Implementation of Indigenous Food Tax Policies in Stores on Navajo Nation

Etsitty O. Sean, BA[1]
Brianna John, BS[1,2,3]
Alex Greenfeld, MS[1,3]
Robert Alsburg, BS[1,3]
Malyssa Egge, MS[1,2]
Sharon Sandman, BA[1,2]
Carmen George, MS[1,3]
Cameron Curley, BS[1,3]
Caleigh Curley, MPH[1,4]
Hendrik D. de Heer, PhD[1]
Gloria Begay, MEd[5]
Shirleen Jumbo-Rintila, BS[6]
Martin E. Ashley, BSBA[7]
Del Yazzie, MPH[8]
Ramona Antone-Nez, MPH[8]
Sonya Sunhi Shin, MD[2,3]
Carolyn Bancroft, PhD[3]

[1]*Northern Arizona University, Flagstaff, AZ, USA*
[2]*Community Outreach and Patient Empowerment, Gallup, NM, USA*
[3]*Brigham and Women's Hospital, Boston, MA, USA*
[4]*The University of Arizona, Tucson, AZ, USA*
[5]*Diné Food Sovereignty Alliance, Gallup, NM, USA*
[6]*Diné College, Window Rock, NM, USA*
[7]*Office of the Navajo Tax Commission, Window Rock, AZ, USA*
[8]*Navajo Epidemiology Center, Window Rock, AZ, USA*

In 2014, the Navajo Nation Healthy Diné Nation Act (HDNA) was enacted and permanently approved in 2020; HDNA places a 2% surtax on unhealthy foods and beverages, while other 2014 legislation exempted healthy food items from the 6% regular sales tax. Little is known about Navajo Nation store manager/owner perspectives toward the HDNA and how best to support stores to implement the legislation. Purposive sampling was used to ensure a balanced sample of correct HDNA implementers, incorrect HDNA implementers, and stores which made healthy store changes over the past 6 years. Three community-based interviewers collected surveys by phone or in-person. Frequency of closed-ended questions was quantified, and open-ended responses were coded using thematic analysis. Of 29 identified sample stores, 20 were interviewed to reach saturation. Eleven of 20 stores made changes improving their healthy food environments. Barriers included lack of equipment (6/20) and low consumer demand (5/20).

Authors' Note: *Data reported in this publication were supported by a cooperative agreement with the US Centers for Disease Control and Prevention (NU58DP005872) and grants from the National Institute on Minority Health and Health Disparities of the National Institutes of Health (award numbers R01MD013352 and U54MD012388) and the National Cancer Institute (award number U54CA143925). The content in this manuscript is solely the responsibility of the authors. Address correspondence to Etsitty O. Sean, #610, 2418 E. Hwy 66, Gallup, NM 87301, USA; e-mail: etsitty.seanobryan@gmail.com.*

Supplement Note: *This article is part of the* Health Promotion Practice *supplement, "Reducing Chronic Disease through Physical Activity and Nutrition: Public Health Practice in the Field." The purpose of the supplement is to showcase innovative, community-centered, public health actions of SPAN, REACH, and HOP programs to advance nutrition and physical activity among priority populations in various settings. The Society for Public Health Education is grateful to the Centers for Disease Control and Prevention, Division of Nutrition, Physical Activity, and Obesity for providing support for the issue. The entire supplement issue is available open access at https://journals.sagepub.com/toc/hppa/23/1_suppl.*

Health Promotion Practice
November 2022 Vol. 23, Suppl 1 76S–85S
DOI: 10.1177/15248399221112964

Facilitators included consumer awareness and increased produce supply options (5/20). Sixteen of 20 stores supported HDNA continuation. Facilitators to HDNA implementation included orientation and informational materials (6/20) and promotion of tax-free items (5/20). Barriers included confusion about the tax (6/20) and tax exemption (5/20). Suggestions for support included printed materials (6/20) and store training (5/20). HDNA benefits included greater awareness of healthy choices among staff (7/20) and customer-community members (2/20). Most managers and owners expressed receiving support for healthy store changes and HDNA, but also identified a need for added resources and support. Findings inform legislative action to promote timely and appropriate uptake of HDNA, and support equitable, healthy food systems.

Keywords: food insecurity; junk food tax; food tax-policy; American Indian; food equity; Navajo Nation; Sovereignty; community-based participatory research; Racial and Ethnic Approaches to Community Health; HDNA

BACKGROUND

The Navajo Nation is a sovereign nation covering portions of Arizona, New Mexico, Utah, and Colorado. It is home to over 300,000 individuals with approximately 47% of tribal members currently living within tribal boundaries (Navajo Native American Research Centers for Heath [NARCH], 2020). Despite Navajo Nation's vast size, there are only 13 grocery stores on the Nation leaving residents to travel 90 to 120 miles round trip for groceries (Eldridge et al., 2015). These travel distances result in most families only visiting grocery stores 1 to 2 times a month (Eldridge et al., 2015). There are also approximately 100 small food stores (MacKenzie et al., 2019), including convenience stores and trading posts (independently owned stores that have long operated as both cultural hubs and local sources for food and essential household items). Although an essential part of the food system, a 2016 survey found that availability of healthier food options was limited in Navajo small stores and several healthier items were more expensive than less healthy items (Kumar et al., 2016). Fortunately, several small store interventions have demonstrated improved purchasing and health behaviors (Gittelsohn et al., 2013; MacKenzie et al., 2019).

