

**Expanding the Realm of Food Security: Electronic Benefit Transfer Use
in Farmers' Markets in East Bay, California**

Priscilla Yung

ABSTRACT

Government assistance program accessed through electronic benefit transfer (EBT) assists low-income families in gaining access to nutritious produce and address chronic health issues in urban neighborhoods. Yet, few studies have considered the difficulties in using EBT in urban farmers' markets, impacting the efficiency and awareness of EBT acceptance. I conducted surveys and interviews to document EBT use practices in Hayward, Downtown Oakland, Oakland Grand Lake, and Berkeley farmers' markets, in Alameda County, California. I classified 406 respondents as EBT users, potential EBT users, and non-EBT users, focusing on demographic and behavioral characteristics, consumer knowledge and barriers to using EBT. I found that an average of 25% ($\pm 20\%$ SD) of respondents used EBT at the four farmers' markets and 25% ($\pm 8\%$ SD) of respondents qualified, but did not use EBT. Respondents cited the availability of fresh produce and nutritional/health values as their primary reasons for shopping at farmers' markets. Barriers to EBT use at farmers' markets included a lack of EBT tokens and deficiency in EBT use awareness in farmers' markets. My findings suggest that increasing EBT use at farmers' markets is possible, and that it may serve public needs in maximizing the provision of food subsidies to low-income families. However, to achieve this goal, barriers to use by EBT users and potential users must be addressed.

KEYWORDS

Fresh produce, food subsidies, nutrition, consumer behavior, farmers' market

INTRODUCTION

Chronic illnesses are on the rise in United States partly due to unbalanced diet, particularly in low-income communities (Barr, 2003). Malnutrition is the primary environmental and social justice issue underlying chronic illnesses (Gray, Cossman & Powers, 2006). Homes with food insecurity have insufficient access to nutritionally adequate food and may consume fewer fruits and vegetables, leading to increased rates of chronic diseases (Drewnowski & Specter, 2004; Kroft, Holben, Holcomb & Anderson, 2007). Low-income urban women tend to purchase high fat content and processed foods, while those in higher income communities tend to purchase foods that contain relatively lean or low-fat alternatives (Dammann & Smith, 2010). Further, low-income urban families often have few options for purchasing fresh produce, due to a lack of retail grocery retailers in their neighborhoods (Cotterill & Franklin, 1995; Dammann & Smith, 2010). Lack of access to healthy food must be addressed by providing food security for citizens of all ages and household status (*Annual Historical Review*, 1997; Gundersen & Oliveira, 2001). Government policies and subsidy programs can facilitate access to healthy foods in low-income neighborhoods (Gundersen & Oliveira, 2001). Specifically, policies that promote the use of foods stamps at farmers' markets may be an important way of addressing food insecurity issues for low-income urban families (Gundersen & Oliveira, 2001).

Federal nutritional subsidy programs, including the WIC program provides women, infant, and children up to five years old with nutritional food and coupons to purchase fresh, locally grown produce from farmers' markets. This plays an increasingly important role in assuring food security for low-income urban residents, in part by increasing their access to farmers' market products by providing EBT in farmers' markets and other markets (Joy et. al, 2001; Herman, Harrison, & Jenks, 2006; Kroft et. al, 2007; Herman et. al, 2008). California and federal nutritional programs and policies can assist low-income families in obtaining access to fresh, nutritious, unprepared, locally grown fruits and vegetables and increase the amount of purchases in farmers' markets, leading to the increased of fruits and vegetable intake to give participants well-balanced diets (Joy, Bunch, Davis, & Fujii, 2001; Herman, Harrison, Afifi, & Jenks, 2008). However such programs may have not increased access to fresh produce purchases at farmers' markets as much as they might for low-income residents. California state policies specified in AB 537 and administered under the Supplemental Nutrition Assistance Program

(SNAP) seek to increase low-income Californians access to fresh produce using EBT (SNAP, 2008). Yet, most of California's farmers' markets are currently cash-only operations set up in fields, parks, or parking lots, with less than 20% accepting EBT cards (Bussewitz, 2010; Cavanugh & Heilbrunn, 2010); Therefore, state assembly member Juan Arambula introduced AB 537 (2010) requiring all farmers' markets to accept EBT by 2012 (Bussewitz, 2010; Cavanugh & Heilbrunn, 2010). The bill assigns California State Food and Nutrition Service certified entities to operate EBT systems at farmers' markets if the market operator chose not to operate the system themselves prior to 2010, and provides the expensive EBT wireless device for free to increase the number of farmers' markets that accept EBT (Bussewitz, 2010; Cavanugh & Heilbrunn, 2010). Yet, there is little research on the potential impact of these programs on food security for low income urban residents.

Low-income families face difficulties using government subsidies in farmers' markets to purchase fresh produce (Herman et. al, 2006; Herman et. al, 2008), but such subsidies can increase their access to fresh produce and change their choice of markets and shopping behaviors (Dammann & Smith, 2010). EBT is the most commonly used system through which government assistance programs are monetized, allowing some low-income families to purchase fresh produce (Joy et. al, 2001; Herman et. al, 2006; Herman et. al, 2008). State agencies administer EBT in the form of a debit card that is available from point of sale machines and automated teller machines, to facilitate easy access to benefits in grocery stores, farmers' markets, or other type of stores (Dib, Dodson, & Schocken, 2000). However, the use of EBT in farmer's markets is often limited because the system is relatively new and is not efficiently used (Navarrette, 2010), and the EBT system may reduce the range of potential food shopping locations due to limited acceptance of the debit card (Dib et. al, 2000; Navarrette, 2010). There are few studies on the expanding EBT program; the lack of information on EBT use in farmers' markets may impact the efficiency of the EBT program by undermining awareness of EBT in farmers' markets.

I assessed the effectiveness of EBT in providing access to food products of high nutritional value at farmers' markets. Specifically, I documented the EBT use rates and practices of EBT clients and those eligible to be EBT clients (potential EBT users) in farmers' markets in the East Bay, California. I focused on demographic patterns among EBT users classes, differences in the value, types of food purchased, and barriers to EBT use at farmers' markets.

