

The Navajo Nation Healthy Diné Nation Act: A Description of Community Wellness Projects Funded by a 2% Tax on Minimal-to-No-Nutritious-Value Foods

Del Yazzie, MPH; Kristen Tallis, MPH; Caleigh Curley, MPH; Priscilla R. Sanderson, PhD; Regina Eddie, PhD; Sonya Shin, MD, MPH; Timothy K. Behrens, PhD; Carmen George, MS; Ramona Antone-Nez, MPH; Shirleen Jumbo-Rintila, BS; Gloria Ann Begay, MA; Hendrik "Dirk" de Heer, PhD, MPH

ABSTRACT

Context: To promote the health of the Navajo people, the Navajo Nation passed the Healthy Diné Nation Act (HDNA) in 2014. The HDNA included a 2% tax on "minimal-to-no-nutritional-value" foods and waived 5% sales tax on healthy foods, the first such policy in the United States and any sovereign Tribal nation. Uniquely aligned with Tribal government structures, revenue was directly allocated to 110 small local government entities (Chapters) for self-determined wellness projects.

Objective: To characterize HDNA-funded wellness projects, test for variation in project type, and funding amount over time by region and community size.

Design: Longitudinal study assessing funded wellness projects from tax inception through 2019.

Setting: The Navajo Nation.

Participants: One hundred ten Navajo Nation Chapters receiving funding for self-determined wellness projects.

Outcome Measures: The categories and specific types of wellness projects and funding over 4 years by region and community size.

Results: Of revenue collected in 2015-2018, more than 99.1% was disbursed through 2019 (\$4.6 million, \$13 385 annually per community) across 1315 wellness projects (12 per community). The built recreational environment category received 38.6% of funds, equipment/supplies 16.5%, instruction 15.7%, food and water initiatives 14.0%, and social events 10.2%. Most common specific projects were walking trails (\$648 470), exercise equipment (\$585 675), food for events (\$288 879), playgrounds (\$287 471), and greenhouses (\$275 554). Only the proportion allocated to instruction changed significantly over time (increased 2% annually, $P = .02$). Smaller communities (population <1000) allocated significantly higher proportions to traditional, agricultural, and intergenerational projects and less to the built environment.

Conclusions: Through 2019, more than 99% of HDNA revenue was successfully disbursed to 110 rural, Tribal communities. Communities chose projects related to promoting the built recreational environment, agriculture, and fitness/nutrition education, with smaller communities emphasizing cultural and intergenerational projects. These findings can inform other indigenous nations considering similar policies and funding distributions.

KEY WORDS: Chapter, HDNA, junk food, Navajo Nation, rural, sovereignty, tax, Tribal, wellness projects

Author Affiliations: Navajo Epidemiology Center, Navajo Department of Health, Window Rock, Arizona (Mr Yazzie and Ms Antone-Nez); Department of Health Sciences (Mss Tallis, Curley, and Sanderson and Drs Behrens and de Heer) and College of Nursing (Dr Eddie), Northern Arizona University, Flagstaff, Arizona; Brigham and Women's Hospital, Boston, Massachusetts (Dr Shin and Ms George); College of Health Sciences, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin (Dr Behrens); Navajo Division of Community Development, Window Rock, Arizona (Ms Jumbo-Rintila); and Diné Food Sovereignty Alliance, Gallup, New Mexico (Ms Begay).

Research reported in this publication was supported by the National Institute on Minority Health and Health Disparities of the National Institutes of Health under award nos. R01MD013352 and U54MD012388 and the Robert Wood Johnson Foundation (grant 74440). The content is solely the responsibility of the authors and does not necessarily represent the official views of the funders.

The authors declare no conflicts of interest.

Supplemental digital content is available for this article. Direct URL citation appears in the printed text and is provided in the HTML and PDF versions of this article on the journal's Web site (<http://www.JPHMP.com>).

This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

Correspondence: Hendrik "Dirk" de Heer, PhD, MPH, Department of Health Sciences, Northern Arizona University, 1100 S Beaver St, PO Box 15095, Flagstaff, AZ 86011 (dirk.deheer@nau.edu).

Copyright © 2021 The Authors. Published by Wolters Kluwer Health, Inc.