In 2014, a study identified food insecurity on Navajo Nation as among the highest in the United States, with more than 75% of households describing some level of food insecurity (Pardilla et al., 2014). Food insecurity among children has been associated with adverse outcomes including lower test scores, psychosocial problems, and poorer health (Pardilla et al., 2014), as well as increased risk of elevated body weight and diabetes in adulthood (Nikolaus et al., 2022; Stotz et al., 2021).

The association between food insecurity and chronic health conditions contributes to health disparities among communities where food systems have been undermined by historical underinvestment and marginalization. Food insecurity experienced today is a manifestation of long-standing effects of colonialism. The repeated use of Indigenous land for profit throughout American history has environmental and health risks pertaining to the contamination of groundwater, surface water, air, and soil (Lin et al., 2020; Reno, 1981). In the Western United States, there are more than 4,000 abandoned uranium mines (Lewis et al., 2017). More than 500 of these mines are on the Navajo Nation, with potential routes for toxic exposure including inhalation via windblown dust and ingestion of contaminated water and/or food (Beamer et al., 2014; deLemos et al., 2009; Hoover et al., 2019). This disregard for Indigenous reliance on free-flowing waterways during the reallocation and subsequent development of infrastructure—like dams and diversion systems on the Colorado River—has contributed to the Navajo people's homeland turning into a high-altitude food desert with increasingly strained capacity for self-sufficient food production (Reno, 1981).

Despite these historical challenges, the sovereignty of Indigenous peoples opens unique opportunities, including the ability to use Navajo law and regulations to address pertinent issues within tribal boundaries. In 2014, Navajo Nation became the first tribal nation to pass legislation regarding an added tax on foods with minimal-to-no nutritional value ("junk food tax") (Yazzie et al., 2020). The Healthy Diné Nation Act (HDNA) was designed to promote the health of tribal members by addressing the rising consumption of unhealthy foods, including pre-packaged foods high in salt, saturated fat, and sugar, sweetened beverages, sweets, and chips (Yazzie et al., 2020). In parallel, Navajo Nation waived the Navajo 6% sales tax on healthy food and beverage items, thus introducing a unique food policy with both disincentives for unhealthy foods and incentives for healthy foods. From 2015 to 2019, the junk food tax raised $7.58 million, with each small community on Navajo Nation receiving $13,000 annually to fund community-developed wellness projects (Yazzie et al., 2020).

HDNA and the tax exemption law have had major implications on food retailers, both in terms of shifting potential consumer demand toward healthier items, but also by placing additional demands on stores to correctly implement these policies. From 2013 to 2019, food environments in stores improved, including increased healthy signage, increased displays of healthy food items, food items offered, and pricing (George et al., 2021a). Among Navajo stores surveyed, 71% offered least three fruit varieties, and 65% of stores had three or more vegetables for sale (George et al., 2021a). Furthermore, 87.2% of Navajo Nation stores accurately applied the 2% sales tax on unhealthy items, while 55.3% of stores accurately implemented the tax exemption to healthy items (George et al., 2021b). These findings highlight the dynamic changes that stores have undergone to offer increasingly healthy foods while adapting to new tax policies. Further research is needed to understand the perspectives and experience of store managers/owners themselves in how and why they have made these changes. This information will inform future food policies and bear important implications on the Navajo food environment.

PURPOSE AND AIMS

To better understand perspectives of store managers/owners, our team conducted a mixed-methods study to gauge store manager/owner attitudes toward HDNA as well as successes and challenges to making healthy store changes. The research team utilized a community-based participatory (CBP) framework, acknowledging the legitimacy of experiential knowledge while focusing on improving practices and situations. CBP is highly relevant in Indigenous communities because it focuses on establishing respectful relationships and empowering community members to have a shared control and interest in group health and social conditions (Christopher et al., 2011; LaVeaux & Christopher, 2009). Implementation of CBP promotes a collaborative approach, empowering community members to utilize concrete tools like planning, evaluation, and collective reflections to pinpoint community needs, community desires, and inform equity values (Sánchez et al., 2021). Implementation aims of this study focused on understanding the types of changes that were made to support healthy food choices, the impact of HDNA legislation, extent of support for HDNA, facilitators and barriers to implementing HDNA, and opportunities for ongoing support to stores to maintain positive environment changes and accurate sale taxes. An active implementation framework was utilized to accomplish the two aims of identifying determinants of implementation that should be further analyzed while simultaneously providing hands-on support for the implementation of HDNA (Nilsen, 2015). The goal of the research is to empower Navajo Nation community members to explore barriers and limitations to implementation of food taxes within a sovereign nation and highlight the needed resources identified by the community for success and sustainability.

METHOD

Ethical Considerations

This study was approved by the Navajo Nation Human Research Review Board (NNR17.284T), Northern Arizona University's Human Research Protection Program, and Brigham & Women's Hospital's Human Research Committee. Ethical considerations in regard to Racial and Ethnic Approaches to Community Health (REACH) (https://www.cdc.gov/nccdphp/dnpao/state-local-programs/reach/index.htm) Programs were guided by the Navajo Department of Health (NDOH) and Centers for Disease Control and Prevention (CDC) to improve Navajo and other Indigenous peoples' public health in the areas of culturally aware, community-level health regarding Navajo place-based health and wellness resilience; and development of policy, systems, and environmental changes for improved health and wellness.

