

USDA/ARS Center for WIC Nutrition Education Innovations at
Baylor College of Medicine

Grantees Workshop Summary

INTRODUCTION

The USDA/ARS Children's Nutrition Research Center (CNRC) at Baylor College of Medicine (BCM) was awarded funding to create the USDA Center for WIC Nutrition Education Innovations (CNRC WIC Center) in August, 2012. A major goal was to develop and administer a competitive process to solicit, evaluate, and fund innovative and effective WIC nutrition education sub-grants. A Request for Applications (RFA) was developed and issued two times (12/12 and 10/13). University-based researchers, collaborating with state/local WIC collaborators, were eligible to respond. Two review panels were conducted and four awards were made: 1) Dr. Rafael Pérez-Escamilla at Yale [LATCH (Lactation Advice thru Texting Can Help)], 2) Dr. Lorrene Ritchie at University of California Nutrition Policy Institute [Online Nutrition Education: WIC in the 21st Century], 3) Dr. M Jane Heinig, UC-Davis [Supporting Baby Behavior Through Pediatric Offices], and 4) Dr. Jennifer Di Noia, William Paterson University, NJ [Online WIC Nutrition Education to Promote Farmers' Market Fruit and Vegetable Purchases and Consumption]. These were distinct projects, each for a 2-year period, with no common outcome measures [breakfast dietary behaviors, salt reduction, breastfeeding maintenance for 3 months, timing of first postpartum contact between mother and Peer Counselor, improvements in fruit and vegetable intake and use of farmers' market nutrition program and WIC cash value vouchers, and the effect of providing Baby Behavior tools and training designed for medical staff on provider knowledge and practice and on WIC participant outcomes (infant BMI z score)]sum.

The CNRC WIC Center coordinated the efforts among the grantees, monitored progress, and convened a Workshop at the Food and Nutrition Service office in Alexandria, VA, on July 20, 2016. The four grantees presented the outcomes of their projects at that time. Each presentation was followed by a short question and answer session. Dr. Kelley Scanlon from the Food and Nutrition Service of the USDA provided closing comments.

A summary of each presentation follows.

WIC FRESH START: PROGRESS TO DATE AND LESSONS LEARNED

Jennifer Di Noia, PhD, William Paterson University, New Jersey

Dorothy Monica, MPH, Director of the Saint Joseph's WIC program in Paterson, NJ

Mary Ann Ellsworth, MS, RDN, Public Health Consultant, Nutrition; State WIC Program, Nutrition Services

Dorothy Monica: The farmers' market program in New Jersey provides two \$10.00 vouchers (FMNP) to a limited number of participants. The vouchers went to pregnant and breastfeeding women and children over the age of 2 between June 1st and September 30th. They can redeem those checks up until November 30th. New Jersey also issues cash value vouchers (CVV) for fruits and vegetables that people can cash in the supermarket (\$11.00 for women and \$8.00 for children). In New Jersey, CVVs can be redeemed at the farmers' market. Only 22 percent of the states allow the redemption of CVVs at farmers' markets. Nationwide, the farmers' market redemption is about 63 percent. For our local agency, the redemption rate was about 42 percent. Only less than 1 percent of CVVs are redeemed at farmers' markets as reported from the states that have this data. Our CVV redemption rate is over 85 percent, but it's at the supermarkets or their local stores.

St. Joseph's WIC program is affiliated with St. Joseph's Regional Medical Center. The main office is in Paterson, New Jersey, which is a very densely populated urban inner city area. The monthly caseload is about 21,500 participants from three counties. There is one main administrative site with 16 satellite sites serving Bergen, Morris, and Passaic Counties (except for the City of Passaic, which has its own WIC agency). Our population includes women from very urban inner cities and suburban and rural areas, and is diverse.

Dr. Jennifer Di Noia: The idea for this project was from an article in the *Journal of the Academy of Nutrition and Dietetics* about the promise of farmers' markets and community gardens and basically talking about what they could do, but that there were not a lot of well designed, rigorously evaluated initiatives. Through dialogues with state and local WIC agencies, the study evolved. New Jersey has an online resource called NJWIConline, developed in 2006. WIC participants can use this resource to meet their nutrition education requirement, which is a nutrition education lesson every three months when they go for recertification. One of the ideas was to develop a lesson to promote the redemption of Farmers' Market Nutrition Program (FMNP) vouchers and F/V intake among women enrolled in WIC and to integrate the lesson into the NJWIConline portal.

During the grant planning stage, focus groups were conducted with WIC participants. Questions addressed barriers to using the vouchers; reactions to the planned lesson; the idea of doing the lesson at the farmers' market; what else could encourage women to use the vouchers; where they shop for fruits and vegetables, and what, if anything prevents them from purchasing them at these venues. Participants mainly used supermarkets. They had a lack of familiarity with what farmers' market fruits and vegetables look like and believed they looked dirty, so they must not be safe to eat. Plus there were foods that they didn't know. There was also misinformation about food safety, like the idea that you should wash your vegetables with soap or bleach or detergent.

There were also transportation issues. New Jersey also used to offer the vouchers in four \$5.00 increments. What the focus group participants said is that with the \$10.00 vouchers, if I want to go to Farmer A and Farmer B, I can't because I have to spend the entire voucher in one place and I can't get change back (which is the case). So they would develop strategies where they would go with a friend. Person A would go to Farmer A, and Person B would go to Farmer B, and then they would divide the bags in half and share their food that way. That was interesting to learn that the face value of the voucher had an effect on their shopping behaviors. They loved the idea of recipes and food safety. They definitely wanted to know more about how they could make sure their fruits and vegetables were safe to eat. They didn't like the idea of doing the lesson at the market. They said buying food, watching kids, and watching the lesson felt like it would be too much to do all at once.

Suggestions for encouraging women to use farmers' markets included providing transportation, encouraging women to go to a farmers' market with someone who knows the ropes and has been there before (we built this into the lesson narrative), and increasing the number of farmers authorized by WIC and the variety of fruits and vegetables offered at markets. As we thought, most commonly, women were buying fruits and vegetables at supermarkets, and barriers to doing so were the foods not being fresh or being too expensive or the stores not having what women wanted, and the fruits and vegetables being unappealing.

The study logo is on our website. The items shown in the logo are all New Jersey seasonable vegetables that are discussed in the lesson. The lesson addressed barriers identified in focus groups and is based on social cognitive theory and the transportation imagery model. Relatable role models and feedback were included to foster observational learning, and experiential activities were used to build behavioral capacity (knowledge and skills to increase F/V intake). Online delivery is very conducive to interactive activities. Narratives or stories, considered powerful for conveying health information, were also included. The idea is that if someone is transported into a story, they're more likely to believe the propositions of the story, and possibly to adopt some of the ideas that the characters are conveying, and they are less likely to counter argue or discount what is being said. So the focus is on redeeming farmers' market and cash value vouchers. WIC participants were cast for the lesson so that the messages came from WIC moms.

All of the segments were filmed on location, at the agency and at a local farmers' market. The farmers' market was very excited to be part of the project, to make it very realistic. A narrative serial drama format was used, which is the idea that you meet these three characters in the beginning. Each has a story to tell about why she didn't go to farmers' markets, events serving as a catalyst for change (something that happened to change their mind about this), and ways they overcame the challenges, and strategies to help viewers do the same.

