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# Using Propensity Score Analysis to Examine Participation in CalFresh and Its Association with Dietary Intake among Californian Adults in Poverty

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## ABSTRACT

*Background:* CalFresh, also known as the Supplemental Nutrition Assistance Program (SNAP) in California, seeks to meet the dietary needs and improve the health and well-being of Californians, especially those living in poverty. The SNAP participation rate in California remains lower than the national average. Research that identifies the correlates of CalFresh participation among adults in poverty is needed to improve the reach and utilization of the program. In addition, the association between CalFresh participation and dietary intake is unknown among adults in poverty.

*Objectives:* (1) To examine the correlates of participation in CalFresh; (2) To examine the association between CalFresh and dietary intake.

*Participants:* Data came from the 2012 California Health Interview Survey. The sample included 2,637 non-institutionalized Californian adults with income below the federal poverty level income.

*Statistical analysis:* Logistic regression was used to examine the demographic, household, and neighborhood-level correlates of CalFresh

participation. Propensity score matching was used to investigate the association between CalFresh and intake of fruits, vegetables, soda, fries, and fast food in the past week.

*Results:* CalFresh participation was significantly associated with age, income, employment status, family type, and house tenure ( $P < 0.001$ ). CalFresh participants had 26% higher intake of fries than non-participants ( $P < 0.05$ ).

*Conclusions:* Future research should address the barriers of CalFresh participation among underserved populations to improve its reach. Food assistance program should be accompanied with community nutrition interventions to improve dietary quality among recipients.

*Key words:* CalFresh; food assistance participation; dietary intake; poverty; SNAP

## INTRODUCTION

CalFresh, also known as the Supplemental Nutrition Assistance Program (SNAP) in California, seeks to meet the dietary needs and improve the health and well-being of over 4 million state residents, most of whom are living in poverty (United States Department of Agriculture, 2017). Despite the large

population served, the program has the potential to improve its reach and access to healthy foods. The Program Access Index (PAI) released by USDA Food and Nutrition Services (FNS) in 2013 shows that the state estimate of participation rate (53%) still remains lower than the national average (75%), indicating there is room for growth in participation (United States Department of Agriculture, 2015). Most county plans have addressed barriers of utilizing CalFresh, including but not limited to stigma associated with receiving CalFresh, lack of knowledge about the program, frustrations with the application process, and the misconceptions among immigrant communities (California Department of Health Services, 2002; California Department of Social Services, 2013). However, the demographic, household, and neighborhood correlates of CalFresh participation remain understudied. Research that identifies the factors that may discourage CalFresh participation among populations living in poverty is needed to improve the reach and utilization of the program.

The aim of the present study is to examine the correlates of participation in CalFresh and its association with dietary intake among people living in poverty. Using the Social-Ecological Model (McLeroy, Bibeau, Steckler, & Glanz, 1988), the current study characterizes the demographic, household, and neighborhood level correlates of CalFresh participation among Californian adults living in poverty to enhance the understanding of underutilization of CalFresh. Furthermore, the association between CalFresh participation and dietary intake can provide the explanation for the association between CalFresh participation and obesity identified in previous research (Leung & Villamor, 2010; Meyerhoefer & Pylypchuk, 2008), and hence contribute to developing community-based nutrition interventions.

To date, a handful of studies have examined the factors that are associated with SNAP participation. For demographic information, a previous national study found that SNAP participants tend to be younger, more likely to be racial/ethnic minority or females, have lower income, and are more likely to have a clinical condition (e.g., disability, obesity) compared to the non-participants (Berkowitz,

Seligman, Rigdon, Meigs, & Basu, 2017). Related to the findings around age in that study, a focus group study found that the common barriers to SNAP participation among older adults were stigma, incorrect eligibility information, lack of transportation, and complex application procedures (Gabor, Williams, Bellamy, & Hardison, 2002). On the household level, another national study found that owning a house and having workers in the household are related to lower SNAP participation, whereas having more children, adults, or individuals with disabilities increased the probability of SNAP participation (Swann, 2017). On the regional level, the previous study did not find a significant difference in the rural or urban locations between the SNAP participants and nonparticipants (Berkowitz *et al.*, 2017). However, previous literature paid less attention to state-specific factors that led to SNAP participation. Given the lower SNAP participation rates in California compared to the national average, it would be of importance to identify factors related to participation that can help to develop state-level efforts to improve the reach of the program. In addition, a recent systematic review shows that the impact of SNAP on dietary intake has been studied extensively; however, most of those studies were on the national scale and results were mixed (Andreyeva, Tripp, & Schwartz, 2015). Considering the various eligibility and usage policy of SNAP across states, research that uses state-representative sample examining the impact of SNAP participation, such as CalFresh, on dietary intake is needed to better inform the policy stakeholders of the program's effectiveness.