Study Design and Setting

This observational, cross-sectional mixed-methods study was conducted in the Navajo Nation, the largest geographical reservation within the United States (Lin et al., 2020; Reno, 1981). Aligned with the CBP framework, the study is a part of a longitudinal partnership with stores on the Navajo Nation and informed by our study team's Community Advisory Group aimed at evaluating the impacts of the HDNA legislation.

Sampling Methods

Purposive sampling was utilized to identify 29 stores on Navajo Nation in all three states, with balanced representation based on measurable categories that could influence study aims: stores that correctly implemented HDNA, stores that incorrectly implemented HDNA, and stores that made measurable healthy store changes over the past 6 years. Data from previous assessments of HDNA implementation in 47 stores (George et al., 2021a) and changes in produce supply in 51 stores (George et al., 2021b), allowing us

to derive the sample for this present study. Researchers partnered with Navajo-based non-profit organizations including the Community Outreach and Patient Empowerment (COPE) and the Healthy Navajo Stores Initiative (HNSI) to identify stores that fit the sampling criteria (MacKenzie et al., 2019).

Recruitment and Enrollment

As the first contact, HNSI Program Coordinator called stores to schedule surveys, which were then conducted by trained community-based surveyors. Repeated calls were made until the manager or owner could be reached. If the manager, owner, or delegated person (in one instance) could not complete the survey immediately, the surveyors would schedule a follow-up time. Respondents received a $25 gift card upon survey completion.

Data Collection

The survey was a series of questions regarding successes and challenges of making healthy store changes and implementing HDNA over the past 2 years and suggestions on how to support the stores. The survey was adapted from a store manager survey previously created for the Epi-AID project in a collaboration between the NDOH, the CDC, and community organizations (Kumar et al., 2016; Navajo Department of Health [NDOH], 2013), resulting in 37 open-ended, multiple choice, and Likert-type-scale-based questions (see Supplemental Material). Details of survey development are described elsewhere (John, 2021).

Store manager/owner surveys were conducted from March 6 to May 11, 2021 by two community-based surveyors and one staff member. One-on-one surveys occurred during a period of limited travel and in-person meetings due to COVID-19, either by phone (13/20) or in person (7/20), after obtaining verbal informed consent. Surveys lasted 30 to 60 min and were all conducted in English; interviews were recorded using Microsoft Teams if consented to recording and then transcribed (otherwise the surveyors took detailed notes). All identifiers were placed by pseudonyms. Responses were entered into CommCare (Dimagi, Cambridge, MA).

Mixed Method Analysis

Qualitative and quantitative data were separately analyzed, then interpreted and combined using a triangulation mixed-methods design (Williamson, 2005). Quantitative results were analyzed using Microsoft Excel to identify frequencies/percentages of store type (grocery, convenience, or trading post); respondent role; regional location; store traffic before and during COVID-19; HDNA categorical perceptions; and types of orientation and support received. Accuracy checks in transcription and coding were conducted by two coders and triangulated with a third coder. The primary coders were Navajo research interns who first received training in CBP research and qualitative methods. A study principal investigator and research manager developed an initial codebook using deductive content analysis. Parent and child themes were developed through deductive and inductive processes and then organized into a schematic overview of salient themes and their interrelatedness emerging from both qualitative and quantitative analyses. This schematic was then reviewed and refined by the entire study team.

Saturation of qualitative data was measured utilizing three primary elements: Base Size, Run Length, and New Information Threshold (Guest et al., 2020). Base Size is defined as the minimum number of surveys reviewed to establish an initial number of themes to use as a denominator for the analysis. Run Length refers to the number of surveys reviewed for new themes within the data set. New Information Threshold was calculated by dividing the number of themes identified in the Run Length by the number of themes initially identified in the Base Size; saturation was reached when New Information Threshold reached ≤5% (Guest et al., 2020).

RESULTS

Study Cohort

From the 29 identified stores, 12 initial stores were chosen as the Base Size for data collection. Two primary community-based surveyors evenly split the Base Size surveys and utilized deductive and inductive thematic analysis based on a previously developed codebook to identify parent and child themes. Based on a Run Length of four surveys, data collection continued until the New Information Threshold reached ≤5%. During outreach, one store declined due to lack of corporate approval. Saturation was achieved after 20 surveys; the remaining eight stores were therefore not recruited. Table 1 provides an overview of the 20 stores included in this study. Respondents included 17 managers, two owners, and one other employee.

Types of Healthy Store Changes

Of the 20 stores surveyed, 13 (65%) of the stores reported changes to improve the healthy food environments (Figure 1). Thirteen respondents (65%) felt that their store had played a positive role by increasing the availability of healthy foods, therefore supporting health promotion in their community.

