

Using Point-of-Purchase Data To Evaluate Local WIC Nutrition Education Interventions

Feasibility Study

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Abstract

The effect of nutrition education—an important component of many Federal Food Assistance programs—on participants' food consumption behavior is difficult to ascertain. This study finds that combining point-of-purchase data with State data on the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is a feasible method to assess behavioral changes in WIC participants. The major obstacle to using these data as a practical method of evaluating WIC participant food-purchasing behaviors is the recruitment of enough stores to allow for a representative sample of WIC participants to be included. The study found that nutrition education intervention directed at encouraging the purchase of 1-percent and skim milk, as well as low-fat cheese, did not significantly influence purchasing patterns among WIC participants.

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Executive Summary

This report presents the findings of a feasibility study conducted to determine whether using point-of-purchase data from grocery purchases made by clients participating in the Supplemental Nutrition Program for Women, Infants, and Children (WIC) can provide a useful and practical method for evaluating local WIC nutrition education efforts. The overall goals of the study were twofold: first, to determine the feasibility and practicality of collecting and linking grocery store Universal Product Code (UPC) data with WIC client demographic data, and second, to test whether these data were useful in examining client behavior changes as a result of receiving a nutrition education intervention.

A. Overview of Study

Nutrition education is a key component of the WIC program. However, there is little evidence to indicate that WIC nutrition education changes eating or food purchasing behaviors. The major obstacle to assessing the effectiveness of WIC nutrition education on behavioral change is that most studies rely on participant self-reporting of data. This study was designed to test the feasibility of examining food purchasing patterns before and after a nutrition education intervention using actual food purchasing data from WIC participants, thus eliminating self-reporting.

The study utilized point-of-purchase data from a major chain store in the State of Washington combined with WIC demographic and redemption data provided by the Washington State WIC program. Data were not representative of all WIC participants in Washington State, nor were they representative of WIC clients utilizing chain stores. However, the data do provide a sound basis for examining the feasibility and practicality of using these types of data to conduct evaluations of local WIC nutrition education activities.

Focus groups were conducted after the second round of data collection to provide insight as to the rationale for food purchases among various groups of WIC participants.

B. Findings related to feasibility and practicality

A number of factors affect the feasibility and practicality of using point-of-purchase grocery store data to evaluate WIC participant food purchasing behavioral changes. The study did find that combining point-of-purchase data with State WIC program data is a feasible method to assess behavioral changes in WIC participants. However, the major obstacle to using these data as a practical method of evaluating WIC participant food purchasing behaviors is the recruitment of enough stores to allow for a representative sample of WIC participants to be included. Some of the obstacles to store participation included:

- Lack of scanning equipment capable of capturing WIC transactions;
- Lack of the ability to incorporate the WIC fiscal instrument (FI) number into the store's scanned data system;
- Lack of staff at the store level that could dedicate time and effort into producing a WIC transaction database;
- Lack of interest in WIC nutrition education outcomes on the part of store personnel; and
- Concerns over client confidentiality

C. Findings related to behavioral changes in the study population

The second objective of the study was to examine whether clients changed their food purchasing behaviors related to the fat content of milk and cheese after receiving nutrition education directed at encouraging the purchase of 1% and skim milk, as well as low-fat cheese. Data were collected for the study population prior to and after the nutrition education intervention was provided. The study found:

- Most study participants purchased whole, two-percent, or a combination of whole and two-percent milk prior to the nutrition education intervention. Of total milk purchased, 87% was either whole milk or two-percent milk.
- Virtually all study participants (97%) purchased regular cheese prior to the nutrition education intervention.

- The variance in purchasing patterns among study participant demographics, including age, and participant category (woman or child) prior to the nutrition education intervention was insignificant.
- There was no significant change in purchasing patterns among the study participants after the nutrition education intervention. Study size limitations made it impractical to assess levels of change among demographic groups.
- Focus group participants explained that taste preference, family preference, and historical purchasing patterns, influenced their choice of milk or cheese more than WIC nutrition education.

D. Conclusions and recommendations

States interested in using this approach, based on store information, to collect data to support nutrition education evaluation should develop a system to make these data available on a regular basis. One of the key issues in assessing the feasibility and practicality of using this tool is the ongoing availability of food purchasing data. The key issue in obtaining WIC food purchasing data is convincing the stores that it is important for them to share the information.

The study team conducted a series of interviews with a variety of store officials, State WIC program staff, and local WIC staff to determine what might be done to facilitate participation in data-sharing arrangements. The following recommendations were made that may encourage store participation:

- 1. Change WIC vendor agreements to facilitate and authorize the provision of food purchasing data.**
- 2. Develop systems that would facilitate including WIC check numbers in the WIC transaction databases**
- 3. Track store capabilities to provide data during the WIC participation authorization process so that data are available on stores that might be able to participate in similar projects over the course of their authorization period.**
- 4. States should consider working with major chain stores to develop a model data confidentiality agreement that would protect stores.**

5. Provide vendors with information about the role of nutrition education in WIC.

Using food purchasing data to examine the impact of nutrition education interventions can be an important tool in assessing client behavioral change. By examining the actual food purchases of clients, researchers can avoid many of the pitfalls encountered when trying to collect self-reported data. Logistical barriers to store participation are the major impediments to widespread use of this technology. To increase the effectiveness and practicality of this approach and to support this important data collection effort, States must recognize the benefit of using this kind of technology to measure program outcomes and also must promote within their WIC vendor management systems the technology itself as well as solutions to logistical problems.

Using Point-of-Purchase Data to Evaluate Local WIC Nutrition Education Interventions: A Feasibility Study

This report presents the findings of a feasibility study conducted to determine whether using point-of-purchase data from grocery purchases made by clients participating in the Supplemental Nutrition Program for Women, Infants, and Children (WIC) can provide a useful and practical method for evaluating local WIC nutrition education efforts.

The overall goals of the study were twofold: first, to determine the feasibility and practicality of collecting and linking grocery store Universal Product Code (UPC) data with WIC client demographic data, and second, to test whether these data were useful in examining client behavior changes as a result of receiving a nutrition education intervention.

The report consists of four sections. This first section provides background on the rationale for the study and its objectives. The second section examines the methods used to conduct the study. The third section presents the findings, both those related to the feasibility of using the proposed data linkage as a practical tool for measuring local nutrition education interventions as well as the results of the quantitative data analysis of the food purchasing patterns before and after the implementation of the nutrition education campaign. In addition, this section incorporates relevant insights obtained from focus groups of WIC clients with regard to the nutrition education intervention and its relative importance in the selection of WIC foods. The final section presents our recommendations, including those for future areas of investigation.

I. Background and Overview

WIC is one of this country's key food assistance programs, serving low-income women, infants, and children. Funded by the U.S. Department of Agriculture (USDA) through its Food and Nutrition Service (FNS), the WIC program each month provides nutrition education, supplemental foods, and referrals for health care and other social services to more than 7.5 million clients nationwide. One of the key objectives of the WIC program is to provide supplemental foods to enhance the nutritional status of eligible individuals in order to promote

optimal human health and well-being through improved nutrition (FNS 2002). Most WIC programs provide healthy foods through the use of food instruments (FIs), such as a check, voucher, or electronic benefits card. The WIC program specifies the types of foods that can be purchased by participants, but it allows participants to make choices about which specific foods they can select within the various food categories.

A. Nutrition Education in the WIC Program

A key component of the WIC program is the provision of nutrition education to pregnant, breastfeeding, and postpartum women, as well as to the parents of eligible infants and children. FNS notes in its 2002 report to Congress that programs such as WIC are a venue for reaching parents and others in the community in order to promote practices that support healthy eating for children (FNS 2002). Federal regulations require that the WIC program offer at least two nutrition education contacts to the participant during each certification period. These contacts include activities that are designed to motivate clients, most of whom have limited family budgets, to develop healthy eating and lifestyle behaviors that are consistent with the most recent dietary advice as reflected in the *Food Guide Pyramid* and *Dietary Guidelines for Americans*.

WIC nutrition education efforts often are directed into three primary areas. First, WIC participants are encouraged to view the WIC food package as a “food prescription” designed to help overcome an identified nutritional risk. To this end, WIC participants are encouraged to purchase and eat all of their prescribed foods. Second, WIC promotes breastfeeding as the optimal source of nutrition for infants. Finally, attention is often given to the selection of healthy foods as part of a larger effort to focus on the nutritional problems of low-income audiences. An example of this is the recent FNS initiative on preventing and reducing childhood obesity. To support FNS’ efforts in this area, some States are using WIC nutrition education to promote the choice of low-fat alternatives within certain WIC food categories, particularly milk and cheese.

