

*WIC Services in the Medical Home:  
Improving Early Feeding Practices  
(WIC Special Projects Grant FY 2000-2005)*

**FINAL  
REPORT**

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*WIC Services in the Medical Home:  
Improving Early Feeding Practices*

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## Overview

### The WIC Program in Vermont

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) became an authorized grant program in 1974 by amendment to the 1966 Child Nutrition Act (PL94-105). WIC is administered by the Food and Nutrition Service (FNS) of the United States Department of Agriculture (USDA) through grants to state agencies. The Vermont Department of Health (VDH) initiated WIC program services statewide in 1974.

In 2004, the Vermont WIC Program served 23,481 participants statewide through 12 VDH district offices, acting as the local WIC agencies, at more than 60 clinic sites. Half of all Vermont children, from birth through four years of age, are enrolled in the WIC program. Most Vermont WIC participants are white and the state is largely rural, with discrete urban pockets. Vermont's WIC food packages are home delivered to participants weekly.

### Overall Design of Project

In 2002, the Food and Nutrition Service (FNS) of the United States Department of Agriculture (USDA) offered competitive Special Project grant funding, with a focus to revitalize quality nutrition services (RQNS), for projects that could:

- Assess barriers faced by working families in accessing WIC,
- Develop an innovative nutrition education or service model, or
- Create innovative changes in the clinic environment that promote the relationship between nutrition and health.

The Vermont WIC program was awarded a three year grant, *WIC Services in the Medical Home: Improving Early Feeding Practices* (WICMH), to pilot an innovative service delivery model in which WIC nutritionists were out stationed to three pediatric medical practice offices in order to provide WIC certification and nutrition education in conjunction with regularly scheduled health supervision or well child visits.

The Vermont model proposed to provide enhanced nutrition education via more frequent nutritionist contacts at health supervision visits; to improve customer service by opening another avenue to WIC services, thereby reducing barriers to WIC participation and promoting continuous enrollment; and to foster a collaborative relation between WIC nutritionists and health care providers.

### Project Evaluation Design

WICMH project evaluation was directed at documenting the impact of the project on a series of changes hypothesized to result from introduction of the program into pediatric offices during a one year period. It was expected that this change would have a positive impact on health care provider knowledge, attitudes, and behaviors, and that the coordinated efforts of WIC and pediatric providers would have favorable impacts on

parental attitudes and behaviors. Several methods were used to document the process of program implementation and levels of impact achieved for specific evaluation elements.

To document the level of success in implementing the WICMH program (process measures), we compared data extracted from the WIC central data files for two cohorts of newborns. To document Pediatric Practice Impact, we conducted surveys of participating pediatric office staffs before implementation of WICMH, and again two years after implementation. The “Coordinated Feeding Advice” component of Office Practice Impact was assessed by a survey conducted with parents of the two cohorts of newborns. The same survey was used to document the Parent Impact elements of the evaluation framework.

#### Staff Competencies or Skills Developed Through the Project

The project did not entail a WIC staff training component, rather, experienced WIC nutritionists brought nutrition expertise, program coordination skills, and a collegial relationship focus into physician based pediatric practices. At one site, WIC nutritionists did obtain the additional skills needed to complete a comprehensive WIC certification, from application evaluation to food order assignments and data entry.

#### Tasks and Time Required of Local Agency Staff

At two sites, local agency WIC nutritionists were assigned to pediatric practices: one site was a 0.2 Full Time Equivalent (FTE) commitment; the second site was 0.4 FTE. The nutritionists’ WIC certification and nutrition education activities at the pediatric practices would have otherwise been completed at the local agency. Therefore, additional nutritionist time was not required at these sites. Other local agency staff helped to coordinate scheduling, and engaged in routine clinic preparation and post clinic activities

At the third site, a 1.0 FTE WIC nutritionist position was assigned to the project from the state agency, and functioned in both a direct service role (at the pediatric practice) and an administrative role (as Project Director). At this site, the local agency staff had a limited role in coordination with project nutritionists.

#### Materials Available to Implement the Project

In order to implement the project, WIC nutritionists developed a set of nutrition education modules that focused on discrete time periods in the first two years of life-coordinating with the recommended schedule of well child health supervision visits. Content was based on *Bright Futures in Practice: Nutrition*, and Dr. T. Barry Brazelton’s *Touchpoints*. Companion flow sheets for each visit were also developed to document assessments and nutrition education, to provide communication between the medical practice and the WIC office, and to act as data collection medium for project evaluation.

## **Abstract**

**Objective:** To revitalize quality nutrition services in WIC by providing nutritionist services to WIC eligible children in conjunction with health supervision visits at their medical home.

**Design:** WIC nutritionists were placed to three pediatric physician practices in order to provide WIC certification, nutrition education, and outreach to eligible children at their regular health supervision visits.

**Setting:** Private pediatric physician offices, one in each of three areas of the state.

**Participants** WIC eligible children who were patients of the designated physician practices.

### **Results**

During the project period, 1997 certifications were conducted in the three pediatric practices, with many infants receiving additional nutrition education contacts on site. A comparison of matched program and comparison cohorts showed that a significantly higher proportion of the WICMH cohort were continuously enrolled in WIC during their first year of life ( $P = .01$ ). The acceptability of WICMH by pediatricians and practice staffs and their knowledge of WIC early feeding recommendations increased significantly during the project implementation period. Parents in the WICMH group were significantly more likely to receive advice about eight recommended early feeding practices from both their pediatrician and a WIC nutritionist ( $P < .01$ ); among those receiving advice from both sources, the WICMH parents were significantly more likely to say that exactly same advice was provided by both sources. WICMH parents were significantly more likely to report social norms that were supportive of recommended feeding practices. Results did not show a significant impact on positive or negative indicators of early feeding behaviors.

### **Implications**

The WICMH program successfully delivered essential WIC services to infants and children in the three pediatric practices. Some additional enhanced nutrition education visits also were delivered, although the level of service possible in this area fell short of expectations. The group of children who received WIC services in their doctors' offices benefited by having a significantly better chance of receiving WIC services continuously and on schedule during their first year, and probably throughout their first two years. The improvements in continuity of care and communication of advice about important early feeding practices are highly desirable program effects that are likely to benefit WIC clients. The high level of acceptability by the pediatric practices indicates that these partners of the WICMH program see value in the program.

## Introduction and Background

WIC is the premiere national public health nutrition program, serving nearly one half of all infants and one quarter of all preschoolers nationwide. Nutrition services is one of the fundamental benefits of WIC participation, and the revitalizing quality nutrition services (RQNS) initiative works to enhance and strengthen its effectiveness.

In 2002, the Food and Nutrition Service (FNS) of the United States Department of Agriculture (USDA) offered competitive Special Project grant funding with an RQNS focus, for projects that could assess barriers faced by working families in accessing WIC; develop an innovative nutrition education or service model; or create innovative changes in the clinic environment that promote the relationship between nutrition and health. The challenges in providing high quality nutrition services to all eligible WIC participant families are discussed in the 2001 U.S. General Accounting Office (GAO) report, *Food Assistance: WIC Faces Challenges in Providing Nutrition Services*.<sup>[1]</sup> These include strengthening WIC's connection with the health care system; making WIC services more accessible to applicants and participants - especially those in the workforce; and, improving WIC's ability to respond to emerging health issues by expanding nutrition education and breastfeeding promotion.

The Vermont WIC program faces similar challenges to providing high quality nutrition services to all eligible families. The *WIC Services in the Medical Home: Improving Early Feeding Practices* project intended to address at least three challenges as described below.

*1) The need to improve early feeding practices and other nutrition outcomes – as well as respond to emerging health issues - by strengthening WIC's nutrition education component*

According to the recent statewide WIC nutrition assessment data, parents of 27 percent of participating children, aged one to five years, report using inappropriate feeding practices, and parents of 6.2 percent of infants report providing an inadequate infant diet (see Appendix A). Given the breadth of these risk categories and their importance for the overall health of children, the Vermont WIC program regards them as key areas for additional focus related to improved nutrition outcomes.

At the same time, like other WIC programs across the country, Vermont is challenged in engaging families in second educational contacts. While Vermont WIC publishes a quarterly newsletter and provides ongoing group education opportunities, participation between certification appointments is limited, and many families are only seen at six month intervals.

Another health issue of concern related to this population is breastfeeding duration. In its November 2001 Policy Statement on the WIC Program <sup>[2]</sup>, the American Academy of Pediatrics (AAP) specifically discussed the importance of collaboration between the WIC

program and pediatricians related to breastfeeding, and the opportunity it provides to improve breastfeeding duration.

An additional emerging health issue is childhood obesity. According to the 2000 Pediatric Nutrition Surveillance [3] data in Vermont, nearly one-third of children under the age of five years were at risk for overweight as evidenced by Body Mass Index (BMI) or weight for height comparisons greater than the 85<sup>th</sup> percentile. By providing ongoing nutrition education at each well child visit, the WIC nutritionist will be able to provide consistent, developmentally appropriate information to families that will improve early feeding practices, thereby preventing nutrition related problems or addressing them in their early stages.

Early feeding practices targeted in this project addressed three major areas of infant and early childhood feeding. The first area is what foods are offered, focusing on the nutrition content of foods parents provide to their children. The second area covers practices related to how foods are prepared and offered, targeting safety, satiety and independence. Finally, there is a group related to when certain feeding practices are introduced, focused on the developmental stage of the child. A complete list of early feeding practices addressed by the project is included in Appendix A.