One trading post made changes that reduced healthy food availability: rather than competing with the nearby grocery store, they focused on selling convenience items

TABLE 1
Demographics of the 20 Stores That Participated in the Study

Characteristics (n if not equal to 20)	*N (%)*
Type of store	
Convenience	10 (50)
Trading post	3 (15)
Grocery	7 (35)
Respondent	
Sole owner	2 (10)
Partner (co-owner)	0 (0)
Manager (non-owner)	17 (85)
Other	1 (5)
Region	
Southern	3 (15)
Eastern	2 (10)
Northern	5 (25)
Central	3 (15)
Western	7 (35)
Busiest time of month for store	
Early in the month	14 (70)
Middle of the month	1 (5)
End of the month	0 (0)
Same throughout the month	5 (25)

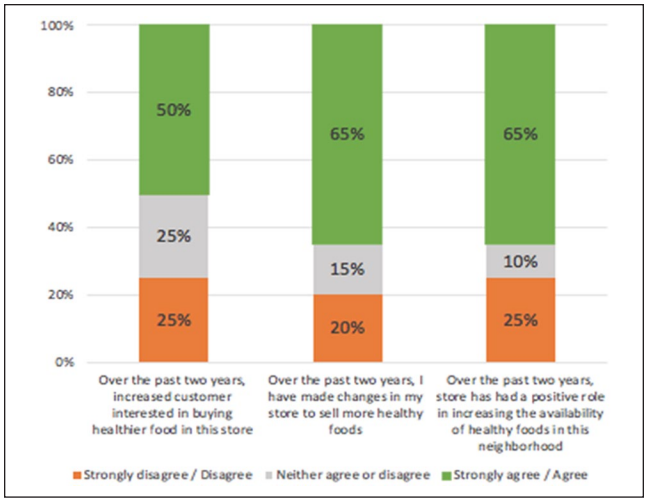

FIGURE 1 Healthy Store Changes

like chips and candy primarily to tourists (1/20):

> We have made opposite direction changes. We are not going to compete with the market up the street. We serve many more tourists and have cut down on the grocery items and sell more convenience store items that aren't as healthy. (Carla)

The most common healthy changes included increased supply by purchasing more produce to sell (8/20), increased marketing/promotion efforts (8/20), and modifying store layout such as vegetable coolers and fruit racks (6/20):

> We added a fruit section and added an extra water door. (Sheryl)

> We did the Saturday sale selling veggie and fruits on sale implemented fruit basket at the register. (Jimmy)

> We order groceries—fresh fruits and vegetable . . . so they don't have to travel so far. (Marie)

Facilitators and Barriers to Making Healthy Changes

Store managers/owners identified several facilitators to making healthy changes. Internal factors (implemented by store staff) included increased produce supply (5/20) and efforts to promote tax-free items in the store, using green tags and health branding, such as "Be Healthy Diné" and "Full Circle" (5/20). External factors (reflecting changes outside the stores' control) included greater awareness of health and growing consumer demand for healthy foods (6/20). As shown in Figure 1, about half of store respondents felt that consumer demand for healthy foods had increased over the past 2 years:

> We launched the Be Healthy Diné and put tags up that show which items are healthier. We have Full Circle products throughout the store and have implemented the fresh cut foods program available throughout the day. (Annie)

> We brought in a larger cooler; a built-in cooler can only hold so much. The larger separate cooler can hold fruits veggies and eggs, more room. (Tina)

Barriers to healthy changes included lack of equipment and marketing materials (6/20), lack of consumer demand (5/20), and lack of motivation on the part of store leadership (4/20). Less common barriers included confusion regarding taxed/non-taxed foods (1/20), difficulty changing customers' healthy behaviors (1/20), and lack of additional room for vegetable coolers and fruit and water racks (1/20).

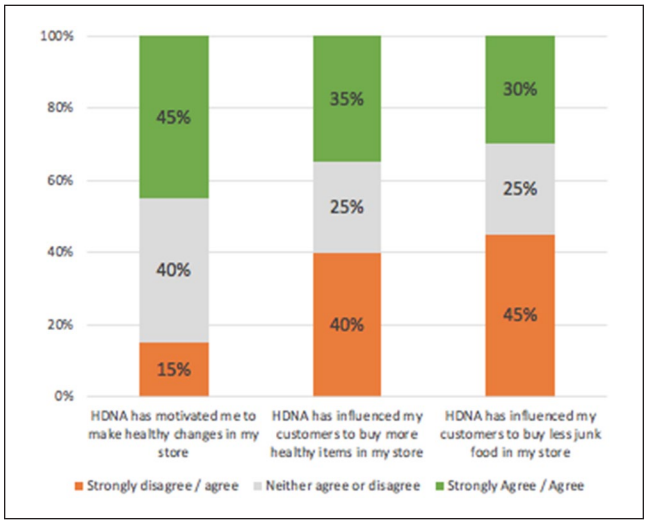

FIGURE 2 Impact of HDNA on Store and Customers
Note. HDNA = Healthy Diné Nation Act.

Impact of HDNA

When asked if HDNA has been beneficial or harmful to their store, 100% of respondents felt that HDNA was beneficial, while eight individuals (40%) felt HDNA was harmful in some ways. Almost half (45%, Figure 2) felt that HDNA motivated them to make healthy changes in their store, 35% felt customers bought more healthy tax-free items, and 30% thought shoppers bought less junk food.