WIC nutrition education is generally provided to the client in person, using one of two methods. Many WIC agencies provide nutrition education through a one-on-one nutrition education session, either at the time of certification or at the time the WIC FI is picked up by the

participant. Other agencies may use group classes to provide nutrition education. In either case, the time available for nutrition education is often limited by the need to conduct and process certification information and by the significant demands that are made on the time of the WIC nutrition staff.

B. The Effectiveness of WIC Nutrition Education

Recent studies, such as the *WIC Nutrition Education Demonstration Study* and the *WIC Nutrition Education Assessment Study*, show that nutrition education in the WIC program is effective in providing the WIC participant with nutrition knowledge. However, the studies yielded inconclusive findings when examining the relationship between increased knowledge and the actual food purchasing behaviors of the WIC participants. Both of the studies noted above concluded that despite the attempts to develop a valid tool to measure the impact of nutrition education on food purchasing patterns, a generally accepted version does not exist (USDA 1999; USDA 2001).

One of the primary problems with the methodologies used to measure behavior change is the use of self-reported data. In a recent report to Congress, the General Accounting Office (GAO) reviewed studies examining the impact of WIC nutrition education services and concluded that “the results of seven impact studies provide few, if any, insights into the effectiveness of specific WIC nutrition services. The results of the impact studies are severely limited by methodological constraints, including the use of outdated and poor-quality data” (GAO 2001). Hersey, et al. also noted in 2002 that the food shopping practices of low-income families are associated with diet quality and as such represents an area that deserves increased attention in nutrition education efforts. However, there is a need for research to assess the validity with which the self-reported measures from low-income respondents reflect actual food shopping practices (Hersey, et al. 2002).

The self-reporting of data related to the impact of nutrition education on food purchasing patterns has several drawbacks, including low response rates, errors in respondent recall of which foods were purchased, and the deliberate provision of misinformation designed to make the nutritionist

believe that the participant followed his/her advice and purchased the foods that were expected of them. Even when food assistance participants have been asked to keep store receipts for a particular time period, the fact that participants know that the government will be examining their food purchases may cause them to modify their shopping patterns for that time period (USDA 1999).

C. The Purpose of This Study

State and local WIC agencies, along with program evaluators and researchers, would benefit greatly if a tool were available to examine whether nutrition education efforts produced changes in client behavior. This study was designed to examine whether combining point-of-sale grocery store scanning data with State-level WIC demographic and redemption data could be used effectively to measure the impact of local WIC nutrition education interventions. The technology of linking WIC food purchases with State WIC program client demographic and redemption data was proven feasible in the USDA-sponsored 1997 WIC Food Purchasing Study (Bell, et al. 1997) and further supported by a similar study of the Food Stamp Program in 1999 (Kirlin, et. al. 1999)

The use of scanning data from grocery stores has the potential to be an effective tool in assessing WIC program nutrition education. This is because point-of-purchase scanning data contain all of the information about a transaction, including the type of food purchased, the brand name of the food product, the container size, the date the product was purchased, the price of each item, and whether a WIC FI was used to pay for the transaction. These data, when linked to State-level WIC program demographic data, can provide an accurate picture of the food purchasing patterns of WIC clients. The single greatest advantage of using scanner data from grocery stores is that this method allows for accurate data collection in a manner that guarantees client confidentiality and that does not require the client to provide any self-reported data.

The objectives of this study, therefore, were threefold. The first objective was to examine factors that must be present, within grocery stores and a State WIC office, to be able to construct a linked database of scanned food purchasing data and State-level demographic and redemption

data suitable for examining food purchasing patterns of WIC participants. The second objective was to test the feasibility of using these methods to evaluate local nutrition education interventions. We sought to accomplish this by conducting an analysis of food purchasing behaviors of clients from four local agencies participating in a nutrition education intervention designed to promote the use of low-fat alternatives within WIC food categories, specifically milk and cheese. Finally, the study sought to gain insights into why clients did or did not make their food purchases in accordance with the WIC nutrition education message.

The specific research questions that were examined are as follows:

- To what extent are WIC-authorized grocery stores in selected geographic areas of Washington State capable of and interested in providing data on WIC food purchasing patterns?
- What barriers prevent WIC-authorized grocery stores with the technical capability to provide WIC food purchasing data from actually providing these data to State officials and researchers?
- To what extent can food purchasing data obtained in this study be linked with State WIC program demographic and redemption data to create a database of client food purchasing patterns?
- What are the food purchasing choices made by WIC participants with regard to the fat content of milk and cheese?
- To what extent were changes made in the type of milk and cheese selected by study participants after receiving nutrition education interventions directed at encouraging the purchase of low-fat milk and cheese?
- To what extent is this technology and approach useful and practical for the measurement of behavioral changes that result from local nutrition education interventions?

II. Study Methods

To test the feasibility of using the technology described above, the Washington State WIC program was recruited to participate in the study. Washington was selected for two reasons. First, it uses a “vendor-specific” check system, which requires participants to select a single store for all of their WIC shopping. Such a system allows the study team to track all WIC purchases made by an individual selecting a study store for his/her shopping. Second, Washington State is well known for the quality of its nutrition education efforts. The study team believed that Washington State could identify a number of local agencies that would not only be interested in participating in the study, but that also would make the necessary commitment to implement the proposed nutrition education intervention.

Within Washington State, a selected group of local WIC agencies was recruited for inclusion in the study. These local WIC agencies agreed to participate in the study by conducting nutrition education focused on encouraging WIC participants to purchase low-fat alternatives within their WIC food package choices. In addition, a number of grocery stores that were located within the geographic service area of the selected agencies and that had the potential for providing scanning data were approached and encouraged to participate in the study. In the end, one large food store chain agreed to participate.

A. Study Design

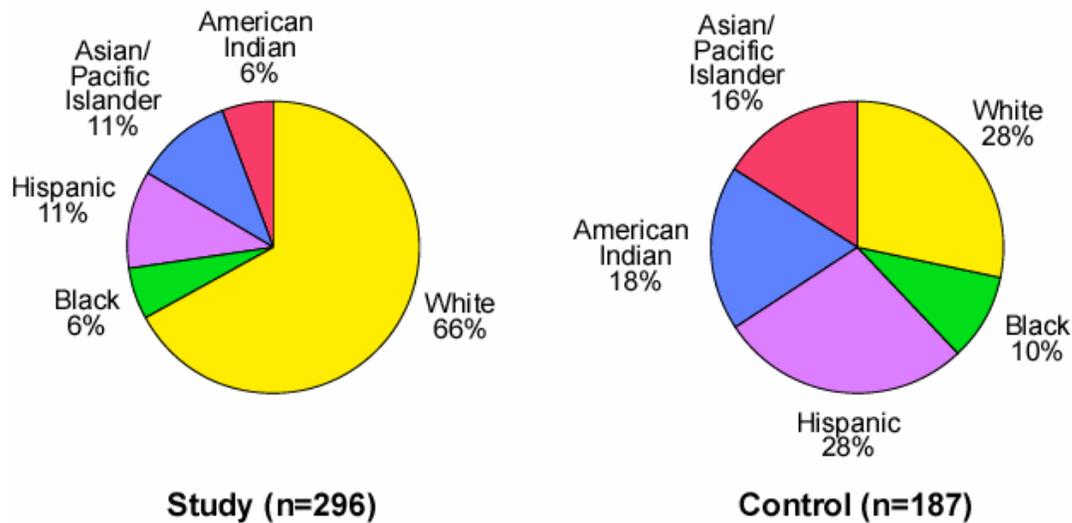
For this study we conducted a pre- and post-intervention analysis of food purchasing data from clients shopping at stores included in the study. To do this, we first examined the food purchasing patterns of WIC participants shopping at the selected study stores prior to the implementation of the nutrition education intervention at their local agencies (baseline data). Next, the local agencies implemented the nutrition education intervention over a six- to eight-month period to ensure that all WIC participants being served by the agency were exposed to the nutrition education message. A second round of data collection then took place to collect post-intervention food purchase data. We then were able to conduct an analysis of changes in the

food purchasing patterns of the WIC participants who received the nutrition education intervention.