*2) The need for increased communication and coordination of services between the WIC program and the enrolled child's pediatric office*

Consistency between WIC and the pediatric provider strengthens nutrition messages to families. Currently, physical measurements are done both at WIC clinics and in the child's medical home. Besides being duplicative, the resulting measurements may not be the same, due to technique or equipment differences. As a result, a parent may be told that his or her child is underweight or over-weight in one setting, only to be refuted in another. There are also divergent *interpretations* of the data; e.g. the statement that a child is "underweight" as perceived by a parent after an encounter with a WIC nutritionist or a pediatrician may be interpreted differently in terms of the child's own medical history, family history or the duration and pattern of the condition.

Vermont WIC has created a communication form for pediatricians, but its primary function is to relay information to pediatricians about high risk children. Further, with WIC and well-child services offered at two different locations, much of the opportunity for direct and proactive collaboration is lost, thus affecting the ability of WIC nutrition education to fully address both prevention and emerging health issues unique to each child.

In its November 2001 Policy Statement mentioned earlier, the AAP also highlighted the importance of collaboration between pediatricians and WIC programs to ensure that infants and children receive high-quality, cost-effective health care and nutrition services through their medical home

3) *The need to improve continuity of enrollment and completion of services by addressing current high “no show” rates at WIC clinics and high “drop-out” rates of children after their first birthday.*

Currently, the statewide “no show” rate at Vermont WIC clinics averages 26 percent. The no-show rate is significant and comes at a cost – both in the missed opportunity to provide WIC services to those families, and in real costs for staff and other clinic expenses. Further, 17 percent of enrolled children discontinue participation after their first birthday.

As the proportion of parents of WIC-eligible children in the workforce has grown, it has become increasingly difficult for WIC programs nationwide to recruit new eligible families, and to retain previously enrolled families for the full time that they could receive WIC services. According to the *KIDS COUNT 2005 Data Book Online, Vermont Profile* [4], the proportion of Vermont children under age six years having working parents is consistently higher than the US average, with the 2004 rate being 63 percent, compared to 59 percent nationally, as shown below:

Children under age 6 with all available parents in the labor force, Vermont					
2000	2001	2002	2003	2004	US 2004
65%	68%	67%	70%	63%	59%

Source: Annie B. Casey Foundation *Kids Count 2005 Data Book*

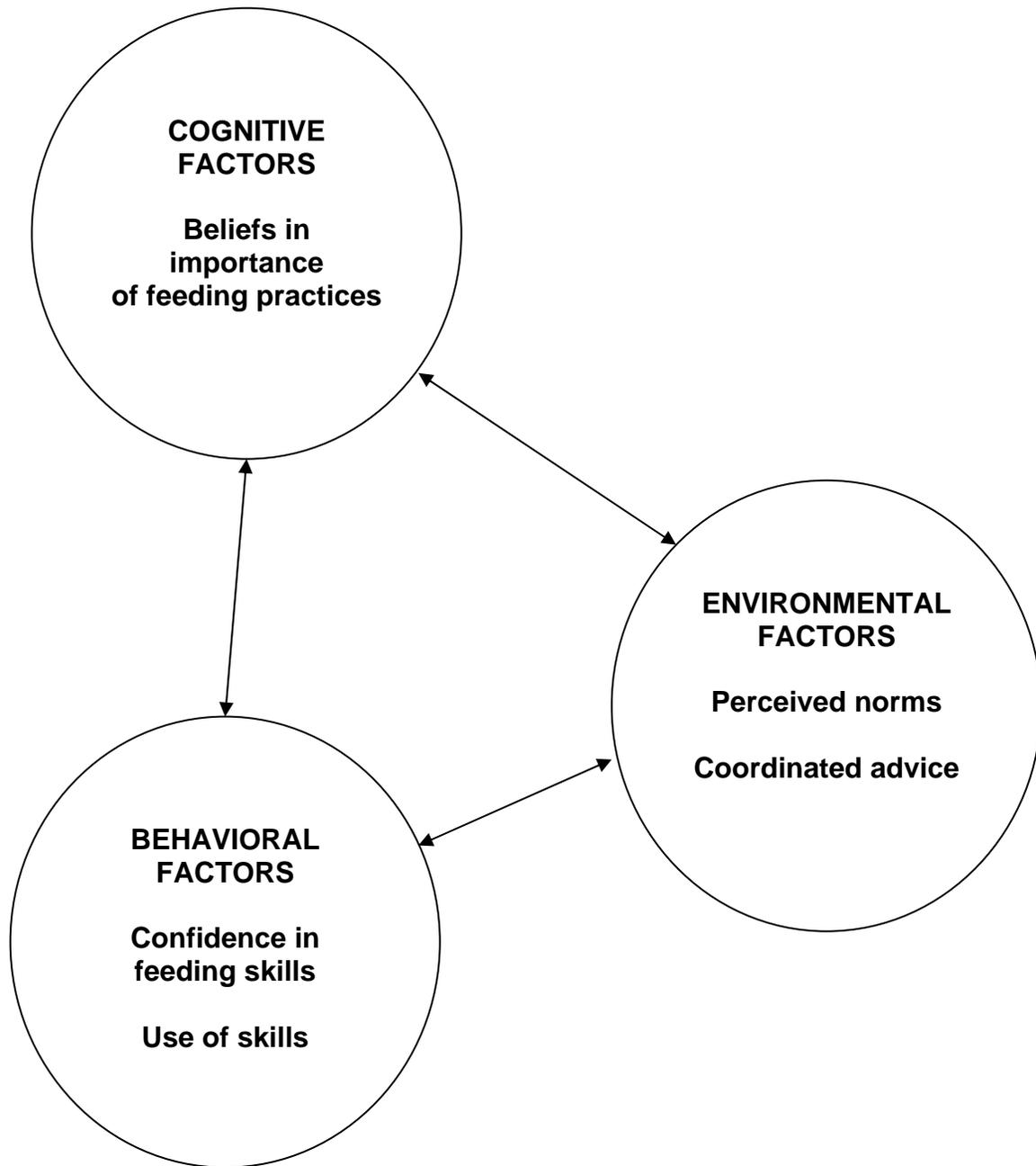
Focus groups with former WIC participants in Vermont found that many working women missed or failed to schedule clinic appointments, because the effort of getting to clinic outweighed the perceived benefits of WIC, or they had difficulty finding time to reschedule missed appointments because they had too many other tasks needing attention.

The design of this project addressed barriers faced by families in accessing WIC services by saving them a trip to a separate appointment for WIC, in order to impact both the continuity of enrollment and completion of services.

## **Theoretical Basis for “WIC In the Medical Home”**

The intervention design was informed by an analysis of determinants of parental behaviors concerned with early feeding practices based on social cognitive theory. The theoretical perspective of social cognitive theory is that behavior is determined by reciprocal interactions among cognitions, the perceived environment, and behavioral skills and experiences (See Figure 1; ref. Bandura A: *Social Foundations of Thought and Action – A Social Cognitive Theory*. Englewood Cliffs, NJ, Prentice Hall, 1986). Each

of these constructs is described in more detail to provide a basis for the program design and evaluation framework.



**FIGURE 1: Social Cognitive Model for Early Feeding Practice Influences**

Beliefs About Early Feeding Practices. Personal beliefs typically have an influence on behavior independent of other influences. Decisions about behavioral choices can be influenced by beliefs about the positive or negative consequences of a specific choice. Repeated coordinated affirmations of early feeding recommendations by WIC staff and pediatricians could change parental beliefs about the balance of advantages and disadvantages of specific feeding practices and influence decisions to choose the recommended practices.

Perceptions of Social Norms. When their social environment is perceived to be supportive of a behavioral choice, individuals are more likely to choose that course of action. The primary strategy for influencing clients' perceptions of social norms supportive of recommended early feeding practices in this project is through better coordinated advice on early feeding practices from pediatricians and WIC staff. Individuals, who hear concordant advice from these two credible sources, rather than discordant advice, will be more likely to perceive a supportive social environment for these choices. Although the project is unable to address directly other facets of the social environment (i.e. family members, friends, community networks), consistent messages delivered by respected health care providers may increase the salience of indications of support in the larger social environment resulting in more positive perceptions of community norms supporting the recommended practices.

Behavioral Factors. Parents who feel that they understand how to perform a recommended behavior, or how to avoid a behavior that is not recommended, will be more likely to follow the recommendations. These behavioral skills can be modeled directly or verbally by WIC staff or pediatricians. Increased agreement between WIC staff and pediatricians on recommended behaviors, and increased levels of educational contact with WIC staff will increase the likelihood of addressing the skill aspects of recommendations, and increase parents' confidence that they can implement them.

Early Feeding Behaviors. The aim of this project is to positively influence parental perceptions and feeding skills to increase the possibility that they will follow recommended early feeding practices. Parents who believe that the recommended practices have more advantages than disadvantages, that recommended practices are supported by others in their social environment, and that they have the skills necessary to implement the practices will be more likely to implement them. The WIC In the Medical Home project was designed to favorably influence these factors influencing parental behaviors.

## **Implementation**

### Preparation Phase

The preliminary steps to begin the project included recruiting physician practices, developing nutrition support materials to direct and document activities, and developing procedures with each physician practice.

The project was piloted in three areas of Vermont, with specific pediatric practices chosen for their strong relationship with the local WIC agency (VDH District Office) and their interest in this project.

