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## **Willow Comes to WIC: Participants' Perceptions of Effects on Fruit- and Vegetable-Related Attitudes and Behaviors**

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To the Graduate Council:

I am submitting herewith a thesis written by Sarah Elizabeth Lisson entitled "Willow Comes to WIC: Participants' Perceptions of Effects on Fruit- and Vegetable-Related Attitudes and Behaviors." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Nutrition.

Marsha Spence, Major Professor

We have read this thesis and recommend its acceptance:

Sarah Colby, Katie Kavanagh

Accepted for the Council:

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Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

**Willow Comes to WIC: Participants' Perceptions of Effects on Fruit- and Vegetable-  
Related Attitudes and Behaviors**

A Thesis Presented for the  
Master of Science  
Degree  
The University of Tennessee, Knoxville

Sarah Elizabeth Lisson

May 2019

## Dedication

To my parents, Robert and Lisa Lisson, who noticed my interest in food and nutrition at an early age and encouraged me to run with it. Great things happen when parents allow children to play with their food.

## Acknowledgements

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## Abstract

**Objective:** To examine perceived effects of the Willow Comes to WIC program on participants' fruit- and vegetable-related behaviors and attitudes.

**Design:** Cross-sectional study using focus groups.

**Setting:** 8 WIC sites in 7 states (KS, OR, NJ, WI, GA, IN, NV).

**Participants:** Adult participants (n=62) in Willow Comes to WIC.

**Phenomenon of interest:** Fruit- and vegetable-related behaviors and attitudes (intake, willingness to try, use of cash-value fruit and vegetable vouchers)

**Analysis:** Transcripts were analyzed using content analysis methodology to identify major themes.

**Results:** Many participants reported increased fruit and vegetable intake and/or willingness to try for themselves and/or their children. Several also reported involving children in grocery shopping and meal preparation. Children's pickiness was reported as a barrier to increasing fruit and vegetable intake. Favorite aspects of Willow Comes to WIC included the Willow puppet and the use of a magnifying glass to examine fruits and vegetables.

**Conclusions and implications:** Participation in Willow Comes to WIC resulted in positive outcomes for many participants that were consistent with existing literature. Opportunities for future research include adapting program recipes for time and simplicity, improving fidelity and consistency among future focus groups, and focusing on program impacts among participants who attended multiple sessions.

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## Chapter 1: Review of the Literature

### **WIC eligibility and participation**

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) was permanently established as a federal food assistance program in 1974.<sup>1,2</sup> Administered by the United States Department of Agriculture's Food and Nutrition Service (USDA FNS), WIC provides grants to all 50 states, Washington, D. C., 5 territories, and 34 Indian tribal organizations to improve the health of eligible women, infants and children by providing supplemental food, health care referrals, breastfeeding support, and nutrition education.<sup>1-3</sup> To qualify for WIC services, a woman must be pregnant, postpartum (up to 6 months after delivery), or breastfeeding (up to 1 year after delivery); have income at or below 185% of the federal poverty line; and be classified as "at nutritional risk".<sup>1-3</sup> Eligible infants and children may receive services until their fifth birthday.<sup>1,3</sup>

In 2014, more than 9.3 million individuals participated in WIC.<sup>2</sup> Over half of these participants (53.3%) were children, while 23.0% were infants and the remaining 23.6% were women (9.6% pregnant, 7.4% breastfeeding, 6.6% postpartum).<sup>2</sup> Among the women, 86.0% were between 18 and 34 years of age and the majority enrolled during the first (54.5%) or second trimesters (36.0%) of their pregnancies.<sup>2</sup> Nearly all infants (91.4%) were certified to receive WIC benefits during their first 3 months of life, but participation decreased with age.<sup>2</sup> More than one-third (36.7%) of children were 1 year of age, while only 14.2% were 4 years of age.<sup>2</sup> The most commonly reported races were White (58.7%), Black (20.3%), and American Indian or Alaska Native (11.1%).<sup>2</sup> Hispanic or Latino ethnicity was reported by 41.6% of participants.<sup>2</sup>

The largest percentage of WIC participants (74.2%) reported an income level below 100% of the federal poverty line, compared to 14.5% of the general population.<sup>2</sup> The lowest average annual household incomes were reported among postpartum mothers (\$12,966) and

Black households (\$13,337), while Asian households reported the highest average annual income (\$20,985).<sup>2</sup> For all WIC participants, the average annual household income was \$16,800.<sup>2</sup>

According to the 2015-2020 Dietary Guidelines for Americans (DGA), children over the age of two years should consume at least 1 to 2.5 cup equivalents of vegetables and at least 1 to 2 cups of fruits per day, while women of childbearing age should aim for 2.5 to 3 cup equivalents of vegetables and 1.5 to 2 cup equivalents of fruits per day.<sup>4</sup> Fruits and vegetables provide essential micronutrients, including vitamins and minerals, the recommendations for which follow the appropriate Dietary Reference Intakes (DRI) for adults and are extrapolated from these values for infants and children.<sup>5</sup> Current priority micronutrients for which deficiencies are common among the WIC population include calcium, iron, zinc, folate, vitamin D, potassium, and choline. Additionally, it is recommended that sodium intake be limited.<sup>6</sup> The DRI values for these priority micronutrients are shown in Table 1 (blank boxes indicate that a micronutrient is not a priority for the subgroup).<sup>6</sup>

**Table 1. DRI values for priority micronutrients for WIC participants by life stage<sup>6</sup>**

<b>Life Stage</b>	<b>Calcium (mg)</b>	<b>Iron (mg)</b>	<b>Zinc (mg)</b>	<b>Folate (μ)</b>	<b>Vitamin D (IU)</b>	<b>Potassium (mg)</b>	<b>Choline (mg)</b>	<b>Sodium (mg)</b>
Infant, >6 to <12 months		6.9	2.5					
Child, >1 to <5 years	3000-3800							<1500-1900
Pregnancy	800	22	9.5	520	400	4700	450	<2300
Lactation	800		10.4	450	400	5100		<2300
Postpartum	800	8.1	6.8	520	400	4700		<2300

Unfortunately, many women and children enrolled in WIC fail to meet dietary guidelines, including the recommendations for fruits, vegetables, and multiple micronutrients.<sup>6,7</sup> In 2014, more than half (54.0%) of WIC participants had more than one nutritional risk, with women being more likely than infants and children to have multiple risks.<sup>2</sup> Breastfeeding women were the most likely subgroup to have three or more risks (55.7%), as well as the least likely to have only one risk (17.5%).<sup>2</sup> One of the most commonly reported risks for all participant groups was high weight-for-height/length, which is used as an indicator of whether a participant is currently or is at risk of becoming overweight or obese.<sup>2</sup> In 2014, 55.3% of women, 12.9% of infants, and 32.1% of children had high weight-for-height/length.<sup>2</sup> Additionally, 53.9% of all participants had at least one dietary risk, such as “failure to meet [DGA]” or “inappropriate nutrition practices,” indicating nutritional inadequacy of a participant’s diet.<sup>2</sup> Children were the most likely subgroup to have a dietary risk (73.2%).<sup>2</sup>

### **Supplemental food packages**

WIC participants receive monthly packages of supplemental foods designed to improve their nutritional status and decrease their nutritional risk.<sup>1-3</sup> Participants may select from a variety of WIC-authorized foods and beverages, such as fruits and vegetables, juices, peanut butter, milk, yogurt, beans, and whole-grain products. Women who do not exclusively breastfeed their infants may also purchase iron-fortified infant formula using WIC benefits.<sup>3</sup> To increase access to and purchases of fresh fruits and vegetables, additional coupons from the WIC Farmers’ Market Nutrition Program can be used to purchase produce at participating farmers’ markets.<sup>1</sup> Currently, participants can purchase monthly allotments of WIC-authorized foods using either paper vouchers or electronic benefits transfer (EBT) cards depending on the state in which they

live. By October 1, 2020, all states and territories will exclusively use EBT cards for the transfer of WIC benefits.<sup>3</sup>

In 2009, WIC revised their policy governing the items included in the supplemental food packages.<sup>8</sup> The revised policy includes provisions allowing participants to purchase a greater quantity and variety of fruits and vegetables with their monthly benefits.<sup>8</sup> Prior to the revision, breastfeeding women received fruit and vegetable cash-value vouchers that were greater in value than those provided to pregnant and postpartum women, and children received even less.<sup>8</sup> Since the revision, all women now receive \$10 worth of cash-value vouchers for fruits and vegetables each month, and the value of vouchers provided for children has been increased from \$6 to \$8.<sup>8</sup> The revised policy also clarifies which fruits and vegetables are WIC-eligible, including frozen and canned products without added fats, oils, sodium, or sugars, and authorizes states to allow farmers' market vendors to accept cash-value vouchers.<sup>8</sup>

### **Cultural appropriateness of WIC-eligible foods**

WIC serves individuals from a variety of cultural backgrounds, and fruit and vegetable intake varies by culture. A study by Di Noia and colleagues examined differences in fruit and vegetable consumption among a predominantly Hispanic sample of women participating in WIC in a densely-populated urban area.<sup>9</sup> Demographic information, including race/ethnicity, nativity, and language preference, was collected from participants using verbally-administered questionnaires.<sup>9</sup> Fruit and vegetable intake were measured using data from the 2013 Behavioral Risk Factor Surveillance System (BRFSS). Fruits and vegetables were categorized as 100% fruit juice, fruit, cooked or canned beans, dark green vegetables, orange-colored vegetables, or other vegetables, and intake was reported as the number of times per day, week, or month each food was consumed.<sup>9</sup> Of the 723 WIC participants in the sample, 60% were Hispanic, 31% were non-

