

FINAL REPORT -- MICHIGAN
USDA 2004 Special Projects Grant
***www.wichealth.org*: Innovative Educational and Counseling Strategies for**
Impacting Fruit and Vegetable Consumption

Grant Received in Response to USDA 2004 Special Project Grant Program Announcement,
Cooperative Agreement No. W159-03-034, CFDA No. 10.578

Project Period: September 30, 2004 to September 30, 2007 with extension to December 31,
2007

Date: March 31, 2008

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EXECUTIVE SUMMARY – USDA 2004 Special Project Grant

Background

Nutrition education is central to the core mission of WIC. Nutrition education provided within local WIC agencies is not always effective in achieving behavior change, due to issues like WIC client availability, interests and needs, and the lack of match between client needs and education being offered. The VENA (Value Enhanced Nutrition Assessment) initiative recognizes that clients should be more involved in nutrition education and that education should be more oriented to client-defined needs. At the same time there is greater support for the need for behavior change education, using models such as the Transtheoretical Model of Stages of Change (Prochaska, et al, 1977) and effective client-centered counseling techniques such as Motivational Interviewing/Motivational Negotiation (Miller and Rollnick, 2002, Stang, 2002). The increased use of the Internet over the past decade has opened the door for a variety of new avenues for addressing public health issues, including behaviorally based nutrition education.

The purpose of this project was to develop, test, and evaluate a fruit and vegetable consumption component and follow-up motivational negotiation counseling associated with wichealth.org, an Internet-based nutrition education system. [Wichealth.org](http://wichealth.org) is based on Stages of Change, Behavioral Intent, and Persuasive Communication. This nutrition education delivery system currently consists of twelve modules that focus on parent-child feeding behaviors, postpartum wellness and breastfeeding associated with WIC client needs and interests. Additionally four of the modules are currently in Spanish.

A 5-year implementation of this site to nearly 200,000 WIC client uses across six Midwest states and the state of Washington found this approach to have promise in assisting clients' movement along the five stages of readiness to change continuum, especially from earlier stages of change to action stages. It was also found that this approach provides an avenue for addressing the needs of clients who are in maintenance stages. The successes identified through the 5-year implementation place wichealth.org in a position to be a model for Internet-based nutrition education.

To assure the integrity of this Nutrition Education Internet site, wichealth.org educational content is monitored regularly to assure stage-based educational information that is relatively free of product promotions/advertisements.

Research Summary

The question remained during the first years of wichealth.org implementation and use by WIC clients – is this model effective in moving users toward intent to change nutrition behavior?

The USDA Special Project Grant provided the opportunity to test the premise that the wichealth.org model is as effective as traditional WIC nutrition education. As a component of the grant, wichealth.org developed modules on fruit and vegetable consumption. The project also looked at the impact of motivational negotiation training of WIC nutrition educators, on continuing to move WIC clients toward action. Additionally, the effectiveness of wichealth.org in comparison to traditional education strategies was assessed. Local Michigan WIC agencies, representing the statewide demographic of WIC clients, were invited to participate in this project.

In this Special Project Grant USDA-funded study, Phase 1 developed a fruit and vegetable education module aimed at increasing adult fruit and vegetable intake. It was decided by the grant Steering

Committee (member list in Appendix G in separate Appendix section) that the fruit and vegetable consumption of the caretakers of WIC children had to be influenced to increase their consumption. Then education was directed in Phase 2 to increasing the fruit and vegetable intake of the children of WIC clients.

Little evidence-based research exists in relation to the use of the Internet as a means for providing effective nutrition education. The major objective of this study was to measure the impact of Internet nutrition education on the overall outcome of increasing fruit and vegetable consumption.

A number of the findings in this study are relevant to the research goals of this project. Most interesting are the following five findings from both the Phase 1 and Phase 2 results:

1. Users of the Internet education modules found them comparable to traditional education in terms of being easy to use, easy to understand and helpful in providing nutrition education.
2. Internet education was significantly different than traditional education in moving clients from preparation to action/maintenance in relation to fruit and vegetable consumption over time.
3. As compared to the traditional education group, the Internet education group demonstrated similar to larger mean differences in the consumption of fruit and vegetable servings per day from baseline to follow up.
4. In Phase 1, over 80% of subjects in the Internet education group reported they like to learn from the Internet better than other educational activities offered at the WIC agency. In Phase 2, 74% of Internet education group participants indicated that wichealth.org was their preferred way to receive nutrition education.
5. The Internet education group that received no follow-up counseling had significantly greater consumption of juice, fruits, and vegetables than the traditional education group with no follow-up counseling. The traditional education group needed counseling follow-up in order to achieve consumption patterns that were similar to those found with the Internet education group. The Internet education group achieved similar consumption patterns regardless of whether or not they received follow-up counseling. This finding suggests that counseling is essential for the traditional education (as the education alone does not increase consumption to much degree), whereas the wichealth.org FV modules alone increased and sustained consumption without needing follow-up counseling. This allows the follow-up with WIC clients to reinforce what has been achieved and develop future behavior change plans.

LESSONS LEARNED

A number of lessons have been learned during this Special Project Grant related to doing research in WIC agencies. There has been a learning curve for everyone involved in the research – both the research project staff and the agency staff committed to carrying out the project. Additionally this research was carried out during a time of growing WIC client caseload in Michigan. Therefore local agencies had caseloads that stressed their resources.

Improved communication with study clinics. The wichealth.org research project assistants found that the project progressed more smoothly when they communicated with the local agencies on a regular schedule – consequently the project assistants scheduled monthly on-site visits and regular phone calls and emails during the 2nd year of the project. The increase in on-site visits meant that the wichealth.org project assistants were better able to follow-up with materials needed,

materials sent, survey collection, and incentives for the staff and clients. It took the responsibility out of the hands of the WIC staff and put it into the hands of the wichealth.org project assistants.

Benefits directly related to increased communication include:

- WIC staff involved with the project were more likely to express concerns and request more materials when needed.
- Wichealth.org project assistants were made aware of WIC staffing changes sooner and were better able to make accommodations based on these changes.
- WIC staff had a better understanding of what materials they should be using and when they should be using them.
- WIC staff used the correct surveys.
- Surveys were collected more frequently. This enabled the wichealth.org project assistants to check each clinic's supply of surveys at each visit helping to ensure the correct use of surveys and correcting of any survey misuse.

Increased awareness and motivation to participate. The wichealth.org staff found that WIC clients were more motivated to participate in the project when they were made aware of the project and given incentives to participate. As was the case with WIC staff members who also had greater motivation to participate when there was an incentive involved. Promotional posters with incentives for participation were displayed in the waiting room of each WIC clinic. WIC staff members were provided with pins to initiate client inquiry about the project, and WIC clients were given one incentive for each survey completed. All clinics were given computers for participating in the project, and each clinic was given the opportunity to qualify for a scholarship to attend a WIC conference. Scholarships were awarded to 5 staff members in two agencies with the greatest participation rates.

Benefits directly related to increased awareness and motivation:

- Client enrollment increased in Year 2.
- WIC staff members were more excited about the project, which in turn, increased enthusiasm among WIC clients, and overall improved participation and retention.
- WIC staff members were able to use the computer incentive to allow clients to access wichealth.org at the clinic, which also increased participation in the project.

One negative lesson learned was that computers might have been given to clinics too early. While some clinics used the computers as intended, to promote client enrollment and to use wichealth.org nutrition education; other clinics received their computer and dropped out of the study shortly after. (The clinics were asked to return the computers in this situation.)

Teamwork. At the initial trainings, suggestions were provided to WIC staff on how to track the clients in the project. Ultimately, it was left to the WIC staff to decide how they would best accomplish a tracking system in their clinic. Each WIC clinic works differently and has a different system of following up with their clients. In some clinics tracking clients became confusing and unsuccessful for WIC staff. The wichealth.org project assistants learned that it was necessary to work with the WIC staff as a team to resolve issues they were facing with the project, especially when it came to tracking clients. It was important, going into the second year of the project, to have a definitive tracking plan and system in place. This was accomplished by the WIC staff and the wichealth.org project assistants working together, discussing specific functionality of each clinic, discussing the most commonly used methods of tracking, and tailoring the tracking to meet the needs of each individual clinic.

Benefits directly related to teamwork and improved tracking:

- Increased retention of clients through the duration of the project.
- Decreased confusion among WIC staff members when it came to what their role was in the project.

- Increased communication between WIC staff members if problems arose.
- The [wichealth.org](http://www.wichealth.org) project assistants were better able to help the WIC staff if there were problems they were unable to resolve on their own because there was a set plan in place.

Persistent follow-up with project clients. Day-to-day clinic operations presented the project assistants with the typical clinic challenges – clients missing appointments, losing their WIC ID-VOC folders, and frequent WIC client moves. Consequently, tracking WIC clients is an ongoing problem with no easy solution.

Initiatives taken to increase follow-up with clients:

- Clinics were provided with a list of clients and surveys completed to date. This gave the clinics the opportunity to follow-up with clients who had not yet completed the 2nd-4th surveys.
- If survey completion did not occur during the scheduled clinic visit, surveys were then mailed to each client. Clients were instructed to return the completed survey to the clinic and were offered an incentive.

Motivational Negotiation Training. The motivational negotiation training was offered to each WIC staff member who participated in the project. It was offered only as a suggestion and in the form of an internet tutorial that they could do on their own time. The [wichealth.org](http://www.wichealth.org) project assistants learned that a hands-on training on motivational negotiation counseling and the theory of behavior change would have been more beneficial to all WIC staff participating in this project.

FUTURE IMPLICATIONS FOR WIC

Ultimately, this project will serve to strengthen nutrition education by providing two Internet modules on fruit and vegetable education that were developed as part of this project: "Adult Fruit and Vegetable Consumption" and "Help Your Child Be Healthy with Fruits and Vegetables." Fruits and vegetables are going to be available in the WIC Food Packages being introduced late in 2009. Eating more fruits and vegetables is a recommendation for WIC by the Institute of Medicine report and is an emerging health issue that will improve client healthy behavior for life. (Institute of Medicine, 2002)

This project found that using the Internet was one means available to WIC clients for obtaining secondary nutrition education that was shown to be positively accepted and preferred over traditional methods. The convenience of completing the educational modules at home free from distractions and freeing up client's time to travel to the WIC agency, accompanied by the breadth of information available in a controlled setting (i.e., [wichealth.org](http://www.wichealth.org) educational content is monitored regularly to assure stage-based educational information relatively free of product promotions/advertisements), were viewed by WIC clients as significant benefits to this program.

An impressive finding was that the Internet education group, while receiving no follow-up counseling, had significantly greater consumption for fruits and vegetables than the traditional education group with no follow-up counseling. The traditional education group needed follow-up counseling in order to achieve consumption patterns that were similar to those found with the Internet education group that received no follow-up counseling. This impressive project outcome can impact client behavior change in a way that has the potential to be used to improve WIC programs locally, regionally, and nationwide. While it is not the intent for [wichealth.org](http://www.wichealth.org) educational modules to be suitable for all WIC clients, the 25% of participants who can and do use this educational mode, currently in seven states (Midwest Region and Washington), free up critical nutritionist, registered dietitian, and CPA time, allowing greater time for these nutrition educators to impact clients who are at high nutrition risk or do not have access to or interest in the Internet.

How does interactive Internet nutrition education meet USDA WIC nutrition education needs? A number of WIC clients have indicated in Michigan clinic interactions that they appreciate the opportunity to receive education in a setting that acknowledges their busy schedules. They do not want to avoid this education; they want clinics to understand the busyness of their lives.

To this end, wichealth.org provides the following benefits for WIC clients and staff:

- Modules meet the USDA guidelines for nutrition education on the Internet set out in the 2006 USDA memo. (USDA, 2006)
- Modules meet VENA guidelines by helping to implement Michigan's plan to shift WIC nutrition assessment from a deficiency finding process to a more client-centered and positive process that focuses on desired health outcomes. In line with this, client education is oriented to allowing the client some choice in what they learn about nutrition.
- Modules can be translated into other languages (currently there are 4 Spanish modules) to meet the needs of diverse populations.
- Local agencies report that modules make nutrition education more rewarding for local agency staff because clients are more interested in completing nutrition education.
- Modules assist nutrition educators in reinforcing client intent to change behavior.
- Clients move from behavioral intent toward committing to change fruit and vegetable consumption.
- [Wichealth.org](http://wichealth.org) may be useful for encouraging client intent to change behavior in other areas such as breastfeeding, consuming whole grain foods, increasing their intake of lower fat milk products, and food safety.

SUSTAINABILITY OF WICHEALTH.ORG AND THE FRUIT AND VEGETABLE MODULES

The fruit and vegetable modules are ready to be incorporated in the educational module selections in wichealth.org. The modules will then be available for use by WIC clients and agencies in Michigan, the Midwest states currently using wichealth.org modules, and clients in the state of Washington and Salt Lake County. The potential exists for clients from other states and agencies to also benefit from use of wichealth.org should they chose to partner with the project or other funding becomes available. Other local agencies, clients, and state WIC agencies may then access the modules via the Internet, as the mode of delivery is in place. It may be feasible to link to the wichealth.org site from the USDA WIC Works web site. States that have an interest in tracking the behavior change of their clients may then participate and access the statistics related to their clients use of wichealth.org modules.

Other applications for wichealth.org outside the WIC program for which nutrition education is appropriate and needed might include clients reached by state SNAP (State Nutrition Action Plans) projects, food stamps, extension, Farmers' Market nutrition programs (e.g., Project FRESH in MI), and other entities looking for innovative education techniques.

FINAL EVALUATION REPORT

INTRODUCTION

The goals of the *Innovative Educational and Counseling Strategies for Impacting Fruit and Vegetable Consumption* project (hereafter referred to as the "WIC FV Project") were to (1) Improve WIC client access to and availability of WIC nutrition education opportunities by expanding wichealth.org to incorporate modules associated with increasing fruit and vegetable consumption (FVC) among WIC clients and their families; (2) Impact WIC client intent toward behavior change, and sustainability of intent over time, associated with FVC as demonstrated by movement along the stages of change continuum; and (3) Improve local WIC nutrition educators' ability to counsel clients in moving toward active change in FVC. The outcome of this project was to increase FVC among WIC clients (adults and children).