DOI: 10.1097/PHH.0000000000001371

The Navajo nation is one of the largest Tribal nations in the world, with more than 330 000 enrolled Tribal members and a geographic area covering parts of 4 US states.¹ The Navajo Nation includes 5 regions (Agencies) and 110 local “Chapters,” communities with an average population of about 1650 residents that serve as local government entities.¹ Navajo (Diné) people historically lived a healthy lifestyle characterized by physical activity and consumption of healthy, traditional foods. However, similar to many indigenous communities,² Western influences have resulted in dietary changes and an increasingly sedentary lifestyle,³ increasing risk for many common chronic conditions such as type 2 diabetes.⁴

In 2014, the Diné Food Policy Institute published a report making the case to “Rebuild a Self-Sufficient Food System for the Diné People.” The report found that in most communities, there was farming of traditional foods and a strong interest in traditional food consumption, but high rates of poverty, food insecurity, food-related chronic illness, and only 10 full-service grocery stores on the Navajo Nation, an area the size of West Virginia.⁵ Local needs assessments have further documented that diabetes, obesity, and unhealthy foods were identified as the most important health issues facing communities⁶ and that there is a great need for facilities and health programs to address these issues (P. D. Lynch and D. M. Clichee, unpublished material, 2012). For example, more than 60% of respondents mentioned the need for recreational facilities, more than 50% indicated a need for health education, nutrition, and fitness classes, and one-third indicated a need for cardiopulmonary resuscitation certification training, parenting groups, and cultural teachings and resources.⁶

Recent perspectives have highlighted the systematic underfunding of health systems for Tribal populations⁷ and focus on the importance of autonomy, Tribal sovereignty, and systems approaches in policy to engage Tribal communities addressing multicomponent underlying causes of health issues.^{8–10} However, to date, few policy examples exist of Tribal and indigenous nations enacting health policy to address pressing needs of their populations. In November 2014, to promote the health of the Navajo people, the Healthy Diné Nation Act (HDNA) was passed by the Navajo Nation Tribal Council.¹¹ The law enforced a 2% tax applied to Navajo Nation businesses on all unhealthy or “minimal-to-no-nutritional-value” foods. An earlier part of the law also waived the 5% sales tax (6% as of 2020) on water, fresh fruit and vegetables, and nuts, resulting in a 7% total pricing difference between unhealthy and healthy foods (8% as of 2020). To date, the

Navajo Nation is the only location in the United States with a tax on unhealthy foods, although an increasing number of US municipalities have a tax on sugar-sweetened beverages¹² or have enacted tax-related programs to support health care cost locally. For example, Miami-Dade voters approved a half a penny sales tax in 1991 to fund local hospital systems (and later to raise property taxes), providing a sustainable funding source directly supporting the local hospital system.¹³ Several examples of unhealthy food taxes exist internationally (Hungary, Mexico), although the percentages were higher than 2%.^{14–20} These taxes decreased consumption of unhealthy foods, with greater effects among lower-income populations but smaller effects in rural settings.^{14,22}

Uniquely aligned with Tribal government structures emphasizing local decision making, the HDNA allocates tax revenue directly to each of the 110 local Chapter communities for wellness programming. In other settings, most unhealthy taxes have been connected to some type of health programming. For example, in Hungary, the unhealthy food tax partially funds health care costs.¹⁵ In Philadelphia, funding from the soda tax supports pre-kindergarten education, community schools, and an initiative to rebuild parks, recreation centers, and libraries.²² While other cities have directly funded local health systems through a sales tax,¹³ no example exists where tax revenue from unhealthy foods or sugar-sweetened beverages was directly allocated to rural or Tribal communities with autonomous decision-making power over the funds.

Therefore, the current article examined local community wellness projects since the tax inception through 2019. These data provide a unique insight into local Tribal and rural communities’ preferences for wellness programming when directly provided with revenue from a policy such as the junk food tax. Specifically, we aimed to assess (1) what types of wellness projects were proposed by each local community over 4 years; (2) whether the types of proposed projects changed significantly over time; and (3) whether there were significant differences in types of projects by region and community size. We hypothesized that, consistent with local needs assessments, the most common categories would be the built recreational environment, followed by nutrition and fitness classes. Given that the main priorities of diabetes and obesity would be unlikely to change quickly, we hypothesized that the type of projects proposed by communities would not shift significantly over the 4-year time period. Finally, on the basis of research showing less access to grocery stores in rural areas, we hypothesized that smaller, more rural communities would allocate a greater proportion of funds toward

nutrition-related projects focused on producing their own foods.