METHODS

Study site

To assess the effectiveness of Electronic Benefit Transfer (EBT) in providing food security to lower-income shoppers, I conducted surveys and interviews of shoppers and employees of non-profit organizations that administer EBT programs at farmers' markets in Hayward, Downtown Oakland, Oakland Grand Lake, and Berkeley – all of which are in ethnically diverse areas of Alameda County, California in cities with annual household income substantially below the county average of approximately \$70,000 (Table 1).

Table 1. The annual household income and the non-profit organizations regulating at each city (US Census Bureau, 2000)

Study site	Annual household income	Non-profit organization
Oakland: Downtown	\$40,000	Marin Village
Oakland: Grand Lake	\$40,000	Marin Agriculture
Hayward	\$51,000	Marin Agriculture
Berkeley	\$44,500	Ecology Center

Data collection and analysis

Participant surveys

I distributed approximately 100 surveys per site to shoppers using convenient sampling methods to determine patterns of EBT use across different ethnic groups. I gathered data on respondent demographics, EBT use practices and perception of EBT use at farmers' markets. To identify the most common motives for farmers' market shopping, I identified respondents' three most important reasons for shopping at markets. I classified the most common motive by aggregating the count of each motive. In addition, I classified items purchased in East Bay farmers' markets and supermarkets into nine categories, by aggregating the count of each motive and identifying the items with the most count.

Analysis of EBT use across demographic categories

I classified respondents as EBT users, potential EBT users, and non-EBT users, and compared survey data across study sites, focusing on demographic and behavioral factors. I identified potential EBT users as respondents who are currently not using EBT, but are eligible for EBT use as defined by the United States Department of Agriculture's Food and Nutrition Services criteria for low annual household income (Table 2). To determine the significance of associations between educational attainment, ethnicity, and EBT use practices, I used R-commander to produce Chi-squared tests.

Table 2. Income classes based on income and household membership.

EBT & Potential EBT		Non-EBT	
<i>Household Membership</i>	<i>Annual household income</i>	<i>Household Membership</i>	<i>Annual household income</i>
1	Less than \$20,000	1	\$20,000-\$100,000 +
2	Less than \$20,000	2	\$20,000-\$100,000 +
3 +	Less than \$39,999	3 +	\$40,000-\$100,000 +

Consumer interviews

To determine consumers' knowledge of EBT program problems with EBT usage, and consumer motives for shopping at farmers' markets, I interviewed 16 farmers' markets customers at the Oakland Grand Lake and Downtown Oakland farmers' markets.

Non-profit organization coordinator interviews

I examined EBT program administration by non-profit organizations at each site, in order to understand how different administrative practices affected EBT use. To understand the historical and contemporary administration of EBT at each farmers' market, I interviewed non-profit organization coordinators who administer farmers' market EBT programs, focusing on promotion of and problems with EBT use at farmers' markets. I asked the non-profit organization coordinators about patterns of EBT use in each site, perceptions of why some potential EBT users did not use their EBT at the farmers' markets, and upcoming efforts to

improve public awareness of EBT programs at farmers' markets. I also documented the amount of EBT tokens purchased by consumers from each program's EBT department.

RESULTS

Farmers' markets history and demographics

I documented the history and development of the farmers' markets at the four study sites – Downtown Oakland, Grand Lake, Hayward, and Berkeley (Table 3). In aggregate, less than 10% of respondents used EBT at farmer's markets, but nearly 30% qualified as potential EBT users (Fig. 1). Nearly 74% had relatively high educational attainment (Fig. 2) and 66% of shoppers were White (Fig. 3), with females comprising 66% of consumer respondents and males 33%.

Table 3. Development of farmers' markets in East Bay.

Study Site	Community Organization	Study population (N)	Year of farmers' market founded	Year of EBT Acceptance
<i>Grand Lake</i>	Marin Agriculture	149	1998	2008
<i>Downtown Oakland</i>	Urban Village	108	1989	1998
<i>Hayward</i>	Marin Agriculture	88	1993	2009
<i>Berkeley</i>	Ecology Center	61	1987	2003

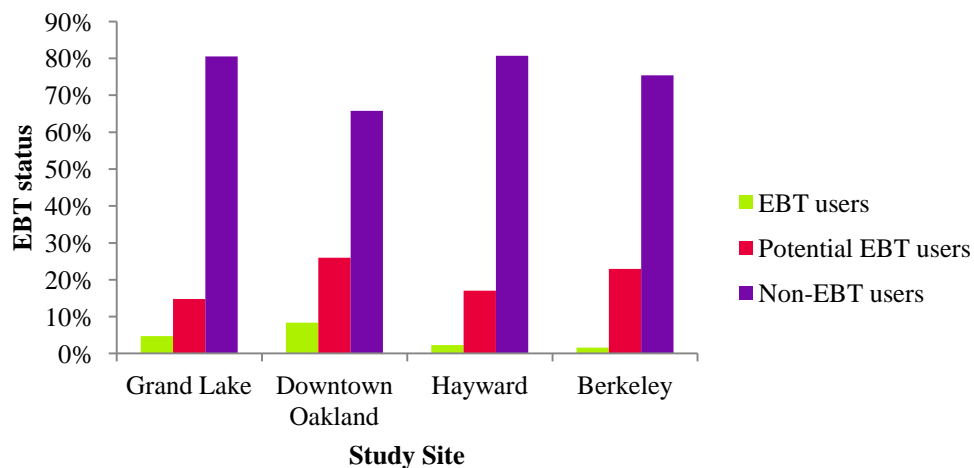


Figure 1. Customer EBT status at four East Bay farmers' markets. "EBT users" denotes respondents who use EBT at farmers' markets. "Potential EBT users" denotes respondents who qualify to use EBT, but do not use EBT at farmers' market. "Non-EBT users" denotes respondents who do not qualify for EBT.