The objectives for Goal 1 focus on expanding wichealth.org by adding modules related to FVC among the children of WIC clients. This includes evaluation of the successful execution of processes associated with the effective functioning of wichealth.org, including marketing and other dissemination materials. Also, the final objective of Goal 1, module popularity and demographic trends (i.e., age, child's age and site of Internet access) associated with module access will be considered in this evaluation summary. Goal 2 objectives focus on WIC client movement along the stages of readiness to change continuum. Intent, perceptions and beliefs related to applying FVC skills are also evaluated in this report. Goal 3 objectives focus on improving staff motivational negotiation training and the additive impact that may have had on program findings.

This evaluation summary focuses on the goals of the project with respect to the impact of both Phase 1 and Phase 2 of the project as well as an overview of the combined impact of both phases on the key outcome measures of progression along the stages of change continuum and increase in personal and child FVC. Note that all significant differences pertain to p values < .05, and are denoted, when appropriate, in tables with asterisks (*).

THEORETICAL BASIS

This project sought to study the relative effectiveness of traditional and Internet nutrition education methods, as well as the added impact of counseling; in helping WIC clients increase their fruit and vegetable consumption. This project successfully developed two fruit and vegetable educational modules using the previously tested and published stage of change Internet-based delivery (wichealth.org) used currently by WIC (Bensley, et. al, 2006). The Internet modules are behavioral theory-driven nutrition education modules, designed to increase clients' intake of fruit and vegetables. The project also incorporated follow-up motivational negotiation designed to enhance staff ability to provide effective follow-up counseling to facilitate movement in fruit and vegetable consumption from planned behavioral intent to commitment toward sustainable behavior change associated with adult and child fruit and vegetable consumption. Originally conceived as a joint project of the six-state Midwest Region WIC agencies, the intent of the wichealth.org was to provide revitalization of quality nutrition services by incorporating a behavioral approach that was individualized, into an innovative, customer-oriented, Internet-based nutrition education delivery system. WIC clients have choices between the modules and within each module, and also may progress at their own pace and time. Clients may have different experiences each time they enter the system, depending on how they respond to the interactive staging questions, thus providing additional opportunities to tailor the educational experience to the client's needs or desires for learning (i.e., providing a tailored, behavior-based, client-centered educational experience).

The existing 12 modules (and 4 Spanish modules) in wichealth.org were developed and implemented for use by WIC clients based on focus group input from WIC clients and expert guidance from state and local agency staff in the six-state Midwest Region. The project team used an interactive series of questions and answers to determine the user's readiness for change as a way of ensuring the modules were client-centered. This staging process, developed into a staging algorithm, then became the basis for the next step in the pathway, and provided behavior-based individualization not always found in content-based nutrition education Internet sites. The initial modules used the principles of behavior change theory, while incorporating the concepts of healthy lifestyles, and positive feeding relationships between parent and child.

While innovative in its approach to nutrition education in WIC, the Internet nutrition education modules enabled local agency WIC staff to make changes in the WIC clinic. Following a client's use of wichealth.org, the clinic staff has more information about the client's stage of change, and the ability to reinforce the client's progress as well as encourage movement forward to a more active stage. The implementation of CD ROM and Internet-based motivational negotiation training for WIC staff provided WIC agency staff with Internet client-centered counseling training needed to continue assisting client movement toward sustainable improvement in fruit and vegetable consumption following completion of wichealth.org nutrition education. (wichealthmn.org)

IMPLEMENTATION/METHODOLOGY

The WIC FV Project was implemented in 15 Michigan WIC clinics within 8 distinct WIC agencies. These agencies were provided mailings, training sessions and tools, other presentations, and extensive onsite support to facilitate the process of project implementation. This project provided both traditional nutrition education and Internet (online) nutrition education. Internet access was obtained by clients in clinics, homes, parent homes or libraries and coupled with follow-up counseling in the clinic setting with nutrition educators trained in the principals of motivational negotiation. Internet nutrition education followed the establish models and practices currently being implemented in the behavior-based wichealth.org nutrition education system. Traditional education was either in the form of group nutrition education, using a standard fruit and vegetable education lesson or a nutrition education mall approach which was self-directed. A general outline for traditional education was provided to each agency, although agencies had the choice of implementing their own education as long as it met the common learning objectives. This approach was decided as it has been established that WIC accepts traditional education, regardless of format, to be the standard accepted education within WIC clinics, and because agency choice represents reality in relation to how traditional education is delivered. The more important question was to what degree did a wichealth.org approach to nutrition education compare to the standard practice currently being used and approved within WIC agencies. The educational objectives were the same in both education modes.

Two phases of intervention were used to determine overall impact. Phase 1 focused on adult (caregiver) FVC, while Phase 2 focused on child FVC. Both Internet nutrition education and traditional nutrition education were designed for the specific focus for each intervention phase. Findings from each phase, as well as the combined impact of both phases, are described in this report. Each phase consisted of baseline data collection (see Appendix A), and three posttest surveys (see Appendices B-E). (Appendices are in separate Appendix document.) Posttest surveys were delivered 3 months after the baseline data were taken, immediately following the educational intervention, during the next follow-up visit (approximately 3 months post intervention), and during recertification (approximately 6 months post intervention). In order to increase retention and reduce disruption of clinic flow, data collection cycles followed normal client visit schedules (certification, nutrition education, recertification). Counseling was offered to all clients during the first follow-up posttest

visit, as is normally done within the recertification. Not all clients elected to attend follow-up counseling during this visit. Again, the study was designed with the primary objective, being to increase the likelihood of client retention and to reduce disruption of routine clinic services.

Outcomes in terms of stage of change progression (based on wichealth.org module and algorithm format) and change in FV servings per day were compared between the Internet nutrition education users and those completing traditional nutrition education. As identified above, clients were assessed at baseline enrollment, immediately after their Internet nutrition education or traditional nutrition education, following counseling and/or regular WIC visit at 3 months and following WIC visit at 6 months or via mailed survey.

The method of evaluation of the WIC FV Project involved the assessment of eight specific objectives related to the impact of the program. These objectives were to:

- 1) Demonstrate a movement along the stages of readiness to change continuum associated with FVC.
- 2) Increase perception in at least 80% of participants so that they can use what they learned by accessing wichealth.org FV modules to impact FVC, how they feed their children, and belief in their ability to make changes.
- 3) Demonstrate that 90% of participants were satisfied with using wichealth.org FV modules as a nutrition education intervention for increasing FVC.
- 4) Demonstrate the extent to which a relationship exists between participant perception of wichealth.org FV modules being both helpful and useful in relation to FVC and movement in stage of readiness to change.
- 5) Demonstrate transference of behavioral intent to commitment associated with movement along the stages of readiness to change continuum.
- 6) Determine the impact of Internet-based learning on FVC compared to traditional educational strategies.
- 7) Demonstrate an increase in FVC among WIC clients.
- 8) Determine the impact the CD ROM and Internet-based motivational negotiation trainings have on assisting WIC clients' move toward an active stage of change in FVC.

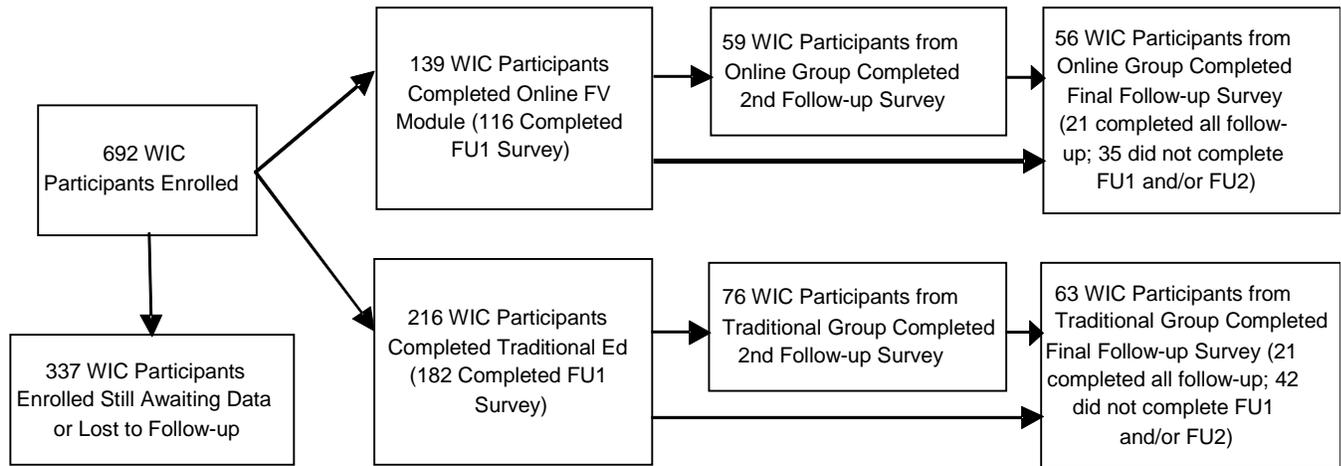
The WIC FV Project evaluation plan also included several process objectives designed to explore the characteristics of WIC clients choosing to enroll in the program. This evaluation report consists of the analysis of various process measures describing (1) client module access and demographics; (2) client satisfaction and perceived ease of use, (3) state WIC personnel perceptions associated with program usage, implementation, and success; (4) the success of procedures established to monitor client access to wichealth.org modules; and (5) clinic staff satisfaction associated with CD ROM and Internet-based training in motivational negotiation.

PHASE 1: ADULT FRUIT AND VEGETABLE CONSUMPTION

Enrollment Baseline Results

During the first stage of this project, 692 WIC clients were enrolled in the study throughout Michigan. Figure 1 illustrates the follow-up to date of the 692 enrollees including whether they self-selected into the traditional or innovative (Internet) study groups. 337 project enrollees were lost to follow-up because they did not complete the wichealth.org FV module or a traditional WIC FV education equivalent.

Figure 1. Phase I Traditional and Online Education Group Enrollment and Follow-up



As presented in the figure above, a total of 139 project enrollees self-selected into the innovative education intervention and 216 chose traditional education. 116 of the innovation group enrollees completed an online follow-up survey after their module session. 23 individuals either did not complete the online follow-up survey or their session ID was unable to be linked back to them, and thus did not have immediate intervention follow-up data, but several did complete the 2nd follow-up (FU2) and/or the final follow-up surveys. Similarly, of the 216 traditional education group enrollees, 182 completed an immediate follow-up survey with the remainder completing only FU2 and/or the final follow-up survey. Because of these relatively small numbers, all participants who completed at least the baseline and one or more follow-up surveys were included in the analysis. This yielded 355 (51.3%) study participants of the initial 692 enrollees. This number would have been smaller without the rigorous attempts to follow-up project enrollees. For example, 326 participants who completed a baseline and follow-up survey, but no final survey, were sent a final survey through the mail or email on three occasions to attempt to capture their responses. Participants receiving mailed follow-up surveys were asked to complete and mail it back using a postage paid return envelope that was provided. As an incentive, all participants were given the opportunity to receive a children's book at their next WIC visit for completing the final survey. Of those 326 participants, 86 (26%) returned a completed survey. Follow-up and retention were low as expected in this population, consistent with other published studies reporting dropout rates as high as 70% (Scott & McIlvain, 2000). Despite follow-up limitations, there were several significant findings regarding the differential impact of the online education program compared to traditional education, on participant outcomes.

Table 1 presents the demographic characteristics of the 692 project enrollees with stratification by final study group and follow-up status.