The possibility of using a control group was examined to provide additional methodological rigor. Because of the large geographic reach of the chain store providing the food purchasing data, the study team tried to identify geographic areas and local WIC agencies within Washington with client demographic characteristics similar to those of the agencies implementing the nutrition education intervention. In addition, preliminary data indicated that approximately the same percentage of WIC participants in the possible control clinics used the selected chain store for their WIC food purchases. To attempt to procure a valid control group, food purchasing data were collected from the stores located in the service area of these additional sites, and these data were linked to the demographic and redemption database provided by the State WIC program.

However, even though the demographic profiles of the selected control agencies were similar, the variability of store choice on the part of participants created a problem with matching demographic characteristics of the actual shoppers. We discovered that, when the linked data for the intervention sites and potential control sites were compared, a significantly different demographic group selected the chain store for its WIC shopping in the intervention group as compared to the control group. Because of the extreme differences between the two groups, we decided that participants using the proposed sites did not constitute a valid control group. Figure 1.1 below displays the differences in demographic profile between the study sites and the proposed control sites.

Figure 1.1
Comparison of population demographics between study and control groups



Finally, after data were collected for the post-intervention clients, focus groups of WIC participants were conducted at the intervention clinics to determine whether the nutrition education message was recognized and understood. In addition, the focus groups examined client rationales for their food purchasing choices and how they were impacted and influenced by the WIC nutrition education.

B. Study Implementation

Once agreement was reached with the Washington State WIC program, four separate but critical activities took place to fully implement the methodology:

- Local WIC agencies were identified and recruited to implement a nutrition education campaign over a sustained period of time designed to promote the purchase of low-fat alternatives within the WIC food package.
- Stores within the geographic service areas of the selected WIC clinics were identified and recruited that would be willing to provide UPC scanned data that could be linked to both a WIC transaction and a specific WIC FI.
- The WIC UPC scanned data from the grocery stores were linked with the demographic and redemption data provided by the State WIC office.

- WIC participants within the selected local agencies were recruited to participate in focus groups designed to examine whether the nutrition education message was received and how it influenced food purchasing decisions.

Each of these steps is discussed below.

1. Selection of local agencies for inclusion in the study

The selection of local WIC agencies for participation in the study involved recruiting WIC sites where the implementation of a new nutrition education campaign would be both feasible and practical. As noted in the introduction to this report, local WIC nutrition education staff can spend only a limited amount of time providing nutrition education to clients. Participation in the study required a commitment of time on the part of local nutrition educators to implement the nutrition education interventions and to sustain the campaign over an extended period of time. Because WIC participants only receive two nutrition education contacts, and because these contacts can happen any time over a six-month period, the only method of assuring that all WIC participants were reached by the campaign message was to conduct the intervention over a six- to eight-month period. By doing so, all WIC participants that purchased food during the last month of the intervention would have been exposed to the nutrition education message.

The campaign selected for implementation involved the promotion of low-fat and skim milk as alternatives to higher-fat milk. In addition, the agencies also promoted the selection of low-fat cheese over regular cheese. Because all of the WIC sites included in the study provided nutrition education on a one-on-one basis, the campaign structure and materials were adapted to fit this nutrition education delivery model. Campaign materials were identified by clinic staff, and the design of the campaign was reviewed by the study team. Local agencies were then instructed to begin and end the campaign on selected dates. Although only 20% of the WIC participants shopped at the stores selected for inclusion in the study, all of the WIC participants received the same nutrition education message. Nutrition educators felt that it was impractical for the clinic to select only those using the study store to receive the intervention. The local WIC agency assisted the study team in recruiting WIC clients for focus groups after the intervention was complete.

As a result of the recruitment efforts made by the Washington State WIC program and the Health Systems Research (HSR) project team, four local WIC sites were selected for inclusion in the study. These sites were selected because the local staff agreed to the conditions necessary for completion of the study and because the sites were located within the geographic areas served by the stores selected for the study. Additionally, the sites were selected because a sufficient percentage of their clients selected the study chain store as their choice for shopping. The clinic sites included an urban site, two suburban sites, and a rural site.

Finally, the nutrition education staff at the selected local agencies were interviewed to gain insight on potential data analysis variables. Using their experience to guide us, we determined that variables to be used in the analysis should include age, ethnic/racial category, and mothers as compared to children. However, ethnic/racial comparisons are not presented in this report because samples sizes did not support analysis by this variable.

2. Selection of chain store for obtaining food purchasing information

The selection of the stores for the study was one of the most challenging aspects of the project. For the study to work, the stores to be selected for study participation needed to meet four important criteria:

- The stores had to have scanning equipment that could identify the WIC transaction as one separate from other transactions made by a customer on the same store visit (purchasing WIC and non-WIC items during the same visit).
- The stores had to have the ability to incorporate the WIC check number into its scanned UPC database or to provide enough information to allow for the use of algorithms for linkage when the check number could not be identified.
- The stores had to be able to provide the transaction data in a form that allowed for analysis of individual food types, sizes, and brands.
- The stores needed to be located within the geographic service area of the local agency study sites and have a reasonable number of WIC clients from the local WIC agency as shoppers.

The study team conducted an initial assessment of all stores located within the geographic service areas of the local WIC agency sites. After reviewing data provided by the Washington State WIC program using the criteria noted above, 16 independent stores, 4 regional chain stores, and outlets representing 4 national chain stores were identified as potential participants. For the individual stores and regional chain stores, each owner was contacted; the study was explained to each owner in detail; and each owner was asked if he/she would be willing to participate. In the case of national chain stores, the regional or national headquarters office was contacted. If the store representatives indicated an interest in being included in the study, a series of questions were asked to determine whether the store had the technical capabilities required for participation.

Six individual stores, two regional chains, and four national chains were identified as potential candidates for inclusion in the study. In the end, one regional chain store was selected. This decision was influenced by several factors:

- Of the six individual stores, four did not have the capability to collect scanner data to distinguish a WIC transaction from other transactions.
- Of the two remaining individual stores, neither had the capability to input or identify the WIC check number into the scanned UPC database.
- Two of the regional chain stores and three of the national chain stores indicated that they did not have staff time available to either make necessary modifications to their existing data collection system or create a unique WIC database.
- One regional chain store, although very interested in participating, was in the process of modifying its existing scanner system and indicated that the changes would not be ready in time for the study.
- One national chain store initially agreed to participate, but the decision was reversed by the national headquarters office legal department, which expressed concerns about client confidentiality and potential liability.

These factors are discussed in more detail in the findings section of this report.

Despite these setbacks and the fact that multiple grocer participants were not available, the chain store selected for the study turned out to be an excellent partner. The chain store met all of the criteria for inclusion and was very interested in participating. One of the key factors in making the decision to use this chain store was the fact that it had a significant number of outlets that were close to the WIC sites included in the study.

Other factors also supported the use of this chain store. For example, the percentage of local WIC clients using its outlets was as high as or higher than the percentage of local WIC clients using any other chain store that might have been included. Approximately 20% of the local WIC clients in the study sites selected one of this chain's stores. In addition, the store management identified a single staff person to serve as a liaison to the project team, and this individual coordinated the necessary data processing and programming support among all the store outlets so that data were provided in a timely manner. As a result, a total of 14 individual store outlets were identified as data sources. Data from the stores were processed daily and transferred to the study team weekly.

Finally, after the data were provided, the chain store officials agreed to be interviewed by study staff to discuss how the technology could be improved and what factors might be considered to encourage other stores to participate in similar studies.

3. Linking of store UPC data with State demographic and redemption data

Once a complete month of store WIC transactions were processed by the study team, the Washington State WIC office was notified of the time period for which State-level data were needed. Upon receipt of the State data, the study team linked the transactions records provided by the store with the State demographic and redemption files. The WIC check number was the primary method used by the team to create the linkage. When a check number was not present, an algorithm was developed to match the transaction with the redemption record. This algorithm included matching on such factors as store identification number, date check used, type of food package, total price of the foods, and food items included on the check.

4. Recruiting focus group participants and conducting focus groups

Upon receipt of the store data for the month designated for the post-intervention analysis, the local WIC agencies were contacted and asked to assist with the recruitment of WIC participants for a series of four focus groups. As noted earlier, the purpose of the focus groups was to provide insight into the thinking of WIC participants who were exposed to the intervention regarding their food purchases. Two specific criteria were provided to the local agency for recruitment purposes: 1) clients were exposed to the nutrition education intervention and 2) clients had selected the study store for their WIC shopping. In addition, we asked that the individuals include a mix of pregnant, breastfeeding, and/or postpartum women, as well as individuals whose children were enrolled in WIC. The local WIC agencies were successful in recruiting a minimum of six to nine participants at each site. A total of four focus groups were conducted.

