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ORIGINAL RESEARCH

Changes to SNAP-authorized retailer stocking requirements and the supply of foods and beverages in low-income communities in seven U.S. states

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Abstract

Low-income communities often lack access to supermarkets and healthy foods. Enhanced stocking requirements for staple foods for Supplemental Nutrition Assistance Program (SNAP)-authorized retailers may increase availability of healthy foods in smaller stores which are prevalent in low-income areas. This study aimed to evaluate the extent that small food stores located in low-income areas met the U.S. Department of Agriculture's 2016 final rule on SNAP-authorized retailer stocking requirements, which increased the minimum number of required staple food varieties from three to seven for each staple food category, required a depth of stock of three units of each variety, and increased the required number of categories with perishables from two to three. A multisite research project was conducted in 2017. Nine research teams located in seven U.S. states audited the availability of perishable and nonperishable staple foods and beverages in 351 small food stores in low-income areas. Analyses determined the extent to which stores met all or part of the stocking requirements and tested differences by store type. 30.2% of stores met all of the 2016 final rule requirements; 86.3% met the requirements for fruits and vegetables, whereas only 30.5% met requirements for dairy. 53.1% of non-chain small grocery stores met all requirements compared to 17.1% of convenience stores ($p < .0001$). Less than one half of the food stores audited met the U.S. Department of Agriculture's 2016 final rule that would expand SNAP-authorized retailer stocking requirements suggesting that, if implemented, the rule may generate increased offerings of staple foods in small stores in low-income areas.

Keywords

USDA, SNAP, Stocking requirements, Food access, Food stores, Low-income

Implications

Practice: This study emphasizes for practitioners that technical assistance may be needed for retailers if stronger USDA SNAP-authorized retailer stocking requirements are implemented.

Policy: This study provides evidence for policymakers on how stronger stocking requirements for SNAP-authorized retailers may lead to increases in the supply of staple foods in low-income areas of the USA.

Research: This study expands the evidence base on the extent to which the USDA's 2016 final rule on SNAP-authorized retailer stocking requirements might expand healthy food offerings in low-income areas and suggests that further research is needed to understand potential differences across urban versus rural areas and additional research is warranted to assess the depth of available perishable staple foods and beverages.

INTRODUCTION

Low-income communities in the USA continue to lack supermarkets and have greater access to small and nontraditional food stores (e.g. convenience stores, gas stations, pharmacies, liquor stores, dollar stores) that offer a limited supply of healthy foods, many of which are authorized to accept Supplemental Nutrition Assistance Program (SNAP) benefits [1–6]. To address this concern, the 2014 Farm Bill directed the U.S. Department of Agriculture (USDA) to reevaluate their food and beverage stocking requirements for SNAP-authorized retailers [7]. Previously, if a retailer's staple food sales did not make up 50% or more of the total gross retail sales, the retailer was required to continuously stock a minimum supply of staple foods in all four USDA staple food categories (fruits and vegetables; meat, poultry, and fish; bread and cereal; and dairy) in order to be SNAP authorized [7]. In December 2016, the USDA published a final rule that detailed enhanced stocking requirements in all four USDA staple food categories for SNAP-authorized retailers [8]. The 2016 final SNAP retailer rule increased minimum stocking requirements from three to seven varieties in each of the four staple food categories; required a minimum

depth of stock of three units rather than one unit for each qualifying variety; and, increased the requirement that a perishable variety be available in three rather than two staple food categories [8].

The 2016 final rule for SNAP retailers also changed regulations on what foods and beverages "counted" toward each staple food category: the rule eliminated the inclusion of "accessory foods," such as chips, cookies, candies, and crackers [8]. Of note, the originally proposed 2016 SNAP retailer rule included a more stringent requirement with respect to stocking units that would have required a minimum stocking requirement of six units for each qualifying variety; however, the 2016 final rule reduced this requirement to three units. Although the 2016 final SNAP retailer rule was effective January 1, 2017, the USDA reopened the rule for public comment and subsequently, in the interim, has reverted back to the previously existing requirement that retailers stock three varieties in each of the four staple food categories with perishable items in two categories [9]. The USDA did, however, maintain the increased depth of stock requirement of three units for each variety (hereafter referred to as the implemented 2018 SNAP retailer rule) [9].