Table 1. Project Enrollee Demographics

Measure	Online Ed Group		Traditional Ed Group		Total Participants		No Follow-up to date		TOTAL	
	n=120		n=157		n=277		n=407		n=684	
	Count	%	Count	%	Count	%	Count	%	Count	%
Age										
<18 years	1	0.8%	9	5.7%	10	3.6%	17	4.2%	27	3.9%
18-24 years	36	30.0%	57	36.3%	93	33.6%	148	36.4%	241	35.2%
25-29 years	39	32.5%	46	29.3%	85	30.7%	117	28.7%	202	29.5%
30-34 years	21	17.5%	25	15.9%	46	16.6%	69	17.0%	115	16.8%
35-39 years	14	11.7%	14	8.9%	28	10.1%	32	7.9%	60	8.8%
40-44 years	2	1.7%	4	2.5%	6	2.2%	10	2.5%	16	2.3%
45-49 years	2	1.7%	0	0.0%	2	0.7%	0	0.0%	2	0.3%
50+ years	1	0.8%	0	0.0%	1	0.4%	1	0.2%	2	0.3%
Missing	4	3.3%	2	1.3%	6	2.2%	13	3.2%	19	2.8%
User Relation to Child										
Parent	108	90.0%	141	89.8%	249	89.9%	368	90.4%	617	90.2%
Grandparent	1	0.8%	1	0.6%	2	0.7%	1	0.2%	3	0.4%
Guardian	1	0.8%	0	0.0%	1	0.4%	9	2.2%	10	1.5%
Other	1	0.8%	1	0.6%	2	0.7%	0	0.0%	2	0.3%
Missing	9	7.5%	15	9.6%	24	8.7%	28	6.9%	52	7.6%
Clinic										
Muskegon	52	43.3%	38	24.2%	90	32.5%	86	21.1%	176	25.7%
Harper-Gratiot	11	9.2%	33	21.0%	44	15.9%	51	12.5%	95	13.9%
Oceana-Hart	17	14.2%	11	7.0%	28	10.1%	60	14.7%	88	12.9%
Wayne	6	5.0%	18	11.5%	24	8.7%	31	7.6%	55	8.0%
Ingham	5	4.2%	13	8.3%	18	6.5%	30	7.4%	48	7.0%
onia	10	8.3%	7	4.5%	17	6.1%	30	7.4%	47	6.9%
Greenville/Stanton	6	5.0%	10	6.4%	16	5.8%	30	7.4%	46	6.7%
Ithica	3	2.5%	10	6.4%	13	4.7%	20	4.9%	33	4.8%
Herman-Kiefer	7	5.8%	2	1.3%	9	3.2%	20	4.9%	29	4.2%
Kalkaska	0	0.0%	9	5.7%	9	3.2%	13	3.2%	22	3.2%
Taylor	1	0.8%	4	2.5%	5	1.8%	14	3.4%	19	2.8%
St. Johns	2	1.7%	0	0.0%	2	0.7%	11	2.7%	13	1.9%
Burton Clinic	0	0.0%	0	0.0%	0	0.0%	9	2.2%	9	1.3%
McRee Health Services	0	0.0%	2	1.3%	2	0.7%	2	0.5%	4	0.6%
Child's Age										
<1 year	10	8.3%	12	7.6%	22	7.9%	29	7.1%	51	7.5%
1 year	12	10.0%	33	21.0%	45	16.2%	68	16.7%	113	16.5%
2 years	21	17.5%	20	12.7%	41	14.8%	72	17.7%	113	16.5%
3 years	14	11.7%	15	9.6%	29	10.5%	64	15.7%	93	13.6%
4 years	3	2.5%	3	1.9%	6	2.2%	15	3.7%	21	3.1%
5 years	4	3.3%	2	1.3%	6	2.2%	5	1.2%	11	1.6%
>1 child <6 years	56	46.7%	72	45.9%	128	46.2%	154	37.8%	282	41.2%
Missing	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Computer Access										
Home	68	56.7%	42	26.8%	110	39.7%	142	34.9%	252	36.8%
Work	7	5.8%	6	3.8%	13	4.7%	20	4.9%	33	4.8%
Library	3	2.5%	18	11.5%	21	7.6%	40	9.8%	61	8.9%
Parent's house	9	7.5%	19	12.1%	28	10.1%	39	9.6%	67	9.8%
Friend's house	3	2.5%	13	8.3%	16	5.8%	24	5.9%	40	5.8%
WIC clinic	1	0.8%	3	1.9%	4	1.4%	1	0.2%	5	0.7%
Other	2	1.7%	6	3.8%	8	2.9%	12	2.9%	20	2.9%
Missing	27	22.5%	50	31.8%	77	27.8%	129	31.7%	206	30.1%

Overall, the online and traditional groups were very similar to each other, as well as to the group of individuals lost to follow-up. One difference is that the traditional group tended to be younger than those individuals selecting to use the online intervention. The study sample was consistent with the general Michigan WIC population. This strengthens the application of the evaluation results to WIC settings beyond the participating clinics.

Table 2 provides results of participant responses regarding their prior and current use of the Internet, including other FV education programs they have experienced.

Table 2. Internet, Computer and FV Education Use of Project Enrollees

Item Description	Online Ed Group		Traditional Ed Group		Total Participants		No Follow-up to date		TOTAL	
	n=120		n=157		n=277		n=407		n=684	
	Count	% YES	Count	% YES	Count	% YES	Count	% YES	Count	% YES
Has Used Internet	108	90.0%	132	84.1%	240	86.6%	347	85.3%	587	85.8%
Uses Internet A Lot	73	60.8%	48	30.6%	121	43.7%	169	41.5%	290	42.4%
Has Used wichealth.org	23	19.2%	18	11.5%	41	14.8%	52	12.8%	93	13.6%
Has used other FV websites	16	13.3%	19	12.1%	35	12.6%	50	12.3%	85	12.4%
Has taken a WIC FV class	38	31.7%	57	36.3%	95	34.3%	92	22.6%	187	27.3%
Other WIC FV services	12	10.0%	20	12.7%	32	11.6%	70	17.2%	102	14.9%
Non-WIC FV services	17	14.2%	15	9.6%	32	11.6%	49	12.0%	81	11.8%
Owns a computer	96	80.0%	64	40.8%	160	57.8%	222	54.5%	382	55.8%

Similar results are seen for all study groups for FV education exposure and having ever used the Internet. However, those in the online group used the Internet more often, and were more likely to own a computer. About twice as many individuals have used wichealth.org in the online group as compared to the traditional education group.

Table 3 provides baseline FVC statistics among all enrollees, including stratification by study group status. Note there are no significant differences among responses by group, for the FVC

Table 3. Fruit and Vegetable Consumption of Project Enrollees

Measure	Servings	Online Group (n=139)	Traditional Group (n=216)	No Follow-Up (n=337)	Grand Total (n=692)
Fruit Juice Servings per Day	1	47	53	96	196
	2	42	76	107	225
	3	19	47	70	136
	4	6	8	12	26
	5	3	8	12	23
	missing	22	24	40	86
Fruit Servings per Day	1	39	64	115	218
	2	57	80	111	248
	3	21	39	63	123
	4	7	12	16	35
	5	4	2	6	12
	missing	11	19	26	56
Vegetable Servings per Day	1	45	67	90	202
	2	54	72	124	250
	3	26	48	63	137
	4	3	7	19	29
	5	2	4	4	10
	missing	9	18	37	64

measures used. As indicated in Table 3, most respondents reported having 1-2 servings of fruit juice, 1-2 servings of fruit, and 1-2 servings of vegetables on a daily basis. For project enrollees measured to be in the maintenance stage with respect to healthy FVC behaviors, 63% indicated having only 1

servings of vegetables per day. Similarly, 64% of this group reported just 1 serving of fruit per day. This indicates a more favorable attitude toward the benefit of healthy behavior compared to actual implementation of healthy behavior. Despite the large percentage of individuals that began the project in the maintenance stage (see Table 4), most project participants still required improvement in FVC behaviors.

Evaluation of Program Objectives

This first objective under the goal of impacting WIC client intent toward behavior change associated with FVC was to demonstrate movement among these participants along the stages of readiness to change continuum associated with this behavior. Results indicated both the traditional and online groups progressed along the stages of change continuum. However, the online group was significantly more likely (RR=1.6; p=0.003) to demonstrate this positive change, especially among individuals that begin in the preparation stage. Table 4 presents the baseline and post-intervention stages of change for each group.

Table 4. Change in Stages of Change by Study Group

Beginning Stage	Latest Stage	Online Group			Traditional Group		
		Count	%	% Change within Begin Stage	Count	%	% Change within Begin Stage
Maintenance	Maintenance	97	68.8%	n/a	145	67.1%	n/a
	Relapse	2	1.4%		8	3.7%	
Action	Maintenance	14	9.9%	n/a	14	6.5%	n/a
	Action	3	2.1%		6	2.8%	
	Relapse	0	0.0%		1	0.5%	
Preparation	Maintenance	10	7.1%	95%	16	7.4%	59%
	Action	11	7.8%		3	1.4%	
	Preparation	1	0.7%		12	5.6%	
	Relapse	0	0.0%		1	0.5%	
Contemplation	Action	0	0.0%	n/a	1	0.5%	40%
	Preparation	0	0.0%		1	0.5%	
	Contemplation	0	0.0%		3	1.4%	
Pre-contemplation	Action	0	0.0%	100%	0	0.0%	0%
	Preparation	0	0.0%		0	0.0%	
	Contemplation	1	0.7%		0	0.0%	
	Pre-contemplation	0	0.0%		3	1.4%	
Missing		0	0.0%	n/a	2	0.9%	n/a
Total		139			216		

These findings suggest the innovative online education has been more effective in moving participants along the stages of change continuum. These findings argue for achievement of the fifth objective, *to demonstrate transference of behavioral intent to commitment associated with movement along the stages of readiness to change continuum.*

Based on follow-up data, 12 individuals were determined to have moved back to earlier stages than initially measured at baseline. This may be related to recent relapse, reducing the healthy behavior. Alternatively, this may indicate that as individuals learn, they may become more critical of their own behavior. This regression in stage varies significantly by study group, affecting 3.7% of participants in the traditional group and only 1.4% in the online group. This may indicate more reliable data collection online, versus paper-based in a clinic setting.

The second objective was to increase participant perceptions of their ability to use what they learned from the wichealth.org FV module to impact FVC, how they feed their children, and their belief in their ability to make such changes, as compared to traditional education.

Table 5. Perceptions of the Usefulness of Education by Study

Item Description	Online Ed Group n=139		Traditional Ed Group n=216		P-Value
	Count YES	% YES	Count YES	% YES	
	The information from the education program was easy to use	138	99.3%*	202	
The information from the program was easy to understand.	139	100.0%*	207	95.8%*	0.015*
The information from the program was helpful	139	100.0%*	206	95.4%*	0.010*
I learned something that will help my eating habits	131	94.2%	200	92.6%	0.545
I learned something to help change the way I eat	123	88.5%	188	87.0%	0.685
I believe I can make changes using what I learned	130	93.5%	200	92.6%	0.737

Table 5 indicates that participants learned something from both the online and traditional approaches to help change the way they eat. However, participants from the online group were more likely to find the education received easy to use, easy to understand, and helpful to them ($p < 0.05$). Although slightly more online group (percentage of participants) indicated they believed they were able to make changes using what was learned, the difference was not statistically significant.

The third objective was to demonstrate that 90% of participants were satisfied with using the wichealth.org FV module as a nutrition education intervention for increasing FVC. The findings presented in Table 5 support the achievement of this objective. Table 6 provides further indication of user satisfaction by asking if they like using web pages better than traditional education and whether they would want to use web pages for other WIC eating topics.

Table 6. Online Education User Satisfaction

Item Description	Online Ed Group n=139	
	Count YES	% YES
	I want to use web pages to learn about other WIC eating topics.	115
I like learning from web pages better than the other types of education I have had.	114	82.0%

The fourth objective was to demonstrate the extent to which a relationship exists between participant perception of the wichealth.org FV module as being both helpful and easy to understand in relation to FVC and participant movement in stage of readiness to change. One hundred percent of clients in the online group agreed that the wichealth.org FV module was both helpful and easy to understand in relation to FVC (compared to 95.4% and 95.8 respectively in the traditional group). This demonstrates that all users, regardless of any stage progression, find benefit in using wichealth.org education.

The sixth objective of the project was to determine the impact Internet-based learning has on FVC as compared to traditional educational strategies. Table 7 presents two comparisons of the online versus the traditional education group self-reported mean fruit and vegetable servings per day. Fruit juice is measured separately to differentiate servings of juice from servings of fruit. The top half of the table shows that project participants in both groups increased their reported servings per day on all three items. However, the magnitude of change was significantly higher for the online group for fruit juice ($p = 0.001$) and vegetable ($p = 0.003$) servings per day.

Table 7. Change in Mean Number of Fruit and Vegetable Servings per Day by Study Group

Study Group	N	Baseline			Average Follow-up			% Change		
		FV Juice per Day	Fruit Times per Day	Vegetables Times per Day	FV Juice per Day	Fruit Times per Day	Vegetables Times per Day	FV Juice per Day	Fruit Times per Day	Vegetables Times per Day
Online Education Group	139	1.94	2.06	1.95	2.35	2.51	2.55	21.2%	21.8%	30.9%
Traditional Education Group	216	2.18	2.03	2.04	2.50	2.46	2.40	14.6%	21.4%	18.1%
Grand Total	355	2.09	2.04	2.00	2.43	2.48	2.46	16.6%*	21.7%	23.2%*
P-value for Mean Difference:								0.001*	0.112	0.003*

Study Group	N	Baseline			Final Follow-up			% Change		
		FV Juice per Day	Fruit Times per Day	Vegetables Times per Day	FV Juice per Day	Fruit Times per Day	Vegetables Times per Day	FV Juice per Day	Fruit Times per Day	Vegetables Times per Day
Online Education Group	56	1.94	2.06	1.95	2.48	2.38	2.54	27.9%	15.2%	30.3%
Traditional Education Group	63	2.18	2.03	2.04	2.17	2.18	2.24	-0.5%	7.5%	10.1%
Grand Total	119	2.09	2.04	2.00	2.32	2.27	2.38	10.9%*	11.3%	19.1%*
P-value for Mean Difference:								0.001*	0.133	0.044*

The bottom half of Table 7 compares project participant baseline FVC responses to the 6 month final follow-up survey responses. This comparison helps to establish the retention of positive behavior changes among participants of each group. Despite the smaller numbers, the mean difference in fruit juice ($p=0.001$) and vegetable ($p=0.044$) servings per day was statistically larger, 6 months post intervention, among participants of the online group. Further, the mean increase in servings per day was sustained more often among the online group participants than in the traditional group. Although clear improvement in fruit consumption was greater among the online group participants, the difference was not statistically significant.

Objective seven of the project was to demonstrate an increase in FVC among WIC clients. Table 7 supports the achievement of this objective for both study groups.

One attenuating factor for the increased FVC among study participants was exposure to follow-up counseling during the course of the study period. This was the focus of the final objective under Goal 3. Use of motivational negotiation techniques during follow-up counseling, and the duration of time spent discussing FVC behaviors, were relatively low. However, the impact of counseling, or other characteristics of clients completing counseling sessions, was related to individual improvement in FVC behaviors. Table 8 shows the mean difference in the three FVC measures by both study group and exposure to counseling.

Table 8. Mean Difference from Baseline to Average Follow-up in Fruit and Vegetable Consumption by Study Group ar Whether Counseling was Received

Fruit and Vegetable Consumption Measure	Attended Counseling		Did Not Attend Counseling	
	Online Education (n=36)	Traditional Education (n=48)	Online Education (n=103)	Traditional Education (n=168)
Fruit Juice Servings per Day	0.80	0.77	0.77	0.16
Fruit Servings per Day	0.57	0.89	0.61	0.40
Vegetable Servings per Day	0.61	0.62	0.87	0.40
Amount of Sessions Devoted to Fruit and Vegetable Consumption Issues	20%	18%		

The impact of the follow-up counseling session is clear. It appears to compensate for the lack of the ability of traditional education alone to impact FVC. Note that the mean difference in the FVC measures is similar among all individuals who had follow-up counseling. However, the online group appears to be less affected by the lack of a counseling session than the traditional group.