In Burlington (Chittenden County) a moderate size city, the site was University Pediatrics, a primary care practice and teaching site associated with the University of Vermont College of Medicine, which involved up to 20 providers, including physicians, nurse practitioners, and pediatric residents. In Middlebury (Addison County), a small town within a largely agricultural area, the site was Dr. Paul Berkner's pediatric practice, representing a part time, solo provider. In Newport (Orleans County), a small city within a very rural farming and forested area, the site was Newport Pediatrics and Adolescent Medicine, a primary care practice with three providers, representing the only pediatric practice in the region.

Revised, age specific, nutrition education modules, informed by *Bright Futures In Practice: Nutrition*, and Dr. T. Berry Brazelton's *Touchpoints*, and companion flow sheets were developed to document assessments, nutrition education, and other visit information such as immunization status and program referrals. The documentation flow sheets remained in the child's medical record, as well as in the WIC record, paper evidence of the integration of two services.

At each site, WIC staff were oriented to physician practice protocols and procedures, which enabled us to structure the project's day to day functioning within the practices' normal operations. In turn, staff in the physician practices were oriented to the project, WIC procedures, including measurement techniques, and documentation formats.

#### Delivery Phase

Once WIC nutritionists were stationed at the practice sites, WIC eligible newborns were enrolled in the project. Expanded WIC nutrition education services were offered in conjunction with regularly scheduled pediatric well visits for children from birth to age two years, so that families potentially had as many as eleven contacts for nutrition education during those critical early years when eating habits are forming. Post-partum, breastfeeding and older siblings also had an opportunity to be certified at these visits. In addition, a child in these practices with a nutritional concern identified by the physician could be referred for follow-up services from the WIC nutritionist. Service delivery had site variations.

In **Burlington**, nutritionists from the state agency were located at University Pediatrics two full days and two half days per week; nutritionists were not co located with the local WIC agency. A laptop computer was used to access the electronic WIC data system, thereby providing client information in the absence of local agency input. Scheduling issues necessitated modifications to the system at University Pediatrics, with a separate WIC nutritionist appointment book. Other services provided included:

- infant nutrition didactic for pediatric residents, including orientation to WIC program services

- provision of Farm to Family coupons to clients in the practice in conjunction with certification or nutrition education visit
- early breastfeeding support and referral for home visiting services (at the enrolled infant's 2 day old to 2 week old health supervision visit)
- updated nutrition materials in the office, particularly the nutrition-related sections in the resource manual used by triage phone nurses, as well as feeding guidelines for client distribution and posters for the waiting room,
- transfer of the medical home nutrition services from the VDH Central Office (state agency) to the District Office (local agency)

### Emerging Health Issue

Within the local community, a significant number of Somali Bantu refugee families were resettled from refugee camps in Kenya after the project had started (immigration was not anticipated at outset of project). University Pediatrics was the designated health care provider for the children, who have faced chronic food shortages and showed evidence of malnutrition. Through the WIC presence in the practice, staff facilitated entry to WIC services for refugee families, who often have 4-5 children, by enrolling them into WIC at their first pediatric visit, usually 1-2 weeks after arrival in the country. By consolidating WIC with well care appointments, services such as interpretation and transportation, which are not only costly, but difficult and time-consuming to arrange, were provided at a single time and location. The WIC presence at University Pediatrics enabled more frequent nutrition education contacts in addition to the initial WIC certification. One result was rapid and significant improvement in the nutrition status.

The subsequent establishment of a weekly refugee clinic at University Pediatrics enhanced nutrition services and follow-up for the African refugee families (primarily Somali Bantu) who are resettling in the area. The WIC nutritionist staffing the Refugee Clinic also participated on the VDH Refugee Health Committee, providing connections with a broader group of service providers assisting refugee families. Through such collaboration, the WIC nutritionist shared knowledge of barriers and characteristics, including language, culture, food preferences, feeding practices, and preliterate status, and suggested alternative venues, delivery modes, and planned events through which continuing WIC services could be provided by the local agency. More than 40 African refugee families are served at University Pediatrics

In **Middlebury**, the nutritionist from the local WIC agency replaced one half-day per week of in-house clinic time with two mornings per week at Dr Paul Berkner's pediatric practice. The Middlebury VDH District Office serves about 1000 participants in west-central Vermont, a largely agricultural area in the lower Champlain Valley. There are several pediatric practices that serve this region. Dr. Berkner was the sole pediatrician in his practice, which had a Medicaid eligible patient base of 40%.

We were notified by Dr. Berkner's practice in late August, 2004 that he was closing his practice to take a position in the state of Maine. During the year that this practice collaborated with WICMH, 63 infants and children received the WICMH services. Working families and higher-income families eligible for WIC program benefits based

on enrollment in Vermont Medicaid were especially likely to utilize this option for WIC certification. The nutritionist felt that many eligible families served by the WICMH model would not otherwise have chosen to receive WIC benefits.

After the closing of Dr. Berkner's office, other pediatric practices in Middlebury were approached about the project; none were able to participate at the time.

In **Newport**, the nutritionist from the local WIC agency was at the practice two full days per week. WIC staff and pediatric office staff coordinated "behind the scenes" to accomplish seamless scheduling of the combined WIC-well child appointments. New babies were identified in the hospital and automatically scheduled for follow-up on days with joint staffing. Priority in scheduling was given for all WIC certification appointments, with interim nutrition education visits being a lower priority.

At the peak of the project, nearly 25% of the district's WIC caseload was seen at Newport Pediatrics for one or more visits. During the span of the project, 35% - 55% of WIC clients identified Newport Pediatrics as their medical home. In order for the nutritionist to have seen all clients at their combined WIC - Well Child visits (birth - age 5 yrs) a full time nutritionist would have been needed in order to accommodate the demand.

Other services provided included a "brown bag lunch" nutrition series for the nurses at Newport Pediatrics, as well as training for the pediatric staff on proper hemoglobin technique with the Hemocue machine, and information about anthropometric measurement techniques for new staff. The practice developed new well child encounter flow sheets as a result of the project. The WIC nutritionist was included in their development, which utilized Bright Futures in Practice and resulted in a much expanded nutrition assessment as well as inclusion of TV time and physical activity questions.

The authorization and distribution of WIC breast pumps was also integrated into the practice. A pump assessment was completed at the 1 month well child visit, with follow-up and education at the 2 month well child visit. The nutritionist also facilitated acquisition of breast pumps for medical need by improving coordination between the lactation consultants at the hospital and the pediatric practice.

Newport Pediatrics hosts Pediatric Residents from the UVM Medical School on rotation. This presents an opportunity to teach new physicians about the WIC program and Vermont's public health system. The team was able to "give them the big picture" as well as include them in joint WIC interviews to "see what it really is all about".

For families with children enrolled in WIC and Children With Special Health Needs (CSHN) joint scheduling in conjunction with the pediatric Well Child visits for all children was prioritized, even if they were over 2 yrs of age. This allowed for coordination of services and an increased frequency of nutrition visits for a very high risk group of clients.

### Evaluation Phase

Evaluation for the WIC In the Medical Home (WICMH) project was directed at documenting the impact of the project on a series of changes hypothesized to result in the favorable set of changes in parental beliefs and behaviors described above in the theoretical framework. The hypothesized sequence of changes is depicted in Figure 2.

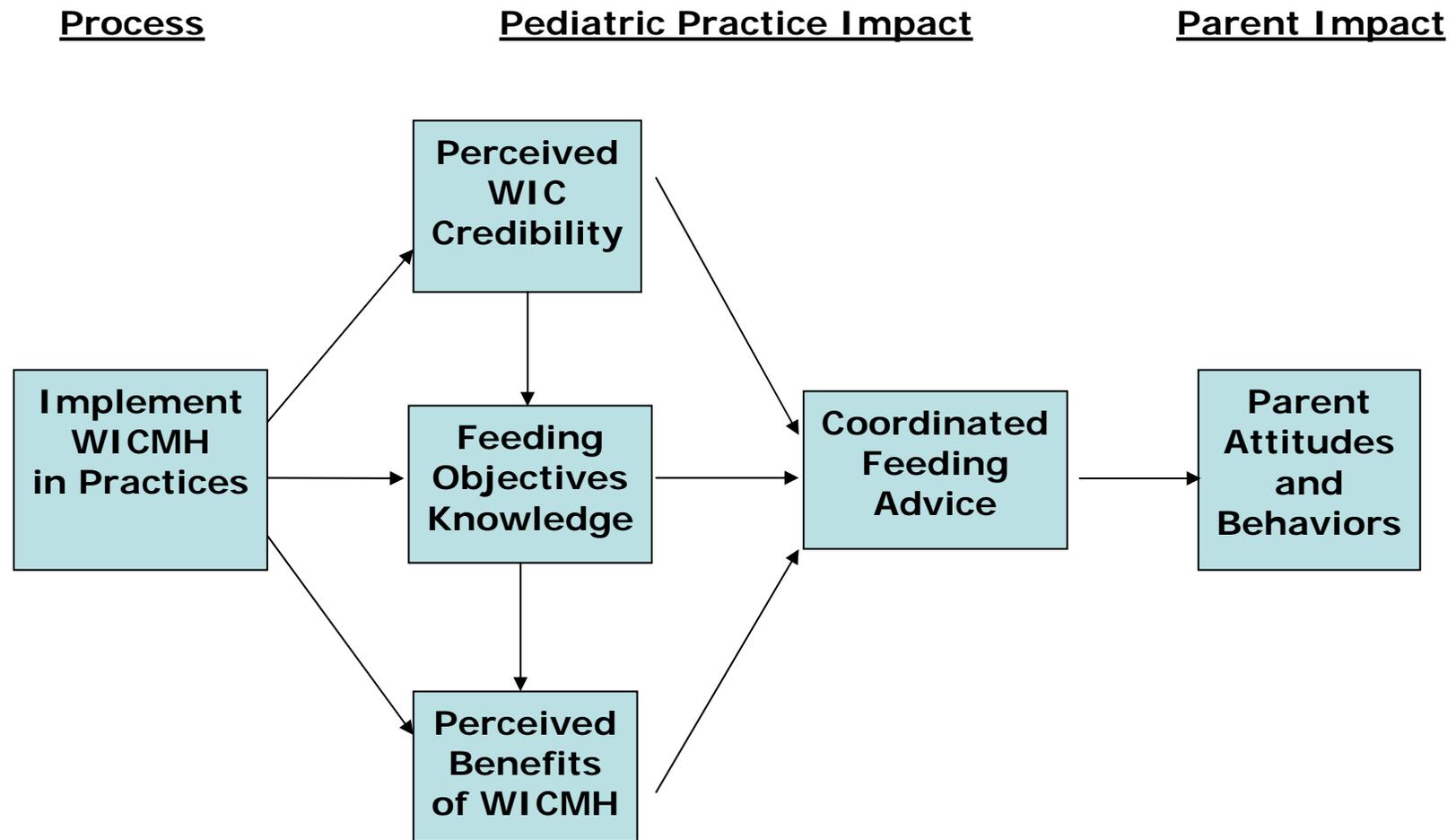
The sequence of changes that the evaluation plan was charged with documenting can be seen by reading this figure from left to right. Implementation of the WICMH program was documented in the “Process” component of the evaluation. Specific objectives for implementation included providing certification for newborns and others in pediatric practice settings; providing recertification for these families in the practices; providing nutrition education at other scheduled well child visits to the practices; and improving continuity of enrollment as a result of these contacts in the practice setting.