Each module features one of the characters presenting her content, using video modality, to address low literacy and numeracy skills. Both English and Spanish language versions were produced. The lessons also had interactive activities to reinforce the main messages. There are three modules. *Farm Fresh* addresses some of the misperceptions about fruits and vegetables being dirty, not liking the way that they look, and not trusting the farmers (some attitudinal

issues). There was a searchable tool to locate WIC authorized markets, so the participant could locate three WIC-authorized markets in her area and email herself that information, as well as post it to an electronic notebook that she could print out at the end of the lesson.

Then the second module, called *Market Smarts* was filmed at a farmers' market. This segment provides information on the rewards of eating locally grown seasonal fruits and vegetables, and three were featured. In focus groups, again, participants divided picture cards of seasonal fruits and vegetables into two piles, those foods that were known and those that were not. Based on the tallies, two unknown items (kale and summer squash) and one known item (blueberries) were picked.

The last module, *In the Kitchen*, addresses food safety skills. There is a special segment on the specific items that are featured in this lesson.

The project began with an advisory board consisting of the agency director, a site nutritionist, chief nutritionist, and the PI. The advisory board had great ideas because the people knew the population so well.

Four focus groups were conducted per module, separately in English and in Spanish. The groups vetted the characters, provided information on some of the rewards of eating fruits and vegetables and why we should eat locally grown seasonal foods. Participants viewed and provided feedback on a four-minute FDA video on F/V food safety (used to develop lesson content on F/V food safety). Another round of focus groups, four in Spanish and four in English, were conducted to preview the content with participants and solicit their feedback. Based on that feedback, the content was finalized. Then the advisory board helped identify participants to feature in the lesson. A video production company developed rough cuts of segments with these characters to show participants and say, "What do you think?" How much do you like this person? How relatable is she? Would you take advice from this person? Then from there, the website designer created the user interface, the lesson activities, and back-end reports. Because she had worked with WIC, she knew what their reporting requirements were, that they wanted to capture information on what lessons people did and so forth. All that could nicely be built into *WIC Fresh Start*, which, by the way, even the name of the lesson came from focus group participants. We asked them what this program should be called. One of the groups said, "How about *Fresh Start*? We like *Fresh Start* 'cause you're starting a fresh, new behavior."

The final product is an online lesson with three modules. Core content is through a video, then they complete an interactive activity to reinforce the content. After the lesson, they receive color handouts reiterating key messages. During the study participants received two cutting boards (one for raw meat, poultry, and seafood and one for fruits and vegetables), and a vegetable brush with peeler. Then one, two, and three months after the lesson, they received an email with a video link featuring one of the participants from the lesson. The character would ask, "Have you gone to the farmers' market yet?" and would reiterate some of the lesson messages.

The study design was a four-arm, longitudinal, randomized design. The stratification factor was FMNP voucher receipt. Participants were orally administered a pretest at the WIC clinic, and then they either received WIC Fresh Start or one of the lessons offered through

NJWIConline.org. Existing lessons were available on breastfeeding, calcium, iron, being active, fruits and vegetables, cholesterol, and oral health. The investigators recorded the number and topical focus of prior NJWIConline lessons, if any, participants completed before the study.

Two weeks after the lesson, participants completed post-tests by telephone with follow-up assessments at three and six months after the post-test. Research assistants approached 1,345 women, 64 were ineligible, 537 were eligible, but declined, and 744 were enrolled. There were 394 in the group who received the vouchers and 350 in the group that did not. An intent-to-treat analytic approach with linear mixed effects models was used. Logistic regression analysis was used for binary outcomes. Exploratory moderator analyses were conducted by adding condition by potential moderator interaction terms to see if lesson effects differed within subgroups of the sample. There were some baseline differences by arm in pregnancy status, breastfeeding status, and receiving assistance other than WIC, which were controlled for in analyses.

The sample was 59% Hispanic, and within that, primarily Dominican and Puerto Rican. A large segment were foreign born, and among foreign born, a large percent preferred to speak Spanish, which is an indicator of less acculturation. On a ten-point scale, the social desirability trait score was 7.74, so that was actually higher than the score in the sample in which Strahan & Gerbasi validated the scale, so that was kind of interesting, too. Fifty percent had completed high school or less, 50 percent had more than a high school education and 55 percent were food insecure.

The changes were in the positive direction, with essentially new lesson plus voucher condition having the greatest, the most significant change, as compared to the three other conditions. Improvements were found in knowledge of the farmers' market nutrition program, F/V food safety skills, farmers' market specific knowledge, familiarity with items found at farmers' markets in July, knowledge of seasonal items (selection, storage, and parts eaten of items) and F/V preparation skills.

At posttest and 3- and 6-month follow-up assessments, more people were aware of WIC-authorized farmers' markets. At 3-month follow up, more reported ever having purchased fruits and vegetables at a farmers' market, and at posttest and 3-month follow-up, more said they intended to purchase fruits and vegetables at a farmers' market in the next two weeks.

Another outcome was redemption of FMNP vouchers at farmers' markets. There were no effects by lesson. However, Spanish language preference moderated effects on voucher redemption in the sample of voucher recipients, and among the subset of foreign-born people who preferred to speak Spanish. Among those voucher recipients, there was no lesson effect among those who did not prefer to speak Spanish, but there was a positive effect of the new lesson among those who preferred to speak Spanish, and the moderating effect of Spanish language preference was even more pronounced in the subset of foreign-born participants. Interestingly, identification with the characters was much stronger in the Spanish language lesson than it was in the English language lesson. Considering that the theoretical model was looking at that narrative persuasion and identification with characters, it's likely that there's something going on in the Spanish-language version of the lesson that's working well, and they're relating to those characters. More women

who saw the Spanish lesson said that they tried the recipe that they saw at home, so that was encouraging.

The rate of redemption of CVVs at farmers' markets was 1 percent, which is larger than the less than 1 percent national redemption figure. It was significantly higher among those who were randomized to receive the new lesson as compared to an existing lesson. Anecdotally, we believe that the change was due to improved awareness that CVVs could be redeemed at farmers' markets. To explore whether this was in fact the case, we looked at changes in responses to an item in the measure of knowledge of the FMNP ("CVVs can be redeemed at farmers' markets" [True/false]). Among those who answered the item incorrectly at pretest, participants who were randomized to the new as compared to existing lesson condition were significantly more likely to answer it correctly at posttest, 3-month follow-up, and 6-month follow-up.

There was no change in measures of F/V intake over time. There was an interaction approaching significance at six-month follow up, but by standard convention, it was not statistically significant. This could be due to a weakness of the measures or a lack of intervention effectiveness. Because there were favorable changes in intermediate outcomes suggesting the lesson was effective, possibly the measures used were not sensitive to detecting change over time. The measures were the CDC BRFSS F/V module, and also a measure developed by the NCI. It's just a two-item query of intake in cups.

Email was the delivery modality for the follow-up videos so women could get videos and, again, hear and see and watch the content. However, of those who said that they had email accounts at baseline, most did not open emails sent one (33%), two (16%) and three (11%) after the lesson. Possibly more follow-up content is needed to really effect change in F/V intake. Email may not have been the best modality for delivering this content.

The analytic procedure of mixed modeling included dropouts under a missing at random assumption; if this assumption was not satisfied, estimates of effects could be biased. To evaluate the pattern of missing values due to attrition, measures of F/V intake at the last time point before attrition were compared by condition. No differences among dropouts were found by voucher receipt, but some differences in F/V intake among dropouts approached significance. Among those who dropped out between 3- and 6-month follow-up assessments, the quantity of vegetable intake was higher among those who received FMNP vouchers as compared to those who did not. The frequency of fruit intake also was higher among those who received FMNP vouchers as compared to those who did not. At 6-month follow-up, those who received vouchers lost participants with higher F/V intake at 3-month follow-up. This may explain the counterintuitive findings at 6-month follow-up.