Table 9 provides the p-values for the mean difference for several comparisons. Among individuals with follow-up counseling, there was no significant difference in the mean improvement in FVC between the online and traditional groups. Among those without follow-up counseling, all measures were significantly different. Among individuals in the online group, there was no difference in the improvement of FVC between those who had follow-up counseling and those who did not. Furthermore, there was no difference in the improvement among those in the online group without follow-up counseling, and in the traditional group that received follow-up counseling. Finally, anyone who had follow-up counseling had a greater significant improvement in FVC behaviors than those in the traditional group without follow-up counseling.

Table 9. Comparisons Among Study Groups for Effect of Counseling on Mean Differences in Fruit and Vegetable Consumption

Comparison	P-value for Mean Difference in Fruit Juice Servings per	P-value for Mean Difference in Fruit Servings per Day	P-value for Mean Difference in Vegetables Servings per
	Day	Day	Day
Online with Counseling v. Traditional with Counseling	0.109	0.497	0.159
Online Alone v. Traditional Alone	0.001*	0.018*	0.004*
Online with Counseling v. Online Alone	0.432	0.454	0.143
Traditional with Counseling v. Traditional Alone	0.006*	0.025*	0.447
Online Alone v. Traditional with Counseling	0.147	0.438	0.005*
Online with Counseling v. Traditional Alone	0.001*	0.064	0.140

To determine if online group participants received adequate exposure to the intervention, two key indicators were used the number of end nodes (i.e., educational Internet pages) used per session and the duration of use for each. Among the 116 online group participants for whom immediate follow-up data have been collected, 105 (91%) used at least 1 end node. Table 10 shows the distribution of use by number of end nodes. The average time spent at each end node was 1 minute and 39 seconds. The average number of end nodes used per online group participant was 1.7, and the most frequent number was 1.

Table 10. Number of End Nodes Used Among Online Education Group Participants

Number of End Nodes Used	Number of Online Education Group Participants	% of Group
0	11	9%
1	60	52%
2	22	19%
3	11	9%
4	3	3%
5	5	4%
6	3	3%
10	1	1%
Grand Total	116	100%

These findings are consistent with similar observations of the general [wichealth.org](http://www.wichealth.org) website in terms of the distribution of the frequency of end nodes visited, although the average time spent at each was less than expected. Accuracy in recording usage times is one consideration to explore further in

order to ensure accurate estimates. The available data indicate that most online group participants were indeed exposed to the intervention.

Table 11 presents the frequency of end nodes utilized by individuals in the online group along with the average amount of time spent per use for each.

Table 11. Online Group End Node Utilization and Average Time of Use

End Node	Visits	Average Time of Use in Seconds
FVM-5	43	87.9
FVM-4	26	102.6
FVM-3	25	83.9
FVM-1	24	99.1
FVM-2	18	73.4
FVA-1	11	86.5
FVA-2	9	111.4
FVP-1	8	111.0
FVP-2	7	87.0
FVA-4	5	146.4
FVA-6	4	68.3
FVP-4	3	92.0
FVP-7	3	216.0
FVA-3	2	154.0
FVP-12	2	164.5
FVP-3	2	142.5
FVP-5	2	196.5
FVP-6	2	104.0
FVP-8	2	143.5
FVA-5	1	415.0
FVP-11	1	22.0
FVP-13	1	68.0
FVPC-1	1	37.0
FVPC-2	1	88.0
Grand Total	203	98.8

Qualitative Analysis

Users of the wichealth.org FV module were generally satisfied with their experience. Even without advancement in stages of change (i.e., users who begin in maintenance or action), users found the education helpful, and established their intent to improve on or continue current healthy fruit and vegetable eating behaviors. This is further supported by qualitative analysis of user exit comments from the wichealth.org FV module. These are summarized in Table 12 below, stratified by user beginning and ending stage of change.

Table 12. wichealth.org FV Module User Exit Comments by Beginning and Ending Stage

Begin Stage	End Stage	Code	Total
Maintenance	Maintenance	Continue healthy behavior	32
		Try recipes in order to eat more fruits and vegetables	21
		Add fruits and vegetables to all meals and snacks	12
		Make fruits and vegetables available for family	9
		Eat more variety / try new fruit and vegetable options	9
		Eat healthier	2
		General website praise	1
		Not sure	1
		Share information with someone else	1
Action	Action	Add fruits and vegetables to all meals and snacks	3
		Make fruits and vegetables available for family	3
		Eat healthier	1
		Involve family and friends to eat more fruits and vegetables	1
Preparation	Action	Add fruits and vegetables to all meals and snacks	8
		Make fruits and vegetables available for family	3
		Eat more variety / try new fruit and vegetable options	2
		Try recipes in order to eat more fruits and vegetables	1
	Preparation	Add fruits and vegetables to all meals and snacks	1
Pre-Contemplation	Contemplation	Think more about it when finances allow	1
TOTAL			112

Table 12 demonstrates that the majority of comments indicated positive attitudes toward the behavioral education each user completed.

Furthermore, those completing a final follow-up survey were asked to share any changes made over the past 6 months that involve FV. A total of 63 comments were collected, with 27 from the online education group (Table 13). Most (70%) of these individuals indicated they had been eating more fruits and vegetables, with many indicating that no change was necessary. Possible barriers such as cost, and difficulty managing family FVC, need to be addressed within the online education intervention.

Table 13. Participant Comments from Final Follow-up Survey

Comment Code	Total
Eating more fruits and vegetables	44
No changes needed	10
Difficult to control family consumption	3
Fruit and vegetables are too expensive	3
Drinking more juice	1
Eating more healthy	1
Unable to eat many fruits due to medical condition	1
Grand Total	63

Process Evaluation

The WIC FV Project evaluation plan includes several process objectives designed to explore the characteristics of WIC clients choosing to enroll in the program. This evaluation report for Phase 1 consists of the analysis of process measures describing (1) participant module access and demographics and (2) participant satisfaction and perceived ease of use, (3) state WIC personnel perceptions associated with program usage, implementation, and success; (4) the success of procedures established to monitor participant access to wichealth.org FV modules; and (5) clinic staff satisfaction associated with CD ROM and Internet-based training in motivational negotiation. Note the process evaluation represents a subset (99% of total final participants) due to missing data at the time of analysis.

Participant Module Access and Demographics

Although participant enrollment in the WIC FV Project was less than anticipated, those who did enroll were fairly representative of the entire Michigan WIC client population. Table 14 provides race/ethnicity information for the 684 WIC participants that enrolled in Phase 1 of the project during the fall of 2005 through March of 2006. Given these results, it will be appropriate to generalize the study findings from Phase 1 of the project to the population of Hispanic, African American and Caucasian WIC clients. The number of enrollees from the other ethnic groups will not be sufficient to draw conclusions about WIC clients from these populations.

Table 14. WIC-USDA Fruit and Vegetable Project Enrolled Participant Demographics for Phase I

Clinic	Hispanic	African American	Caucasian	Asian	American Indian/Alaskan Native	Native Hawaiian/Pacific Islander	Multiracial	Total
Burton		1	8					9
Greenville/Stanton			45				1	46
Harper-Gratiot		89	6					95
Herman-Kiefer		26	2			1		29
Ingham	11	4	31	1			1	48
Ionia	3		44					47
Ithaca	4		29					33
Kalkaska			21				1	22
McRee		2	2					4
Muskegon	10	37	111		3		15	176
Oceana-Heart	18		67			2	1	88
St. Johns	3		10					13
Taylor		3	16					19
Wayne	2	18	32				3	55
Total	51	180	424	1	3	3	22	684
% of Total	7.5%	26.3%	62.0%	0.1%	0.4%	0.4%	3.2%	100%
Actual Michigan WIC %	11.6%	28.5%	57.7%	1.5%	0.7%	0.0%	0.0%	100%

One hundred thirty-two (132) of the 684 WIC clients enrolled in the project chose to complete their FV education using the online wichealth.org FV module. Two hundred twenty (220) of the 684 clients enrolled in the project chose to complete traditional FV education. There was a difference in the race and ethnicity of WIC clients choosing to complete their education online compared to those choosing to complete traditional education. Table 15 presents the 132 WIC clients that completed online education by clinic and race. Note that Caucasians were more likely to choose online education than Hispanic and African American clients. Although the number of clients reported to be multi-racial (bi-racial in table) was small, these individuals were also more likely to choose online education. Although Caucasian and multi-racial clients tended to prefer online education more than Hispanic or

African American clients, the data still support the fact that all clients from all clinics and ethnicities were able to access the online education.

Table 15. WIC-USDA Fruit and Vegetable Online Module Access by Clinic and Demographics for Phase 1

Clinic	Hispanic	African American	Caucasian	Multiracial	Total
Greenville/Stanton			8		8
Harper-Gratiot		7			7
Herman-Kiefer		1			1
Ingham			3		3
Ionia			19		19
Ithaca			5		5
Kalkaska			6		6
Muskegon	4	10	34	6	54
Oceana-Hart	1		8	1	10
St. Johns			7		7
Taylor		1			1
Wayne		4	6	1	11
Total	5	23	96	8	132
% of Total	3.8%	17.4%	72.7%	6.1%	100%

Participant Satisfaction and Perceived Ease of Use

WIC FV Project participants that chose the online educational module overwhelmingly responded in a positive manner to all satisfaction item measures (see Table 16). Over 99% of respondents agreed that the wichealth.org FV module was easy to use, easy to understand and helpful to them. 91.5% of WIC clients completing the online module agreed they could make changes using what they learned. Furthermore, the majority of these individuals wanted to use web pages to learn about other WIC eating topics and indicated they liked learning from web pages better than the other types of education they have had.

Table 16. Participant Satisfaction with Online Fruit and Vegetable Education

Item	n	%YES!/Yes
This web site is easy to use.	130	99.2%
The information on this web site is easy to understand.	130	99.2%
The information on this web site is helpful.	128	100.0%
I learned something that will help my child's eating habits.	128	93.0%
I learned something that will help my eating habits.	126	86.5%
I learned something to help change the way I eat.	130	91.5%
I want to use web pages to learn about other WIC eating topics.	132	79.5%
I like learning from web pages better than the other types of education I have had.	131	78.6%

Table 17 presents results for similar satisfaction items collected from WIC clients that chose to complete traditional FV education at the WIC clinic. The results indicated that both forms of education were well received by participants, however, a significantly larger proportion of WIC clients that chose the online FV education responded positively to items concerning the usefulness, the ease of understanding and the helpfulness of the information they received.

Table 17. Participant Satisfaction with Traditional Fruit and Vegetable Education

Item	n	%YES!/Yes
The information from the education program was useful.	210	92.4%
The information from the program was easy to understand.	210	95.7%
The information from the program was helpful.	210	94.3%
I learned something that will help my eating habits.	210	90.5%
I learned something to help change the way I eat.	209	84.2%
I believe I can make changes using what I learned.	210	90.0%

The online FV education module was found by users to be more useful, easier to use and more helpful than traditional methods delivered onsite at the WIC clinic. Clearly, the objective of creating an online learning environment where users are comfortable and able to easily understand the materials presented has been categorically met.

WIC Personnel Perceptions Associated with Program Usage, Implementation, and Success

Fifteen satisfaction surveys were completed by WIC personnel concerning their perceptions of the usage, implementation, and success of the WIC FV Project (see Table 18). Only three of these individuals completed motivational negotiation training, two using the CD-ROM and one using both the CD-ROM and the wichealthmn.org web site.

Table 18. Results of the WIC Personnel WIC-USDA Fruit and Vegetable Project Satisfaction Survey

Item	n	% Strongly Agree/Agree
Our clinic was able to implement and use www.wichealthfv.org as a means for improving fruit and vegetable consumption among our clients.	15	80.0%
The online module at www.wichealthfv.org had fruit and vegetable consumption behavior information that met the needs of our WIC clients.	15	73.3%
The www.wichealthsupport.org website was used by our clinic for assisting in the effective implementation of the fruit and vegetable project. .	15	46.7%
The motivational negotiation CD-ROM (provided by the state) or web-based motivational negotiation training (located at www.wichealthmn.org) assisted me in helping clients move toward or maintain healthy fruit and vegetable consumption behaviors.	3	100%
The CD-ROM or web-based motivational negotiation training as effective in improving my ability to implement motivational negotiation counseling techniques.	3	100%
I am satisfied with my ability to use the motivational interviewing techniques I learned from the CD-ROM or web-based motivational negotiation training.	3	100%

Most of the respondents agreed that their clinic was able to implement and use wichealth.org FV module as a means for improving FV consumption among their clients. Furthermore, the majority of WIC staff thought the online FV education met the needs of the clients at their clinic. However, most respondents reported not using the wichealthsupport.org web site to assist them with carrying out the project. This indicates that more must be done to ensure that WIC personnel are aware of and able to use the support site as a means of support for the successful implementation of the project at their clinic. All three of the respondents that reported completing the motivational negotiation training found the Internet site helpful in assisting them to help clients move toward or maintain healthy FV consumption behaviors. Furthermore these individuals all found the training effective for improving their own abilities to implement and use motivational negotiation techniques.

Results of the motivational negotiation post-training quiz demonstrated there were many WIC personnel that used the training. Approximately 35 individuals started the training session and about 5 did not complete it. Unfortunately, staff WIC ID was not collected during the training session, so it is not possible to link this information with the actual follow-up counseling sessions provided to WIC FV Project participants where motivational negotiation techniques may have been utilized. Table 19 presents the results for all training quiz items attempted by WIC personnel. There were 6 items

measuring motivational negotiation skills and 10 items measuring knowledge about the Transtheoretical model stages of change. Note some items had more than 50% of attempts that were wrong guesses. Motivational negotiation items 2 and 3 concern exploring ambivalence and identifying discrepancies between clients' behaviors and values. The training materials may need to be reviewed to identify potential improvements so that these concepts are better understood by users. Stages of change items 5, 6, and 8 also had more than 50% of attempts with wrong guesses. These three items all focus on the user's ability to differentiate the earlier stages of change: precontemplation, contemplation, and preparation. It is possible that the information concerning these stages could be delivered in a manner that is easier to understand for the user.