Methods

Of the gross tax revenue generated through the HDNA, 20% was “set aside” to the Permanent Trust Fund, Veterans Trust Fund, and other related funds. The remaining 80% was allocated to the 110 Chapters base budget using a “50:50 formula.” First, funds were allocated to each of 5 regional agencies (each with on average 22 Chapter communities), where each agency received the funds collected from the stores in their agency. Agency funds were then distributed to each Chapter, with 50% evenly distributed across all Chapters within the agency. This was done to ensure even very small communities received a level of funds that allowed for community wellness programming. The remaining 50% of the agency funds were distributed proportionally to the size of the community (based on voter registration) to ensure Chapters with more residents received more funds. A fund management plan developed to guide disbursements was established by the Navajo Division of Community Development (DCD) and based on the legislation, which stated¹²:

The revenue generated from the Healthy Diné Nation Act of 2014 will be earmarked for Chapters to plan community originated wellness projects such as farming and vegetable gardens; greenhouses; farmers’ markets; healthy convenience stores; clean water; clean communities; wellness/exercise equipment and supplies; skate parks; health classes; parks; traditional, intergenerational and contemporary wellness; traditional and non-traditional healthy food preparation classes; food processing and storage facilities; health food initiatives; community and food cooperatives; playgrounds; basketball courts; walking, running and biking trails; picnic grounds; swimming pools; emergency preparedness; agricultural, recreational, health youth clubs; library Navajo traditional craft classes; equine therapy; health coaching; and other community-based wellness projects to address improvements to physical and social environment of the community that are planned, implemented, directed and reported by members of the Navajo nation communities. (CN54-14, Section 1.N, page 5)

The Navajo DCD communicated the amount of funds allocated to each local community Chapter. In response and in accordance with Local Chapter Governance procedures, the Chapters consulted with community residents and submitted an itemized plan for use of the funds to the DCD. After final

approval, the Office of the Navajo Tax Commission then disbursed the funds to the Chapters.

Data sources and coding

Wellness project proposals were collected in a repository maintained by the DCD called WIND. Data included the full wellness project proposals submitted by each Chapter for each fiscal year, an itemized list of proposed activities and associated dollar amounts. Data were first imported into an Excel database, including the year of collection (2015-2018), Chapter and regional agency, date of proposal submission, the total dollar amount requested and disbursed, and full-text description for each item. Data were entered twice and cross-checked by a third person for accuracy.

On the basis of the full text of each proposal, community wellness projects were coded by organizing them into 9 main categories (ie, built recreational environments) and 43 subcategories (ie, playgrounds, walking trails; Table 1; see Supplemental Digital Files, available at <http://links.lww.com/JPHMP/A794>). Coding of projects into categories occurred by 3 different coders (2 Navajo Tribal members). Codes were compared across coders and if any discrepancies existed about the primary or secondary category, codes were discussed until mutual consensus was reached. To gain further insight into the activities beyond the predefined categories, the number of projects that were specifically related to cultural traditions, projects that involved elder and youth interactions, was tabulated. Finally, simple text searches were used to assess the types of physical activities and foods that were commonly mentioned.

Under leadership of the Navajo Epidemiology Center, the current project team collaborated with the Navajo DCD, Tax Commission, and other Navajo Nation organizations on data retrieval and research approvals. The broad collaborative team ensured strong representation of Navajo Nation entities, in-depth knowledge of historical context surrounding the legislation, and appropriate dissemination of the information. All project procedures and this article were approved by the Navajo Nation Human Research Review Board (NNR.17-284T).

Analyses

Microsoft Excel and SPSS v.26.0 (SPSS Inc, Chicago, Illinois) were used to characterize data using frequencies and descriptive statistics. All total dollar amounts were cross-checked with the Office of the Navajo Tax Commission disbursement amounts to ensure an identical match. The total number of submitted projects

and dollar amounts were summarized by main categories and subcategories. Linear regression analysis tested whether there was a significant trend in the proportion of funds allocated to each category over time and by Chapter size (<1000 residents vs >1000 residents). Types of projects were compared across regional agencies using univariate analysis of variance with a Bonferroni correction to account for multiple comparisons. Finally, graphical displays were made using ArcMap v10.7.1.

Results

Of the revenue collected between 2015 and 2018 (\$5.8 million), 80% was disbursed (\$4.6 million) by 2019, or about \$1.5 million each full fiscal year, with modest decreases of 3% to 4% each year. This represented approximately \$13 000 per year on average for each Chapter community.²³ In 2015, 108 of the 110 Chapters submitted proposals, which were up to all 110 Chapters in 2017 and thereafter. As a result, 99.1% of all available funds were successfully distributed for wellness projects through 2019, on average within 14 days. Over the 3.25-year period, the total number of activities proposed was 1315, an average of 12 per Chapter (range, 4-27), or approximately 3.5 per Chapter per year.

Total funds and the proportion of funds allocated by category are summarized in Table 1. There were 5 categories that received more than 10% of all allocated funds: the most funding went to the built

recreational environment with \$1 807 461 in total across 245 activities, followed by equipment, supplies and storage (\$767 810 across 178 activities), and instruction (\$655 099 across 282 activities). Although more funds were allocated to the built recreational environment and equipment, instruction had the highest count of projects. In fact, approximately 100 activities each year were proposed related to either instruction or education. The average cost per activity was \$3509, with higher cost for built recreational environment (\$7377 per activity) than for the other categories.