Dose response effects were examined. Eighty-seven percent of those who got the new lesson completed all activities and videos. At three and six-month follow up, food specific knowledge was higher among those who did all the videos and activities, as compared to those who did not. Those who did all the videos and activities were also more likely to be aware of WIC-authorized markets than were those who did not.

Commonly, the reason for participants not finishing the lesson was technical issues with lesson play. Research assistants (RAs) sat with participants while they did the lessons, and any time there was a departure from the protocol, the RAs would take notes. Some things could not be prevented: the server was down, the lesson would freeze, or they'd be doing a recipe activity and the cards wouldn't stick where they were being moved to.

User satisfaction with the lesson that was received also was examined. Before the study started, it was decided that a score of 5 or higher on a multi-item measure of satisfaction (scores could range from 1 to 7) would indicate a high degree of user satisfaction. Those who got the new lesson had a high rating, and it was significantly higher than those who completed existing NJWIConline lessons. More people who completed the new lesson said they learned new information, talked to their family about the new information they learned, and talked to their friends about the new information learned.

A small percentage of participants completed a prior WIC online lesson, so there was no difference (by condition) in ratings of the novelty of the lesson that was received. For those completing the new lesson there were high ratings of transportation into the video narrative, identification with characters, and the extent of liking lesson activities and learning from them. Participants liked the recipe activity the most. Blueberries were the fruit or vegetable that most participants chose to learn a recipe about, and roughly equal percentages tried the other two. Forty-four percent of participants reported trying the recipe they learned at home. Relative to those completing the English language lesson, a significantly higher percentage of participants receiving the Spanish language lesson reported trying the recipe they learned at home.

Dr. Jennifer Di Noia: Here's our lessons learned. Without our WIC partners, this project never could have happened. Over a two-year time period, things happen that you don't expect. We had a hard time reaching some participants. WIC jumped right in. They said, "We'll give you the contact information we have. We can tell you when they're coming back for their next clinic visit. You can meet them in the waiting room and can ask them what you need to." There were things like that. WIC dedicated staff to recording all of the CVV and FMNP voucher numbers, which was over 23,000 numbers that they manually recorded for us so we could key all those data and determine what the redemption rate was.

The state gave us the data on who redeemed their vouchers. Without everyone on board and being really excited to do this and really working together to do it, I can't imagine how a project like this could happen. That partnership – I love the fact that the RFA built that into the design – by design, they wanted a strong partnership – was vital to the success of the project.

Dorothy Monica: This particular study and what we did really can only be generalized to inner-city WIC. If you are in a rural area, the fact that things come out of the ground is unsurprising: dirty is pretty well known. If they're growing their own fruits and vegetables, they know what it looks like. They know they're not getting the polished, shiny, perfectly formed fruits and vegetables in the supermarket. They understand what that looks like. We do not have a lot of farms in Paterson. Our participants really don't get to see what fruits and vegetables look like in

their natural form, for the most part. Some of our population that would normally eat more fruits and vegetables are used to eating more tropical fruits and vegetables.

You come to New Jersey and tropical does not exist. We're not getting the mangoes and the papayas and the pineapples. That's stuff that they're normally used to eating. So now they're going to the farmers' market. They will probably go to the farmers' market because they're more prone to eating fresh fruits and vegetables, but they're not seeing things there that they know how to prepare or what to do with. I know that even for myself, sometimes I'll go and I'll look around and go, "What do I do with that?" and I've lived in New Jersey my entire life.

The thing to know is that our population is extraordinarily transient. Many have pay-as-you-go phones and there are issues with not having a phone at all times. A lot of our participants do not have computers at home, which could also explain why some of them didn't open the follow-up emails. If they're going to use a computer, they go to the library because it just doesn't exist in their home. They move very frequently. We very frequently have trouble reaching our participants because you call and the phone number has changed or is out of service. We always try to get backup numbers. Sometimes the backup numbers don't work.

It took five calls to reach some of these participants, per assessment, and at 744 people times five per outreach, it was a lot of phone calls. The RAs worked very hard. A 58% consent rate might seem low. But these were people who came into our WIC office. Most of them were there for check pickup because if they were there for certification, a lot of them would refuse anyway because of the length of time they would be in the clinic. If they're normally coming in for check pickup, they either do a lesson or go to a class – all of our high risk participants are seen individually – they get their nutrition education, they pick up their checks, and they leave. Many chose to stay to do the lesson which is remarkable.

Dr. Jennifer Di Noia. So we got the spoiler alert from Rafael on this one. We need multi-faceted approaches. The lesson is only one piece of it. We are actually entertaining the idea of combining something like this with trying to bring farmers to WIC, revisiting the idea that Dori talked about before, because it is a multi-faceted issue that requires multi-faceted solutions. That was a big take-away for us from this project.

Dorothy Monica: This is what I alluded to before. The CVVs are spent at a very high rate – very high rate in New Jersey – but they're not being spent at the farmers' market. What I found interesting is when they said that they didn't know that they could spend them at the farmers' market because it is part of what we mention to them. It's not like we didn't mention it, but I don't think that they were listening. One thing that we did notice, our farmers' market redemption rate dropped dramatically when we started giving out CVVs. There's no study. There's nothing scientific about this. I'm not saying it was a cause and effect. But anecdotally we saw that – and it was something I feared when we first got them. Indeed, despite our best efforts, it is what happened. They started getting fruits and vegetable checks that they could spend at the supermarket, and the idea of having to run to the farmers' market in addition to that became less appealing.

We would have to go back in time to do that study, but it did, indeed, happen. So to try to get them to increase the spending to get fresh fruits and vegetables – because we know at the supermarkets, it might not be fresh. It might have been picked too early. It might be ripening in the process. When they're getting F/V from the farmers, they're fresh picked that day or the day before.

Dr. Jennifer Di Noia: We contracted with the developer of NJWIConline, and the benefits of that, as I said before, is that the person who does this development work really understands WIC, has a long-standing great working relationship with WIC, and all of those are really good assets when you're working on a project like this. The developer could also seamlessly integrate the back-end reports into the program and also could integrate the lesson into the existing NJWI online portal. But it's also important to recognize that when you do that, we found, too, that you're working with people that have a process that works. They've developed these lessons, and the lessons are working, and they're out there, and the participants like them.

So the idea that you're trying to shift the paradigm of the way they do it, sometimes we found that they would say, "No, we don't do it that way. This is what we do." We would say, "Okay, here's what we're trying to do." Sometimes, there was that. Also with this project, we had set deadlines. The developer was used to working with much more flexible deadlines, where it was sort of sometime around that month, or maybe a month later. When we said we're getting ready for the trial, they were like, "You mean you meant that you want it done by –" and we said "Yes." We were rushed at the beta testing phase, and we did have some technical issues with lesson play, which I honestly think was because not enough time went into testing and debugging the lesson. My advice for others doing similar work is this: whatever deadline you want, back that up by a few months, and have your own RAs test and try to cause the lesson to malfunction. Because I think that if I had my RAs do that, they would have broken it, and we would have discovered those things and not relied just on the developer to say it's good to go, it's ready.

Questions

One question concerned measuring social desirability. Dr. Di Noia routinely includes that because it really can bias intake estimates. She uses the Strahan & Gerbasi – it's a short form of the original 33-item Marlowe-Crowne Social Desirability Scale, with true/false items. If they score in the socially desirable way, they get one point, and then we sum it. In our sample, the score was high. In the sub-study, social desirability trait was related to F/V intake. However, it is unclear if there is a bias in the reporting of F/V intake or if people who score high on social desirability trait also tend to eat more F/Vs.

