

WIC Participants' Perceived Behavioral Control, Attitudes Toward, and Factors Influencing Behavioral Intentions to Redeeming Cash-Value Vouchers at Certified Farmers Markets

Leslie McDonnell¹, Michelle Neyman Morris², Julie Holland²

¹ *Glenn County Health Services WIC*

² *California State University, Chico. Department of Nutrition and Food Science*

Abstract

Background: The California Supplement Nutrition Program Women, Infants and Children (WIC) offer a Cash-Value (CV) voucher for the purchase of fresh fruits and vegetables that can be used at Certified Farmers' Markets (CFM). **Purpose:** The purpose of this study was to identify factors associated with redeeming WIC CV vouchers at (CFM) among English and Spanish speakers. **Methods:** This was a cross-sectional study; in which Theory of Planned Behavior constructs were included in a self-report survey. Data were collected from women (n=252) at three rural northern California WIC clinics for two weeks. **Results:** Proportionately more Spanish speakers had greater perceived behavioral control for redeeming CV vouchers at CFM. Not enough variety of produce offered (p<0.001), not knowing what produce to buy (p=0.038), and unfavorable weather conditions (p<0.001) were proportionately lower among English speakers than Spanish speakers. Proportionately more Spanish speakers identified availability of organic produce (p<0.001), other items for sale than just produce (p<0.001), and entertainment provided (p<0.001) as a factor to redeem CV vouchers. Approximately 43% of English speakers identified unfavorable weather as a barrier to attend CFM. **Conclusion:** WIC educators and market managers may use the benefits and barriers identified by ethnic groups to develop interventions that encourage WIC participants to redeem CV vouchers at CFM.

© 2014 Californian Journal of Health Promotion. All rights reserved.

Keywords: WIC, Certified Farmers' Market, rural, fruits and vegetables, Theory of Planned Behavior, Cash-Value vouchers

The Special Supplemental Nutrition Program for Women, Infants and Children (WIC) provides Cash-Value (CV) vouchers for specific nutritious foods, nutrition education and breastfeeding support for low-income pregnant or post-partum women, and children up to five years of age (U.S. Department of Agriculture (USDA), 2011a; USDA, 2011b). In October 2009, a landmark change to the WIC food package was the addition of a CV voucher for women and children to purchase fresh fruits and vegetables (USDA, 2011a). The monthly cash value of vouchers available to participants is ten dollars for women and six dollars for children one to five years of age. The CV vouchers are commonly redeemed at WIC approved retail stores (USDA, 2011a). Prior to the food package change, carrots were the only fresh

produce item that was provided in the monthly food package and only for exclusively breastfeeding mothers (USDA, 2011a; Committee to Review the WIC Food Packages, 2005). The only other option to receive fresh produce through the WIC program was participating in the seasonal Farmers' Market Nutrition Program (FMNP) (USDA, 2011c).

Unlike the monthly issued fruit and vegetable CV voucher, there is a limited number of seasonal FMNP checks available and not every family is guaranteed FMNP checks due to funding constraints. By mid-2010, six California WIC locations completed a successful pilot of Certified Farmers' Markets (CFM) vendors accepting WIC participants' fruit and vegetable CV vouchers. Subsequently, California WIC

offered the opportunity to 13 additional CFM vendors, including a Glenn County CFM, a neighboring county to Butte, the focus of the current study. Glenn County has a population of less than 29,000 and is comprised largely of farming communities (U.S Census Bureau, 2011). Glenn County WIC office served 1,522 participants as of December 2010 (Integrated Statewide Information System (ISIS) database software, California WIC, 2011) and had participated in the seasonal FMNP for 12 years.