Qualitative responses supported these findings, describing increased health awareness and gradual behavior changes among staff (7/20) and shoppers (2/20). One respondent cited community wellness projects as another benefit of HDNA:

> Not only for customers but for the employees they are making the right choices in the food selections they choose to eat. (Sharon)

> People are aware they are paying more for soda than before. (Brenda)

> Many people used to buy chips and stuff but now that people are cooking at home, they notice there aren't taxes on veggies and buy more. (Annie)

In terms of HDNA's impact on store sales, several stores described greater revenue from healthy items, while two respondents mentioned complaints about higher prices:

> [HDNA] helps to sell more fruits and vegetables. (Sheryl)

> Neither beneficial or harmful don't complain but they complain about prices. (Tina)

HDNA Implementation

Most stores (80%) supported reauthorization of HDNA (Table 2). Self-reported understanding of legislation was high (90%) regarding which items were subject to the added tax and somewhat lower (75%) regarding which items were tax-exempt.

Multiple factors facilitated HDNA implementation. A number of stores (6/20) received HDNA orientation, guidance, and/or informational materials; sources of information included internal communications (i.e., supervisor), the Navajo Tax Commission, as well as other entities working with stores such as COPE and Navajo WIC Program. Other facilitators included promotion of tax-exempt healthy foods over taxed junk foods (5/20) and communications to raise HDNA awareness, such as Nation governance and in-store radio announcements (2/20):

> I think what really helps, survey(s) at the stores with customers is continued set up in the store or outside sharing pamphlets. (Sharon)

> In store radio announcements and different coupons and promos. Maybe some text messages with promo codes that we could put into the register. Like a one-time use thing . . . I don't think people really know how to cook healthier foods. (Annie)

Barriers to HDNA Implementation and Suggestions for Added Support

Barriers to HDNA store implementation included lack of information or confusion regarding what foods are taxable with HDNA tax (6/20); lack of information or confusion regarding what is tax-exempt with HDNA tax (5/20); cost (3/20); and a lack of customer awareness (1/20). In addition, four stores report no barriers to HDNA implementation:

> The law is extremely confusing. It's hard to have a handle on it, if there is no way to figure out what is what. And even when you say these items are at this percent and these are at another percent, then our registers don't work that way . . . (Carla)

> We charge junk food [tax] on all of that [soda] because they are processed and have sugar. Now, do we charge the processed drinks like apple juice and orange juice junk food tax or not because in a sense they are produce?? Sometimes we ring it up as grocery. But if it's water we just ring it up as grocery. That was never clarified. (Sam)

TABLE 2
Healthy Diné Nation Act Legislation Support and Understanding Among Navajo Nation Store Managers and Owners

Questions asked to Store Managers/Owners	*N (%)*
Support the continuation of the HDNA legislation past 2020	
Yes	16 (80)
No	3 (15)
Not sure	1 (5)
Store owner/manager and staff understand what items are subject to the junk food tax	
Understand very well/somewhat	18 (90)
Do not understand very well/not at all	2 (10)
Store owner/manager and your staff understand what items are subject to the tax exemption	
Understand very well/somewhat	15 (75)
Do not understand very well/not at all	5 (25)

Note. HDNA = Healthy Diné Nation Act.

> Just not knowing or having the information. Not receiving an orientation . . . I don't know what the HDNA is and the goals and objectives. (Bob)

Store owners and managers suggested other actions that could help implement HDNA in stores: printed materials, signage, and pamphlets (6/20); customer support (5/20); more training, orientation, or information about HDNA (5/20); and improved supply chain as a possible support for implementing and improving HDNA in stores (2/20):

> . . . maybe some food demos and help the mothers with how to make watermelon cup, broccoli salad, how to cook broccoli casserole, etc. cause the mothers were getting WIC and food stamps and were getting those items available. They need to know what they can buy other than apples and bananas . . . (Richard)

> More food distributors. Several are based in Phoenix but they don't service us. We're serviced from New Mexico. But the time we get produce we only have three or four days to turn it over before it spoils. (Sam)

DISCUSSION

We found that most stores were successful in making healthy changes in their stores and the majority of managers/owners (80%) supported HDNA. Successful HDNA implementation was facilitated by assistance from internal and external partners, as well as community-wide promotion of HDNA. Most respondents felt that HDNA had a positive benefit on their stores, staff, and customers. Overall, our findings paint a comprehensive picture of how food tax policies are a synergistic part of a health promotion effort in which Navajo stores play a key role as strong and committed community partners. Store managers/owners viewed tax legislations as an integral part of healthy store changes. Rather than seeing the new policies as a nuisance, respondents tended to support these policies as additional reinforcement of community-wide efforts to promote healthy changes among shoppers and staff (see Figure 3). When asked what additional help stores would like, respondents spoke broadly of the need for strong supply chain and infrastructure as well as broadened community outreach to stores and shoppers to raise awareness of HDNA and health promotion.

Although no policy like the HDNA has been implemented in other Tribal nations, sugar-sweetened beverage taxes in U.S. cities and unhealthy food taxes in rural and international settings provide important context. In Mexico, unhealthy food taxes were not completely passed through to customers in rural and semi-rural areas (Colchero et al., 2017a, 2017b), suggesting a key role of stores in policy implementation. However, very little prior research describes stores as key implementing partners in food tax policies. We have shown that rural Navajo Nation stores implemented the 2% HDNA tax (George et al., 2021b) with comparable accuracy to stores implementing sugar-sweetened beverage taxes in Cook County, Illinois (El-Sayed et al., 2020) and Berkeley, California (Falbe et al., 2020). In a study investigating the sugar-sweetened beverage tax in Berkeley, successful implementation relied heavily on policy simplicity, inner and outer support, and established policy process