One question asked for a description of the lesson. The NJWIConline lessons have the same format (lesson content delivery plus an activity) but the lessons are text and graphic based. The participant reads a little story – for example about fruits and vegetables – and then they do an activity. They can choose from four. They only have to do one to get the certificate that says they satisfied their nutrition education contact. All the lessons are like that. The model was three and three, three shots of information through videos, and then three activities to reinforce the content. The modality was different because it was all listening and watching, as opposed to reading, and

they learned, did activity, learned, did activity, learned, and did activity. Ordinarily, clients are used to reading a piece, and then doing an activity.

One participant asked if time was reported as a barrier to using farmers' markets. The issue is that shopping in one place is convenient, compared with going to a farmers' market. Women who had to take a bus said a \$10.00 incentive was not enough to get on a bus with kids and go to a farmers' market.

A final question concerned the bandwidth needed to see videos in the online program. For the trial, the lesson was not designed to deploy on kiosks at the WIC clinic for a few reasons. One was a research reason. We wanted an RA to be able to sit and observe and record any deviations to understand how does this work when someone's sitting at a laptop? So there was that. Then the kiosks are in the waiting room which is super busy and probably distracting. The equipment could give us the bandwidth. We installed a router at the agency. The goal was to implement it as intended, see if it does work, and remove those other extraneous factors that could really be a barrier. We realize that it's very experimental and may not be real world, but we had to first establish evidence of effectiveness and then ask the question of now, how do we transfer this into the clinic setting, and what do we do?

SUPPORTING BABY BEHAVIOR THROUGH PEDIATRIC OFFICES: EFFICACY OF A VIDEO TRAINING

Jane Heinig, PhD, UC-Davis

Jennifer Banuelos, MAS

Dr. Jane Heinig: The objective of this project was to move the successful *Baby Behavior* program from the WIC educational process into pediatric medical care settings. USDA has been the foundation of this work. The original FitWIC Baby Behavior was funded by a USDA special project grant from 2006-2009 and conducted in collaboration with California WIC.

The *Baby Behavior* program is based on the concept that parents need information about normal healthy infant behavior because many parents misinterpret normal healthy behavior as being related to the lack of satisfaction with feeding or their children always being hungry. For example, if babies cry and wake more than parents expect, they may feed their children inappropriately.

Baby Behavior also includes training on a style of communication to be used with parents and other caregivers. Providers spend a lot of time in public health trying to change parents' feeding practices such as using cereal in the bottle, putting soda in the bottle, putting a bottle in bed with the baby, giving up on breastfeeding, etc. Messages that emphasize only potential consequences of certain feeding practices may have limited effect because they do not address the reasons why these behaviors occur.

The *Baby Behavior* approach focuses on parents' decision-making processes by helping the caregivers and staff members understand more about the knowledge and beliefs that drive the feeding practices. For example, if a mom expects that her child should sleep through the night by the time her child is three-months old and the child is waking up at night, she may decide that she needs to excessive amounts of formula during the day, thinking *if she just feeds her enough* her baby will sleep longer. The combination of the mother's expectation and the baby's behavior (waking) drives the feeding practice.

California was the first state to scale up Baby Behavior statewide. The staff at the State of California worked with local agency staff to create the program that could be used by all participants with infants. More than 35 state WIC agencies have adopted this program, and trainings also have been conducted in hospitals and other medical environments.

The pediatrician's office is an excellent environment for preventing childhood obesity. Throughout infancy, pediatricians repeatedly evaluate infant growth and well-baby checks are ideal settings to screen for risk factors such as early introduction of solid foods. Pediatricians are generally accepted as influential people by family members and others. The goal of this study was to test the feasibility of having pediatric medical clinics that provide care to WIC-enrolled babies, use the *Baby Behavior* program during well-child contacts in the first 6 months. The result would be that the messages participants receive from the WIC program and medical practices would be similar to better support healthy growth and development. It was hypothesized that there would be an additive effect of *Baby Behavior* program in terms of WIC

outcomes, healthcare provider outcomes, and ultimately on mother and baby outcomes, particularly focusing on infant growth. Additional assessments were used to determine the effect of the messages on mediating factors that might influence the impact of the intervention.

The study design included training for both the providers and their staff. Mothers were recruited prenatally. Enrolled mothers attended their normal well-baby contacts, completing online surveys after each in the first 6 months. Providers also collected data at each contact related to topics covered, infant feeding practices, and growth.

One of the goals of Baby Behavior is to remove some of the existing barriers that pediatricians have in communicating messages intended to improve infant-feeding practices and reduce risks for childhood obesity. For examples, time constraints can prevent providers from bringing up topics related to feeding or obesity risk given all that needs to happen during the short (10-15 minute) well-baby visits. Baby Behavior messages are intended to be delivered while providers perform other tasks.

While the project includes ongoing data collection among participating mothers and infants, this presentation focuses on outcomes associated with the effect of the video training on participating physicians.

The first step was in adapting the Baby Behavior training for pediatric offices was to condense the WIC training into two 30-minute segments, incorporating age-specific messages for each well baby contact, and creating age-specific handouts for each well-baby contact. The resulting videos were reviewed by advisory boards and non-participating providers. The handouts were tested for understanding and acceptance among mothers in California WIC clinics.

Among the 81 clinics contacted, final approvals were obtained from a sample of 16 clinics, 8 in each group (randomly assigned to intervention and control). Ninety-six providers were enrolled in the study; 84 and 77 providers completed the baseline and midpoint surveys, respectively. The majority of providers who left the study did so because they no longer worked in participating clinics. A subset of about 40 doctors also participated in voluntary phone interviews. The training and training evaluation were completed only by those in the intervention group.

Most of the participating providers were pediatricians, with some family practice doctors and nurse practitioners. About 50% of participating providers were white, but there were no group differences in terms of race/ ethnicity, or years in practice or training. More of the staff in the intervention sites reported that they spoke Spanish.

The evaluation outcomes from the trainings were positive; the majority of providers agreed that the training was well organized, included new information, would lead to changes in their practice, and that the study messages would be useful to their patients' parents. Less than half reported wanting more training and that they already talked to the parents about the training topics. Less than 20% agreed with the statement that the training was too long. Several providers suggested we add an example of a physician demonstrating the use of this intervention.

The majority of providers agreed that the handout content was age-appropriate, well organized, and engaging for parents. Just over 10% agreed that handouts were too long or not likely to be useful in their clinics.

Results from the training evaluation indicated that the majority of providers expressed more confidence in their ability to talk about infant behavior and that the messages would be easy to share during well-child contacts. Only about of the providers reported that parents would be interested in the messages and about 10 percent reported that they had more important topics to discuss with parents.

At midpoint, the majority of providers reported that the handouts were useful; and very few agreed that the messages take too long to deliver. No providers reported that there were more important topics to discuss. Nearly all providers “agreed” or “slightly” agreed that the messages reduced the stress of parents in their practice and that they empowered parents to make more informed infant-feeding decisions. Despite these outcomes, less than 15 percent of the providers reported that they used Baby Behavior messages with all parents.

There were no group differences at baseline in topics discussed with patients such as sleep, crying, infant feeding practices, weight gain, or infant development. However, at midpoint, providers in the intervention group reported that they were talking more often about the range of infant cues, how mothers could tell if their babies were getting enough to eat and the importance for new parents to ask for family support.

At midpoint, there are also group differences in providers’ reported feeding recommendations. For example, a greater proportion of providers in the intervention group reported that they would “never” recommend cereal be given to infants by bottle.