A total of 16 subcategories had at least \$100 000 allocated over the entire period (Table 2). The most common subcategories for total funding and number of Chapters allocating any funds were walking trails (\$648 470), exercise equipment (\$585 675), food for events (\$288 879), playgrounds (\$287 471), and greenhouses (\$275 554). At least half of all Chapters proposed activities related to exercise equipment (78 of the 110 Chapters), food for events (77 Chapters), supplies (68 Chapters), (non)traditional food demos (68 Chapters), and walking trails (59 Chapters). The Figure graphically demonstrates the “spread” of walking trails across the Navajo Nation, with additional unique Chapters proposing walking trails each year.

A total of 193 activities had a cultural/traditional element, allocating \$401 029 in funding across 75 Chapter communities. A total of 53 different Chapters proposed 117 activities focused on youth, elder, or intergenerational activities that totaled \$288 718 in

TABLE 1

Types of Community Wellness Projects Funded by the Healthy Diné Nation Act Since Inception Through 2019^a

Category Type	Example	Total Funds	% of Funds	No. of Projects	Average Per Project
1. Instruction	Fitness class, Zumba, food preparation, health coaching, cultural classes	\$655 099	14.1	282	\$2 323
2. Equipment	Exercise equipment, storage facilities	\$767 810	16.5	178	\$4 314
3. Built recreational environment	Walking trail, playgrounds, parks	\$1 807 461	38.9	245	\$7 377
4. Social setting	Youth club, senior citizens events	\$475 790	10.2	225	\$2 115
5. Education	Health education materials, presentations	\$76 063	1.6	51	\$1 491
6. Community food/agri-culture and recycling	Farming and vegetable gardens; greenhouses	\$651 425	14.0	225	\$2 895
7. Emergency preparation	First aid, CPR/AED courses	\$115 420	2.5	81	\$1 425
8. Matching funds	Wellness projects matched with other sources	\$1 949	0.1	2	\$975
9. Additional expenses	Consultation fees, incentives	\$90 921	2.0	26	\$3 497
10. Total		\$4 641 935	100	1 315	\$3 509

Abbreviation: AED, automated external defibrillator; CPR, cardiopulmonary resuscitation.

^aFrom Navajo Nation Division of Community Development and Office of the Navajo Nation Tax Commission funding collected from 2015-2018, allocated 2016-2019.

TABLE 2**The 20 Chapter Wellness Project Subcategories With the Most Funding From the Healthy Diné Nation Act Since Inception Through 2019^a**

Rank	Subcategory	No. of Chapters	No. of Projects	Total Funds
1.	Walking trails	57	98	\$648 470
2.	Exercise equipment	74	135	\$585 675
3.	Food for events	75	146	\$288 879
4.	Playgrounds	17	23	\$287 471
5.	Greenhouse	34	54	\$275 554
6.	Wellness center	17	26	\$252 604
7.	(non)Traditional food demos	60	129	\$231 710
8.	Basketball/volleyball courts	24	40	\$228 677
9.	Picnic grounds	17	22	\$171 723
10.	Fitness classes	40	58	\$168 434
11.	Agricultural projects	34	66	\$165 645
12.	Social/community events	32	64	\$152 756
13.	Skate and community parks	13	22	\$150 357
14.	Recycling initiatives	35	62	\$116 745
15.	Traditional arts & crafts	25	38	\$110 912
16.	Storage facilities	5	7	\$108 033
17.	Emergency prep certifications	39	68	\$97 170
18.	Contemporary wellness workshops	24	33	\$86 777
19.	Supplies	21	31	\$67 053
20.	Incentives	14	19	\$57 847

^aData analysis based on data from Navajo Nation Division of Community Development through the Navajo Nation WIND system for funds collected 2015-2018 and disbursed 2016-2019.

funding. Simple text searches further documented that for social/exercise events, “Just Move It” (JMI) was mentioned for 59 events, running for 76 events, and walking for 82 events. When food was purchased for an event, water was mentioned most commonly (82 events), followed by fruit (44 events) and vegetables (34 events).

Changes over time

Regression analyses with proportion of funds for a category as outcome and funding year as predictor were used to test changes over time. The type of projects did not vary substantially across years, with the built recreational environment consistently receiving the most funds (an average of 38.9%), followed by equipment, instruction and food, water, and cleanup initiatives (ranging from 14% to 16%). Only one category showed significant change: the proportion of funds allocated to instruction increased approximately 2% every year, from 10.5% of all funds in 2016 to 16.8% in 2019 ($b = 0.20$, 95% CI, 0.07 to 0.32; $P = .02$).