Hispanic black, and 9% were non-Hispanic white or other. Among Hispanic participants, 56% were foreign-born, and 78% of this subsample reported Spanish as their preferred language.<sup>9</sup> Statistical analyses showed that Hispanic participants consumed cooked or canned beans significantly more frequently than non-Hispanic black (adjusted mean difference, 0.16; 95% CI, 0.09-0.23; Cohen  $d=0.45$ ;  $P<.001$ ) and non-Hispanic white or other participants (adjusted mean difference, 0.18; 95% CI, 0.06-0.29; Cohen  $d=0.51$ ;  $P=.001$ ), and they also consumed orange-colored vegetables significantly more frequently than non-Hispanic black participants (adjusted mean difference, 0.14; 95% CI, 0.07-0.21; Cohen  $d=0.41$ ;  $P<.001$ ).<sup>9</sup> Meanwhile, non-Hispanic white and other participants consumed “other” vegetables (not dark green or orange-colored) more frequently than non-Hispanic black (adjusted mean difference, 0.16; 95% CI, 0.02-0.30; Cohen  $d=0.51$ ;  $P=.01$ ) and Hispanic participants (adjusted mean difference, 0.16; 95% CI, -0.29 to -0.03; Cohen  $d=0.41$ ;  $P=.008$ ).<sup>9</sup> Additional differences were observed among the subsample of Hispanic participants, including greater intake of orange-colored vegetables among foreign-born Hispanic participants than those born in the US (adjusted mean difference, 0.11; 95% CI, -0.20 to -0.02; Cohen  $d=0.31$ ;  $P=.02$ ).<sup>9</sup> The findings from this study highlight the differences in patterns of fruit and vegetable consumption among WIC participants of different cultural backgrounds and emphasize the need not only for culturally appropriate WIC-eligible fruit and vegetable options, but also for policies and nutrition education interventions.<sup>9</sup>

In an attempt to increase fruit and vegetable consumption among WIC participants from different cultures, a number of provisions were made in the revised policy to expand the variety of WIC-eligible fruits and vegetables. Under the revised policy, participants receiving cash-value fruit and vegetable vouchers may redeem them for any eligible fruits and vegetables.<sup>8</sup> State WIC agencies do not have the authority to select which varieties of eligible fruits and vegetables are

made available to participants, but they may establish their own eligibility criteria building upon those set at the federal level. For example, if dried fruit is offered, the state WIC agency cannot restrict availability to a single variety of dried fruit, but they can choose to restrict the package size that can be purchased using fruit and vegetable vouchers.<sup>8</sup>

Cultural appropriateness of WIC-eligible foods was further addressed in the revised policy through provisions offering state agencies and recipients increased flexibility by allowing for culturally appropriate substitutions for WIC-approved foods.<sup>8</sup> Under the revised policy, the number and variety of culturally appropriate food substitutions have increased. These substitutions are made on an individual basis according to participants' needs, and state WIC agencies may also submit proposals to the USDA FNS for additional substitutions to accommodate cultural eating patterns.<sup>8</sup> Substitutions should ideally be at least nutritionally equivalent, if not nutritionally superior, to the foods they replace. For example, soy and lactose-free or lactose-reduced fortified dairy products may be substituted for cow's milk products for participants whose cultural eating patterns exclude dairy.<sup>8</sup>

### **Fruit and vegetable intake among WIC participants prior to the food package revision**

Studies of the dietary intake of WIC participants prior to the revision showed that fruit and vegetable intake among this population was low. A cross-sectional study of mother-child dyads conducted in the two months prior to the revision was conducted with the purposes of assessing dietary differences between Hispanic and Black participants and assessing WIC participants' pre-revision dietary intake.<sup>7</sup> Trained staff collected sociodemographic and dietary intake data from participants, using Marín and Marín's Short Acculturation Scale to measure acculturation and multiple-pass 24-hour recalls to assess dietary intake. Children whose mothers were not with them at mealtime and/or could not recall one or more of their child's meals were

excluded from analyses, as were mothers who reported implausible energy intake values, leaving an analytical sample of 331 children and 352 mothers.<sup>7</sup> With regard to fruit intake, mothers consumed less than the recommended daily servings (median=1.29 servings/day), and only 40.0% of Hispanic mothers and 23.6% of Black mothers met the recommendation. Fruit intake was higher among children, with average daily consumption greater than the recommendation (median= 1.5 servings/day) and 66.3% of Hispanic children and 50.9% meeting the recommendation.<sup>7</sup> Vegetable intake was lower than fruit intake among both mothers and children, with daily intake averaging less than one serving among both groups (median=0.99 and 0.40 servings/day, respectively). Only 22.4% and 28.1% of Hispanic mothers and children and 13.7% and 15.2% of Black mothers and children consumed the recommended daily servings of vegetables.<sup>7</sup>

A variety of factors may have affected WIC participants' fruit and vegetable intake prior to the revision. In a 1998 study, Havas and colleagues delved into the potential for sociodemographic and psychosocial factors to predict fruit and vegetable intake among women participating in WIC.<sup>10</sup> After participating in an educational program designed to increase fruit and vegetable consumption, a sample of 3,122 women agreed to complete written questionnaires consisting of items related to sociodemographic characteristics, self-efficacy for fruit and vegetable behaviors, perceived barriers to fruit and vegetable intake, attitudes toward fruits and vegetables, social support, responsibility for food purchasing and preparation, and fruit and vegetable knowledge and consumption.<sup>10</sup> Regression analyses revealed variations in fruit and vegetable intake across several sociodemographic variables, including race (0.47 servings/day more among black participants compared to white participants), pregnancy (0.30 servings/day more), and breastfeeding (0.60 servings/day more).<sup>10</sup> Higher fruit and vegetable intake was also

associated with multiple psychosocial variables, including correct knowledge of recommendations (0.87 servings/day more), greater self-efficacy (1.1 servings/day more per SD above mean standardized score), more positive attitudes (0.73 servings/day more per SD above mean standardized score), and fewer perceived barriers (0.87 servings/day less per SD above mean standardized score among participants with more perceived barriers).<sup>10</sup>

Nearly a decade later, Kropf and colleagues also examined psychosocial factors related to diet quality, this time with the purpose of identifying differences between participants enrolled in the WIC Farmers' Market Nutrition Program (FMNP) or in WIC only.<sup>11</sup> A total of 235 women (FMNP, n=65; WIC only, n=170) representing WIC-participating households completed paper surveys consisting of validated survey tools to measure household food security, psychosocial indicators of fruit and vegetable intake, food behaviors, perceived health, and social capital. FMNP participants also received questions about their experiences with the program.<sup>11</sup> Statistical analyses showed that while daily fruit servings did not differ between the two groups of participants (FMNP, 1.69±0.97; WIC only, 1.64±1.21; P=0.769), daily vegetable servings were significantly greater among FMNP participants compared to WIC-only participants (FMNP, 2.23±1.18; WIC only, 1.91±0.98; P=0.040).<sup>11</sup> Furthermore, scores for perceived benefit of fruit and vegetable intake were significantly higher among FMNP participants ( $\chi^2=10.238$ , P=0.017), as did stages of change regarding fruit ( $\chi^2=12.171$ , P=0.007) and vegetable intake ( $\chi^2=4.574$ , P=0.032), with more FMNP participants actively trying to increase intake compared to WIC-only participants.<sup>11</sup> Additionally, though a negative association between food insecurity and perceived diet quality was observed across both groups of participants ( $r=-0.248$ , P<0.001), perceived diet quality was higher among FMNP participants ( $\chi^2=7.219$ , P=0.027).<sup>11</sup> Though FMNP benefits are not substantial, the findings from this study suggest that FMNP participation may encourage fruit

and vegetable intake by increasing participants' awareness of and access to fresh produce, which is not included in standard WIC food packages.<sup>1,11</sup> These findings, as well as the findings from Havas and colleagues, also highlight the importance of providing nutrition education and counseling that address both knowledge and psychosocial factors, as well as interventions that address sociodemographic factors such as food insecurity that affect access to fruits and vegetables.<sup>10,11</sup>

### **Impacts of WIC food package revision on fruit and vegetable intake**

Several studies have examined the impact of the food package revision on fruit and vegetable consumption among WIC participants, including a 2013 cross-sectional study by Chiasson et al.<sup>12</sup> More than 3.5 million records, representing approximately 500,000 infants and children enrolled in the New York State WIC program before and after the revision, were analyzed to identify trends in infant feeding practices, food group consumption (fruits, vegetables, whole grains, milk), screen time, and child obesity. Demographic and anthropometric data were obtained from a statewide WIC database, and behavioral data was collected through parent/caregiver interviews conducted during certification and mid-certification appointments. The average interval between visits was six months, and data was analyzed at seven intervals from July-December 2008 to July-December 2011.<sup>12</sup> Among the study population, which was more than 70% non-white at all intervals, the overall proportions of children 1-4 years of age for whom daily fruit and vegetable consumption increased by averages of 5.3% and 3.5%, respectively, after the revision was implemented.<sup>12</sup> However, there was variation in the proportions of daily fruit and vegetable consumption among racial and ethnic subgroups.<sup>12</sup> White children reported the highest proportions of daily fruit (93.8%) and vegetable consumption (87.4%), while Black children reported the lowest daily fruit consumption (89.1%) and Hispanic

children reported the lowest daily vegetable consumption (76.1%).<sup>12</sup> Also noteworthy were the decreases the proportions of children classified as overweight or obese.<sup>12</sup> As was the case with daily fruit and vegetable consumption, the proportions of children who were overweight or obese varied by race and ethnicity.<sup>12</sup> The greatest prevalence of obesity and smallest relative percent decline were observed among Hispanic children.<sup>12</sup> Despite the demonstrated improvements in children's dietary quality and weight status, the results of this study showed that nearly 10% of children participating in WIC were not consuming fruit on a daily basis, and nearly 20% were not consuming vegetables, highlighting the need for continued nutrition education and promotion along with the increases in fruit and vegetable availability and cash-value vouchers.<sup>12</sup>

A more recent study measured changes in diet quality after the revision among children enrolled and not enrolled WIC using the Healthy Eating Index (HEI)-2010, which measured the degree to which an individual conformed to the 2010 DGA.<sup>13</sup> The authors predicted improvements in overall diet quality post-revision and, with regard to fruit and vegetable consumption, that improvements would be observed in the "Whole Fruit" and "Greens and Beans" components of the HEI-2010 after the revision.<sup>13</sup> Study participants were selected from four cycles of the National Health and Nutrition Examination Survey (NHANES): three cycles completed prior to the revision (2003-2004, 2005-2006, 2007-2008), and one cycle completed after the revision (2011-2012). The final sample used for analysis included 1197 children aged 2-4 years from households at or below 185% of the federal poverty line.<sup>13</sup> Dietary intake was measured using the average of two 24-hour dietary recalls, one in-person and one via telephone, conducted on behalf of each child by adults familiar with their dietary intake. The recall data were used to determine each child's component scores for the 12 categories comprising the HEI-2010, which were then summed to provide a total score out of 100 points.<sup>13</sup>