Lessons Learned

We believe we have established that a study to evaluate the use of Baby Behavior in medical offices is feasible and that the messages can be delivered without lengthening well-child visits. With dissemination of the video training and handouts through the internet, the intervention can be offered at very low cost to the providers. The education was well accepted and resulted in modest changes in the providers’ beliefs and behaviors.

Providers in medical clinics serving low-income populations face many challenges that may limit their ability to offer education to patients. These challenges may make it difficult for the program to work in a larger scale. The study design was best suited for medical organizations with obstetric and pediatric offices that are co-located or at least in close proximity to each other and we found that there were many barriers to finding and obtaining cooperation from these organizations.

Despite the providers’ positive comments about the handouts, they were used infrequently in the study settings. In several clinics, the study handouts were not shared because the organization used only mandated institutional handouts. In the majority of clinics, technical and administrative barriers prevented the use of sample video clips that were offered as to the

providers as illustrations of specific infant behaviors. In some settings, it wasn't possible to run the videos in the clinic.

As a result of the study, we will revise the video training based on provider feedback, creating shorter modules and adding real examples of the use of the messages both in English and Spanish in clinic environments.

Questions

A question was asked whether there was any Baby Behavior training separate from this project that is part of the residency, medical education, or MA/PA training. Some residency trainings have been conducted in California hospitals and medical offices.

Another question was asked about how Baby Behavior education was being delivered to women in each state. All of the states have their own style of delivery. In the California model, classes are used for prenatal education and post-natal education. Not all states use classes to deliver education. In Arizona, Baby Behavior (and now toddler) messages are shared through classes and one-on-one counseling. The Baby Behavior curriculum is used differently in WIC depending on the agency size and what type of implementation is best for the individual state. Baby Behavior appears to work in almost any environment because the foundation of the intervention is based on simple messages and a style of communication that can be used in classes, educational materials and in one-on-one counseling.

Outcomes from the participating mothers and infants will be reported at a later date

LACTATION ADVICE THROUGH TEXTING CAN HELP (LATCH): A WIC- BASED
RANDOMIZED CONTROLLED TRIAL

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Dr. Rafael Pérez-Escamilla: Dr. Pérez-Escamilla chaired the Institute of Medicine workshop committee on updating and improving the USDA breastfeeding support campaign. One of the top recommendations from that committee was the need to start using more text messaging to provide timely breastfeeding support to breastfeeding moms.

The LATCH is a text messaging intervention in the mobile health or M-health domain, which is defined as a medical and public health practice supported by mobile devices. The SMS, or short, message service or text messages allow up to 160 characters to be exchanged between mobile devices and have become universally used. The vast majority of WIC moms have cell phones many of which are smart phones, which provides a whole universe of opportunities.

Two-way SMS is the most popular modality used within the mobile health interventions and is the focus of our work. There is only one systematic review and meta analysis that examined the effect of e-technologies on breastfeeding behavior and only one of the 16 studies included looked at the impact of an SMS intervention. That study and the only other peer review that examined the effect of SMS on breastfeeding were both quasi-experimental studies that demonstrated positive results although there is a lack of high quality RCT evidence.

An early pilot study led by Dr. Nurit Harari started with a formative phase to try to find out from 21 WIC moms in three focus groups if they would be interested in an SMS type of intervention to help them with breastfeeding, and if so, what type of advice they had for us in terms of how to tailor the SMS intervention. So women were asked about information that would be helpful prenatally as well as post-partum, information or support that will help them overcome the challenges of breastfeeding and the logistics like ‘do you think you would like, or moms in your community would like to receive text messages’, ‘how often would you like texts’, ‘what type of cell texting plans most of the women in your community have’ and also how much time should elapse from the time you send an SMS communication to the time you get a response from the peer counselor. LATCH was not envisioned as a replacement of peer counselors, but rather as an ancillary tool to empower the very valuable work that peer counselors do.

The steering committee, with the input from the focus groups, helped develop prenatal and post-natal behavior change text messages that also considered what had previously been published in the literature regarding breastfeeding facilitators and breastfeeding barriers. The steering committee included a peer counselor, two lactation consultants, as well as a maternal child nutritionist and two pediatricians.

The implementation phase of the early pilot involved 52 WIC women from two breastfeeding peer counseling programs who intended to breastfeed and had unlimited text messaging plans and were at about the fifth grade of literacy level and fluent in English or Spanish. There were two main findings. First, there was a very strong impact on the ability of peer counselors to get in touch with the moms very soon after their delivery: 87 percent versus 27 percent in the control group were able to get in touch with their moms within 48 hours after birth. A very encouraging finding was that exclusive breastfeeding rates at two weeks post-partum were almost 20 percent higher in the intervention group. Because of limited statistical power, the difference was not statistically significant, but obviously called for actually seeking to launch a larger scale RCT that could fall more into the effectiveness domain.

For this current pilot study, pregnant moms were recruited who were attending the WIC breastfeeding peer counseling program in one of four sites. They had to be less than 28 weeks of gestation because latching is a very important prenatal component and there needed to be enough time during pregnancy for the moms to receive messages. They had to express their intention to breastfeed, deliver a single healthy baby, and have unlimited text messaging on a mobile phone plan.

There were 250 participants enrolled; 212 completed the baseline interview and were randomly assigned into the intervention and the control groups. Due to attrition there were 71 participants in the intervention group and 56 in the control group at two weeks postpartum. Two-week outcome data are presented; the 3-month interview data analyses have not been completed yet.

Josefa Martinez: There were four WIC breastfeeding peer counseling sites involved in the Latch study: two in New Haven, one in Hartford and one in Norwich. Seven breastfeeding peer counselors (four part-time and three full-time), and three IBCLCs (two full-time and one part-time) at two different studies sites were involved.

The Mobile Commons text messaging platform was used. This was a HIPAA-compliant web-based two-way text messaging platform that recorded when the messages were sent, whether they were received or not, and all message exchanges between each participant and their breastfeeding peer counselor. This allowed for an exploration of text messages through qualitative analyses.

In terms of message content design and frequency, the text message topics covered the benefits of breastfeeding for both mother and baby, debunked breastfeeding myths, explained examples of proper positioning, with words, pictures and video. Moms would get a text message with a link to a video or a picture so that they could then see an example of proper positioning; how to tell whether baby was getting enough breast milk, and they reinforced the supportive role of the breastfeeding peer counselor.

The text messages from the pilot study were expanded to cover three months post-partum. Each text message was mapped to the constructs of the Health Action Process approach (HAPA) the model used for behavior change. During the prenatal phase these were action self-efficacy, outcome expectancies and action planning and in the post-partum period the messages were

mapped to coping, planning, maintenance, self-efficacy and recovery self-efficacy. The HAPA is a hybrid model of behavior change that can be used as a continuum or a stage model; the primary hypothesis is that action and coping planning are the constructs (mediators) that bridge the gap between intentions and behavior. Many people can intend to engage in a behavior, but that behavior may not happen later on down the road.

The three types of phase-specific self-efficacy play an important role as well. During the motivational phase when someone is forming an intention to engage in a behavior, action self-efficacy (also called pre-action self-efficacy), outcome expectancies and risk perception come together to help a mom form an intention to engage in a behavior. And then in the volitional phase or the post-intentional phase, intentions, planning and then maintenance and recovery self-efficacy influence whether or not the behavior is actually conducted. Behavior is represented as an iterative process. Someone will start and maintain a behavior and then may stop and need to recover that behavior. The phase-specific self-efficacies are important in that process.