Stricter retailer regulations in federal food assistance programs have the potential to increase store offerings. For example, following food package changes offered by the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), several studies documented increases in the availability of healthy foods in small food stores [10] and positive changes in food product and related macronutrient purchases [11,12]. In 2014, the City of Minneapolis modified a city ordinance to require increased stocking of staple foods and beverages in all stores with grocery licenses that would better align with the Dietary Guidelines for Americans [13,14]. Evaluation results revealed that the percent of small and nontraditional stores with any food in each of the 10 staple food ordinance categories increased from 27.6% to 75.1%, and that there was an increase from 24.4% to 50.5% of stores stocking foods in 8 of 10 of the categories, although the latter increase was not significantly different from stocking changes seen in comparison stores in St. Paul, MN [15].

To date, there has been limited evaluation work conducted to assess the potential impact of the USDA's 2016 proposed, final and implemented rule for SNAP-authorized retailers. Although much of the work done involved qualitative assessments of retailers' perceptions about changes to the rule [16–19], some quantitative assessments have been conducted. A USDA Food and Nutrition Service assessment found that 88.6% of small stores would not meet the new criteria of the originally proposed USDA rule, which included a depth of stock of six units [20]. A quantitative study undertaken in three low-income communities in Chicago, IL, assessed the 2016 proposed SNAP retailer rule changes and found that 22.1% of small food stores met the requirement of carrying at least seven varieties of eligible foods in all four staple food categories, although this study did not assess whether depth of stock requirements were met [21]. Another quantitative assessment conducted in five low-income, rural Appalachian communities in Tennessee found that 25.5% of small food stores (including gas stations, convenience stores, dollar stores, pharmacies, and "other" stores) met the 2016 final rule requirements for both number of varieties and depth of stock [22]; however, when analyzed by store type, only 5.1% of gas stations/convenience stores met all of the requirements.

There is a need to understand how implementing the USDA's 2016 final rule on SNAP-authorized retailer stocking requirements might expand healthy food offerings in low-income areas across the USA. This multisite research project aims to address this need by evaluating the extent that small food stores located in low-income areas would meet the 2016 final rule. Our analyses assessed each of the three aspects of the USDA's 2016 final rule proposed to (a) increase the minimum number of required staple food varieties stocked by SNAP-authorized retailers from three to seven in all four of the staple food categories, (b) require a depth of stock of three units for each variety, and (c) increase the required number of categories with perishable varieties from two to three. Standardized stores audits undertaken in 351 small food stores in seven states across the four major regions in the USA provided data on availability of perishable and nonperishable staple foods and beverages. The study findings have relevance for researchers, policymakers and other stakeholders by providing insight on how stronger stocking requirements for SNAP-authorized retailers may lead to increases in the supply of staple foods in low-income areas of the USA.

METHODS

Data collection

To evaluate the extent that small food stores in low-income communities throughout the USA would meet the 2016 final rule on SNAP-authorized retailer stocking requirements [8], a multisite research study was conducted in 2017. Researchers at the Illinois Prevention Research Center (Illinois PRC) led the data collection effort and recruited researchers from other institutions with experience in conducting food store audits to participate. This was a collaborative study among researchers from nine universities across seven states that participated in Centers for Disease Control and Prevention Nutrition and Obesity Policy Research and Evaluation Network (NOPREN) and the Robert Wood Johnson Foundation Healthy Eating Research Healthy Food Retail Workgroup [23,24].

Each team audited at least 30 small food stores in underserved low-income communities. To standardize the definition of low-income communities with limited food store access across participating sites, the USDA's Food Access Research Atlas (henceforth Atlas) was used to determine eligible areas where small food stores could be audited [25]. The Atlas identifies U.S. census tracts that are low income (i.e. poverty rate ≥20%) and have limited food store access (i.e. limited access to a supermarket, supercenter, or large grocery store within 1 mile for urban areas and 10 miles for rural areas). Only small food stores located in census tracts labeled as being low-income and limited access were considered eligible for inclusion. Final sample sizes for each location are provided in Table 1. A total of 351 small food stores were audited from October 2017 to December 2017, which was prior to the implementation of any additional stocking requirements.