In the “Pediatric Practice Impact” component of the evaluation, co-location of WIC services with the pediatric practices was expected to have several types of impact on the clinical and non-clinical practice staff. Sharing responsibility for some aspects of patient care, exchange of information and skills, and the general sense of common mission and mutual regard associated with a co-location strategy were expected to have positive effects on the pediatric staff. As a result of participation in the WICMH program, the pediatric staffs were expected to have a more positive global view of WIC, have better knowledge of the early feeding behaviors that WIC recommends, and be more likely to endorse statements concerning the benefits of the WICMH program.

The expected immediate impact on parents of seeing both WIC staff and a pediatric staff that was well-informed and supportive of WIC early feeding objectives was better coordinated communication. Parents were expected to report that they received the same advice from both WIC and pediatric staff about recommended feeding practices during their well-child visits to the practices.

In the “Parent Impact” component of the evaluation, the combined influence of the coordinated advice from WIC staff and pediatric staff was expected to influence the factors outlined previously in the theoretical model. The combined and coordinated advice was expected to have an influence on parents’ perceptions of the advantages of these early feeding practices, their perception of social support for using these practices, and their confidence that they could implement these recommended practices. These positive changes were expected to have a favorable impact on parents’ behaviors, which is on their utilization of the recommended early feeding behaviors.

All elements of the evaluation framework depicted in Figure 2 were addressed in the evaluation plan, and evaluation results will be presented for each element. A description of data sources for each element is detailed in Appendix B.



**Figure 2: Evaluation Framework for WIC in the Medical Home (WICMH)**

## **Impact of the Project: Results of Evaluation**

### Evaluation Design and Methods

Several methods were used to document the process of program implementation and levels of impact achieved for the evaluation elements described in the framework. To document the level of success in implementing the WICMH program (the “Process” elements of the framework), we compared data extracted from the WIC central data files for two cohorts of newborns. To document some “Pediatric Practice Impact” elements of the framework, we conducted surveys of participating pediatric office staffs before implementation of WICMH and after two years of implementation. The “Coordinated Feeding Advice” component of Office Practice Impact was assessed by a survey conducted with parents of the two cohorts of newborns. The same survey was used to document the “Parent Impact” elements of the evaluation framework.

Figure 3 provides an overall evaluation design and timeline for events concerning the participating practices; the cohort of newborns and their parents associated with these practices; and the children and parent in the comparison group. Events associated with WICMH participants are shown above the horizontal dashed line. The corresponding set of events for the comparison group is shown below the dashed line.

The first activity depicted at the top of Figure 3 is the survey of pediatric office staffs conducted on two occasions, in April 2003 before the program was implemented in these practices and two years later in April 2005. Comparisons of the results of these two surveys were planned to provide indications of changes in the knowledge and attitudes of the WICMH pediatric office staffs. No corresponding survey was planned for the comparison groups because no office practice was participating in those areas.

Collection of contact, program status, and early feeding practice data are depicted in the second sequence of events in the evaluation design. This part of the design indicates that data were extracted from central files to document several areas of interest throughout the entire project implementation period for both the WICMH and the Comparison groups. At the end of the project these data were compared between the two groups to assess possible differences in the process of care, and differences in reports of early feeding practices.

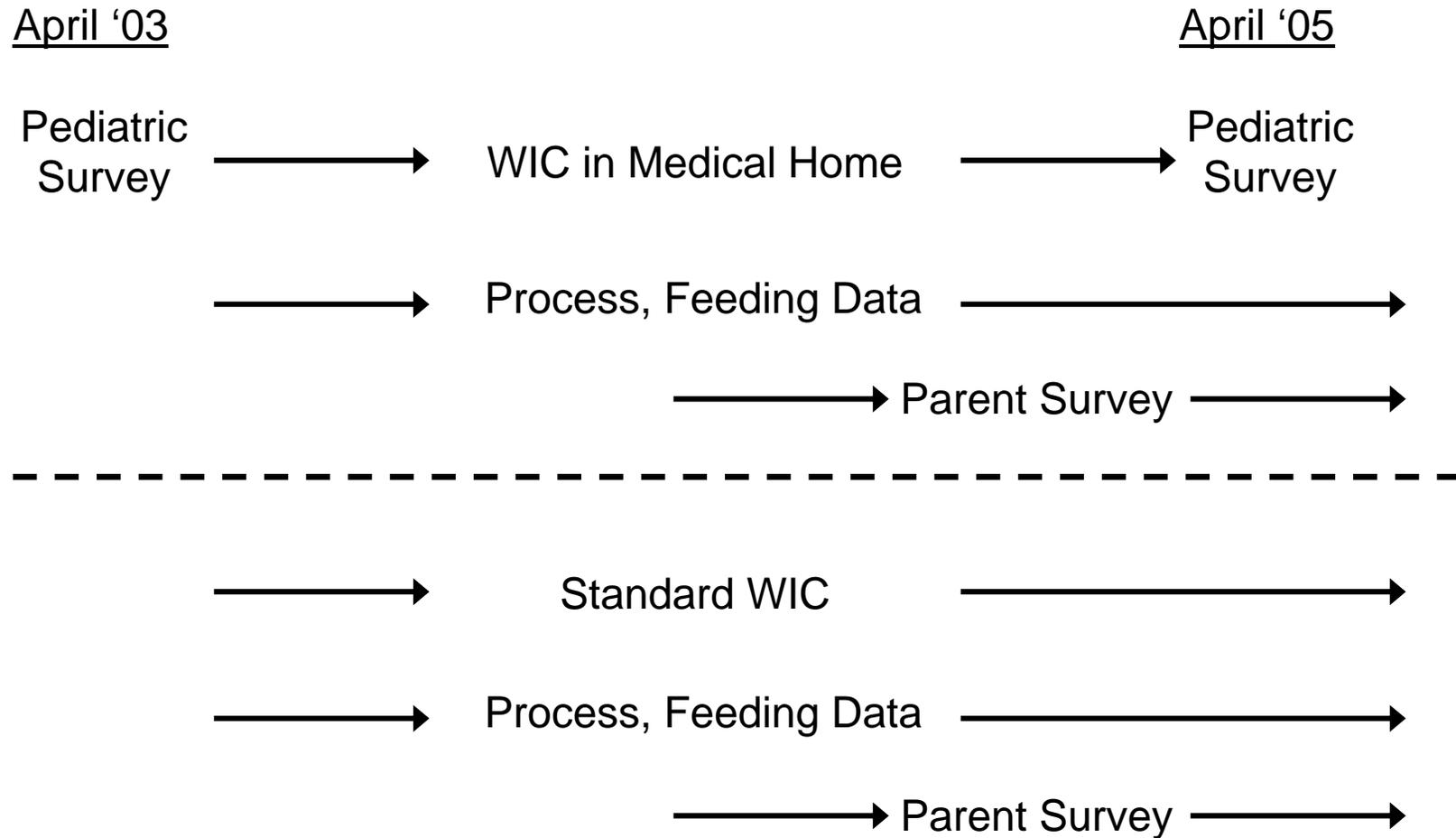
The third horizontal sequence represents a survey of parents of children in the WICMH and comparison cohorts. These telephone surveys were conducted with each set of parents approximately one year after their infant was initially certified. The first set of parents reaching the one year anniversary was interviewed in May 2004; the last parents to participate in this survey were interviewed in July 2005.

