Chapter 3
Participants' Receipt of Nutrition Education Contacts

This chapter describes study participants' prenatal and postpartum nutrition education experiences. Information is presented on the number of documented nutrition education contacts received during each certification period based on data from WIC administrative records.[1] In addition, participants' self-reports are summarized regarding the types of information imparted during WIC nutrition education contacts. The final section of the chapter describes characteristics of women who received a second nutrition education contact during the prenatal period.

Number of WIC Nutrition Education Contacts Received

The amount of nutrition education received by any WIC participant is dependent upon three separate influences: (a) what is offered by the local agency; (b) what is accepted by the participant (conditional on what is offered); and (c) the timing of certification (e.g., women who enroll earlier in their pregnancies have more opportunities for nutrition education than those who enroll later). Moreover, participants' acceptance of WIC nutrition education offerings may be influenced by personal characteristics and/or by characteristics of the nutrition education activities offered. Differences in the amount of nutrition education received by sample members may reflect any of these influences.

Prenatal Nutrition Education Contacts

The number of potential nutrition education contacts available to participants during the prenatal certification period is influenced primarily by the timing of WIC enrollment and the local agency's schedule for voucher issuance. For women enrolling at the same point in pregnancy, the minimum number of possible contacts is higher in local agencies that require more frequent voucher pick-up, e.g., monthly or bimonthly pick-up *versus* tri-monthly or quarterly pick-up.

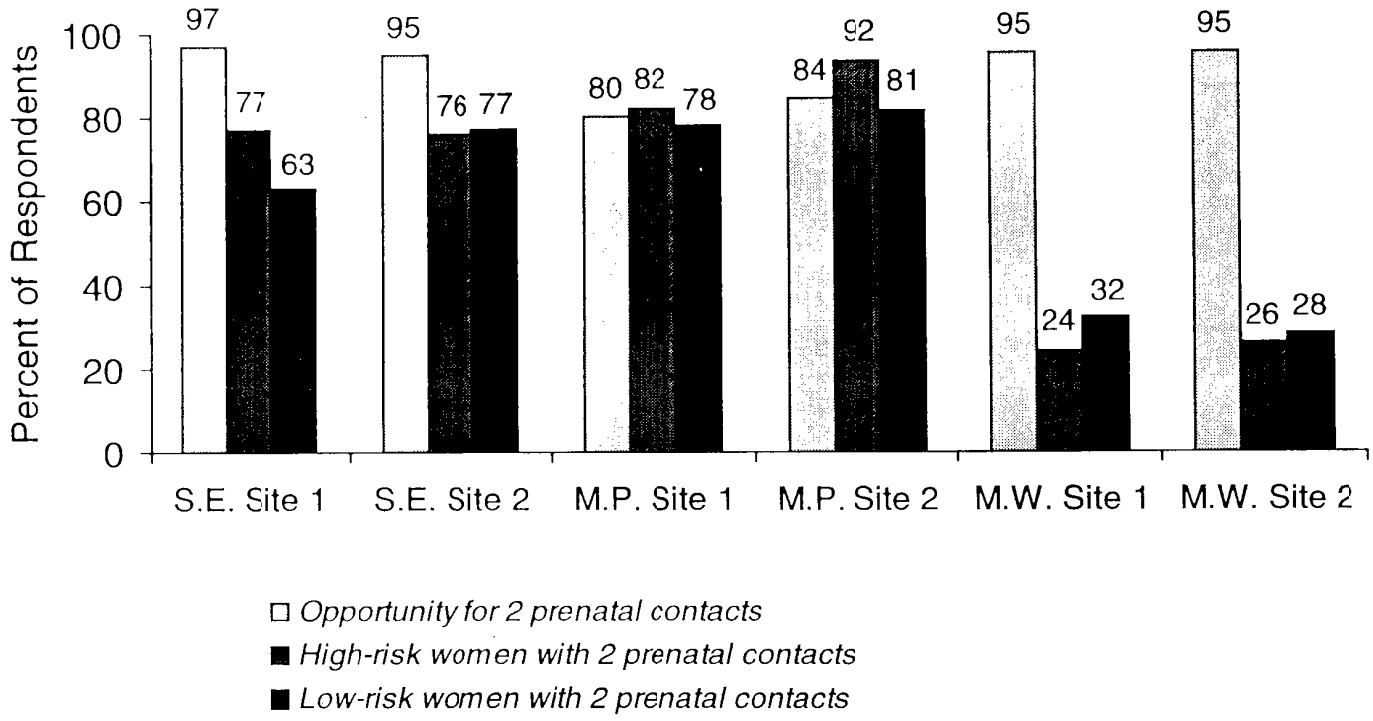
In each of the six study sites, a majority of women (80% - 97%) had the opportunity to receive two nutrition education contacts between the time they were certified (which counts as the first contact) and the birth of their babies. According to WIC administrative records, however, the extent to which this goal was actually achieved varied across sites. In general, patterns were similar within State.

In the two Southeast sites, roughly three-quarters of the prenatal participants enrolled in the study received two (or more) nutrition education contacts between certification and the birth of their babies (Exhibit 3.1). In Southeast Site 2, high-risk participants were just as likely to receive two contacts as low-risk participants. In Southeast Site 1, fewer lower-risk participants received a second contact (newsletters distributed by voucher clerks). This may be because participants did not take newsletters when they came in to pick up vouchers or because site staff were less diligent about documenting these contacts in WIC records.

1 A separate analysis was carried out to assess the comparability of data from WIC administrative records and participant self-reports. Results of this analysis support use of WIC records for counts of nutrition education contacts and participant self-reports for information about topics covered and referrals received.

Exhibit 3.1

Prenatal Nutrition Education Contacts: Opportunity For and Receipt of Two Contacts



Note: Documented contacts include all recorded contacts from time of certification to birth of baby. Certification counts as one contact.

Source: WIC records.

The fact that only about 75 percent of study participants in these sites actually received two prenatal nutrition education contacts, when 95 percent or more had the opportunity, suggests that some participants did not participate in follow-up nutrition education activities made available to them. The approximate size of the gap between potential and actual receipt of two prenatal nutrition education contacts is consistent with expectations based on on-site observations and local agency director reports. As noted in Chapter 2, historical no-show rates for follow-up prenatal contacts in both sites were in the neighborhood of 20-25 percent.[2]

Participants in Southeast Site 2 may actually have received supplementary nutrition education through brief classes taught in the waiting room. These classes are general in nature, covering a wide variety of nutrition topics, and are not considered part of participants' required nutrition education contacts. These contacts are not documented in WIC records.

In the two Mountain Plains sites, where vouchers were issued only once every three months, only 80 and 84 percent of study participants, respectively, had the opportunity to receive two nutrition education contacts during the prenatal period, assuming that contacts occurred in association with voucher pick-up.[3] As Exhibit 3.1 illustrates, the percentage of women in these sites who actually received two contacts was roughly equivalent to or greater than the percentage who had the opportunity for two contacts. In fact, the two Mountain Plains sites were more successful than any of the other sites in providing two prenatal nutrition education contacts, despite the use of tri-monthly voucher issuance which, in theory, decreases the number of contact opportunities. This trend is entirely consistent with no-show rates documented during the on-site observations and with historical patterns reported by local agency directors.

Although the opportunity for two prenatal nutrition education contacts in the Midwest sites was no different from the other sites with bimonthly voucher issuance (the two Southeast sites), the percentage of women who actually received two contacts, based on data from WIC records, was markedly lower (Exhibit 3.1). In both sites, less than one-third of the study participants received two prenatal nutrition education contacts. This pattern conforms with findings from the on-site observations as well as with information provided by local agency staff. As noted in Chapter 2, one factor that may contribute to this problem is use of proxies to pick up vouchers. In comparison to the other four sites, the number of proxy pick-ups reported by sample members was substantially higher in the two Midwest sites (Exhibit 3.2).

Postpartum Nutrition Education Contacts

The number of potential postpartum nutrition education contacts is influenced by a participant's decision to certify for the postpartum period, the timing of certification, and the assigned participant classification (regular postpartum woman (certified for six months) or breastfeeding woman (may be certified for up to 12 months)).

2 The no-show rate seen during the observation period was higher in southeast site 2, however this was probably due to the fact that a hurricane affected the local area for at least a week.

3 The lower percentage for Mountain Plains Site 1 is a function of later (second and third trimester) enrollments.

Exhibit 3.2

Reported Frequency of Proxy Voucher Pick-ups Between Certification and the Prenatal Survey

	SOUTHEAST		MOUNTAIN PLAINS		MIDWEST	
Number of Reported Proxy Pick-ups	Site 1 (n = 284)	Site 2 (n = 343)	Site 1 (n = 296)	Site 2 (n = 205)	Site 1 (n = 213)	Site 2 (n = 228)
None	94.2%	89.7%	99.3%	94.3%	74.7%	79.6%
1-2	5.8	9.6	0.7	5.7	19.1	16.6
3 or more	0.0	0.7	0.0	0.0	6.2	3.8

Note: Percentages may not sum to 100 due to rounding.

Source: Prenatal survey.

The timing and frequency of postpartum certification in each of the study sites is summarized in Exhibit 3.3. As the data illustrate, 80 percent or more of women for whom abstract data were available did certify for postpartum WIC participation. In comparison to the other sites, the percentage of women in Southeast Site 1 (19.7%) who did not enroll as postpartum participants was somewhat high. This finding is consistent with patterns observed during on-site observations and with anecdotal reports from local agency staff. This agency required women to attend two separate appointments to complete infant and postpartum certifications. The infant certification is generally done first and some women do not return for the subsequent postpartum certification appointment .

In most sites, a majority of women completed postpartum certification within six weeks of the expected date of delivery, i.e., within the time allowed before termination of prenatal WIC benefits. The time lapse between the birth of the infant and certification of the mother was greatest in the two Southeast sites, particularly Site 2. In both cases, a substantial number of women were not certified for postpartum participation until after the six week transition period.

Record abstract data were collected for virtually all women at least six months after the birth of their babies. Therefore the data covered the full postpartum certification period for all women except those who were still breastfeeding (less than 12 percent, across all sites). While these women were eligible to participate in WIC for up to 12 months, as long as they continued breastfeeding, they, too, should have received two nutrition education contacts by the time WIC records were abstracted. As noted in Chapter 1, WIC regulations require that nutrition education be offered at least quarterly, or once every three months, to participants whose certification period extends beyond six months.

All but one sample member had the opportunity to receive two postpartum nutrition education contacts, with postpartum certification counted as one contact, prior to the time abstract data were collected. As shown in Exhibit 3.4, however, the percentage of women who actually did so ranged from a low of five percent (Midwest Site 1) to a high of 59 percent (Southeast Site 2). The fact that postpartum women appear to take even less advantage of nutrition education opportunities than prenatal participants is consistent with findings from the on-site observations.

Information and Advice Provided by WIC Staff

Study participants were asked whether WIC staff provided information or advice about a variety of topics considered central to WIC nutrition education. They were also asked about receipt of referrals from WIC staff and, if a referral had been received, whether they actually contacted the subject agency or office. These data are discussed in the following sections.

Topics Covered

The prenatal survey included a list of 16 topic areas thought to be central to WIC nutrition education efforts (Exhibit 3.5). The list was structured to cover most of the items included in the nutrition knowledge measure (see Chapters 1 and 4), as well as the topic areas documented in on-site observations. Three nonsense topics, noted in Exhibit 3.5, were also included to provide a means of assessing the relative accuracy of respondents' answers. Ten of the 16 topics and all three of the nonsense items were included in the postpartum survey. Exact wording for each survey item may be found in the sample prenatal survey provided in Appendix A.

Exhibit 3.3

Frequency and Timing of Postpartum Certification

Timing of Postpartum Certification	SOUTHEAST		MOUNTAIN PLAINS		MIDWEST	
	Site 1 (n = 284)	Site 2 (n = 343)	Site 1 (n = 296)	Site 2 (n = 205)	Site 1 (n = 213)	Site 2 (n = 228)
Did not certify	19.7%	7.9%	14.9%	6.3%	7.5%	5.7%
Within 6 weeks of EDD	51.1	42.0	74.3	85.4	91.1	90.8
6 or more weeks after EDD	29.2	50.2	11.8	8.3	1.4	3.5

Notes: EDD = Estimated date of delivery.

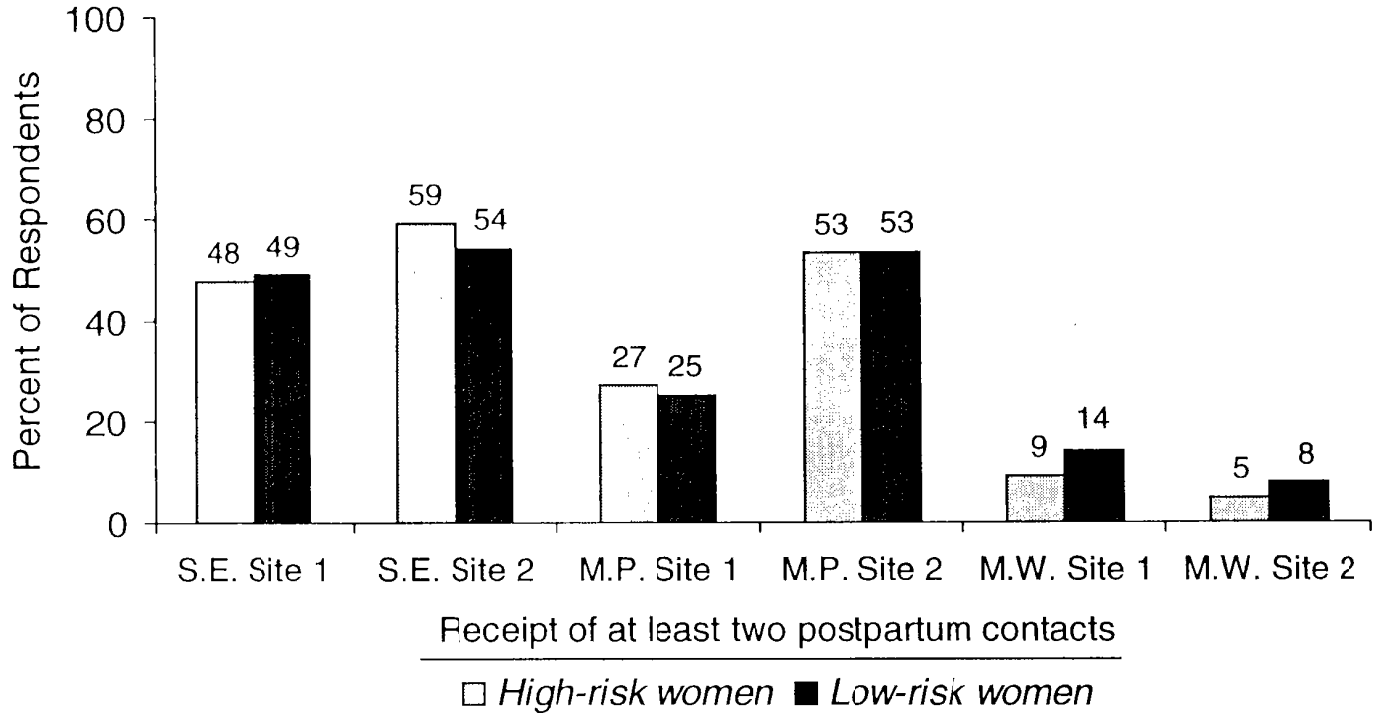
Prenatal WIC benefits are terminated six weeks after the EDD. Certification as a postpartum or breastfeeding participant during this time frame prevents the loss of WIC benefits (food package).

Percentages may not sum to 100 due to rounding.

Source: WIC records.

Exhibit 3.4

Receipt of Two Postpartum Nutrition Education Contacts



Notes: Virtually all postpartum participants had the opportunity to receive two nutrition education contacts prior to the postpartum survey.

Documented contacts include all recorded contacts between birth of baby and time WIC records were abstracted (generally six months or more postpartum).

Source: WIC records.

Exhibit 3.5

Nutrition Education Topics Assessed in Prenatal and Postpartum Surveys

WIC Foods

How to use WIC vouchers

Foods you can get with WIC vouchers

Prenatal Topics

Types and amounts of food to eat while pregnant

How to get more halite in your diet[1]

Importance of prenatal care

Weight gain during pregnancy

Dealing with complications of pregnancy[2]

Need to consult physician before taking over-the-counter medications

Effects of alcohol, smoking, caffeine and other drugs

Importance of prenatal vitamin and iron pills

Chewing gums to avoid while pregnant[1]

Breastfeeding/Infant Feeding Topics

Benefits of breastfeeding

Importance of adequate fluids while breastfeeding

Importance of glucose intake while breastfeeding[1]

Dealing with typical breastfeeding problems[3]

Importance of iron-fortified formula

Introducing solid foods

Avoiding bottle caries

Breastfeeding support services

[1]These items are "nonsense" topics inserted to assess the reliability of respondents answers. None of these topics would have actually been covered in WIC nutrition education contacts.

[2]Includes nausea, vomiting, heartburn and constipation.

[3]Includes sore nipples, infants who won't latch on, and planning breastfeeding around normal daily activities.

For the most part, respondents' self-reports were consistent with findings from the nutrition education observations: topics observed in all or most of the observations were generally reported by 80 percent or more of respondents (Exhibits D.10 - D.12). Notable exceptions included the following:

- In Southeast Site 2, the percentage of prenatal respondents reporting receipt of information on weight gain during pregnancy was *lower* than expected based on on-site observations. Only 70 percent of prenatal survey respondents reported receiving information or advice about weight gain. However, this topic was documented in all of the observed prenatal contacts (both certifications and follow-ups).

  A potential explanation for this discrepancy is that the wording of the survey item, which asked about receipt of information on "how much weight *you* should gain while pregnant," was interpreted by some women as receipt of individualized advice—something that few women in this site received. As discussed in Chapter 2, nutrition education contacts in this site were almost exclusively classes; only some high-risk women received individual contact. Thus, while the topic of weight gain may have been covered in classes, women were unlikely to receive personalized advice on this issue unless their pattern of weight gain or pre-pregnancy weight classified them as high-risk.

- There were a few instances in which the percentage of respondents reporting receipt of information was substantially *greater* than expected based on on-site observations. This was true in all sites except Midwest Site 2 for information on the importance of adequate fluid intake while breastfeeding. It was also true in Southeast Site 1 for dealing with the topic of typical breastfeeding problems, and in both Midwest sites for breastfeeding support services.

  It is possible that there were real differences in the topics covered during on-site observations and the topics covered in the contacts received by sample members. A more likely explanation, however, is that respondents attributed knowledge gained elsewhere to the WIC Program or, as described below, reported receiving information that was not actually provided.

As expected, a greater percentage of respondents reported coverage of topics related to breastfeeding and infant feeding at the time of the postpartum survey than the prenatal survey (increases ranged from 6 to 40 percentage points for different topics). In general, more than 80 percent of respondents in all sites reported that breastfeeding/infant feeding topics were covered by WIC staff by the time of the postpartum survey. The only such topics that were reported by less than 80 percent of respondents were: dealing with typical breastfeeding problems; breastfeeding support services; and introducing solid foods. It is not possible to assess consistency between participant self-reports and on-site observations for topics generally discussed in postpartum contacts because of the limited number of postpartum contacts observed.

Responses for "Nonsense Topics"

As noted in the introduction to this chapter, the survey included three "nonsense items" meant to provide a barometer of the relative reliability of respondents self-reports about information provided by WIC. The nonsense items included: how to get more halite in your diet; chewing gums to avoid while pregnant; and the importance of glucose intake while breastfeeding.

With the exception of Southeast Site 1, fewer than ten percent of respondents reported receiving information about chewing gums to avoid while pregnant. A larger percentage of respondents were apparently confused by the more official sounding nonsense topics — halite in the diet and, especially, glucose intake while breastfeeding. In most sites, roughly one-quarter of respondents reported receiving information on halite at the time of the prenatal survey. The prevalence of inappropriate responses was higher for the postpartum survey, and ranged from 30 - 47 percent of respondents. A similar pattern was noted for the importance of glucose intake while breastfeeding, however the prevalence of inappropriate response to this item was greater, in all sites, for both the prenatal and postpartum surveys (29 to 41 percent for the prenatal survey and 50 to 62 percent for the postpartum survey).

Ordinarily, this level of inappropriate response might be considered indicative of poor respondent reliability. However, two patterns in the data suggest that, overall, respondent reliability was reasonably good. First, as noted in the preceding section, the overall picture painted by the self-report data is consistent with data from the on-site observations. Second, the chewing gum item — the most straightforward of the three nonsense topics — was handled appropriately by 90 percent or more of respondents in all sites except Site 1. Viewed in concert, these patterns suggest that respondents were thrown by the more technical terms — halite and glucose — used in the other two nonsense topics. Thus, a reasonable conclusion is that, while the overall reliability of WIC participants' self-reports regarding topics covered in WIC nutrition education is generally good, it may decrease as the complexity of the topic being queried, i.e., the number of technical terms involved, increases. This tendency may explain the few examples of apparent over-reporting noted in the preceding section.