Previous national studies have reported that participation in SNAP has been associated with negative health status, such as increased BMI and obesity (Leung & Villamor, 2010; Meyerhoefer & Pylypchuk, 2008). While CalFresh provides assistance to low-income households to help purchase nutritious foods, the prevalence of obesity among CalFresh participants was 30% higher than non-participants in 2007 (Leung & Villamor, 2010). As the impact of obesity on medical costs is tremendous (Cawley & Meyerhoefer, 2012), the role that CalFresh may play in the development of such health status among the recipients deserves attention. Given the close relationship between diet and obesity

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(Swinburn, Caterson, Seidell, & James, 2004), examining the association between CalFresh and dietary intake is critical for understanding the potential influence of CalFresh participation on obesity and other diet-related health conditions. However, such research remains scarce to our knowledge.

## **METHODS**

### *Data Source*

Data came from the 2012 Adult California Health Interview Survey (CHIS) (UCLA Center for Health Policy Research, 2016). It is a population-based cross-sectional survey that uses random-digit-dialing for both landlines and cellphones. Questions cover a variety of information regarding health status and health behaviors among non-institutionalized adults over 18 years of age in California. The study adopts a complex sampling design by oversampling racial and ethnic minorities, people with a low-income or education, and people who live in certain geographic areas. This study has been conducted every other year since 2001. The 2012 CHIS is selected among the most recent surveys due to its large sample size and most comprehensive information of participants' dietary intake. Only subjects whose total household income is below the federal poverty level are included in the current study. The final sample includes 2,637 non-institutionalized Californian adults who are living in poverty. More detailed information about the sampling design can be found at the UCLA Center for Health Policy Research (UCLA Center for Health Policy Research, 2016). Missing values in the data file were replaced through imputation for nearly every variable through completely random selection approach from the observed distribution of respondents and hot deck imputation without replacement (Edwards, Fraser, & King, 2014). The data file used in this study was published after imputation was conducted (Edwards et al., 2014). Because the analysis was based on secondary public-use data, it was deemed exempt from Institutional Review Board approval under federal regulation 45 CFR §46.101(b).

### *Measures*

The dependent variables for the study include participation in CalFresh and dietary intake. To measure participation in CalFresh, subjects who are eligible for CalFresh are asked "Are you receiving Food Stamp benefits, also known as CalFresh?" "No" is coded as 0, "Yes" as 1. To measure dietary intake, participants are asked during the past month: (1) "How many times did you eat fruits? (Do not count juices)"; (2) "How many times did you eat any vegetables like green salad, green beans or potatoes? (Do not include fried potatoes.)"; (3) "How many times did you drink soda; and (4) "How many times did you eat French fries, home fries and hash browns". The responses are standardized to times of intake per week. In addition, participants are asked: "In the past 7 days, how many times did you eat fast food, such as food you get at McDonald's, KFC, Panda Express, or Taco Bell? Include fast food meals eaten at work, at home, or at fast-food restaurants, carryout or drive through."

Correlates of CalFresh participation are measured at demographic, household, and neighborhood levels. Demographic correlates include age (younger adults aged 18-34 treated as reference, middle aged 35-64 and older adults aged above 64 coded as dummy variables), sex (male treated as reference, female coded as a dummy variable), self-identified race (non-Hispanic White treated as reference, Latino, American Indian or Alaska Native, Asian, Black and other coded as dummy variables), nativity (born outside the US treated as reference, born in the US coded as a dummy variable), education (below high school treated as reference, high school or GED and above coded as a dummy variable), employment status (employed treated as reference, unemployed not looking for work and unemployed looking for work coded as dummy variables), and total household income (ratio to the federal poverty level). To account for the non-linear relationship between income and participation in CalFresh, the mean-centered quadratic term of age and income are also included in analysis.