At the time of the study, to the authors' knowledge, there were no known publications on redeeming CV vouchers at CFM. A previous study found that food purchasing can vary by ethnicity, such as Hispanics purchasing proportionately more fruits and vegetables than African Americans, and proportionately less mixed dishes than Whites (Cullen et al., 2007). Neuhaus, Thompson, Coronado and Solomon (2004) found that Hispanics consumed more fruits and vegetables than non-Hispanic Whites, and that highly acculturated Hispanics consumed fewer fruits and vegetables than those less acculturated. This finding is relevant because Glenn County WIC provides nutrition education in English and Spanish. There is increasing interest among health professionals and institutions in encouraging fruit and vegetable consumption to improve health, especially among lower socioeconomic populations which tend to have poorer intakes (Cassady, Jetter & Culp, 2007). We wish to identify criteria to include in nutrition education messages to encourage WIC participants utilizing their fruit and vegetable CV vouchers at CFM.

This study used the Theory of Planned Behavior (TPB) to assess the perceived behavioral control, attitudes toward, and factors influencing intentions of WIC participants to using fruit and vegetable CV vouchers at CFMs. The theory is based on the assumption that most behaviors of social relevance are under volitional control (Glanz, Rimer & Viswanth, 2008). Most notably is behavioral intention, the precursor of behavior. The three constructs that have direct influence over intention are: *attitudes toward behavior, subjective norm and perceived behavioral control over behavior* (Glanz et al.,

2008). The theory suggests that when individuals have a sufficient degree of control over their behavior and have a positive attitude about a behavior, they are likely to carry out the intended behavior when the opportunity is presented (Glanz et al., 2008). It is theorized that WIC participants, who are sufficiently motivated by positive attitudes and intentions toward redeeming CV vouchers at CFM, will be more likely to redeem CV vouchers for fruits and vegetables at CFM. We hypothesized that more WIC Spanish speakers will have greater perceived behavioral control, positive attitudes, and intentions to using Cash-Value vouchers at CFM than English speakers.

Methods

Study Design and Sample

This study was a cross-sectional survey of WIC participants. At the time of the study, Glenn County WIC participants were primarily Hispanic (75.4%), with non-Hispanic White participants representing approximately 22% of the WIC population, and the remaining 2% comprised of Asian/Asian Americans, Native Americans, African Americans and Pacific Islanders (ISIS database software, California WIC, November 17, 2010). Inclusion criteria were current enrollment in the Glenn County WIC program at Hamilton City, Orland or Willows, and being 18 years of age or older. Informed consent was obtained prior to participation in the study. All participants were offered an incentive gift such as a water bottle, cookbook or pedometer after completing the survey, and they were also entered into a raffle for a gift certificate that was issued at the completion of data collection. All procedures were approved by the California State University, Chico Human Subjects Review Committee.

At the time of data collection, there were approximately 627 families in Glenn County participating in WIC. A sample size table determined that approximately 240 (CI=95%, p=0.05) surveys were necessary to detect the effect sizes desired; however, 265 surveys were collected to account for attrition and incomplete surveys. Modified systematic random sampling

was employed to contact WIC clients to participate in the study. A master list was created identifying all WIC participants in Glenn County by first name alphabetically. The total number of WIC participants was divided by the desired sample size to obtain a sampling fraction of three, then every third WIC participant was called on the list. In addition, to ensure reaching the target number of surveys required within the two-week data collection period, WIC participants (n<30) attending regularly scheduled appointments at one of the two clinics Hamilton City and Orland were also asked to participate in the study. Recruitment took place the first two weeks of February 2011.

Measures and Data Collection

Survey questions were developed by Glenn County WIC staff and nutrition educators, and based on factors identified during literature review (Kunkel, Luccia & Moore, 2003; Middleton & Smith, 2011; Racine, Smith Vaughn & Laditka, 2010) and WIC participant responses on the use of the seasonal FMNP checks at CFM. The survey was founded on the Theory of Planned Behavior and focused on perceived behavioral control, attitudes toward the behavior, and factors influencing intentions.