There are several potential explanations for the fact that inappropriate response to nonsense topics increased over time. One is that women are provided with increasing amounts of information and consequently lose some of their ability to discriminate between actual and potential topics. It is also possible that women attended to the postpartum survey less closely, given that it was the third time it was administered and that respondents were caring for young infants. Finally, the mere fact that the nonsense topics were mentioned on three different occasions may have prompted positive responses (i.e., respondents may have remembered hearing the terminology before but did not attribute it appropriately).

As mentioned above, results for all three nonsense topics were markedly different for Southeast Site 1. Among prenatal respondents in this site, 89 percent reported receiving advice about how to obtain adequate amounts of halite (compared to 23 - 35 percent in other sites); 36 percent reported receiving information about chewing gums to avoid during pregnancy (compared to 4 to 9 percent in other sites); and 57 percent reported hearing about the importance of glucose during breastfeeding (compared to 29 - 41 percent in other sites). A likely explanation for these findings is an unfamiliarity with the language, particularly technical terms, among the many recent immigrants in this population. This language barrier may well have affected participants' understanding of the nutrition education offered to them and, thereby, the magnitude of differences over time in the nutrition education outcomes analyzed in Chapter 4.

Referrals Made by WIC Staff

In both the prenatal and postpartum surveys, respondents were asked whether they had been referred by WIC staff to any other programs or services. Respondents who indicated they had been referred were asked to identify the programs or services to which they were referred and to indicate whether they had followed through on the referral.

In assessing the prevalence of referrals to particular types of programs and services, computed rates of referral were based on appropriate subgroups of participants wherever possible. For example, the base for referrals to prenatal care included only respondents who were not enrolled in prenatal care at baseline. Likewise, the base for referrals to counseling programs for cigarettes, alcohol, and drugs included only respondents who reported use of cigarettes or alcohol since becoming aware of their pregnancy, and the base for referrals to breastfeeding support services included only women who indicated an intention to breastfeed, either exclusively or in combination with formula, at the time of the baseline survey.

An attempt was made to make similar partitions in the sample for referrals to AFDC, Medicaid, and the Food Stamps program. However, when the sample was divided into eligible and ineligible groups using available data on household income and composition, the results did not conform well with other survey data. For example, some women who reported being enrolled in AFDC or Food Stamps at baseline were classified as ineligible. Similarly, some of the women who reported receiving referrals for these programs were classified as ineligible. At least part of this problem is attributable to the fact that the available data on income (reported in ranges) and household composition is not detailed enough to support development of a rigorous screening tool. Given the limitations of the available data, referral rates reported for AFDC, Food Stamps, and Medicaid reflect an overall rate for all respondents. The number of referrals reported was so low that results were essentially identical even when income eligibility criteria were applied to screen out potentially ineligible sample members.

Exhibit 3.6 presents data on referrals reported by study participants. In reviewing these data, it is important to realize that the relatively low prevalence of referrals does not necessarily indicate that WIC staff overlooked participants' needs. It may be that women did not receive referrals because they were already enrolled in needed programs and services or because services were provided as part of the routine care in the multi-faceted public health and social service agencies in which most local agencies were located. It is also possible that referrals were offered and not recalled, however, the low prevalence of referrals noted in the on-site observations suggests this is not the case. The findings reported here are best interpreted as indicative of the simple prevalence of referrals in study sites, as reported by study participants, rather than the appropriateness or completeness of WIC referrals.[4]

The percentage of respondents reporting *no referrals* ranged from a low of about 63 percent to a high of 97 percent. In general, the most frequently reported referral was for breastfeeding support services. Self-reports regarding referrals to counseling programs for cigarettes, alcohol, and/or drugs were lower in Midwest Site 1 than anticipated based on-site observations (such referrals were included in 16 of 18 observations). This may be due to intentional under-reporting of these rather sensitive referrals.

Respondents who reported receiving one or more referrals were asked whether they actually contacted the subject agency or program. As evident in Exhibit 3.6, the total number of participants referred to

4 Self-reports could not be cross-checked with WIC records because most sites did not document referrals.

Exhibit 3.6

Participant Self-Reports About Referrals Received From WIC Staff

Referrals Received	SOUTHEAST		MOUNTAIN PLAINS		MIDWEST	
	Site 1 (n = 324)	Site 2 (n = 329)	Site 1 (n = 333)	Site 2 (n = 237)	Site 1 (n = 216)	Site 2 (n = 233)
Prenatal Survey						
None	96.9%	84.5%	84.4%	62.9%	64.8%	76.8%
Prenatal care[1]	N/A	0.0	0.0	4.0	11.8	7.4
AFDC and/or Food Stamps	0.0	N/A	4.5	5.1	4.2	3.9
Medicaid	0.0	4.6	1.8	5.1	4.2	6.4
Other family/personal assistance	0.0	1.5	2.4	1.7	1.4	3.4
Counseling for smoking, alcohol, drugs[2]	N/A	0.0	0.0	26.3	0.0	0.0
Child birth classes	0.9	2.4	0.9	5.5	4.2	0.4
Breastfeeding support[3]	0.0	1.0	4.1	22.2	12.7	2.8
Health care services (other than prenatal care)	1.2	4.6	3.3	7.6	9.7	10.3
Postpartum Survey	(n = 301)	(n = 344)	(n = 310)	(n = 218)	(n = 216)	(n = 239)
None	93.4	81.4	75.6	59.0	59.5	70.2
Prenatal care[1]	N/A	N/A	N/A	N/A	N/A	N/A
AFDC and/or Food Stamps	1.7	N/A	5.7	7.2	6.0	7.1
Medicaid	0.9	4.4	2.0	4.8	4.4	7.1
Other family/personal assistance	1.2	2.2	4.0	1.6	1.6	6.4
Counseling for smoking, alcohol, drugs[2]	N/A	N/A	N/A	N/A	N/A	N/A
Child birth classes	1.2	3.2	1.2	5.2	3.6	0.4
Breastfeeding support[3]	0.0	14.7	6.7	21.4	12.2	4.8
Health care services (other than prenatal care)	2.3	5.7	7.5	10.0	14.7	14.7

Note: In the postpartum survey, respondents were asked to report all referrals received between prenatal certification and date of interview.

N/A = Data not reported because not relevant in postpartum period or base sample is less than 25.

[1]The base for referrals to prenatal care includes only respondents who were not enrolled in prenatal care at the time of the baseline survey.
[2]The base for referrals to smoking, alcohol, and drug counseling includes only respondents who reported use of cigarettes or alcohol since becoming aware of pregnancy.
[3]The base for referrals to breastfeeding support includes only respondents who reported an intention to breastfeed, either exclusively or in combination with formula, at the time of the baseline survey.

any specific program or service was very small. Consequently, answers to the follow-up question were examined for the pooled sample, rather than by site, and only for agencies and programs to which more than 10 women, across all sites, had been referred.

The data indicate that more than half of the participants who reported a referral followed through on it (Exhibit 3.7). Overall, 53 percent of those referred indicated that they had contacted the agency or program in question by the time of the postpartum survey. Follow-through was greatest for referrals to Medicaid (80 percent of 61 referrals); personal or family assistance (73 percent of 33 referrals); and health care other than prenatal care (63 percent of 118 referrals).

Relationship Between Nutrition Education Offered and Received

The data presented in the beginning of this chapter indicate that some WIC participants did not take full advantage of the nutrition education opportunities made available to them. While a majority of participants in all sites had the opportunity to receive a second *prenatal* contact, the proportion of women who actually did so, according to WIC administrative records, ranged from about 25 percent in the two Midwest sites to 92 percent in Mountain Plains Site 2 (Exhibit 3.1).

These data demonstrate clearly that, while the amount of nutrition education offered is under the control of local WIC staff, the amount of nutrition education received is controlled by the individual WIC participant. It is fully dependent upon her willingness to participate in the nutrition education opportunities offered by the local agency.

To assess factors that may affect the likelihood of receiving a second contact, a multiple regression model was run including a dummy variable to indicate whether a respondent had received a second *prenatal* nutrition education contact. The model included site indicators; key demographic characteristics, including age, race, marital status, education, employment status, household composition, receipt of cash assistance or food stamps, and poverty level; baseline measures of nutrition knowledge, attitudes and behaviors; and indicators of women's satisfaction with WIC nutrition education (see Chapter 5). The model was run on the pooled sample as well as by site. The use of separate models for each site did not substantially alter the pattern of results, although, because sample sizes were smaller, few coefficients were statistically significant. Findings from the pooled analysis are summarized below:

- Women who had previously been pregnant but not enrolled in WIC were significantly *less likely* to receive a second prenatal contact ($p < 0.05$).
- Women who enrolled in their third trimester were *less likely* to receive a second prenatal contact ($p < .001$).
- Previous WIC recipients were significantly *more likely* to receive a second prenatal contact ($p < 0.05$).
- Other demographic and household characteristics were *not* significantly related to receipt of a second prenatal contact.
- Women with higher overall nutrition knowledge scores at baseline were *more likely* to receive a second contact ($p < 0.10$).

Exhibit 3.7

Participant Self-Reports About Follow-up on Referrals Received from WIC Staff

Referral Received	Percentage Who Followed Up on Referral[1]
Medicaid	80%
Other Personal/Family Assistance	73
Healthcare services (other than prenatal care)	63
AFDC	60
Food Stamp	55
Prenatal care	53
Child birth classes	40
Breastfeeding support	32
Counseling for smoking, alcohol, drugs	N/A
All types of referrals	53

[1]By time of postpartum survey.

N/A = Data not reported because base sample is less than 25.

- Other baseline nutrition knowledge and attitude measures were *not* significantly associated with receipt of a second prenatal contact.

- Women who reported regular use of prenatal vitamins at baseline were *more likely* to receive a second prenatal contact ($p < 0.01$).

- Women who smoked were *less likely* to receive a second prenatal contact ($p < 0.05$).

- Other behaviors relating to diet, use of alcohol, and use of over-the-counter drugs were *not* significantly associated with receipt of a second prenatal contact.

- Women who were planning to breastfeed for six months or more were significantly *more likely* to receive a second prenatal contact ($p < 0.05$).

- Satisfaction with WIC nutrition education was *not* significantly related to receipt of a second prenatal contact.[5]

- Women in the two Mountain Plains sites were *more likely* to receive a second prenatal contact than women in other sites ($p < .001$).

These data suggest that the women most likely to return for a second prenatal nutrition education contact are those who already have higher levels of nutrition knowledge and, to some extent, already exhibit desirable health behaviors (e.g., take prenatal vitamins more frequently, do not use cigarettes, and plan to breastfeed for at least six months). Conversely, women who are theoretically most in need of services are less likely to return for a second prenatal contact (e.g., women with lower levels of nutrition knowledge, women who enrolled in their third trimester, and women who had previously been pregnant but not enrolled in WIC).

5 The model was run once using a composite measure of satisfaction (see Chapter 5) and once using the sum of responses to the following two survey items: "Things were explained in a way that I could understand;" and "The information was tailored to my individual needs," scored on a four-point scale. Neither satisfaction measure was significantly associated with receipt of a second nutrition education contact.

Chapter 4
Changes in Participants' Knowledge, Attitudes, and Behaviors Over Time

This chapter presents information on changes over time in participants' knowledge, attitudes, and behaviors. As described in Chapter 1, the initial analysis plan for this study called for an exploratory impact analysis in which outcomes for participants in sites providing higher-intensity nutrition education would be compared to outcomes for participants in sites providing lower-intensity nutrition education. The hypothesis assumed that, if WIC nutrition education was effective, higher-intensity sites would show more positive change (i.e., greater gains in nutrition knowledge) than lower-intensity sites. This analysis was attempted, but was ultimately abandoned because some of the higher-versus-lower-intensity contrasts expected at the time sites were selected were *not observed* in actual practice. The decreased contrast in site characteristics made it impossible to interpret between-site differences observed in the analysis.

The alternative analysis, presented in this chapter, uses simple *t*-tests to test the significance of differences observed over time (baseline to prenatal survey and baseline to postpartum survey) in each site. In the absence of a control group, significant changes noted in these analyses can not necessarily be ascribed to the WIC Program. However, the extent to which the pattern of change conforms with expectations (based on-site observation and participant self-reports of information provided in nutrition education contacts) increases the likelihood that WIC nutrition education played at least some role in precipitating the change.

In addition to analyses conducted for the full sample, separate analyses were conducted to examine change over time among specific population subgroups: women classified as high-risk; early enrollers (first trimester); first-time mothers; teenagers; and, for selected analyses, women with low baseline knowledge scores and women who planned, at baseline, to bottle feed exclusively.

Data Sources and Variables

The following groups of outcome variables were included in the analysis:

- Nutrition Knowledge
- Nutrition-related Attitudes and Perceptions
- Nutrition-related Behaviors
  - use of prenatal vitamins and iron supplements
  - consumption of WIC foods
  - consumption of selected non-WIC foods
  - initiation and duration of breastfeeding
  - infant feeding practices
- Other Behaviors
  - use of cigarettes
  - use of alcohol
  - use of over-the-counter medications.

All outcomes were measured identically in the baseline, prenatal, and postpartum surveys. Moreover, all analyses included only the subset of women who responded to all three surveys. Hence, differences from one measurement point to the next are not confounded with changes in either the outcome measure or the analytic sample. Sample sizes for each site are shown in Exhibit 4.1.

Exhibit 4.1

Sample Sizes for Analyses Comparing Baseline and Follow-up Measures of Knowledge, Attitudes, and Behaviors

Southeast Site 1	276
Southeast Site 2	303
Mountain Plains Site 1	292
Mountain Plains Site 2	206
Midwest Site 1	180
Midwest Site 2	220

A relatively small number of respondents in each site (minimum of 17 and maximum of 77) was no longer participating in WIC at the time of the postpartum survey. This was true either because respondents did not recertify as postpartum participants or because they ceased postpartum participation prior to the date of the postpartum survey. Preliminary analyses indicated that postpartum measures computed with and without these individuals were virtually identical, so a decision was made to retain them in the analysis.

Nutrition Knowledge

Participants' nutrition knowledge was measured by a battery of 19 true/false and multiple-choice questions developed by FNS staff and designed to measure concepts or facts thought to be central to most WIC nutrition education efforts (see Chapter 1).[1] The 19 items were divided into four different categories, each measuring a different aspect of nutrition knowledge: general nutrition knowledge (primarily food sources of nutrients) (6 items), healthy practices during pregnancy (4 items), breastfeeding (4 items), and recommended infant feeding practices (5 items). Survey items are shown in Exhibit 4.2. In the actual survey (Appendix A, items D4 - D7), items were interspersed rather than grouped together by topic area.

1 The survey actually included 21 items. During analysis, two items were dropped because scores for these items were negatively correlated with total knowledge scores. Excluded items included the true/false statements: "It is not safe to drink even one alcoholic drink while pregnant" and "Breastfeeding mothers have to follow a special diet."

Exhibit 4.2

Items Used to Assess Nutrition Knowledge

General Nutrition Knowledge

What you eat has nothing to do with whether you have anemia or low iron.

Bread is a good source of vitamin C.

Eating many small meals each day is better for your health than eating just one or two large meals.

Choose the food that is the best source of iron.[1]

Choose the food that is the best source of calcium.[2]

Choose the food that is the best source of folic acid.[3]

Health Practices During Pregnancy

The food a woman eats during pregnancy can affect how healthy her new baby will be.

It is OK for a pregnant woman to take medicine without talking to a doctor as long as it is not a prescription drug.

If a woman is overweight, she should try to lose weight during pregnancy.

A mother who smokes only a few cigarettes a day throughout her pregnancy may harm her developing baby.

Knowledge About Breastfeeding

You should follow a strict schedule for feeding the baby when breastfeeding.

Alcohol, caffeine, and nicotine can pass from your blood into your breast milk and affect your baby.

Breastfeeding for even one week is better for your baby than not breastfeeding at all.

Breastmilk can help protect babies from certain illnesses.

Recommended Infant Feeding Practices

It is OK for babies to drink regular or lowfat milk after the age of 6 months.

It is OK for babies to begin to eat solid foods, including cereal, at two months of age. This would include cereal in a bottle.

It is OK to lay a baby down with a bottle as long as the bottle has milk or formula in it and not juice or soda.

Giving a baby solid food helps him/her sleep through the night.

A baby should eat many different types of food as soon as possible.

---

[1]Choices presented: broccoli, orange juice, pinto beans, cheese.
[2]Choices presented: tomatoes, milk, chicken, whole wheat bread.
[3]Choices presented: spinach, milk, chicken, grapefruit juice.

Overall Nutrition Knowledge Scores

With the exception of Southeast Site 1, participants entered WIC with reasonably high levels of nutrition knowledge (Exhibit 4.3). In most sites, the mean overall knowledge score at baseline was roughly 70 percent, indicating that, on average, newly enrolling WIC participants answered 13 of the 19 knowledge items correctly.

Overall knowledge scores increased significantly in all sites between the baseline and prenatal surveys. Gains persisted through the postpartum survey and in most sites actually increased by a modest amount. The two Southeast sites showed the greatest cumulative improvement in nutrition knowledge, with baseline to postpartum increases of 10 percentage points (equivalent to two additional correct answers). Increases in other sites were more modest, ranging from three to eight percentage points.

Content-Specific Scores

The content areas that showed the greatest improvement were knowledge related to breastfeeding and knowledge related to recommended infant feeding practices (Exhibits 4.4 and 4.5, respectively). The specific concepts that showed the greatest improvement, across all sites, were the health benefits of breastmilk (two items), the inappropriateness of lowfat milk for infants, and the need to control the introduction of new foods to infants.

Mean scores in the other two content areas (general nutrition knowledge and healthy practices during pregnancy) also improved, however, changes were less substantial and did not always reach statistical significance. Participants' general nutrition knowledge at baseline (primarily food sources of nutrients) was relatively modest, as were improvements over time (Exhibit 4.6). The only item in this group that showed an appreciable improvement, across all sites, was the one about food sources of folic acid. Participants' baseline knowledge about healthy practices during pregnancy was quite high and, consequently, showed less improvement over time than the other nutrition knowledge measures (Exhibit 4.7).

Overall, the pattern of change seen in these data is consistent with the notion that WIC nutrition education is effective in communicating key nutrition concepts to program participants. Two of the content areas in which gains were most substantial (breastfeeding and recommended infant feeding practices) were those in which women showed lower levels of baseline knowledge *and* which on-site observations and participant self-reports document as being well-covered in WIC nutrition education contacts.

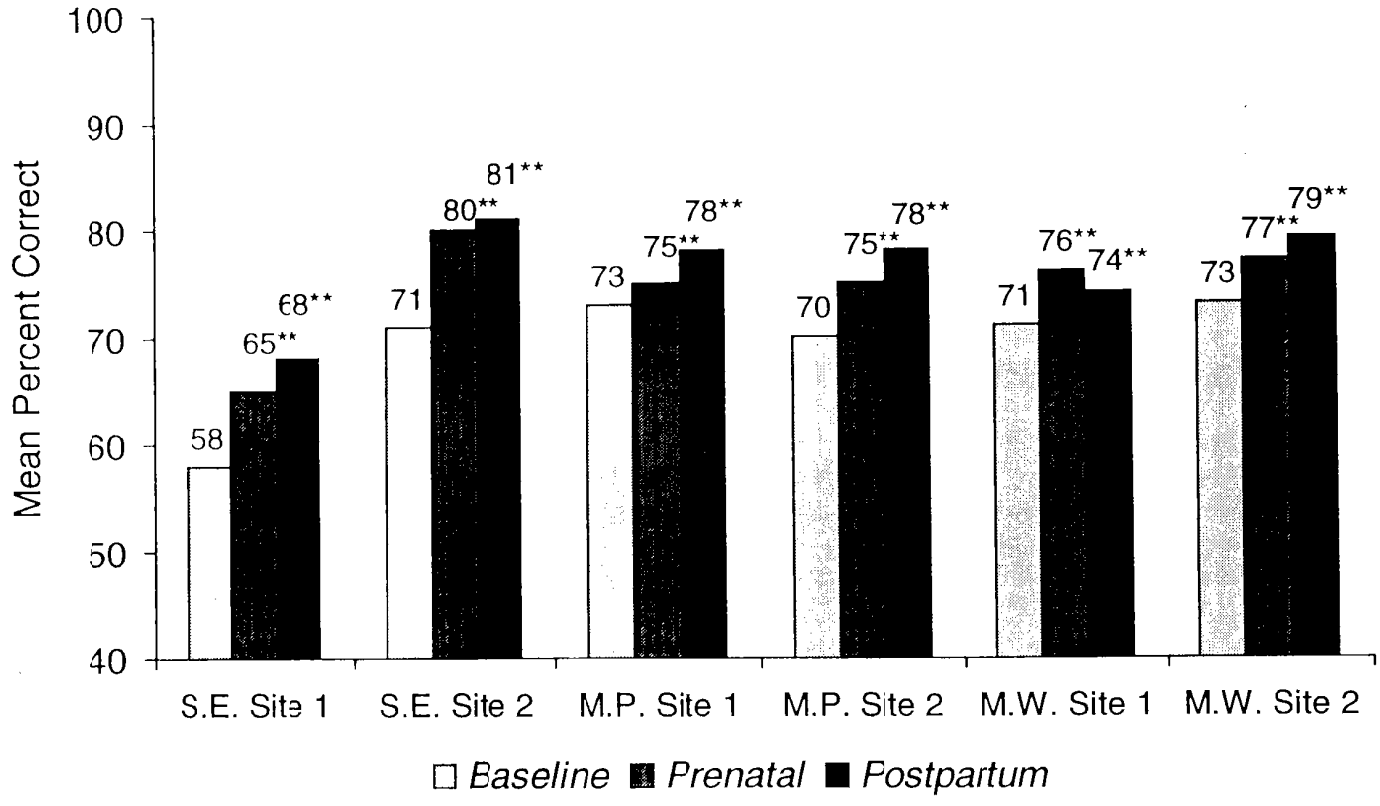
Moreover, the area in which knowledge gain was most limited (general nutrition knowledge/food sources of nutrients) was not covered as fully in WIC nutrition education contacts. The survey items queried knowledge about specific food sources of nutrients, but WIC nutrition education tended to focus on more applied information, e.g., the fact that it is important to consume four servings of milk per day, without necessarily explaining that milk is a good source of calcium.