Survey instrument

The Illinois PRC NOPREN Food Store SNAP Form (henceforth SNAP form) was developed to evaluate the extent that small food stores were meeting the USDA's 2016 final rule on SNAP-authorized retailer stocking requirements. The five-page audit instrument (available online) comprised five distinct sections [26]. The first section assesses general store characteristics and features. The subsequent four sections collect information on the availability, perishability, and depth of stock for eligible varieties of staple foods and beverages in the USDA staple food categories: fruits and vegetables; meat, poultry, and fish; bread and cereal; and dairy. The USDA defines a variety as a specific type of food item [7]. For example, they consider an apple, orange, and banana to be different varieties in the fruits and vegetables category [7]. Different preparations of a food item count toward a single variety. Therefore, the USDA counts 100% apple juice, green apples, and applesauce toward the same staple food variety: apple [7].

Reliability testing of the SNAP form was conducted in Chicago, IL, in 2017 among 40 small food stores located in a low-income neighborhood. Analyses of outcome measures related to each of the three aspects of the USDA's 2016 final rule were assessed by percent agreement and kappa statistics [27]. Percent agreement for the form ranged from 0.95 to 1.00 and the kappa statistic estimates ranged from 0.89 to 1.0, which is considered to be "almost perfect" agreement [28].

The form requires data collectors to visually scan a store to identify food and beverage items that are considered staple foods according to the USDA, and therefore, may count toward an eligible variety under the final rule. To ease the burden of data collection, a number of staple food varieties are listed on the SNAP form for all staple food categories. For each identified item, the data collector must (a) indicate whether or not the item is perishable and (b) record the number of stocking units that are visibly available on a shelf. Data collectors did not count items present in the store that were not visibly available to customers (i.e. stock located in a storage room or area). If more than three units are available for an item, the data collector selects the "+" option on the SNAP form. If three or fewer units are available, the data collector must select the exact number of units (i.e. 1, 2, or 3). Once three stocking units for a staple food variety have been found, the data collector moves on to evaluate another variety. Once 10 varieties have been recorded for a staple food category, the data collector moves on to the next category. Data collectors from all sites were required to participate in a 1-day virtual training session that instructed them on the instrument's data collection protocol as detailed in the training manual. Completed SNAP forms were entered into a secure REDCap [29] database and examined for quality and completeness by researchers at the Illinois PRC.

Table 1 | Sample size of small food stores by study site, *N* (%)

Study site (city, state)	*N* = 351
Blacksburg/Lynchburg, VA	30 (8.55)
Buffalo, NY	40 (11.40)
Champaign, IL	30 (8.55)
Chicago, IL	48 (13.68)
Ithaca, NY	43 (12.25)
Knoxville, TN	34 (9.67)
Minneapolis/St. Paul, MN	54 (15.38)
Raleigh, NC	30 (8.55)
San Diego/Imperial Counties, CA	42 (11.97)

N Number of observations.

Store characteristics and features

Information on general characteristics, interior store features, and exterior store features was collected on all small food stores. These measures included store type, SNAP authorization status, WIC authorization status, number of cash registers, availability of ready-to-eat and/or fast food meals, availability of a service counter, availability of on-site parking, and availability of security features. Data collectors recorded the store type from the following options: non-chain grocery store, convenience store, small discount store, pharmacy, and liquor store. A store had to sell fresh meat in order to be categorized as a non-chain grocery store. Fresh meat was defined as a perishable meat item that has not undergone any preservation process; stores that only sold frozen, processed, and/or shelf-stable meat items were not considered a non-chain grocery store. Small discount stores sold a limited line of groceries and a range of nonfood items (e.g. clothing, household clean products, decorations). Prescription medication had to be sold for a store to be labeled a drug store/pharmacy and ≥50% of a store's inventory had

to be alcoholic products for it to be considered a liquor store.