Table 1

Demographic Characteristics of the Sample by Language Preference							
	All		Spanish speakers		English speakers		P-value
	n	(%)	n	(%)	n	(%)	
Age, mean (SD)*	248	29.2±6.5*	115	31.0±6.5*	133	27.7±6.2*	<0.001
Ethnicity (n=251)							
Hispanic	194	77.3	118	100	76	57.1	<0.001
Non-Hispanic	57	22.7	0	0	57	42.9	
Education level (n=248)							
High school/ less	184	74.2	107	92.2	77	58.3	<0.001
Some college/ higher	64	25.8	9	7.8	55	41.7	
Employment or in school (n=252)							
Unemployed/ not in school	152	60.3	84	70.6	68	51.1	0.002
Employed/ going to school	100	39.7	35	29.4	65	48.9	
Marital Status (n=249)							
Married or living with partner	212	85.1	102	87.9	110	82.7	0.248
Not married or living with partner	37	14.9	14	12.1	23	17.3	
Household size (n=251)							
1-2	13	5.2	6	5.1	7	5.3	0.009
3- 4	140	55.8	53	44.9	87	65.4	
5- 6	74	29.5	44	37.3	30	22.6	
7 or more	24	9.6	15	12.7	9	6.8	
Annual Income (n=220)							
Less than \$10,000	41	18.6	11	10.7	30	25.6	0.038
\$10,000- \$19,999	56	25.5	26	25.2	30	25.6	
\$20,000- \$29,999	75	34.1	42	40.8	33	28.2	
\$30,000-\$40,000	39	17.7	21	20.4	18	15.4	
greater than \$40,000	9	4.1	3	2.9	6	5.1	

*Mean ± Standard Deviation

The survey included 69 questions and took approximately 15 to 18 minutes to complete. Data were collected on past seasonal FMNP check use, history of CFM patronage and demographic data (Table 1); question responses were close-ended and included an option of “I don’t know”. Twelve questions were developed to address perceived behavioral control in

redeeming WIC monthly fruit and vegetable CV vouchers at CFM. Likert-scale responses for perceived behavioral control questions were: “it would stop me,” “it might stop me” and “it wouldn’t stop me” (Table 2). Likewise, to address attitude toward redeeming CV vouchers at CFM; Likert-scale responses for 13 questions were: “not important,” “somewhat important,”

and “important” (Table 3). Lastly, responses for the 12 questions on factors influencing

behavioral intentions were: “not likely,” “somewhat likely” and “likely” (Table 4).

Table 2

WIC Participants’ Perceived Behavioral Control to Redeeming Cash-Value Vouchers at Certified Farmers’ Markets (Ordinal Regression^{a,b})

	All participants		Spanish speakers		English speakers		p-value
	n	%	n	%	n	%	
Not enough variety of produce offered							<0.001
would stop me	49	19.4	25	21.0	24	18.0	
might stop me	57	22.6	8	6.7	49	36.8	
would not stop me	146	57.9	86	72.3	60	45.1	
Not knowing what produce I can buy							0.038
would stop me	24	9.5	15	12.6	9	6.8	
might stop me	30	11.9	3	2.5	27	20.3	
would not stop me	198	78.6	101	84.9	97	72.9	
Unfavorable weather conditions							<0.001
would stop me	67	26.8	22	18.5	45	33.8	
might stop me	57	22.8	8	6.7	49	36.8	
would not stop me	126	50.4	89	74.8	37	27.8	

^a Education (high school or less/Some college or more) and seasonal Farmers’ Market Nutrition Program participation (yes/no) were added as control variables in multivariate analyses. Ethnicity (Hispanic/non-Hispanic) was omitted from analyses due to being highly correlated with language preference (Spanish/English).

^b The following variables were not significantly different between Spanish and English speakers: the wrong time of day, the wrong day of the week, the distance to the CFM, difficulty finding parking, no transportation service provided, only seasonally grown produce is sold, not selling frozen/canned foods, ease of buying foods at grocery store, produce does not look clean or not packaged.

The survey was written in English, translated into Spanish and then translated back into English by employees at the California WIC Division. Spanish was the primary language of the translators. Glenn County WIC staff was trained on interviewing, data collection techniques and use of the online survey tool that was utilized, Survey Monkey®. The trained interviewers field tested the survey via face-to-face interviews at the neighboring Butte County WIC clinic (n=30 participants); the participants were asked about the clarity of the survey questions. The survey was revised based on participant responses and suggestions.