Nutrition Knowledge Scores Among Previous WIC Participants

Baseline nutrition knowledge scores for women who participated in WIC during a previous pregnancy were compared to scores for women with no prior WIC participation. In five of the six study sites, overall nutrition knowledge scores at baseline for women who participated in WIC

Exhibit 4.3

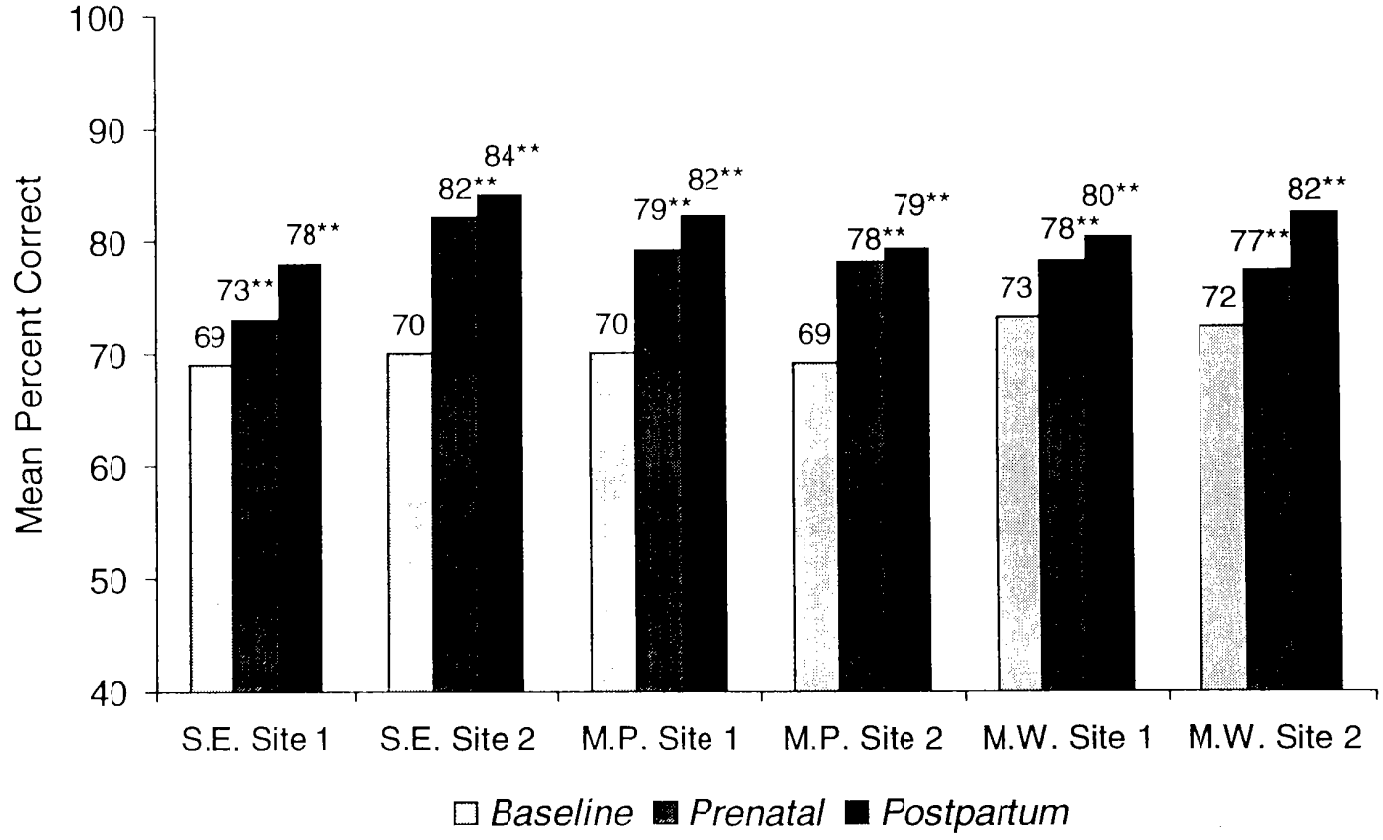
Overall Nutrition Knowledge Scores



**Change from baseline is statistically significant at the .01 level.

Exhibit 4.4

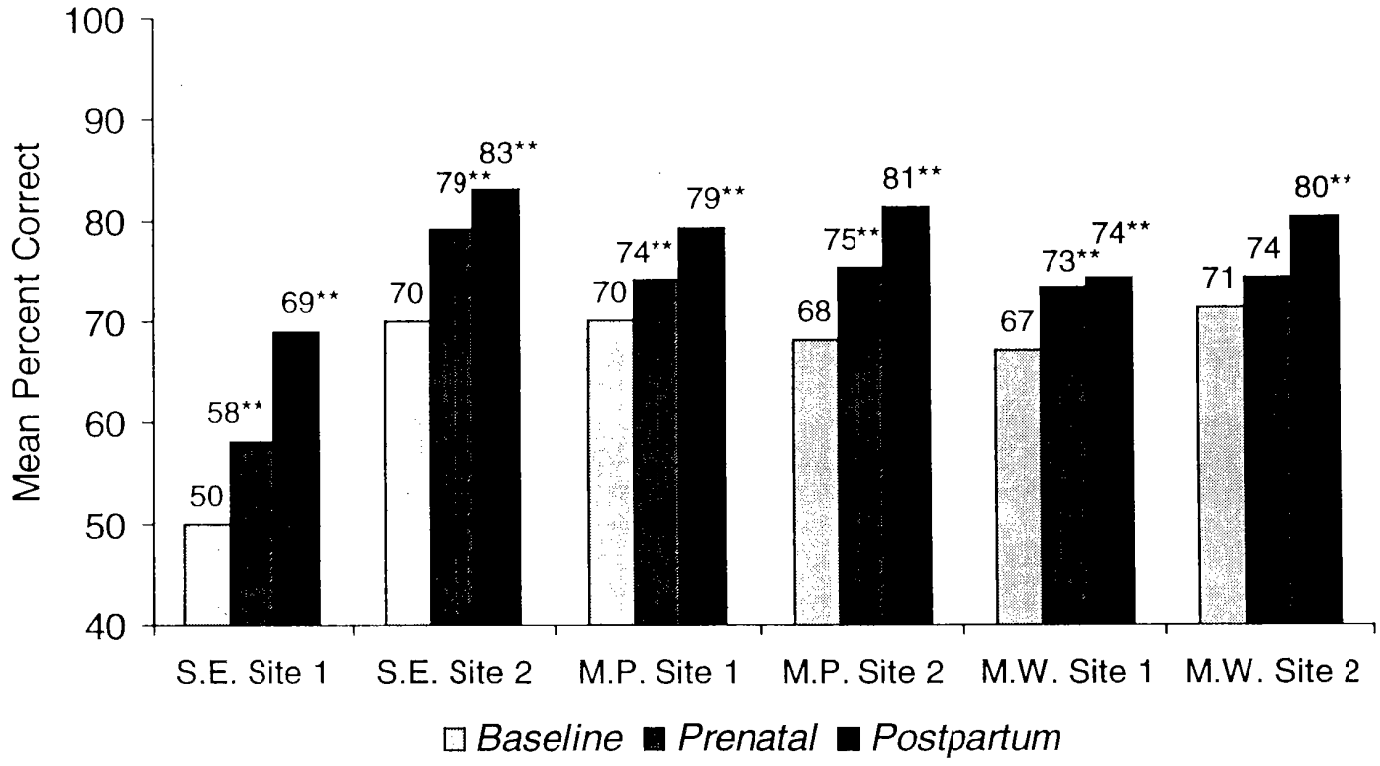
Knowledge About Breastfeeding



**Change from baseline is statistically significant at the .01 level.

Exhibit 4.5

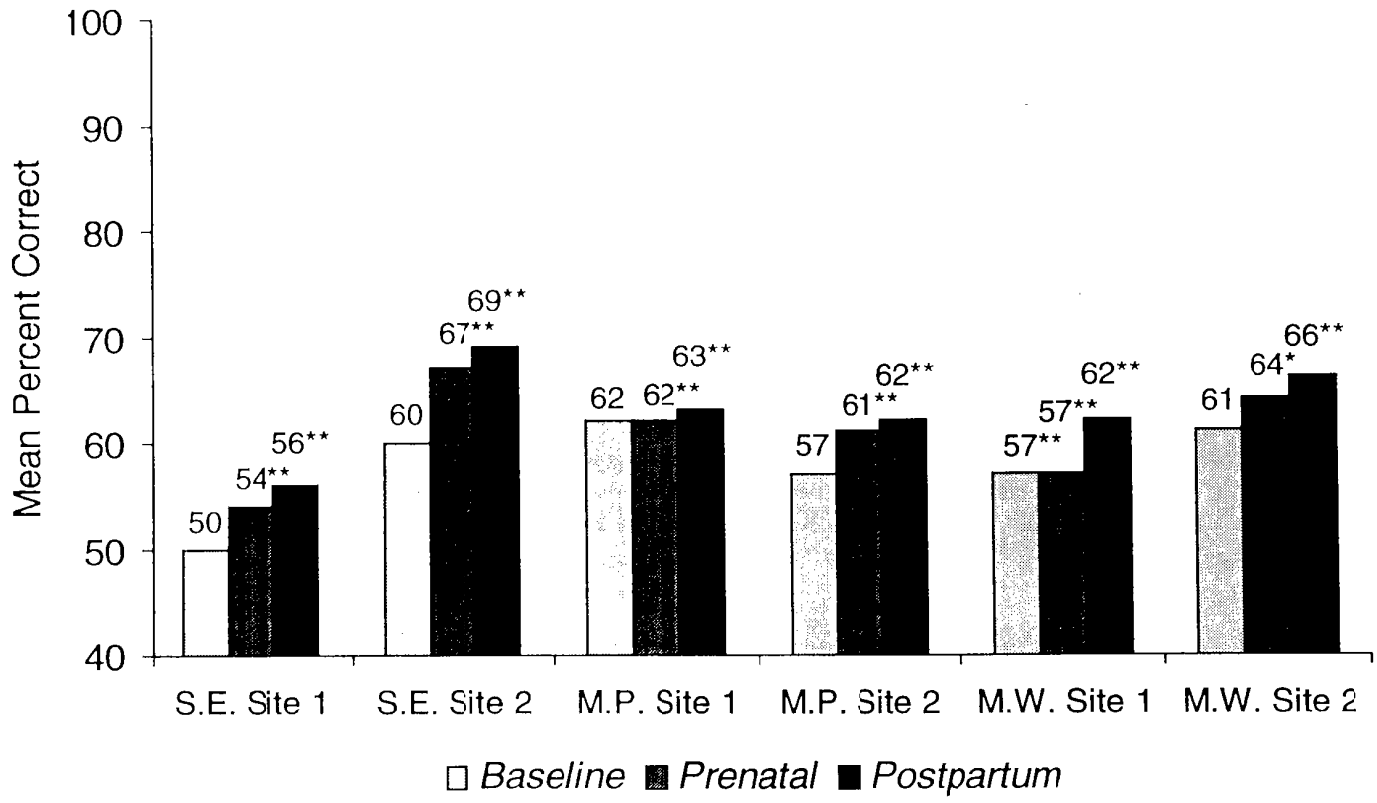
Knowledge About Recommended Infant Feeding Practices



**Change from baseline is statistically significant at the .01 level.

Exhibit 4.6

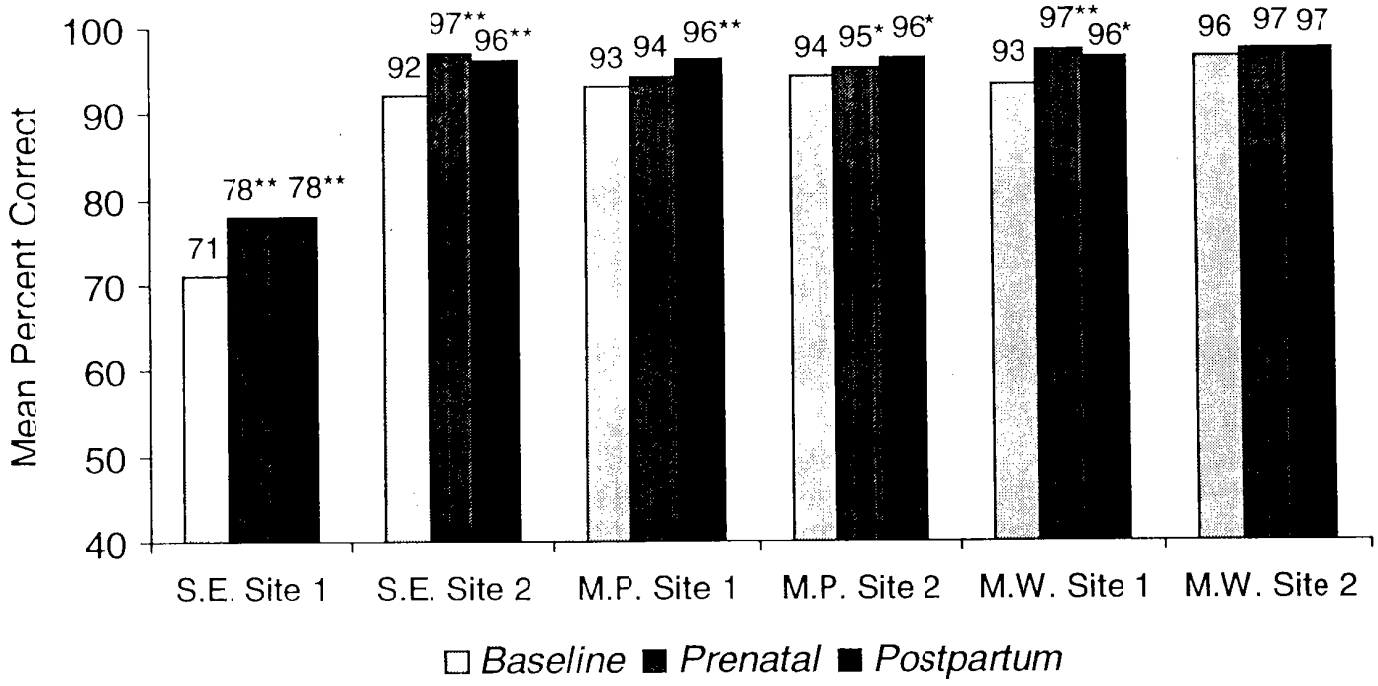
General Nutrition Knowledge



**Change from baseline is statistically significant at the .01 level.

Exhibit 4.7

Knowledge About Healthy Practices During Pregnancy



*Change from baseline is statistically significant at the .05 level.

**Change from baseline is statistically significant at the .01 level.

during a previous pregnancy were significantly higher than scores for women who had not participated previously (Exhibit 4.8). As the exhibit shows, these differences were largely attributable to differences in scores for breastfeeding knowledge (three sites) and knowledge about recommended infant feeding practices (five sites) — the two contact areas that showed the most substantial gain in this study. This finding suggests that at least some of the gains in nutrition knowledge noted in the preceding analyses may be attributable to the impact of WIC nutrition education.

Nutrition-related Attitudes and Perceptions

Five measures of attitudes and perceptions were examined. These include attitude about healthy eating; perceived self-efficacy; perception about overall health status; perception about personal eating habits; and infant feeding preference score. Findings for all of these measures are summarized in Exhibit 4.9. Each is discussed, in turn, below. With the exception of the infant feeding preference score, significant differences described below are associated with very small differences in mean values, e.g., less than one-tenth of a point in many cases. The practical significance of these small differences in unclear, so the results should be interpreted with caution.

Attitude About Healthy Eating

Attitude about healthy eating was measured by a battery of seven items pertaining to the importance of a healthy diet and to personal responsibility for the quality of food intake.[2] Statements were read to respondents as declarative sentences, for example, "If I take a vitamin pill in the morning, I don't have to worry about what I eat." Respondents indicated their level of agreement with each statement as either strongly agree, agree, disagree, or strongly disagree. Responses were scored on a four-point scale, with a higher score reflecting a more positive attitude. Responses for the seven individual items were then averaged to compute an overall score for each sample member.

As shown in Exhibit 4.9, women in the study sample had fairly positive attitudes about healthy eating at the time of WIC enrollment (baseline mean of 2.8 – 3.1 on a 4 point scale). In all six sites, the mean score either remained the same or decreased slightly between baseline and prenatal surveys.

By the time of the postpartum survey, mean scores in all sites had decreased slightly from baseline levels. In all cases, baseline-to-postpartum differences were statistically significant. While the magnitude of the differences is quite small, it is interesting to note the consistent decline in attitude toward healthy eating in the postpartum period. As discussed later in this chapter, study participants showed some improvements in desired eating behaviors during the prenatal period, but seemed to revert to pre-pregnancy habits after their babies were born. The decrease in attitude toward healthy eating during the postpartum period is consistent with a diminished focus on adhering to recommended eating patterns.

---

2 Survey items used to construct this attitude measure may be found in section E4 of the prenatal survey (Appendix A). Note that two of the items shown were *not* included in computing the composite "attitude about healthful eating" measure. It was decided that these items ("Sometimes I eat foods that I like but I know they aren't good for me" and "Sometimes I eat what everybody else is eating even if I know it is not good for me") measure behavior rather than attitude.

Exhibit 4.8

Mean Baseline Knowledge Scores by Prior WIC Participation

	SOUTHEAST				MOUNTAIN PLAINS				MIDWEST			
	Site 1		Site 2		Site 1		Site 2		Site 1		Site 2	
	Prior WIC Participation		Prior WIC Participation		Prior WIC Participation		Prior WIC Participation		Prior WIC Participation		Prior WIC Participation	
Knowledge Score	No (n = 184)	Yes (n = 92)	No (n = 183)	Yes (n = 120	No (n = 211)	Yes (n = 83)	No (n = 109)	Yes (n = 97)	No (n = 106)	Yes (n = 74)	No (n = 145)	Yes (n = 72)
Overall score	56.5	61.9**	69.3	74.7**	71.9	74.1	67.2	73.7**	69.1	73.2*	71.5	76.3**
General nutrition knowledge	49.0	52.2	59.3	61.5	62.5	62.4	55.4	58.9	58.2	56.3	60.0	63.2
Healthy practices during pregnancy	71.2	70.4	92.1	92.1	93.8	92.2	93.8	94.6	92.5	94.6	94.8	96.9
Breastfeeding	68.5	69.0	67.2	73.8*	68.8	72.9	64.7	72.9*	68.6	79.4**	70.3	74.3
Recommended infant feeding practices	44.1	61.1**	64.6	77.5**	68.0	74.7*	62.2	75.5**	64.0	71.4	67.6	77.2**

* Difference between baseline knowledge scores for women with and without previous WIC participation is statistically significant at the .05 level.
** Difference between baseline knowledge scores for women with and without previous WIC participation is statistically significant at the .01 level.

Exhibit 4.9

Nutrition Attitude Measures: Mean Scores

Site/Survey	Attitude About Healthy Eating[1]	Perceived Self-Efficacy[2]	Perceived Health Status[3]	Perceived Healthfulness of Eating Habits[4]	Infant Feeding Preference Score
Southeast Site 1					
Baseline	2.8	3.0	2.9	2.9	27.2
Prenatal Survey	2.7	2.7**	3.1**	3.2**	27.1
Postpartum Survey	2.7**	2.6**	3.0	3.2**	N/A
Southeast Site 2					
Baseline	3.1	3.1	3.2	2.9	22.3
Prenatal Survey	3.1	3.1	3.5**	3.2**	31.3**
Postpartum Survey	3.0**	3.0**	3.3*	2.9	N/A
Mountain Plains Site 1					
Baseline	3.1	3.2	3.2	2.9	20.4
Prenatal Survey	3.0	3.1	3.5**	3.1**	25.7**
Postpartum Survey	3.0**	3.0**	3.2	2.9	N/A
Mountain Plains Site 2					
Baseline	3.1	3.2	3.2	3.0	15.6
Prenatal Survey	3.1	3.3*	3.6**	3.2**	26.5**
Postpartum Survey	3.0*	3.2	3.3*	2.9	N/A
Midwest Site 1					
Baseline	3.1	3.1	3.1	3.0	16.4
Prenatal Survey	3.0	3.1	3.5**	3.1	16.4
Postpartum Survey	3.0**	2.8**	3.4**	2.9	N/A
Midwest Site 2					
Baseline	3.1	3.0	3.1	2.9	12.1
Prenatal Survey	3.0*	3.0	3.4**	3.1**	17.0*
Postpartum Survey	3.0**	2.8**	3.2*	2.9	N/A

N/A = Not measured in postpartum survey.