Variability across region and community size

In the context of regional variability in the amount of disbursed funds,²³ it was tested whether region was significantly associated with the proportion of funds allocated to each category. The agency with the lowest revenue allocated the smallest proportion of funds to the built recreational environment (20.3% vs as high as 48.5% in other agencies ($F_4 = 5.36$, $P = .007$), but the highest proportion of funds to events in the social setting (19.4%, vs 8.0%-11.0% in other agencies ($F_4 = 3.34$, $P = .04$).

To test whether Chapter size was an influential variable in type of projects selected, and whether smaller Chapters allocated more funds to nutrition-related projects, we compared funding allocation between smaller Chapters ($N = 44$, population <1000, average population 641 ± 225 residents) and 66 larger Chapters ($N = 66$, mean population 2193 ± 1776 residents). While the overall amounts were smaller (total average of \$27 688 for smaller vs \$51 873 for larger Chapters since tax inception), smaller Chapters actually received more funding per resident (total of \$46.18 vs \$23.65 for larger Chapters,

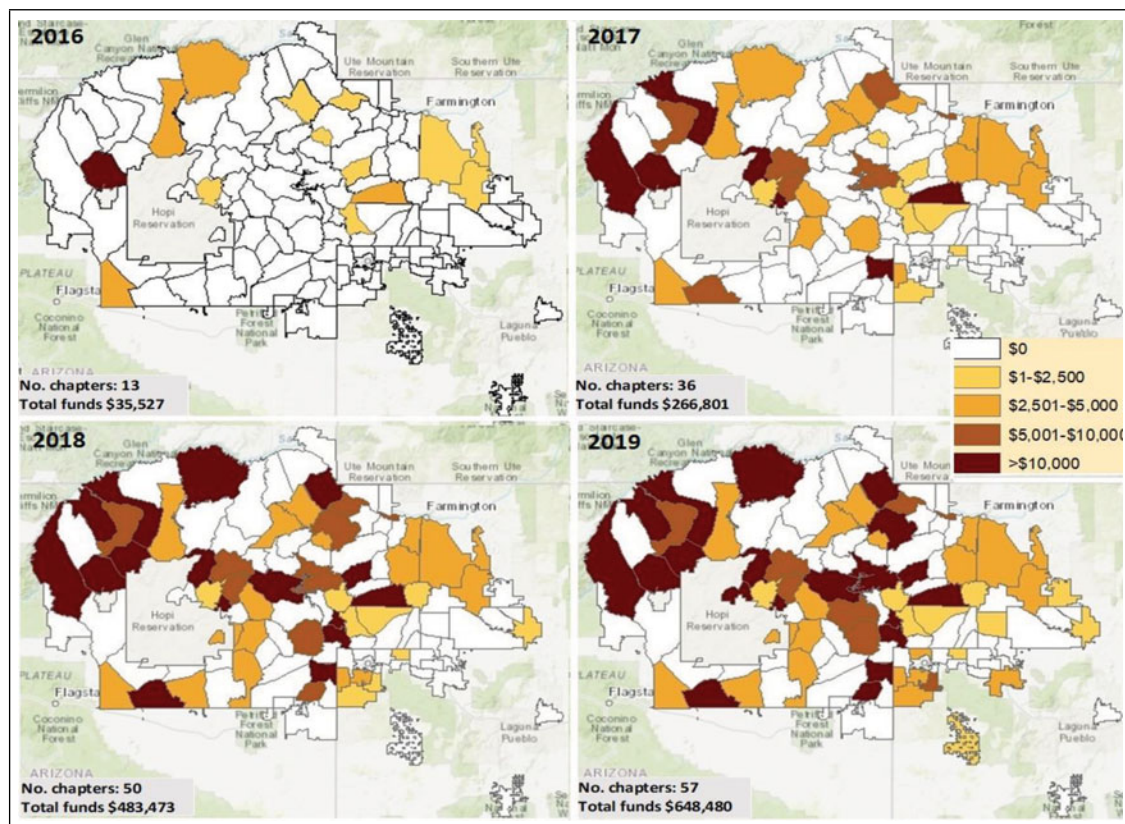


FIGURE Cumulative Funding for Walking Trails Across the Navajo Nation With Healthy Diné Nation Act Funds Through 2019⁹

⁹From Navajo Nation Division of Community Development through Navajo Nation WIND system. Graphical displays made by the authors using ArcMap v10.7.1 and Navajo area map from https://geodata.epa.gov/arcgis/rest/services/Region9/Navajo_Nation_Administrative_Boundaries/MapServer. Maps are for projects funded for 2015-2018, funds disbursed 2016-2019.