Both the WIC (n=719) and non-WIC samples (n=498) had high proportions of minority participants, the WIC sample had a much lower proportion of participants identifying as non-Hispanic white compared to the non-WIC sample (30.4% vs. 51.3%). WIC participants were also significantly more likely to be Hispanic, to have less educated caregivers, and to come from impoverished households.<sup>13</sup> Mean overall HEI-2010 scores were higher among WIC participants than nonparticipants before (52.4 vs. 50.0) and after the food package revision (58.3 vs. 52.4).<sup>13</sup> Regarding fruit and vegetable consumption, ratios of relative changes between both samples showed greater changes in “Whole Fruit” (1.1 [95% CI, 0.8-1.4]) and “Total Vegetables” consumption (1.1 [95% CI, 0.9-1.3]) among WIC participants than nonparticipants.<sup>13</sup> The most significant ratio of changes was seen for the “Greens and Beans” component, in which the change among WIC participants was 3.4 times greater than that observed among nonparticipants (95% CI, 1.3-9.4).<sup>13</sup> It should be noted that WIC participants also displayed a positive change for this component, whereas a decrease in consumption was observed among nonparticipants.<sup>13</sup> Overall, the results of this study provide promising evidence that the revision has resulted in improved dietary quality, including increased fruit and vegetable consumption, among children participating in WIC, despite the fact that not all improvements in consumption were significant compared to the changes in nonparticipants’ consumption.<sup>13</sup>

Other studies have provided evidence of improved fruit and vegetable consumption specifically among Hispanic and Black participants following the revision. One such study examined differences in home food availability and dietary intake among 273 Hispanic and Black mother-child dyads in the six months following the revision.<sup>14</sup> Trained interviewers conducted 24-hour dietary recalls with mothers/guardians during baseline and six-month follow-up visits. Consumption within specific food categories, including fruit and vegetable, was

calculated using the Nutrition Data System for Research (NDS-R), Version 2009. The fruit category excluded juices, avocado, fried fruits, and fruit-based savory snacks, and the vegetable category included all vegetable subcategories plus avocado, fried potatoes and other vegetables, and vegetable juice.<sup>14</sup> Additionally, each participant completed a sociodemographic questionnaire, which included information about WIC participation in their household, and participants identifying as Hispanic/Latina completed an additional questionnaire to measure acculturation.<sup>14</sup> Children's height and weight were measured at both baseline and follow-up, and their mother's/guardian's height and weight were measured on one of these occasions.<sup>14</sup> A shortened version of the U.S. Household Food Security Survey Module was used to categorize food security.<sup>14</sup> Statistical analyses showed that while recommendations for fruit and vegetable intake were not met by any of the subgroups within the sample, fruit intake significantly increased among Hispanic mothers, and Hispanic children came very close to meeting recommendations for daily fruit intake (1.9 servings/day).<sup>14</sup> A modest but significant increase in fruit consumption was observed among Hispanic mothers (+0.33 servings/day,  $p=.04$ ), and fruit juice consumption also decreased among this subgroup (-0.45 servings/day,  $p=.02$ ).<sup>14</sup> Overall, increases in home food availability did not correlate with increases in fruit and vegetable consumption. Black mothers reported a significant increase in the availability of vegetables in their homes, which had a significant positive correlation with their vegetable consumption ( $r_s=0.22$ ,  $p=.04$ ); however, no correlation was observed among their children or among Hispanic mothers and children.<sup>14</sup> Additionally, a weak positive correlation was observed between fruit juice availability and consumption among Hispanic children ( $r_s=0.18$ ,  $p=.05$ ), but no such correlation was observed among Hispanic mothers or Black children or mothers.<sup>14</sup>

The authors also examined the long-term effects of the revision on fruit and vegetable consumption in another study that compared dietary intake immediately before and 18 months after the revision.<sup>15</sup> Many of the same participants from the prior study participated in this study, but some were excluded from analysis due to missing, incomplete, or implausible diet history data, leaving an analytical sample of 209 mothers and 164 children.<sup>9</sup> Small changes were observed in fruit and vegetable intake among Hispanic and Black mothers and children (all increases, with the exception of vegetable intake among Hispanic mothers), expressed as the percentage of participants consuming >0 servings/day, but these changes were not statistically significant.<sup>15</sup> Fruit intake increased 1% and 8% among Hispanic mothers and children, respectively, and 10% and 8% among Black mothers. Vegetable consumption increased 5% among Hispanic children and 7% and 9% among Black mothers and children, respectively, and decreased 4% among Hispanic mothers.<sup>15</sup> The only significant change observed regarding fruit and vegetable intake was a decrease in fruit juice consumption among Hispanic mothers (55%-38%,  $p < .0001$ ).<sup>15</sup> The results of these studies suggest that the revision may have positively influenced fruit and vegetable consumption among some groups, particularly Hispanic mothers and children, but the changes reported were modest, potentially due to other factors such as previously high availability of fruits and vegetables in the home or the still-low value of the cash-value vouchers for fruits and vegetables.<sup>14,15</sup> Additionally, participants completed only one 24-hour recall at each data collection point, and children's meals consumed in childcare settings were not taken into account, so the diet history data may not have reflected typical dietary intake.<sup>14,15</sup>

Similar results were seen in an earlier study conducted in California with a primarily Hispanic sample.<sup>16</sup> Participants, which included pregnant and postpartum women and caregivers

of children participating in WIC, were randomly selected from all WIC participants in California to complete a survey about their intake of foods and beverages included in the revised food packages.<sup>16</sup> Sampling first took place in July 2009, prior to implementation of the revision, and again in January 2010, after the revision was implemented.<sup>16</sup> Surveys were administered over the telephone in both English and Spanish, and data collection continued until approximately 3000 surveys (n= 3004 pre, n=2996 post) were completed at each time point.<sup>16</sup> At both time points, approximately 80% of participants identified as Hispanic.<sup>16</sup> The proportion of respondents who reported that their families consumed more vegetables at the time of the survey than 6 months prior was significantly greater after the revision, with an increase of 7.2 percentage points from July to January ( $p<.001$ ).<sup>16</sup> Respondents also reported significant increases in frequency of fruit consumption after the revision ( $1.26\pm 1.52$  times/day to  $1.38\pm 1.82$  times/day  $p=.006$ ), as well as statistically insignificant increases in frequency of vegetable consumption ( $1.19\pm 1.38$  times/day to  $1.25\pm 1.65$  times/day,  $p=.12$ ).<sup>16</sup> These findings supported the hypothesis that providing WIC participants with revised food packages, including additional funds to purchase fruits and vegetables, would increase fruit and vegetable consumption and improve overall diet quality.<sup>16</sup>

### **Impacts of WIC food package revision on fruit and vegetable availability, accessibility, and price**

In addition to examining impacts on WIC participants' fruit and vegetable consumption, studies have also explored the impacts of the food package revision on the availability, accessibility, and prices of WIC-eligible foods. Zenk and colleagues conducted a quasi-experimental study of WIC-authorized vendors in seven Illinois counties to compare fruit and vegetable prices pre- and post-revision, hypothesizing that prices would decrease after the revision, especially in small and non-chain stores and in neighborhoods with lower income and

larger minority populations.<sup>17</sup> Price observations were conducted in retail locations over 3 years: 2008 (n=329), 2009 (n=346), and 2010 (n=364). The WIC Northern Illinois Vendor Project tool was used to record the prices of multiple varieties of fresh, frozen, and canned fruits and vegetables without added sugar or fat. Vendors were categorized by type using criteria such as name (pharmacy or non-pharmacy), size (based on number of cash registers), and chain affiliation.<sup>17</sup> Mixed model regressions revealed several different changes in fruit and vegetable prices before (2008-2009) and after the revision (2009-2010). Canned (p<.001) and frozen (p<.001) vegetable prices increased slightly before the revision and then decreased afterward.<sup>17</sup> Fresh vegetable prices decreased after the revision in chain supermarkets (p=.005), while canned fruit prices decreased in mass merchandise stores (e.g. supercenters) during the same period (p=.01).<sup>17</sup> Canned (p=.04) and frozen vegetable prices (p<.001) decreased in non-chain supermarkets, but price increases for fresh vegetables (p<.001) and frozen fruits (p=.006) were also observed in these stores.<sup>17</sup> Some of the largest price changes were observed among the smallest vendors, including stabilization of canned fruit prices after a pre-revision increase and a post-revision decrease in frozen vegetable prices.<sup>17</sup> Additionally, a modest price decrease for canned vegetables was observed in pharmacies after the revision (p<.001).<sup>17</sup>

Zenk and colleagues also examined variations in fruit and vegetable prices between vendor and neighborhood types. Mass merchandise stores were found to have lower prices for fresh (p<.001) and frozen vegetables (p<.001) and fresh (p=.03) and frozen fruits (p<.001) compared to chain supermarkets.<sup>17</sup> However, chain supermarkets had lower prices for canned fruit compared to non-chain supermarkets (p<.001); for canned vegetables (p<.001), canned fruit (p<.001), and frozen fruit compared to small stores (p<.001); and for canned vegetables compared to pharmacies (p<.001).<sup>17</sup> Fresh fruit (p<.001) and vegetable prices (p<.001) were

found to be significantly lower in neighborhoods with larger Hispanic populations.<sup>17</sup> Canned vegetable prices were higher in neighborhoods with larger Hispanic ( $p=.02$ ) and Black populations ( $p=.03$ ), as well as in neighborhoods with higher median income ( $p=.002$ ).<sup>17</sup> The results of this study highlight the need for nutrition professionals working low-income and high-minority communities to be aware of the price and availability of WIC-eligible food items, including fruits and vegetables in various forms, as well as the importance of increasing WIC participants' knowledge and skills related to purchasing fruits and vegetables.<sup>17</sup>