Data collectors recorded "yes" or "no" if the store accepted SNAP and WIC benefits (if there was no signage to indicate whether SNAP and/or WIC benefits were accepted then data collectors asked the store clerks). The count for the number of cash registers included self-checkout and unused registers and excluded registers at service counters, such as the pharmacy and photo center. Data collectors recorded "yes" or "no" if ready-to-eat/fast food meals were available for customers to obtain from a designated shelf or service counter. Fast food restaurants attached to stores did not count toward the ready-to-eat/fast food meals measure. The types of service counters considered include a butcher counter, bakery counter, and deli service counter. Data collectors recorded "yes" or "no" if there was on-site parking and specific security features available. Security features included having plexiglass or some other divider at the register, bars on the windows, and a security mirror, camera, or guard.

Statistical analysis

Descriptive statistics (i.e. means and frequencies) were calculated for all store characteristics and feature measures stratified by store type: non-chain grocery stores, convenience stores, and other stores. Owing to small sample sizes, small discount stores, drug stores/pharmacies, and liquor stores were grouped together and labeled as "other" small stores. Two stores in the sample did not meet the criteria for any of the five store types; however, they did stock food and beverage items and participated in the SNAP program. These two stores were also labeled as "other." The percentage of small food stores meeting all of the stocking requirements outlined in the final rule was calculated among all stores and by store type. Meeting all requirements was defined as offering seven varieties with ≥3 stocking units in each of the four staple food categories and offering a perishable variety with ≥3 stocking units in at least three staple food categories.

The percentage of small food stores meeting specific components of the requirements was calculated for all small food stores and by store type. These specific components included the following: (a) offering seven varieties in each staple food category, (b) offering seven varieties with ≥3 stocking units in each staple food category, and (c) offering a perishable variety with ≥3 stocking units in a least three staple food categories. The percentage of small food stores not meeting the requirement of offering seven varieties with ≥3 stocking units was calculated for all four staple food categories. Among the stores not meeting this requirement, the conditional mean of varieties offered was assessed by staple food category.

Wald tests were performed to identify significant differences in SNAP retailer requirement outcomes by store type. Wald tests also were performed to identify significant differences in store features by store type. p values ≤.05 were considered statistically significant. All analyses were performed with Stata, version 14 (StataCorp LLC, College Station, TX). This research study was deemed not to involve human subjects by the University of Illinois at Chicago Institutional Review Board.

RESULTS

General characteristics and features of the small food stores included in the multisite study are provided in Table 2 for all stores and stratified by

Table 2 | General characteristics and features of small food stores by store type

Characteristic	Sample sizes (all stores, by type)	All stores $N = 351$	Non-chain grocery[a] $N = 49$	Convenience store[b] $N = 222$	Other[c] $N = 80$	p value
Interior store features						
SNAP-authorized	(349, 48, 221, 80)	94.0%	89.6%	95.0%	93.8%	.497
WIC-authorized	(341, 44, 218, 79)	12.6%	20.5%	8.3%	20.3%	.014
Number of cash registers	(338, 45, 216, 77)	1.8 (0.8)	1.6 (0.9)	1.7 (0.7)	2.4 (1.0)	<.0001
Sells ready-to-eat/fast food meals	(346, 48, 222, 76)	51.2%	37.5%	66.2%	15.8%	<.0001
Service counter available[d]	(349, 49, 221, 79)	13.2%	32.7%	13.1%	1.3%	<.0001
Plexiglass or divider at register	(348, 49, 219, 80)	17.2%	4.1%	25.1%	3.8%	<.0001
Exterior store features						
Sells gasoline	(351, 49, 222, 80)	40.2%	8.2%	61.7%	0%	<.0001
On-site parking available	(351, 49, 222, 80)	84.3%	69.4%	85.6%	90.0%	.023
Security mirror/camera/guard	(349, 49, 220, 80)	95.4%	85.7%	96.8%	97.5%	.086
Bars on window	(350, 48, 222, 80)	19.4%	27.1%	22.5%	6.3%	<.0001

SNAP Supplemental Nutrition Assistance Program; WIC Supplemental Nutrition Program for Women, Infants, and Children; N number of observations.
[a]Non-chain grocery stores sold fresh meat.
[b]Convenience stores did not sell fresh meat.
[c]Other food stores include small discount stores ($n = 29$), drug stores and pharmacies ($n = 31$), liquor stores ($n = 18$), and other stores ($n = 2$).
[d]Stores with service counters have a bakery, deli counter, and/or butcher.