Each text message was mapped to a specific social cognitive construct. For example, action planning message reads: *Some mothers wonder how much milk their baby's getting. Plan to follow your baby's weight and poop closely to make sure your baby is feeding well.* Mom receives a message about a concern that she may have. Obviously most moms are nervous about understanding how much milk their baby is getting and whether the baby is getting enough. The message proposes something she can do about it. If you follow this message this can ensure that your baby is getting enough milk. Each of the constructs was measured at baseline, two weeks post-partum, and three months post-partum.

The message frequency increased during the prenatal period and decreased post-partum. From randomization to 20 days before the baby was due, one message sent every two days; from 20 days before the baby's expected due date until the baby birth date, one message a day. In the first one to four days post-partum, five messages a day were sent, four a day were sent during days five and six, and three per day for the second week post-partum. During weeks 3 to 12 post-partum, the number diminished from three a day to one per day.

Moms were recruited, consented and enrolled into LATCH through their breastfeeding peer counselor. The intake survey was done through the Mobile Commons platform. As soon as that survey was submitted, the mom received an automatic text message from the Mobile Commons platform thanking them for enrolling in the study and to please reply yes to confirm enrollment. Within one week of confirmation, the baseline interview was done when a researcher called each mom to conduct the baseline phone interview and collect information about mom's breastfeeding planning. All of the baseline HAPA constructs were collected as well. Then mom was randomized to either the intervention or the control group. The control group was the standard of care breastfeeding peer counselor program through WIC and the intervention group received the standard of care plus LATCH text messages.

The primary outcome was exclusive breastfeeding status at two weeks post-partum and the secondary outcome was time to contact with breastfeeding peer counselor once the baby was born. For process measures, intensity of engagement via text message, defined as the total

number of two-way text message exchanges, was examined. This measure was developed through qualitative coding of the text messages to total the number of two-way exchanges moms had with their counselors. This total was dichotomized to determine who had a high intensity of engagement (four or more two-way text message exchanges) or low intensity (less than 4) over two-way text message. The number of breastfeeding issues resolved over text message were calculated and the types of issues the moms were discussing with their peer counselors over text were collated.

Dr. Rafael Pérez-Escamilla: The groups were equivalent at baseline: moms were on average 27 years old with a 28 BMI, and they were planning to breastfeed on average for nine months when they were recruited during pregnancy. There was no difference in the distribution of the groups across sites. Ethnicity was similar between the groups. About 75% were Hispanic moms, 70% were living with a partner, 43% were high school graduates, and 42% had more than a high school education. About 67% preferred to speak English.

There was no significant intervention effect on exclusive breastfeeding at two weeks. There was almost a six percent difference in the expected direction in favor of the intervention group, but lacked statistical power due to small sample size. What is very encouraging is that the strong impact of the intervention on early contact between the breastfeeding peer counselor and the mom was confirmed through this study. Immediately after birth almost 25% of the intervention group moms were contacted versus only 8% in the control group.

There were site differences albeit not statistically significant; sites one and four had a benefit over 10 % in the expected direction for exclusive breastfeeding rates at two weeks. The lower rates at site three may be related to the part-time coverage from a single peer counselor.

A composite score that reflected three indicators was developed: whether the mom was not overweight or obese, planning to breastfeed for more than six months and preferred to speak English (one point for each). Among women with all these characteristics present 87 percent of moms in the intervention group were exclusively breastfeeding at two weeks post-partum compared with 33% of women in the control group.

Josefa Martinez: The two-way text message exchanges were coded to examine intensity of engagement. There was a larger number of two-way text messaging exchanges during the prenatal period than in the first two weeks post-partum; about 5.5 versus 3.7. Moms may have more time before the baby is born to engage with their peer counselor. However only post-partum engagement intensity was significantly associated with exclusive breastfeeding status at two weeks; about 4.3 for exclusive breastfeeding moms versus 3 for partially breastfeeding moms.

The average number of breastfeeding issues addressed over text messages was significantly associated with breastfeeding status in the first two weeks post-partum: 3.6 for exclusive breastfeeding moms versus 2.3 for partially breastfeeding moms.

A content analysis of the text messages was conducted; 4 domains were identified both in the prenatal period and in the first two weeks post-partum. These were the mechanics of breastfeeding, social support, babies' nutrition, and the peer counselor maintaining text message contact with the moms.

There were four main themes both in the prenatal and post-partum periods for the breastfeeding domain. Prenatally, moms were talking to their peer counselor about how long a feeding should take, when to initiate breastfeeding, what skin-to-skin contact was, how frequently they needed to feed their baby, when milk production would start. They also wanted to know about the best position to feed the baby, getting the baby to latch, breastfeeding while on certain medications, how to obtain a breast pump from insurance and the best way to initiate breastfeeding after a Cesarean section. These themes stayed in the post-partum period. The first three themes are the same. The milk supply subthemes changed slightly. Moms wanted to know what to do if the baby is still hungry once they've been fed and how to maintain and increase their milk supply. The real standout theme here was breastfeeding problems. Moms wanted to know how to fix a latch if the baby was having trouble latching, how to pump correctly, how to manage engorgement, and plugged ducts, nipple pain and how to resume breastfeeding if they had already stopped within the first two weeks post-partum.

There were several themes for the social support domain, both prenatally and in the first two weeks post-partum. Moms were reaching out to their peer counselors for social support. The peer counselors were encouraging them to ask other professionals for help especially the nurses in the hospital, and to make sure that they talked to a lactation consultant before leaving the hospital. Peer counselors were also calling moms to follow up with them about an issue that may have come up over text message. In the first two weeks post-partum some of these themes were the same: getting social support, encouraging moms to ask for help in the hospital, asking moms about family support, do you have somebody at home who can support you in breastfeeding, somebody who can do the other household things while you focus on feeding the baby, and also the issue of family/peer pressure to give formula.

The third domain was about babies' nutrition; the benefits of breastfeeding for the baby, when to introduce formula, and how and when to introduce solids. These were prenatal questions. In the first two weeks post-partum there were conversations about the addition of formula. Moms also wanted to know what kinds of things they needed to have in their diet to increase their milk supply, and how to check whether baby is getting enough breast milk.

The fourth domain was about peer counselors maintaining contact with participants. A significant proportion of participants that signed up for the text messaging did not use text messages soon after birth. If there was no contact within 14 days post-partum, a text message was sent to re-engage them with their peer counselor. Peer counselors used the text message to schedule appointments, check on the baby's arrival, maintain or reestablish contact and check in and see how helpful moms thought the texts were. These themes stayed the same in the post-partum period except for the peer counselors checking in on the mom's wellbeing and on breastfeeding progress.

Exclusive breastfeeding moms had a greater intensity of engagement in the first two weeks postpartum than the partially breastfeeding moms, and a greater number of breastfeeding issues were addressed over text message than the moms who were mix feeding. These findings underscore the importance of having adequate PC and IBCLC coverage when text messaging is used. These process findings validate the use of the SMS messaging as a tool to augment and reinforce the peer counseling process because they demonstrate that it is possible to successfully address breastfeeding issues over text message between a mom and her peer counselor.

Lori Goeschel -Lessons learned: We'll now turn to give our perspective on our lessons learned being on the front lines of the study. The one thing about Mobile Commons that is so critical is that we have the ability to watch and monitor the text exchanges. When peer counselors use their own phone, you have no control over what's being said. You have no way really of tracking those conversations. So this is an area where you could if you wanted to cut and paste and put it into your WIC MIS system if you really wanted to and I think there's a need for that. But the oversight of the two-way texting is critical.