A later study conducted in Texas found that the revision had little impact on food prices and overall did not result in improved affordability of WIC-eligible foods. Using an adapted version of the Texas Nutrition Environment Assessment of Retail Food Stores (TxNEA-S) which included foods specific to Texas' large Hispanic and Black populations, Lu and colleagues audited 105 WIC-authorized stores immediately before and three years after the revision.<sup>18</sup> The prices of the least expensive items for each WIC-eligible food were recorded and compared using two-sided paired-sample t-tests. Among the findings, significant increases were observed in the prices of the least expensive fruits (8%,  $P<0.001$ ) and vegetables (9%,  $P<0.001$ ), consistent across all store sizes, types, and locations.<sup>18</sup> However, the authors also found that the availability and accessibility of fruits and vegetables increased as well after the revision. Regarding availability, increases were observed for both fruits and vegetables in shelf space (0.16% for fruits,  $P<0.001$ ; 0.10% for vegetables,  $P<0.01$ ) and varieties of fresh vegetables (0.07%,  $P<0.001$ ).<sup>18</sup> Most fruits and vegetables were not labeled as WIC-eligible prior to the revision, but labeling increased by 4% ( $P<0.05$ ) and 3% for fruits and vegetables, respectively, following the revision, thus increasing accessibility of fruits and vegetables to WIC participants.<sup>18</sup>

### **WIC-mandated nutrition education**

In addition to supplemental food packages, WIC participants receive mandatory nutrition education and counseling.<sup>1-3</sup> During each 3-month certification period, women and caregivers of participating children must be offered at least two opportunities to receive nutrition education, which may be delivered one-on-one, in group settings, or online.<sup>2</sup> The education is provided by a registered dietitian or trained nutrition educator and covers a variety of topics related to health and nutrition, including the importance of fruit and vegetable consumption.<sup>2,19</sup> Though curricula and methods of delivery may vary between regions and individual WIC agencies and clinics, evidence suggests that nutrition education has a positive impact on WIC participants' nutrition knowledge and diet quality.<sup>19,20</sup> A 1998 study by Rose and colleagues found that WIC participation was significantly associated with improvements in children's intake of 10 of 15 nutrients studied, including several vitamins and minerals.<sup>20</sup> The effect of WIC participation was found to be stronger than that of participation in the Food Stamp Program (currently the Supplemental Nutrition Assistance Program), particularly on intake levels of iron and zinc.<sup>20</sup> The authors speculated that WIC's integration of nutrition education could be a potential reason for this difference in effect size.<sup>20</sup>

In addition to increasing nutrient intake, nutrition education has been shown to increase consumption of specific food groups, including fruits and vegetables, among WIC participants.<sup>19</sup> Immediately prior to the implementation of the food package revision, all WIC programs in the state of California provided nutrition education using the *Healthy Habits Everyday* curriculum, a 6-month curriculum broken into 3 2-month blocks focusing on different foods included in the revised food packages.<sup>19</sup> The first block, "Get Healthy Now," focused on eating a variety of fruits and vegetables and increasing frequency of fruit and vegetable consumption.<sup>19</sup> Participants

were randomly sampled from all WIC participants in California, where a large proportion of WIC participants are Hispanic, and included pregnant and postpartum women and caregivers of children participating in WIC.<sup>19</sup> Surveys were administered in both English and Spanish before (n= 3015) and after (n= 3004) the curriculum was delivered to identify changes in participants' recognition of nutrition education messages, readiness to change behaviors related to nutrition, and consumption of foods included in the revised food packages.<sup>19</sup> Though no significant differences were identified in participants' frequency of fruit and vegetable consumption, frequency of fruit juice consumption did significantly decrease, and the proportion of participants reporting that their family had eaten more fruit over the past 6 months significantly increased.<sup>19</sup> Recognition of fruit- and vegetable-related messages increased significantly, as did the proportion of participants who reported hearing these messages from WIC.<sup>19</sup> Further, a positive shift was observed in participants' intentions toward fruit and vegetable consumption, with a greater proportion of participants intending to consume or already consuming more fruits and vegetables after receiving nutrition education.<sup>19</sup> As with other studies relying on participant-reported dietary intake data, it is possible that these reported improvements in consumption and intentions may have been affected by social desirability bias or recall bias; however, the results of this study show that nutrition education has the potential to significantly impact nutrition-related attitudes and behaviors, including those related to fruits and vegetables, among WIC participants.<sup>19</sup>

More recently, some state WIC agencies have redesigned the way they deliver nutrition education by shifting to a participant-centered education model.<sup>21,22</sup> Participant-centered education (PCE), sometimes called client-centered education or patient-centered counseling, emphasizes collaboration between educators and participants to elicit positive changes in health-

and nutrition-related behaviors.<sup>21,23</sup> While traditional nutrition education tends to focus on participants' shortfalls and negative behaviors, PCE focuses on participants' strengths and capabilities.<sup>21</sup> Table 2 describes the theories and models that provide the foundation of PCE.<sup>23</sup>

Deehy and colleagues developed a framework specifically for PCE within WIC. The framework is comprised of 7 domains: state agency responsibilities, service delivery environment, leadership and mentoring, local agency staff engaged and supportive, nutrition educator skills, cultural competency, and materials to support PCE.<sup>21</sup> While developing the PCE model, Deehy and colleagues conducted a series of site visits, staff and participant interviews, and group discussions to assess the readiness of 24 WIC clinics across WIC's western region to implement PCE.<sup>21</sup> Overall, staff at the state and local levels agreed that the current teacher-centered methods of delivering nutrition education were not the most effective and were enthusiastic about transitioning to a participant-centered approach.<sup>21</sup> Competing priorities such as increasing caseloads and limited funding and resources were identified as the main barriers to

**Table 2. Theories and models providing the foundation of PCE<sup>23</sup>**

<b>Theory or Model</b>	<b>Description</b>
Consumer Information Processing Theory	Information must be available to and wanted by the client, and the client must have the time, energy, and comprehension skills to process it.
Health Belief Model	Behavior change is dependent upon the client's perceptions of their vulnerability to an outcome, consequences of inaction, benefits of and capability for taking action, and costs versus benefits of taking action.
Stages of Change Model	The client's level of readiness to change can be measured on a continuum.
Social Cognitive Theory	The client's behavior is influenced by their level of self-efficacy and expectations of outcomes.
Behavioral Self-Management	The client becomes aware of behavioral triggers and reinforcers and learns to alter or replace them.

implementing PCE, as doing so would require inputs of time, staff, and money.<sup>21</sup> In addition, staff expressed concerns about their abilities to successfully implement PCE, especially with culturally diverse populations; however, these concerns would be addressed through thorough training, as well as a mentoring program to close gaps in knowledge that may be left due to high rates of turnover among WIC staff.<sup>21</sup> Successful implementation of PCE also relies upon a comfortable and supportive environment in the WIC clinic, which may require changes to the layout or appearance of the clinic to make more welcoming and child-friendly.<sup>21</sup>

Many of Deehy and colleagues' findings echoed earlier reflections by Sigman-Grant and colleagues. After working on several projects related to nutrition education strategies used in WIC agencies and attitudes of WIC clients and staff toward nutrition education, the major theme observing from the authors' observations was the importance of quality relationships between staff, clients, and community and state partners to the delivery of quality WIC nutrition education.<sup>24</sup> Ultimately, successful and sustainable delivery of patient-centered nutrition education requires systemic and administrative support. However, WIC staff can work on establishing an inclusive team dynamic and leveraging resources from community partners.<sup>24</sup>

PCE has already been implemented by some WIC agencies, including several in Texas, and appears to be a promising model for delivery of nutrition education.<sup>22</sup> Isbell and colleagues conducted phone interviews and administered surveys to explore the successes and challenges of implementing PCE in Texas WIC over a 3-year period.<sup>22</sup> The overarching goal of implementing PCE was to increase participant engagement in nutrition education.<sup>14</sup> When participants were engaged and responded positively to PCE, staff grew more enthusiastic and morale improved.<sup>22</sup> Local and state WIC agencies emphasized the importance of training for and clear communication between all staff to ensure successful and consistent implementation of PCE.<sup>22</sup>

Training, in particular, was highlighted as essential to the development of cultural competency and skills in nutrition education and participant-centered facilitation.<sup>22</sup> Staff also reported a need for new materials to support PCE, including lesson plans, online education resources, and updated materials and/or interpreters for Spanish-speaking participants.<sup>22</sup> An important aspect of the implementation process was evaluation, which was carried out in the form of interviews, case studies, and surveys.<sup>22</sup> Based on feedback collected through these methods, state agencies could make any necessary adjustments.<sup>22</sup>

The trend toward PCE when delivering nutrition education is timely, as WIC participants have expressed a common desire for nutrition education that is more tailored to their needs and experiences.<sup>21,25</sup> The participants interviewed by Deehy and colleagues responded positively when introduced to PCE, and those who had already been exposed to PCE felt as though WIC staff really heard their questions and concerns, which motivated them to make positive changes.<sup>21</sup> Their suggestions for improving nutrition education in WIC aligned with the principles of PCE, including tailoring group education sessions based on participants' needs, interests, and input and providing materials that are practical and relevant for participants.<sup>21</sup> WIC staff in Arizona reported that their participants wanted more relevant resources as well, rather than the lengthy handouts with generalized messages that were being provided.<sup>25</sup> Focus groups with current and former WIC participants also revealed a demand for more interactive, participant-focused nutrition education methods featuring videos and food preparation demonstrations to illustrate strategies for introducing healthier foods to their children.<sup>25</sup>

### **Willow Comes to WIC**

Willow Comes to WIC, developed by New York City-based FamilyCook Productions, is a unique nutrition education program that addresses many of the concerns and desires expressed

by WIC staff and participants, including more interactive education and bilingual materials, as well as a way to better supervise or engage children during nutrition education sessions.<sup>22,25,26</sup>

The program fulfills the WIC nutrition education requirement and has been implemented in several locations across the northeastern, southern, midwestern, and northwestern United States.

First introduced in WIC clinics in 2010, the program introduces children 2-5 years of age and their parents/guardians to fruits and vegetables using a bunny puppet character named Willow.<sup>26</sup>

The program is intended to be led by WIC nutritionists, but other clinicians or qualified individuals such as dietetic interns may lead the program after completing a series of required training modules. Each session is highly interactive and engages children and their parents in multisensory exploration of fruits and vegetables.<sup>26</sup> Participants are able to touch the fruits and vegetables and examine them using magnifying glasses before preparing and tasting recipes featuring them.<sup>26</sup> Emphasis is placed on seasonal produce with which participants may not be entirely familiar (for example, rhubarb may be highlighted during a session held during the summer). Cultural foods are neither promoted nor negated; rather, parents are provided with strategies for introducing new fruits and vegetables to their children. In addition to the bunny puppet, a variety of other props and materials are used to engage participants, including brightly colored posters and a garden apron used to illustrate how fruits and vegetables grow.<sup>26</sup> After each session, parents receive recipe cards printed in English and Spanish featuring suggestions for involving children in food preparation.<sup>26</sup>

## **Purpose**

This study aimed to answer the following research question: What changes do WIC participants perceive in their fruit- and vegetable-related behaviors and attitudes as a result of attending Willow Comes to WIC?