Statistical Tests

IBM SPSS Statistics (version 21, IBM Corporation, NY 2012) was used to analyze data. Means, standard deviations, percentages and frequencies were computed for demographic variables. Chi-square analyses and independent-sample t-tests were used to compare demographic data between English and Spanish

speakers (Table 1). Dependent variables were the behavioral control, attitudes towards the behavior, and factors influencing behavioral intention to using CV vouchers at CFM by the study participants; see left column on Tables 2, 3 and 4. Because the dependent variables had three-point Likert scales, ordinal regression was employed in multivariate analyses. The two variables ‘educational level’ and ‘employment/in school’ were highly correlated with each other, so employment/in school variable was omitted from multivariate analyses. Despite differences in household size and annual income between English and Spanish speakers, these variables were not entered into analyses, since all study participants met the low-income qualification to enroll in WIC. Language preference was the main independent variable of interest; accordingly, proportions were reported for the dependent variables between English speakers and Spanish speakers. Language preference (English/Spanish), FMNP participation (participant/nonparticipant) and

education (high school or less/some college or more) were factored simultaneously in the ordinal regression analyses. These analyses were used to calculate significant proportional differences in dependent variables to using CV

vouchers at CFM between English speakers and Spanish speakers. Ethnicity (Hispanic/non-Hispanic) was omitted from analyses due to its high association with language preference. Statistical significance was set at $p \leq 0.05$.

Table 3

WIC Participants' Attitudes Towards Redeeming Cash-Value Vouchers at Certified Farmers' Markets (Ordinal Regression^a)^b

	All participants		Spanish speakers		English speakers		p-value
	n	%	n	%	n	%	
Variety of produce offered							0.013
not important	9	3.6	5	4.2	4	3.0	
somewhat important	28	11.1	3	2.5	25	18.8	
important	215	85.3	111	93.3	104	78.2	
Offering organic produce							<0.001
not important	40	15.9	9	7.6	31	23.3	
somewhat important	45	17.9	11	9.2	34	25.6	
important	167	66.3	99	83.2	68	51.1	
Day of the week							0.001
not important	78	31.1	29	24.4	49	36.8	
somewhat important	50	19.9	16	13.4	34	25.6	
important	123	49.0	73	61.3	50	37.6	
Time of day							0.013
not important	76	30.3	33	27.7	43	32.3	
somewhat important	62	24.7	19	16.0	43	32.3	
important	113	45.0	66	55.5	47	35.3	
Entertainment provided at CFM							<0.001
not important	128	51.0	47	39.5	81	60.9	
somewhat important	48	19.1	16	13.4	32	24.1	
important	75	29.9	55	46.2	20	15.0	
Family and children friendly							0.011
not important	6	2.4	1	0.8	5	3.8	
somewhat important	11	4.4	1	0.8	10	7.5	
important	234	93.2	116	97.5	118	88.7	
Items for sale than just produce							<0.001
not important	45	17.9	12	10.1	33	24.8	
somewhat important	58	23.1	14	11.8	44	33.1	
important	148	59.0	92	77.3	56	42.1	
Public transportation available							<0.001
not important	69	27.5	16	13.4	53	39.8	
somewhat important	36	14.3	9	7.6	27	20.3	
important	146	58.2	93	78.2	53	39.8	

^a Education (high school or less/Some college or more) and seasonal Farmers' Market Nutrition Program participation (yes/no) were added as control variables in multivariate analyses. Hispanic) was omitted from analyses due to being highly correlated with language preference (Spanish/English).

^b The following variables were not significantly different between Spanish and English speakers: quality of produce; price of produce for sale; the distance I have to travel, closer the better; concession stands for food is available; and customer service/friendliness of sales staff.