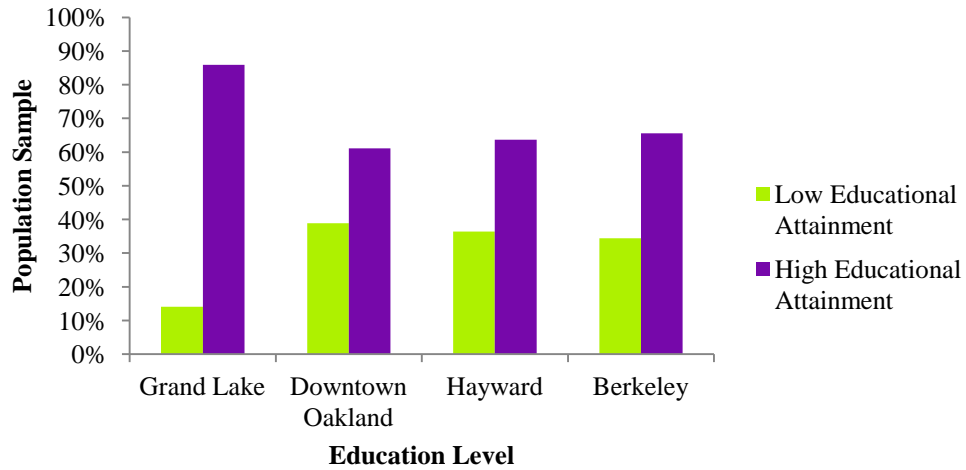


Figure 2. Educational attainment of respondents at four East Bay farmers' markets. “Low educational attainment” included less than high school, high school/GED and some college. “High educational attainment” included college degree (BS, BA) and graduate degree (Masters, MD, JD, PhD).

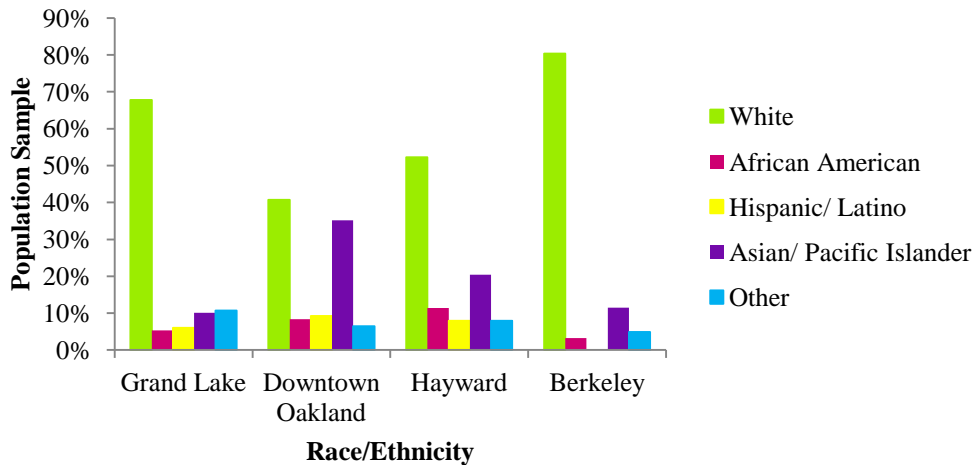


Figure 3. Customer race/ethnicity at four East Bay farmers' markets. “Other” denotes that participants indicated more than one race/ ethnicity.

Shopping behaviors

I found similar shopping behaviors across the four study sites. Of the eight potential motivating factors for farmers' market shopping, fresh produce and nutritional/ health values were frequently mentioned at all four sites (Table 4). Of the nine possible purchased items at East Bay farmers' markets, the top three most purchased items were fresh vegetables, fresh fruits

and baked goods at all markets. The most purchased items in the supermarkets by respondents at the four study sites were eggs and fresh vegetables (Table 5).

Table 4. Common motives for farmers' market shopping patterns. Respondent's motives for shopping at farmers' markets included 8 possible choices: fresh produce availability, organic products, nutritional/health values, environmental values, shopping atmosphere/experience, price, acceptance of food stamps, and location/convenience.

Study Site	Most common	Second most common	Third most common
<i>Grand Lake</i>	Fresh produce	Organic products	Nutritional/health values
<i>Downtown Oakland</i>	Fresh produce	Nutritional/health values	Price
<i>Hayward</i>	Fresh produce	Nutritional/health values	Organic products
<i>Berkeley</i>	Fresh produce	Nutritional/health values	Organic products

Table 5. Commonly purchased items in supermarkets. Motives of 8 possible choices including fresh vegetables, fresh fruits, processed food, meat, seafood, bake goods, eggs, and others.

Study Site	Most common	Second most common	Third most common
<i>Grand Lake</i>	Fresh vegetable	Meat	Egg
<i>Downtown Oakland</i>	Seafood	Other (Utilities)	Egg/ Fresh fruits
<i>Hayward</i>	Fresh vegetable	Meat	Egg
<i>Berkeley</i>	Fresh vegetable	Processed food	Egg

EBT use in farmers' markets

An average of 25% ($\pm 20\%$ SD) of respondents was EBT users, 25% ($\pm 8\%$ SD) potential EBT users, and 25% ($\pm 10\%$ SD) non-EBT users across the four study sites. EBT use by market ranged from 5%-47% (Table 6). Nearly half of EBT users and potential EBT users had relatively low educational attainment with a large variance, and 5% of non-EBT users had low educational attainment with a little variance (Fig. 4). The top three racial/ethnic groups of EBT users were White (12% $\pm 12\%$ SD), Hispanic/ Latino (5% $\pm 4\%$ SD), and Asian/ Pacific Islanders (4% $\pm 5\%$ SD) (Fig. 5).

Table 6: EBT user distribution at four East Bay farmers' markets. Percent denotes the average of each EBT group at the four sites.