Household-level correlates include household size (small household with five or less people living in the household treated as reference, large household with

more than five people coded as a dummy variable), family type (single with no kids treated as reference, single with kids, married with no kids and married with kids coded as dummy variables), and house ownership (not owning a house treated as reference, owning a house coded as a dummy variable).

Neighborhood-level correlates include whether the subject is living in rural or town (treated as reference), urban, second city (an area that is less densely populated than a nearby city but still a city hub), or “suburban” based on self-reported zip codes of residency, and whether the subject can always find fresh fruits and vegetables in their neighborhood or near workplace.

### *Statistical Analysis*

Logistic regression was used to examine the correlates of CalFresh participation, by regressing CalFresh participation on all levels of potential correlates. Due to its robustness and precision of treatment effect estimation, and statistical power over regression (Cepeda, Boston, Farrar, & Strom, 2003), propensity score analysis with 1:1 nearest neighbor matching approach is conducted to pair subjects between those who are on CalFresh and those who are not to remove the potential confounding effects of covariates (d’Agostino, 1998). The propensity score for each subject is calculated as the predicted probability of being on CalFresh estimated from the logistic regression model. Each subject among those who are on CalFresh is paired with one subject who is not on CalFresh and has the closest propensity score. To address the balance of demographic, household, and neighborhood characteristics and maximize matched subjects, the matching caliper is set-up as 0.06 standard deviation of the logit of propensity scores. In other words, if the difference of the logit of propensity score is beyond its 0.06 standard deviation, the subject on CalFresh cannot be paired, and thus is removed from the study. Using this rule, approximately 85.5% (N = 615) of the CalFresh recipients are matched. Table 1 shows the results of balance checking before and after propensity score matching. All differences in the correlates of CalFresh participation are balanced after propensity score matching. Due to the overdispersion

of count data in food intake, generalized linear mixed-effects negative binomial models are used to examine the difference in dietary intake between the CalFresh and control group. All statistical analysis procedures are conducted using R (R Core Team, 2016). Propensity score matching procedure is conducted using the “nonrandom” package (Stampf, 2014).

## **RESULTS**

### *Descriptive Statistics*

Table 2 shows descriptive statistics for the study sample (N = 2,637). The percentages of younger adults, middle-aged, and older adults are respectively 20.3%, 49.3% and 30.4%. The mean income is 0.59 times of the Federal Poverty Level. Female accounted for 68.3% of the sample. Respondents who graduated high school or received GED make up 85.5% of the sample. The study sample includes 34.4% Latinos and Latinas, 24.9% non-Hispanic Whites, 21.2% Asians, 5.3% Blacks, 2.5% American Indians and Alaska Natives, and 11.7% other races. Approximately 41.2% of the subjects were born in the United States. A total of 27.1% of the sample are currently employed, whereas 11.8% are unemployed and looking for work, and another 61.1% report being unemployed but not looking for work.

About 52.4% of the subjects are single and have no kids, 13.3% are single and have kids, 12.7% are married and have no kids, and 21.6% are married and have kids. About 22.4% of the respondents report owning the home, while the others report renting a place or living in a place through another arrangement. A total of 12.2% of the respondents are living in a household with more than five people. Living in an urban area accounted for the highest percentage (53.5%), followed by living in a second city (23.1%), living in town or a rural area (15.1%), and living in a suburban area (8.3%). About 69.8% of the subjects report that they can find fresh fruits and vegetables in their neighborhood or near workplace.

The percentage of subjects receiving CalFresh is 27.3%. The median for times of consuming fruits, vegetables, soda, fries and fast food per week are respectively 7, 5, 0, 0, and 1.

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## Logistic Regression

Table 3 presents the logit coefficients (b) and standard errors (SE) for logistic regression to examine the correlates of participation in CalFresh. For demographic correlates, older adults are significantly less likely to receive CalFresh than younger adults ( $P < 0.001$ ). Those having a higher income are less likely to be on CalFresh ( $P < 0.001$ ). Those who are unemployed and not looking for work ( $P < 0.001$ ), or looking for work ( $P = 0.003$ ), are both more likely to be on CalFresh than those who are employed. For household-level correlates, compared to those who are single with no kids, those who are single and have kids ( $P < 0.001$ ), or are married and have kids ( $P < 0.001$ ) are both more likely to be on CalFresh. Subjects who own a house are significantly less likely to participate in CalFresh than those who do not ( $P < 0.001$ ). None of correlates on the neighborhood-level in this study are significantly associated with CalFresh participation.