[1]Mean score on a 4-point scale (1-4), with a higher score indicating a more positive attitude.
[2]Mean score on a 5-point scale (1-5), with a higher score indicating a greater degree of self-efficacy.
[3]Mean score on a 5-point scale (1-5), with a higher score indicating a more positive perception of personal overall health status.
[4]Mean score on a 4-point scale (1-4), with a higher score indicating a more positive perception of the healthfulness of personal eating habits.

* Change from baseline is statistically significant at the .05 level.
** Change from baseline is statistically significant at the .01 level.

Perceived Self-Efficacy

A number of factors may make it difficult for women to eat as healthfully as they would like. For example, many people find it difficult to eat well when they have to eat out, when they are bored or stressed, or, for pregnant women, when they are dealing with strong food cravings. The level of confidence a person has in her ability to deal successfully with these challenging situations is known as self-efficacy. Nutrition education interventions can improve levels of self-efficacy by helping individuals pinpoint specific situations that may impede healthful eating and identify strategies for dealing with these situations when they arise.

Sample members were presented with eight potentially difficult situations and asked to rate their ability to eat healthfully in each scenario. Respondents were asked "Are you able to eat healthy when...."

- you are eating out;
- there is no time to plan/prepare meals;
- you are feeling stressed;
- you are feeling bored;
- you haven't eaten all day and are starving;
- someone else is preparing your meals;
- there are a lot of non-nutritious foods in the house; or when
- you have strong food cravings.

Five responses were possible: definitely yes, probably yes, maybe, probably no, and definitely no. These responses were placed on a five-point scale, with increasing scores indicating higher levels of self-efficacy (i.e., 1=definitely no and 5=definitely yes). Responses for the eight individual items were averaged to compute an overall self-efficacy score for each respondent.

Mean self-efficacy scores, like the measure of attitude toward healthy eating, showed virtually no change during the prenatal period but were significantly lower (in comparison to baseline scores) at the time of the postpartum survey ($p < .01$) (Exhibit 4.9). Mountain Plains Site 2 was an exception. Here, the mean score increased slightly between the baseline and prenatal surveys ($p < .05$), but fell back to the baseline level by the time of the postpartum survey.

Examination of the data for individual items indicated that the decline in overall self-efficacy scores was attributable to a general decrease in scores for all items (i.e., an increase in the number of "definitely no" and "probably no" responses), rather than a marked change in scores for one or two items. The two situations for which respondents consistently reported the lowest levels of self-efficacy were when there was a lot of non-nutritious food in the house and when they were feeling stressed.

Perceptions about Personal Health Status and Eating Habits

Respondents rated their overall health status as being excellent, very good, good, fair, or poor. Personal eating habits were rated as very healthy, somewhat healthy, somewhat unhealthy, or very unhealthy. Responses were scored using five-point and four-point scales, respectively, with higher scores assigned to more favorable perceptions.

As shown in Exhibit 4.9, mean scores for overall health status increased between baseline and prenatal surveys in all six sites ($p < .01$). Postpartum scores were lower than prenatal scores, but were still

significantly higher than baseline scores in four of the six sites. A similar pattern was noted for baseline to prenatal changes in perceptions about personal eating habits, however, postpartum scores for this measure remained elevated only in Southeast Site 1.

This pattern suggests that, overall, women felt better about their health status and the healthfulness of their eating habits while they were pregnant. Self-assessments declined somewhat after pregnancy and, in the case of perceptions about eating habits, essentially returned to baseline levels.

Infant Feeding Preference Score

The decision to initiate breastfeeding, one of the major outcomes of interest for WIC nutrition educators, is influenced by a wide variety of factors. According to the *theory of reasoned action* (Fishbein, M. and Azjen, I., 1980) which has been used as the conceptual framework for several studies of breastfeeding decisions (Gielen, A.C., et al., 1992; Manstead, A.S., et al., 1983; Matheny, R.J., 1987), a person's intention to perform a particular behavior is determined by a personal attitude factor as well as a social or "normative" factor, i.e., how others feel about the behavior.

In order to understand women's attitudes toward breastfeeding, it is necessary to understand underlying perceptions about the consequences, i.e., advantages and disadvantages, of breastfeeding (behavioral beliefs) as well as the relative importance attached to each potential consequence (evaluation factors). Respondents were asked to react to 16 behavioral belief statements about breastfeeding and bottle feeding (e.g, "Breastfeeding is embarrassing for the mother," and "Bottle feeding provides complete nourishment for the baby") using a six-point scale that ranged from strongly agree to strongly disagree.[3]

Respondents also indicated the level of importance they placed on each of 14 evaluation factors, using a different six point scale that ranged from extremely important to not at all important. Evaluation factors were posed as questions, e.g., "How important is it that the feeding method you choose makes it easy for you to go to work or school?" Responses for behavioral beliefs and evaluation factors were combined to create an infant feeding preference score. The higher the score, the greater the preference for breastfeeding.

Baseline and prenatal means for the infant feeding preference score are summarized in Exhibit 4.9 (these items were not included in the postpartum survey). Mean infant feeding preference scores increased in four of the six sites, indicating that women's openness to breastfeeding increased over the course of their prenatal WIC participation. As a point of reference, the mean score for women who planned to breast-feed exclusively (at baseline) was 45.5; women who planned to combine breastfeeding with bottle feeding scored, on average, 28.2; and women who planned to bottle feed exclusively had a mean score of -5.1. The increase was most dramatic in Mountain Plains Site 2, which had the second lowest score at baseline. The mean increased from 15.6 to 26.5, an increase of approximately 70 percent.

3 Behavioral beliefs and evaluation factors may be found in sections G7 and G8 of the sample survey (Appendix A) or in Chapter 6. The methodology used in computing infant feeding preference scores is described in detail in Chapter 6.

Nutrition-related Behaviors

Five different groups of nutrition-related behaviors were examined: use of prenatal vitamins and prenatal iron supplements; consumption of WIC foods; consumption of non-WIC foods; initiation and duration of breastfeeding; and infant feeding practices (other than breastfeeding). Findings for each of these outcomes are summarized in the following sections.

Use of Prenatal Vitamins and Iron Supplements

In both the baseline and prenatal surveys, women were asked how many times per week they were taking prenatal vitamins and how many times per week they were taking separate prenatal iron supplements. At baseline, women were taking prenatal vitamins an average of 4.4 to 6.3 times per week (Exhibit 4.10). By the time of the prenatal survey, the mean frequency increased to 5.7 to 6.6 times per week. This increase was statistically significant in five of the six study sites.

Use of prenatal iron supplements also increased over time in all six sites (Exhibit 4.11). The range across sites moved from 0.7 - 5.6 times per week to 1.5 - 6.3 time per week. The frequency of iron supplement use at baseline was notably higher in Southeast Site 1 than in any of the other sites. Local agency staff explained that a majority of immigrant women enrolled in this site were anemic. Thus, prescriptions for iron supplements were fairly routine. Moreover, women were reportedly more likely to take iron supplements than to take regular prenatal vitamins. WIC staff suggested that women generally understood the need to take the iron pill to "strengthen their blood," but were less accepting of the need for the general prenatal vitamin.

Although the importance of prenatal supplements was a consistent theme in prenatal WIC nutrition education efforts in all study sites (see Chapter 2), a portion of the increase in use of prenatal vitamins and iron supplements is probably associated with an increase in the proportion of women enrolled in prenatal care. (The percentage of women not enrolled in prenatal care at baseline averaged 21 percent and ranged from four to 43 percent). No attempt was made to partition this effect, however, because movement into prenatal care may, in itself, be related to WIC nutrition education. The importance of prenatal care was a common theme in WIC nutrition education contacts in all study sites except the two Southeast sites.

Reported Consumption of WIC Foods

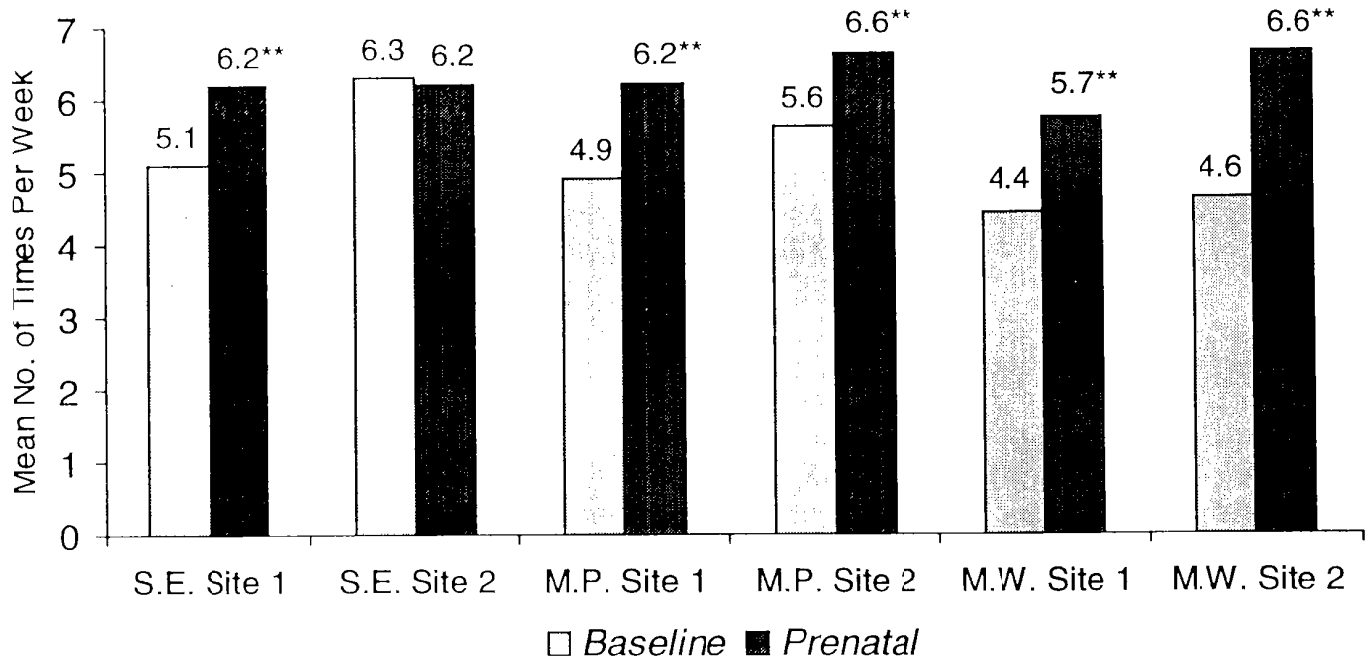
Women were asked to report the frequency with which they consumed specific foods included in WIC food packages: milk; cheese; eggs; 100% fruit juice; WIC cereals (a list of allowable WIC cereals was read to respondents); peanut butter; and dried beans, peas, and lentils.[4] Response options ranged from never to three or more times per day. Responses were transformed to "times per day" using, as necessary, mid-points of specified ranges (e.g., 1-2 times per week was considered equivalent to 1.5 times per week or 0.2 times per day). During analysis, responses for peanut butter and dried beans, peas, and lentils were combined because reported frequencies for each individual food were very low.

Reported daily consumption of milk, 100% fruit juice, and WIC cereals increased significantly in all six study sites between the baseline and prenatal surveys (Exhibit 4.12). Reported consumption of

4 As noted in Chapter 1, the measures of food consumption used in this study were very general (see Section C1 in prenatal survey (Appendix A)) because the length of the survey precluded use of a more elaborate measure.

Exhibit 4.10

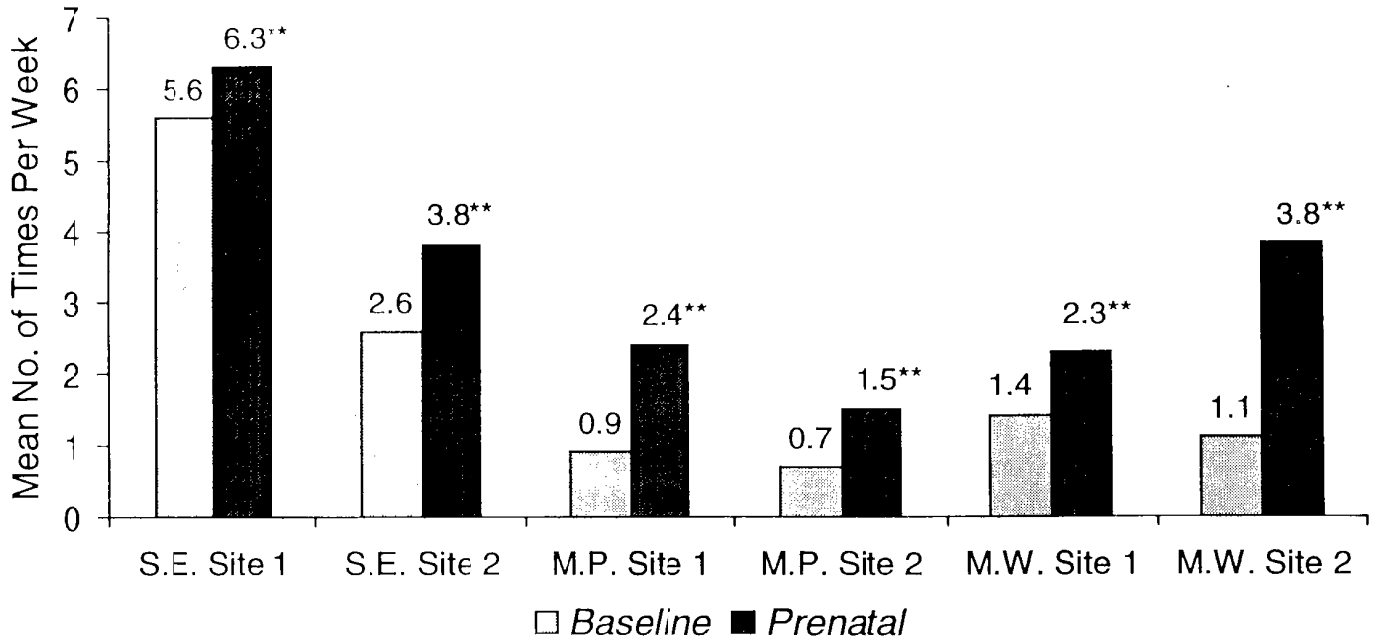
Use of Prenatal Vitamins



**Change from baseline is statistically significant at the .01 level.

Exhibit 4.11

Use of Prenatal Iron Supplements



**Change from baseline is statistically significant at the .01 level.

Exhibit 4.12
Reported Daily Consumption of WIC Foods

Site/Survey	Milk	100% Fruit Juice	WIC Cereals	Cheese	Peanut Butter, Beans, Peas, and Lentils	Eggs
	Mean Number of Times Consumed Per Day					
Southeast Site 1						
Baseline	1.3	1.2	0.5	0.6	0.8	0.5
Prenatal Survey	2.1**	1.6**	0.8**	1.1**	1.0**	0.7**
Postpartum Survey	1.5**	1.2	0.7**	0.9**	N/A	0.6*
Southeast Site 2						
Baseline	1.2	1.0	0.6	0.7	0.5	0.4
Prenatal Survey	1.7**	1.2*	0.8**	0.9**	0.6*	0.5*
Postpartum Survey	1.0**	1.0	0.6	0.8	N/A	0.4
Mountain Plains Site 1						
Baseline	1.6	1.1	0.6	0.8	0.6	0.4
Prenatal Survey	2.1**	1.4**	0.8**	1.0**	0.8**	0.4
Postpartum Survey	1.4**	0.9*	0.6	0.9	N/A	0.4
Mountair Plains Site 2						
Baseline	1.5	1.1	0.6	0.9	0.6	0.4
Prenatal Survey	2.3**	1.5**	1.0**	1.2**	0.9**	0.5**
Postpartum Survey	1.6	1.2	0.7**	1.1**	N/A	0.5**
Midwest Site 1						
Baseline	1.6	1.2	0.6	0.8	0.7	0.4
Prenatal Survey	2.1**	1.5**	1.0**	0.8	0.6	0.4
Postpartum Survey	1.4*	1.2	0.8**	0.9	N/A	0.4
Midwest Site 2						
Baseline	1.7	1.0	0.5	0.9	0.6	0.3
Prenatal Survey	2.2**	1.3**	0.8**	0.9	0.6	0.3
Postpartum Survey	1.4**	0.9	0.7**	0.8	N/A	0.3

cheese, as well as peanut butter, beans, peas, and lentils, increased in four sites. Consumption of eggs increased in three sites.

In the postpartum survey, the increase in reported milk consumption was retained only in Southeast Site 1. In four of the other five sites, daily milk consumption decreased to levels *below* baseline and differences between baseline and postpartum measures were statistically significant. Reported juice consumption also declined between the prenatal and postpartum surveys. In this case, postpartum consumption generally approximated baseline levels, i.e., the difference between baseline and postpartum reports was not significant. The only exception was Mountain Plains Site 1 where reported juice consumption at the time of the postpartum survey was significantly lower than at baseline.

Some of the decline in reported daily intake of milk and juice may be associated with a return to pre-pregnancy eating habits. It is also likely that differences in prenatal and postpartum WIC food packages account for some of these changes. Postpartum women receive less milk and less juice than pregnant women. The change is equivalent to about eight fewer ounces of milk per day and three fewer ounces of juice per day. Although the available data reflect "times consumed per day," rather than "servings per day," the overall patterns in the data are consistent with this level of change.

Postpartum consumption of cheese and eggs varied across sites. In two of the four sites where reported cheese consumption increased between the baseline and prenatal surveys, postpartum women continued to show an increased use of cheese (in comparison to baseline). In the other two sites, reported use of cheese returned to baseline levels. Increased use of eggs continued into the postpartum period in two of the three sites where an increase was noted during the prenatal period, and decreased to baseline levels in the remaining site. Change in the availability of WIC foods is not a likely contributor to differences noted over time in reported consumption of these foods. The basic prenatal and postpartum food packages include equivalent amounts of cheese and eggs.

The WIC food for which increased consumption was maintained into the postpartum period most consistently was WIC cereals. Reported postpartum consumption remained significantly higher than baseline levels in four of the six study sites. Equivalent amounts of WIC cereal are provided in prenatal and postpartum food packages.

Reported Consumption of Non-WIC Foods

In addition to WIC foods, respondents were asked to report usual consumption of selected non-WIC foods including fried foods; sweetened sodas and fruit drinks; fruits; vegetables (other than dried beans, peas and lentils);[5] cookies, cakes and pastries; candy; and snack foods such as chips, pretzels, and packaged popcorn.[6] Response options were the same as those reported for WIC foods and

---

5 After survey instruments were designed, the WIC food package for breastfeeding women was expanded to include canned, fresh, or frozen carrots. Thus, the postpartum measure of fruit and vegetable intake may actually include, for breastfeeding women, carrots from the WIC food package.

6 Two other non-WIC foods were included in the survey but were dropped during analysis. The first was "non-fried beef, pork, veal, chicken, or fish (excluding tuna fish)." This item was dropped because of concerns that it did not perform well (poorly worded and too many inclusions/exclusions), as well as difficulties in interpreting data. Unlike the other items reported in Exhibits 4.12 and 4.13, an increase or decrease in the frequency of this food group cannot be interpreted, even in a general way, as positive or negative. The second non-WIC food dropped during the analysis was alcoholic beverages. This item was dropped because relevant information was gathered in a separate survey item. (Data reported later in this chapter).

conversion to reported daily intake was handled in the same manner. During analysis, items measuring fruits and vegetables were combined into a single measure and items measuring sweetened sodas and fruit drinks, cookies, cakes, pastries, and candy were collapsed to create a single measure referred to as "sweets."

As Exhibit 4.13 indicates, reported intake of fruits and vegetables increased significantly between the baseline and prenatal surveys in four of the six sites. As noted for WIC foods, however, increases were not maintained through the postpartum period. At the time of the postpartum survey, reported daily consumption of fruits and vegetables in all study sites was equivalent to or significantly less than reported consumption at baseline.

Reported daily consumption of all of the less-nutritious non-WIC foods queried in this study (fried foods, sweets, and snack foods) declined in most study sites between the baseline and prenatal surveys, and most of these changes were statistically significant. Reversion to baseline levels of consumption varied for each food group. In general, reported consumption of snack foods showed the least amount of deterioration over time, i.e., maintenance of improvements seen in the prenatal data.

Initiation and Duration of Breastfeeding

Exhibit 4.14 summarizes women's intentions to breastfeed, as reported in baseline and prenatal surveys, as well as actual behaviors reported in the postpartum survey. At baseline, the percentage of women who indicated an intention to breastfeed, either exclusively or in combination with formula feeding, ranged from 47 to 87 percent.

By the time of the prenatal survey, the proportion of women expressing an intention to breastfeed had increased significantly in both of the Southeast sites and in the second Mountain Plains site. These increases were essentially transient, however, because the percentage of women who actually followed through on this intention, i.e., the percentage of women who actually initiated breastfeeding (for any amount of time), was not significantly different from the percentage who expressed an intention to breastfeed at baseline.