The program's impact was evaluated by qualitatively examining participants' perceived changes in redemption of cash-value fruit and vegetable vouchers and farmers' market coupons, home preparation and consumption of fruits and vegetables introduced by Willow, positive behavior and attitude changes at home related to fruits and vegetables and children's overall acceptance of fruits and vegetables after participation in the program. In addition, this study explored the barriers WIC participants face to increasing home fruit and vegetable consumption that may not be currently addressed by Willow Comes to WIC.

## Chapter 2: Manuscript

### **Introduction**

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), administered by the United States Department of Agriculture's Food and Nutrition Service (USDA FNS), provides grant funding to all 50 states, the District of Columbia, 5 territories, and 34 Indian tribal organizations to improve the nutritional status of women, infants, and children through supplemental food packages, healthcare referrals, breastfeeding support, and nutrition education.<sup>1-3</sup> To receive WIC benefits and services, women must be pregnant, up to 6 months postpartum, or breastfeeding up to one year postpartum, in addition to meeting household eligibility requirements and demonstrating "nutritional risk." Qualified infants and children are eligible to receive benefits from birth to 5 years of age.<sup>1-3</sup>

In 2014, more than 9.3 million individuals participated in WIC, over half of whom were children (53.3%); 23.0% were infants and the remaining 23.6% were women.<sup>2</sup> The majority of participants identified as White (58.7%), followed by Black (20.3%), and American Indian or Alaska Native (11.1%). Additionally, 41.6% of participants identified as Hispanic or Latino.<sup>2</sup>

According to the 2015-2020 Dietary Guidelines for Americans (DGA), children over the age of two years should consume at least 1 to 2.5 cup equivalents of vegetables and at least 1 to 2 cups of fruits per day, while women of childbearing age should aim for 2.5 to 3 cup equivalents of vegetables and 1.5 to 2 cup equivalents of fruits per day.<sup>4</sup> Unfortunately, as is the case among the general population, many WIC participants fail to meet the recommendations for fruit and vegetable intake, as well as those for multiple micronutrients.<sup>6,7</sup> More than half (54.0%) of WIC participants had more than one nutritional risk in 2014.<sup>2</sup> One of the most commonly reported risks reported for all participant groups was high weight-for-height/length.<sup>2</sup> In 2014, WIC data

indicated that 55.3% of women, 12.9% of infants, and 32.1% of children had high weight-for-height/length.<sup>2</sup> Additionally, 53.9% of all participants had at least one dietary risk, such as “failure to meet the [DGA]” or “inappropriate nutrition practices.”<sup>2</sup> Children were most likely to have one of these dietary risks (73.2%).<sup>2</sup>

In 2009, WIC revised their policy governing the items included in the supplemental food packages.<sup>8</sup> Under the revised policy, which includes provisions such as increases in the value of cash-value fruit and vegetable vouchers and clarification of which fruit and vegetable products are WIC-eligible, participants are able to purchase a greater quantity and variety of fruits and vegetables with their monthly benefits.<sup>8</sup> States also received authorization to allow farmers’ market vendors to accept cash-value vouchers.<sup>8</sup> Furthermore, to accommodate WIC’s culturally diverse participant base, the revised policy expanded participants’ options for substituting nutritionally-equivalent cultural foods for items in the standard WIC food package.<sup>8</sup>

There have been multiple studies of changes in WIC participants’ fruit and vegetable intake after the revised policy was implemented.<sup>12-16</sup> Though variations were seen between racial/ethnic groups, the evidence suggests an overall positive trend in post-revision fruit and vegetable intake among WIC-participants.<sup>12-16</sup> There is also evidence of improvements in participants’ fruit and vegetable intake and overall diet quality as a result of receiving WIC-mandated nutrition education.<sup>19,20</sup>

In recent years, many WIC agencies have shifted toward a participant-centered education (PCE) model, which emphasizes collaboration between educators and participants to elicit behavior change.<sup>21-23</sup> Willow Comes to WIC is a nutrition education program developed by FamilyCook Productions to address the shared desire of WIC participants and staff for more engaging and interactive nutrition education materials.<sup>22,25,26</sup> The program, which was first

introduced in 2010 and has since been implemented across the United States, introduces children 2-5 years of age and their parents/guardians to fruits and vegetables using a bunny puppet character named Willow, who encourages participants to explore new fruits and vegetables using multiple senses.<sup>26</sup> At the end of each session, participants receive a recipe card which includes suggestions for involving children in preparation of the featured fruit or vegetable. Willow Comes to WIC fulfills the WIC nutrition education requirement, and translated materials are available for use by agencies with large numbers of Spanish-speaking participants.<sup>26</sup>

The purpose of this study was to examine perceived changes in WIC participants' fruit- and vegetable-related attitudes and behaviors following participation in Willow Comes to WIC, as well as the aspects of the program that participants found most impactful. Behaviors of interest included fruit and vegetable intake and willingness to try and/or introduce unfamiliar fruits and vegetables. Food purchasing behaviors, children's involvement in food selection and preparation, and barriers to increasing fruit and vegetable intake were also explored.

## **Methods**

### *Focus group sites and moderator training*

A total of 8 sites in 7 states committed to participate in the study by submitting a letter of support to the research team. Each site agreed to conduct at least one focus group in both English and one in Spanish, unless there were too few Spanish-speaking participants enrolled in a site's WIC program to warrant a separate focus group. The study protocol was approved by the University of Tennessee Institutional Review Board (UTK IRB-16-03163-XP).

FamilyCook Productions sent a memo to each site with instructions for moderator selection, training, and participant recruitment. At least one moderator and assistant moderator were appointed at each site to facilitate and record the focus groups. The moderator was

responsible for guiding the discussion, and the assistant moderator was responsible for recording the discussion and taking written notes. All moderators and assistant moderators completed an online training module developed by FamilyCook Productions, the primary investigator, and a former graduate assistant. This module covered recruitment procedures, moderator roles, how to choose a location, necessary materials, facilitation skills, and audio recording of focus groups. After moderators completed the online training, FamilyCook Productions held live distance trainings, in which moderators participated in roleplay to practice facilitating focus groups. The distance trainings were evaluated using an online survey, in which moderators were asked to rate the content and overall quality of the training session on a five-point scale ranging from “Poor” to “Excellent”. Moderators were also trained on obtaining informed consent according to the Collaborative Institutional Training Initiative training module.<sup>27</sup>

#### *Participants and recruitment*

Participants were recruited by flyers and through word-of-mouth advertising from WIC staff at each site. Flyers included information about expected time commitments, incentives, and audio recording. FamilyCook Productions provided the script that was used to recruit parents during their WIC visits and Willow Comes to WIC sessions. Participants were eligible for inclusion in the focus groups if they had attended at least one Willow Comes to WIC session. Each site aimed to recruit eight to twelve participants per focus group.

#### *Focus group procedures*

The focus groups were held in addition to, rather than in lieu of, nutrition education sessions. Focus groups were designed to last no more than 45 minutes. FamilyCook Productions, the primary investigator, and a former graduate assistant developed a discussion guide (Appendix B) that was provided to each site, which included questions about participants’

experiences with Willow Comes to WIC, their children's eating habits, and their current meal planning and preparation habits. Suggested probes were also included in the discussion guide to elicit more detailed responses from participants as necessary.

At the beginning of each focus group, participants were invited to enjoy a bowl of oatmeal prepared by WIC staff. A variety of mix-ins were offered, such as dried fruits and nuts. Each participant received a canister of oats as compensation for their participation in the focus group, as well as a set of simple recipes for preparing the oats.

### *Data analysis*

All focus groups were recorded by the moderators and were later transcribed verbatim by FamilyCook Productions. The transcripts were analyzed using qualitative data analysis software (NVivo).<sup>28</sup> Content analysis methodology was used to code and analyze the transcripts to identify patterns and emerging themes in focus group participants' experiences with Willow Comes to WIC.<sup>29-32</sup> The focus group transcripts were coded using a common codebook containing nodes and subnodes derived from the content of the focus groups. The codebook was developed by a former FamilyCook Productions intern. This former intern and a graduate student at the University of Tennessee independently coded the transcripts. The unit of analysis was defined as one complete thought, and only one node or subnode was assigned per unit. Data saturation was defined as the point at which no new information was found after coding three transcripts. Saturation was reached by the ninth transcript; however, the remaining transcripts were still coded to confirm saturation at sites not yet analyzed.

To evaluate fidelity to the discussion guide between sites, the two coders reviewed all of the transcripts a second time and counted how many times each question and probe was asked across the focus groups. A tally was kept in a spreadsheet.

Coding comparison queries were run in Nvivo for each node to measure inter-rater reliability.<sup>28</sup> For each node and subnode, at least 81% agreement between the two coders was achieved for each node and subnode across all transcripts. If the research assistants could not come to consensus regarding a code, the primary investigator examined the discrepancy and determined the most appropriate code. Nodes were clustered under larger themes related to the research question, and relevant quotes were extracted from the transcripts to support each theme. Additionally, a hierarchy diagram was generated in Nvivo to illustrate the aspects of the program which participants found the most useful and/or enjoyable.<sup>28</sup>

## **Results**

### *Participant demographics*

Across all 8 sites, 15 focus groups were conducted (English, n=12; Spanish, n= 3). A total of 62 participants took part in the focus groups. The average group size was 4.1 participants. None of the sites achieved the target recruitment rate of 8-12 participants per focus group, and in some cases only participant was in attendance.