Results

Sample Characteristics

All Spanish speakers self-identified as Hispanic, but English speakers were Hispanic or non-Hispanic. The mean age of the study participants was 29.2 ± 6.5 years (range: 18-55 years). Most

participants were English speakers (Table 1). Proportionately, more English speakers had attended college ($p < 0.001$), and had incomes less than \$20,000 annually ($p = 0.005$). There were no significant differences in marital status between English and Spanish speakers.

Perceived Behavioral Control to Using Cash-Value Vouchers at CFM

Logistic ordinal regression results indicated that three factors on perceived behavioral control to overcome barriers were significantly different between English and Spanish speakers (Table 2). The answers of not enough variety of produce offered ($p<0.001$), not knowing what produce to buy ($p=0.038$), and unfavorable weather conditions ($p<0.001$) were proportionately lower among English speakers than Spanish speakers. Proportionately more study participants with HS or less (71.7%) than participants with some college or more (43.8%) thought that wrong time of day would not stop them in using CV vouchers at CFM, while controlling for education and language preference ($p=0.024$).

Attitude towards the Using Cash-Value Vouchers at CFM

Logistic ordinal regression results indicated that, proportionately fewer English speakers than Spanish speakers indicated that the following factors were associated with their intentions to buy produce at CFMs: variety of produce ($p=0.011$), offering organic produce ($p=0.002$), day of the week ($p=0.031$), entertainment provided ($p=0.002$), family and children friendly ($p=0.003$), other items for sale than just produce ($p=0.001$), and availability of public transportation ($p<0.001$) (Table 3). Proportionately fewer FMNP participants (46.3%) than non-participants (65.1%) thought that having other items for sale than just produce was important in using CV vouchers at CFM, while controlling for education and language preference ($p=0.016$). FMNP participants (45.1%) than non-participants (64.5%) thought that having public transportation was important in using CV vouchers at CFM, while controlling for education and language preference ($p<0.001$).

Factors Associated with Behavioral Intention toward Using Cash-Value Vouchers at CFM

Logistic ordinal regression results indicated that, proportionately more Spanish speakers than English speakers were likely to use CV vouchers for the following variables: 'I would be helping out farmers or community' ($p=0.005$), 'produce is grown in season' ($P<0.001$), 'I like shopping

outdoors' ($p=0.005$), 'I like supporting sustainable practices' ($p=0.003$) (Table 4). Proportionately more study participants with HS or less (62.3%) than some college or more (48.4%) thought it was important that 'if public transportation was available' in redeeming CV vouchers at CFM, while controlling for language preference and ethnicity ($p=0.002$). Proportionately more study participants with HS or less (65.5%) than some college or more (37.5%) thought that 'I can buy other food items than just produce' was important in using CV vouchers at CFM, while controlling for language preference and ethnicity (Ordinal Regression, $p=0.027$).

Discussion

The results of this study provide insight into Glenn County WIC participants' perceived behavioral control, attitudes toward, and factors influencing intentions to purchasing fruit and vegetables at CFM with WIC CV vouchers. Spanish speakers were more motivated to redeem CV vouchers if criteria deemed important (variety of produce, offering organic produce, day of the week, entertainment provided, family and children friendly, other items for sale than just produce, availability of public transportation) were met and English speakers were significantly less motivated to redeem fruit and vegetable if perceived barriers existed. Barriers to not redeeming CV vouchers at CFM for English speakers were not enough variety of produce offered, not knowing what produce to buy, and unfavorable weather conditions.

Over 78% of Spanish speakers considered public transportation important to redeem CV vouchers at CFM, while less than 40% of English speakers thought it was important (Table 3). Also, the furthest clinic from the CFM, Willows, was a significant covariate. WIC participants at this site considered the closer distance for travel to the CFM as important for redeeming CV vouchers and considered no transportation service provided as a barrier. Similar to our findings, other studies have identified barriers to shopping at farmers' markets (Racine, Vaughn Smith & Laditka, 2010; Middleton & Smith

2011; Anliker, Winne & Drake, 1992). Transportation to CFM seems to be a common barrier identified by both older adults and WIC participants enrolled in the seasonal FMNP. Middleton and Smith (2011) reported that transportation issues were barriers to frequenting farmers' markets among older adults participating in the Senior Farmers' Market Nutrition Program. Among WIC participants in the District of Columbia (DC) and North

Carolina, barriers to frequenting farmers' markets included transportation, no farmers' market in close proximity, and not knowing location of the markets (Racine et al., 2010). Anliker, Winne, and Drake (1992) also identified lack of transportation as well as location of markets as barriers to redeeming seasonal FMNP checks at Connecticut farmers' markets.