Midwest Site 2 was an exception. Here, the percentage of women who actually initiated breastfeeding was significantly *less* than the percentage who intended to do so at baseline. Overall, these data suggest that most women enter the WIC Program with fairly well established plans for feeding their infants. That is, in all sites except Midwest Site 2, the percentage of women who actually initiated breastfeeding was not significantly different from the percentage who entered the program already intending to breastfeed.

With regard to breastfeeding duration, intentions remained essentially stable over the course of prenatal WIC certification. In all six sites, the percentage of women intending to breastfeed for at least six months was five percent or less. The actual duration of breastfeeding, measured in terms of the percentage of women who breastfed for at least six months as well as the mean length of the breastfeeding period, was, in all six sites, significantly less than initially planned.

Exhibit 4.13

Reported Daily Consumption of Non-WIC Foods

	Fruits and Vegetables[1]	Fried Foods[2]	Sweets[3]	Snack Foods[4]
	Mean Number of Times Consumed per Day			
Southeast Site 1				
Baseline	1.7	0.5	1.2	0.2
Prenatal Survey	2.1**	0.3**	1.0*	0.1**
Postpartum Survey	1.7	0.4	1.1	0.1**
Southeast Site 2				
Baseline	1.8	0.4	1.9	0.4
Prenatal Survey	1.8	0.4*	1.5**	0.3**
Postpartum Survey	1.6*	0.5	1.8	0.4
Mountain Plains Site 1				
Baseline	1.9	0.4	1.7	0.4
Prenatal Survey	2.1*	0.3**	1.4**	0.3**
Postpartum Survey	1.6**	0.4*	1.8	0.3**
Mountain Plains Site 2				
Baseline	2.1	0.6	1.9	0.5
Prenatal Survey	2.4*	0.6	1.6**	0.4**
Postpartum Survey	2.0	0.7	1.7*	0.4**
Midwest Site 1				
Baseline	1.9	0.6	2.4	0.6
Prenatal Survey	2.1*	0.4**	1.6**	0.4**
Postpartum Survey	1.7	0.4**	2.0*	0.5**
Midwest Site 2				
Baseline	1.9	0.7	2.6	0.6
Prenatal Survey	2.0	0.4**	1.7**	0.3**
Postpartum Survey	1.5**	0.4**	1.7**	0.4**

[1]Includes fresh, frozen, and canned fruits and vegetables, excluding dried beans, peas, and lentils.
[2]Survey item read: *"Fried foods such as fried chicken, fish, pork, or french fries."*
[3]Includes cookies, cakes, pastries, and candy of any type.
[4]Survey item read: "Snacks such as chips, pretzels, and packaged popcorn."

* Change from baseline is statistically significant at the .05 level.
** Change from baseline is statistically significant at the .01 level.

Exhibit 4.14

Breastfeeding Intentions and Behaviors

Breastfeeding Intention or Behavior	SOUTHEAST		MOUNTAIN PLAINS		MIDWEST	
	Site 1	Site 2	Site 1	Site 2	Site 1	Site 2
Breastfeed Exclusively or in Combination with Formula Feeding						
Baseline intention	87%	56%	74%	62%	54%	47%
Prenatal intention	91*	63**	76	70**	59	47
Actual behavior	83	58	75	65	57	41*
Breastfeed for Six Months or More						
Baseline intention	5%	3%	5%	4%	3%	3%
Prenatal intention	5	3	5	4*	3	3
Actual behavior	3**	1**	2**	2**	1**	1**
Duration of Breastfeeding (months)						
Baseline intention	11.3	6.9	9.4	8.0	5.6	5.4
Prenatal intention	11.0	7.6	10.3	8.4	6.0	4.8
Actual behavior	5.4**	2.4**	3.6**	2.7**	1.6**	1.8**

* Change from baseline is statistically significant at the .05 level.
** Change from baseline is statistically significant at the .01 level.

Adherence to Recommended Infant Feeding Practices

WIC recommends that *only* breastmilk, iron-fortified formula, and plain (unsweetened) water be offered to infants through 3 months of age. Beginning at 4 months, other foods may be introduced according to the following recommended progression (USDA, 1993):

- 4-6 months: Iron-fortified infant cereals
  Infant juices or 100% fruit juice high in vitamin C (*if infant can drink from a cup*)
- 6-8 months: Vegetables and fruits
  Infant juices or 100% fruit juice high in vitamin C
  Can try meats if extra iron source is needed
- 8-12 months: Meat and other protein-rich foods
  Crackers, breads, and other grain products

To assess the extent to which WIC participants in this study adhered to these recommended infant feeding guidelines, postpartum survey respondents were asked whether, by the time of the interview (4-6 months postpartum), they had fed their infant anything other than breastmilk, formula, or plain water. Respondents who answered in the affirmative were than asked to provide information on the age at which a variety of different foods and drinks were offered.

These data were used to construct several measures of undesirable infant feeding practices. Because preliminary analyses revealed a relatively high occurrence of undesirable feeding practices before 4 months of age, two different sets of measures were created. One assessed inappropriate feeding in very early infancy—before 2 months of age—and one assessed cumulative inappropriate feeding practices—before 4 months of age. Food items included in the inventory read to respondents are shown in Exhibit 4.15. All of these foods and beverages were considered inappropriate if fed before the infant was 4 months of age.

The data indicate that, although most women appear to have followed recommended infant feeding guidelines during the earliest months of life, some women offered their infants inappropriate fluids (primarily sweetened water) or solids (primarily infant cereal) before the age of two months (Exhibit 4.16). The percentage of women who offered inappropriate fluids ranged from a low of five percent to a high of 27 percent. The percentage who offered solid foods ranged from three percent to 18 percent.

The prevalence of undesirable infant feeding practices increased sharply for older infants. More than 40 percent of women in each site offered their babies something other than breastmilk, formula, or plain water before the age of 4 months (Exhibit 4.17). In several sites, two-thirds to three-quarters of women reported this behavior. Use of solids (primarily infant cereal) before 4 months of age was also a common practice, although less common than use of inappropriate fluids (minimum of 39 percent and a maximum of 67 percent).

Finally, roughly one-third of women in all sites except Mountain Plains Site 2 offered their infants something that is considered completely inappropriate for infants of any age, (e.g., fruit drinks, sodas, or desserts), or not appropriate until at least 6 months of age (e.g., fruits or vegetables, meats, and, in some cases, whole eggs or milk).

Exhibit 4.15

Food Items Included in Infant Feeding Inventory

- 100% fruit juice
- Fruit drinks, including Kool-Aid, Hi-C, punches and sodas
- Regular or lowfat milk
- Water with sugar or other sweetener
- Infant cereals
- Fruit, including baby food
- Vegetables, including baby food
- Beef, pork, chicken or fish, including baby food
- Baby dinners with meat
- Noodles or rice, including baby dinners
- Whole eggs or egg whites
- Egg yolks
- Desserts, including baby crackers, puddings, tapioca, custard, ice cream

Other Behaviors

In practice, WIC nutrition educators address a broad range of health practices that are not directly related to nutrition, including use of cigarettes and alcohol, and use of over-the-counter medications. This section summarizes changes in these behaviors noted among study participants.

Use of Cigarettes

Many women who smoked cigarettes prior to pregnancy reportedly quit after becoming aware of the pregnancy and before enrolling in WIC (Exhibit 4.18). Nonetheless, in all sites except Southeast Site 1, where very few women smoked even before pregnancy, 20 to 41 percent of women reported using cigarettes at the time of the baseline survey. At the time of the prenatal survey, the prevalence of cigarette use was significantly lower in two of the five sites that had an appreciable number of smokers. There was no difference in the remaining two sites.

A majority of women who stopped smoking before or after WIC certification resumed the habit by the time of the postpartum survey. In all six sites, the percentage of women using cigarettes at the time of the postpartum survey was significantly greater than at baseline. Although cigarette use had not returned to pre-pregnancy levels, there was a definite trend in this direction.

Exhibit 4.16

Prevalence of Undesirable Infant Feeding Practices Before Two Months of Age

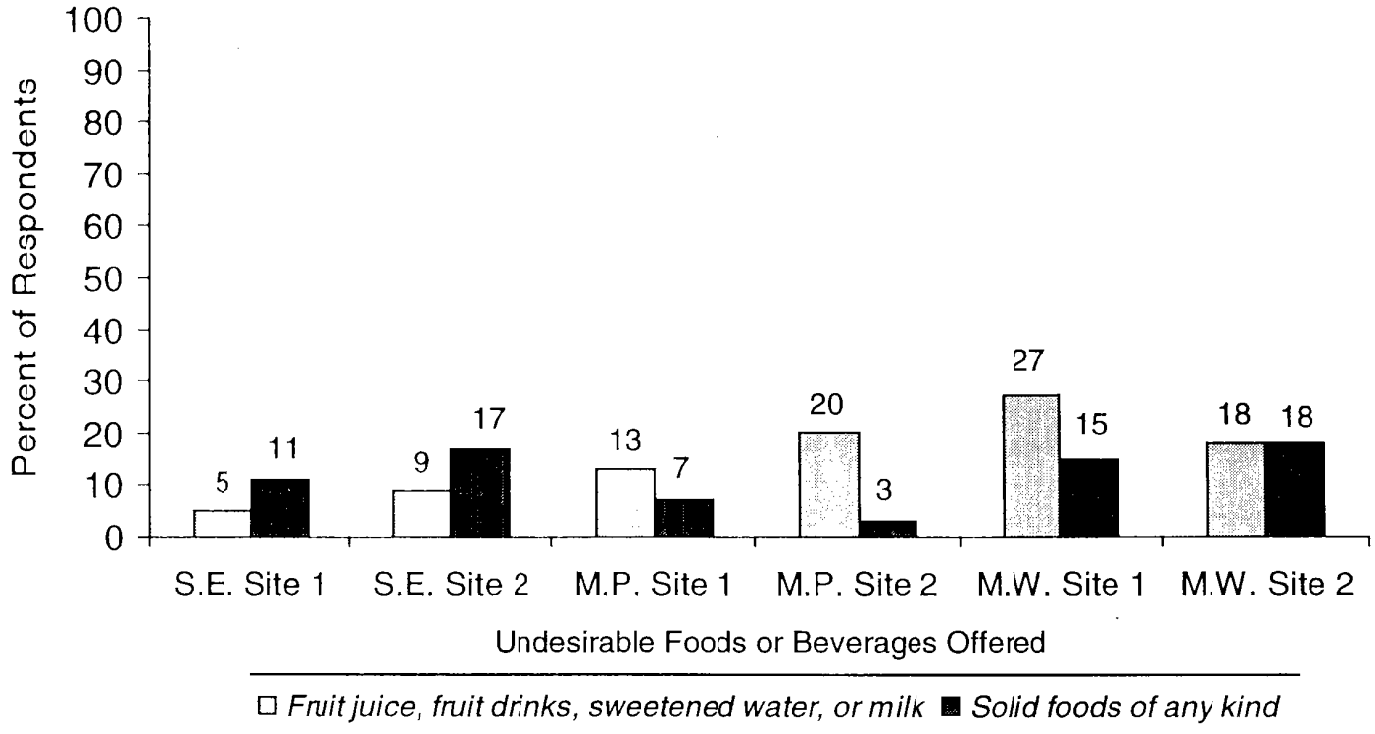


Exhibit 4.17

Prevalence of Undesirable Infant Feeding Practices Before Four Months of Age

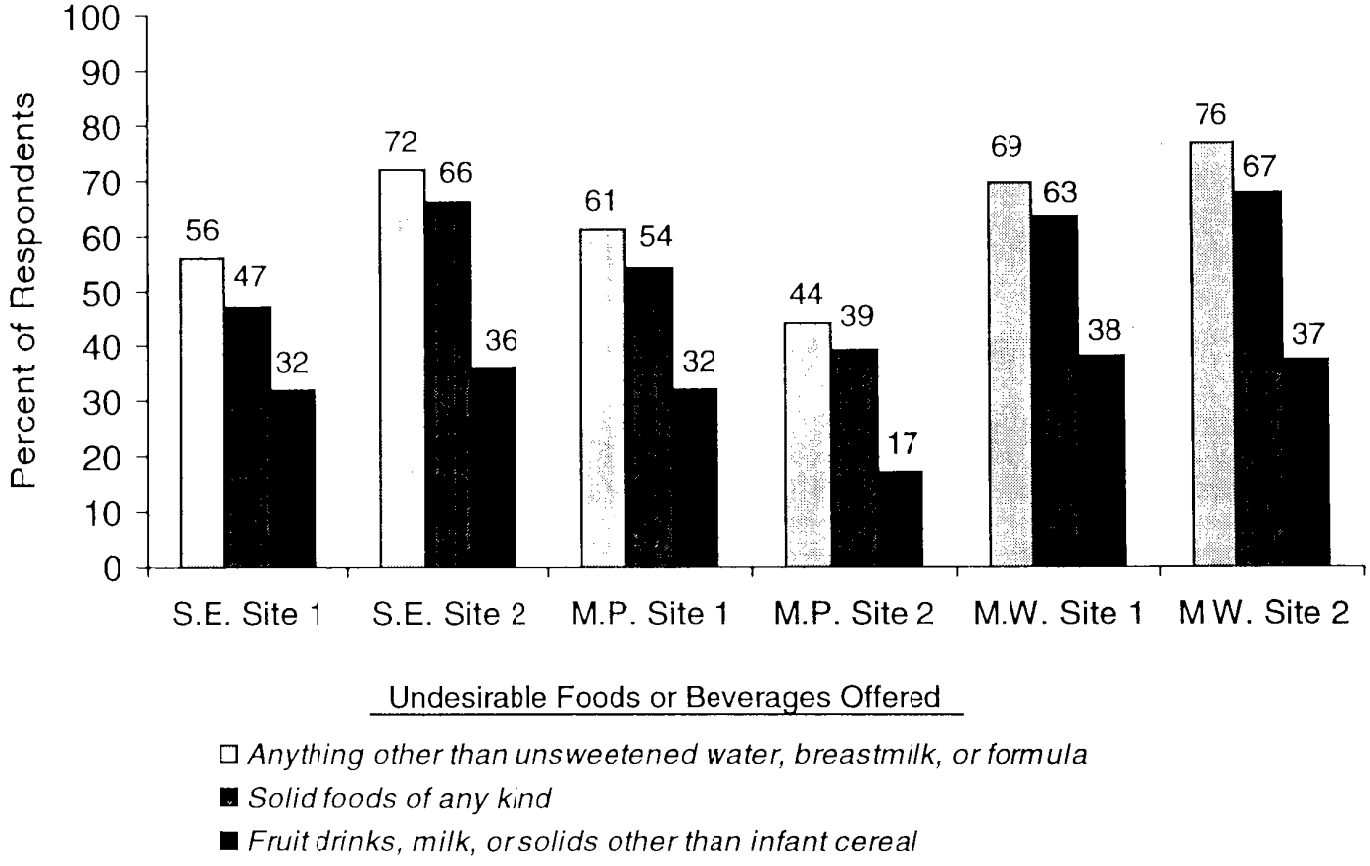


Exhibit 4.18

Self-Reported Users of Cigarettes and Alcohol

	Proportion Smoking Cigarettes	Proportion Consuming any Alcohol
Southeast Site 1		
Pre-pregnancy	3.8%	15.4%
Baseline	0.4	2.5
Prenatal Survey	0.4	3.0
Postpartum Survey	2.6*	7.5**
Southeast Site 2		
Pre-pregnancy	36.0	44.3
Baseline	20.5	7.6
Prenatal Survey	18.2	6.3
Postpartum Survey	26.1**	21.5**
Mountain Plains Site 1		
Pre-pregnancy	49.3	59.6
Baseline	34.0	15.3
Prenatal Survey	28.6**	8.6**
Postpartum Survey	38.4*	34.7**
Mountain Plains Site 2		
Pre-pregnancy	46.0	58.2
Baseline	19.5	5.3
Prenatal Survey	18.9	1.5
Postpartum Survey	30.1**	10.2*
Midwest Site 1		
Pre-pregnancy	50.0	44.9
Baseline	31.9	4.0
Prenatal Survey	25.3**	2.6
Postpartum Survey	39.4**	26.1**
Midwest Site 2		
Pre-pregnancy	52.0	44.6
Baseline	40.5	7.7
Prenatal Survey	37.2	4.1*
Postpartum Survey	45.0*	15.9**

* Change from baseline is statistically significant at the .05 level.
** Change from baseline is statistically significant at the .01 level.

Use of Alcohol

Most women who used alcohol prior to pregnancy reportedly discontinued this practice prior to WIC certification. With the notable exception of Mountain Plains Site 1, fewer than ten percent of women reported use of alcohol at the time of the baseline interview (Exhibit 4.18). Over the course of prenatal WIC participation, use of alcohol decreased further (and significantly) in two sites. In the other three sites, the value of the estimates shifted somewhat, sometimes up and sometimes down, but these differences were not statistically significant.

By the time of the postpartum survey, many women had resumed use of alcohol. In all six sites, the prevalence of reported alcohol consumption during the postpartum period was significantly greater than at baseline (but still substantially lower than prior to pregnancy.)

Use of Over-the-counter Medications

In recent years, the WIC Program has targeted use of over-the-counter medications as a topic for nutrition education contacts. Pregnant and breastfeeding women are discouraged from taking any over-the-counter medications without physician approval. In this study, most women came to the WIC Program already adhering to this recommendation. More than 70 percent of women in each site were following this recommendation at baseline (Exhibit 4.19). Nonetheless, adherence to the recommendation increased significantly in all sites between the baseline and prenatal surveys, reaching levels of 82 to 97 percent.

This analysis was not repeated for postpartum survey data because, after pregnancy, the recommendation only applies to women who are breastfeeding. The percentage of women who were still breastfeeding at the time of the postpartum survey was too small to support this analysis.

Changes Among Selected Subgroups

The goal of this analysis was to determine whether certain subgroups of participants show evidence of greater or lesser change than the general population of pregnant WIC participants. Subgroups included in this analysis include participants who are likely to receive more or less nutrition education than the norm as well as participants for whom WIC nutrition education could be especially valuable because of increased risk for low levels of nutrition knowledge or increased prevalence of undesirable behaviors. A subset of four key outcomes was used in the subgroup analysis. These include:

- overall nutrition knowledge score;
- infant feeding preference score;
- use of prenatal vitamin supplements; and
- daily consumption of milk.

The following four subgroups were included in these analyses:

- women classified as high-risk at the time of prenatal certification;
- early enrollers, i.e., women who enrolled in WIC during or before the 15th week of gestation (the sample median);
- first-time mothers; and
- teenagers (under the age of 18).

Exhibit 4.19

Reported Use of Over-the-Counter Medication

Site/Survey	Proportion Using OTC Medications Only With Physician Approval
Southeast Site 1	
Baseline	89.1
Prenatal Survey	96.7**
Southeast Site 2	
Baseline	82.1
Prenatal Survey	95.7**
Mountain Plains Site 1	
Baseline	71.1
Prenatal Survey	81.8**
Mountain Plains Site 2	
Baseline	71.2
Prenatal Survey	87.8**
Midwest Site 1	
Baseline	75.0
Prenatal Survey	85.6**
Midwest Site 2	
Baseline	80.9
Prenatal Survey	95.0**

* Change from baseline is statistically significant at the .05 level.

** Change from baseline is statistically significant at the .01 level.

Exhibit 4.20 summarizes results of the subgroup analyses. Every check mark in this exhibit indicates a significant difference ($p < .01$ or $p < .05$) between baseline and prenatal measures. In general, as the exhibit illustrates, baseline to prenatal changes observed in the total population were generally observed in each of the subgroups. There were, however, isolated instances in which one or more subgroups did *not* exhibit a positive change noted in the overall population. This was true most often for first-time mothers and teenagers.

The most interesting finding involves teenagers and milk consumption. In three of the four sites with more than 25 teenagers, the teenagers did not report increased daily consumption of milk, while the overall sample, and each of the other subgroups, did.

Exhibit 4.20

Summary of Significant Change for Key Subgroups

Measure/Site	Subgroup: High-risk Women	Early Enrollers	First-time Mothers	Teenagers	All Women
Overall Nutrition Knowledge					
Southeast Site 1	✓	✓	✓	N/A	✓
Southeast Site 2	✓	✓	✓		✓
Mountain Plains Site 1	✓	✓		✓	✓
Mountain Plains Site 2	✓	✓	✓	✓	✓
Midwest Site 1	✓	✓	✓	N/A	✓
Midwest Site 2	✓	✓			✓
Infant Feeding Preference Score					
Southeast Site 1		✓		N/A	
Southeast Site 2	✓	✓	✓	✓	✓
Mountain Plains Site 1	✓	✓	✓	✓	✓
Mountain Plains Site 2	✓	✓	✓	✓	✓
Midwest Site 1	✓			N/A	
Midwest Site 2	✓				✓
Use of Prenatal Vitamins					
Southeast Site 1	✓	✓	✓	N/A	✓
Southeast Site 2					
Mountain Plains Site 1	✓	✓	✓	✓	✓
Mountain Plains Site 2	✓	✓	✓		✓
Midwest Site 1	✓	✓	✓	N/A	✓
Midwest Site 2	✓	✓	✓	✓	✓
Daily Milk Consumption					
Southeast Site 1	✓	✓	✓	N/A	✓
Southeast Site 2	✓	✓	✓		✓
Mountain Plains Site 1	✓	✓	✓		✓
Mountain Plains Site 2	✓	✓	✓		✓
Midwest Site 1	✓	✓		N/A	✓
Midwest Site 2	✓	✓	✓	✓	

✓ = Change from baseline to prenatal is statistically significant at the .05 or .01 level.
N/A = Not measured or sample size of less than 25.