## Propensity Score Matching and Analysis

Results of generalized linear mixed-effects negative binomial models (Table 4) show that fruit (Incidence rate ratio (IRR) = 0.93,  $P = 0.147$ ), vegetable (IRR = 0.99,  $P = 0.754$ ), soda (IRR = 1.16,  $P = 0.208$ ), and fast food (IRR = 0.95,  $P = 0.442$ ) intake do not differ significantly between CalFresh group and control group. CalFresh participants consume fries 26% significantly more frequently than their counterparts ( $P = 0.013$ ).

## DISCUSSION

Our study results identify several protective or risk factors for CalFresh participation among those eligible to participate. These findings shed light on which populations may deserve more attention in the outreach efforts. For demographic information, older age is related with lower participation in CalFresh. This is consistent with the demographics of SNAP participation on the national level in that over 40% of the participants are younger than 17 years old (United States Department of Agriculture, 2014). The present study finds that being unemployed, regardless of job

seeking status, is associated with higher CalFresh participation. This finding may be explained by the Able-Bodied Adult Without Dependent (ABAWD) work requirement, which requires the applicants over age 17 and under 50 who are not disabled must work at least 20 hours per week to participate in SNAP (United States Department of Agriculture Food and Nutrition Services, 2017). Our finding calls for more efforts to provide the access to CalFresh for the employed eligible individuals who comply with this requirement.

On the household level, being single with kids or being married with kids is associated with increased likelihood of CalFresh participation, compared to being single with no kids. This result is not surprising, as CalFresh participation among households with more minor dependents is more pronounced. In addition, ABAWD requires able-bodied adults without minor children have a limited period for CalFresh assistance (United States Department of Agriculture Food and Nutrition Services, 2017), unless they are working or in a work program, which may provide further explanation about relative lower participation among households without children. The results also suggest house tenure matters. Though home ownership does not affect eligibility to apply for CalFresh, having housing tenure is associated with less likelihood of CalFresh participation. The reasons for the associations between house tenure and CalFresh participation are unclear and call for future research to explain. Perhaps, this may reflect the common myth regarding eligibility criteria held by individuals where they believe they cannot own or buy home and be eligible to CalFresh at the same time (California Department of Social Services, 2017). The efforts to correct such misunderstanding and raising the awareness of the eligibility criteria will be crucial to increasing the access to CalFresh among individuals in need.

We also observe that CalFresh in general does not seem to be associated with improved diet. Specifically, CalFresh participants consume more fries, which is consistent with the findings from the 2007 CHIS data (Leung & Villamor, 2010). However, intake of healthy food, including fruits and vegetables do not differ by CalFresh participation. In

general, the findings in our study are consistent with the national trend that the SNAP participants display lower Healthy Eating Index score compared to the nonparticipants (Gregory, Ver Ploeg, Andrews, & Coleman-Jensen, 2013).

The result regarding the association between unhealthy dietary intake among CalFresh participants may provide possible explanation for the link between CalFresh or SNAP participation and obesity (Leung & Villamor, 2010; Meyerhoefer & Pylypchuk, 2008). Given that energy-dense foods, such as fries, may be the lowest-cost options for people and, hence, more likely to be consumed by low-income populations (Drewnowski & Specter, 2004), the association between CalFresh participation and obesity may partially be mediated by unhealthy dietary intake of the participants. The dietary quality among CalFresh participants can be affected by the types of food stamp retailers available in the neighborhood, especially in non-urban areas. Food vendors, including convenience and discount stores, gas stations, or pharmacies that have been approved to accept the EBT card could attribute to this dietary pattern. The recently changed rule of SNAP in 2016, going into effect in 2017, that requires SNAP retailers to be equipped with a wider array of healthy products may help support more access to healthy food for program participants and deserves further investigation (United States Department of Agriculture, 2016). Further, the federal SNAP-Ed and Obesity Prevention Program could help address challenges experienced by certain low-income populations, as it provides funding to states to implement direct nutrition education in conjunction with strategies to change policies, systems, and environments in communities to make healthy eating more accessible for SNAP-eligible people.