Table 4

Factors that Influence WIC Participants' Behavioral Intention to Using Cash-Value Vouchers at Certified Farmers' Markets (Ordinal Regression^{a,b})

	All study participants		Spanish speakers		English speakers		P-value
	n	%	n	%	n	%	
I would be helping out farmer's or community							0.005
not likely	3	1.2	1	0.8	2	1.5	
somewhat likely	12	4.8	1	0.8	11	8.3	
likely	237	94.0	117	98.3	120	90.2	
Produce is grown in season							<0.001
not likely	5	2.0	0	0	5	3.8	
somewhat likely	20	8.0	2	1.7	18	13.5	
likely	226	90.0	117	98.3	109	82.6	
I like shopping out doors							0.005
not likely	19	7.6	5	4.2	14	10.5	
somewhat likely	37	14.7	11	9.2	26	19.5	
likely	195	77.7	102	85.7	93	69.9	
I like supporting sustainable practices							0.003
not likely	7	2.8	2	1.7	5	3.8	
somewhat likely	24	9.5	5	4.2	19	14.3	
likely	221	87.7	112	94.1	109	82.0	

^a Education (high school or less/Some college or more) and seasonal Farmers' Market Nutrition Program participation (yes/no) were added as control variables in multivariate analyses. Hispanic (Spanish/English) was omitted from analyses due to being highly correlated with language preference (Spanish/English).

^b The following variables were not significantly different between Spanish and English speakers: grown locally; it may be healthier than produce at grocery stores; may be fresher than grocery stores; I want to know where my food comes from or who grows it; it is a social event; not just buying produce; if public transportation is available; and I can buy other food items than just produce.

Few studies have assessed produce shopping behaviors among Spanish-speaking families. The Food and Marketing Institute reported that Hispanics favor local produce and are more likely to buy local produce if they earn under \$25,000 a year (Food and Marketing Institute Research 2004). In the current study, attitudes towards attending CFM among Spanish speakers were offering a variety of produce, having offering organic produce, and other items

for sale than just produce (Table 3). Proportionately more Spanish speakers thought it was important to have entertainment provided and a family and child CFM. This may reflect how celebrations centered on good food to reinforce relationships among Hispanic families (Food and Marketing Institute, Research 2004; Food and Marketing Institute, 2002). Thus, the social component, in addition to the availability of fruit and vegetables for purchase may

encourage shopping at CFM and redeeming CV vouchers.

Studies have documented that individuals with more education are more likely to frequent farmers' markets (Blanck, Thompson, Nebeling & Yaroch, 2011; Kropf et al., 2007; Centers for Disease Control and Prevention, 2010). Kropf (2007) also noted that women participating in WIC FMNP in Ohio had higher education levels (high school graduate versus non-high school graduate) than those who did not participate. This may be related to our findings that participants with a high school diploma or less thought it more important to have public transportation and other items than just produce for sale. In contrast, we found that participants with lower education would not be stopped by wrong time of day than those with higher education.

Several agencies can promote the use of CV vouchers at CFM. Educators have the opportunity to inform/educate vulnerable populations about the healthful benefits of eating fruits and vegetables whereas market managers can increase sales for their produce vendors with increased redemption of WIC CV vouchers. Policy makers have the opportunity to partner with market managers, health educators, WIC staff and participants to coordinate services. There was a high frequency of agreement among Spanish and English speakers regarding perceived behavioral control, attitudes toward, and factors influencing intentions to redeeming CV vouchers at CFM. Similarities should be acknowledged in order to promote increased participation among WIC participants at CFM in a cost effective manner. Varied and regional marketing strategies may be required to ensure equal participation from English and Spanish speakers to attend CFM. Examples of marketing strategies may be: offering WIC information booth; offering bus coupons or free transportation; offering non-produce items for sale; scheduling entertainment such as music, cooking demonstrations and activities for children; offering affordable organic produce and electronic banking services.