	Grand Lake	Downtown Oakland	Hayward	Berkeley
EBT users, n = 19	7	9	2	1
(%)	(37%)	(47%)	(11%)	(5%)
Potential EBT users, n = 79	22	28	15	14
(%)	(28%)	(35%)	(19%)	(18%)
Non-EBT users, n = 308	120	71	71	46
(%)	(39%)	(23%)	(23%)	(15%)
Respondents	149	108	88	61

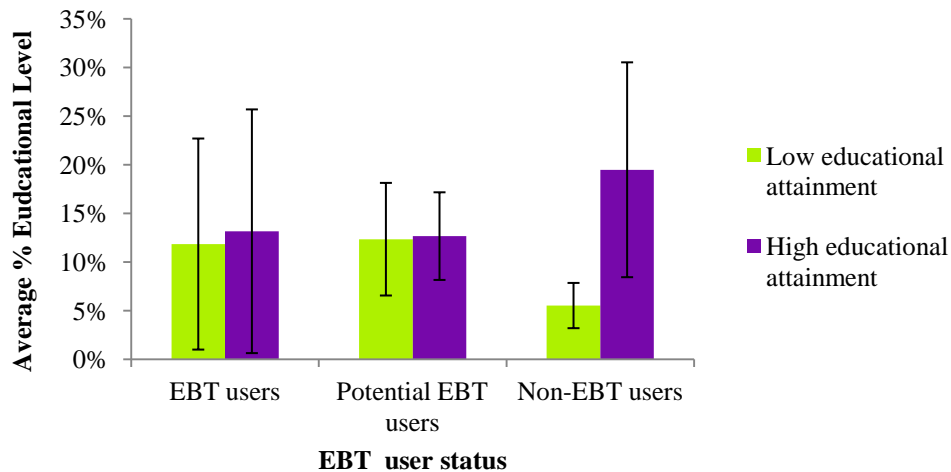


Figure 4. Mean percentage of education attainment of respondents at four East Bay farmers' markets (±SD). “Low educational attainment” included less than high school, high school/GED and some college. “High educational attainment” included college degree (BS, BA) and graduate degree (Masters, MD, JD, PhD).

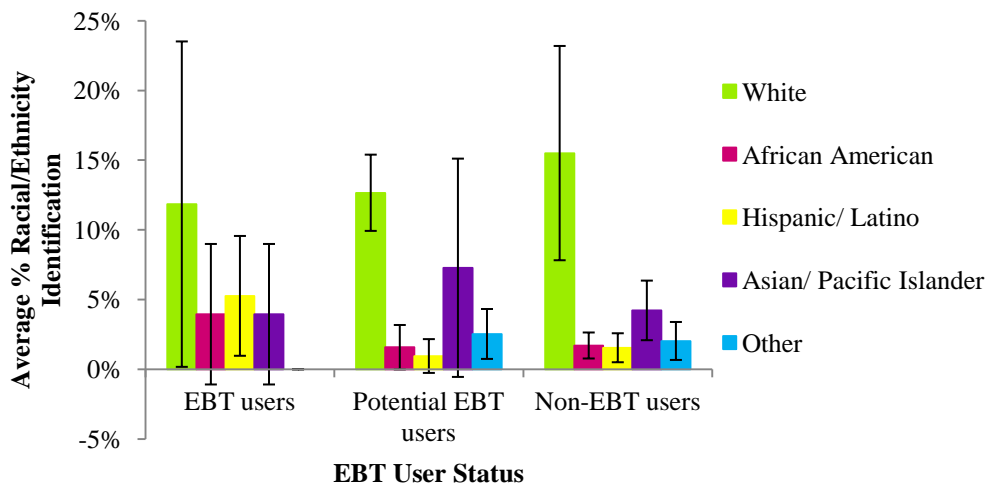


Figure 5. Mean percentage of customer racial/ethnicity identification at four East Bay farmers' markets (±SD). “Other” noted that participants indicated more than one race/ ethnicity.

Comparison of demographic and shopping behavior data between EBT users, potential EBT users, and non-EBT at four study sites revealed that educational attainment level was significant relative to EBT user status at Grand Lake, Downtown Oakland and Berkeley farmers' market sites (Table 7). In aggregate, associations between EBT user class and educational attainment level was significant for EBT users and non-EBT users (χ^2 (1, N=327) = 6.36, $p = 0.01$) (Table 7), with an odds ratio 3.16, indicating that non-EBT users are approximately three times more likely to have a high educational attainment than EBT users. In addition, educational attainment level in relation to EBT user status was statistically significant for potential EBT users and non-EBT users (χ^2 (1, N=387) = 23.41, $p < 0.001$), with an odds ratio 3.43, indicating that non-EBT users are approximately three times more likely to have a higher educational attainment compared to potential EBT users.

Association between EBT users and educational attainment level in Grand Lake was borderline significant for EBT users and non-EBT users (χ^2 (1, N=127) = 3.17, $p = 0.08$), with an odds ratio 4.32, indicating that non-EBT users are approximately four times more likely to have a higher educational attainment compared to EBT users. However, associations between EBT users and educational attainment level in Grand Lake was significant for potential EBT users and non-EBT users (χ^2 (1, N=142) = 17.02, $p < 0.001$), with an odds ratio 7.45, indicating that non-EBT users are approximately 7.5 times more likely to have a higher educational attainment compared to potential EBT users. Associations between EBT users and educational attainment level in Downtown Oakland was significant for potential EBT users and non-EBT (χ^2 (1, N=99) = 6.52, $p = 0.01$), with an odds ratio 3.13, indicating that non-EBT users are approximately three times more likely to have a higher educational attainment compared to potential EBT users. Association between EBT users and educational attainment level in Hayward was not significant for all users (χ^2 (2, N=88) = 3.60, $p = 0.17$). Association between EBT users and educational attainment level in Berkeley was significant for potential EBT users and non-EBT (χ^2 (2, N=60) = 6.88, $p = 0.008$), with an odds ratio 4.94, indicating that non-EBT users are approximately five times more likely to have a high educational attainment compared to potential EBT users.