Chapter 5
Participants' Satisfaction with WIC Nutrition Education

This chapter describes participants' satisfaction with the nutrition education component of the WIC program. To date, very little work has been done on this topic and the information presented here, although not generalizable to all local WIC agencies, provides valuable information on how WIC participants may view the nutrition education component of the program. The chapter summarizes participants' opinions and perspectives about various aspects of WIC nutrition education, as well as more general feedback about the WIC Program as a whole.

The last section of the chapter presents findings from an exploratory analysis that examined relationships between participants' nutrition education experiences and their overall level of satisfaction. Findings from this analysis offer insights into factors that influence participants' satisfaction with WIC nutrition education.

Satisfaction with Components of Nutrition Education

This section describes participants' satisfaction with written nutrition education materials and nutrition education classes. Data are also presented on the prevalence of unmet information needs among study participants and the issues/concerns involved.

Written Materials

Virtually all respondents reported receiving written nutrition education materials. At the time of the prenatal survey, three-quarters or more of the respondents in each site reported reading *all or most* of the materials provided (Exhibit 5.1). Another ten to 23 percent of respondents reported reading *some* of the written materials. One percent or less of the respondents indicated that they did not read any of the materials. The overall pattern of responses was similar for the postpartum survey data.

Women who reported reading at least some of the written materials provided by WIC were asked to rate the relative usefulness of the materials. More than half of the prenatal survey respondents in each site rated the written materials as either extremely useful or useful (Exhibit 5.2). With the exception of Southeast Site 1, roughly a third of the respondents found written materials to be only somewhat useful. A small percentage of women (3% or less in each site) judged the materials provided by WIC to be not very useful or useless. Again, the overall pattern of responses was similar for the postpartum survey data.

Respondents in Southeast Site 1 had a more favorable appraisal of written materials than respondents in any other site. This trend is noted consistently throughout the analyses presented in this chapter.

Exhibit 5.1

Amount of Written Materials Actually Read

Amount of written materials actually read	SOUTHEAST		MOUNTAIN PLAINS		MIDWEST	
	Site 1	Site 2	Site 1	Site 2	Site 1	Site 2
Prenatal Survey	(n = 322)	(n = 308)	(n = 324)	(n = 304)	(n = 215)	(n = 236)
All	62.4%	42.9%	59.4%	57.0%	49.5%	57.8%
Most	20.2	32.1	27.2	30.4	26.9	25.9
Some	17.1	23.4	13.3	9.7	21.8	13.4
None	0.3	1.6	0.0	0.8	1.4	0.9
Postpartum Survey	(n = 301)	(n = 323)	(n = 233)	(n = 211)	(n = 229)	(n = 236)
All	74.1%	45.8%	52.8%	51.7%	58.5%	48.7%
Most	11.3	31.3	24.6	32.2	14.1	13.4
Some	13.6	21.0	21.0	14.7	14.1	17.8
None	1.0	1.9	1.6	1.4	0.5	0.1

Note: Sample sizes include only respondents who reported receiving written materials.

Exhibit 5.2

Reported Usefulness of Written Nutrition Education Materials

	SOUTHEAST		MOUNTAIN PLAINS		MIDWEST	
Written materials were ...	Site 1	Site 2	Site 1	Site 2	Site 1	Site 2
Prenatal Survey	(n = 321)	(n = 303)	(n = 324)	(n = 300)	(n = 215)	(n = 236)
Extremely useful	44.2%	29.1%	28.7%	23.5%	28.4%	27.6%
Useful	33.0	35.1	38.4	37.0	32.2	28.9
Somewhat useful	22.1	33.1	35.6	37.0	37.0	40.4
Not very useful/useless	0.6	2.6	2.2	2.6	2.4	3.1
Postpartum Survey	(n = 298)	(n = 316)	(n = 229)	(n = 208)	(n = 228)	(n = 234)
Extremely useful	47.1%	30.6%	28.7%	24.5%	28.9%	31.5%
Useful	29.4	39.4	35.3	37.0	33.7	10.6
Somewhat useful	12.8	26.8	32.7	35.6	36.0	55.3
Not very useful/useless	1.7	3.1	3.3	2.6	1.4	2.5

Note: Sample sizes include only respondents who reported reading at least some written materials.

Nutrition Education Classes

Women who reported attending at least one nutrition education class were asked to provide an overall assessment of the class(es) they attended. Response options ranged from very interesting to boring. The data suggest that, overall, WIC participants were more satisfied with classes than with written materials (Exhibit 5.3). More than 60 percent of prenatal survey respondents who attended a nutrition education class rated the class(es) as either very interesting or interesting. Postpartum assessments were somewhat more positive in two sites (Southeast Site 1 and Midwest Site 1), and somewhat more negative in three sites (Southeast Site 2, Mountain Plains Site 1, and Midwest Site 2).

Unmet Information Needs

As a means of gauging the responsiveness of WIC nutrition education to participants' individual needs, respondents were asked whether there were any issues or concerns they would have liked to discuss with a nutritionist or other WIC staff member. The data reveal relatively few instances where respondents were left with unanswered questions. With the exception of Southeast Site 1, fewer than ten percent of respondents identified an unmet information need in either the prenatal or postpartum surveys (data not shown).

In Southeast Site 1, the percentage of women reporting an unmet information need at the time of the prenatal survey (12%) was more than twice that of any other site. By the time of the postpartum survey, however, the prevalence of this problem had dropped considerably, to six percent, and was comparable to other study sites.

Unaddressed information needs identified by respondents included infant feeding guidelines; personal concerns about pregnancy complications and/or risk factors; personal/social issues; and, for postpartum women, issues related to breastfeeding and weight loss.

Knowledge Gained from WIC

Participants were asked directly whether they learned anything from WIC ("Did you learn anything that you did not know before you visited the WIC program?"). In most sites, less than half of the prenatal survey sample responded affirmatively (Exhibit 5.4). Results for the postpartum survey were quite similar with the exception of Southeast Site 1. Change between prenatal and postpartum responses, where noted, was always in a positive direction (at the group level). This was especially true in Southeast Site 1, where the percentage of respondents reporting that they learned something from WIC increased by more than 20 percentage points between surveys (43 percent to 65 percent).

Respondents who reported learning something from WIC were asked to identify what was learned. Responses were consistent with findings reported in Chapters 2 and 3 regarding topics covered in WIC nutrition education. The topic areas in which most respondents reported knowledge gain were guidelines for healthy eating during pregnancy and breastfeeding (Exhibit D.13).

Respondents' self-reports about knowledge gain correspond well with changes in both nutrition knowledge scores and infant feeding preference scores, as described in Chapter 4. Although knowledge scores increased significantly over time for both self-described learners and non-learners,

Exhibit 5.3

Participant Assessments of Nutrition Education Classes

	SOUTHEAST		MOUNTAIN PLAINS		MIDWEST	
Classes were ...	Site 1	Site 2	Site 1	Site 2	Site 1	Site 2
Prenatal Survey	(n = 146)	(n = 105)	(n = 248)	(n = 11)	(n = 26)	(n = 67)
Interesting[1]	80.8%	67.6%	62.5%	N/A	76.9%	70.2%
Somewhat interesting	16.4	20.9	23.4	N/A	11.5	22.4
Boring[2]	2.7	11.4	14.1	N/A	11.5	7.5
Postpartum Survey	(n = 210)	(n = 133)	(n = 245)	(n = 1)	(n = 39)	(n = 103)
Interesting[1]	95.2%	63.9%	57.6%	N/A	84.6%	62.1%
Somewhat interesting	2.4	23.3	24.5	N/A	10.3	27.2
Boring[2]	2.4	12.8	18.0	N/A	5.1	10.7

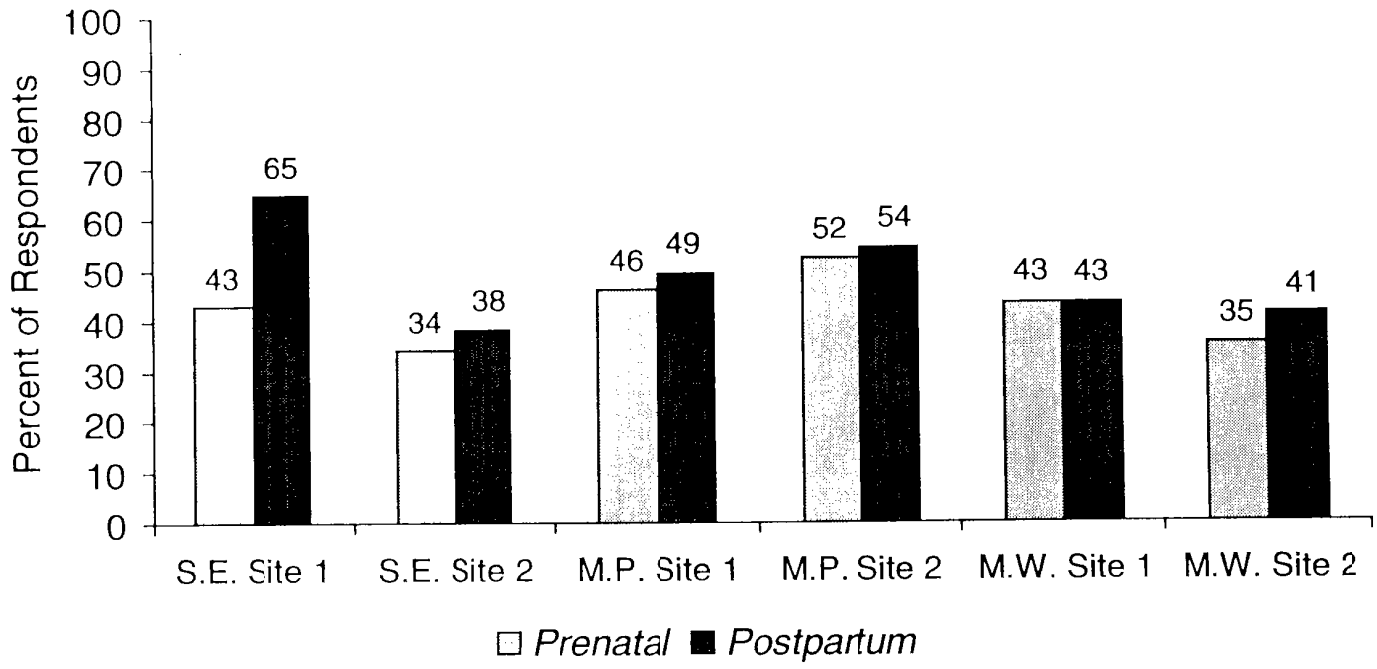
N/A = Data not reported because sample size is less than 25.

Notes: Sample sizes include only respondents who reported attending a WIC class.
Percentages may not sum to 100 due to rounding.

[1]Includes ratings of "very interesting" and "interesting".
[2]Includes ratings of "somewhat boring," "boring," and "very boring."

Exhibit 5.4

Percentage of Respondents Who Reported Learning Something from WIC



Note: Answered yes to question "Did you learn anything that you did not know before you visited the WIC clinic?"

respondents who said they learned something from WIC (self-described learners) gained significantly more knowledge than respondents who said they had *not* learned anything from WIC (self-described non-learners) (Exhibit 5.5). Mean overall knowledge scores for self-described learners increased 6.8 percentage points between baseline and prenatal surveys, compared to 4.5 percentage points for self-described non-learners. Likewise, between the baseline and postpartum surveys, overall knowledge scores increased 8.8 points for self-described learners compared to 6.3 percentage points for self-described non-learners.

Thus, the data indicate that both learners and non-learners increased their nutrition knowledge over the course of the study. The fact that participants who reported learning something from WIC showed significantly greater gains in knowledge than participants who said they had not learned anything from WIC suggests that, for these participants, at least some of the knowledge gain realized over time is attributable to WIC nutrition education.

A similar pattern was noted for the infant feeding preference score. Scores for self-described learners showed a statistically significant increase ($p < 0.01$) of 7.7 percentage points between the baseline and prenatal surveys (Exhibit 5.6). In contrast, scores for non-learners increased an average of 3.7 percentage points and this increase was not statistically significant. The increase in infant feeding preference score, which indicates an improved attitude toward breastfeeding, is consistent with the finding that breastfeeding was the second most commonly cited area in which knowledge was gained from WIC.

Best and Worst Aspects of the WIC Program

Respondents were asked to identify up to three things they liked about the WIC Program and up to three things they disliked. A comprehensive summary of responses is provided below.

Best Aspects of the WIC Program

Respondents had no trouble identifying positive aspects of the WIC Program, although there was some variation across sites in the specific characteristics cited (Exhibit 5.7). WIC supplemental foods ranked as the leading positive program attribute in all six sites in both prenatal and postpartum surveys. This was the only program characteristic that was consistently included in the top three positive aspects of the WIC program.

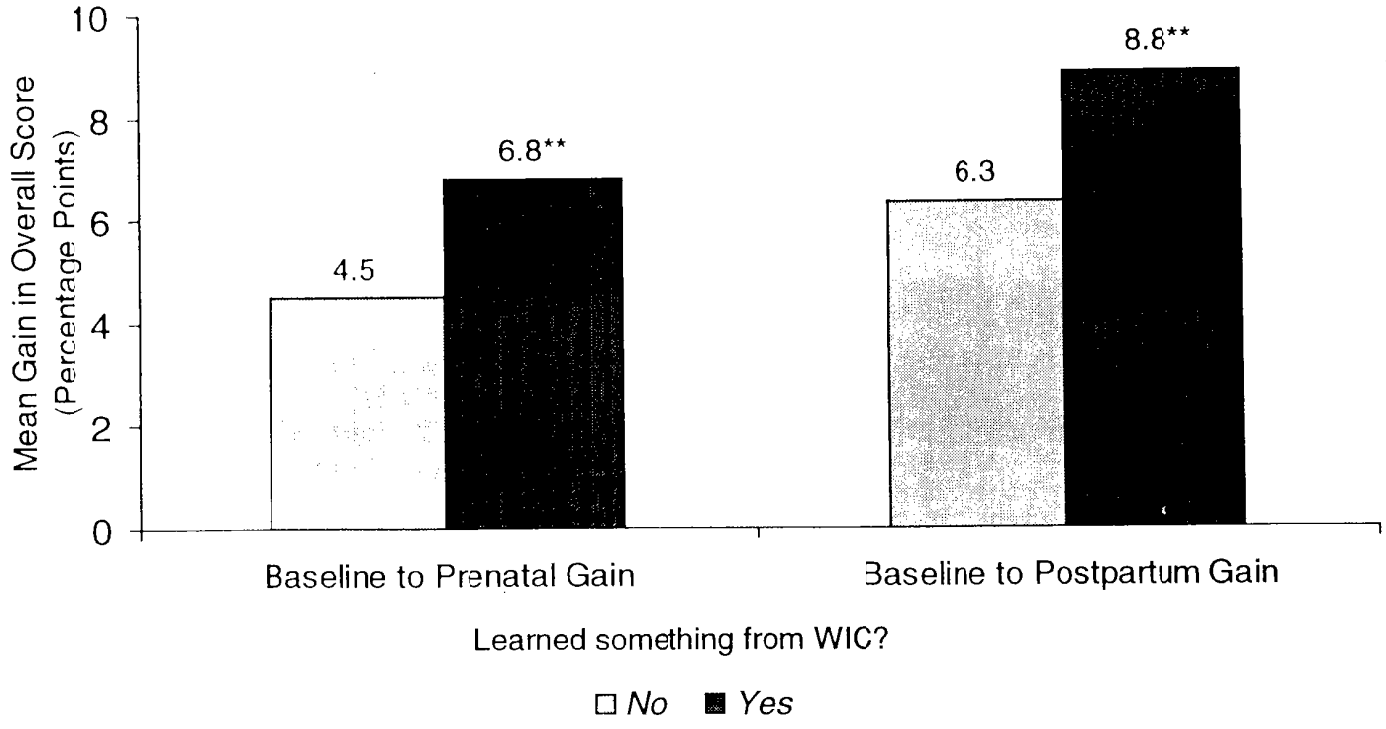
The next most frequently cited program feature, included among the top three in all sites except Southeast Site 2 and Mountain Plains Site 2 (postpartum survey), was that the WIC Program and/or its staff cares about participants. An argument can easily be made that the nutrition education component of the program plays a role in generating this perception.

Other program characteristics that vied for third place on the top-three list for all sites combined included "learn about healthy eating," "talking to the nutritionist," and "talking with other WIC staff." All three of these responses are clearly related to the nutrition education component of the WIC program.

Other positive characteristics, mentioned by at least 10 percent of respondents in two or more sites, included the fact that it's easy to get to and/or use the WIC Program (e.g., easy transportation, no

Exhibit 5.5

Self-Described Learners Had Significantly Larger Gains in Overall Nutrition Knowledge Scores

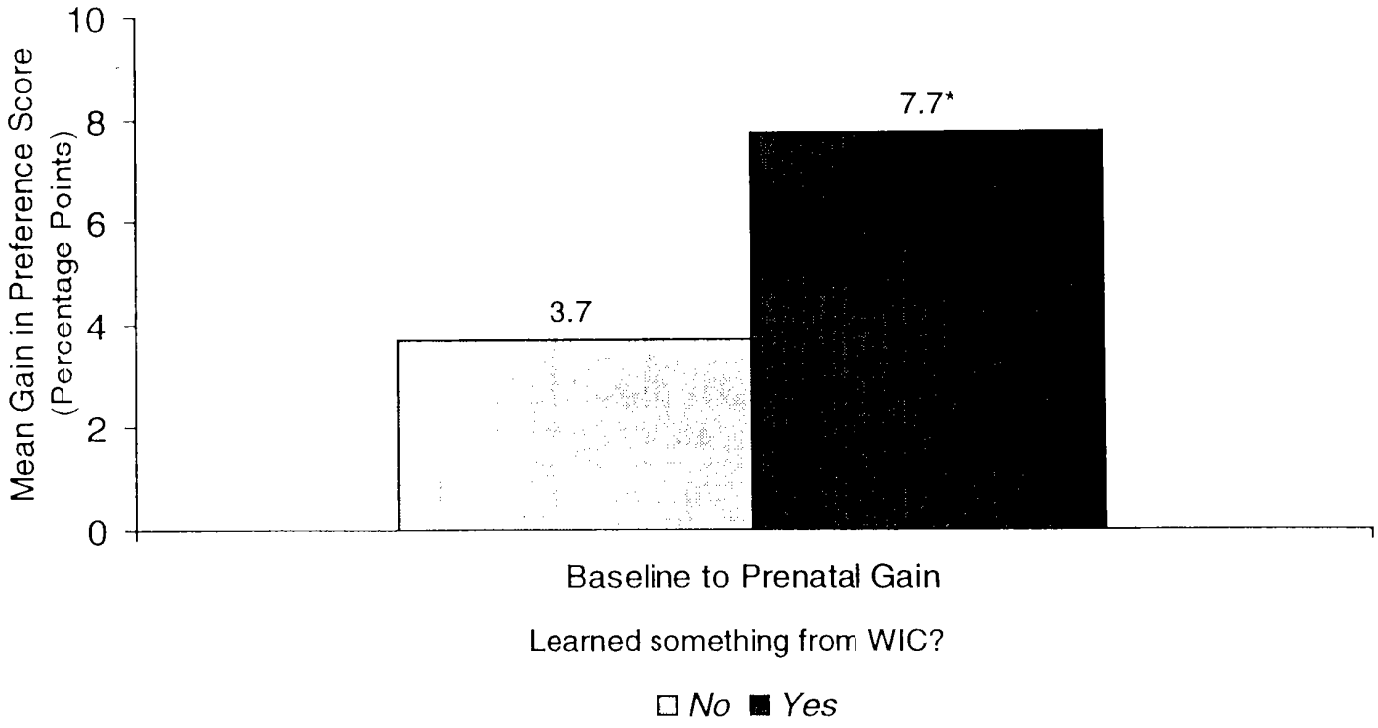


**Difference between two groups is statistically significant at the .01 level.

Note: Knowledge gain from baseline is statistically significant, at the .01 level, for all four groups.

Exhibit 5.6

Self-Described Learners Had Significantly Larger Gains in Infant Feeding Preference Scores



*Difference between two groups is statistically significant at the .05 level.

Note: Increase in score from baseline is statistically significant, at the .01 level, only for the self-reported learners.