$P < .001$). Larger Chapters allocated a significantly higher proportion of their funds to the built recreational environment (41% of funds vs 31% in smaller Chapters, $P = .02$). Smaller Chapters allocated almost 20% of their funds to agriculture, water, and cleanup activities, about double the proportion of larger Chapters ($P = .03$; see Table 3), with the largest difference in subcategory of greenhouses (11.1% for smaller Chapters, 2.6% for larger Chapters, $P = .003$). Smaller Chapters did not allocate proportionally more funds to any other category including instruction-related projects such as nutrition education (16.8% vs 15.4%, $P = .34$). Although not specific to any category, smaller Chapters did spend more funds on cultural/traditional activities (12.7% vs 7.3%, $P = .001$) and youth, elder, or intergenerational activities (9.5% vs 5.0%, $P = .01$, data not shown in Table 3).

Discussion

This study is the first example of an unhealthy food tax in a sovereign Tribal nation, using a structure of

revenue distribution in alignment with values of local governance and shared community decision making. Of more than 1300 tax-funded projects, more than half of all revenue was allocated to promoting the recreational physical activity environment, including building or repairing walking trails, playgrounds, and basketball courts, and fund wellness centers, treadmills, and weights. Projects related to instruction, such as traditional food demonstrations and fitness classes, accounted for 15%, as did agricultural projects. There was little variation in types of projects over time, but some variability across regions, with more rural regions and Chapters with fewer than 1000 residents proposing more agricultural, traditional, and intergenerational projects and allocating less funds to the built recreational environment.

The current findings suggest that Navajo Chapters proposed wellness projects were well aligned with pressing community needs documented in local needs assessments^{6,7} and studies of the Navajo food store environment.²³⁻²⁶ These studies consistently identified diabetes, obesity, limited access to healthy traditional foods, and lack of recreational activity facilities as

TABLE 3**Type of Projects Funded by the Healthy Diné Nation Act by Navajo Nation Chapter Community Size**

% of Funds	Small Chapters (N = 44)	Larger Chapters (N = 66)	b (95% CI)	t ₁₀₈	P ^a
Instruction or education	16.8%	15.4%	3.50 (−3.76 to 10.76)	0.96	.34
Equipment	18.6%	15.8%	1.43 (−6.61 to 9.47)	0.35	.73
Built recreational environment	31.0%	41.8%	−16.84 (−27.39 to −6.29)	−3.16	.002^b
Social events	9.0%	10.7%	4.87 (−1.37 to 11.11)	1.55	.13
Community food/agriculture, clean water and recycling	21.4%	11.4%	7.61 (0.89 to 14.33)	2.27	.03^c
Emergency preparedness	2.4%	2.5%	0.93 (−1.44 to 3.30)	0.78	.44
Other (consultants, matching funds etc.)	1.8%	2.4%	−1.66 (−3.60 to 0.29)	−1.69	.09
Total				100%	100%

^a Test-statistics based on linear regression analyses with proportion funds as outcome and Chapter size as predictor, adjusting for amount of funding per resident. Analyses based on data from the Navajo Division of Community Development through the Navajo Nation WIND system.

^b P < .01.

^c P < .05.

important priorities.^{6,7,23-26} While receiving less funds may inhibit smaller Chapters from engaging in more structural projects such as the built recreational environment, it has to be noted that smaller Chapters actually received significantly more funds *per resident*. Prior research has suggested promising strategies to promote the built recreational environment in smaller rural areas include building on existing infrastructure and partnering with existing organizations that may have underutilized facilities, starting smaller and developing increasingly larger projects, and pooling funds regionally.²⁷ Wellness activities also commonly included traditional and cultural projects including food demonstrations and traditional agriculture, consistent with several studies that documented that gardening and agriculture extension can play a role in prevention of common conditions on the Navajo Nation.²⁸ Findings suggest that agricultural projects made up a relatively larger proportion of funding received in smaller communities, primarily driven by greenhouses. This may suggest a greater emphasis on local food production in smaller communities that are generally further away from grocery stores (there are only 10 full-service grocery stores on the Navajo Nation, all in larger communities).⁵ Research from rural indigenous communities has further suggested the most effective nutrition interventions are multifaceted (ie, education, enhancing the retail and agriculture environments), culturally adapted, and directly engage the community.²⁹