Table 7. EBT user distribution and educational attainment at four farmers' markets. Pooled sites included Grand Lake, Downtown Oakland, Hayward, and Berkeley. "NA" denotes data does not apply. *Values are significant.

Study Site	χ^2	Df	p-value	Odds Ratio (EBT v. non-users)	Odds Ratio (potential users v. non-users)
<i>Pooled sites</i>	26.39	2	1.86E-06*	3.16	3.43
<i>Grand Lake</i>	17.57	2	0.0001*	4.32	7.45
<i>Downtown Oakland</i>	7.57	2	0.023*	NA	3.13
<i>Hayward</i>	3.60	2	0.17	NA	NA
<i>Berkeley</i>	7.47	2	0.024*	NA	4.94

In aggregate, association between EBT use and ethnicity was borderline significant across all study sites (Table 8). Associations between EBT users and ethnicity identity was borderline significant for potential EBT users and non-EBT (χ^2 (1, N=387) = 3.38, p = 0.07), with an odds ratio 0.63, indicating that potential EBT users are 1.5 times more likely to be minority compared to non-EBT users. However, ethnic identity did not have a significant association among individual study sites (Table 8).

Table 8. EBT user distribution and ethnicity (White and minorities) at four farmers' markets. Pooled sites included Grand Lake, Downtown Oakland, Hayward, and Berkeley. "NA" denotes data does not apply. *Values are significant.

Study Site	χ^2	df	p-value	Odds ratio (potential user v. non-users)
<i>Pooled sites</i>	4.51	2	0.10*	0.63
<i>Grand Lake</i>	1.05	2	0.59	NA
<i>Downtown Oakland</i>	1.61	2	0.45	NA
<i>Hayward</i>	2.24	2	0.33	NA
<i>Berkeley</i>	0.79	2	0.67	NA

Consumers' attitudes and knowledge regarding farmers' markets and EBT program

I conducted 16 interviews to ask consumers about their attitudes and knowledge regarding farmers' markets and the EBT program at Grand Lake and Downtown Oakland revealing that 50% of respondents were not aware of EBT acceptance in farmers' markets (Table 9). Of those eight who were aware of EBT acceptance, four were EBT users. 75% of those interviewed went to the farmers' markets for the fresh produce, 69% of them went to support local farmers, and 44% of them went to be part of the community.

Table 9. Consumers' attitude of farmers' market and EBT program. I interviewed 16 people from Grand Lake and Downtown Oakland.

Topic	Response	% Respondents
<i>Factors that influence consumers going to farmers' markets</i>	Fresh produce	75%
	Supporting local farmers	69%
	Part of the community	44%
	Cheap produces	25%
	Shopping outdoor	25%
	Entertainment	19%
	Large selection	19%
	Organic selection	19%
	Environmental benefits	13%
	Connecting to nature	6%
	Learn from local farmers	6%
<i>Changes needed in farmers' market</i>	Promotion of recyclable bags	13%
<i>Inconvenience of farmers' markets</i>	Parking	19%
	Other payments	19%
	Not allowing dog	6%
	Not enough chairs	6%
	Price inconsistency between markets	6%
<i>Inconvenience of EBT program</i>	Not widely accepted	13%
	Broken EBT machines	6%
	Cannot buy other utility items	6%
	Farmers' market ran out of EBT tokens to sell	6%
	Smaller currency other than whole dollars	6%
	Unable to interchange between some farmers' markets	6%
<i>Sources of EBT program awareness</i>	Unable to purchase prepared food	6%
	No knowledge	50%
	Farmers' markets/ other markets	19%
	Commercials/ Ads	13%
	EBT Application Centers	13%
	AmeriCorp	6%
Radio	6%	

Non-profit organizations coordinator interviews

Non-profit organization coordinators responsible for administering EBT programs at farmers' markets indicated their understanding of use practices and problems with EBT, and the number of vendors at each farmers' market. Among the four East Bay farmers' markets, Berkeley sold the most tokens within September and October, 2010, with approximately 7,500 tokens (Table 10).

Table 10. EBT tokens sold among the four East Bay farmers' markets in 2010. *EBT machine broken from the last week of September to the third week of October. ** Figures are still not reported yet.

Study Site	September	October
<i>Grand Lake</i>	1717	1800**
<i>Downtown Oakland</i>	855*	941*
<i>Hayward</i>	327	474
<i>Berkeley</i>	4437	2815

According to the Grand Lake and Hayward coordinators, there are problems with the acceptance of EBT tokens by farmers and pre-packaged food purveyors. It is also difficult to track where the EBT tokens are spent because all Marin Agriculture farmers' markets including the Grand Lake and Hayward farmers' markets sold identical EBT tokens and the tokens are accepted at all of the Marin Agriculture farmers' markets because on some days the farmers' markets would receive more EBT tokens than the amount sold. The Grand Lake and Hayward farmers' markets recently expanded the number of tokens they carry for EBT recipients, so they would not run out at the beginning of every month. The variation of seasons and produces could affect the number of customers to the farmers' markets and weather was also a main factor in the number of customers in farmers' market.

Downtown Oakland coordinator stated that a broken EBT machine recently took a long time to fix, causing repeated problems with selling the EBT tokens. In addition, they often run out of EBT tokens preventing some EBT users from purchasing tokens from the Downtown Oakland site. There was an advertisement through the Alameda County Food Bank to distribute flyers throughout the community to encourage customers to purchase fresh produce at the farmers' market and use their EBT at the farmers' market. As for the Berkeley coordinator, it was indicated that the biggest obstacle in EBT use in farmers' market was spreading the awareness of EBT use in farmers' markets. Unfortunately, there is a perception that farmers' markets are not for people with limited resources, and are only for those with disposable income. She suggested that to increase awareness of the EBT program, partnerships with local food stamp offices, community and senior centers or through EBT-related promotions should be implemented.