store type. Of the 351 stores that were audited, 49 (14.0%) were non-chain grocery stores, 222 (63.2%) were convenience stores, and 80 (22.8%) were other small store types. Other stores included 29 small discount stores, 31 drug stores/pharmacies, 18 liquor stores, and 2 other small stores (1 small specialty food store and 1 small general merchandise store). Approximately 94.0% of stores were SNAP authorized and 12.6% were WIC authorized. Mean number of cash registers was 1.8, and 51.2% of stores sold ready-to-eat/fast food meals. There was a service counter available in 13.2% of stores, and 84.3% had on-site parking available. More than 95% of stores had at least one security feature and almost 20% had bars on their windows. Significant differences were observed by store type for all measures evaluated except SNAP authorization status and availability of a security mirror, camera, or guard. Although there were no differences in SNAP-authorization status by store type, compared to convenience stores, higher percentages of non-chain grocery stores and other stores were WIC authorized ($p = .01$).

Results on the percentage of small food stores that met all, or some, of the SNAP-authorized retailer stocking requirements outlined in the 2016 final rule are presented in Table 3 for all stores and stratified by store type. Overall, 30.2% of stores met all aspects of the 2016 final rule requirements. Approximately 34.8% of stores met the requirement of offering seven varieties in all four USDA staple food categories, 30.5% met the requirement of offering seven varieties with ≥3 stocking units in all categories, and 92.6% met the requirement of offering a perishable variety with ≥3 stocking units in at least 3 categories. Although 86.3% of small food stores offered seven varieties with ≥3 stocking units of fruits and vegetables, only 32.5% offered seven varieties with ≥3 stocking units of dairy. Several differences were observed by store type. Although 53.1% of non-chain grocery stores and 52.5% of other stores met all requirements, only 17.1% of convenience stores met all requirements ($p < .0001$). Only 23.0% of convenience stores offered seven varieties of dairy compared to 67.3% of non-chain grocery stores and 58.8% of other stores ($p < .0001$). 81.3% of other stores offered a perishable fruit and vegetable variety with ≥3 stocking units compared to 98.0% of non-chain grocery stores, and 95.0% of convenience stores ($p < .05$).

The conditional means of varieties offered at small food stores that failed to meet the requirement of offering seven varieties with ≥3 stocking units in each USDA staple food category are reported in Table 4. Approximately 13.7% of stores did not offer seven varieties with ≥3 stocking units in the fruits and vegetables category; 24.2% in the meat, poultry, and fish category; 36.2% in the bread and cereal category; and 67.5% in the dairy category. Among the stores that did not meet the requirement for fruits and vegetables, they offered an average of 4.4 varieties. The stores not meeting the requirement for meat, poultry, and fish, on average, offered

Table 3 | Percentages of small food stores that met the final rule on Supplemental Nutrition Assistance Program (SNAP)-authorized retailer requirements by store type

Requirement	All stores *N* = 351	Non-Chain grocery *N* = 49	Convenience store *N* = 222	Other[a] *N* = 80	*p* value
7 varieties available					
Fruits and vegetables	90.0%	98.0%	87.8%	91.3%	.003
Meat, poultry, and fish	80.3%	93.9%	74.8%	87.5%	.0001
Bread and cereal	68.7%	79.6%	62.6%	78.8%	.004
Dairy	37.3%	67.3%	23.0%	58.8%	<.0001
All four staple food categories	34.8%	61.2%	20.3%	58.8%	<.0001
7 varieties available with ≥3 stocking units					
Fruits and vegetables	86.3%	95.9%	83.8%	87.5%	.006
Meat, poultry, and fish	75.8%	93.9%	68.9%	83.8%	<.0001
Bread and cereal	63.8%	77.6%	56.8%	75.0%	.001
Dairy	32.5%	59.2%	19.4%	52.5%	<.0001
All four staple food categories	30.5%	55.1%	17.1%	52.5%	<.0001
Perishable variety available with ≥3 stocking units					
Fruits and vegetables	92.3%	98.0%	95.0%	81.3%	.003
Meat, poultry, and fish	90.3%	98.0%	89.2%	88.9%	.005
Bread and cereal	88.6%	87.8%	91.0%	82.5%	.184
Dairy	96.0%	93.9%	98.6%	90.0%	.022
At least three staple food categories	92.6%	93.9%	94.6%	86.3%	.135
Met all requirements	30.2%	53.1%	17.1%	52.5%	<.0001

N number of observations.
[a]Other food stores include small discount stores ($n = 29$), drug stores and pharmacies ($n = 31$), liquor stores ($n = 18$), and other stores ($n = 2$).