Table 19. Results of the Motivational Negotiation Post-Training Quiz

Quiz Type	Item	Attempts	Wrong Guesses
Motivational Negotiation	1	60	28
	2	54	46
	3	43	34
	4	37	9
	5	35	14
	6	35	17
Motivational Negotiation Total		264	148
Stages of Change	1	72	11
	2	68	18
	3	61	11
	4	61	41
	5	58	37
	6	57	47
	7	55	26
	8	54	35
	9	53	26
	10	53	4
Stages of Change Total		592	256

Table 20 presents the survey results completed by WIC personnel following the motivational counseling sessions they provided to WIC clients participating in the project. These sessions were completed within 3 to 6 months of initial enrollment. The purpose of these surveys was to understand the potential incremental impact of motivational negotiation counseling on the online and traditional education interventions completed by project participants. Furthermore, these surveys demonstrated the effectiveness of the wichealthmn.org web site in educating WIC personnel about how to utilize motivational negotiation techniques to help their clients move toward or maintain healthy FV consumption behaviors.

Table 20. WIC-USDA Motivational Negotiation Counseling Session Survey Results

	n	Online	Traditional
Average Percentage of Counseling Time Spent on Fruit and Vegetable Education		15.5	12.7
Item		%Yes	
The client and I acted as a team.		63%	80%
I provided information only when asked to or with permission from the client.		26%	48%
The client and I explored both the positive as well as the negative side of change.		28%	26%
I was comfortable using a variety of strategies to elicit "change talk" from the client.		19%	22%
I felt successful in my ability to enhance motivation to change behavior in the client.		33%	28%
I tailored my approach based on the values and goals of the client throughout our interaction.		53%	52%
I acknowledged it is normal for there to be discrepancy between the client's behavior and values.*		12%	14%
Throughout the session I was able to express empathy for my client's situation.		33%	52%
I used primarily open-ended questioning to get responses from the client.		70%	64%
I was able to move forward when encountering any resistance from the client.		21%	12%
I was able to help the client explore ambivalence.*		12%	6%
I was able to repeat back or paraphrase what the client said.		42%	56%
I have had training on how to use motivational negotiation techniques when working with a client.		49%	56%
I completed the motivational negotiation training available at www.wichealthmn.org		28%	18%

Note that only 43 of the 132 online education participants and 50 of the 220 traditional education participants completed follow-up counseling sessions. The average percentage of counseling time spent on fruit and vegetable education was relatively low at 15.5% and 12.7% for online and traditional education participants, respectively, making it difficult to fully determine the impact of motivational negotiation in moving participants toward active change.

The items in Table 20 concerning the ability to identify discrepancies between an individual's behavior and values and the ability to help clients explore ambivalence were the key weaknesses that WIC personnel had in delivering motivational negotiation based counseling to clients. These two items were also the same two items from the motivational negotiation post-training quiz that had the highest proportion of attempts with wrong guesses. This consistency in the findings helps to establish validity to the data collected; however it also demonstrates that there are weaknesses that must be addressed in how this information is presented in the wichealthmn.org Internet site learning module.

Success of Procedures Established to Monitor Participant Access to wichealth.org Modules

The wichealthfv.org Internet site has proven itself to be very technically sound. Not once during the 12 months of its use during this project were there any complaints or feedback indicating the presence of issues that prevented participant access to the educational module. An online form was developed for submission via email of any problems experienced by users, however not one problem was submitted.

Clinic Staff Satisfaction Associated with CD ROM and Web-based Training in Motivational Negotiation

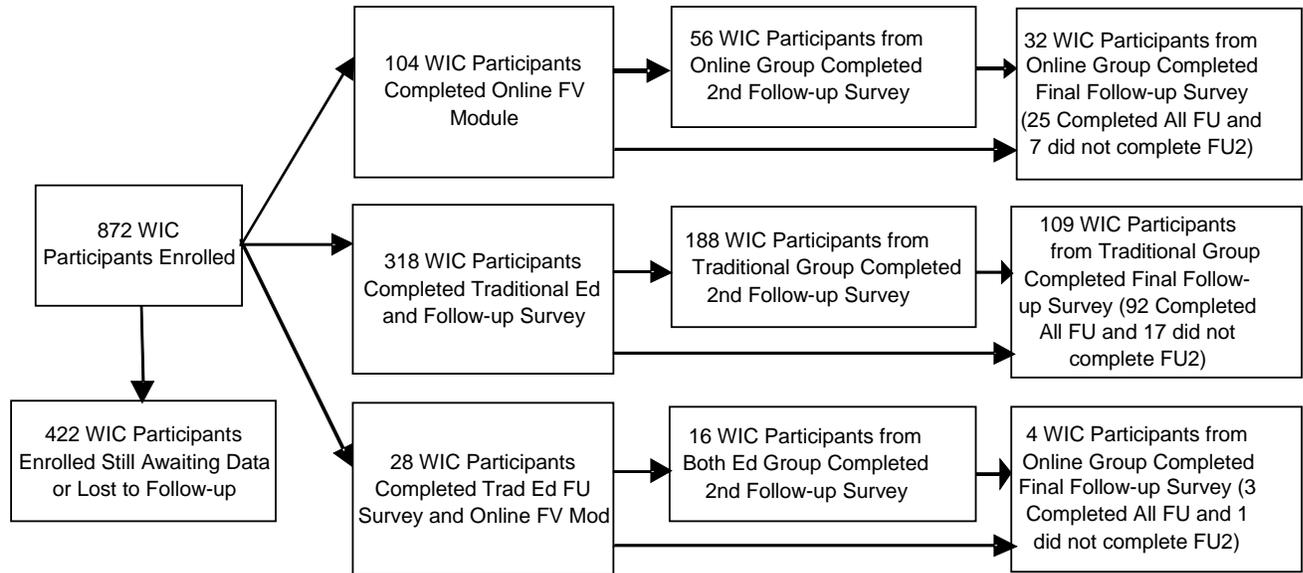
Based on the limited number of individuals completing the WIC staff satisfaction survey, the motivational negotiation training was found to be helpful in assisting them to help clients move toward or maintain healthy fruit and vegetable consumption behaviors. Examples of comments received from WIC staff about the training included: "the MN training helped as a refresher as well as to reinforce and change behaviors" and that it "helped in awareness of alternative ways to negotiate fruit and vegetable behavior." Because so few WIC staff who completed the motivational negotiation training also completed a satisfaction survey, it may be valuable to include a satisfaction survey to be completed following the training session.

PHASE 1I: CHILD FRUIT AND VEGETABLE CONSUMPTION

Enrollment Baseline Results

During the second phase of this project, 872 WIC clients were enrolled in the study. Figure 2 illustrates the follow-up of the 872 enrollees including whether they self-selected into the traditional or online study groups. 442 project enrollees were lost to follow-up because they did not complete the wichealth.org FV module or a traditional education equivalent.

Figure 2. Phase II Traditional and Online Education Group Enrollment and Follow-up



As presented in the figure above, a total of 104 project enrollees self-selected into the online education intervention and completed it while 318 chose and completed the traditional education. Fifty-six (56) participants from the online group complete the 2nd follow-up survey and 32 completed the final follow-up survey. Similarly, of the 318 traditional education group enrollees that completed the immediate follow-up survey, 188 completed the 2nd follow-up survey and 109 completed the final survey. Note, as illustrated in Figure 2, that a portion of the individuals completing the final follow-up survey did not complete the 2nd follow-up survey. There were also 28 participants who completed both types of education. These participants had enrolled in the online group and 86% of them completed the online education prior to or on the date they completed the traditional education. This may have occurred because clients did not bring the certificate of completion to their appointment. Therefore, WIC staff may have had the client complete the traditional education to ensure completion of the intervention. During Phase 1, there were 21 participants who also completed both types of education, but these individuals were not included in the evaluation. The remaining unusable data mostly included surveys or online modules completed among individuals that never enrolled in the

Table 21. Project Enrollee Demographics

Measure	Online Ed Group n=104		Traditional Ed n=318		Both Ed Group n=28		Total Participants n=450		No Follow-up to n=422		TOTAL n=872	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Age												
<18 years	6	5.8%	9	2.8%	1	3.6%	16	3.6%	16	3.8%	32	3.7%
18-24 years	20	19.2%	109	34.3%	4	14.3%	133	29.6%	147	34.8%	280	32.1%
25-29 years	26	25.0%	94	29.6%	12	42.9%	132	29.3%	120	28.4%	252	28.9%
30-34 years	22	21.2%	51	16.0%	8	28.6%	81	18.0%	54	12.8%	135	15.5%
35-39 years	16	15.4%	19	6.0%	1	3.6%	36	8.0%	26	6.2%	62	7.1%
40-44 years	7	6.7%	14	4.4%	2	7.1%	23	5.1%	16	3.8%	39	4.5%
45-49 years	2	1.9%	3	0.9%	0	0.0%	5	1.1%	9	2.1%	14	1.6%
50+ years	1	1.0%	2	0.6%	0	0.0%	3	0.7%	4	0.9%	7	0.8%
Missing	4	3.8%	17	5.3%	0	0.0%	21	4.7%	30	7.1%	51	5.8%
User Relation to Child												
Parent	100	96.2%	309	97.2%	28	100.0%	437	97.1%	387	91.7%	824	94.5%
Grandparent	2	1.9%	2	0.6%	0	0.0%	4	0.9%	13	3.1%	17	1.9%
Guardian	1	1.0%	1	0.3%	0	0.0%	2	0.4%	7	1.7%	9	1.0%
Other	1	1.0%	1	0.3%	0	0.0%	2	0.4%	7	1.7%	9	1.0%
Missing	0	0.0%	1	0.3%	0	0.0%	1	0.2%	12	2.8%	13	1.5%
Clinic												
Greenville/Stanton	4	3.8%	30	9.4%	5	17.9%	39	8.7%	20	4.7%	59	6.8%
Harper-Gratiot	20	19.2%	13	4.1%	0	0.0%	33	7.3%	66	15.6%	99	11.4%
Herman-Kiefer	0	0.0%	8	2.5%	0	0.0%	8	1.8%	13	3.1%	21	2.4%
Ionia	11	10.6%	36	11.3%	2	7.1%	49	10.9%	65	15.4%	114	13.1%
Ithaca	0	0.0%	0	0.0%	0	0.0%	0	0.0%	20	4.7%	20	2.3%
Kalkaska	0	0.0%	24	7.5%	0	0.0%	24	5.3%	2	0.5%	26	3.0%
Macomb	45	43.3%	86	27.0%	4	14.3%	135	30.0%	46	10.9%	181	20.8%
Muskegon	14	13.5%	29	9.1%	0	0.0%	43	9.6%	110	26.1%	153	17.5%
Oceana-Hart	5	4.8%	26	8.2%	3	10.7%	34	7.6%	16	3.8%	50	5.7%
St. Johns	0	0.0%	43	13.5%	13	46.4%	56	12.4%	10	2.4%	66	7.6%
Taylor	2	1.9%	5	1.6%	0	0.0%	7	1.6%	15	3.6%	22	2.5%
Wayne	3	2.9%	18	5.7%	1	3.6%	22	4.9%	39	9.2%	61	7.0%
Child's Age												
<1 year	4	3.8%	8	2.5%	0	0.0%	12	2.7%	8	1.9%	20	2.3%
1 year	26	25.0%	70	22.0%	8	28.6%	104	23.1%	79	18.7%	183	21.0%
2 years	28	26.9%	62	19.5%	4	14.3%	94	20.9%	100	23.7%	194	22.2%
3 years	13	12.5%	37	11.6%	1	3.6%	51	11.3%	61	14.5%	112	12.8%
4 years	5	4.8%	12	3.8%	1	3.6%	18	4.0%	32	7.6%	50	5.7%
5 years	0	0.0%	1	0.3%	1	3.6%	2	0.4%	3	0.7%	5	0.6%
>1 child <6 years	25	24.0%	127	39.9%	13	46.4%	165	36.7%	134	31.8%	299	34.3%
Missing	3	2.9%	1	0.3%	0	0.0%	4	0.9%	5	1.2%	9	1.0%
Computer Access												
Home	60	57.7%	103	32.4%	18	64.3%	181	40.2%	195	46.2%	376	43.1%
Work	6	5.8%	12	3.8%	2	7.1%	20	4.4%	16	3.8%	36	4.1%
Library	2	1.9%	29	9.1%	0	0.0%	31	6.9%	27	6.4%	58	6.7%
Parent's house	8	7.7%	28	8.8%	1	3.6%	37	8.2%	33	7.8%	70	8.0%
Friend's house	1	1.0%	29	9.1%	2	7.1%	32	7.1%	24	5.7%	56	6.4%
WIC clinic	0	0.0%	13	4.1%	0	0.0%	13	2.9%	16	3.8%	29	3.3%
Other	26	25.0%	65	20.4%	5	17.9%	96	21.3%	83	19.7%	179	20.5%
Missing	1	1.0%	39	12.3%	0	0.0%	40	8.9%	28	6.6%	68	7.8%

program. In total, from among the 872 initial enrollees, 450 (51.6%) participants completed a baseline assessment, educational intervention and immediate follow-up survey. This proportion is similar to Phase 1. This number would have been smaller without the rigorous attempts to follow-up with project enrollees. Participants who completed a baseline and follow-up survey, but no final survey, were sent a final survey through the mail or email to attempt to capture their responses. Participants receiving mailed follow up surveys were asked to complete and mail it back in a postage paid return envelope that was provided. As an incentive, all participants were given the opportunity to receive children's books at their next WIC visit as an incentive for completing the final survey. Overall, follow-up and retention were low as expected and demonstrated already in Phase 1. As previously indicated, prior research has demonstrated dropout rates for this population as high as 70% (Scott & McIlvain, 2000). Despite follow-up limitations, there were several significant findings

regarding the differential impact of the online education program compared to traditional education, on participant outcomes. Table 21 presents the demographic characteristics of the 872 project enrollees with stratification by final study group and follow-up status.