The demographic characteristics of focus group participants are shown in Table 3. Demographic information was available for all but one site. Among sites that did provide demographic information, 41.8% of participants identified as White (n=23) and the majority of those who reported their ethnicity (n=49) were not Hispanic or Latino (n=32; 65.3%). All but two participants were female. The mean age of participants ranged from 24 to 36.3 years; however, some participants may have mistakenly provided their children's ages instead of their own, and these responses were excluded when calculating the mean ages reported in Table 3. The average family size among participants ranged from 3 to 5.4 members. On average, participants' families included at least one child under 5 years of age.

**Table 3. Demographic characteristics of Willow Comes to WIC focus group participants by site**

	Site 1 (KS)	Site 2 (OR)	Site 3 (NJ)	Site 4 (WI)	Site 5 (GA)	Site 6 (KS)	Site 7 (IN)	Site 8 (NV)	All Sites
Total participants	7	7	5	16	15	4	7	1	62
Number of focus groups	1	1	1	6	3	1	1	1	15
Male	-	0	0	0	3	0	2	0	5
Female	-	7	5	16	12	4	5	1	50
Race- White	-	3	1	7	4	1	6	1	23
Race- Other	-	4	4	9	11	3	1	0	32
Ethnicity- Hispanic/ Latino	-	0	0	12	5	0	0	0	17
Mean age (years)	-	32	35	32.7	36.3	33.3	29.3	24	31.8

### *Identification of major themes*

During coding, five major themes emerged from the focus group transcripts. Two of these themes- changes in participants' fruit and vegetable intake, and lasting impacts and favorite parts of Willow Comes to WIC- pertained specifically to participants' perceptions of the program's effects on their attitudes and behaviors. Additional findings that did not directly pertain to Willow Comes to WIC were grouped into three themes: involving children in food selection and preparation; food purchasing behaviors; and barriers to increasing fruit and vegetable intake. Brief definitions and supporting quotations for each theme are provided in Tables 4 and 5. Each quotation represents a different participant's experience.

### *Changes in participants' fruit and vegetable intake*

Though some participants reported that their children were still picky eaters at the time of the focus groups, many reported that their children tried at least one new fruit or vegetable

**Table 4. Willow-related themes with definitions and supporting quotations**

<b>Theme</b>	<b>Definition</b>	<b>Supporting quotations</b>
Changes in participants' fruit and vegetable intake	Changes in willingness to try and intake of fruit and vegetables following program participation, as well as strategies used to encourage children's fruit and vegetable intake	<p>"They learned a lot and they tried a lot of foods and things they didn't eat before."</p> <p>"I like that my son eats more vegetables. Now my son eats more jicama and beets and cabbage. Before he only ate carrots, broccoli."</p>
Lasting impacts and favorite parts of Willow Comes to WIC	Favorite and most impactful aspects of Willow Comes to WIC	<p>"My daughter says, "Let's do what Willow does."</p> <p>"The magnifier was what impressed the most to my little ones and I bought one for them."</p>

**Table 5. Other themes with definitions and supporting quotes**

Theme	Definition	Supporting quotations
Involving children in food selection and preparation	Allowing children to participate in grocery shopping and meal preparation	<p>“They go to the store and see things that I wouldn’t have bought before... and want to get and want to try it.”</p> <p>“...they have jobs, they have you know setting the table and... make sure everyone's got a drink... and if we don't have a slow cooker meal thing... then they'll help pick out the vegetables... Or whether or not they want apple sauce...”</p>
Food purchasing behaviors	Preferred shopping locations and strategies; redemption of WIC cash-value fruit and vegetable vouchers	<p>“I always use a list. I know what I want to cook.”</p> <p>“I like the farmers’ market to buy the strawberry and corn. It looks fresher.”</p>
Barriers to increasing fruit and vegetable intake	Factors negatively impacting participants’ ability to increase fruit and vegetable intake	<p>“I tried to get her to eat new things, she just tells me no I won’t eat that.”</p> <p>“...he’s the pickiest eater, so whatever they bring to eat, he won’t eat it or try it.”</p>

during participation in Willow Comes to WIC. Not all children liked the fruit or vegetable they tried, and some refused completely, but participants reported that their children still enjoyed examining the fruits and vegetables featured in the program with their other senses. Multiple participants also reported trying new fruits and vegetables themselves during Willow Comes to WIC and described how their experiences in the program made both them and their children more open to trying new fruits and vegetables at home. In some cases, when participants shared the tasting experiences with their children during the program, they felt more empowered to continue introducing new fruits and vegetables to their children at home.

Additionally, a few participants reported that their children had started eating greater quantities of fruits and vegetables since participating in Willow Comes to WIC. One participant explained that her child barely ate any fruit prior to participating in the program and had since started eating multiple types of fruit each day. Another participant reported that his/her children started eating more carrots and broccoli, and yet another shared that his/her child started eating vegetables such as jicama and beets in addition to carrots and broccoli.

Participants shared many strategies used at home to encourage their children to eat more fruits and vegetables; however, in most cases, these were not new behaviors resulting from Willow Comes to WIC attendance. Multiple participants reported that their children would eat vegetables in the form of a salad, while others served fruits and vegetables with dips or sauces to add flavor (e.g. fruit with yogurt, broccoli with cheese sauce). Several participants also reported cutting fruits and vegetables into small pieces to make them easier for children to eat or to hide them in other dishes. Other common strategies included bargaining (e.g. child must eat fruit before they can have dessert) and role modeling of desired eating behaviors.

*Lasting impacts and favorite parts of Willow Comes to WIC*

A variety of props and activities were used during Willow Comes to WIC sessions, including colored plates, a magnifying glass, rhymes and songs, and the Willow puppet. Figure 1 provides a visual representation of which aspects of Willow Comes to WIC were mentioned most often in the focus groups. When asked about their and their children's favorite parts of Willow Comes to WIC, participants frequently mentioned the Willow puppet (Figure 2). One participant reported that their child was afraid of the puppet, but most others had positive recollections and shared that they and their children found the puppet engaging. Multiple participants reported that their children had continued to associate the Willow puppet with fruits and vegetables after participating in the program. One participant shared that their child often asked for the Willow puppet at home, and others reported that their children were more motivated to eat fruits and vegetables that they had seen Willow "eat."

The magnifying glass was mentioned as a favorite part of Willow Comes to WIC nearly as many times as the Willow puppet. Multi-sensory exploration of fruits and vegetables is a hallmark of the program, and many participants reported that their children greatly enjoyed using the magnifying glass to look more closely at the featured produce before tasting it. Participants appreciated that the magnifying glass encouraged their children's curiosity, and one participant even reported purchasing a magnifying glass for their children to use at home since they enjoyed it so much during the program.

Despite participants' overall positive impressions of and experiences with Willow Comes to WIC, some participants wondered if their children were too young to fully engage in the activities and grasp the concepts taught. Though the program was open to all children enrolled in WIC, participants with children 2 years old and younger thought the program might be better suited for children 3-5 years old, as older children tend to have longer attention spans and be

better at following instructions. One participant also reported that they still breastfed their child and the child preferred breastmilk to solid food, so the program did not have much of an impact on the child.

*Involving children in food selection and preparation*

Several participants reported involving their children in the selection of foods to be eaten at home. Many participants described how their children actively participated in grocery shopping by holding bags or selecting which fruits and vegetables to purchase. In some cases, participants reported that their children asked for fruits and vegetables that they had tried in Willow Comes to WIC, while others reported that their children selected unfamiliar fruits and vegetables, which could sometimes present a challenge if the participant did not know how to prepare them. Some participants provided their children with a bit more structure by allowing their children to choose one of a limited number of fruit and vegetable options. Participants also described the ways in which they involved their children in meal preparation at home. When children were involved, they were usually given simple jobs such as draining and washing canned vegetables, putting items in the microwave, and setting the table. Very few participants mentioned that they had prepared recipes from Willow Comes to WIC at home. One participant cited time and existing routines or habits as barriers to doing so.



**Figure 1. Hierarchy diagram of participants' favorite aspects of Willow Comes to WIC**



**Figure 2. Willow puppet used in Willow Comes to WIC**

### *Food purchasing behaviors*

Food purchasing behaviors varied among participants. Overall, the most important factors when choosing a grocery store were location, price, and food freshness. Multiple participants reported that their children accompanied them to the grocery store at least some of the time, and many described how their children would help with or participate in shopping. Some participants described grocery shopping as an opportunity to reinforce lessons about healthy eating and the benefits of fruits and vegetables.

Some participants reported that they always prepared a list or plan before going to the grocery store, while others reported that they never planned their shopping trips ahead of time and just tried to avoid the aisles containing unhealthy foods such as cookies or chips. A few participants described how they used technology to aid them in grocery shopping. One of these participants mentioned taking pictures of the inside of their refrigerator so they could visualize what they needed to buy, and another mentioned a smart phone app that allowed them to see sales and specials from grocery stores. In one focus group, participants discussed a WIC smart phone app that would allow them to check the balance of their vouchers on their phones. Unfortunately, the app had not yet been introduced at the focus group site and participants were having difficulty accessing the WIC website at the time.

Several participants discussed their experiences shopping at farmers' markets and using their WIC benefits to purchase local produce. Most of these participants reported positive experiences, saying they liked how fresh the fruits and vegetables were. In one focus group, a participant said they liked shopping at farmers' markets because it reminded them of the produce markets in Mexico. Others, however, described barriers to shopping at farmers' markets,

including lack of time, losing their paper vouchers, and benefits not being accepted by all vendors.

### *Barriers to increasing fruit and vegetable intake*

In some focus groups, participants briefly discussed barriers to increasing their or their children's fruit and vegetable intake. One of the most frequently discussed barriers was that some children were picky eaters and remained so after attending Willow Comes to WIC. Though some participants reported that their children loved fruits and vegetables and instead refused other foods, the majority of participants dealing with picky eating reported that their children either refused to eat fruits and vegetables or were very particular about which types and preparations of fruits and vegetables they would eat. Vegetables seemed to be more challenging than fruits. For example, one participant reported that his/her child would only eat salad if they could assemble the vegetables and dressing on their own, and others mentioned having to hide vegetables in other dishes so their child would not be able to pick them out. Participants with multiple children reported additional challenges in encouraging fruit and vegetable intake, particularly if one child was pickier than their siblings. One participant explained that he/she stuck to a small variety of vegetables that he/she knew all of their children would eat, as this was easier than trying to introduce unfamiliar vegetables that their children might not be willing to eat.