This study included mixed sampling methods (n=30 convenience, and n=222 random), and sampling in a rural setting, thus limiting the generalizability of the results to WIC participants throughout California and the US. Additionally, language preference, English/Spanish, was used as a proxy for acculturation. The authors utilized California WIC program's questions on race and ethnicity which does not clarify the nation of origin for Hispanic ethnicity nor acculturation level. However, the sample distribution for Hispanics in northern California is similar to the WIC program statewide (Food and Nutrition Service 2002). This study is pioneering a subject where little or no research has been published. WIC staff, market managers and policy makers can use this information to help minimize barriers for WIC participants in redeeming their CV vouchers at CFM. The survey was not tested for reliability, and it did not ask if the dollar amount on the CV voucher was considered a barrier or a benefit (\$10 increments for adults and \$6 for children) and should be included in future studies.

Implications for Research and Practice

WIC nutritionists have an opportunity to provide participants with specific regional CFM information that could help with purchasing decisions. WIC classes could focus on factors associated with using CV vouchers at CFM, such as teaching WIC participants how to identify, select and prepare 'locally sold' produce at CFM. Educational messages during WIC classes could include seasonally grown produce offered, outdoor shopping experience, how shopping with CV vouchers at CFM differs from retail shopping experience and 'what are' sustainable growing practices'. Additionally, despite statistical differences between English and Spanish speakers, agreement was found between the two groups.

The new WIC CV voucher has potential for financially supporting farmers of locally grown produce. CFM popularity was observed in the California WIC community by increases in seasonal FMNP redemption rates over the last several years (2005: 57.21% to 2012: 66.16%) (Griffin P, written communication, 2013).

Millions of dollars of WIC CV vouchers are issued each month for the purchase of fruits and vegetables nationwide which are commonly redeemed at retail stores. California WIC alone issues well over 7 million dollars each month (Cowell T, written communication, 2009). Communities have the opportunity to keep the revenue from WIC CV vouchers local by encouraging WIC participants to visit and purchase produce using their CV vouchers at CFM. With the availability of WIC fruit and vegetable CV vouchers and the growth and popularity of farmers' markets nationwide, further studies are warranted among other WIC

populations in order to maximize CV voucher redemption rates at CFM.

Acknowledgements

The authors would like to thank Glenn County and Butte County WIC staff for their assistance with this study. Data for this manuscript were taken from a thesis for one of the authors (LM). The California State University, Chico provided funding for use of Survey Monkey®. LM and JS dedicate this manuscript to memory of their parents who passed during the preparation of this paper.