Based on the user relationship to the child and the child's age, the online and traditional groups were very similar to each other, as well as to the group of individuals lost to follow-up. However, the proportions of participants by clinic and by computer access location had several differences between the online and the traditional study groups. One difference is that the traditional group tended to be younger than those individuals selecting to use the online intervention, [wichealth.org](http://www.wichealth.org). This is similar to findings from Phase 1 of the project. Also, home access to a computer was much lower (32.4%) for the traditional group than it was for the online group (57.7%). Finally, although most clinics reflected the 3 to 1 ratio of traditional group participants to online group participants, the Harper-Gratiot location had more online group participants than traditional.

Table 22 provides results of participant responses regarding their prior and current use of the Internet, including other fruit and vegetable education programs they had experienced.

Table 22. Internet, Computer and FV Education Use of Project Enrollees

Item Description	Online Ed Group		Traditional Ed Group		Both Ed Groups		Total Participants		No Follow-up to date		TOTAL	
	n=104		n=318		n=28		n=450		n=422		n=872	
	Count YES	% YES	Count YES	% YES	Count YES	% YES	Count YES	% YES	Count YES	% YES	Count YES	% YES
Has Used Internet	99	95.2%	275	86.5%	28	100.0%	402	89.3%	379	89.8%	781	89.6%
Uses Internet A Lot	78	75.0%	103	32.4%	19	67.9%	200	44.4%	207	49.1%	407	46.7%
Has Used wichealth.org	29	27.9%	54	17.0%	10	35.7%	93	20.7%	58	13.7%	151	17.3%
Has used other FV websites	31	29.8%	53	16.7%	12	42.9%	96	21.3%	67	15.9%	163	18.7%
Has taken a WIC FV class	34	32.7%	120	37.7%	17	60.7%	171	38.0%	134	31.8%	305	35.0%
Other WIC FV services	27	26.0%	83	26.1%	1	3.6%	111	24.7%	106	25.1%	217	24.9%
Non-WIC FV services	14	13.5%	35	11.0%	4	14.3%	53	11.8%	52	12.3%	105	12.0%
Owens a computer	83	79.8%	173	54.4%	25	89.3%	281	62.4%	260	61.6%	541	62.0%

Comparable to Phase 1, similar results are seen for all study groups for FV education exposure and having ever used the Internet. However, those in the online group used the Internet more often, and were more likely to own a computer. Nearly twice as many individuals have used [wichealth.org](http://www.wichealth.org) in the online group as compared to the traditional group.

Table 23 provides baseline child FVC statistics among all enrollees, including stratification by study group status. Note the similarity in baseline FVC among all groups. The largest difference was found for fruit juice servings per day, which was higher among the traditional group than the online group. There were no other significant differences among baseline FVC responses by group.

As indicated by Table 23, most respondents reported that their child usually has 2-3 servings of fruit juice, 2-3 servings of fruit, and 1-2 servings of vegetables on a daily basis. For project enrollees measured to be in the maintenance stage with respect to healthy child FVC behaviors, 72% indicated that their child had 2 or fewer servings of vegetables per day. Similarly, 66% of this group reported that their child had 2 or fewer servings of fruit per day. This indicates that despite the large percentage of individuals that began Phase 2 of the project in the maintenance stage (see Table 24), most participants still required improvement in their ability to manage child FVC behaviors.

Table 23. Fruit and Vegetable Consumption of Project Enrollees

Measure	Servings	Online Group (n=104)		Traditional Group (n=318)		Both Ed Group (n=28)		No Follow-Up (n=422)		Grand Total (n=872)	
		Count	%	Count	%	Count	%	Count	%	Count	%
Fruit Juice Servings per Day	0	5	4.8%	13	4.1%	1	3.6%	12	2.8%	31	3.6%
	1	32	30.8%	59	18.6%	4	14.3%	74	17.5%	169	19.4%
	2	30	28.8%	133	41.8%	12	42.9%	146	34.6%	321	36.8%
	3	26	25.0%	73	23.0%	7	25.0%	112	26.5%	218	25.0%
	4	5	4.8%	26	8.2%	2	7.1%	35	8.3%	68	7.8%
	5	5	4.8%	13	4.1%	1	3.6%	15	3.6%	34	3.9%
	missing	1	1.0%	1	0.3%	1	3.6%	28	6.6%	31	3.6%
Fruit Servings per Day	0	2	1.9%	13	4.1%	0	0.0%	10	2.4%	25	2.9%
	1	24	23.1%	70	22.0%	4	14.3%	87	20.6%	185	21.2%
	2	42	40.4%	136	42.8%	17	60.7%	160	37.9%	355	40.7%
	3	22	21.2%	80	25.2%	4	14.3%	105	24.9%	211	24.2%
	4	11	10.6%	15	4.7%	2	7.1%	23	5.5%	51	5.8%
	5	2	1.9%	2	0.6%	0	0.0%	8	1.9%	12	1.4%
	missing	1	1.0%	2	0.6%	1	3.6%	29	6.9%	33	3.8%
Vegetable Servings per Day	0	4	3.8%	11	3.5%	0	0.0%	11	2.6%	26	3.0%
	1	26	25.0%	65	20.4%	7	25.0%	97	23.0%	195	22.4%
	2	44	42.3%	157	49.4%	14	50.0%	170	40.3%	385	44.2%
	3	18	17.3%	73	23.0%	5	17.9%	91	21.6%	187	21.4%
	4	7	6.7%	7	2.2%	0	0.0%	16	3.8%	30	3.4%
	5	3	2.9%	3	0.9%	1	3.6%	7	1.7%	14	1.6%
	missing	2	1.9%	2	0.6%	1	3.6%	30	7.1%	35	4.0%

Evaluation of Program Objectives

This first objective under the goal of impacting WIC client intent toward behavior change associated with child FVC was to demonstrate movement among these participants along the stages of readiness to change continuum associated with this behavior. Results indicated both the traditional and online groups progressed along the stages of change continuum. However, the online group was more likely (RR=1.4; p=0.089) to report this positive change based on their child's FVC, especially among individuals beginning in the preparation stage. Due to the small numbers of individuals that reported beginning in any stage other than maintenance at baseline, this rate ratio is not statistically significant. Table 24 presents the baseline and post-intervention stages of change for each group.

Similar to Phase 1, these findings suggest that online education was as effective or more effective in moving participants along the stages of change continuum compared to traditional education. These findings argue for achievement of the fifth objective, to demonstrate transference of behavioral intent to commitment associated with movement along the stages of readiness to change continuum.

Table 24. Change in Stages of Change by Study Group

Beginning Stage	Latest Stage	Online Group			Traditional Group			Both Ed Group		
		Count	%	% Change within Begin Stage	Count	%	% Change within Begin Stage	Count	%	% Change within Begin Stage
Maintenance	Maintenance	81	77.9%	n/a	220	69.2%	n/a	23	82.1%	n/a
	Relapse	3	2.9%		19	6.0%		0	0.0%	
Action	Maintenance	2	1.9%	n/a	9	2.8%	n/a	0	0.0%	n/a
	Action	3	2.9%		3	0.9%		0	0.0%	
	Relapse	0	0.0%		0	0.0%		0	0.0%	
Preparation	Maintenance	3	2.9%	100%	24	7.5%	77%	2	7.1%	100%
	Action	1	1.0%		3	0.9%		0	0.0%	
	Preparation	0	0.0%		7	2.2%		0	0.0%	
	Relapse	0	0.0%		1	0.3%		0	0.0%	
Contemplation	Action	4	3.8%	100%	4	1.3%	56%	0	0.0%	n/a
	Preparation	0	0.0%		1	0.3%		0	0.0%	
	Contemplation	0	0.0%		4	1.3%		0	0.0%	
Pre-contemplation	Action	0	0.0%	n/a	2	0.6%	67%	1	3.6%	100%
	Preparation	0	0.0%		0	0.0%		0	0.0%	
	Contemplation	0	0.0%		0	0.0%		0	0.0%	
	Pre-contemplation	0	0.0%		1	0.3%		0	0.0%	
Missing		7	6.7%	n/a	20	6.3%	n/a	2	7.1%	n/a
Total		104			318			28		

Based on follow-up data, 23 individuals were determined to have moved back to earlier stages than initially measured at baseline. This may be related to recent relapse in behaviors associated with the management of child FVC. Alternatively, this may indicate that as individuals learn, they may become more critical of their own behavior. This regression in stage varies significantly by study group, affecting 6.3% of participants in the traditional group and only 2.9% in the online group. This further suggests that online education may better promote maintenance of healthy child FVC behaviors. This may also indicate that the post-online education assessment may provide more reliable data collection as compared to the paper-based method used at the clinic for the traditional group. The second objective was to increase participant perceptions of their ability to use what they learned from the wichealth.org FV module to improve their child's FVC and their belief in their ability to make such changes, as compared to traditional education.

Table 25. Perceptions of the Usefulness of Education by Study

Group	Item Description	Online Ed Group		Traditional Ed Group		P-Value
		n=104		n=318		
		Count YES	% YES	Count YES	% YES	
	The information from the education program was easy to use	103	99.0%	296	93.1%	0.020*
	The information from the program was easy to understand.	103	99.0%	316	99.4%	0.726
	The information from the program was helpful	102	98.1%	311	97.8%	0.865
	I learned something that will help my eating habits	97	93.3%	284	89.3%	0.236
	I learned something to help change the way I eat	93	89.4%	264	83.0%	0.116
	I believe I can make changes using what I learned	95	91.3%	289	90.9%	0.885

Table 25 indicates that the majority of participants had positive learning experiences from both the online and traditional education approaches designed to help them better manage their child's FVC. However, participants from the online group were significantly more likely to find the education received was easy to use. Although more online group participants indicated they believed they were able to make changes using what was learned, the difference was not statistically significant.

The third objective was to demonstrate that 90% of participants were satisfied with using wichealth.org FV modules as a nutrition education intervention for increasing FVC. The findings presented in Table 25 support the achievement of this objective. Tables 26 and 27 provide further indication of user satisfaction by asking: (1) if users would want to use Internet pages for other WIC eating topics and (2) what is users' favorite way to get nutrition information. Note that in Table 27, 96.4% of those that completed both types of education report that, from among the four options provided, wichealth.org was their favorite way to get nutrition education.

Table 26. Online Education User Satisfaction: Desire to Use Web Page for Other WIC Eating Topics

Item Description	Online Ed Group		Both Ed Group	
	n=104		n=28	
	Count YES	% YES	Count YES	% YES
I want to use web pages to learn about other WIC eating	84	80.8%	21	75.0%

Table 27. Online Education User Satisfaction: Favorite Way of Getting Nutrition Education

Item Description	Online Ed Group		Both Ed Group	
	n=104		n=28	
	Count YES	% YES	Count YES	% YES
Person-to-person counseling at the WIC	11	10.6%	0	0.0%
Class or Group session at the WIC	3	2.9%	1	3.6%
Information Mall or other self-guided resources at the WIC	13	12.5%	0	0.0%
Wichealth	77	74.0%	27	96.4%

The fourth objective was to demonstrate the extent to which a relationship exists between participant perception of wichealth.org FV modules as being both helpful and useful in relation to their child's FVC and participant movement in stage of readiness to change. Almost all participants in the online group agreed that the wichealth.org FV module was helpful and useful in relation to FVC (see Table 25). This demonstrates that all users, regardless of any stage progression, find benefit in using wichealth.org education.

The sixth objective of the project was to determine the impact Internet-based learning has on FVC as compared to traditional educational strategies. Table 28 presents two comparisons of the online versus the traditional group self-reported mean fruit and vegetable servings per day. Fruit juice is measured separately to differentiate servings of juice from servings of fruit. The top half of the table compares project participant baseline child FVC responses to the average change across all follow-up periods (3 and 6 month). It shows that project participants in both groups increased their reported servings per day on all three items, with online being significantly higher than traditional education for all three outcomes (FV juice $p=.026$, Fruit $p=.004$, Vegetables $p=.001$).

Table 28. Change in Mean Number of Fruit and Vegetable Servings per Day by Study Group

Study Group	n	Baseline			Average Follow-up			% Change		
		FV Juice per Day	Fruit Times per Day	Vegetables Times per Day	FV Juice per Day	Fruit Times per Day	Vegetables Times per Day	FV Juice per Day	Fruit Times per Day	Vegetables Times per Day
Online Education	104	2.09	2.21	2.07	2.45	2.64	2.56	17.4%*	19.1%*	23.8%*
Traditional Education	318	2.25	2.16	2.03	2.27	2.23	2.08	0.8%	3.3%	2.5%
Grand Total	422	2.21	2.18	2.04	2.31	2.33	2.20	4.6%	7.2%	7.8%

Study Group	n	Baseline			Final Follow-up			% Change		
		FV Juice per Day	Fruit Times per Day	Vegetables Times per Day	FV Juice per Day	Fruit Times per Day	Vegetables Times per Day	FV Juice per Day	Fruit Times per Day	Vegetables Times per Day
Online Education	29	2.09	2.21	2.07	2.10	2.30	2.23	0.8%	3.9%	8.0%
Traditional Education	108	2.25	2.16	2.03	2.17	2.23	2.17	-3.7%	3.3%	6.9%
Grand Total	137	2.21	2.18	2.04	2.15	2.25	2.18	-2.5%	3.3%	7.1%

The bottom half of Table 28 compares project participant baseline child FVC responses only to the 6 month final follow-up survey responses. This comparison helps to establish the retention of positive behavior changes among participants of each group. Among this fraction of study participants completing the final follow-up survey, the percentage change for all child FVC measures decreased somewhat, but slightly more so for the traditional group than the online group. None of these differences were statistically significant. This demonstrates that the online education is as effective, if not slightly more effective, than the traditional education in improving child FVC among the WIC families involved in the study.