### **Discussion**

This study is the first large-scale evaluation of the Willow Comes to WIC program, and the results provide insight into the program's successes and shortcomings. For many participants, Willow Comes to WIC provided motivation to increase their and their children's fruit and vegetable intake and increased their and their children's willingness to try new fruits and

vegetables. These findings echoed those of a previous study in which phone interviews were used to evaluate increases in both fruit and vegetable intake and intentions to consume fruits and vegetables following participation in a WIC-mandated nutrition education program.<sup>19</sup> However, the intervention in the previous study was delivered over 6 months, with 2 months devoted to fruits and vegetables.<sup>19</sup> Participants in the present study may only have attended one Willow Comes to WIC session, which may not have been enough time to produce lasting changes in their fruit- and vegetable-related attitudes and behaviors. At most focus group sites, participants had only been offered one or two opportunities to attend Willow Comes to WIC prior to participating in the focus groups.

Many participants reported involving their children in the selection and preparation of fruits and vegetables at home, though very few mentioned preparing the recipes featured in Willow Comes to WIC. The benefits of involving children in food selection and preparation are well-documented.<sup>33,34</sup> These activities provide opportunities for parents to model positive fruit- and vegetable-related attitudes for their children. One study even found that parental modeling had the strongest impact on children's fruit and vegetable intake when compared to other social determinants such as peer influence and verbal directives.<sup>33</sup> There is also evidence that fruit- and vegetable-related behaviors are affected by children's self-concept (i.e. how they view their personal traits and capabilities), particularly in older children and adolescents. In a recent study, self-concept was positively associated with intentions to consume fruits and vegetables.<sup>34</sup> By involving children in fruit and vegetable selection and preparation, parents can teach them that eating fruits and vegetables is a desirable behavior and help them develop the necessary capabilities to do so. Evaluation of Willow Comes to WIC recipes could help staff identify ways

to make the recipes simple and quick enough that participants will be more likely to prepare them at home.

Due to the study design and methodology, a direct relationship between participation in Willow Comes to WIC and use of cash-value fruit and vegetable vouchers cannot be determined. However, some participants did discuss using their vouchers to purchase fruits and vegetables, and others talked about their experiences shopping at farmers' markets and grocery stores. The experiences reported in this study were generally positive, with the exception of some farmers' market vendors not accepting WIC vouchers. In another recent study, WIC participants in four states reported that it was also sometimes challenging to maximize the value of their cash-value vouchers, particularly if statewide policies required that these vouchers be totally spent in one transaction.<sup>35</sup> However, educating WIC participants about how and where they can use their benefits, including cash-value vouchers, may increase rates of redemption. A study of WIC participants in New York City found that both knowledge and voucher redemption at farmers' markets significantly increased following an educational campaign in which participants were provided instruction on using their vouchers and were taken on market tours.<sup>36</sup> A greater emphasis on the benefits of cash-value vouchers in future Willow Comes to WIC sessions might help to improve participants' experiences when trying to redeem their vouchers, or encourage them to start redeeming their vouchers if they are not already doing so.

The Willow puppet was found to be one of participants' children's favorite aspects of Willow Comes to WIC. Though studies of the use of puppetry in nutrition education are limited, there is evidence that young children respond well when characters are used for educational purposes, especially when the children are able to interact with these characters.<sup>37,38</sup> In a recent Dutch study, children 2-3 years old were read a picture book with the message that "eating

carrots makes you strong,” and then were offered both healthy and unhealthy snacks. Though the use of a puppet resembling the book’s protagonist (a bunny, like Willow) did not independently result in consumption of a higher proportion of the healthy snack option, it did act as a moderator in conditions when the reader engaged children by asking questions, providing praise, and encouraging character imitation.<sup>37</sup>

Participants also commonly reported that their children enjoyed using the magnifying glass and engaging in tactile exploration of the fruits and vegetables featured in Willow Comes to WIC, and multiple participants reported that they and/or their children tried at least one new fruit or vegetable during the program. A fairly large body of evidence exists showing that repeated exposure to fruits and vegetables prior to tasting helps to decrease neophobia and increase fruit and vegetable liking.<sup>39-41</sup> In multiple studies, children’s willingness to try increased when they were repeatedly shown picture books of unfamiliar fruits and/or vegetables.<sup>39-41</sup> Other nutrition education programs have also incorporated multisensory exploration, as Willow Comes to WIC does, encouraging children to touch and smell fruits and vegetables in addition to visually examining and tasting them.<sup>42</sup> However, for programs like this to be successful, activities should be fun and engaging to help children form positive associations with the target fruits and vegetables.<sup>42</sup> This appeared to be the case in Willow Comes to WIC, given the number of participants who praised the program’s interactive nature and cited the magnifying glass as a favorite aspect.

### *Limitations*

Despite this study’s strengths, including its geographically diverse sample and the inclusion of Spanish-speaking participants, it also has limitations, such as its small sample size. Though each site aimed to recruit 8-12 participants per focus group, no site achieved this for any

of their focus groups. Additionally, focus group participants could not be contacted for follow-up, so researchers did not have an opportunity to clarify their responses. Review of the focus group transcripts also revealed that not all moderators asked all of the questions or used all of the probes in the discussion guide, so there may have been additional feedback that was not obtained from participants. Finally, since many participants only attended one Willow Comes to WIC session, the scope and depth of feedback they were able to provide may have been limited, and the research team was unable to discern a dose-response effect.

### **Implications for research and practice**

Given the results of this study, there are multiple opportunities for future research and for modification of the Willow Comes to WIC program. If future focus groups were to be conducted, additional training may be warranted to ensure that all moderators are asking the same discussion questions in the same manner. Alternatively, employing different methodology such as surveys could help researchers to draw stronger and more quantifiable conclusions regarding the relationships between participation in Willow Comes to WIC and outcomes of interest such as cash-value voucher redemption and children's pickiness. Targeting participants who have attended multiple Willow Comes to WIC sessions for future focus groups or interviews would also help to provide stronger evidence of the program's perceived effects.

## Chapter 3: Expanded Methodology

### **Project overview**

This study was developed to examine the effects of participation in a participant-centered, multisensory nutrition education program on WIC participants' attitudes and behaviors related to fruit and vegetable intake, as well to evaluate which aspects of the program were the most impactful and enjoyable according to participants. Though both parents and children participated in the program, only parents participated in the focus groups for this study. However, many parents provided feedback on behalf of their children.

This study was approved by the University of Tennessee Institutional Review Board.

### **Focus group sites and moderator training**

A total of 8 WIC sites in 7 states committed to participate in the study (Table 7) by submitting a letter of support to the research team. Each site conducted one focus group in English and one in Spanish, unless there were too few Spanish language speakers enrolled in the site's WIC program. FamilyCook Productions sent a memo to each site with instructions for moderator selection, training, and participant recruitment. At least one moderator and assistant moderator were appointed at each site to facilitate and record the focus groups. The moderator was responsible for guiding the discussion while refraining from interjecting their own views and experiences related to Willow Comes to WIC, and the assistant moderator was responsible for recording the discussion and taking written notes as a back-up in case the audio recording device did not work or the recording was unintelligible. All moderators and assistant moderators completed an online training module developed by FamilyCook Productions, the primary investigator, and a former graduate assistant. This module covered recruitment procedures, moderator roles, how to choose a location, necessary materials, how to best facilitate discussion,

and how to record the focus groups. After moderators completed the online training, FamilyCook Productions held live distance trainings, in which moderators participated in roleplay to practice facilitating focus groups. The distance trainings were evaluated using an online survey, in which moderators were asked to rate the content and overall quality of the training session on a five-point scale ranging from “Poor” to “Excellent”. Moderators were also trained on obtaining informed consent according to the CITI training module.

### **Participant recruitment and eligibility**

Focus group participants were recruited by flyers and through word-of-mouth advertising from WIC staff. FamilyCook Productions provided the script that was used to recruit parents during their WIC visits and Willow Comes to WIC sessions. Flyers were displayed in waiting areas, hallways, nutrition educator offices, and classrooms at each focus group site, and they included information about expected time commitments, incentives, and audio recording. Participants were eligible to participate in the focus groups if they had attended at least one Willow Comes to WIC session. Each site agreed that they would aim to recruit eight to twelve participants per focus group.

### **Informed consent and demographic surveys**

Before each focus group, all participants signed and returned an informed consent statement. By signing this form, participants indicated that they were aware of the expected time commitment for the focus groups, their right to choose to not answer questions, and that the focus groups would be audio-recorded. In the event that a participant had withdrawn, their responses would have been removed from the audio recording and transcript of their focus group. Participants were also asked to complete a brief anonymous demographic survey, which was used to collect data about participants’ gender, age, household size, family size, race, and

ethnicity (Appendix A). Completion of the demographic survey was voluntary, and participants were allowed to skip questions if they did not feel comfortable answering. Demographic survey responses from all 8 sites were entered into an Excel spreadsheet for quantitative analysis. Frequencies were calculated for each response category on the survey, and responses from individual sites were then compiled to provide a demographic overview of study participants.

### **Focus groups**

A total of 15 focus groups were conducted. The majority of sites conducted a single focus group in English; however, two sites conducted multiple focus groups. Only one site had enough demand to warrant conducting focus groups in Spanish with bilingual facilitators.

FamilyCook Productions provided each site with a discussion guide (Appendix B) for moderators to use during the focus groups. The discussions were designed to last no more than 45 minutes and included questions about participants' experiences with Willow Comes to WIC, their children's eating habits, and their current meal planning and preparation habits. Suggested probes were also included in the discussion guide to elicit more detailed responses from participants as necessary.

At the beginning of each focus group, participants were invited to enjoy a bowl of oatmeal prepared by WIC staff. A variety of mix-ins were offered, such as dried fruits and nuts. Each participant received a canister of oats as compensation for their participation in the focus group, as well as a set of simple recipes for preparing the oats. Even if a participant withdrew prior to the focus group, they were still welcome to take a canister of oats.

### **Audio recording and transcription of focus groups**

All focus groups were audio-recorded by WIC staff at each site. Recordings were later transcribed verbatim and checked by staff at FamilyCook Productions. One focus group was

transcribed by a research assistant from the University of Tennessee, and all others were transcribed by FamilyCook Productions staff. Each transcriber signed a pledge of confidentiality before handling the transcripts.