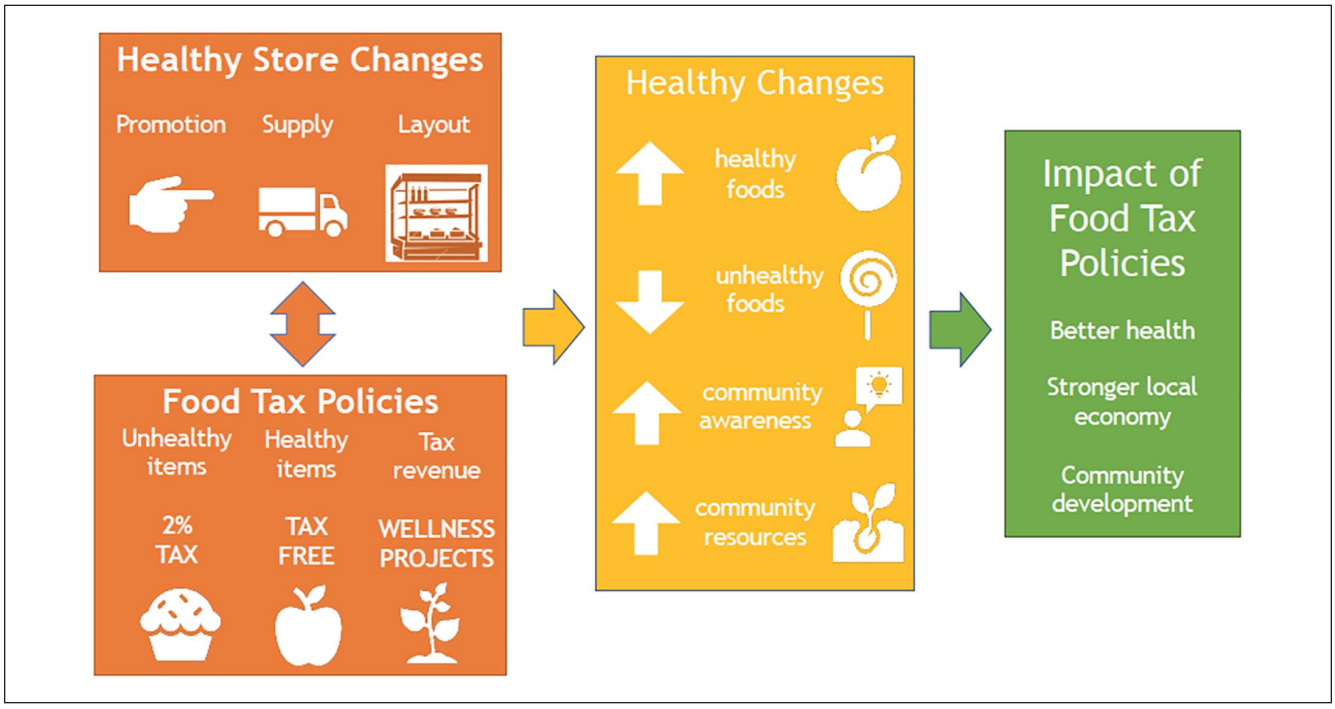

FIGURE 3 Food Tax Policies: Relationship With Healthy Store Changes and Impact Pathway

so there was proper funding management and proper outreach (Falbe et al., 2020). Our findings are similar to those described in the Berkeley experience in highlighting the importance of supporting stores and other business partners to implement food taxes. This study also described the importance of having adequate support from community partners to implement changing legislation as well as the continued need for increased public awareness of these laws. Finally, similar to barriers reported in our study, qualitative research investigating the soda tax in Cook County suggested that confusion about messaging about the policy (public health vs. revenue) and confusion about implementation were contributing factors for repeal (Chriqui et al., 2020).

Strengths and Limitations

There are several limitations to our study. Most surveys were conducted by phone, given constraints of COVID-19; despite this challenge, we were able to collect detailed and open responses. We also recognize that some stores experienced staff turnover since the era when these policies were passed into law, adding to potential recall bias of challenges and successes with initial implementation. Another limitation was the inability to include stores from a national chain due to difficulty obtaining corporate approval. However, our study also had several strengths including a high response rate and the ability to collect firsthand testimony from store leaders themselves. Another strength of the study was that it was carried out by a team that was majority Navajo and supported by a Community Advisory Group.

Implications for Practice, Policy, and Research

Practice. We found that HDNA was well-received by most Navajo store managers/owners and was successfully implemented in many stores. Given the study team includes key Navajo stakeholders—including staff within the NDOH and a local community-based profit organization—the following strategies are currently underway in response to our findings: distribution of culturally informed promotional materials on HDNA, the tax-exemption law, and healthy food items for store use; and community dissemination of information on changes and updates in the HDNA's permanent reauthorization of 2020. Store manager/owner feedback led to the recognition of the need for a systematic process that properly orients staff on HDNA policy and regulations. In addition, the research team recommends additional strategies to support Navajo stores: promoting increased access to tax-exempt items through improved store infrastructure and supply chains to sell fresh produce and water; and engaging Navajo

stakeholders at all levels to support equitable and healthy food systems.