Objective seven of the project was to demonstrate an increase in participants' child FVC. Table 28 supports the achievement of this objective for both study groups.

One attenuating factor for the increased FVC among children of study participants was exposure to follow-up counseling during the course of the study period. This is the focus of the final objective under Goal 3. Based on counselor surveys, the use of motivational negotiation techniques during follow-up counseling and the duration of time spent discussing child FVC behaviors were relatively low at 33% and 19% for the online and traditional groups, respectively. However, the impact of follow-up counseling, or other characteristics of clients completing counseling sessions, was demonstrated in the study as those participants who attended follow-up counseling tended to report greater improvement in child FVC than participants who did not attend counseling. Table 29 shows the mean difference in the three FVC measures by both study group and exposure to follow-up counseling.

Table 29. Mean Difference from Baseline to Average Follow-up in FVC by Study Group and Counseling Attendance

Fruit and Vegetable Consumption Measure	Attended Counseling		Did Not Attend Counseling	
	Online Education (n=9)	Traditional Education (n=93)	Online Education (n=95)	Traditional Education (n=225)
Fruit Juice Servings per Day	0.83	0.79	0.69	0.48
Fruit Servings per Day	0.71	0.64	0.68	0.56
Vegetable Servings per Day	0.71	0.68	0.67	0.50
Amount of Sessions Devoted to Fruit and Vegetable Consumption Issues	33%	19%		

Table 30. Comparisons Among Study Groups for Effect of Counseling on Mean Differences in Fruit and Vegetable Consumption

Comparison	P-value for Mean Difference in Fruit Juice Servings per Day	P-value for Mean Difference in Fruit Servings per Day	P-value for Mean Difference in Vegetables Servings per Day
	Online with Counseling v. Traditional with Counseling	0.421	0.428
Online Alone v. Traditional Alone	0.080	0.235	0.109
Online with Counseling v. Online Alone	0.260	0.462	0.432
Traditional with Counseling v. Traditional Alone	0.005*	0.203	0.036*
Online Alone v. Traditional with Counseling	0.285	0.253	0.488
Online with Counseling v. Traditional Alone	0.043*	0.343	0.149
Either Group with Counseling v. Either Group Alone	0.007*	0.235	0.048*

As reported in Table 30, the impact of the follow-up counseling session is clear. It appears to compensate for the lack of the ability of traditional education alone to impact child FVC. Note that the mean difference in the child FVC measures is similar among all individuals who had follow-up counseling. The online group appears to be less affected by the lack of a follow-up counseling session than the traditional group. However, the impact of motivational negotiation-based counseling is not clear, as few staff reported implementing more advanced motivational negotiation counseling skills. The findings associated with stage movement as well as increased FVC, especially with regard to the effect of counseling when added to traditional education, do lend support to the importance of follow-up counseling when using traditional education interventions. As demonstrated, this finding is

not true with regard to online education, which had shown on its own to achieve similar levels of FVC.

Table 30 also provides the p-values for the mean difference for several comparisons. Among individuals with counseling, there was no significant difference in the mean improvement in child FVC between the online and traditional groups. Among those without follow-up counseling, the mean increase in servings of fruit juice and vegetables per day were both marginally greater, though not significant, in the online group compared to the traditional group ($p \leq 0.10$). Among individuals in the online group, there was no difference in the improvement of child FVC between those who had counseling and those who did not. Furthermore there was no difference in the improvement among those in the online education group without follow-up counseling, and in the traditional group that received follow-up counseling. Child FVC was slightly more improved, although not significant, among participants in the online group that received follow-up counseling as compared to participants receiving the traditional education alone. However, statistically significant improvement was seen in mean fruit juice servings. Finally, anyone from either group who had follow-up counseling had a highly significant improvement in their child mean fruit juice servings per day and mean vegetable servings per day than those that did not receive counseling. These results, although demonstrating fewer significant improvements in FVC between the online and the traditional groups, are consistent with the magnitude of improvement reported for Phase 1 of the project.

To determine if online group participants received adequate exposure to the intervention, two key indicators were utilized, the number of end nodes used per session and the duration of use for each. As reported in Table 31, among the 134 participants from the online and both education groups that completed the child FVC module on wichealth.org, 126 (94%) used at least 1 end node. Table 31 also shows the distribution of use by number of end nodes. The average time spent at each end node was 1 minute and 48 seconds. The average number of end nodes used per online participant was 2.2, and the most frequent number was 8.

Table 31. Number of End Nodes Used Among Online Education Users

Number of End Nodes Used	Number of Online Ed Users	% of Online Ed Users
0	8	6%
1	53	40%
2	38	28%
3	15	11%
4	8	6%
5	4	3%
6	4	3%
7	3	2%
8	1	1%
Grand Total	134	100%

Table 32. Online Ed User End Node Utilization and Average Time of Use

End Node	Visits	Average Time of Use in Seconds
CFVM-3	85	161.5
CFVM-5	53	56.5
CFVM-4	48	89.8
CFVM-1	42	70.3
CFVM-2	8	201.5
CFVA-2	7	163.3
CFVP-1	6	51.5
CFVP-2	5	87.4
CFVA-5	3	53.7
CFVA-6	3	100.3
CFVA-4	2	269.5
CFVP-8	2	46.5
CFVA-1	1	135.0
CFVP-3	1	129.0
CFVP-4	1	11.0
CFVP-5	1	138.0
CFVP-6	1	74.0
Grand Total	269	108.0

The end node usage results are comparable to Phase 1, although the number of end nodes used per participant was 0.5 end nodes greater for Phase 2. The available data indicate that most online education group participants were sufficiently exposed to the intervention.

Table 32 presents the frequency of end nodes visited by online education users with the average amount of time spent per use for each.

Qualitative Analysis

Qualitative analysis of user exit comments from wichealth.org FV modules, as well as final follow-up survey comments, help support the impact of the online education. Comments from 79 online education users were collected and are summarized in Table 33, stratified by user beginning and ending stage of change.

Table 33. wichealthfv.org User Exit Survey Comments by Beginning and Ending Stage

Begin Stage	End Stage	Code	Count
Maintenance	Maintenance	User Indicated They Desired Other Wichealth.org Topics to Use	18
		Plan to try them/useful healthy meal resources/chart aspects helpful	15
		Learned options/fun/creativity/partic/disguise/variety	12
		Learned how to feed kids fruits and vegetables more/enough/every meal	10
		Learned how to shop for/afford more/keep in house	4
		Will continue behavior/info was reassuring	4
		Indicated that "these are great ideas" and will share with others	4
		Will use ideas for snacks	2
Action	Action	Indicated that "these are great ideas" and will share with others	2
		Learned how to feed kids fruits and vegetables more/enough/every meal	1
		User Indicated They Desired Other Wichealth.org Topics to Use	1
		Plan to try them/useful healthy meal resources/chart aspects helpful	1
Preparation	Action	Answered incorrectly, what they wish was on site/want to see more of	1
		Recipes & Meals – Practical: fast healthy meals/kids can help out	1
Contemplation	Action	FRUITS & VEGETABLES – How More: options/fun/creativity/partic/disguise/variety	1
		Answered incorrectly, what they wish was on site/want to see more of	1
Pre-Contemplation	Action	Recipes & Meals – Specific: smoothie/fruit dippers/veggie dip	1

Table 33 demonstrates that the majority of comments indicated positive attitudes toward the online behavioral education each user completed. Furthermore, it demonstrates that WIC clients desire to learn about other topics through online education. WIC clients reported wanting to use [wichealth.org](http://www.wichealth.org) to learn more about cooking for children with medical conditions, weaning and getting a child to sleep in their own bed, decreasing disruptive behavior, planning well-child preventive health and dental visits, and assuring safety in the home.

Furthermore, those completing a final follow-up survey were asked to share any changes made over the past 6 months that involve FVC. A total of 73 comments were collected, 17 from the online education group (see Table 34). Most (72.6%) of these individuals indicated they had applied techniques learned to increase child FVC or other positive comments. Seventeen indicated that no change was necessary, but that they maintained healthy FVC behaviors for their child. Three comments were concerning barriers such as cost and difficulty finding and properly storing fruits and vegetables.

Table 34. Participant Comments from Final Follow-Up Survey

Comment Code	Total
Applied techniques to increase child FVC (bought more/more at meals/role model/persevere/tried new)	40
Maintained healthy child FVC	17
Provided better fruit snacks/less junk	9
General comment about FVC increase	4
Tried "everything" but.. (kids too picky)	2
Need better info on how about keeping/finding FV fresh/in season/more affordable	1
Grand Total	73

Process Evaluation

Participant Module Access and Demographics

Phase 2 process evaluation focused on (1) participant module access and demographics, and (2) participant satisfaction and perceived use (already reported in Tables 25-27). Similar to Phase 1, participant enrollment in the WIC FV Project was highly representative of the entire Michigan WIC client population. Table 35 provides race/ethnicity information for the 795 WIC clients that enrolled in Phase 2 of the project during the fall of 2006 through Spring 2007. Generalizing the study findings from Phase 2 of the project to the Michigan population of Hispanic, African American, and Caucasian WIC clients is appropriate, given these results. The number of enrollees from the other ethnic groups is not sufficient to draw meaningful conclusions about WIC clients from these populations.

104 of the 872 WIC clients enrolled in the project chose to complete their fruit and vegetable education using the online [wichealth.org](http://www.wichealth.org) FV module (see Figure 2). For Phase 1, there was a significant difference in the race and ethnicity of WIC clients choosing to complete their education online compared to those choosing to complete traditional education. Table 36 presents the race/ethnicity information available for 96 of the WIC clients that completed online education by clinic. Note for Phase 2, unlike Phase 1, the proportion of individuals that chose the online intervention by race is not significantly different from the overall Phase 2 enrollment. This was achieved by increasing the number of contacts and visits made to the Harper-Gratiot clinic.

Table 35. WIC-USA Fruit and Vegetable Project Enrolled Participant Demographics for Phase 2

Clinic	Hispanic	African American	Caucasian	Asian	American Indian/Alaskan Native	Native Hawaiian/Pacific Islander	Bi-Racial	Total
Greenville/Stanton	2	1	55				1	59
Harper-Griatiot		96			1		1	98
Herman-Kiefer		20				1		21
Ionia	6		78		1		8	93
Ithaca	1		20		2			23
Kalkaska			24					24
Macomb	11	23	130	2			11	177
Muskegon	7	34	79		1		8	129
Oceana-Hart	9		36				2	47
St.Johns	1		61				2	64
Taylor		4	11					15
Wayne	2	12	27				4	45
Total	39	190	521	2	5	1	37	795
% of Total	4.9%	23.9%	65.5%	0.3%	0.6%	0.1%	4.7%	100%
Phase 1	7.5%	26.3%	62.0%	0.1%	0.4%	0.4%	3.2%	100%
Actual Michigan WIC %	11.6%	28.5%	57.7%	1.5%	0.7%	0.0%	0.0%	100%

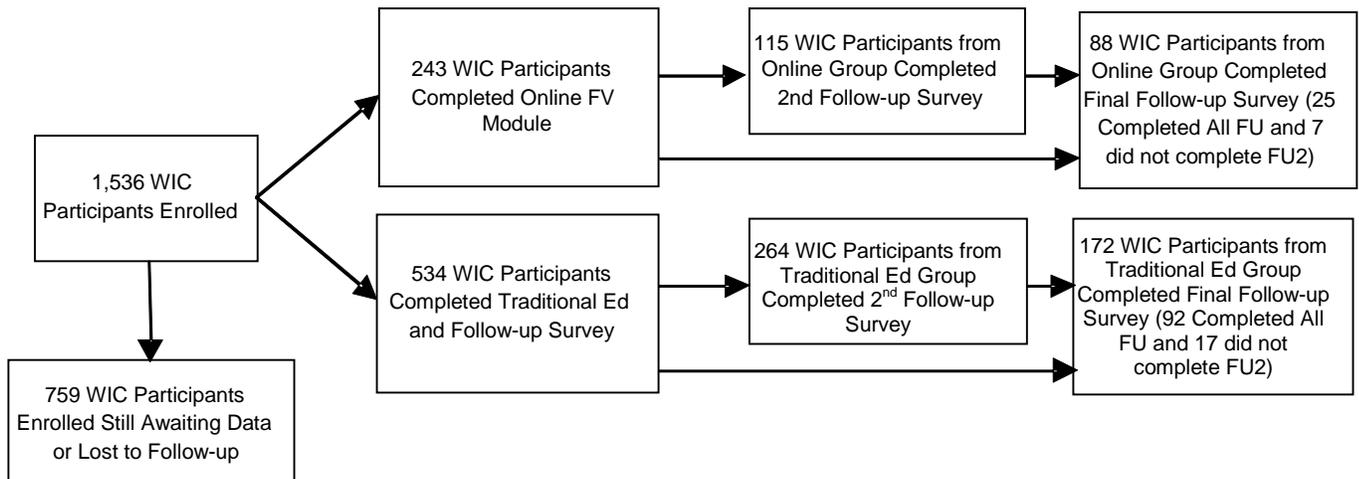
Table 36. WIC-USA Fruit and Vegetable Online Module Access by Clinic and Demographics for Phase 2

Clinic	Hispanic	African American	Caucasian	Asian	American Indian/Alaskan Native	Native Hawaiian/Pacific Islander	Bi-Racial	Total
Greenville/Stanton			4					4
Harper-Griatiot		19			1			20
Ionia			7				1	8
Macomb	4	4	32	1			3	44
Muskegon		2	11					13
Oceana-Hart	1		4					5
Taylor			1					1
Wayne		1						1
Total	5	26	59	1	1	0	4	96
% of Total	5.2%	27.1%	61.5%	1.0%	1.0%	0.0%	4.2%	100%
Phase 1	3.8%	17.4%	72.7%	0.0%	0.0%	0.0%	6.1%	100%

SUMMARY OF KEY OUTCOME MEASURES FOR PHASE 1 AND 2

Combining Phases 1 and 2 data resulted in total participant counts as identified in Figure 3.