Findings have to be evaluated in the context of similar taxes elsewhere.¹³⁻²² While most unhealthy food taxes have been implemented in large metropolitan areas, findings from the 8% tax on nutrient-dense foods

in Mexico found that consumption of these foods decreased nationally but no effect was found in rural areas.¹⁷⁻¹⁹ Researchers found that prices increased less than the amount of the tax in rural areas, whereas in urban areas prices increased by the full amount of the tax.¹⁸ While it is not known whether this is the case for the rural Navajo Nation, data suggest at least a modest decrease of 3% to 4% every year in unhealthy food purchases on the Navajo Nation.²³ This is somewhat similar to the 5.3% decrease in nutrient-dense food consumption found in Mexico.¹⁷ In addition, any impacts on consumption could be direct (through increased cost) or indirect through wellness projects focused on, for example, nutrition education. Furthermore, although not rural, other taxes have directly benefited local and high-risk minority communities. In Miami-Dade, where more than 80% of the population is of Hispanic or Black background, half a penny sales tax has partially funded the hospital system for 30 years,¹³ which is as an example of sustainable funding for the local health system serving a high-risk population with limited socioeconomic means.

While no other examples to date exist of an indigenous nation passing a legislation such as the HDNA, several examples of indigenous and rural health policy provide valuable lessons learned. For example, a systematic review of 22 studies examined policy and environmental strategies to prevent obesity in rural communities³⁰ found that the most commonly implemented strategy was to *enhance infrastructure supporting walking*, mentioned in 11 of the 22 studies and emphasized the importance of building on existing infrastructure. This is similar to

“walking trails” being the most commonly funded project type in the current study. Furthermore, a recent summary of 11 reviews of aboriginal food and nutrition programs identified the most important factor of program success was community involvement in and control of program development and implementation.⁹ These findings underscore the importance of community engagement and autonomy in development and implementation of Tribal health policies and place-based approaches considering community characteristics and social determinants in addressing health disparities.^{9,31} This is further consistent with the growing movement aimed at rebuilding a self-sufficient food systems among indigenous nations, supported by policy and legislation tailored to the needs and traditions of Tribal nations.³²

To do this, high-quality epidemiologic survey data collected in close collaboration with Tribal nations are needed to track health data on their own people as the basis for informing local priorities and policies.³³ National and state-level estimates of health behaviors often include small sample sizes and people from many Tribal nations, limiting each Tribe’s ability to evaluate impact of existing services and inform policy. On the Navajo Nation, the Navajo Nation Health Survey (NNHS), a Tribal-specific Behavioral Risk Factor Surveillance Survey, was implemented from 2013 to 2016 to address this lack of data.³⁴ The survey found not only high diabetes rates, high rates of daily soda intake, and low rates of vegetable consumption but also high rates of fruit intake and physical activity (with walking and running the most common activities) and regional variability.³⁴ Notably, in direct relation to the HDNA funding, the diabetes rates as assessed by the NNHS were the lowest in the Eastern Agency of the Navajo Nation, incidentally also the areas with the smallest amount of HDNA revenue,²³ an important area of future study. Taken together, these findings suggest the importance of local engagement in determining health priorities and alignment of findings in the current study with other sources of health information relevant to the Navajo people.

Strengths and limitations

The current study has several strengths. Importantly, it is the first comprehensive summary of wellness projects funded by an unhealthy food tax in an indigenous nation with a population at high risk for diabetes and other conditions. The findings provide insight into what Tribal communities chose as major priorities to address and serve as an example of local activities directed by and for each community. Furthermore, the data are complete (99% of possible proposals were submitted), include all 110

communities on the Navajo Nation, and cover 4 fiscal years of validated funding. Still, this study has several limitations. The assessment of Chapter wellness projects is limited to the descriptions provided by each local community, which were on average 52 words long for each annual proposal and 17 words per activity. This limits the ability to understand details about proposed projects. Furthermore, although anecdotal evidence has suggested successful implementation in a number of Chapter communities, systematic data on which Chapters were particularly successful in project implementation and engagement of community members in each activity are not available. Accordingly, a key area of future research is to assess the characteristics associated with successful program implementation and resources needed at the community level to maximize project impact on health outcomes.

Conclusions

The Navajo Nation HDNA of 2014 implemented a 2% tax on foods of minimal-to-no-nutritious value, allocating revenue directly to local communities. Although most tax initiatives and proposals¹² supported health initiatives or fund health care costs and even local health systems in underserved urban areas in

Implications for Policy & Practice

The findings from this study have important implications for health policy and taxation of unhealthy foods among underserved communities to fund local wellness initiatives, particularly among rural, Tribal populations.