The focus groups were structured to obtain information in five broad categories:

- Did the participants remember receiving nutrition education in general and the intervention message in particular at some time during the prior six months?
- Did the participants feel that nutrition education was a valuable component of the WIC program?
- Did the nutrition education message participants received play any role in their decision-making process regarding which types of milk and cheese to select?
- If the nutrition education message did not have influence on decisions regarding milk and cheese selection, what factors did the participants take into account when making this choice?
- How could nutrition education be better structured or presented to be more helpful in making healthy eating choices?

C. Data Analysis and Limitations of the Data

1. Analysis of feasibility data

During the study process, the study team conducted an ongoing assessment of the practicality and feasibility of the technology used to accomplish our objectives. To be sure that data collected regarding feasibility issues were carefully examined, the study team and data processing staff from the chain store developed a checklist of issues that were examined during the data collection process. These issues included the following:

- How to sort and separate the WIC transactions from all other purchases made by the client at the time a WIC voucher was used, thus creating a single transaction record for each client.
- How to best capture the WIC check number and place it into the scanned database.
- How to capture product descriptions using UPC codes.
- How to structure the database to reflect both individual items purchases as well as the total number of items purchased for each transaction.
- How to track the accuracy of purchase transactions to ensure that a complete transaction record could be created for each participant, even if he/she shopped on multiple days.

This was accomplished through a series of tests using data from a single store outlet. The data were provided to the project team in different formats, and each was analyzed for its advantages and disadvantage. Conference calls were conducted after each test dataset was sent and analyzed. Alternatives to format and content were explored by the chain store data processing officials, and requests for modifications to either data format or content were accommodated. In the end, the final database was designed and created to facilitate the linkage of data from the State WIC agency and to provide the necessary transaction detail in a format that would allow for ease of analysis.

2. Analysis of pre-and post-intervention data

The linked data from all of the study stores were analyzed to create a pre-intervention or baseline dataset and a post-intervention dataset. The analysis was conducted using Statistical Analysis Software (SAS) and was focused on comparing baseline with post-intervention data. Pre- and post-intervention data could not be matched to the individual level over time. For this reason, pre- to post-intervention changes were examined at the group, not the individual, level. Data were analyzed in order to:

- Assess the overall change in behavior across all study participants.
- Assess the change in behavior of those shopping for themselves (pregnant, breastfeeding, and postpartum women) as compared to those shopping for children.
- Examine differences across age groups, including a comparison of adults to adolescents and of children less than three years of age to those over three.

3. Limitations on the use of the pre- and post-intervention data

Because this was a feasibility study, it was not designed to draw conclusions that would be applicable to the Washington State WIC population in general or to the population served by specific clinics. In this kind of study, the testing of feasibility must be confined to the circumstances surrounding the item being tested. That being said, it is important to be specific regarding why study results from the analysis of pre-and post-intervention data cannot be generalized. The specific limitations include the following:

- **Lack of a randomized sample of WIC participants.** Because this was a feasibility study, and because only the outlets of one chain grocery with the necessary technology were used, a random sampling of WIC participants was not possible. The purposive sample that was used reflects only the individuals who selected one of the study stores for shopping. Because the sample was not randomized, we cannot draw any conclusions related to participants who did not shop at the study stores.

- Lack of different stores for comparison of results. Although we believe that this chain store is typical of chain stores in Washington State, and although 80% of the 12,000 WIC clients in the study area use chain stores for their WIC purchases, we do not know what factors might cause a person to select this chain store over others. In addition, we do not know whether factors related to chain store choice influenced the decision to purchase different types of milk and cheese products. We also did not have data available from individuals who shopped at other chain stores for comparison with those who shopped at the selected chain. We therefore do not know if any factors related to the stores themselves influenced participant decisions.
- The relative size of the study population. Because this study was designed to examine the feasibility of analyzing data regarding local nutrition education interventions, and because the study population was limited to those shopping at an outlet of the selected chain store, the total population included in the study represented only 20% of the WIC population attending the study sites. Because these numbers are small and not randomized, conclusions cannot be drawn for all participants at the study sites. Furthermore, the sample size in this study does not support the analysis of results by race/ethnicity.
- No assessment of the quality or frequency of the nutrition education intervention. We did not collect any data to assess the quality or variability of the nutrition education provided because our focus was to determine whether we could use the food store data to assess education impacts, not to critique the quality of the education intervention that was delivered. Because all of the nutrition education was provided in a one-on-one setting, we do not know if the approach or amount of time spent by the nutrition educator varied across sites. We therefore cannot be sure that a consistent message was provided to all participants.

III. Study Findings

This section presents the findings of this feasibility study. First, the findings are discussed related to the feasibility and practicality of using the study technology as a tool to capture information about food purchasing patterns of WIC participants. Next, the findings are presented that are related to the analysis of the pre- and post-intervention food purchasing data. Incorporated into this section are relevant insights provided by the focus group participants.

A. Findings Related to the Feasibility and Practicality of Using Linked Data

This section presents the feasibility findings related to the use of the technology as a tool for evaluating the impact of the WIC nutrition education intervention on food purchasing choices.

1. Feasibility of using linked data

In general, the technology worked very well, and data obtained from both the store and the State WIC offices were complete in terms of reflecting all WIC transactions and were workable in creating a database of WIC transactions linked to client demographic and redemption data. One of the key elements in making the linkage successful was the ability of the chain store to “read” the WIC check number from micro-encoded data on the bottom of WIC checks. This involved re-programming store check-reading machines to capture this information (which occurs as checks are passed through the machine to record store check deposit information). Capturing the WIC check number in this way made it easy to use the State WIC redemption file to find a check number and link it to a participant. Because the chain store makes daily bank deposits, the data from all the chain outlets must be transferred to the headquarters office on a daily basis. The WIC checks were then read along with all other instruments (personal check, gift certificates, and others) and the data were pulled into a separate file. This file was then transferred into a text file suitable for importing into SAS. The text file was compiled on a weekly basis and sent via e-mail to the HSR project team. Nearly all baseline checks could be linked to a WIC record, with a 99.8% match rate.

During the post-intervention data collection phase, the HSR study team encountered a problem. The chain was bought out by a much larger national chain, and the new owners replaced all of the scanning equipment in the study stores. As a result, new check reading equipment was used that did not have the capability of capturing the WIC check number in the database. To solve this problem, the check number was entered into the system manually at the cash register. However, because of inconsistent data entry, about 40% of the records contained no WIC check number.

To address this issue, the study team developed an algorithm to match the transactions to a client record using reconciliation data from the State. By using the algorithm, the team was able to match 90% of the store transactions to a client record. The only transactions that could not be matched were those that involved two or more client records that matched a group of transaction records, but for which no distinction could be made to identify which transaction went with which record.

2. Practicality of obtaining linked data

The single biggest issue related to the practical use of food purchasing data is the willingness of a store to cooperate with researchers. In order to ensure that a sufficiently large population can be included in a study to support valid conclusions, multiple stores must contribute data to the study. On the one hand, this does not seem like an overwhelming task, because about 80 % of all WIC transactions in the study areas flowed through the six major chain stores. These chain stores all either have the technology available or, with small modifications to existing systems, could have the technology available to produce a database with WIC transaction records. However, as noted previously, all but two of the chain stores indicated that they did not want to be included in the study. Most indicated that they did not have sufficient staff resources to make providing WIC data a priority. The one chain that noted problems with confidentiality recently had been sued by a consumer advocacy organization for selling information from its frequent shopper program. This chain decided that it would no longer provide anyone with customer food purchasing data, even when customer confidentiality could be guaranteed. Unless ways can be found to increase store cooperation and involvement, the practicality of collecting large amounts

of data from a variety of stores seems limited. However, as we will discuss in our recommendations section, there are ways to reduce the burden of providing these data, deal with confidentiality issues, and provide incentives that would promote store participation.

B. Findings Related to Pre- and Post-Intervention Behaviors

This section presents the findings from the analysis of the pre- and post-intervention data collection. The first section provides information on the baseline data collection, which reflects the purchase of different types of milk and cheese by the study population as a whole and by the various demographic subgroupings. The second section compares the baseline data with the post-intervention data. As previously noted, relevant information from the focus groups will be included in the second section.