Policy. This study provides further evidence to support the implementation of food policies, particularly as a manifestation of tribal sovereignty, to increase healthy food access and reduce health disparities. If implementation of HDNA is solely the responsibility of stores on Navajo Nation, resources for cash registers or tax conversion software to decrease the burden placed on storefronts to accurately tax, calculate, and charge the correct prices must be explored. Through continued improvements on ground-breaking policy, utilization of sovereignty to overcome health inequity could lead to sustainable solutions to chronic health disparities seen throughout rural, tribal communities.

Research. Further research should explore how culturally informed promotional materials and refresher information about HDNA affects understanding and successful implementation of HDNA in Navajo stores. Continued research is paramount to building supportive evaluation that accurately and efficiently highlights conditions within unique tribal government structures that impede or facilitate changes in health policy.

ORCID iDs

Etsitty O. Sean https://orcid.org/0000-0001-6976-0321
Brianna John https://orcid.org/0000-0002-1482-5869

REFERENCES

Beamer, P. I., Sugeng, A. J., Kelly, M. D., Lothrop, N., Klimecki, W., Wilkinson, S. T., & Loh, M. (2014). Use of dust fall filters as passive samplers for metal concentrations in air for communities near contaminated mine tailings. *Environmental Science: Processes & Impacts*, *16*(6), 1275–1281. https://doi.org/10.1039/C3EM00626C

Chriqui, J. F., Sansone, C. N., & Powell, L. M. (2020). The sweetened beverage tax in Cook County, Illinois: Lessons from a failed effort. *American Journal of Public Health*, *110*(7), 1009–1016. https://doi.org/10.2105/AJPH.2020.305640

Christopher, S., Saha, R., Lachapelle, P., Jennings, D., Colclough, Y., Cooper, C., Cummins, C., Eggers, M. J., Fourstar, K., Harris, K., Kuntz, S. W., Lafromboise, V., Laveaux, D., McDonald, T., Bird, J. R., Rink, E., & Webster, L. (2011). Applying indigenous community-based participatory research principles to partnership development in health disparities research. *Family & Community Health*, *34*(3), 246–255. https://doi.org/10.1097/FCH.0b013e318219606f

Colchero, M. A., Molina, M., & Guerrero-López, C. M. (2017a). After Mexico implemented a tax, purchases of sugar-sweetened beverages decreased and water increased: Difference by place of residence, household composition, and income level. *The Journal of Nutrition*, *147*(8), 1552–1557. https://doi.org/10.3945/jn.117.251892

Colchero, M. A., Zavala, J., Batis, C., Shamah-Levy, T., & Rivera-Dommarco, J. (2017b). Changes in prices of taxed sugar-sweetened beverages and nonessential energy dense food in rural and semi-rural areas in Mexico. *Pan American Journal of Public Health*, *59*, 137–146. https://doi.org/10.21149/7994

deLemos, J. L., Brugge, D. E., Cajero, M., Downs, M., Durant, J. L., George, C. M., Henio-Adeky, S., Nez, T., Manning, T., Rock, T., Seschillie, B., Shuey, C., & Lewis, J. (2009). Development of risk maps to minimize uranium exposures in the Navajo Churchrock mining district. *Environmental Health*, *8*(1), 29. https://doi.org/10.1186/1476-069X-8-29

Eldridge, D., Jackson, R., Rajashekara, S., Piltch, E., Begay, M., VanWassenhove, J., Jim, J., Abeita, J., Daye, L., Joe, L., Williams, M., Castillo, M., Miller-Castillo, M., Begaye, S., Tully, V., & Shin, S. (2015). Understanding food insecurity in Navajo Nation through the community lens. In L. Ivers (Ed.), *Food insecurity and public health* (pp. 155–173). CRC Press.

El-Sayed, O. M., Pipito, A. A., Leider, J., Chriqui, J. F., & Powell, L. M. (2020). An assessment of food store compliance with the Cook County sweetened beverage tax. *Journal of Public Health Management and Practice*, *26*(4), E20–E23. https://doi.org/10.1097/PHH.0000000000001017

Falbe, J., Grummon, A. H., Rojas, N., Ryan-Ibarra, S., Silver, L. D., & Madsen, K. A. (2020). Implementation of the first US sugar-sweetened beverage tax in Berkeley, CA, s2015-2019. *American Journal of Public Health*, *110*(9), 1429–1437. https://doi.org/10.2105/AJPH.2020.305795

George, C., Bancroft, C., Salt, S. K., Curley, C. S., Curley, C., de Heer, H. D., Yazzie, D., Eddie, R., Antone-Nez, R., & Shin, S. S. (2021b). Changes in food pricing and availability on the Navajo Nation following a 2% tax on unhealthy foods: The Healthy Diné Nation Act of 2014. *PLOS ONE*, *16*(9), Article e0256683. https://doi.org/10.1371/journal.pone.0256683

George, C., Bancroft, C., Salt, S. K., Curley, C. S., Curley, C., Eddie, R., Edison, T., de Heer, H., Sanderson, P. R., Yazzie, D., Antone-Nez, R., & Shin, S. S. (2021a). Successful Implementation of the healthy diné nation act in stores on the Navajo Nation. *Preventive Medicine Reports*, *24*, 101573. https://doi.org/10.1016/j.pmedr.2021.101573

Gittelsohn, J., Kim, E. M., He, S., & Pardilla, M. (2013). A food store-based environmental intervention is associated with reduced BMI and improved psychosocial factors and food-related behaviors on the Navajo nation. *Journal of Nutrition*, *143*(9), 1494–1500. https://doi.org/10.3945/jn.112.165266