DISCUSSION

As the EBT system expands to new farmers' markets, the lack of knowledge about EBT acceptance at farmers' markets that I document in this study suggests the possibility that barriers to access will continue to undermine the efficacy of the program. Thus, my findings points to the need for more effective dissemination of public education and information on the EBT program at farmers' markets; they also point to means of addressing these flaws. Most importantly, I found that 26% non-EBT users qualify for the EBT-served Supplemental Nutrition Assistance Program based on annual income adjusted for household size, suggesting the possibility of much greater use of EBT in farmers' markets. Further, I found both the EBT demographic associations and EBT behavior patterns did not meet expectation in following the food subsidy stereotype, suggesting that information on EBT use at farmers' markets may be more effective in reaching whites and may require more EBT program advertisement to other ethnicities (Rose & Richards, 2004; SNAP, 2010). In addition, I found that whites with relatively low levels of educational attainment comprised the largest single group of EBT users and potential EBT users, which again counter the food subsidy stereotype that EBT users are primarily minorities with low levels of educational attainment (Rose & Richards, 2004; SNAP, 2010). Finally, my finding that EBT users were mostly females, but that nutritional/health values were not among the top three motivational factors counters the finding of other studies that farmers' market shoppers are primarily concerned with buying motivated produce (Ragaert, Verbeke, Delieghere & Debevere, 2004; Webber, Sobal & Dollahite, 2010).

Socioeconomic factors influencing EBT use in farmers' markets

I found that an average of 12% of EBT users and 13% potential EBT users were white countering the food subsidy trend expected at these markets (Fig. 4 and Fig. 5). A possible explanation for this may be a lack of awareness in minority communities (Table 9) about EBT use in farmers' markets and particularly the non-Latino minority communities, since EBT applications are only available in Spanish and English (Coe, 1983; Grace, Grace, Becker & Lyden, 2005; SNAP, 2010). I was unable to conclude much about EBT user demographic patterns because there were few EBT users at the four farmers' markets. However, there was no

significant association between EBT users and educational attainment at all study sites (Table 7), indicating the small sample size cannot give much inference. I did find a significant association between potential EBT users and non-EBT users' educational attainment in the Grand Lake, Downtown Oakland, Berkeley farmers' market, indicating that there are more non-EBT users with high educational attainment than potential EBT users (Table 7 and Table 8), which signifies that farmers' markets are currently attracting individuals with higher educational attainment and potentially more disposable money (Daponte, Sanders, & Taylor, 1999; Berkeley coordinator, 2010). There are more potential EBT users than EBT users at all the sites, possibly reflecting that poor information about eligibility and particular negative personal feelings towards using food subsidies may be a possible problem (Coe, 1983; Daponte et al., 1999). Potential EBT users contradicted the EBT low-income, minority trend, possibly reflecting temporary unemployment due to the bad economy and that the minority community is unaware of the EBT availability in farmers' markets (Coe, 1983; Daponte et al., 1999). The demographic aspect of the various EBT user statuses present information to the EBT program officials to increase funding to provide access for the minorities, particularly in Asian/Pacific Islander communities.

Consumer behavior

The most common motivational factors for going to farmers' markets were the availability of fresh produce, organic products and nutritional/ health values, which fits with findings in other studies that farmers' market shoppers rank freshness significantly higher than nutritional/ health values and organic produce availability (Wolf, Spittler & Ahem, 2005; Zepeda, 2009; Ragaert et. al, 2004). As the Berkeley coordinator mentioned, EBT users tend to shop more when they received their benefits (often at the beginning of their monthly cycle – the beginning of the month) and then shop less as the month ends and they are out of EBT funds. The coordinator also contended that EBT use typically decreases in the winter, along with overall attendance at farmers' market. There may also be a difference in EBT use in rural areas as opposed to urban areas due to difference in consumer behavior and preference. Females EBT users and potential EBT users did not show significant association between gender and nutritional/health values as the common motivational factor countering the idea that people go to farmers' markets for more nutritious produces (Ragaert et. al, 2004; Webber et. al, 2010).

Respondents at all sites cared about the freshness of the food they consume, which may reflect a greater concern with their health compared to those who do not shop at the farmers' market (Webber et. al, 2010). Fresh produce was the most commonly purchased food type at the four farmers' markets, countering Collie et al.'s (2009) finding that in farmers' market in Scotland, purchases of meat, meat products, and fish purchases exceed other food categories. This may reflect observations that food consumption habits in the East Bay are different from habits at another part of the world or country (Collie & Colquhoun, 2009). My findings about EBT and potential EBT users' consumer behavior, suggest that the EBT program can alter their services and the types of produce available in farmers' markets to accommodate the needs of their consumers.

Constraints on the use of EBT at farmers' markets

The process of using EBT tokens in farmers' markets may not prove worthwhile to their users and potential users because obtaining EBT presents challenges (Daponte, Sanders & Taylor, 1999; Gundersen & Oliveira, 2001). Other challenges include the effort to compare price between multiple growers in the farmers' market, and the limited farmers' markets accepting EBT (Grace et al., 2005). However, opportunities for direct interaction with farmers attract consumers to farmers' markets because it acts as a social medium for people within the community (Grace et al., 2005; Rose & Richards, 2004). Yet, many consumers in the farmers' markets were not aware that EBT could be used at farmers' markets (Table 9). In addition, the EBT program prevents its users from buying processed food products, such as jams, which may discourage EBT users from shopping at the farmers' markets. Webber et al. (2010) found that respondents who lived far from the farmers' markets, had difficulty carrying groceries home by walking, suggesting that it may cost participants more money to travel to the farmers' market than to shop at a nearby supermarket or liquor stores which conveniently accept EBT to purchase junk food that contribute to health issues (Duggan, 2004; Granville, 2009). Consumers may buy produce directly from local farmers as a conscious choice to support the local farming economy, even when price may be slightly above market, raising the possibility that shoppers at the farmers' markets may be more "green conscious" (Webber, Sobal & Dollahite, 2010). Additionally, the prevalence of "direct dealing" as a specified motivational factor encompassed

statements that customers felt it right to support the local farmers because of tangible assurance of quality and freshness (Lyon, Collie & Colquhoun, 2009). With greater knowledge of barriers to EBT in farmers' markets, EBT program officials can increase awareness of EBT program and improve the program efficiency.