1. Overview of data presentation

The nutrition education intervention was designed to promote the purchase of low-fat or skim milk. For a number of years, a great deal of confusing information has been available regarding the relative fat content of whole milk compared to 2% milk, 1% milk, and non-fat milk. Other than for whole milk, the actual percentage referred to in the milk description relates to the percentage of the weight (based upon 100 grams) of the milk that comes from fat. For example, whole milk has 3.34 % of its weight per 100 grams composed of fat; 2 % milk has 2% of its weight per 100 grams composed of fat; and 1 % milk has 1% of its weight per 100 grams composed of fat.

The real difference between truly low-fat milk and higher-fat milk is found in the grams of fat per serving (of one cup). Whole milk contains more than 8 grams of fat per serving, while 2% milk contains more than 4.5 grams, and 1% milk contains only 2.5 grams of fat per serving. Skim milk contains .4 grams of fat per serving. To provide consumers with guidance, and to clarify the relative fat levels of these different types of milk, the Food and Drug Administration (FDA) in 1999 changed labeling rules to require that only 1% and skim milk could be called

“low-fat” milk. Whole milk remained whole milk, while 2% milk was changed to “reduced fat” milk.

The targeting of 1% or skim milk purchases through a nutrition education intervention is supported as a healthy alternative for women and children over 3 years old in recommendations made by the American Academy of Pediatrics and through numerous studies (FDA 1998). Therefore, the goal of this study was to move WIC participants, if appropriate, from purchasing whole and 2% milk to purchasing 1% or skim milk. We therefore decided to group client purchases into three separate categories:

- Clients purchasing only whole milk or only 2% milk, or a combination of the two.
- Clients purchasing only 1% or only skim milk, or a combination of the two.
- Clients purchasing some of their milk in the whole and 2% category and some of their milk in the 1% or skim category (combination purchase).

These groupings were necessary because the WIC program allows individuals to mix and match their milk purchases among the various types of milk. Individuals can choose to purchase only one type of milk or a combination of several types, up to the maximum quantity allowed on the FI. Data are therefore presented using these three groupings as the basis for analysis.

2. Presentation of baseline data

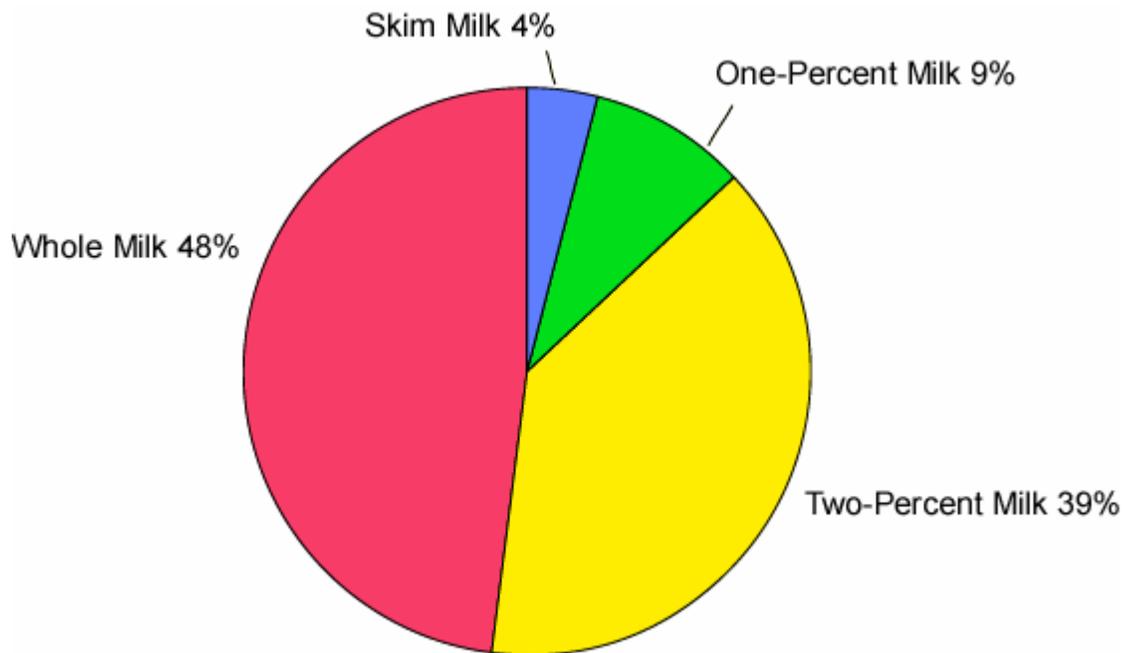
Milk Purchases at Baseline

The initial analysis of the milk purchases required the division of milk by type, prior to grouping the milk purchases into the categories described above. We were, however, interested in the total volume of milk purchased and in which of the specific milk types comprised the total.

Figure 1.2 below displays the total milk purchases by type for all the study participants during the pre-intervention data collection phase. The quantity of milk was reduced to quarts for

consistency in presentation and for analysis purposes. The figure shows that most of the WIC participants purchased either whole milk or 2% milk prior to the intervention. More than 48% of all milk purchased by the study population was whole milk, and 39% of the milk purchases were 2% milk.

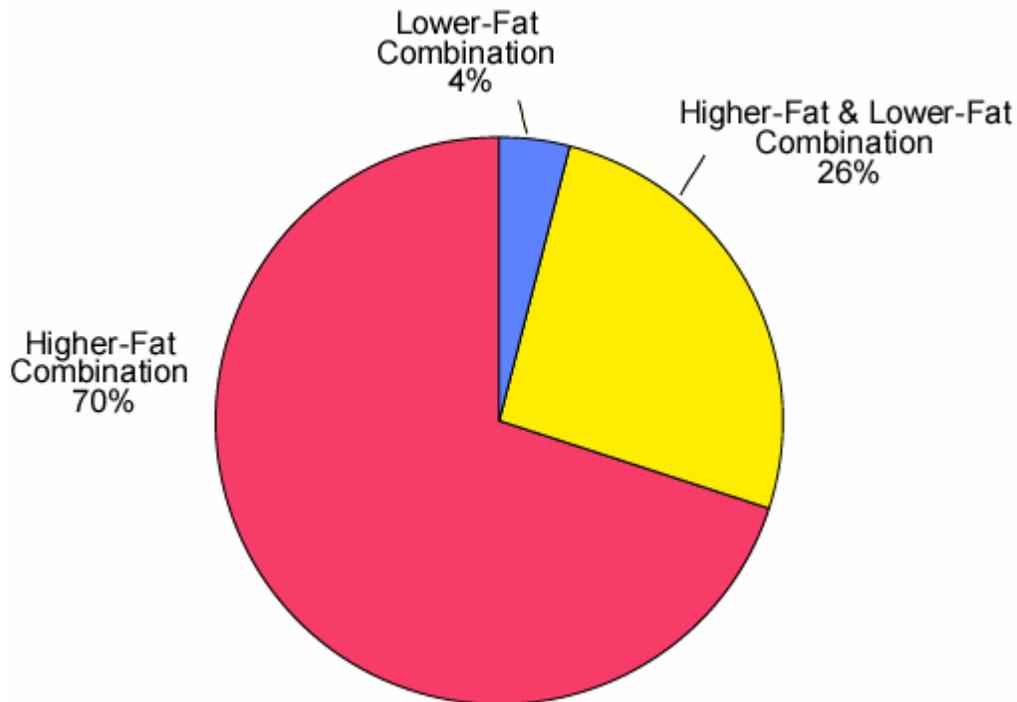
Figure 1.2
Distribution of all milk purchases, by type of milk (n=5,909 quarts)



For the remainder of the analysis, we grouped the milk purchases into the three categories and then used the number of individuals purchasing milk as the unit of analysis. Those who purchased whole, 2%, or a combination of whole and 2% milk were grouped into a category of higher-fat milk purchasers and were the primary target of the nutrition intervention. Those purchasing 1%, skim, or a combination of 1% and skim were categorized as lower-fat milk purchasers and were considered already to be compliant with the healthy behavior. Individuals who purchased some higher-fat and some lower-fat milk were grouped into a category called “combination of higher-fat and lower-fat purchasers” and also were targets of the behavior change intervention.

It was interesting to note that the large majority of persons purchasing milk in some combination purchased the higher-fat combination of 2% and whole milk. Figure 1.3 below displays the distribution of the study population across the three categories.