Table 4 | Conditional mean of varieties offered at small food stores that did not meet the variety requirement by U.S. Department of Agriculture (USDA) staple food category

Staple Food Category	All stores *N* = 351
Fruits and vegetables	
Stores not meeting the variety requirement	13.7%
Mean number of varieties offered with ≥3 stocking units	4.4 (±1.6)[a]
Meat, poultry, and fish	
Stores not meeting the variety requirement	24.2%
Mean number of varieties offered with ≥3 stocking units	4.9 (±1.5)
Bread and cereal	
Stores not meeting the variety requirement	36.2%
Mean number of varieties offered with ≥3 stocking units	4.1 (±1.7)
Dairy	
Stores not meeting the variety requirement	67.5%
Mean number of varieties offered with ≥3 stocking units	3.5 (±1.7)

N number of observations.
[a]Mean (±standard deviation).

4.9 varieties. On average, 4.1 varieties were offered by the stores not meeting the requirement for bread and cereal. Finally, of the stores not meeting the requirement for dairy, only 3.5 varieties were offered. Thus, staple food offerings would need to increase by 2.1–3.5 varieties across the staple food categories.

DISCUSSION

This multisite study found that just more than two thirds (69.8%) of small food stores in the sample, which included SNAP-authorized stores, would need to expand their staple food offerings to meet the USDA's 2016 final rule that increased the minimum stocking requirements for SNAP-authorized retailers. Although more than 60% of stores met the new requirements of stocking at least seven varieties with at least three stocking units each in three of the USDA staple food categories (86.3% for fruits and vegetables; 75.8% for meat, poultry, and fish; and 63.8% for bread and cereal), less than one third (30.5%) met the requirements for dairy. The vast majority of stores (92.6%) met the requirements for having perishable varieties in at least three of the staple food categories. Significant differences by store type were identified and revealed that just more than one half of non-chain grocery stores (53.1%) and other stores (52.5%) met all requirements compared to only 17.1% of convenience stores.

Among those stores that did not already meet the 2016 final rule requirements of stocking at least seven varieties with three or more stocking units in each staple food category, the mean number of offerings available in each category shed light on the extent to which stores would need to increase their offerings. On average, to meet the new requirements stores would need to increase the number of varieties offered by 2.6 for fruits and vegetables; 2.1 for meat, poultry, and fish; 2.9 for bread and cereal; and 3.5 for dairy. This suggests that the vast majority of small food stores (i.e. the more than two thirds of stores that did not meet the requirements for diary) would need to double the number of their dairy offerings (from an average of 3.5 to 7) in order to meet the minimum requirement.

The study findings are consistent with three recent single-site studies that found more than 70% of small food stores (88.3% in Baltimore, MD; 77.9% in Chicago, IL; and, 74.5% in Appalachian East, TN) would not meet the proposed or final USDA expanded minimum stocking requirements in all four USDA staple food categories and that those stores sampled were most likely not to meet the stocking requirements for dairy [17,21,22]. Our study findings also are consistent with the USDA's Food and Nutrition Service initial regulatory assessment that 88.6% of small stores would not meet the originally proposed increased stocking minimums (from a total of 12 food items under the previous law [3 varieties × 4 staple food groups × 1 stocking unit] to 168 items [7 varieties × 4 staple food groups × 6 stocking units] under the 2016 proposal), with the greatest challenge for dairy [20].