The major barrier to EBT use at farmers' markets is a function of problems with EBT administration at the markets. Non-profit organization coordinators commented that inadequate tokens for EBT users led to administrative problems, and that a failure to communicate within the organizations made it hard for coordinators to provide enough EBT tokens for users (Stephanson, Lev & Brewer, 2008). When tokens are not available, consumers may stop coming to the markets. The limited organizational capacity to administer EBT programs on the part of non-profit organizations may possibly reflect insufficient funding available to the organization to purchase tokens, which, in turn leads to an insufficient flow of EBT tokens to meet demand at farmers' markets (Biswas & Pinstrup-Andersen, 1985; Gundersen & Oliveira, 2001). Communication barriers within the organizations make it difficult for coordinators to be prepared for an uncertain demand for EBT tokens at the farmers' markets (Dearden & Ackroyd, 1989). EBT token availability issues could be resolved by the standardization of token types across all farmers' markets, as some respondents complained that they are not allowed to use the tokens that belong to different community organizations (Table 18). Additional funds to administer records of EBT use in EBT programs can regulate the use patterns to help provide sufficient EBT tokens for all locations.

Study limitations

Study limitations include variability of sample size and study sites, classification of the sample population, demographics influence, motivational factors, and method of survey and interview distribution. The variability among study sites underlies the limited inference of my study to other study sites. Difference between urban, suburban and rural areas in the study was not explored, limiting inference particularly to rural markets that might present different patterns. The potential EBT users category may not have accurately represent the potential EBT user population because the category did not correspond exactly to the government scale, since the survey did not use the government scale as a guideline. The study was conducted in the East Bay

in California, so it may infer only demographic distribution, motivational factors or behaviors that are specific to that location or to locations with similar demographics. The most common motivational factors ranked imparted limited inference noting the individual bias among the respondents' choices. Access of transportation was not investigated in detail, which can limit the amount of people shopping at farmers' markets. With a limited sample size achieved from using convenience sampling, it might present bias to the data. In addition, the data collected from surveys and interviews presented response bias. The limitation in consumer motives could be further explored with an increased number of interviews.

Future directions

Future studies should be conducted in other parts of the United States and limit the convenience sampling and response bias presented in the study. A key area requiring further study is the effects of differential access to transportation to farmers' markets because the distance traveled to the farmers' markets may be a factor in the amount of fresh produce purchased and the willingness to travel to the farmers' markets. The amount of food subsidy required for potential EBT users may infer the reasons why these users are not using the EBT program and understanding these reason can help improve the EBT program. Replicating research in rural areas, as suggested by the Berkeley coordinator, may be useful, as rural areas may have different EBT use patterns than urban areas. According to Dibsall et al. (2002), access to food, affordability of food, and the motivation to eat healthily can affect fruit and vegetable consumption patterns, suggesting that these factors could be incorporated into future studies. Different between neighborhoods should be incorporated into studies, as they may affect shoppers' motivations and types of transportation used.

Broader implications

My findings suggest that policy should seek to maximize the provision of food subsidies to low-income groups by increasing the use of EBT at farmers' markets. Additional EBT advertisement is needed to inform EBT users and qualified non-users that they can use EBT in farmers' market. Therefore, government subsidies must be tailored to the needs of EBT users and

encourage potential EBT users to take advantage of the EBT program can to minimize future health problems and money spent on healthcare. Farmers' markets are centers for community that attracts many people who teach their children about the importance of eating fresh produce, enjoy themselves, create direct bonds between farmers and the general public, and a common area for health awareness education. It is important to serve these public needs through the promotion of EBT use at farmers' markets and the improvement the EBT program coordination.

ACKNOWLEDGEMENTS

I want to thank all of the ES 196 professors and graduate student instructors, especially Kurt Spreyer for all your help in giving me new writing approaches and Patina Mendez and Lara Roman for all your statistical analysis assistance. I would also like to thank Johnny Sanvichith, Jimmy Lam, Yolanda Wright, and Nick Garcia for being my peer review group in looking over my entire paper and giving constructive criticism. In addition, I want thank Julie Hopper, Linda Büergi, and my family for moral support and bouncing ideas with me. Last but definitely not least, I want to especially thank Teddy Leung for supporting me every step in this process, and always taking the time to help me without complaints. Without him this study would not have as many samples. This project received CPHS Exempt status.

REFERENCES

- Annual Historical Review: Fiscal Year. (1997). U.S. Department of Agriculture, Food and Nutrition Service.
- Barr, V. J., Robinson, S., & Marin-Link, B. (2003). The Expanded Chronic Care Model: An Integration of Concepts and Strategies from Population Health Promotion and the Chronic Care Model. *Healthcare Quarterly*, 7(1), 73-82.
- Biswas, M.R., & Pinstrup-Andersen, P. (1985). *Nutrition & Development*. New York: Oxford University Press.
- Bussewitz, C. (2010, February 13). Bill to help farmers' markets take food stamps. *San Francisco Chronicle*. Retrieved from http://articles.sfgate.com/2010-02-13/bay-area/17875562_1_farmers-markets-food-stamp-certified-farmers-markets