Figure 1.3
Distribution of milk purchase combinations, by type of combination (n=104)

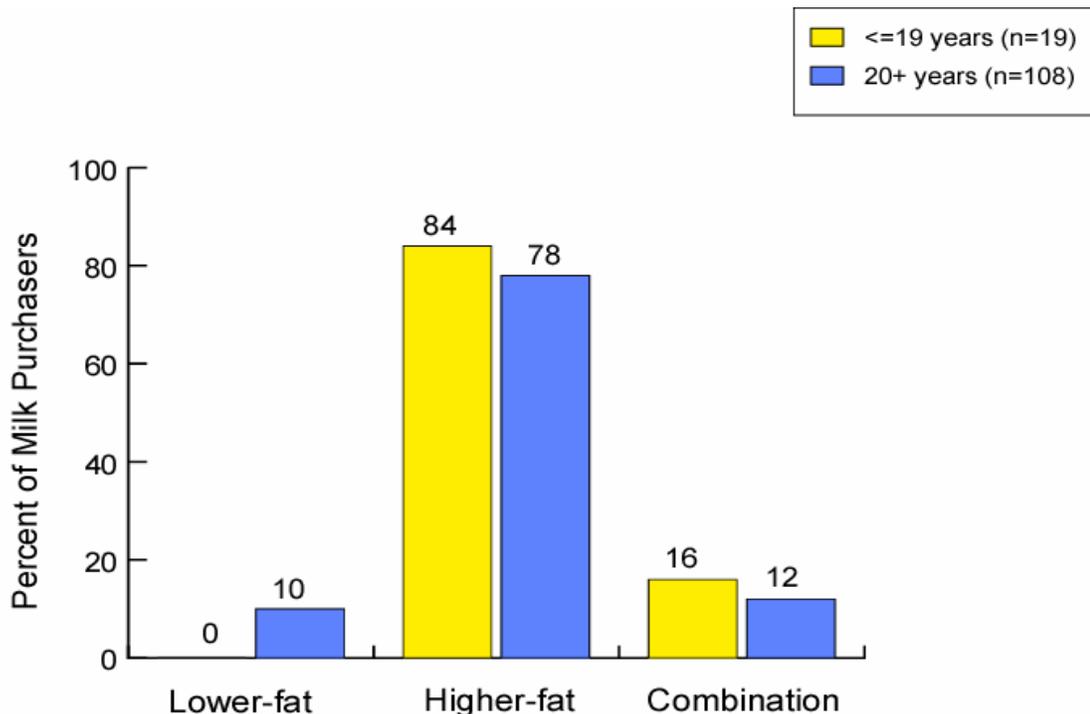


By grouping the milk purchasers into the three primary analysis categories, we found that the majority of individuals (91%) purchased either all higher-fat milk or all lower-fat milk. Of women WIC participants shopping for themselves, more than 86% purchased only the higher-fat milk, while only 8% purchased the lower-fat milk. Six percent of women purchased a combination of higher-fat and lower-fat milk for themselves.

For individuals shopping for children, the distribution was slightly different. Almost 80% of the individuals shopping for children purchased only the higher-fat milk, while nearly 8% purchased low-fat milk and more than 12% purchased a combination of low-fat and higher-fat milk.

We also were interested in examining how age might affect the choice of milk product. WIC staff interviewed prior to the intervention indicated that they thought adolescents might be more receptive to changing their diet, as issues of weight and body image might be factors that would motivate change. For purposes of this study, we divided the women into two groups, those 19 years of age and under (adolescents) and those 20 years old and older (adults). Figure 1.4 below displays the percentage of each group that purchased milk in one of the three analysis groupings during the baseline period. As can be seen, none of the adolescents purchased only the lower-fat milk. In addition, it is interesting to note that of the 16% of adolescents that purchased the combination of higher-fat and lower-fat milk, none purchased skim milk.

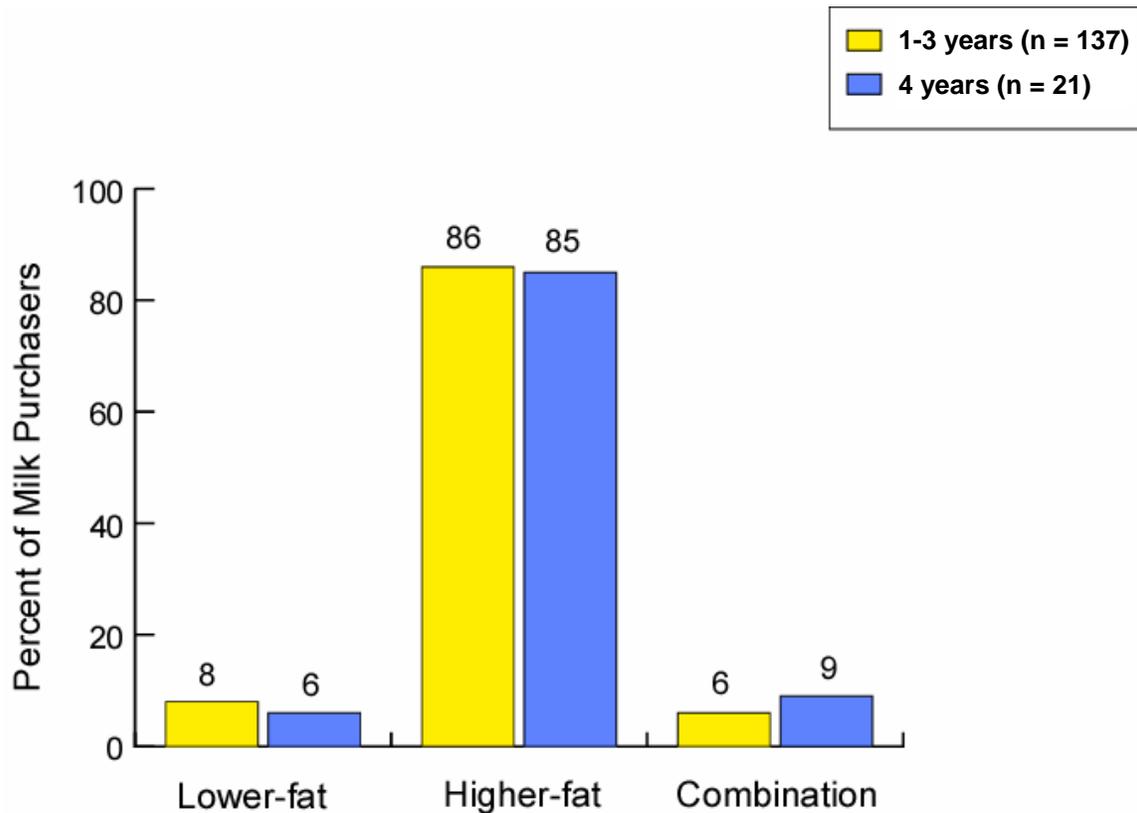
Figure 1.4
Milk purchases among women at baseline by milk type and age



We also were interested in comparing the distribution of milk purchases for children age three and under (younger children) with children four and five (older children). There was some belief on the part of WIC staff interviewed prior to implementing the intervention that many parents would select regular milk for younger children, but might switch the children over to low-fat milk after age three. However, from the baseline data, findings for both groups were very similar, with 86% of the individuals shopping for younger children and 85% of the individuals

shopping for older children purchasing the higher-fat milk. Figure 1.5 below displays the distribution of milk purchases for each of these two groups.