### **Analysis of focus group transcripts**

Focus group transcripts were analyzed using qualitative data analysis software (NVivo).<sup>28</sup> Content analysis methodology was used to code and analyze the transcripts, with the ultimate goal of identifying patterns and emerging themes in focus group participants' experiences with Willow Goes to WIC.<sup>29</sup> Content analysis is a research technique that involves drawing inferences from texts or other materials.<sup>29-31</sup> These inferences must be both replicable and valid; that is, multiple independent researchers should derive the same results, and any claims made should be supported by the evidence.<sup>28</sup> Content analysis can be applied for a variety of purposes, such as extrapolation of trends and patterns, identification of phenomena, detection of bias, and examination of characteristics of communicators.<sup>28,29</sup>

According to Krippendorff, content analysis consists of six main components: a body of text or other data, a research question to be answered by examining the data, a context within which to analyze the data, an "analytical construct" such as a codebook that provides operational definitions related to the context, inferences to answer the research question, and validating evidence to justify the results.<sup>29</sup> Krippendorff also describes some of the aspects of content analysis that distinguish it from other methodologies. Content analysis is unobtrusive, in that it does not contaminate or interfere with the phenomena of interest.<sup>28</sup> For example, in the context of the present study, the focus group participants may have responded differently depending on their level of awareness of the research questions or the specific variables being examined. Content analysis is also ideal for unstructured data (i.e. data not consisting of predefined

response choices, as in multiple choice surveys).<sup>29</sup> Perhaps most importantly, content analysis is sensitive to the context surrounding the data. When units of data are considered within their original context, researchers are able to draw conclusions that are more likely to be meaningful and relevant to the population that will eventually use the results.<sup>29</sup>

The focus group transcripts were coded using a common codebook containing nodes and subnodes derived from the content of the focus groups. The codebook was developed by a former FamilyCook Productions intern. This former intern and a graduate student at the University of Tennessee served as coders for the transcripts. The unit of analysis was defined as one complete thought, and only one code was assigned per unit. Data saturation was defined as the point at which no new information was found after coding three transcripts. Data saturation was met after coding 9 transcripts, but all remaining transcripts were still coded to confirm saturation at sites not yet analyzed.

Coding comparison queries were run in Nvivo for each node to measure inter-rater reliability.<sup>28</sup> Inter-rater reliability, sometimes referred to as reproducibility in the context of content analysis, is a measure of consistency and agreement between coders.<sup>29,30</sup> A high degree of inter-rater reliability indicates that both coders independently arrived at the same results.<sup>30-32</sup> For each node and subnode, inter-rater reliability was at least 81.32% across all transcripts. Had there been any disputes over coding that could not be resolved between the coders, the primary investigator would have been the tie-breaker and made final rulings.

There are multiple ways in which data may be summarized using content analysis methodology, including word or phrase counts, cross-tabulations, contingencies, and clustering.<sup>30</sup> In the present study, nodes were clustered under larger themes related to the research question. Relevant quotes were extracted from the transcripts to support each theme. Additionally, a

hierarchy diagram was generated in Nvivo to illustrate the aspects of the program which participants found the most useful and/or enjoyable.<sup>28</sup>

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## Appendices

## Appendix A: Demographic Survey for Focus Group Participants

<b>WIC Site:</b>		
<b>What is your gender?</b> <input type="radio"/> Male <input type="radio"/> Female <input type="radio"/> Other <input type="radio"/> Choose not to answer	<b>What is your age? (Write in your age)</b>  <p style="text-align: center;">_____ Years old</p>	<b>How many children live in your household who are... (Write in your response for each)</b>  Less than 5 years old: _____  5-12 years old: _____  13-17 years old: _____
<b>What is your family size? (Include yourself and anyone that lives with you)</b>  <p style="text-align: center;">_____</p>	<b>How would you describe yourself? (Check all that apply)</b> <input type="radio"/> American Indian/Alaskan Native <input type="radio"/> Asian <input type="radio"/> Black or African American <input type="radio"/> White <input type="radio"/> Other <input type="radio"/> Choose not to answer	<b>Are you Hispanic or Latino? (Check one)</b> <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Choose not to answer

## Appendix B: Focus Group Discussion Guide

[Insert WIC Center Name] staff facilitator(s): [insert name(s) who will facilitate Willow]

Welcome; Self-introduction; Sign-in sheet; Thank everyone for their time (1 minute)

Before I ask you to introduce yourself, let me give you an overview of today's agenda (1 minute):

The objective of today's session is to learn about your experiences with the "Willow Comes to WIC" program and get your feedback about it. The aim of the "Willow Comes to WIC" program is to promote seasonal fruits and vegetables in a familiar and appealing way to make them more acceptable to children, while providing helpful recipe concepts for parents to share these foods at home.

We are looking to gain a better understanding about your family's eating habits and your experience with the Willow program during today's discussion. Feel free to share your personal experiences with food and playtime, family traditions, or most memorable moments. This is a safe, confidential space. We are hoping to use your feedback to learn which aspects of the program are most effective and how to improve the program. After filling out some paper work we will do group introductions and then open the discussion to the participants with a few guided questions. First I would like to invite you to enjoy a nice breakfast of some delicious oatmeal while we have our discussion.

Oatmeal (1 minutes) – This oatmeal was prepared with [insert ingredients] and prepared using a crockpot. This is an easy and nutritious breakfast packed with whole grains and fiber. You can personalize it by adding healthy toppings and mix-ins like fresh apples, berries, sliced peaches, walnuts, pecans, peanut butter, etc. Feel free to come up and make your oatmeal or help yourself during the discussion.

Informed consent forms (5 minutes) – In front of you there is a form to review and sign. This form states the information about your involvement in this study, the risks, benefits, confidentiality, and how to contact the researchers if you have any questions. Please read over the form and if you would like to participate in the study please initial the first page and sign and date the second page.

*Collect informed consent forms and pass out demographic survey.*

Demographic surveys (2 minutes) – Please take a few moments to complete this short survey. This helps the researchers who will compile the information you share with us today to better understand the make-up of who participated in this discussion. This form is voluntary and you can choose to skip any of the questions.

*Collect demographic surveys.*

Participant Introductions (5 minutes) – Thank you for taking the time to fill out the forms, now lets get started. First lets introduce everyone. Each person gives their name and names a food they like that starts with the first letter of their name (i.e. My name is Alicia and I like apples).

Discussion Questions (40 - 45 minutes)

*Common probing questions that can be used for many questions include: “Can you tell me more about that? What were you thinking during ‘X’?”*

Willow Specific Questions (20 minutes)

1. Can you tell me your experience with the Willow classes?
  - a. If you attended more than one Willow class can you tell me some of the reasons you decided to come back?
  - b. If you were not able to come back for more than one Willow class can you tell me some of the reasons why?
2. Were there any foods in Willow that you or your child/children had never tried before?
  - a. If yes, can you tell me more about this experience? What food was it?
  - b. If you or your child tried the new food, how did you feel about this experience?
    - i. Probe: Was there anything about the experience of trying the food in the Willow session that surprised you?
    - ii. Probe: Can you tell me more about that?
3. How has Willow affected you or your child’s eating habits?
  - a. Did you or your child learn, see, or do something in Willow that you continued to do at home?
    - i. Probe: Can you tell me more about that?
  - b. Did you or your child learn, see, or do something in Willow that influenced you?
    - i. Probe: Can you tell me more about that?
  - c. Are there any concepts, songs, rhymes, or words from Willow that you and your child continue to use at home?
    - i. If yes, can you tell me more about that? What specifically and how do you use it/them?
4. What components of the Willow class did your children respond to most?
  - a. Probe: Willow the puppet? Songs? Rhymes? Time to explore, like with the magnifying glasses? Tasting the ingredients? “1,2,3 Nibble?” Making the recipe?
  - b. Probe: Can you tell me more about that?
5. How does Willow compare to other nutrition education classes your child or you have participated in either at WIC or in another setting?
  - a. What if anything, is different about Willow compared to other programs?
  - b. What would you suggest to improve the Willow classes?

Eating Habits (5 minutes)

1. Do you encourage your children to eat certain foods more than others?
  - a. Do you feel your child is a picky-eater? If so, which foods does he/she like the most? Least?
2. Do you use any strategies to have your child/children eat certain foods?
  - a. Probe: If yes, can you describe them? Which foods do you use these strategies for?
  - b. Probe: If no, which foods does your child like the most?

Meal Planning and Preparation (15 minutes)

1. Can you tell me about your last trip to the grocery store? Did you have a game plan/grocery list for what you wanted to buy?
  - a. Probe: Are there certain aisles in the grocery store you usually walk through first?
  - b. Probe: Can you tell me about your last experience grocery shopping?
2. Do you redeem your WIC cash value vouchers each month?
  - a. Can you tell me what if anything influenced your decision to redeem or not redeem your vouchers?
  - b. If you do redeem your vouchers where do you buy your fruits and vegetables? Grocery stores, farmer's markets...?
3. Have you redeemed your farmer's market WIC coupon (one time per year)?
  - a. Probe: If yes, can you tell me more about that experience?
4. Is your child/children usually involved with preparing a meal?
  - a. Probe: What would influence you to involve your child/children or not?

Thank you and wrap-up (1 minute) – Thank you for joining us today and sharing your family's experience with Willow.

*Distribute canister of Quaker Oats to each participant.*

### Vita

Sarah Lisson was born in Raleigh, North Carolina, to Robert and Lisa Lisson. After graduating from Jesse O. Sanderson High School in 2012, she attended East Carolina University as an EC Scholar and Honors College student. In 2016, she graduated *summa cum laude* with a Bachelor of Science degree in Nutrition and Dietetics. Sarah is currently a master's candidate at the University of Tennessee, where she is pursuing both a Master of Science in Public Health Nutrition and a Master of Public Health with a concentration in Community Health Education. She is expected to graduate in May 2019. During her time at the University of Tennessee, Sarah served as a graduate teaching assistant for NUTR 100 (Introductory Nutrition) and a nutrition instructor for East Tennessee Children's Hospital's Healthy Kids Club program. In addition to completing her thesis, she also assisted with other studies conducted by members of the ICAN-GROW Lab in the Department of Nutrition. Sarah is currently completing her dietetic internship through the University of Tennessee and will take the Commission on Dietetic Registration exam in the late summer of 2019.