The relationship between the peer and the lactation consultant was very different and became very intimate. The texting is definitely the preferred way of communication

As we said earlier it was a very efficient way to find out the baby's delivery date. For those in the clinic it's very hard to find out quickly when babies are born, and of course we need to know when they're discharged because that's when issues arise. So we want to know right away when babies are born so that peer counselors can give as much support as possible.

Then there were a lot of teachable moments for the lactation consultant. It also helped seeing the common themes commonly expressed across messages- we could then talk to our WIC nutritionists and let them know about frequent text message issues. They could focus counseling more around these topics.

Another benefit was that any time moms had a question they could text us. They knew that if they sent that message at 3 a.m., they might have to wait, but at least it was off their mind and they knew that they were going to get a response to that eventually. And many moms wouldn't answer the phone, but within minutes to hours they would probably respond to a text. Then the awesome part was that pictures could be sent.

Even though a lot of the automated text that went out and had moms answer a question, moms could ask their own questions.

The biggest concern was staff coverage. We also need a way to go into the Mobile Commons platform to prevent text messages from going to a mom with a loss. Another potential problem could be a lack of bilingual staff to respond to Mobile Commons messages.

Given the benefits of breastfeeding, the cost of formula and specialty formulas and the emphasis on breastfeeding, mom need more help. WIC moms do text, it's something they can use to reach out a little bit more. So this is powerful.

Questions

One question had to do with WIC's involvement in the development of the messages. The Connecticut WIC program was very strongly involved with the development of the messages since the pilot study. They were part of the advisory group. The peer counselors were also asked to provide feedback. And yes, the IOM report on the loving support campaign was taken into account when developing those messages. In fact, the IOM report was a great inspiration for LATCH. There was a lot of input from the WIC program in the development of the messages

One concern was the referral mechanism between the peer counselor and IBCLC for problems. In the study, each of the sites had both the peer counselor and the IBCLC component. An IBCLC at one of the sites monitored the text messages and the exchanges back and forth. The peer counselors throughout the State of Connecticut are all trained with the Loving Support module and they all know when they need to yield and those are all instances where yielding would take place. So if a IBCLC was not seeing those immediate text messages, then the peer would alert the IBCLC so she could get involved either via text to find out when a good time to call would be or there would be more probing by the IBCLC through the Mobile Commons platform or we would have the mom come into the office. Those are huge issues and that's why this model has to work with an IBCLC and a peer counselor.

Another participant wondered if a new post-partum mom is interested in texting at that time. In the focus groups the moms requested to receive text messages frequently.

ONLINE NUTRITION EDUCATION: WIC IN THE 21ST CENTURY

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Dr. Shannon Whaley - Background: Access to the Internet is rapidly expanding. Many WIC clients have access primarily through their cellphones. Studies have shown that using technology for health behavior change has resulted in improvements in a number of behaviors. The question we sought to address in our study was how can technology be applied effectively in the WIC setting?

Two online classes were developed: one on breakfast and one on salt. The comparison would be the modality of education: group nutrition education or online. Before using online programs for all, it was important to know that it works. The PHFE WIC program is in L.A. County and serves 250,000 participants a month—one quarter of California's WIC population. At PHFE, nutrition education is in a number of formats. There is the one-on-one counseling that is universal across the country. Group nutrition education is offered all day long at all of 54 sites.

There is no California state-wide online nutrition education program. Although a number of other online platforms were providing WIC nutrition education online, there were challenges with these because clients were required to print out a certificate to bring in to their local WIC office in order for the class to count as a nutrition education contact. An in-house online education system was started in 2011 by PHFE WIC; it provides education in both English and Spanish. Clients enter their WIC ID to automatically confirm they completed the lesson. A few previous studies have shown that the online education with WIC participants was associated with behavior change, but prior studies did not randomly assign participants to groups and therefore findings could be biased. This grant enabled an evaluation of the efficacy of the online interventions using a randomized design comparing participants taking a group in-person class with those completing the class online on their own.

The first trial focused on eating breakfast every morning and easy breakfast meals with WIC foods. This class on breakfast is given to all our participants who are not prenatal. This study focused on post-partum women and women with children. The way PHFE WIC develops classes is to survey participants every one to two years about what topics they want to learn about from WIC. Once topics are selected, a literature search is conducted to inform the development of the classes, which are then pilot-tested in English and Spanish. Before the class is finalized, further editing and a pilot test is done. With 54 sites, there is a lot of training to do to teach each class to all the front-line staff.

The online platform has a very simple interface. There is text, but it is limited and very readable so that it works on a dial-up connection. Each class also has some interactive parts, so clients are clicking and answering questions. The group classes are also very interactive, with parents talking, sharing stories, sharing ideas.

The “Where’s the Salt” class is the newer class that emerged with the current focus on problems with sodium consumption, particularly of processed foods. In the in-person class, there are foods, like chips, soup, and ramen noodles passed around so that everyone can practice reading the sodium content on the nutrition labels. There is a true/false quiz about salt. A handout asked clients to set a goal to limit sodium or read the labels, eat home-cooked foods, cook with spices and herbs instead, limit high-sodium condiments and sauces, and choose fresh fruits and vegetables. The online class has the same curriculum and clients had to click through screens to get credit for taking the class.

Both the group class and the online class were 20 minutes long, consistent with real practice in WIC. This study is designed about real-world WIC in mind, and not an attempt to evaluate something additional to WIC. This was important to determine what would be generalizable to WIC, based on this study.

Dr. Lorrene Ritchie - Design: The objectives of our study were to examine the impacts of both online and in-person group nutrition education, as delivered in WIC, on several outcomes. Breakfast eating and sodium reduction behaviors, knowledge, and self-efficacy were assessed. Both trials were conducted in 2014. Participant satisfaction with the nutrition education was also assessed. The salt trial was conducted in three WIC clinics; 666 women out of a potential 1,440 were recruited. Of interest, about 90 were excluded because they did not have Internet access. Most of the women at the WIC clinics had Internet access, which included access through mobile devices, such as tablets or phones.

The 666 were randomly assigned to receive the online education or the in-person group education. There was a two to four-month follow up in both the breakfast and salt trials, and also a nine-month follow up in the salt trial. About 257 were retained per group, out of the roughly 300 per group, which equates to about an 80 percent retention rate. Participants completed questionnaires before they took the class, and those were administered either online, if they were in the online group, or by paper and pencil if they were in the group class. Questions were also completed after the class, and then identical questions two to four months and nine months follow up. T tests were used to compare changes within and between in-person and online groups. GEE models assessed differences in changes between groups.

For the satisfaction results for both trials combined, the participants completed the same questions. Regardless of the mode of delivery, whether it was in person or online, 90 percent or more of participants were highly satisfied with the class. They had very positive things to say. What was really different – which has practical importance – is their preference for the next class. After the class, we asked, “What would your preference be for the future?” For the in-person group, about half said, “I’d like to keep having in-person classes,” and the other half said, “I’d like to try online.” Only about 20 percent of our sample had tried online before. PHFE WIC has used online for several years now, but not everybody has received information in that way. Most people were fairly new to online. But this suggests that when you expose folks to just a single, in most cases, online class, their preference for online was significantly higher. It might be the convenience and accessibility since they do not have to bring their kids in to the WIC

clinic and they do not have to schedule an appointment at a certain time. They can complete the nutrition education when they are ready to learn.

The Spanish speakers tended to be a little bit more satisfied with everything, regardless of the mode of delivery. The English speakers were the ones that were more satisfied about online than the Spanish speakers at the start, before taking the online class. But after they had been exposed to online nutrition education, these differences went away.