Figure 1.5
Milk purchases among children at baseline by milk type and age



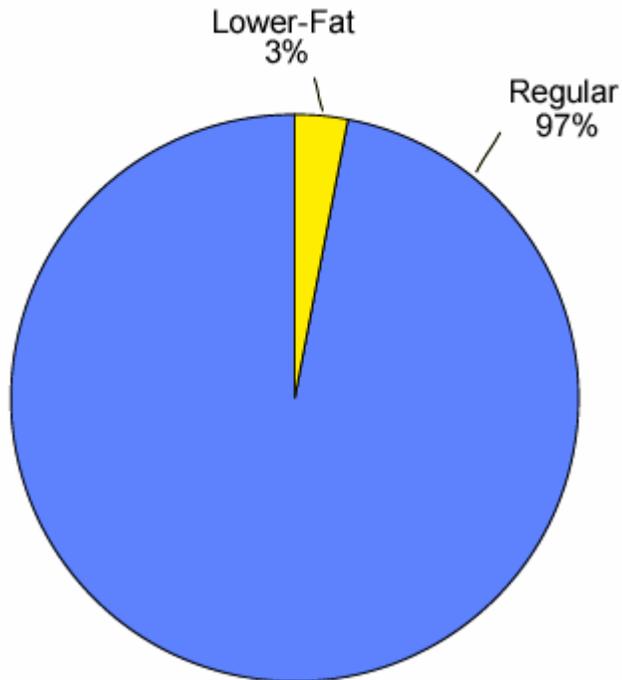
Cheese Purchases at Baseline

One of the components of the nutrition education intervention was the promotion of low-fat cheese as an alternative to regular cheese. To assess whether changes in purchasing patterns

were present, we examined the purchase of low-fat cheese as compared to regular cheese. The overwhelming majority of cheese purchases were of the regular, higher-fat cheese. A little more than 97% of all cheese purchases fell into the regular cheese category. These findings were consistent across most analysis variables, including women as compared to children, age of the child, and adolescent women as compared to adults.

Figure 1.6 below displays the distribution of cheese purchases for regular as compared to low-fat cheese.

Figure 1.6
Percentage of cheese purchased by type of cheese (n=6,544 ounces)



3. Post-nutrition education intervention findings

Data were again analyzed after the nutrition education intervention to determine whether there were any changes in the overall milk and cheese purchasing patterns of WIC participants. Had the intervention been successful, we expected to see a decrease in the purchasing of higher-fat milk and cheese and an increase in the purchase of 1% or less milk and low-fat cheese. The study found that there were no significant differences between pre- and post-intervention in the purchasing patterns of milk and cheese. Although there was some small amount of movement in some categories, none of the movement could be tied to the intervention having any significant impact. This finding was consistent across all variables.

Milk Purchases Post-Intervention

For total milk purchases, the baseline data indicated that 83% of all individuals purchased higher-fat milk, 8% purchased lower-fat milk, and 9% purchased a combination. After the intervention was complete, the percentage of individuals purchasing higher-fat milk remained nearly the same, at a little more than 81%. However, the percentage of individuals purchasing only lower-fat milk dropped from 8% to just under 7%, while the percentage of persons purchasing the lower-fat/higher-fat combination increased from 9% to 12%. In essence, the post-intervention distribution in milk purchases was unchanged from baseline. Table 1.1 below displays the comparative findings for all milk purchases.

Table 1.1
Comparison of pre- and post-intervention milk purchases by milk type

	Pre-Intervention n=296	Post-Intervention n=338
	%	%
Less than 2%	8	7
2% or whole	83	81
Combination	9	12

One of our concerns was that individuals might have decided that purchasing 2% milk instead of whole milk might comply with the intent of the nutrition education intervention. We therefore examined whether there was any change between the purchase of whole milk and the purchase of 2% milk. Our examination of these data showed that there was a three percentage point drop in the number of persons purchasing whole milk and a one percentage increase in each of the other three categories—2% milk, 1% milk, and skim milk. Therefore, we believe that a general shift from whole milk to 2% milk did not take place.

Table 1.2 below presents the results of the analysis for specific subgroups. When considering purchases made by women for their own use, the percentage of individuals purchasing the higher-fat milk actually increased from 79% pre-intervention to 84% post-intervention. When

examining milk purchases made with children’s FIs, the purchase of higher-fat milk dropped from 86% to just below 80%. The total percentage of individuals purchasing lower-fat milk for children actually stayed the same between the pre- and post-intervention data collection (8%). The movement within this frequency was in the percentage of individuals who purchased a combination of lower-fat and higher-fat milk, rising from 7% in the pre-intervention time period to 13% in the post-intervention period.

Table 1.2
Comparison of pre- and post-intervention milk purchasers by milk type and WIC population

	Overall		Less Than 2%		2% or Whole		Combination	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
	n	n	%	%	%	%	%	%
Children	169	196	8	8	86	80	7	13
Women	127	142	9	6	79	84	13	11

When changes in milk purchase patterns were explored by age, a small change was seen in the percentage of adolescents purchasing only lower-fat milk. Table 1.3 below displays the changes in the purchase of milk by age. As noted earlier, no adolescents in the first round of data collection purchased only lower-fat milk. In the post-intervention round, 6% of the adolescents purchased only lower-fat milk. This increase, however, seems to have come from those purchasing the higher-fat/lower-fat combination, as that percentage dropped from 16% to 6%. There also was an increase in the percentage of adolescents purchasing only higher-fat milk.

Table 1.3
Comparison of pre- and post-intervention milk purchasers among women by milk type and age

	Overall		Less Than 2%		2% or Whole		Combination	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
	n	n	%	%	%	%	%	%
<=19 year	19	17	0	6	84	88	16	6
20+ years	108	125	10	6	78	83	12	11

Finally, when we examined age differences for children (Table 1.4 below), the greater change was seen in those shopping for older children. The percentage of individuals shopping for older children that purchased higher-fat milk fell from 84% to 76%. The percentage for lower-fat milk only purchases increased from 6% to 9%, and the percentage of combination purchases increased from 9% to 15%.

Table 1.4
Comparison of pre- and post-intervention milk purchasers for children
by milk type and age

	Overall		Less Than 2%		2% or Whole		Combination	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
	n	n	%	%	%	%	%	%
1-3 years	137	110	8	6	86	83	6	11
4 years	32	86	6	9	84	76	9	15

Cheese Purchases Post-Intervention

An examination of cheese purchases showed that there was no real change in the percentage of individuals purchasing regular cheese as compared to low-fat cheese. As was true for milk, participants could have purchased only regular cheese, only low-fat cheese, or a combination of the two. When total cheese purchases were examined, the pre-intervention data showed that 92% of individuals purchased only regular cheese, 2% purchased only low-fat cheese, and 6% purchased the combination. The post-intervention findings show that 94% of individuals purchased only regular cheese, 2% purchased low-fat cheese, and 4% purchased the combination.

With regard to age, the only movement of interest occurred with older children and with adolescents. For older children, the purchase of regular cheese increased from 92% to 98%, while the purchase of the combination decreased from 8% to 2%. No low-fat cheese was purchased for older children in either the first round or second round of data collection. For

adolescents, the percentage of individuals purchasing regular cheese increased from 92% to 100%.

4. Discussion of findings related to changes in purchasing behaviors

A number of factors could have influenced the study finding that there was relatively little change in purchasing behavior after the WIC nutrition education intervention. These factors may include individual taste preference, the quality of nutrition education provided, the influence of family and friends on food selection, traditional food selections, and cultural food preferences. Focus groups were conducted with WIC clients to inform the study team as to which factors might have been most important in their food selection decisions. Information from the focus groups informs the findings by providing insight into the fact that there was little to no change in purchasing behavior. These findings, while qualitative in nature, may help to explain why changes in purchasing behaviors were not made.

As noted earlier, four focus groups were conducted at the study sites the month after the second round of data was collected, and the discussion topics were broken out into five categories to determine whether the participants were aware of the intervention, whether they found value in nutrition education, whether the nutrition education intervention had any influence on the milk and cheese purchase decisions, and if not, what factors influenced decisions related to the purchase of milk and cheese and what could be done to improve nutrition education.

Three of the focus groups comprised primarily adults, with an equal division of individuals who had shopped for themselves as a pregnant, breastfeeding, or postpartum woman and those who had shopped for their children. One focus group consisted entirely of adolescents, again split between women shopping for themselves and those shopping for children.

All of the focus group participants remembered hearing the message about buying low-fat or non-fat milk and cheese products at least once, with many saying the topic had been discussed more than once. All of the participants thought nutrition education was valuable, but some indicated that although the information was valuable, it was not always easy to follow the

guidance or recommendations. This was particularly true for the purchase of the target foods—milk and cheese. The focus groups, across the board, confirmed the findings of the data analysis that participants had not changed their purchasing behaviors. Most of the participants said that although they knew it would be better for them to purchase lower-fat milk, they did not. Some of the reasons they did not purchase the lower-fat milk included the following:

- There was pressure from other family members to purchase whole milk. Many of the participants indicated that husbands, partners, parents, or other family members often pressured them to buy whole milk. In some cases, this was because of taste preference. In other cases, there was a belief on the part of the family member that only whole milk was good for pregnant women or children and that it was not healthy to drink low-fat milk.
- Some of the participants indicated that they purchased 2% milk as a low-fat alternative to whole milk. They believed that the reduced fat in 2% milk was just as healthy as the only slightly lower fat content of 1% milk or skim milk.
- Most participants said that they had been raised on whole milk and liked the taste better. Some of the participants indicated that they bought whole milk for themselves, but lower-fat milk for their children.
- All of the adolescents indicated that they purchased whole milk, either because of taste preference or because their family members insisted on the adolescent drinking only whole milk.