Guest, G., Namey, E., & Chen, M. (2020). A simple method to assess and report thematic saturation in qualitative research. *PLOS ONE*, *15*(5), Article e0232076. https://doi.org/10.1371/journal.pone.0232076

Hoover, J., Erdei, E., Nash, J., & Gonzales, M. (2019). A review of metal exposure studies conducted in the rural southwestern and mountain west region of the United States. *Current Epidemiology Reports*, *6*(1), 34–49. https://doi.org/10.1007/s40471-019-0182-3

John, B. (2021). *Navajo nation stores show resilience during COVID-19 pandemic* [Conference session]. Presentation at the *Navajo Nation Human Research Review Board Conference*, *Window Rock, AZ, United States*.

Kumar, G., Jim-Martin, S., Piltch, E., Onufrak, S., McNeil, C., Adams, L., Williams, N., Blanck, H. M., & Curley, L. (2016). Healthful nutrition of foods in Navajo nation stores: Availability and pricing. *American Journal of Health Promotion*, *30*(7), 501–510. https://doi.org/10.4278/ajhp.140821-QUAN-422

Laveaux, D., & Christopher, S. (2009). Contextualizing CBPR: Key principles of CBPR meet the Indigenous research context. *Pimatisiwin*, *7*(1), 1.

Lewis, J., Hoover, J., & MacKenzie, D. (2017). Mining and environmental health disparities in Native American communities. *Current Environmental Health Reports*, *4*(2), 130–141. https://doi.org/10.1007/s40572-017-0140-5

Lin, Y., Hoover, J., Beene, D., Erdei, E., & Liu, Z. (2020). Environmental risk mapping of potential abandoned uranium mine contamination on the Navajo Nation, USA, using a GIS-based multi-criteria decision analysis approach. *Environmental Science in Pollution Research International*, *27*(24), 30542–30557. https://doi.org/10.1007/s11356-020-09257-3

MacKenzie, O. W., George, C. V., Pérez-Escamilla, R., Lasky-Fink, J., Piltch, E. M., Sandman, S. M., Clark, C., Avalos, Q. J., Carroll, D. S., Wilmot, T. M., & Shin, S. S. (2019). Healthy stores initiative associated with produce purchasing on Navajo nation. *Current Developments in Nutrition*, *3*(12), nzz125. https://doi.org/10.1093/cdn/nzz125

Navajo Department of Health. (2013). *Healthful nutrition of foods in stores on Navajo Nation: Availability, pricing, and promotion* (Epi Aid, 2013-057). Navajo Epidemiology Center, Centers for Disease Control and Prevention's Division of Nutrition, Physical Activity, and Obesity (DNPAO).

Navajo Native American Research Centers for Heath. (2020). *Partnership between Diné College and Northern Arizona University, Navajo Nation Department of Health, and Arizona Department of Health*. 2020 Navajo Nation Maternal and Child Health Needs Assessment.

Nikolaus, C. J., Hebert, L. E., Zamora-Kapoor, A., & Sinclair, K. I. (2022). Risk of food insecurity in young adulthood and longitudinal changes in cardiometabolic health: Evidence from the national longitudinal study of adolescent to adult health. *The Journal of Nutrition*. Advance online publication. https://doi.org/10.1093/jn/nxac055

Nilsen, P. (2015). Making sense of implementation theories, models and frameworks. *Implementation Science: IS*, *10*, 53. https://doi.org/10.1186/s13012-015-0242-0

Pardilla, M., Prasad, D., Suratkar, S., & Gittelsohn, J. (2014). High levels of household food insecurity on the Navajo Nation. *Public Health Nutrition*, *17*(1), 58–65. https://doi.org/10.1017/S1368980012005630

Reno, P. (1981). *Mother earth, father sky, and economic development: Navajo resources and their use* (No. 3). University of New Mexico Press.

Sánchez, V., Sanchez-Youngman, S., Dickson, E., Burgess, E., Haozous, E., Trickett, E., Baker, E., & Wallerstein, N. (2021). CBPR implementation framework for community-academic partnerships. *American Journal of Community Psychology*, *67*(3–4), 284–296. https://doi.org/10.1002/ajcp.12506

Stotz, S., Brega, A. G., Henderson, J. N., Lockhart, S., & Moore, K. (2021). Food insecurity and associated challenges to healthy eating among American Indians and Alaska Natives with type 2 diabetes: Multiple stakeholder perspectives. *Journal of Aging and Health*, *33*(7–8_suppl), 31S-39S. https://doi.org/10.1177/08982643211013232

Williamson, G. R. (2005). Illustrating triangulation in mixed-methods nursing research. *Nurse Research*, *12*(4), 7–18. https://doi.org/10.7748/nr2005.04.12.4.7.c5955

Yazzie, D., Tallis, K., Curley, C., Sanderson, P. R., Eddie, R., Behrens, T. K., Antone-Nez, R., Ashley, M., Benally, H. J., Begay, G. A., Jumbo-Rintila, S., & de Heer, H. D. (2020). The Navajo Nation healthy diné nation act: A two percent tax on foods of minimal-to-no nutritious value, 2015-2019. *Preventing Chronic Disease*, *17*, 200038. https://doi.org/10.5888/pcd17.200038