Figure 3. Traditional and Online Education Group Enrollment and Follow-up - Phase 1 & 2 Combined



In order to have the greatest power to detect the impact of the online education intervention, data for the key outcome measures of stage of change progression and FVC (mean increase in servings per day) were combined. Table 37 presents the baseline (Beginning Stage) and post-intervention (Latest Stage) stages of change for the online and traditional group for combined Phases 1 and 2.

Although 100% of online group participants that began in contemplation and pre-contemplation advanced at least 1 stage, compared to less than 40% from the traditional group, the numbers are too small to demonstrate any statistical difference. However, among individuals that began in the preparation stage, 96.2% of online group participants advanced at least one stage, while only 69.7% advanced at least one stage in the traditional group. This difference was strongly significant ($p=0.0005$). Further among individuals in the preparation, action and maintenance stages, those in the online group were less likely to fall back or relapse to a prior stage ($p=0.02$).

Table 37. Change in Stages of Change by Study Group - Phase 1 and 2 Combined

Beginning Stage	Latest Stage	Online Group			Traditional Group		
		Count	%	% Change within Begin Stage	Count	%	% Change within Begin Stage
Maintenance	Maintenance	178	73.3%	n/a	365	68.4%	n/a
	Relapse	5	2.1%		27	5.1%	
Action	Maintenance	16	6.6%	n/a	23	4.3%	n/a
	Action	6	2.5%		9	1.7%	
	Relapse	0	0.0%		1	0.2%	
Preparation	Maintenance	13	5.3%	96.2%*	40	7.5%	69.7%
	Action	12	4.9%		6	1.1%	
	Preparation	1	0.4%		19	3.6%	
	Relapse	0	0.0%		2	0.4%	
Contemplation	Action	4	1.6%	100%	5	0.9%	35.7%
	Preparation	0	0.0%		2	0.4%	
	Contemplation	0	0.0%		7	1.3%	
Pre-contemplation	Action	1	0.4%	100%	2	0.4%	33.3%
	Preparation	0	0.0%		0	0.0%	
	Contemplation	0	0.0%		0	0.0%	
	Pre-contemplation	0	0.0%		4	0.7%	
Missing		7	2.9%	n/a	22	4.1%	n/a
Total		243			534		

Table 38 presents the mean difference in servings per day for the three child FVC measures from baseline to average follow-up by study group for combined Phases 1 and 2. Table 38 demonstrate that participants in both study groups reported improved personal and child FVC. However, those in the online group without follow-up counseling increased their FVC to a significantly greater extent than those in the traditional group without follow-up counseling. Counseling attendance only had a significant impact on improving the traditional group participant FVC.

Table 38. Mean Difference from Baseline to Average Follow-up in FVC by Study Group and Counseling Attendance - Phase 1 and 2 Combined

Fruit and Vegetable Consumption Measure	Attended Counseling		Did Not Attend Counseling	
	Online Education (n=45)	Traditional Education (n=141)	Online Education (n=198)	Traditional Education
Fruit Juice Servings per Day	0.81	0.78	0.73	0.34
Fruit Servings per Day	0.60	0.73	0.64	0.49
Vegetable Servings per Day	0.63	0.66	0.77	0.46
Amount of Sessions Devoted to Fruit and Vegetable Consumption Issues	23%	19%		

Table 39 lists the p-values for several comparisons between the online and traditional study Groups as well as between those attending follow-up counseling and those who did not attend. Note that all three FVC measures showed significantly greater increases in servings per day for those in the online group without follow-up counseling than those in the traditional group without follow-up counseling.

Table 39. Comparisons Among Study Groups for Effect of Counseling on Mean Differences in Fruit and Vegetable Consumption -- Phase 1 and 2 Combined

Comparison	P-value for Mean Difference in Fruit Juice Servings per Day	P-value for Mean Difference in Fruit Servings per Day	P-value for Mean Difference in Vegetable Servings per Day
Online with Counseling v. Traditional with	0.147	0.387	0.371
Online Alone v. Traditional	0.002*	0.047*	0.003*
Online with Counseling v. Online	0.252	0.414	0.237
Traditional with Counseling v. Traditional	0.001*	0.038*	0.108
Online Alone v. Traditional with	0.324	0.453	0.048*
Online with Counseling v. Traditional	0.005*	0.150	0.179
Either Group with Counseling v. Either Group	0.003*	0.064	0.334

Given the results from both Phase 1 and Phase 2 of the WIC FV Project, the online education of wichealth.org has demonstrated itself as a viable alternative to traditional education.

LIMITATIONS OF THE PROJECT AND LESSONS LEARNED

The greatest limiting factor of this project was the ability to retain participants beyond the initial follow-up survey. Although greater effort was expended during Phase 2 of the project, the percentage of initial project enrollees that completed at least one follow-up was nearly the same as Phase 1 at just under 52%. As previously indicated, given the population, this result is consistent with findings reported by other researchers (Scott & McIlvain, 2000). When conducting research in this population, expending extra resources to maintain follow-up of participants is not necessarily cost effective, but is what is necessary to do research projects in WIC clinics. The extra time spent visiting each clinic and meeting with staff had limited results. This is a challenge that requires future work for the success of client retention in future research projects with WIC participants. The added initiatives taken throughout Phase 2 to increase project enrollee retention included:

- Posters provided to each clinic at inception of Phase 2 to promote the project to clients.
- Buttons were offered to each clinic staff member designed to increase client awareness/interest and to encourage them to inquire about the project.

- Incentives were added for clients and staff. Clients were given incentives at the completion of each survey. All clinics had the chance to be eligible for a scholarship to send 3 staff to a National WIC conference in 2008.
- At the Harper-Gratiot (Detroit) clinic, clients were asked to provide their email address, as an option, below their WIC ID on the enrollment survey. These participants were sent a reminder by email to complete the online fruit and vegetable module and survey.
- Wichealth.org staff worked with WIC staff to find the best way for each clinic to follow-up with clients, including placing subsequent surveys in the client folders for their next visit, highlighting clients in the appointment book, and flagging clients in the computer.
- A spreadsheet was provided to all clinics each month listing all of the clients enrolled in the project and which surveys they had completed to date. This allowed staff to follow-up with clients who had not completed the intervention or follow-up survey.
- Communication with the clinics was increased by wichealth.org staff to include monthly visits to each clinic and frequent calls in-between. Follow up letters to study clinics were also frequently sent, either through email, mail or both. Letters included an overview of the visit, items discussed during the visit, and the intention of the clinic staff to make the project run more successfully between visits.
- All Muskegon participants that completed a yellow or online survey were mailed a final follow-up survey.
- One hundred and one (101) participants who completed an initial post-intervention survey and had not completed a follow up survey as of October 1, 2007 were sent a follow-up survey through the mail and asked to return to their clinic.

Other lessons learned concerned the many barriers the project faced throughout both study phases. Expanded implementation of this project or replication in other clinics should plan to address:

- WIC Staff turnover; on a few occasions WIC staff in charge of the project either decided to not participate in the project or left WIC without informing wichealth.org staff.
- Clients missing appointments or leaving WIC for unknown reasons.
- At some clinics, "Healthy 3 and 4 year olds" were taken off WIC because of the high demand for appointments for pregnant women (priority clients).
- Some of the clinics were disinterested in participating in Phase 2 causing a slow start in their clinic's enrollment.

Finally, the reality of real time WIC clinic operation resulted in an inability to completely randomize this study, resulting in loss of control for self-selection into educational intervention, timing for follow-up surveys, and administration of data collection. However, measures were taken to minimize these impacts as much as possible. These findings, albeit sufficiently large with regard to effect size for accounting for possible influence of extraneous issues, should be interpreted as such.

CONCLUSIONS

The online group educational intervention has demonstrated itself as comparable, and in many instances having greater impact, than traditional education in both project phases. Further, evaluation of the online education developed here suggested it had several advantages over traditional education in its ability to provide information perceived to be useful to WIC clients, move WIC clients along the stages of change continuum with respect to adult and child FVC, and to maintain education effectiveness without the use of follow-up counseling. A key finding is that 96.2% (see Table 37) of individuals that began in the preparation stage among those using wichealth.org FV modules moved to the action stage following the intervention. This is significantly more than the 69.7% demonstrating the same movement among individuals participating in a traditional education

equivalent. Although the number of online users that began in the preparation stage was relatively small, this result has been demonstrated in prior [wichealth.org](http://www.wichealth.org) modules on other healthy eating topics. Expanding use of Internet-based nutrition education would not only give WIC clinics the ability to provide additional support through [wichealth.org](http://www.wichealth.org), but would also help to increase our understanding of: (1) assessing user stage of change and FVC in an online setting and (2) how to increase usage among individuals in pre-contemplation and contemplation stages.

These findings demonstrate that users of [wichealth.org](http://www.wichealth.org) FV modules were highly satisfied with their nutrition education experience. Even without advancement in stages of change (i.e., users who begin in maintenance or action), users found the education helpful and easy to use, and established their intent to improve on or continue healthy management of child fruit and vegetable eating behaviors. Similarly, participants in the traditional group also reported a high degree of satisfaction with the helpfulness and ease of use associated with the education intervention.

Given the attrition rate in both Phase 1 and Phase 2, it was not expected that differences between the study groups could be adequately detected. However, many significant differences were found and other marginally important comparisons may have likely been significant as well had the study sample been larger. Although a more detailed analysis is limited by the number of participants, such as impact at the clinic level, the major impact measures including movement in stage of change and increase in FVC both demonstrate significant differences between the online and traditional education groups. Furthermore, it was demonstrated that the online education alone was as effective as traditional education with added follow up counseling. This finding was replicated in both project phases. Likewise, traditional education without follow-up counseling was significantly less effective than the online education, regardless of whether follow-up counseling was attended. Evaluating this evidence, it is clear the objectives of the program have largely been met. These findings also support the importance of additional follow-up counseling following traditional education in increasing FVC.

Review of the recent literature concerning educational programs to increase FVC in similar populations provides additional support for the results reported here. On average, participants in both study groups increased their servings of fruit juice, fruit and vegetables by 0.54 servings per day. This is comparable to the range of increases in servings per day previously published from 0.2 to 1.3 (Richards et al, 2006; Heimendinger et al, 2005; Resnicow et al, 2001).

Staff reported using some motivational negotiation counseling skills (open ended questioning, working together as a team, tailoring the session) but were less inclined to incorporate the more advanced counseling skills that embody motivational negotiation (i.e., exploring ambivalence and identify discrepancy). Testing results associated with the self-tutorial training also indicated staff might have struggled more with learning these more advanced counseling skills. Testing also indicated struggles in differentiating early stages of change. These findings suggest that additional staff training associated with advanced counseling skills should be a focus of future WIC trainings and are in accordance with VENA client-centered nutrition education objectives. Further evaluation of the impact of counseling should follow a more intensive training process.

Because the FV modules of [wichealth.org](http://www.wichealth.org) have demonstrated being a comparable alternative to, and in some respects having greater impact than, traditional education, the availability of the current online educational modules, as well as additional related topics, should be considered for expanding to additional WIC agencies. Such expansion would provide WIC clinics an evidence-based, viable alternative to assure that clients who are able to access the Internet receive continuing education concerning FVC. The results of this study have demonstrated that [wichealth.org](http://www.wichealth.org) would likely be a complement to traditional education for improving FVC among select WIC clients.

REFERENCES

Bensley RJ., Brusk J J, Anderson J V, Mercer N, Rivas J, Broadbent L. (2006). [wichealth.org](http://www.wichealth.org): Impact of a stages of change-based Internet nutrition education program. *Journal of Nutrition Education and Behavior*, 38:222-229.

Heimendinger J, O'Neill C, Marcus AC, Wolfe P, Julesburg K, Morra M, Allen A, Davis S, Mowad L, Perocchia RS, Ward JD, Strecher V, Warnecke R, Nowak M, Graf I, Fairclough D, Bryant L, Lipkus I. (2005). Multiple tailored messages are effective in increasing fruit and vegetable consumption among callers to the Cancer Information Service. *Journal of Health Communication*, 10(Supplement 1):65-82.

Institute of Medicine (IOM); Committee on Dietary Risk Assessment in the WIC Program. *Dietary risk assessment in the WIC program*. Washington, DC: National Academy Press; 2002.

Miller WR, Rollnick S. *Motivational Interviewing: Preparing people for change* (2nd Edition). New York: Guilford Press. 2002.

Motivational Negotiation Internet-based Training: wichealthmn.org.

Prochaska JO, Velicer WF The transtheoretical model of health behavior change. *American Journal of Health Promotion*, 12(1): 38-48, 1997.

Richards A, Kattelman KK, Ren C. (2006). Motivating 18- to 24-year-olds to increase their fruit and vegetable consumption. *Journal of the American Dietetic Association*, 106(9):1405-11.

Resnicow K, Jackson A, Wang T, De AK, McCarty F, Dudley WN, Baranowsk T. (2001). A motivational interviewing intervention to increase fruit and vegetable intake through Black churches: results of the Eat for Life trial. *American Journal of Public Health*, 91(10):1686-93.

Scott WJ, McIlvain HH. (2000). Interactive software: an educational/behavioral approach to smoking cessation for pregnant women and their families. *Tobacco Control* 9(Supplement 3):iii56-iii57.

Stang, Jamie. Assessment of nutritional status and motivation to make behavior changes among adolescents. *Journal of the American Dietetic Association*, S13-22, March 2002.

USDA, 2006. MWSSNP 2-2 NE 1; NE 3; WC 7-2. WIC Nutrition Education Guidance. Appendix A, *Criteria for the Development and Evaluation of Electronic-Based Nutrition Education for WIC Participants*. January 23, 2006.