Exhibit 5.7

Best Aspects of WIC Program

	SOUTHEAST		MOUNTAIN PLAINS		MIDWEST	
	Site 1	Site 2	Site 1	Site 2	Site 1	Site 2
Prenatal Survey	(n = 324)	(n = 329)	(n = 333)	(n = 3'0)	(n = 2'6)	(n = 216)
WIC foods	58.0%	76.6%	61.9%	69.2%	63.4%	64.4%
Program/staff care(s) about me	44.8	11.9	52.6	30.8	35.7	40.3
Learn about healthy eating	28.4	27.4	24.0	21.9	21.8	3.4
Talking to the nutritionist	40.7	17.0	8.1	6.8	19.0	19.3
Talking with other WIC staff	6.5	14.3	11.7	34.2	17.6	1.3
Easy access	13.0	9.7	16.8	8.9	16.7	16.7
Vouchers are easy to use	11.7	9.7	4.2	0.8	13.4	5.6
Nutrition education materials/sessions	8.0	6.7	6.6	3.4	7.9	15.0
Learn about breastfeeding	10.8	10.0	6.9	7.2	3.7	3.9
Easy to apply for/access WIC	12.0	9.1	3.9	3.8	12.5	2.6
Staff check my weight	5.6	0.9	5.4	12.7	1.9	2.6
Staff check my child's weight	2.8	1.2	1.8	3.0	3.7	2.2
Everything ("it's a good program")	0.9	3.0	5.7	7.6	0.5	3.0
Learn about infant/child feeding	8.3	1.2	5.7	7.6	2.8	2.2
Postpartum Survey	(n = 301)	(n = 344)	(n = 237)	(n = 218)	(n = 233)	(n = 239)
WIC foods	73.8%	79.1%	68.4%	68.8%	71.3%	68.6%
Program/staff care(s) about me	46.5	7.9	48.4	16.1	40.7	33.0
Learn about healthy eating	25.6	27.6	16.8	28.0	9.7	3.8
Talking to the nutritionist	37.9	23.3	5.5	1.8	14.4	24.7
Talking with other WIC staff	4.0	17.8	7.7	40.4	38.9	2.1
Easy access	6.0	12.5	20.7	13.8	15.7	18.4
Vouchers are easy to use	10.6	1.2	1.6	0.0	6.0	0.0
Nutrition education materials/sessions	6.3	6.4	6.5	3.7	6.0	14.2
Learn about breastfeeding	9.0	8.1	5.2	4.6	1.8	4.6
Easy to apply for/access WIC	16.6	3.5	3.9	2.3	8.8	5.0
Staff check my weight	1.3	1.2	3.2	5.0	3.7	1.3
Staff check my child's weight	1.3	3.8	2.6	8.3	9.3	2.9
Everything ("it's a good program")	0.3	1.2	4.5	2.3	1.4	1.3
Learn about infant/child feeding	10.6	2.6	7.4	9.2	2.3	0.8

Note: Lists include only items mentioned by five percent or more of respondents in any site at either measurement point.

prolonged waiting time); it's easy to apply for and access the WIC program; vouchers are easy to use; and participants learn about breastfeeding. Although there were some minor variations across sites, the overall pattern of responses was similar for prenatal and postpartum surveys.

Worst Aspects of the WIC Program

Respondents in most sites found it more difficult to identify unfavorable aspects of the WIC Program than favorable aspects. With the exception of Southeast Site 2, more than two-thirds of prenatal respondents were unable to identify anything they did not like about WIC (Exhibit 5.8). In the postpartum survey, this was true for more than half of all respondents in all sites except Southeast Site 2.

The aspects of the program most often considered as negative were the time required to participate and the types of food offered. The former was the chief complaint made by participants in both Midwest sites, which seems consistent with the high no-show rates noted in these sites during on-site observations (Chapter 2) and the small percentages of respondents who received two or more nutrition education contacts (Chapter 3). The latter was the primary complaint in Southeast Site 1 and in both Mountain Plains sites. Southeast Site 1 had a large population of recent immigrants and the two Mountain Plains sites had sizeable Hispanic populations.

Less frequently cited negatives, mentioned by less than ten percent of respondents in most sites, included the quantities of foods provided in WIC food packages; access issues (e.g., location, operating hours, waiting room space); and interactions with WIC staff. The latter included general complaints about staff attitudes and specific complaints about excessive emphasis on breastfeeding; staff being too rushed or disorganized; and space being too noisy or crowded to permit reasonable conversations.

The percentage of respondents that was able to identify a negative aspect of the WIC Program increased slightly in most sites between the prenatal and postpartum surveys. The specific characteristic that showed the greatest amount of change over time was "interaction with WIC staff." Although the shift was not dramatic, the relative consistency of the trend across sites is noteworthy, and suggests that there may have been some deterioration in staff/participant interactions over time.

Responses for Southeast Site 2 were notably different from the other five sites. The percentage of respondents who indicated that they liked everything about WIC was lower in this site than in any of the other sites (51% *versus* 67-81% in the prenatal survey). The most common complaint registered by respondents in this site was that WIC required too much time. The prevalence of this complaint was more than double that seen in any of the other sites. Data reported later in this chapter suggest that this complaint is specifically related to time spent in the waiting room waiting to be seen.

Participant Suggestions for Improvement

Respondents were asked to provide specific suggestions for improving WIC nutrition education ("Do you have any suggestions about how WIC can improve the way they provide information on healthy eating?"). Few respondents were able to offer specific suggestions (Exhibit D.14). In the prenatal survey, suggestions were offered by only four to 15 percent of respondents. The range for the postpartum survey was three to 19 percent.

Exhibit 5.8

Worst Aspects of the WIC Program

	SOUTHEAST		MOUNTAIN PLAINS		MIDWEST	
	Site 1	Site 2	Site 1	Site 2	Site 1	Site 2
Prenatal Survey	(n = 324)	(n = 329)	(n = 333)	(n = 310)	(n = 216)	(n = 216)
Nothing (everything is positive)	80.6%	51.4%	67.3%	76.0%	72.2%	67.4%
Time requirement	5.6	21.0	6.3	4.2	10.2	9.9
WIC foods (types)	8.0	10.0	9.0	9.6	3.0	4.6
Interaction with WIC staff	3.1	7.6	6.6	4.2	1.4	4.7
Access issues	1.9	6.7	3.9	3.8	6.9	4.7
Quantities of food provided	3.7	4.6	3.9	2.1	2.8	1.7
Information provided (not enough/inappropriate)	0.3	1.5	3.6	4.2	1.4	2.6
Nutrition education materials	2.8	2.7	0.9	0.0	0.5	3.0
Other	0.6	9.4	5.1	6.8	4.6	6.4
Postpartum Survey	(n = 301)	(n = 344)	(n = 237)	(n = 218)	(n = 233)	(n = 239)
Nothing (everything is positive)	81.7%	46.2%	59.0%	68.4%	71.3%	64.4%
Time requirement	2.3	29.9	5.8	8.7	4.6	12.1
WIC foods (types)	8.4	9.0	11.6	4.2	5.6	2.5
Interaction with WIC staff	4.7	11.0	7.1	8.7	7.4	8.4
Access issues	0.7	6.7	8.1	8.7	7.4	6.3
Quantities of food provided	2.3	5.2	5.8	0.9	1.8	1.7
Information provided (not enough/inappropriate)	0.7	2.3	5.2	4.1	2.8	2.5
Nutrition education materials	1.0	2.6	0.7	0.0	0.0	5.0
Other	1.0	9.9	6.8	3.2	7.9	4.2

Note: Lists include items mentioned by five percent or more of respondents in any site at either measurement point. All responses included in "other" category were cited, on an individual basis, by less than 3 percent of respondents in any site.

Among respondents who did offer suggestions, the specific recommendation made most often was to improve the content and/or delivery of nutrition education. Other recommendations were to increase individualized contact and to increase participants' awareness of, or opportunities for, nutrition education. Here, participants offered a variety of recommendations that ran the gamut from making attendance at nutrition education classes mandatory to sending nutrition education materials through the mail. Some of the other recommendations offered by respondents included: decrease waiting time; improve office atmosphere and/or staff attitudes; and increase the availability of bilingual nutritionists.

Overall Satisfaction with WIC Nutrition Education

Overall satisfaction with WIC nutrition education was evaluated using a series of statements that assessed the extent to which participants' experiences with WIC nutrition education were associated with desirable characteristics such as friendly, helpful, and respectful staff; feelings of satisfaction when leaving the WIC clinic; having questions answered; and having information provided in terms that could be easily understood. Respondents were asked to register agreement (strongly agree or agree) or disagreement (disagree or strongly disagree) with each statement (see section B5 in the sample prenatal survey in Appendix A).

The data indicate that, overall, the vast majority of respondents in all six study sites were quite satisfied with WIC nutrition education (Exhibit D.15). At both measurement points, more than 90 percent of respondents in five of the six sites found WIC staff to be helpful, as well as warm and friendly; believed that WIC staff respected them as individuals; found explanations offered by WIC staff to be readily understandable; had their questions answered; felt satisfied when they left the WIC clinic; and found the information offered to be helpful. Likewise, more than 90 percent of respondents in five of six sites, did *not* feel confused when they left the WIC clinic.

The only sites that did not fit this pattern for one or more of the attributes investigated were the two Southeast sites. This is consistent with other data presented in this chapter. Specifically, respondents in Southeast Site 2 reported more negative feelings about the WIC Program than respondents in any other site (Exhibit 5.8). The major complaint was the time required to participate in WIC. The data presented in Exhibit D.15, i.e., responses to the item "The staff made me wait too long," suggest that the problem with the time requirement was largely due to the amount of time participants had to wait to be seen. (This may be one reason for the waiting room nutrition education classes taught in this site). The time required to actually participate in nutrition education contacts in Southeast Site 2 was not noticeably greater than other sites. The duration of observed prenatal contacts was on the high end of the range (see Chapter 2), but by no means the longest. The length of postpartum contacts was actually shorter than most other sites.

In Southeast Site 1, 16 percent of prenatal respondents *agreed* with the statement "I felt confused when I left the WIC clinic" (compared to 2-5% in other sites). This is consistent with the previously reported finding that 12 percent of prenatal respondents in this site reported having unmet information needs. In the postpartum survey, the percentage of respondents reporting confusion dropped to seven percent (Exhibit D.15) and the percentage reporting unmet information needs dropped to six percent (data not shown). These patterns suggest that the language barriers present in

this site complicate, but do not prevent, transmission of nutrition information from WIC staff to program participants.

The highly positive ratings for items related to the nutrition education component of the WIC Program may appear somewhat surprising in view of the fact that, in most sites, less than half of the respondents reported learning anything new from WIC (Exhibit 5.4). A possible explanation for this apparent contradiction is that women who believed they did not learn anything from WIC did not expect to do so or did not place a premium on knowledge gain.

It is also possible that the generally positive and helpful attitude of WIC nutrition education staff, in combination with the overarching benefit of the WIC food package and the relative ease with which WIC benefits can be accessed and utilized, outweighs any negative reactions participants might have about the lack of new information.

Although the overall picture of participant satisfaction is highly positive, respondents did identify some areas of dissatisfaction (Exhibit D.15). Five to 37 percent of respondents indicated a concern about the waiting time at WIC clinics (agreed or strongly agreed with the statement "the staff made me wait too long"). The percentage of respondents who said they had to wait too long increased between the prenatal survey and the postpartum survey in five of the six sites. As noted above, waiting time was a particular problem in Southeast Site 2. While the survey item was meant to capture concerns about time spent in waiting rooms waiting to be seen by WIC staff, it is possible that some respondents considered the entire time spent at the WIC clinic, including time associated with nutrition education contacts, in their response.

Another area of dissatisfaction was the fact that some of the information and guidance provided by WIC staff conflicted with information provided by physicians (agreed or strongly agreed with the statement "Some of the advice I received contradicted what my doctor told me"). At the time of the prenatal survey, the percentage of respondents reporting such conflicts, ranged from 15 to 24 percent. The issue of contradictory advice was mentioned in participant focus groups conducted during the formative stages of this study. According to focus group participants, conflicts most often involved advice related to weight gain during pregnancy, the need for iron supplements (i.e., whether or not participants' were anemic), and breastfeeding.

In all six sites, the prevalence of contradictory advice from physicians increased in the postpartum survey (range from 24% to 47%). Based on comments from WIC staff and preliminary focus group work, conflicts during the postpartum period most often involved breastfeeding — with WIC staff encouraging breastfeeding and local physicians either downplaying or actually discouraging breastfeeding.

Some dissatisfaction was also expressed with regard to advice provided about breastfeeding. The statement "The counselor helped me decide how to feed my baby" was included in the survey as a means of measuring, indirectly, participant resistance to breastfeeding promotion. Results suggest that participants in some sites did not find WIC staff to be particularly helpful in this area. With the exception of Southeast Site 1 and Mountain Plains Site 2, less than half of the respondents indicated that WIC nutrition educators were helpful in making decisions about how they would feed their babies. This is consistent with the finding—reported in Chapter 4—that the percentage of women

who initiated breastfeeding was essentially the same as the percentage who reported an intention to breastfeed at the time of prenatal certification.

Relationship Between Satisfaction and Nutrition Education Experiences

This section presents results of an exploratory analysis that examined the relationship between participants' experiences with WIC nutrition education and their reported level of satisfaction. The discussion has two parts. The first part describes the development of a composite measure of satisfaction using the list of satisfaction items shown in Exhibit D.15. The second part presents findings from an analysis of the relationship between the composite satisfaction measure and participants' WIC experiences.

Construction of a Composite Measure of Satisfaction

Factor analysis was used to identify a subset of the 12 individual satisfaction items that could reasonably be combined into a single composite measure of satisfaction. Factor analysis is an analytic technique in which variables that are correlated with one another, but largely independent of other subsets of variables, are combined into discrete "factors." Factors are thought to reflect underlying processes that contribute to the correlations among the variables.

An important first step in factor analysis is determining the number of salient factors represented by a certain collection of variables. For example, in tests of general scholastic aptitude, one might expect at least two factors to emerge, one representing math aptitude and the other representing reading and vocabulary aptitude.

When prenatal and postpartum survey data were analyzed, a single factor emerged from the 12 individual satisfaction items. Most of the individual survey items had high factor loadings on the single factor, indicating measurement of a common construct. The common construct can reasonably be described as a measure of overall satisfaction with WIC nutrition education.[1]

Three items had relatively small factor loadings, indicating a poor "fit" with the common construct of overall satisfaction with WIC. A poor fit means that many women who had high scores on the other satisfaction measures disagreed (or agreed, for negatively worded statements) with the statement. Or, conversely, women who had low satisfaction scores agreed or strongly agreed with the statement. The three poor-fitting items were "The counselors helped me decide how to feed my baby;" "Some of the advice I received was different from my doctor's [advice];" and "The staff made me wait too long."

After site-specific analyses were completed to confirm that the relationship among satisfaction variables was generally consistent across all six sites, a composite satisfaction measure was created by taking the mean of the responses to the nine items with high factor loadings (greater than .40, absolute value). Responses were coded on a scale of one to four so that strongly agree was given the

[1]Factor loadings for each individual item, which represent the relationship between the variable and the common factor, are shown in Exhibit D.16. Large factor loadings (absolute value) indicate high correlations between the observed variable and the underlying common factor.)

value four, and strongly disagree was assigned a value of one. The item "I felt confused when I left the WIC clinic" was coded in reverse order.

Relationships Between Overall Satisfaction and Nutrition Education Experiences

Regression analysis was used to explore relationships between overall satisfaction, individual measures of satisfaction, and participants' experiences with WIC nutrition education. Experience variables were defined based on data from participant self-reports and WIC administrative records. The following variables were included in the regressions:

Participant Self-Reports

- read all, most, some, or none of the written materials provided;
- thought written materials were useful;
- had no outstanding issues/questions to discuss with WIC staff;
- was *not* referred to any other programs or services;
- thought nutrition education classes were interesting;
- did *not* learn anything from WIC;
- did *not* believe that wait was too long;
- did *not* receive information that was contradictory to advice provided by doctor; and
- reported that WIC staff helped decide how to feed baby.

WIC Administrative Records

- met one-on-one with a nutritionist;
- met one-on-one with other WIC nutrition educator;
- *not* still receiving WIC benefits at time of survey;

In the regression models (separate models were run for prenatal and postpartum data), each item appeared as a dummy-coded factor. For example, the item "had no outstanding issues" was coded as a zero if the respondent *did* report having outstanding issues, and as a one if the respondent *did not* report outstanding issues. For variables with four or more possible responses, several response categories were combined, based on results of preliminary analyses, to reduce the number of contrasts and simplify interpretation of results.

Many of the nutrition education experience measures had strong, positive associations with overall satisfaction (regression coefficients and standard errors are shown in Exhibits D.17 and D.18). Women who had the following types of experiences reported significantly higher overall levels of satisfaction than women who had other experiences (items are listed in descending order of importance, based on regression coefficients for the prenatal survey):

- strongly agreed that counselors helped in decision about how to feed baby;
- strongly *disagreed* that WIC staff made them wait too long;
- strongly *disagreed* that advice given by WIC was contradictory to advice given by physician;
- thought written nutrition education materials were useful or very useful; and

- did not have any outstanding issues/questions to discuss with a nutritionist;

In addition, two factors—*not* having been referred to health or social services, and *not* learning anything new from WIC—were associated with slightly lower levels of lower overall satisfaction.

Results were consistent for both prenatal and postpartum surveys. Moreover, results were consistent when site variables were added to the regression models, indicating that results were generally consistent across sites.

The two variables that defined the type of nutrition education staff encountered by sample members were not found to have strong associations with overall satisfaction. The association between having "met one-on-one with other WIC nutrition educator" and satisfaction was weak but statistically significant. The variable "met one-on-one with a nutritionist" yielded inconsistent results in the two models. Coefficients were small and negative in both the prenatal and postpartum models, and statistically significant only in the prenatal model. In comparison to the strength and consistency of relationships noted for the other variables, this pattern suggests that the relationship between these variables and participant satisfaction is weak to non-existent. This, in turn, suggests that the type of staff person involved in providing nutrition education is less important than the content of the nutrition education and the context in which it was provided (e.g., waiting time, quality of written materials, etc.).

In summary, findings from this analysis demonstrate that, while most participants are quite satisfied with WIC nutrition education, the characteristics of individuals' nutrition education experiences are significantly related to their overall satisfaction. For the most part, the associations between characteristics of nutrition education experiences and overall satisfaction were in the expected directions. For example, women who strongly agreed that a WIC counselor had helped them decide how to feed their babies were more satisfied than women who either were more equivocal or who disagreed with the statement. Women who found written materials to be useful were more satisfied than those who didn't receive any written materials or thought the materials they received were of little use.

In considering these findings it is important to remember that because overall satisfaction with WIC was quite high, the magnitude of the differences associated with indicators of nutrition education experiences, while statistically significant, were generally small.

Chapter 6
Attitudinal and Social Influences on Selected Behaviors

This chapter presents results of two analyses that examined the influence of selected attitudinal and social characteristics on behavioral outcomes of interest to WIC nutrition educators. The first analysis examined factors that may influence the initiation and duration of breastfeeding, including beliefs about the benefits and disadvantages of breastfeeding and personal breastfeeding exposure and experiences. The second analysis examined the effect of social support on eating habits during pregnancy and on use of cigarettes and alcohol. The initial plan for this analysis also included an investigation of the influence of social support on the initiation and duration of breastfeeding, however, this analysis was not pursued because only seven percent of the sample reported the presence of negative social support for breastfeeding.

Factors Influencing Women's Breastfeeding Intentions and Behaviors

The decision to initiate breastfeeding is one of the major outcomes of interest for WIC nutrition education. Data from this study confirm what previous studies have shown: women's breastfeeding behaviors are strongly associated with stated intentions during pregnancy. For example, 85 percent of the women in this study who breastfed their babies indicated their intention to do so in the baseline survey (at the time of WIC certification). Conversely, 73 percent of women who did *not* breastfeed their babies indicated at baseline that they planned to use formula exclusively. This pattern suggests that identification of variables that are associated with women's breastfeeding intentions and are amenable to change may be useful in focusing breastfeeding promotion efforts.

To identify such variables, the analysis examined the relationship between beliefs about the advantages and disadvantages of breastfeeding and breastfeeding intentions and behaviors. The analysis was modeled after several other studies that examined determinants of breastfeeding (Gielen, A.C., et al., 1992; Manstead, A.S., et al., 1983; and Matheny, R.J., et al., 1987) and incorporated tenets of the *theory of reasoned action* (Azjen, I. and M. Fishbein, 1980). According to the *theory of reasoned action*, individuals consider the implications of their actions before deciding to engage in a behavior.

Behavioral Beliefs and Evaluation Factors

Exhibit 6.1 lists the behavioral beliefs (potential advantages and disadvantages of breastfeeding and bottle feeding) and evaluation factors (potential consequences of breastfeeding and bottle feeding) included in study instruments (see Appendix A). For the behavioral belief items, women were asked to respond on a six-point scale ranging from strongly agree to strongly disagree. A different six-point response scale, ranging from extremely important to not at all important, was used for the evaluation factors.