The current study highlights the importance of increasing healthy food access among CalFresh participants to improve the effectiveness of the program. Research found that the usage of SNAP dollars is strongly associated with perceived availability of nutrition environment (Gustafson *et al.*, 2013), affordability of nutritious food (Leung *et al.*, 2013), the presence of convenience stores and mid-sized grocers (Mabli & Worthington, 2015; Shannon, 2014), travel time to grocery stores

(Mancino & Guthrie, 2014), and the acceptance of SNAP at food stores (Wetherill & Gray, 2015). Strategies to address those challenges to improve the dietary quality among CalFresh participants may include providing incentives for the SNAP retailers to increase their healthy food availability, enhancing programs that deliver meals to CalFresh recipients' homes, and offering vouchers, coupons, or any monetary incentives for purchasing healthy food with SNAP benefits.

The strength of the current study is the design of propensity score matching, which aims to remove potential confounding variables between CalFresh participation and dietary intake. However, the study has limitations. Reliability of data remained an issue due to recall bias. Using cross-sectional data limits the study's ability to infer a causal-relationship between CalFresh participation and dietary intake without addressing the temporality assumption. Research using longitudinal data is needed given the complex relationship between food assistance participation and dietary intake. Although we tried to capture all the potential correlates of CalFresh at different levels, there may still be other correlates beyond the data, which may influence the accuracy of propensity score estimation. The CHIS dataset has detailed information regarding factors influencing diet at multiple levels. Nonetheless, it only has five types of dietary intake. Future research should consider utilizing a more well-rounded dietary instrument to extend the understanding of the impact of food assistance programs on dietary intake. Finally, the current study focuses on the overall association between CalFresh participation and dietary intake. This association may differ across people from different social, cultural and economic background, which may be the next step for future research. It should be cautioned that the results of this study are only generalizable to the non-institutionalized adults living poverty in California because of data source.

## CONCLUSIONS

The findings of this study have important implications for food policy research and practice. First, we identify the population underserved by CalFresh, including the elderly, the employed, and

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people who own their homes. Future research should address the barriers to participation in CalFresh among these underserved populations. Second, we find that food assistance programs may not necessarily improve the dietary quality among recipients. Community health and nutrition interventions should be sensitive to the unique risk factors of poor dietary quality among food assistance program recipients. The national SNAP-Ed and Obesity Prevention Grant Program could play a role in addressing these challenges while providing an opportunity to increase access to healthy foods based on where CalFresh participants live.

### Author contributions

KW led the project, formulated research questions, conducted data management and statistical analyses, wrote the first draft, and approved submission. BW contributed to the literature review and discussion, wrote the first draft, and approved submission. CD contributed to discussion, wrote the first draft, and approved submission.

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Table 1  
Balance check of correlates by CalFresh participation status before and after propensity score matching

Variables	Unmatched Sample		<i>P</i>	Matched Sample		<i>P</i>
	CalFresh (N = 719)	No CalFresh (N = 1,918)		CalFresh (N = 615)	No CalFresh (N = 615)	
	Mean (SD)/%	Mean (SD)/%		Mean (SD)/%	Mean (SD)/%	
Age groups (ref: younger adults)						
Middle-aged	64.3%	43.7%	<0.001	62.9%	63.4%	0.91
Older adults	7.8%	39.9%	<0.001	9.1%	10.7%	0.39
Female	71.5%	67.0%	0.03	70.4%	67.0%	0.22
Race (ref: Non-Hispanic White)						
Latino	41.9%	31.6%	<0.001	39.3%	42.6%	0.27
American India/Alaska Native	2.8%	2.4%	0.59	2.9%	2.4%	0.72
Asian	15.7%	23.3%	<0.001	16.7%	16.3%	0.88
Black	6.7%	4.8%	0.07	7.5%	4.9%	0.08
Other	12.9%	11.2%	0.23	12.0%	13.2%	0.61
Born in the U.S.	38.4%	42.2%	0.08	41.3%	37.9%	0.24
High school/GED or above	81.6%	86.9%	0.001	81.8%	82.4%	0.82
Employment status (ref: Employed)						
Unemployed, but looking for work	17.0%	9.9%	<0.001	18.2%	15.8%	0.29
Unemployed, not looking for work	49.8%	65.3%	<0.001	50.7%	49.3%	0.65
Income	0.51 (0.29)	0.61 (0.31)	<0.001	0.51 (0.30)	0.53 (0.31)	0.44
Living in big household	20.7%	9.0%	<0.001	18.7%	18.2%	0.88
Family type (ref: Single with no kids)						
Single with kids	28.2%	7.7%	<0.001	26.0%	22.1%	0.13
Married with no kids	6.8%	15.0%	<0.001	8.0%	8.9%	0.61
Married with kids	38.1%	15.4%	<0.001	34.8%	37.9%	0.29
Owning the home	13.4%	25.8%	<0.001	13.8%	13.8%	1.00
Neighborhood type (ref: Rural/Town)						
Suburban	7.4%	8.6%	0.29	7.2%	8.1%	0.59
Second city	24.6%	22.6%	0.28	24.6%	23.7%	0.79
Urban	52.3%	54.0%	0.45	53.3%	51.9%	0.65
Can always find fresh fruits and vegetables	73.9%	68.2%	0.004	73.7%	74.3%	0.85