Pediatric Practice Sample. The WICMH project began with three participating practices in April 2003, but one small practice closed before the first year was over. The three practices were located in three different parts of the state, and included a large urban practice, and large and small rural practices. The Pediatric Practice sample used in this evaluation consisted of staff from the two continuing practices, one large urban and one large rural. In these practices all staff members having direct contact with families, both clinical and non-clinical staff, were included in the Pediatric Practice Surveys conducted in April 2003 and April 2005. The surveys on both

occasions were cross-sectional, including all current eligible employees. A copy of the Pediatric Practice Survey instrument is included in Appendix E.

Measures Used in the Pediatric Practice Surveys. Four multi-item scales with generally excellent measurement characteristics, and one single-item measure were used to assess change in pediatric staff perceptions over the life of the pilot project. A detailed report of these measures, and results, is provided in Appendix F. The key measures used in the assessment were

- (1) Global Assessment of WIC (single item, “How important would you say the WIC program is to the health of participating children,” with responses provided on a five point scale).
- (2) Coordination of Services by WIC (four items, e.g. “Please rate how well the WIC program coordinates its services with your pediatric practice...early feeding guidance”).
- (3) Knowledge of WIC Early Feeding Objectives (six items, e.g. “Please indicate which of the following early feeding practices are promoted by the WIC program...exclusive breast feeding for first six months”).
- (4) Perceived Advantages of WIC in the Medical Home (four items, e.g. “Families are more likely to stay in the WIC program,” responses limited to Agree or Disagree).
- (5) Perceived Disadvantages of WIC in the Medical Home (eight items, e.g. “This program puts a significant burden on our staff”).



**Figure 3: Evaluation Design for WIC in the Medical Home**

WICMH Evaluation Group. The main focus in this evaluation has been on the cohort of newborns certified by WIC in the participating pediatric practices during the first year of implementation; this group was chosen to provide a well-defined sample of children who have frequent well child visits scheduled during a critical period for establishment of feeding behaviors, and who could be followed up for at least a full year. The program began certifying newborns in the three practices during April 2003. Newborns certified in the practices from this time through July 2004 were included in the WICMH Evaluation Group. The small number of children certified in the practice that discontinued participation before the end of the first year were included. Visit, program status, and feeding practice histories for these children were followed for at least one year and as long as two years for some. Parents of these children constituted the WICMH Parent Sample for the parent telephone surveys.

Comparison Evaluation Group. The WICMH Evaluation Group was based on children certified in practices located in three of Vermont's 12 Health Districts. To create the Comparison Evaluation Group three demographically similar districts were identified. Within these three matched health districts, newborns were matched to WICMH Group newborns by birthdate. For each WICMH newborn, the newly certified infant in the matched comparison area having the closest birthdate was chosen for membership in the Comparison Group. The same visit, program status, and feeding practice history data were extracted for these children from the WIC central data files. This group was routinely offered 2<sup>nd</sup> nutrition contacts though few families participated outside of sessions related to Farmers' Market, Cooking for Life, and Fit WIC activities which made up the majority of events offered. Parents of these children constituted the Comparison Parent Sample for the parent telephone surveys.

Overall Evaluation Sample. A total of 259 newborns provided the initial membership of the WICMH Evaluation Group. They were matched by 259 Comparison Group newborns for a total Evaluation Sample of 518. These numbers were reduced for some data analyses because of small amounts of missing data in the case of WIC central system data, or because of ineligibility for or nonresponse to the parental telephone interview.

Other WICMH Samples. WIC staff were co-located with the participating practices for over two years in which services were provided and data were collected for this project; as a result of this extended period of service WIC staff had an opportunity to see families of newborns and older children who were not included in the WICMH Evaluation Group. Data for all certification, recertification, and nutrition education visits conducted by WIC staff in the participating clinics will be reported.

Measures Used in Evaluation Sample Parent Survey. Six groups of items were used to assess key facets of WICMH and Comparison group parent perspectives. The individual items in each group were generally treated as individual measures because of interest in the detailed responses. A copy of the survey instrument is included in Appendix C and item groupings, with survey data, are shown in Appendix D. The key measures used in this assessment were:

(1) Access to WIC Services (four items, e.g. "During the past year, how convenient has it been to get each of the following WIC services...appointments?" with responses on a four point scale).

(2) Satisfaction with WIC (five items, e.g. “During your appointments, how often did WIC staff...take time to understand the specific needs of your child?” (with four point response scale).

(3) Perceived Benefits of Recommended Feeding Practices (eight items, e.g. “Please say if you think [waiting to start cow’s milk until after first birthday] doesn’t matter, or if you think it might be important, or somewhat important, or very important to the health of a baby”).

(4) Confidence in Feeding Skills (eight items, e.g. “Please say if you think [Waiting to start solids until baby is 4-6 months old] is very hard, somewhat hard, somewhat easy, or very easy”).

(5) Perceived Social Norms (eight items, e.g. “For [waiting to introduce juice until baby can drink from a cup] would you guess that in your community very few families, some families, a lot of families, or most families with babies feed them this way?”).

(6) Consistency of Nutrition Messages (eight items, e.g. “Did you get advice about [avoid putting baby to sleep with a bottle] from WIC? From your baby’s doctor?”).

## **Results of Evaluation**

The three data sources were used to evaluate four areas of performance of the program. Results are summarized under the objectives or hypotheses stated in the project plan for each of these areas. An overall summary of results is provided at the end of this section.

### 1. Process Evaluation: Delivery of WIC Services in Pediatric Practices

The first issue addressed by the results of the evaluation was the extent to which essential and additional WIC services were delivered in pediatric practices as planned. Data for this set of reports were drawn from the standard WIC reporting system, with several modest refinements.

#### 1a. Provide WIC certification, recertification, and reinstatement services in pediatric practices

WIC staff provided services in two larger pediatric practices from April 2003 through the end of the project period in July 2005. Services were provided in one smaller practice for approximately eight months until that practice closed. During these times WIC staff certified, recertified, and reinstated children included in the WICMH Evaluation Group and other children seen in the practices. Although most of the evaluation report focuses on the WICMH and matched Comparison Groups, the total volume of clearly-identifiable WIC services delivered in the practices is reported in this section. As shown in the following table, the total number of certification visits (283) was slightly larger than the number of children recruited into the WICMH Evaluation Group (259). The total number of recertification visits, however, is much

larger than would be expected over this time period for the group that was certified, indicating a substantial demand for recertification services in the pediatric practice setting.

Pediatric Practices	A	B	C	Total
Services Provided				
New/Initial Certification	129	140	14	283
Recertification	1483	19	55	1557
Reinstate after termination	75	74	8	157
Total visits/actions	1687	233	77	1997

1b. Provide enhanced nutrition education services during well-child visits.

In addition to the expected schedule of contacts with families for WIC certification and recertification, the WICMH program planned to take advantage of the more frequent pediatric schedule of well-child visits for infants and toddlers to make additional contacts for the purpose of providing enhanced nutrition education. Implementation of this feature of the WICMH program was somewhat limited by the demand for WIC staff to focus on the mandated visit services. The table shown below indicates that most but not all of the WICMH Evaluation Group infants received one additional contact, but few received more than one additional contact.

Pediatric Practices	A	B	C	Total
Total Nutrition Education Contacts: Infants	260	18	27	305
# infants having 1 contact	164	14	10	188
# infants having 2 contacts	30	2	5	37
# infants having 3 contacts	12	0	1	13
# infants having 4+ contacts	0	0	1	1
Unduplicated # of infants receiving additional nutrition education contacts	206	16	17	239

Matching of the comparison group was blind to prevent any special treatment of those families. The District Office IT data systems were not capable of retrospectively tracking the number of interim nutrition education contacts from the comparison group at an individual level. The comparison group was offered the standard “menu” of WIC interim education offerings. A sample of topics offered during the study period included breastfeeding, healthy snacking, food safety, serving sizes and picky eating. Historically, these are not well attended, thus highlighting our current intent to provide enhanced interim nutrition education targeting specific growth and developmental *Touchpoints*.

Offered equally, and available to both the study and the comparison groups were group education sessions tied to Vermont's Farmers Market Nutrition program, Farm to Family. Nutrition education on fruit and vegetable selection, preparation and purchasing was provided in conjunction with Farm to Family coupons at these sessions.

The lack of data on numbers of interim nutrition contacts for the comparison group of infants is, in hindsight, something we should have foreseen and fixed early on in the project. We feel confident based on historical knowledge of interim contacts, as well as findings from FNS management reviews of our program, that had we done so, we would have been able to demonstrate a significant increase in interim nutrition education contacts for the WICMH group.

Some WICMH families in the study group were seen exclusively at the pediatric practice, while others were seen both at the pediatric practice and at their local WIC office for one or more of their expected visits during the study period. On occasions when WIC certification services were due but the appointment could not be scheduled at the pediatric practice due to conflicts with the physician's availability, families were referred back to their local office for that visit only.

Thus, the WICMH intervention was not exclusive to certification visits at the pediatric offices, but sought to provide enhanced nutrition services in conjunction with health supervision visits for the majority of well visits recommended during the first two years. The pediatric practice was the primary location of the treatment, and the model preferred to see families at the practice according to the well child schedule of appointments. However the model also had to evolve to allow for flexibility in location in order to accommodate the schedules of families, pediatricians and WIC periodicity.

This understanding of the intervention is important when interpreting the data. As demand for WIC services in the Medical Home exceeded the capacity for both WIC and pediatric staff to meet, mainly because of the part-time nature of work schedules, the nutrition services focus evolved from a goal of frequent contacts into meeting the demand for certification. Appointment slots which had been designated for interim nutrition visits were sometimes converted to slots for certification visits, thus reducing the number of expected total visits for each individual child.

