WIC food items. The incidence of reported shopping problems was considerably higher, however (12.8 and 9.7 percent, respectively), for the relatively few WIC families adhering to religious or vegetarian diets.