- Cashell, B. (2007). *Who are the "Middle Class"?* CRS Report for Congress, Order Code RS22627: Government and Finance Division. Retrieved from http://assets.opencrs.com/rpts/RS22627_20070320.pdf
- Cavanugh, M., & Heilbrunn, S. (2010, March 4). More farmers markets to possibly accept food stamps. *These Days*. KPBS.org. Retrieved from <http://www.kpbs.org/news/2010/mar/04/more-farmers-markets-possibly-take-food-stamps/>
- Coe, R.D. (1983). Nonparticipation in welfare programs by eligible households: The case of the food stamp program. *Journal of Economic Issues*, 17(4): 1035-1056.
- Cotterill, R.W., & Franklin, A. W. (1995). The Urban Grocery Store Gap. Food Marketing Policy Center. University of Connecticut Food Marketing Policy Issue Paper No. 8.
- Dammann, K. W., & Smith, C. (2010). Race, Homelessness, and Other Environmental Factors Associated with the Food-Purchasing Behavior of Low-Income Women. *Journal of the American Dietetic Association*, 110(9), 1351-1356.
- Daponte, B.O., Sanders, S., & Taylor, L. (1999). Why do low-income households not use food stamps? Evidence from an experiment. *The Journal of Human Resources*, 34(3): 612-628.
- Dearden, P.J., & Ackroyd, P.J. (1989). Reassessing the role of food aid. *Food Policy*: 14(3), 218-231.
- Dibsdall L.A., Lambert, N., Robbin, R.F., & Frewer, L.J. (2002). Low-income consumers' attitudes and behavior towards access, availability and motivation to eat fruit and vegetables. *Public Health Nutrition*: 6(2), 159-168.
- Dimitri, C., Greene, C., & Richman, N. (2001). Organic Marketing, 31-37.
- Drewnowski, A., & Specter, S. (2004). Poverty and obesity: the role of energy density and energy costs. *American Journal of Clinical Nutrition*, 79(1), 6-16.
- Duggan, T. (July 16, 2004). Bringing healthy produce to poor neighborhoods: Food activists, small farmers lead project. *San Francisco Chronicle*. Retrieved from <http://www.sfgate.com/cgi-bin/article.cgi?file=/chronicle/archive/2004/07/16/BAGBQ7MCMO1.DTL>
- FNS Supplemental Nutrition Assistance Program (SNAP). (2010). United States Department of Agriculture. Retrieved from <http://www.fns.usda.gov/snap/faqs.htm>
- Fox et al. (2009). Rcmdr: R Commander. R package version 1.5-4 [Software]. Available from <http://CRAN.R-project.org/package=Rcmdr>
- Grace, C., Grace, T., Becker, N., & Lyden, J. (2005). Barriers to using urban farmers' market: an investigation of food stamp clients' perception. Oregon Food Bank.

- Granville, K. (October 31, 2009). Bringing fresh produce to the corner store. *New York Times*. Retrieved from http://www.nytimes.com/2009/10/31/business/smallbusiness/31grocery.html?_r=1&scp=1&sq=corner%20%20store%20and%20low%20income%20health&st=cse
- Gray, V. B., Cossman, J. S., & Powers, E. L. (2006). Stunted growth is associated with physical indicators of malnutrition but not food insecurity among rural school children in Honduras. *Nutrition Research*, 26(11), 549-555.
- Gundersen, C., & Oliveira, V. (2001). The food stamp program and food insufficiency. *American Journal of Agricultural Economics*: 83(4), 875-877.
- Herman, D. R., Harrison, G. G., & Jenks, E. (2006). Choices made by low-income women provided with an economic supplement for fresh fruit and vegetable purchase. *Journal of the American Dietetic Association*, 206(5), 740-744.
- Herman, D. R., Harrison, G. G., Afifi, A. A., & Jenks, E. (2008). Effect of a Targeted Subsidy on Intake of Fruits and Vegetables among Low-Income Women in the Special Supplemental Nutrition Program for Women, Infants, and Children. *American Journal of Public Health*, 98(1), 98-105.
- Joy, A. B., Bunch, S., Davis, M., & Fujii, J. (2001). USDA program stimulates interest in farmers' markets among low-income women. *California Agriculture*, 55(3), 38-41.
- Kroft, M. L., Holben, D. H., Holcomb, J. P., & Anderson, M. (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.
- Lyon, P., Collie, V., & Colquhoun, A. (2009). Shopping at the farmers' market: consumers and their perspectives. *Journal of Foodservices*: 20(1), 21-30.
- R Development Core Team. (2009). R: A language and environment for statistical computing. R Foundation for Statistical Computing [Computer software], Vienna, Austria. Available from <http://www.R-project.org>.
- Ragaert, P., Verbeke, W., Delieghere, F., & Debevere, J. (2004). Consumer perception and choice of minimally processed vegetables and packaged fruits. *Food Quality and Preference*. 15(1), 259-270.
- Rose, D., & Richards, R. (2004). Food store access and household fruit and vegetable use among participants in the US food stamp program. *Public Health Nutrition*: 7(8), 1081-1088.
- Stephenson, G., Lev, L., & Brewer, L. (2008). 'I'm getting desperate': what we know about farmers' markets that fail. *Renewable Agriculture and Food Systems*, 23(3), 188-199.

- US Census Bureau: Income distribution in East Bay, California. (2000). Retrieved April 10, 2010, from http://search.census.gov/search?q=Income+distribution+in+East+Bay%2C+California&btnG=Search+This+Site&filter=0&entqr=0&output=xml_no_dtd&ud=1&ie=UTF-8&client=subsite&proxystylesheet=subsite&hq=inurl%3Awww.census.gov%2Fhhes%2Fwww%2Fincome&subtitle=hhes-income
- Webber, C., Sobal, J., & Dollahite, J. (2010). Shopping for fruits and vegetables. Food and retail qualities of importance to low-income households at the grocery store. *Appetite*, 54(2), 297-303.
- Wilde, P., & Andrews, M. (2000). The food stamp program in an era of welfare reform: Electronic benefits and changing sources of cash income. *Journal of Consumer Affairs*, 34(1), 31-46.
- Wolf, M. M., Spittler, A., & Ahem, J. (2005). A profile of farmers' market consumers and the perceived advantages of produce sold at farmers' markets. *Journal of Food Distribution Research*: 36(1), 192-201.
- Zepeda, L. (2009). Which little piggy goes to market? Characteristics of US farmers' market shoppers. *International Journal of Consumer Studies*, 33(3), 250-257.