We hypothesize that this flexibility may have helped enhance continuous enrollment in the WICMH group. We also hypothesize that the decreased dosage of exposure to nutrition education regarding early feeding practices may partially explain the lack of significant effect on early feeding practices seen in the intervention group.

#### 1c. Increase proportion of children who are enrolled continuously.

To evaluate possible difference in continuity of care as a result of participation in WICMH, children in the Evaluation sample were categorized as having or not having received all expected visits in specified time periods. Results were then compared for the WICMH and the Comparison Groups as shown below. The expected WIC schedule in the first year is one visit at approximately 4-6 weeks of age, one at 6 months, and one at 12 months. There is often a birth

"visit" which is a paper enrollment without face to face contact; these visits have not been included. Federal WIC guidance allows visits to occur up to 30 days before or after the scheduled month; the age ranges reflect the 30 day window on either side of the age when visits would be expected.

As a second test for continuity of care, children were classified as having been terminated from WIC within specified time periods. The most common reasons for termination are failure to schedule an appointment in the appropriate time frame, or failure to show up for a scheduled appointment. This table includes terminations for any reason. A child could be formally terminated and still receive all visits within the expected timeframes; this occurs when families respond to termination by quickly scheduling and keeping an appointment so that they are seen within the 30 day window. Some children received the expected number of visits, but due to termination or delays in scheduling appointments, did not receive them on the expected schedule. For example, a child who missed the 6 month visit and was terminated, might have had a visit at 2 months, 8 months and 14 months instead of 2, 6 and 12.

The WICMH Group record reflected a significant advantage in receipt of expected visits within the first 12 months on the expected schedule, or the first 14 months on any schedule. A positive trend was also detected for the relatively small number of participants who reached age 26 months within the study period. Similar results were found when comparing the termination histories for the two groups. WICMH children had significantly fewer terminations of WIC enrollment within their first 12 months of life; a positive but non-significant trend of fewer termination reports was found for the smaller number who reached age 24 months during the study period.

Visit Continuity	WICMH Group		Comparison Group		Chi Square	
	%	N	%	N		
Received all expected visits by age 12 months, on expected schedule	65.5%	255	54.6%	251	6.276	p = .012
Received all expected visits by age 14 months, on any schedule	73.3%	255	62.9%	251	6.288	p = .012
Received all expected visits by age 26 months, on any schedule	37.3%	75	30.8%	78	.734	p = .391
Terminated at least once in first 12 months of age	20.8%	255	33.1%	251	9.711	p = .002
Any termination between birth and 24 months of age	49.3%	75	57.7%	78	1.074	p = .300

Summary of process evaluation results. The WICMH program successfully delivered essential WIC services to infants and children in the three pediatric practices. Some additional enhanced nutrition education visits also were delivered, although the level of service possible in this area fell short of expectations. The intervention evolved slightly from its original model in order to

accommodate the challenges in meeting the demand for services with part-time provider schedules, as well as busy family schedules. The group of children who received WIC services primarily in their doctors' offices benefited by having a significantly better chance of receiving WIC services continuously and on schedule during their first year, and probably throughout their first two years.

## 2. Impact of WICMH in Pediatric Practices

The second set of evaluation results addresses the issues of the acceptability of the WICMH program to the participating pediatric practices. Anonymous surveys of all staff having contact with families were conducted on two occasions. Responses from 34 staff in two WICMH pediatric practices in April 2003 were compared with responses staff in the same two practices in April 2005. Nonparametric tests were used to determine whether responses differed at these two times. Five hypotheses were tested.

### 2a. Pediatricians and staffs will report a more favorable global assessment of WIC after 24 months of participation in this trial.

Global assessments of the importance of WIC to a child's health were high in 2003 (mean of 4.6 on a scale of 1-5) but improved significantly over two years of participation in the WICMH program (mean of 4.9;  $p=.007$ ). Pediatric clinic staff had more positive global views of WIC after participating in the program, indicating high credibility of the program in these practices.

### 2b. Pediatricians and staffs will report a higher level of service coordination with WIC.

Pediatric staff views of the level of coordination of WIC services with services in their practice were moderately high in 2003 (14.0 on a scale of 4-20) and improved significantly to a very high level in 2005 (18.2;  $p<.001$ ). Pediatric clinic staff had more positive views of coordination of WIC services and services in their practice after participating in the program.

### 2c. Pediatricians and staffs will report an improved knowledge of early feeding practices promoted by WIC.

Pediatric staff levels of knowledge about early feeding practices promoted by WIC were at a modest level in 2003 (55% correct) and improved somewhat over two years of participation in the program (68% correct;  $p=.035$ ). Correct responses for individual items ranged from a high of 78% correctly stating that WIC endorsed the practice of "no cow's milk until after 12 months" to a low of 35% stating correctly that WIC does not endorse the practice of "bottle-feeding of juices after six months." Modest improvements were found in pediatric staff knowledge of WIC's early feeding practices.

2d. Pediatricians and staffs will report more perceived advantages of hosting on-site delivery of WIC services.

Pediatric staff beliefs about the advantages of having the WICMH program in their practices were high in 2003 (3.5 on a scale of 0-4) and improved significantly after two years of participation in the WICMH program (3.9;  $p=.015$ ). Pediatric clinic staff had were more likely to agree that the WICMH was beneficial after participating in the program.

2e. Pediatricians and staffs will report fewer perceived disadvantages of hosting on-site delivery of WIC services.

Pediatric staff disagreement with statements about the disadvantages of having the WICMH program in their practices was moderately high in 2003 (5.2 on a scale of 0-8) and improved significantly after two years of participation in the WICMH program (6.7;  $p=.002$ ). Pediatric clinic staff had were more likely to disagree with statements about the disadvantages of WICMH after participating in the program, also indicating stronger beliefs in WICMH benefits.

Other results. Two items measuring potential advantages of the WICMH program elicited responses that were not consistent with responses to other items in this group, and that were contrary to expectations. Agreement with an item proposing that “differences in clinical measurement of the child have been reduced” fell from 91% in 2003 to 65% in 2005 ( $p=.01$ ). Similarly, agreement with an item proposing that “participating children will give fewer blood samples” fell from 67% in 2003 to 46% in 2005 ( $p=.08$ ). Based on discussions with participating staff it appears likely that these results reflect a more realistic understanding of differences between WIC and typical pediatric service protocols in these areas.

Summary of Pediatric Practice Survey results. After two years of participation in the WICMH program pediatric clinic staff provided more positive assessments of WIC and the WICMH program than they did prior to the beginning of the program on every major measure, indicating a high level of acceptability of the program in these practices. Relatively low levels of knowledge of the early feeding objectives of WIC among pediatric clinic staff indicated a need for more structured approaches to communication of program objectives with clinicians and other staff.

### 3. Impact of WICMH on Parent Perspectives

Among the 518 matched children in the Evaluation Sample, a total of 495 parents were identified as having a contact telephone number; 250 of these families were in the WICMH Group and 245 were in the Comparison Group. The survey protocol provided explicit criteria for identifying valid and invalid telephone numbers from among those supplied by WIC to the survey contractor; the proportions determined to be eligible among the WICMH and the Comparison groups were nearly identical. Among the 373 telephone numbers determined by the survey contractor to be valid, 294 completed surveys were obtained, for a response rate among eligible respondents of 79%; the response rate among those eligible was nearly identical for the two study groups. Among potential respondents who were contacted successfully by the survey team, the participation rate was very high, with only 28 refusing the request to be interviewed.

Considering the entire Evaluation Sample of 518, parents completed a telephone interview in about 57% of these families; the participation rate was nearly identical for the two groups (56.8%, 56.7%).

The characteristics of the respondents in the two groups were generally equivalent. No significant differences were found for age or educational attainment of the responding parent or the age of the oldest child. The WICMH Group was found to have a slightly larger number of children (mean of 2.1 children for WICMH Group vs. 1.9 for Comparison Group parents). Five categories of hypotheses were tested to assess differences between these two groups of parents that might be attributed to participation in the WICMH program.

3a. WICMH parents will report better access to WIC services.

There were no significant differences between the WICMH Group parents and the Comparison Group parent participating in the telephone survey with regard to any of the four forms of service convenience that were assessed. No consistent trends were observed in these data. Convenience scores were high for both groups (overall mean of 3.65 on a 1-4 scale). Parents did not report any convenience advantage of the WICMH program.

3b. WICMH parents will report higher satisfaction with WIC compared to standard care parents.

There were no significant differences in parent reports of satisfaction with WIC staff performance in the five areas assessed. No consistent trends in differences between the groups were seen. Satisfaction scores were relatively high for both groups (3.45 on a 1-4 scale). Parents who participated in the WICMH program did not report higher satisfaction with WIC staff.

3c. WICMH parents will report greater perceived benefits of recommended infant feeding practices.

No significant differences between the two parent groups were found for perceived benefits of eight recommended early feeding practices. On a 1-4 scale of importance to the health of a baby, mean perceived benefit scores ranged from 3.14 for breast feeding in the first 4-6 months to 3.80 for not allowing the baby to sleep with a bottle, with a mean for all eight practices of 3.54. Parents who participated in the WICMH program did not report higher levels of perceived benefit for the eight recommended early feeding practices.

3d. WICMH parents will report greater confidence in their infant feeding skills.