Behavioral beliefs and evaluation factors were combined to create three scores: a ***breastfeeding score***, a ***bottle feeding score***, and an ***infant feeding preference score***. The breastfeeding and bottle feeding scores were the sums of scores for each of the behavioral belief items (strongly agree to strongly

Exhibit 6.1

Behavioral Beliefs and Evaluation Factors Used to Asses Infant Feeding Preference

BEHAVIORAL BELIEFS

Breastfeeding ...	*Bottle feeding ...*
is a very convenient method of feeding baby.	increases chances that the baby will have colic.
helps protect baby against infection.	provides incomplete nourishment for baby.
helps mother feel close to baby.	makes it easier for other family members to be involved in feeding baby.
helps mother lose weight.	makes it easier for the mother to go to work or school.
is embarrassing for the mother.	is an expensive method of feeding.
makes it difficult for the mother to go out.	is a trouble-free method of feeding
is difficult to do successfully.	allows one to see exactly how much milk baby has had.
is the best nourishment for baby.	
requires the mother to watch what she eats and drinks.	

EVALUATION FACTORS

How important is it that the feeding method you choose ...

is convenient?

helps protect baby against infection?

helps you feel close to baby?

helps you lose weight?

provides complete nourishment for baby?

allows baby's father or other family members to feed baby?

does not make you feel embarrassed?

allows you to go out socially?

makes it easy for you to go to work or school?

is trouble free?

is inexpensive?

allows you to see exactly how much milk baby has had?

decreases the chance of getting colic?

does not require you to watch what you eat or drink?

disagree), weighted by the relative degree of importance attributed to the item (extremely important to not at all important). Scores for belief items that were negative for a specific feeding method (e.g., "Breastfeeding is embarrassing for the mother") were reversed. The scores assigned to each behavioral belief were:

Strongly agree:	2.5
Agree:	1.5
Somewhat agree:	0.5
Somewhat disagree:	-0.5
Disagree:	-1.5
Strongly disagree:	-2.5

The following scores were assigned to each evaluation factor:

Extremely important:	6
Very important:	5
Somewhat important:	4
Somewhat unimportant:	3
Not very important:	2
Not important at all:	1

Thus, if a woman strongly agreed with all five positive beliefs about breastfeeding and strongly disagreed with all four negative items about breastfeeding, and rated all nine items as extremely important, her breastfeeding score would be the maximum of $9 \times 2.5 \times 6$, or 135. Conversely, if she strongly disagreed with the four positive beliefs about bottle feeding, strongly agreed with the three negative beliefs about bottle feeding , and assigned extreme importance to each belief, her bottle feeding score would be the minimum of $7 \times (-2.5) \times 6$, or -105.

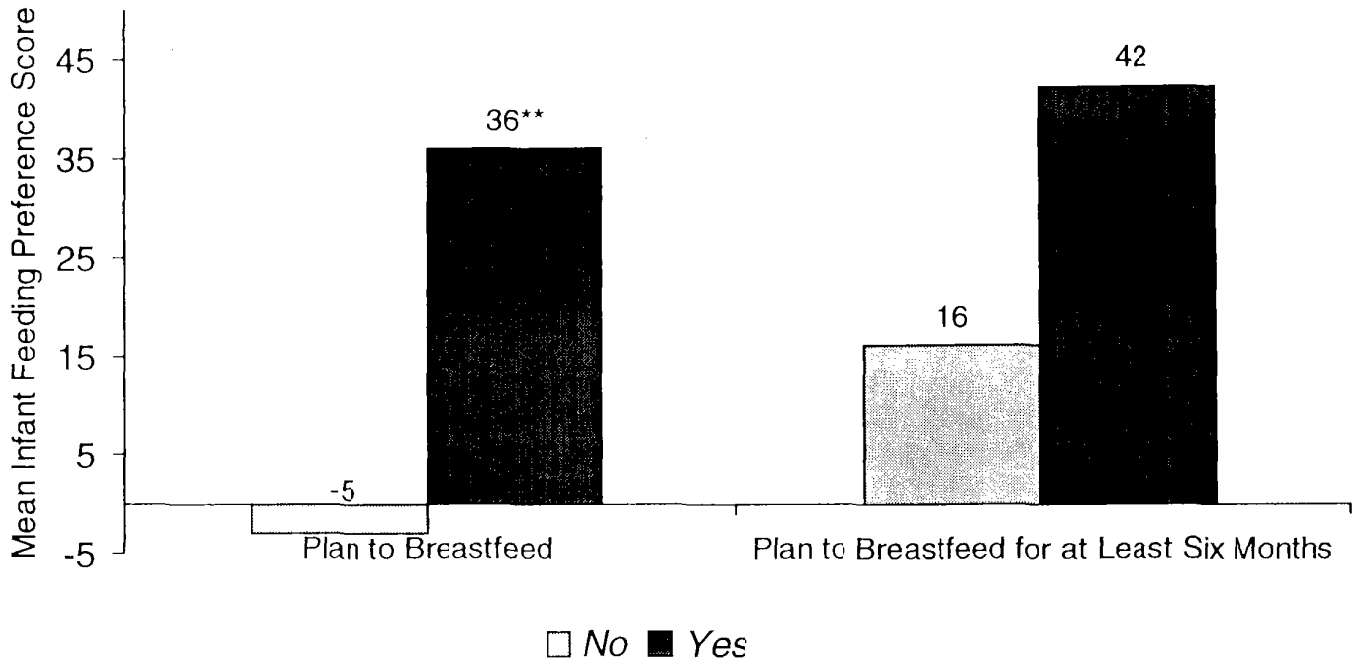
The infant feeding preference score was calculated as the difference between breastfeeding and bottle feeding scores. The higher the score, the greater the preference for breastfeeding. In actual practice, scores as high as 103.75 and -45 were observed at baseline for the breastfeeding and bottle feeding scores, respectively. Actual infant feeding preference scores were as high as 138.75.

Relationship Between Infant Feeding Preference Scores and Breastfeeding Intentions and Behaviors

Infant feeding preference scores were strongly related to both breastfeeding intentions and actual breastfeeding behaviors. As shown in Exhibit 6.2, the mean infant feeding preference score at baseline was 36 for women who planned to breastfeed (either exclusively or in combination with formula feeding). The mean score for women who planned to bottle feed exclusively was significantly lower, at -5. Similarly, scores for women who reported an intention to breastfeed for six months or more were significantly higher than scores for women who did not plan to breastfeed for at least six months (42 *versus* 16).

Exhibit 6.2

Infant Feeding Preference Scores by Baseline Intentions



**Difference between scores is statistically significant at the .01 level.

Infant feeding preference scores were also strongly related to actual breastfeeding behaviors (Exhibit 6.3). Women who initiated breastfeeding had significantly higher infant feeding preference scores than women who did not breastfeed at all (35 *versus* 6). Moreover, women who breastfed for six months or more (exclusively or in combination with formula) had a significantly higher mean score at baseline than women who breastfed for less than six months (43 *versus* 22).

The relationship between infant feeding preference scores and breastfeeding intentions and behaviors remains strong even after womens' demographic and other characteristics are taken into account. Four measures of breastfeeding intentions (intent to breastfeed exclusively; intent to use breastfeeding in combination with bottle feeding; intended duration of breastfeeding (months); and the intent to breastfeed for at least six months) were regressed on infant feeding preference score, including as covariates site indicators; key demographic characteristics; household needs and resources; pregnancy, childbirth, and WIC history; and baseline nutrition knowledge, attitudes, and behaviors. Separate models were run for baseline data and prenatal survey data. Comparable regressions were run for three measures of breastfeeding behavior (initiated breastfeeding (either exclusively or in combination with bottle feeding); breastfeeding duration (months); and breastfed for six months or more).

In all 11 models (four using baseline intentions, four using prenatal intentions, and three using actual behaviors) the relationship between infant feeding preference score and breastfeeding intentions or behaviors was positive and statistically significant (data not shown). These results indicate that infant feeding preference score is a strong predictor of breastfeeding intentions and subsequent behaviors, regardless of an individual's background characteristics. If WIC nutrition education can bring about a positive and sustained improvement in women's perceptions about the benefits of breastfeeding, and/or on the weight women give to perceived drawbacks to breastfeeding, it may be able to influence the initiation and duration of breastfeeding among WIC participants.

Of the 16 behavioral belief items included in the infant feeding preference score, the four that appear to be the most amenable to change, i.e., showed the greatest change between baseline and prenatal surveys were:

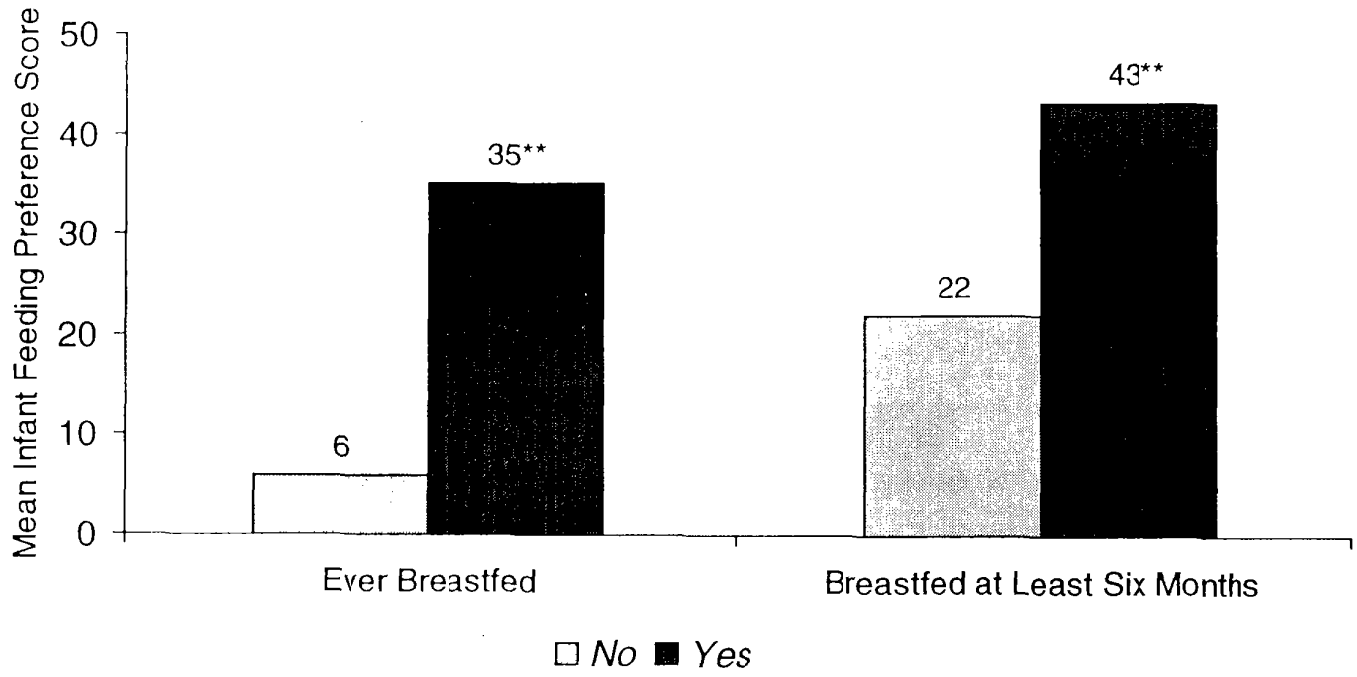
- breastfeeding helps protect baby against infection;
- breastfeeding helps mother lose weight;
- breastfeeding makes it difficult for mother to go out; and
- bottle feeding is a trouble-free method of feeding.

Between baseline and prenatal surveys, there was an increase in the percentage of respondents who *agreed* with the first two items and an increase in the percentage who *disagreed* with the third and fourth items. Each of these changes contributed to an improvement in the overall infant feeding preference score (more favorable to breastfeeding) between baseline and prenatal surveys.

While these beliefs may be good candidates for WIC breastfeeding promotion efforts, because they appear to be amenable to change, the data reported in Chapter 4 suggest that breastfeeding promotion efforts should focus as well on behavioral beliefs that were least favorable to breastfeeding and *did not* show substantial improvement over time. Recall that the improvement in infant feeding preference score at the time of the prenatal survey was essentially transient and did not lead to a significant change in women's behaviors (compared to stated intentions at the time of WIC enrollment).

Exhibit 6.3

Infant Feeding Preference Scores by Actual Breastfeeding Behaviors



**Difference between scores is statistically significant at the .01 level.

Beliefs that showed the least improvement between baseline and prenatal surveys included:

- breastfeeding is a very convenient method of feeding baby;
- bottle feeding makes it easier for other family members to be involved;
- bottle feeding makes it easier for the mother to go to work or school; and
- breastfeeding requires the mother to watch what she eats and drinks.

The theme of convenience/burden clearly underlies all of these beliefs.

Breastfeeding Exposure and Experience

Women were asked about their previous exposure to and experience with breastfeeding: whether they had been breastfed themselves; whether their mother had breastfed any of their siblings; whether any friends or relatives had breastfed a baby; and whether they had breastfed a previous infant. Most women (82 percent) had some prior exposure to or experience with breastfeeding. Over 70 percent had a friend or relative who had breastfed a baby, and 27 to 39 percent had experienced the other types of exposure.

Relationships between all four of the breastfeeding exposure variables and the initiation of breastfeeding were strong and statistically significant. The strongest predictor was having breastfed a previous infant, followed by having been breastfed oneself (Exhibit 6.4). Among women with previous breastfeeding experience, more than three-quarters initiated breastfeeding with the infant born during the study, compared to 51 percent of women who had no prior breastfeeding experience. Comparable patterns were noted for the other three exposure variables.

Even after controlling for other characteristics, as described in the preceding section, all four of the breastfeeding exposure measures were positively associated with the initiation of breastfeeding. The strongest predictors continued to be having previously breastfed a baby oneself and having been breastfed as an infant (data not shown). These data suggest that women who have little to no prior experience with or exposure to breastfeeding may be good targets for breastfeeding promotion efforts.

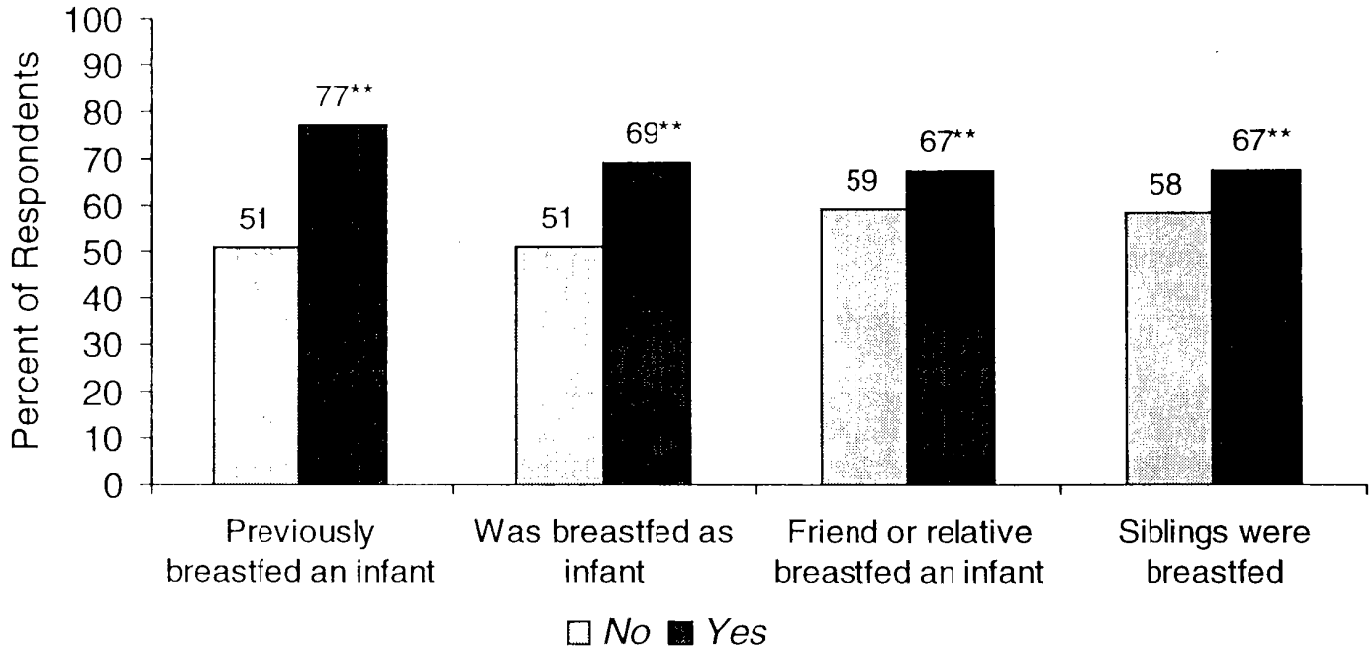
Influence of Social Support on Behaviors During Pregnancy

The analyses reported in this section assessed the influence of social support on adoption of desired health behaviors during pregnancy. Lack of support from a spouse, family members, or friends may make it difficult to follow recommended eating guidelines or to curb or eliminate use of cigarettes and alcohol. Health programs often try to minimize the negative impact of poor or inadequate social support by reaching out, to the extent possible, to participants' significant others. For example, Southeast Site 2 offered a special class for spouses or partners of women who were interested in breastfeeding.

Social support can be measured in a number of different ways. In this study, the baseline interview included a question about whether anyone in the respondent's life had or might make it difficult for them to follow through with specific health behaviors, including eating well during pregnancy; reducing or eliminating cigarette smoking; and reducing or eliminating alcohol consumption.

Exhibit 6.4

Breastfeeding Initiation by Previous Breastfeeding Exposure



Note: Includes women who breastfed for any length of time.

**Difference is statistically significant at the .01 level.

Negative social support was most problematic in the area of cigarette smoking. Almost one-quarter of the women who reported cigarette use prior to pregnancy reported that someone in their life had or might make it difficult for them to cut down or quit smoking. This problem was especially prevalent in Midwest Site 2, where almost one-third of the smokers reported negative social support for behavior change. Ten percent of all women indicated that their efforts to eat well during pregnancy might be compromised by lack of appropriate social support and fewer than six percent of respondents who reported use of alcohol reported negative social support for behavior change. Reports of non-support in both of these areas were also notably high in Midwest Site 2.

To test whether the presence of negative social support influences women's behaviors, other things being equal, several regression models were run using the following measures as dependent variables:

- use of cigarettes during pregnancy;
- use of alcohol during pregnancy; and
- daily consumption of selected WIC and non-WIC foods: milk; 100% fruit juice; fruits and vegetables; fried foods; sweets; and snack foods.

Separate analyses were run for prenatal and postpartum data. Sample sizes for the analyses related to use of cigarettes and alcohol were limited to respondents who reported engaging in these behaviors prior to pregnancy. Total sample sizes for these four regressions (two behaviors x two data sets) were between 600 and 700.

No significant relationships were detected between the presence of negative social support and any of the dietary behavior variables. In fact, for four of the five variables, the direction of the relationship, although not statistically significant, was the opposite of what was anticipated. That is, respondents who reported negative social support tended to drink more milk and fruit juice and eat fewer sweets and snack foods.

In contrast, the presence of negative social support for positive behaviors related to use of cigarettes and alcohol was associated with an increase in both of these behaviors. That is, the presence of negative social support was associated with both the likelihood of continued smoking during pregnancy and the number of cigarettes smoked at the time of the prenatal interview. A comparable relationship was observed for alcohol use. These data indicate that women's efforts to decrease or eliminate use of cigarettes and alcohol during pregnancy may be undermined by lack of support among significant others. Efforts to decrease these behaviors among WIC participants may be enhanced if the understanding and support of women's spouses, partners, and significant family members is solicited.

REFERENCES

Azjen, I. and M. Fishbein (1980). *Understanding Attitudes and Predicting Social Behavior.* Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psych Rev* 84: 191-215.

Fishbein, M. and I. Azjen (1975). *Beliefs, Attitudes, Intention, and Behavior.* Reading, MA: Addison-Wesley.

Fox, M.K., et al. (1998). *WIC Nutrition Education Assessment Study: Baseline Data Report.* Report prepared by Abt Associates Inc. for the Food and Nutrition Service, U.S. Department of Agriculture.

Gielen, A.C., et al. (1992). Determinants of breastfeeding in a rural WIC population. *J Hum Lact* 8(1): 11-16.

IOX Assessment Associates (1988). *Program Evaluation Handbook: Nutrition Education.* Los Angeles, CA: IOX Assessment Associates (pp. 165-166).

Manstead, A.S., C. Proffitt, and J.L. Smart (1983). Predicting and understanding mothers' infant feeding intentions and behaviors: testing the theory of reasoned action. *J Pers Soc Psychol* 44: 657-671

Matheny R.J., M.F. Picciano, and L. Birch. (1987). Attitudinal and social influences on infant-feeding preference. *J. Nutr. Ed.* 19(1): 21-31.

Peacock, J. (1998). Personal communication.

Rosander, K. and L. Sims (1981). Measuring effects on an affective-based nutrition education intervention. *J. Nutr. Educ.* 13(3): 102-105.

U.S. Department of Agriculture (1993). *Infant Nutrition and Feeding: A Reference Handbook for Nutrition and Health Counselors in the WIC and CSF Programs.* Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service.

Williams, R.L., et al. (1990). *Study of WIC Participant and Program Characteristics: 1988.* Report prepared by The Research Triangle Institute for the Food and Nutrition Service, U.S. Department of Agriculture.