Some participants had issues with getting online. A short video was developed showing how to get into the PHFE WIC online system and class.

Dr. Lauren Au – Trial Results: For the breakfast class, there were demographic differences between the study groups at baseline. The questionnaires were completed at baseline, immediately following the class, and at follow-up. There were socioeconomic differences in education, relation to child, language, time to follow-up, and previous exposure to online class at follow-up which were controlled as covariates in the analysis.

For the breakfast class, participants were asked about how much sugar can WIC cereals have per serving. There were significant increases in knowledge, and most of that knowledge was retained. However, there were some differences by group. From baseline to post-test, the in-person group had a greater increase because they started at a lower knowledge level, and then from post-test to follow up, online retained that information a little bit more. But the overall take-away is that they retained the knowledge in both groups.

Participants were also asked about how many ounces of juice WIC recommends per day for kids. Again there were no significant differences between the groups; there was a significant increase in knowledge in both groups, and it was very comparable. For reasons for skipping breakfast in the past 30 days for the online group, there was a large decrease in reports of experiencing these barriers for eating breakfast, but no differences between groups. There were no differences in self-efficacy between groups.

For the parents in the online group, there was a significant increase in eating breakfast, and a significant difference between groups. In the online group, there was an increase in their children eating something for breakfast.

In summary, in the breakfast trial, online education was as effective as in person group education, suggesting that online can be used as a supplement to in-person education. Knowledge, attitudes, and behaviors were maintained two to four months later, and English and Spanish speakers chose how to receive their education differently.

For the salt trial, there were some demographic differences in participants, controlled for in our analysis. For salt, there were no differences between groups on the knowledge question about whether processed foods were the main source of dietary salt; the percent of respondents who selected the correct answer increased in both groups. There was also a significant increase in the correct response directly after the class for the amount of sodium adults should consume in a day, but this gain in knowledge diminished by 2-4 or 9-months follow-up.

There were strong significant improvements in sodium dietary behaviors within both groups. In the online group, there was a decrease in eating fast food, and some specific foods that were decreased within groups. But again, there were very few differences between groups. There were significant improvements within groups, in both in person and online, they were equally effective. Salt knowledge and behaviors improved and maintained two to four months later.

In summary, the in-person and online modalities were both effective in increasing knowledge, reducing sodium intake, and improving other salt-related behaviors at the 9-month follow up. This also further supports the potential usefulness of multiple modalities in WIC.

One of the strengths of the study was that this was conducted in a real world setting. This was a randomized intervention. However, the results may not be as generalizable to other areas in the U.S.

Martha Meza - Working with WIC: There were some challenges to research in the WIC settings. WIC staff is not very experienced with research. Staff is more focused on actually working with the participants to complete all the necessary WIC activities. So conducting research and collecting data may be hard for the staff. It was necessary to work with them to understand the time frame and steps. Good constant communication with the WIC staff is very important. It is important that all staff understand the ‘what and why’ of the research activities. What would be really helpful is if a staff person could be employed to be the lead within the WIC setting, because this person can also follow through to make sure that things are not missed.

For example, there was a lot of paperwork to complete, getting the surveys done, mailing out reminder postcards, and encouraging WIC staff. It is important to understand what the client has going on with them and whether they have the time to participate. Just a little thing like talking to them can make it be a really successful project. Once they are able to understand the study, all the participants said, “I want to do it online now. It’s so much easier.” A step-by-step video on how to go online was created and almost all of them were able to go in successfully and take the online class.

The best part was talking to the participants because they all have a lot to share. They are so eager to know that WIC cares. These were some of the quotes that we got back from the participants: *“I learned that salt is not just in the salt that I add to my food, but it’s also in the hidden processed foods”, “I went home and I cleared out everything from my cabinets that was processed high-salt foods”, and “My whole family is now eating healthier thanks to WIC and the information that we received every month.”*

Participants really appreciate that we care about their opinion and their comments, that it’s important to us, that we care. The WIC staff have the power and ability to be able to connect with all these participants and be able to make successful changes in anything that has to do with the children’s goal and children’s eating habits and making lifestyle changes. Research in a WIC setting is widely accepted by the WIC staff and the participants.

Dr. Shannon Whaley - Conclusions: At the end of the day, more research is needed. For all the studies completed in the social science world to demonstrate that nutrition education makes an impact, it's a very high bar in the economics world. The fact that there are no studies showing the impact of WIC education compared to one who does get education is problematic. About a third of our participants are using online education, but online education needs to be available to 100 percent of our WIC participants.

Technology appears to have an impact on keeping our families in the program. This use of technology matters, and it is where WIC probably needs to go. We need group education because it is so much a part of what so many of our clients really do like and appreciate, that one on one, and group education and talking to other moms.

Questions from the audience:

A question was asked as to whether clients could just click through the online programs without reading. In this study, clients certainly could, but our data showed that did not happen. We have data on every participant and how long they were in the system. So we could not allow the class to count if they got through it in less than three minutes. We did not have to do that, but we do have checks in place for that. There were the interactions in between, so when the question was asked how much salt is recommended per day, participants would have to pick the answer before going on to the next screen. You could just randomly pick, but you would have to stop at some of the screens and do something before you could go on.

Another question was on whether there is any kind of feedback at that point for the online class. In our WIC program, if we are using any online education, when the mom comes in the staff pulls up the record and says, "I see you took online," what we've trained our staff to say "I see you took the baby behavior class. Tell me how you liked it, or what do you remember from it?" There's a dialogue that's encouraged by all staff when they come in. It's not just a click, oh you took it, here's your checks. It's really intended to have that dialogue.

CLOSING COMMENTS: USDA PERSPECTIVE

Dr. Karen Castellanos-Brown, FNS Project Officer, introduced the presenter of closing remarks, Dr. Kelley Scanlon. Dr. Scanlon is the new division director for the Special Nutrition Research and Analysis Division at the FNS. She was previously at the Centers for Disease Control, in the Division of Nutrition, Physical Activity and Obesity. During her 26 years there, she worked on a variety of nutrition topics, including breastfeeding, pediatric diet, and child feeding strategies. Her most recent work has focused on policy to support optimal infant and young child feeding practices. Dr. Scanlon has been a long time supporter of WIC.

In Dr. Scanlon's closing remarks, she noted that these four innovative feasibility projects are exciting because education is so important to compliment environment and policy changes. And education becomes a policy change, as it scales up to the larger scale. The world is changing, technologies are changing, and the way people access information is changing. Therefore, these technology-based interventions that compliment in person – education are very exciting to hear about. There was also great interest about the approach to educate clinicians so they can provide better education to parents. These approaches, when tested for feasibility, then have the potential to become policy and implemented as programs.

On behalf of the FNS, Dr. Scanlon thanked Dr. Karen Cullen, her team, and the USDA/ARS funded Children's Nutrition Research Center at Baylor College of Medicine for conducting the process to select and fund the research of the four grantees we heard from today. The cooperative agreement for the Center for WIC Nutrition Education Innovations is one of the first USDA FNS cooperative agreements where a university was awarded a grant to lead the sub grant selection and management process. When the FNS decided to fund this cooperative agreement to manage the sub grant process, it was difficult to predict the outcome. With the presentations today-- details of the successful projects, the methodology, and the findings -- this cooperative agreement between USDA and the Baylor school has been a success.

The four grantees also deserve thanks for their leadership and detail and outstanding work carrying out these projects and sharing their findings today.

FNS wants to encourage the continued dissemination of these findings. Of course, the ultimate goal that we all have is improving the health of mothers and children.