No significant differences between the two parent groups were found for reported confidence in using the eight recommended early feeding practices. Mean confidence scores ranged from 2.79 for breast feeding in the first 4-6 months to 3.78 for stopping feeding when the baby signaled he was full, with a mean for all eight practices of 3.48 on a 1-4 scale of confidence in using the practices. Parents who participated in the WICMH program did not report higher levels of confidence that they could implement the eight recommended feeding practices.

3e. WICMH parents will report greater social acceptability of recommended infant feeding practices.

According to the SCT model, behavior is determined by (among other things) the "perceived environment. Significant positive differences were found for measures of perceived community norms about two of the eight early feeding practices, and a marginally significant difference was found for perceived norms about a third practice. WICMH parents were more likely than Comparison Group parents to say that families in their community used breast feeding in the first 4-6 months (2.34 vs. 2.08;  $p=.032$ ), and were more likely to say that families in their community stopped feeding when the baby signals he's full (3.28 vs. 2.94;  $p=.002$ ). A marginally positive result also was found for throwing away leftover baby food (3.08 vs. 2.90;  $p=.06$ ). Positive trends in perceived community norms were found for several of the other five feeding practices. Parents of the WICMH Group were more likely to report community support for use of some of the recommended feeding practices.

Although the project is unable to address directly other facets of the social environment (i.e. family members, friends, community networks), consistent messages delivered by respected health care providers may increase the salience of indications of support in the larger social environment resulting in more positive perceptions of community norms supporting the recommended practices.

3f. WICMH parents will report greater consistency in nutrition messages between their WIC and pediatric service providers.

The primary strategy for influencing parent perceptions of social norms supportive of recommended early feeding practices in this project was through better coordinated advice on early feeding practices from pediatricians and WIC staff. Significant positive differences in reports of coordinated communication were reported for four early feeding practices, and a marginally positive result was found for a fifth practice. WICMH parents were more likely than Comparison parents to report hearing about the following practices from both WIC staff and their baby's doctor: breast milk for first 4-6 months (86.6% vs. 73.0%;  $p=.005$ ); wait to start solids (86.4% vs. 77.4%;  $p=.05$ ); start self-feeding at 10-12 months (74.4% vs. 63.2%;  $p=.05$ ); and wait to start cow's milk (82.4% vs. 70.3%;  $p=.02$ ). A marginally significant positive result was found for wait to introduce juice (71.7% vs. 61.0%;  $p=.06$ ). Trends in coordinated advice for the other three feeding practices also favored the WICMH parents.

The eight separate indicators of Coordinated Communication were combined into a single measure that demonstrated high internal consistency ( $\alpha=.76$ ). Scores for this overall measure for the two groups indicated that the WICMH Group reported significantly higher levels of Coordinated Communication than the Comparison Group across all feeding advice topics. Further analyses demonstrated that high levels of Coordinated Communication were associated with more positive attitudes towards breast feeding (higher perceived benefits and norms, more confidence) and more positive attitudes towards waiting to introduce juice (higher perceived benefits and norms). These results showed that Coordinated Communication was associated with factors that can have a positive influence on feeding behavior choices.

Among those who indicated that they had received advice on any of the eight practices from both WIC staff and their baby's doctor, a follow-up question asked if they had received the same advice from both sources. Significant positive differences in parents reporting that they received exactly the same advice from both sources were found for four of the eight feeding practices, and a marginally positive result was found for a fifth practice. WICMH parents were more likely than Comparison parents to report hearing exactly the same advice about the following practices from both WIC staff and their baby's doctor: avoid putting baby to sleep with a bottle (74.2% vs. 60.0%;  $p=.03$ ); wait to start solids (46.7% vs. 29.7%;  $p=.008$ ); stop feeding when baby signals full (56.7% vs. 40.0%;  $p=.03$ ); and throw away leftover baby food (62.1% vs. 41.4%;  $p=.006$ ). A marginally significant positive result was found for wait to introduce juice (25.6% vs. 38.4%;  $p=.07$ ).

WICMH parents were more likely to report hearing advice about recommended early feeding practices from both WIC staff and from their baby's doctor for most of the eight practices; WICMH parents also were more likely to report that they received the same advice from both sources. Receiving the same advice from both sources consistently was associated with more favorable attitudes towards the recommended feeding practices. These results suggest that delivery of advice about early feeding practices was more effective for the WICMH group than for other parents.

Summary of impact on parents. The telephone survey of WICMH and Comparison Group parents successfully reached a high proportion of those with valid telephone numbers. The two groups represented in the survey sample were very well matched on personal and family characteristics. Comparison of responses from parents in the two groups showed several areas for which the WICMH program made no apparent differences and several areas in which significant, positive differences in the expected directions were found.

The areas in which no differences between the groups were found included assessments of the WIC program and staff (satisfaction with staff and access to WIC services); parents reported very positive assessments in both areas. Parents' beliefs in the benefits of eight recommended early feeding practices did not differ between the two groups of parents. A similar lack of impact was found for parents' reported levels of confidence in implementing these eight practices.

Significant differences were found in parent perceptions of community support for several of the eight recommended practices. WICMH parents were significantly more likely to report that families in their community used these practices. Significant differences favoring the WICMH Group were found for reports of hearing about some of the feeding practices from both WIC staff and their baby's doctor; WICMH parents also were more likely to say that they received the same advice from these two sources. WICMH parents thus received better coordinated advice on early feeding practices, and were more likely to perceive a supportive environment for using these practices.

#### 4. Impact of WICMH on Early Feeding Behaviors

Client data from WIC central data files was extracted and linked over time for the members of the Evaluation Sample. Standard data were enriched with additional detail about inappropriate feeding behaviors noted by the WIC staff member while conducting a visit. Breast feeding data routinely recorded and entered in central data files also were utilized to test feeding behavior hypotheses.

##### 4a. Fewer WICMH parents will report inappropriate feeding practices.

Evaluation sample members were classified as having any of the 19 inappropriate feeding behaviors noted at each of three visits: 0-3 months, 5-7 months, and 11-13 months. The sample members were then divided into those in the WICMH Group and those in the Comparison Group. The proportion of clients for whom any inappropriate practice was noted at each of these visits was then compared between the two groups using chi-square tests. As shown in the table below, no significant differences or notable trends were found for any of these comparisons. The sample size at each visit includes those who had a visit during the stated time period. At the 0-3 month visits for these children, for example, 7.1% of the WICMH group and 6.3% of the Comparison group had notations for any inappropriate feeding practices. Results were no different when assessing potential differences for individual feeding practices. These data suggest that this test of the WICMH program did not achieve a reduction in inappropriate early feeding practices.

Feeding Practices	WICMH Group		Comparison Group		Chi Square	
	%	N	%	N		
Any feeding practice at 0-3 month visit	7.1%	212	6.3%	239	.116	p = .734
Any feeding practice at 5-7 month visit	23.6%	148	18.6%	199	1.319	p = .251
Any feeding practice at 11-13 month visit	27.6%	181	23.4%	158	.782	p = .376

We were not terribly surprised that parents reported few inappropriate feeding practices in the 0-3 months age range. Our baseline WIC data showed that only 6.2% of infants (0-12 months) were reporting inappropriate/inadequate infant feeding practices.

As a result of this study, we were able to identify more specifically which feeding practices were occurring in our infant and toddler population. When Vermont adopted the national RISC codes several years ago, many of the inappropriate feeding practices were collapsed into related groups sharing a single code. For the WICMH project the codes were unbundled in order to track individual risk codes more specifically. We discovered that of the long list of potentially inappropriate feeding practices, only 4 are wide spread among our population: early introduction of solids, bottle to bed, use of bottle for juice, and excessive juice consumption in children > 12

months. These findings will be used to inform ongoing development of consistent nutrition education messages.

The remainder of the feeding practices were identified so infrequently that no meaningful comparisons could be made. In addition, many of the codes were age specific, or limited to a subset of the population based on the mother’s decision to either breast or bottle feed. Thus, all feeding practices had to be aggregated in order perform statistical analysis. We do not feel that a more refined measure, such as a count of inappropriate feeding behaviors, would result in any practical difference in the project’s outcome.

4b. More WICMH parents will report exclusive breast-feeding at age six weeks.

Similar methods were used to test for differences in breast feeding behaviors between the WICMH Group and the Comparison Group. As shown in the following table, no significant differences between the WICMH and Comparison groups were noted for several measures of breast feeding behaviors. For example, 66.5% of the WICMH group and 64.3% of the Comparison group reported ever breast feeding their child (p=.59). These results indicate that the WICMH program did not have a significant impact on breast feeding behavior.

Breastfeeding Indicators	WICMH Group		Comparison Group		Chi Square	
	%	N	%	N		
Ever breastfed	66.5%	257	64.3%	249	.291	p = .590
Breastfed 6 weeks or more	48.6%	257	48.6%	249	.000	p = .992
Exclusively breastfed 6 weeks or more	17.5%	257	20.1%	249	.548	p = .459
Exclusively breastfed 12 weeks or more	12.1%	257	12.0%	249	.000	p = .996
Breastfed 6 months or more	30.0%	257	27.3%	249	.435	p = .510
Formula started at age 6 months or older	2.7%	257	2.7%	249	.000	p = .988
Breastfed 1 year or more	17.5%	257	14.1%	249	1.133	p = .287

Summary of WICMH impact on early feeding behaviors. These results did not show any impact of the WICMH program as tested here on positive or negative indicators of early feeding behaviors. These results could be due to inadequacies of the program design, level of program implementation, or possibly the measures used to assess feeding behaviors. All feeding practices had to be aggregated in order perform statistical analysis.