References

- Anliker, J. A., Winne, M., & Drake, L. T. (1992). An evaluation of the Connecticut Farmers' Market Nutrition Program. *Journal of Nutrition Education*, 24(4), 185-191.
- Blanck, H. M., Thompson, O. M., Nebeling, L., & Yaroch, A. L. (2011). Improving fruit and vegetable consumption: use of farm-to-consumer venues among US adults. *Prevention of Chronic Disease*, 8(2), A49.
- Cassady, D., Jetter, K., & Culp, J. (2007). Is price a barrier to eating more fruits and vegetables for low-income families? *Journal of the American Dietetic Association*, 107(11), 1909-1915.
- Centers for Disease Control and Prevention. (2010). State specific trends in fruit and vegetable consumption among adults-United States, 2000-2009. *Morbidity and Mortality Weekly Report*, 59(35), 1125-1130.
- Committee to Review the WIC Food Packages. (2005) *WIC food packages: Time for a change*. Washington, DC: The National Academies Press.
- Cullen, K., Baranowski, T., Watson, K., Nicklas, T., Fisher, J., O'Donnell, S., Baranowski, J., Islam, N., & Missaghian, M. Food category purchases vary by household education and race/ethnicity: Results from grocery receipts. *Journal of the American Dietetic Association*, 107(10), 1747-1752.
- Food and Marketing Institute. (2002). Hispanics bring together family and food. *Supermarket Research*. 4(3), 4.
- Food and Marketing Institute Research. (2004). *El Mercado 2004: A perspective on U.S. Hispanic shopping behavior*. Washington DC. Accessed April 1, 2013, from: <http://www.fmi.org/forms/store/CommercePlusFormPublic/search?action=Feature>
- Food and Nutrition Service. (2002). Funding and Program Data. Table 1 Racial/ethnicity enrollment by region and state April 2002. Accessed December 2, 2011, from: <http://www.fns.usda.gov/wic/racial-ethnicdata/2002table1.htm><http://www.fns.usda.gov/wic/racial-ethnicdata/2002table1.htm>
- Glanz, K., Rimer, B. K., & Viswanth, K. (2008). *Health behavior and health education: theory, research and practice*. (4th ed.). San Francisco, CA: Jossey-Bass Publishers.
- Kropf, M. L., Holben, D. H., Holcomb, J. P., & Anderson, H. (2007). Food security status and produce intake and behaviors of Special Supplemental Nutrition Program for Women, Infants, and Children and Farmers' Market Nutrition Program participants. *Journal of the American Dietetic Association*, 107(11), 1903-1908.
- Kunkel, M. E., Luccia, B., & Moore, A. C. (2003). Evaluation of the South Carolina Seniors Farmers' Market Nutrition Education Program. *Journal of the American Dietetic Association*, 103(7), 880-883.

- Middleton, C., & Smith, S. (2011). Purchasing habits of seniors farmers' market shoppers: utilizing the Theory of Planned Behavior. *Journal of Nutrition in Gerontology and Geriatrics*, 30(3), 248-260.
- Neuhouser, M., Thompson, B., Coronado, G., & Solomon, C. (2004). Higher fat intake and lower fruit and vegetables intakes are associated with greater acculturation among Mexicans living in Washington State. *Journal of the American Dietetic Association*, 104(1), 51-57.
- Racine, E. F., Vaughn Smith, A., & Laditka, S. B. (2010). Farmers' market use among African-American women participating in the Special Supplemental Nutrition Program for Women, Infants and Children. *Journal of the American Dietetic Association*, 110(3), 441-446.
- U.S. Census Bureau. State and County Quick Facts. Glenn County. (2011). Accessed November 11, 2011, from: <http://quickfacts.census.gov/qfd/states/06/06021.html>
- U.S. Department of Agriculture, Food and Nutrition Service, Office of Research and Analysis. (2011a). *WIC Food Packages Policy Options Study*, by Cole, N., Jacobson, J., Nichols-Barrer, I., & Fox, M. K. Alexandria, VA.
- U.S. Department of Agriculture, Food and Nutrition Service. Nutrition Program Facts. (2011b). Accessed January 16, 2014, from: <http://www.fns.usda.gov/sites/default/files/WIC-Fact-Sheet.pdf>
- U.S. Department of Agriculture. WIC Farmers' Market Nutrition Program fact sheet. (2011c). Accessed January 16, 2014, from: <http://www.fns.usda.gov/sites/default/files/WIC-FMNP-Fact-Sheet.pdf>

Author Information

Leslie McDonnell, MS, RD, IBCLC
At the time of the study, Glenn County Health Services
WIC.

Lead author is currently retired.

Michelle Neyman Morris, PhD, RD
California State University, Chico.
Department of Nutrition and Food Sciences.

*Julie Holland, PhD
California State University, Chico.
Department of Nutrition and Food Sciences.
400 W. 1st Street, Chico, CA.
(530) 898-6567, (530) 898-5586 (fax),
jmholland@csuchico.edu.

* corresponding author