Table 2  
 Demographics of a cohort of 2,637 Californian adults living in  
 poverty selected in the study

	Median(IQR <sup>a</sup> range)/Mean(SD <sup>b</sup> ) /%
Younger adults	20.3%
Middle age	49.3%
Older adults	30.4%
Male	31.7%
Female	68.3%
Race	
Non-Hispanic White	24.9%
Latino	34.4%
American India/Alaska Native	2.5%
Asian	21.2%
Black	5.3%
Other	11.7%
Born in the U.S.	41.2%
High school/GED or above	85.5%
Employment status	
Employed	27.1%
Unemployed, but looking for work	11.8%
Unemployed, not looking for work	61.1%
Income	0.59 (0.31)
Living in big household	12.2%
Family type	
Single with no kids	52.4%
Single with kids	13.3%
Married with no kids	12.7%
Married with kids	21.6%
Owning the home	22.4%
Neighborhood type	
Urban	53.5%
Second city	23.1%
Suburban	8.3%
Rural/Town	15.1%
Can always find fresh fruits and vegetables	69.8%
On CalFresh	27.3%
Times of eating fruits per week	7.0 (2.0, 14.0)
Times of eating vegetables per week	5.0 (2.0, 7.0)
Times of drinking soda per week	0.0 (0.0, 2.0)
Times of eating fries per week	0.0 (0.0, 1.0)
Times of eating fast food per week	1.0 (0.0, 2.0)

Note: a. IQR: Interquartile range; b. SD: Standard deviation.

Table 3

Logistic regression on participation in CalFresh (N = 2,637)

	Logit coefficient (b)	SE
Intercept	-0.88*	0.35
Demographic Correlates		
Age group (ref: younger adults)		
Middle-aged	0.06	0.12
Older adults	-1.21***	0.20
Female (ref: male)	0.07	0.11
Race (ref: Non-Hispanic White)		
Latino	-0.19	0.18
American India/Alaska Native	0.12	0.33
Asian	0.28	0.22
Black	0.36	0.24
Other	-0.31	0.20
Born in the U.S.	0.18	0.16
High school/GED or above	-0.14	0.13
Employment status (ref: employed)		
Unemployed, but looking for work	0.46**	0.16
Unemployed, not looking for work	0.41***	0.12
Household Correlates		
Income	-1.22***	0.22
Mean-centered income squared	-1.63**	0.62
Living in big household	0.23	0.14
Family type (ref: single with no kids)		
Single with kids	1.81***	0.16
Married with no kids	0.11	0.19
Married with kids	1.52***	0.15
Owning the home	-0.57***	0.14
Neighborhood Correlates		
Can always find fresh fruits/vegetables	0.15	0.11
Neighborhood type (ref: rural/town)		
Urban	-0.05	0.16
Second city	-0.16	0.17
Suburban	-0.08	0.22

Note: \*:  $P < 0.05$ ; \*\*:  $P < 0.01$ ; \*\*\*:  $P < 0.001$ .

Table 4

Effects of CalFresh on dietary intake after propensity score matching

	IRR	95% CI
Fruits	0.93	[0.84, 1.03]
Vegetables	0.99	[0.90, 1.08]
Soda	1.16	[0.92, 1.46]
Fries	1.26*	[1.05, 1.52]
Fast food	0.95	[0.82, 1.09]

Note: \*:  $P < 0.05$ ; \*\*:  $P < 0.01$ ; \*\*\*:  $P < 0.001$ .