The project specific flow sheets used to document each visit and capture the inappropriate feeding practices are included in Appendix G. The code for each feeding practice that was identified during the nutrition assessment was recorded on the standard WIC data entry form

used for all WIC visits (Appendix H: VDH WIC 106). Clerical staff then entered the data into the Vermont WIC CIS system, from which all data relevant WIC generated data for the project was extracted. No new or special data entry forms for staff were required.

## 5. WICMH Evaluation Results Summary

The WICMH program tested in this project was successful in achieving many of its objectives. The program delivered essential and enhanced educational services as planned in pediatric practices. As a result significantly higher proportions of children receiving services in the program maintained continuous enrollment in WIC at least through their first year of life. Although certification and recertification service plans clearly were fulfilled, the amount of additional nutrition education contact achieved was lower than expected.

Acceptance of the WICMH by the pediatric practices was very strong. Measures of WIC credibility and the perceived benefits of the WICMH program improved significantly over the initial two years of program operation. These results were consistent with strongly supportive comments offered by participating pediatricians. The surveys also indicated modest improvements in knowledge about specific early feeding behaviors promoted by WIC, and increased awareness of differences between WIC and standard pediatric practices regarding clinical measurements. More focused methods to address these areas may improve program performance.

Parent surveys provided evidence that WICMH parents were more likely to receive advice about recommended early feeding behaviors from both WIC staff and from their pediatricians. WICMH parents also were more likely to report that the advice they received from both sources was consistent. WICMH parents clearly benefited from coordinated and consistent advice from two highly credible sources about best practices for feeding their babies. Perhaps as a result of these well-focused messages, WICMH parents were more likely to report that several of these recommended practices were used by families in their communities, an indicator of perceived social support for the practices. No differences were found between the two parent groups for perceived benefits of the feeding practices, confidence in using the practices, or assessments of WIC services and staff.

Comparisons of several indicators of early feeding behaviors, however, showed no differences between the WICMH and the Comparison Groups. These results could be explained by program considerations or evaluation design considerations. On the program side, for instance, it is possible that the amount and timing of additional nutrition education was not sufficient to achieve a change in behavior. On the evaluation side it is possible that the measures used were not sufficiently sensitive to differences in feeding behaviors, or the size and length of the study may not have been sufficient.

Overall, the WICMH program achieved many important objectives. The improvements in continuity of care and communication of advice about important early feeding practices are highly desirable program effects that are likely to benefit WIC clients. The high level of acceptability by the pediatric practices indicates that these partners of the WICMH program see value in the program. Several areas for potential improvement in both the program and

evaluation areas have been noted. Further attention to these issues may increase the chances of documenting positive impacts of the WICMH program on early feeding behaviors.

## **Lessons Learned**

Some of the lessons learned are shared across all of the project sites. Additionally, each practice and VDH district office selected for this project was unique; thus, many of the lesson learned are also unique, and influenced by factors such as the practice size, geographic location, WIC staffing patterns, size of the WIC participant caseload and characteristics of the both the WIC and pediatric client base. This section of the report will describe some of the findings from both the VDH WIC program and medical home perspectives.

### Common Themes

Nutrition staff in all the WICMH offices observed that families seeking WIC services felt less of the stigma sometimes associated with program enrollment when they received services at their pediatrician's office as opposed to their usual WIC clinic venue. They also observed that WICMH families felt more respected, and greatly appreciated the convenience of making just one appointment for comprehensive well-child services instead of two. This increased the likelihood that participants remain continuously enrolled, and also increased the likelihood of new families enrolling that might not otherwise come to a WIC clinic. Families that had dropped off WIC re-enrolled at their child's well appointment and continued to participate as long as they could avoid certification in the regular WIC setting. In addition, WIC outreach brought families to their medical home and allowed immunizations that had been missed to be administered.

The WIC nutritionists working in the medical home setting felt that families came to appointments better prepared to ask nutrition and feeding related questions ,and that receiving WIC nutrition education in this professional environment elevated its importance and credibility for families.

An extremely important personal process outcome reported by all the WIC nutrition staff involved in the project was increased job satisfaction, which resulted from a sense of opportunity for professional growth and development. The words of the Newport WIC nutritionist

“The continuing education that being part of a pediatric practice offered me... the collegial relationship... the information that I picked up from the pediatricians, nurse practitioner and nurses and the discussion/review about patient cases after the visits...”

perfectly describe this unexpected staff benefit. The Middlebury nutritionist further explains

“ Dr.Berkner and his staff seem to really appreciate the nutritionist’s presence. The team style interview works seamlessly, often what one misses the other picks up...We feel so lucky to be doing this.”

In general, while Vermont pediatricians and Health Department personnel have enjoyed a long history of collaboration to improve the delivery of children’s health services, previous work had identified the aforementioned communication issues related to differences in measurement technique and interpretation and consistency of nutrition messages delivered in the different sites. Providers in the WICMH intervention practices commented frequently on the benefits of increased standardization of measurement and interpretation, as this led directly to more positive and consistent communication with parents regarding the implications of the data collected. In addition, providers noted that the increased satisfaction expressed by families linked to provision of WIC services in the pediatric office greatly exceeded the expectations held at the start of the project.

Medical staff within the intervention practices also commented positively on their increased knowledge as a result of the presence of WIC staff. For example, one of the practices had an unusual string of low hemoglobin results. WIC staff offered their expertise and re-trained the pediatric nursing staff on sampling technique, and the problem was resolved. Some pediatric practice staff also began modeling the open-ended question, client-centered interview style of the WIC nutritionists. They felt that the opportunity to observe this modeling was much more effective for improving their skills and increasing their nutrition literacy than more traditional types of training.

This informal education led providers in two of the practices to make systemic changes in the way they perform nutrition assessments for all children, not just the study participants. At Newport Pediatrics, nutrition assessment questions were re-worded to use open-ended language, because the providers had observed that the WIC nutritionist often obtained more detailed and relevant information by using this method. At University Pediatrics, a group of pediatric residents developed new patient encounter forms with an enhanced list of age-specific nutrition topics, based partly on interviews they had observed in WIMH visits.

Finally, staff in the 3 intervention district offices found improved general relations between the practice and the local health department. Not only was nutrition information exchanged but also information on immunizations, hemoglobins, blood lead levels, seasonal health advisories, and other public health topics.

### Challenges to Overcome

The VDH Burlington District Office and University Pediatrics: This site represents the largest District Health Office and the largest intervention practice involved in the project. As such, it is not surprising that some of the barriers noted at this practice included challenges in integrating the scheduling of WIC appointments with well child appointments using an electronic system with little flexibility to accommodate additional data. Flexibility on the part of both WIC and practice staff was key in overcoming the barrier of integrating additional clinical activity into the existing pattern of patient flow at well child visits. However, as parents began to experience the

benefits of the project and express their appreciation for the availability of these services, practice and WIC staff strengthened their commitment and worked together to overcome these barriers in order to assure a seamless experience for clients. When asked by peers about participation in WICMH (and the possibility of expansion of this concept to other areas of the state), pediatricians repeatedly noted that the benefits of the project far outweighed these barriers to implementation. Physician, nursing and administrative staff at this practice unanimously identified the particular benefit, including striking positive clinical outcomes, to the Bantu refugee families who received WIC services through this project.

The VDH Newport District Office and Newport Pediatrics and Adolescent Medicine: As with all FNS WIC special project grant projects, this one aspires for sustainability and transferability. For the Newport WIC program, WICMH presented both benefits and challenges.

“From a supervisory viewpoint, the project removed a .5 Nutritionist from other aspects of the district office’s work for 2/3 of her time. This significantly impacted special formula handling, breastfeeding counseling, availability to staff as a mentor and resource, and standard clinics. On the other hand, having 20-25% of the caseload seen by one staff in turn reduced the standard clinic time for the office as a whole. Also on the positive side, there was efficient exchange of information such as immunization records and vaccine.”

The VDH Middlebury District Office and Dr. Paul Berkner: The loss of Dr. Berkner’s practice from the Middlebury community and from this project perfectly illustrates the steep challenges faced by sole providers in small, rural communities, and the risks an agency takes when establishing an exclusive collaboration with such a small practice. Dr. Berkner was an excellent choice for this model of partnership because of a previously established positive relationship with VDH. His practice also had a large Medicaid patient base. Additionally, he had the kind of close relationship with his patients, and wielded the kind of influence on them, that stems from the nature of solo medical practice. This type of doctor-patient relationship is very beneficial to the success of the WICMH model. Unfortunately, when such a practice leaves a community, it may not be possible, as was the case with Vermont WICMH, to find a replacement.

Two of the three project sites continue to provide coordinated services following this model. Modifications to the design include: a focus on children from birth to 24 months, a focus on targeted risk behaviors for older children, and, a focus on special needs populations.

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## Resources

### Tools and Forms

Nutrition education modules and companion flow sheets were developed for visits at ages 2 weeks, 2 months, 4 months, 6 months, 9 months, 12 months, 15 months, 18 months, and 2 years; can be viewed in Appendix G.

### People to Contact

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### Appendices

Appendix A: List of Inappropriate Feeding Practices  
Appendix B: Description of Data Sources  
Appendix C: Parent Survey Instrument  
Appendix D: Parent Survey Report  
Appendix E: Provider Practice Survey Instrument  
Appendix F: Provider Practice Survey Report  
Appendix G: WIC in the Medical Home: Visit Flow Sheets and  
Nutrition Education Modules  
Appendix H: WIC 106 Data Entry Form

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