The study findings that such a limited number of stores would meet the increased stocking requirements, particularly for dairy, are, in part, underscored in recent qualitative work that has documented storeowners' concerns about spoilage, adequate space for refrigeration, consumer demand, and so forth. A mixed methods study for Baltimore that assessed the potential impact of the 2016 final SNAP retailer rule on stocking found that storeowners expressed concerns over low customer demand, high potential for spoilage, and high distributor costs of acquiring the newly required foods and beverages [17]. A recent multistate study added to the qualitative literature by also identifying

rural corner storeowners' concerns about not having enough space or proper equipment (i.e. refrigeration, freezers) to stock more staple items, as well as a need for help marketing and promoting the new items [19]. A study conducted in four states that assessed storeowners' perceptions related to the Healthy Small Store Minimum Stocking Recommendations developed by the Robert Wood Johnson Foundation, Healthy Eating Research, which were modeled after the USDA SNAP-authorization requirements, found that storeowners' expressed concerns about spoilage and ability to acquire staple foods at competitive prices [18].

Therefore, technical assistance would be important if USDA standards increased to the required stocking amounts as examined in this research. More investigations are needed to determine how multiple food storeowners can meet increased stocking goals (with or without policy enforcement) in a flexible manner that compliments the culture and desires of their consumer base while adhering to dietary guidance. Tailored approaches are likely to generate buy-in and create opportunities to increase SNAP consumer demand [30]. However, these engagements, technical assistance, and any storeowner-focused training or education should be evaluated; while a number of 'best practices' in the field have been previously noted [30] and overall these methods suggest positive effects on a number of outcomes of interest [31], the most effective strategies are currently not known [32]. There is also a need to align research, practice, and policy approaches with retailers' needs and values to ensure profits and the capacity for healthy food stocking to be implemented and maintained [32].

Limitations of this study include the following: (a) although it is a multistate study, it does not provide full representation across the country; thus, generalizability is still somewhat limited; (b) the number of sites did not permit comparisons across rural and urban areas; and, (c) data collection occurred during the fall season and may not represent food availability through the year. Despite these limitations, this is the first study of the 2016 final rule on increased SNAP-authorized retailer stocking requirements that captures stores sampled from across the USA and informs on the potential increases in staple food availability in small stores from such a regulatory change.

Although the 2016 final rule required seven varieties for all staple food categories with perishable items in three categories and a depth of stock requirement of three units per variety [8], as noted earlier, based on the Consolidated Appropriations Act of 2017, the current stocking requirement includes the increased depth of stock to three units but has remained at three varieties in each staple food category with perishable items required in two categories [9]. Our results suggest that future changes aligned with the 2016 final rule may offer an opportunity to generate increased store offerings by a majority of small food stores in low-income underserved communities in the USA. In addition, our study results that highlight the greatest challenge in meeting the requirements for dairy, coupled with previous qualitative work that highlight small storeowner's concerns around spoilage, refrigeration, and other challenges of demand and marketing, suggest that future work should assess the extent that perishable offerings are being met beyond just the one variety required to satisfy the perishable requirement in a given staple food category. Indeed, such future work could inform whether even stricter regulations that stipulate higher numbers of varieties of perishable items per category may serve to increase the supply of fresh foods in small stores that serve low-income areas. This would, of course, need to be combined with assessments of barriers and support needed to help small storeowners overcome any such barriers related to increasing the provision of fresh foods within the various staple food categories.

Translational implications

Changes to SNAP-authorization policy guidelines could enhance healthy food access to low-income Americans in communities throughout the USA. This research quantifies a gap between what retailers currently stock and what they would be mandated to stock if the 2016 policy rule were implemented. Policymakers and USDA funders should consider SNAP-authorized food storeowner and manager perspectives regarding increasing the number of products aligned with dietary guidance, as this population are "knowledge brokers" to successful policy adoption, implementation, and maintenance [33]. Available implementation frameworks could be used to guide assessments that aim to fit policy interventions to the retail setting, as barriers to increasing product variance without consumer demand for these products are high risk for retailers [32]. For example, individual characteristics, organizational, and community factors all influence the likelihood for strategies to be successfully used in their intended settings [34]. The USDA is a key stakeholder to mobilize agencies at the state level in order to understand optimal policy approaches and required technical assistance to improve the feasibility of public health approaches for SNAP business stakeholders.

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Compliance with Ethical Standards

Conflicts of Interest: The authors have no conflicts of interest to report.

Human Rights: This article does not contain any studies with human participants performed by any of the authors.

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