With regard to cheese, most of the focus group participants were not aware that low-fat cheese was available. The most popular types of cheese were those that could be used either for pizza or in sandwiches. Many said they had never seen or at least not noticed any low-fat cheese in the store. Additionally, many participants said that they liked only one kind of cheese and were not willing to change.

Regarding issues related to how nutrition education could be improved, a number of participants offered suggestions that they felt would help them make healthier food selection decisions.

Some of the suggestions included the following:

- Having group classes rather than one-on-one encounters, so that individuals could learn from one another and share experiences. All of the adolescents thought that

having a group class would be more interesting than the one-on-one education they received. Others felt that classes would help exert more pressure to change behaviors and that classes might provide more support among the peers for making changes. Several of the focus group participants indicated that the focus group session was the first time they had been able to share their experiences with other WIC clients and that they found the experience enjoyable.

- Having classes with cooking demonstrations on how to use low-fat milk and cheese in cooking. If the participants could taste different foods that used low-fat products, they might decide to use more low-fat products in their cooking or diet.
- Having nutrition education classes that family members or other individuals with whom participants have a relationship could attend. This way the message also would be delivered to the individuals who influence participants' food purchasing decisions.
- Spending more time with each individual during one-on-one educational encounters. Clients at the WIC clinic have certification forms to complete and vouchers to pick up and they undergo voucher education and nutrition education. Many felt that a large amount of information was sometimes simply thrown at them, making it seem less important.

In general, the findings from the focus groups support the findings of the pre- and post-intervention data collection. The barriers to purchasing low-fat products described by the clients work against the messages provided in the WIC clinics. It is clear that simply increasing client knowledge about the importance of selecting lower-fat foods did not have an impact on purchasing decisions. To ensure that behaviors actually change, other approaches to nutrition education that address these outside factors need to be considered.

IV. Conclusions and Recommendations

The key finding of this study is that despite logistical limitations, using UPC data to measure changes in WIC participant food purchasing behaviors can be a valuable tool for measuring the impact of local nutrition education interventions. The use of this tool has the clear advantage over the use of self-reported data because it tracks the actual behaviors of clients. In addition, because of the ability of researchers to break down purchases by any number of variables, these data can be used by WIC officials to target specific nutrition education interventions to specific groups and then measure whether any changes have occurred.

A number of recommendations can be made based on this study. This section details the recommendations that would support the use of this approach to data collection, as well as improve both the feasibility and practicality of using it on an ongoing basis to evaluate local nutrition education interventions.

1. Recommendations related to increasing the feasibility and practicality of collecting food purchasing data.

States interested in using this approach, based on store information, to collect data to support nutrition education evaluation should develop a system to make these data available on a regular basis. One of the key issues in assessing the feasibility and practicality of using this tool is the ongoing availability of food purchasing data. The key issue in obtaining WIC food purchasing data is convincing the stores that it is important for them to share the information.

The study team conducted a series of interviews with a variety of store officials, State WIC program staff, and local WIC staff to determine what might be done to facilitate participation in data-sharing arrangements. The following recommendations were made that may encourage store participation:

- A. Change WIC vendor agreements to facilitate and authorize the provision of food purchasing data. Although most State officials interviewed were reluctant to simply

require stores to provide data as a condition of WIC authorization, there was some interest in establishing, through the written WIC vendor agreements, the right of the State to collect data on WIC participant purchasing patterns. Some State and local officials pointed out that under current Federal regulations, States are allowed to require stores to provide information on the purchases made by WIC participants. By expanding on this requirement within vendor agreements, State officials can set a standard for stores to be aware that data sharing is an important component of the WIC program and that the State reserves the right to request participant purchasing data.

- B. **Develop systems that would facilitate including WIC check numbers in the WIC transaction databases.** Most large stores with scanning systems have the capability to identify a WIC transaction. The key to linking the WIC transaction to the State demographic file is including the WIC check number in the transaction record. Store officials noted that if States bar-coded WIC checks so that the number could be scanned in the same way that a product “cents off” coupon or store gift certificate is scanned, it would be much easier to input check numbers. This would allow stores to enter the WIC check number into their systems without key entry or the need to use check-reading machines. While this may seem to be the easiest adaptation of technology to facilitate examining food purchasing patterns, issues related to privacy of sales information and the cost of including the WIC check number in the store’s data system may still persist.

- C. **Track store capabilities to provide data during the WIC participation authorization process so that data are available on stores that might be able to participate in similar projects over the course of their authorization period.** When State officials authorize (or re-authorize) WIC stores for participation in the program, they often collect data regarding products and prices. At the same time they could request information regarding store scanning and WIC transaction data collection abilities so that an assessment can be made regarding which stores might be approached about data sharing. This type of database also would help local WIC agencies decide whether the capacity exists at the local level to conduct a similar study.

- D. Consider working with major chain stores to develop a model data confidentiality agreement that would protect stores. In this study for tracking WIC participant food purchases, the technology was used without capturing any client identification data. To address any store concerns about confidentiality, State officials could design a model confidentiality agreement for all stores. This may help increase store interest in participating. Again, while some stores may be receptive to sharing information, stores with concerns about how data will be used may be resistant to developing such agreements.

- E. Provide vendors with information about the role of nutrition education in WIC. One method for encouraging support for projects to measure the impact of nutrition education is informing stores about the role of nutrition education in the WIC program and working with stores to participate in nutrition education campaigns. Officials at the study chain store became very interested in the findings of this study and observed that if store owners and managers understood the importance of WIC nutrition education and the role that can be played by stores in furthering those efforts, they might have more interest in providing data.
 - 2. Recommendations related to expanding the use of this technology in conducting further nutrition education outcome evaluations.

Once logistical issues related to store participation are resolved, it would make sense to expand the scope of this study to incorporate additional research objectives. The usefulness of WIC food purchasing data in measuring a number of nutrition education objectives should be explored, because these data can be used in numerous ways beyond simple pre- and post-intervention analysis.

- A. **Recruit multiple stores.** Recruitment of multiple stores is essential to capturing complete food purchasing information for clients. In Washington State, the system used for the selection of vendors (vendor specific) allowed us to capture complete food purchasing data on all clients included in the study. However, most States use an “open system” for vendor selection, which allows WIC participants to use their FIs at any

authorized WIC store. This means that participants could use one of their checks at one store and the remainder at a different store. To capture complete information on as many participants as possible, it will be necessary to recruit as many stores within a geographic area as possible in order to ensure that a sufficient number of complete food purchases can be collected and analyzed.

- B. **Use the study methodology on an ongoing basis.** The analysis of food purchasing data can provide a useful tool for evaluating different methods and approaches to providing nutrition education. This study attempted only to measure changes in purchasing behaviors after the introduction of a highly unstructured, limited nutrition education intervention. This tool introduces the ability to compare different approaches to education in different geographic areas or communities, using the same, non-subjective measurement tool. The ability to link purchase data to demographic and risk factor data permits the analysis of the impacts of interventions on specific groups of interest. Having such information would allow local programs to customize their approach to nutrition education to meet specific client group needs.

- C. **Conduct trend analysis.** The technology used for this study can be used to track purchases over a longer period of time. This would allow State officials and researchers to assess trends in food purchasing behaviors in order to look at longer-term impacts of WIC and nutrition education.

- D. **Use study technology in needs assessment.** Use of the study technology for conducting needs assessments of client purchasing trends can be helpful in the development of nutrition education plans. Data on WIC participant purchasing behaviors also can be used in a needs assessment process for identifying and targeting specific demographic groups, behavioral changes, and education approaches.

Using food purchasing data to examine the impact of nutrition education interventions can be an important tool in assessing client behavioral change. By examining the actual food purchases of clients, researchers can avoid many of the pitfalls encountered when trying to collect self-

reported data. Logistical barriers to store participation are the major impediments to widespread use of this technology. To increase the effectiveness and practicality of this approach and to support this important data collection effort, States must recognize the benefit of using this kind of technology to measure program outcomes and also must promote within their WIC vendor management systems the technology itself as well as solutions to logistical problems.

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