- The HDNA of 2014 was the first-ever tax on unhealthy foods in the United States and any sovereign Tribal nation worldwide. The policy serves as a model of a Tribal nation exercising its Tribal sovereignty to determine health policy for its people.
- More than 99% of allocated revenue was successfully distributed and all 110 Chapters submitting projects and receiving funds. Policies that align with Tribal government structures and emphasize community decision making to address local priorities may be a promising strategy in rural and Tribal communities.
- Findings suggest that when provided with autonomy in allocating funds, primary priorities of rural, Tribal communities focused on improving access to healthy foods, recreational physical activity, and sustaining traditions and that these priorities were stable over time.
- Future research should assess key barriers and facilitators of Chapter wellness project impact on health outcomes and utilize Tribal-specific health surveys to assess change.

the United States,¹³ this study adds insight into a policy where tax funds were directly allocated to rural, high-risk Tribal communities that can decide each year which health issue to prioritize. The communities most commonly chose to allocate funds to promoting access to healthy foods and physical activity by funding instructional activities, agriculture, exercise equipment, and modifying the built environment. The community wellness activities and tax structure may be relevant for other underserved communities in need of sustainable funding sources for wellness initiatives, particularly other Tribal nations with highly localized governments.

References

- Navajo Epidemiology Center, Navajo Department of Health. Navajo population profile report. <https://www.nec.navajo-nsn.gov/Portals/0/Reports/NN2010PopulationProfile.pdf>. Published 2013. Accessed September 16, 2020.
- Kuhnlein HV, Receveur O. Dietary change and traditional food systems of indigenous peoples. *Annu Rev Nutr*. 1996;16(1):417-442.
- Kopp J. Crosscultural contacts: changes in the diet and nutrition of the Navajo Indians. *Am Indian Culture Res J*. 1986;10(4):1-30.
- Powell J, Isom S, Divers J, et al. Increasing burden of type 2 diabetes in Navajo youth: the SEARCH for diabetes in youth study. *Pediatr Diabetes*. 2019;20(7):815-820.
- Dine Policy Institute. Diné Food Sovereignty: a report on the Navajo Nation food system and the case to rebuild a self-sufficient food system for the Diné people. https://www.firstnations.org/wp-content/uploads/publication-attachments/Dine_Policy_Institute_Food_Sovereignty_Report.pdf. Accessed September 12, 2020.
- Clichee DM. Tsehootsooi Medical Center. Community Health Needs Assessment. 2016. https://www.fdihb.org/documents/TMC_CHNA_2016.pdf. Accessed April 5, 2021.
- Warne D, Frizzell LB. American Indian health policy: historical trends and contemporary issues. *Am J Public Health*. 2014;104(suppl 3):S263-S267.
- Andrade NS, Espey DK, Hall ME, Bauer UE. A holistic approach to chronic disease prevention: good health and wellness in Indian country. *Prev Chronic Dis*. 2019;16:190081.
- Browne J, Adams K, Atkinson P, Gleeson D, Hayes R. Food and nutrition programs for Aboriginal and Torres Strait Islander Australians: an overview of systematic reviews. *Aust Health Rev*. 2018;42(6):689-697.
- Webster P. Autonomy needed to improve indigenous Canadian health. *Lancet (London, England)*. 2020;395(10218):101-102.
- Resolution of the Navajo Nation Council. The Healthy Diné Nation Act (HDNA). 22nd Navajo Nation Council—Fourth Year, 2014. CN54-14. <http://www.navajonationcouncil.org/Navajo%20Nation%20Codes/Title%2024/CN-54-14.pdf>. Accessed September 18, 2020.
- Pomeranz JL, Wilde P, Huang Y, Micha R, Mozaffarian D. Legal and administrative feasibility of a federal junk food and sugar-sweetened beverage tax to improve diet. *Am J Public Health*. 2018;108(2):203-209.
- Yanez L. Voters OK half-cent rise in sales tax Dade agrees to finance Jackson Memorial plans. *South Florida Sun Sentinel*. September 4, 1991. <https://www.sun-sentinel.com/news/fl-xpm-1991-09-04-9102030563-story.html#:~:text=Dade%20County%20voters%20on%20Tuesday,draw%20in%20Tuesday's%20special%20election>. Accessed January 17, 2021.
- Jensen JD, Smed S. The Danish tax on saturated fat: short run effects on consumption, substitution patterns and consumer prices of fats. *Food Policy*. 2013;42:18-31.
- Biró A. Did the junk food tax make the Hungarians eat healthier? *Food Policy*. 2015;54:107-115.
- Batis C, Rivera JA, Popkin BM, Taillie LS. First-year evaluation of Mexico's tax on nonessential energy-dense foods: an observational study. *PLoS Med*. 2016;13(7):e1002057.
- Hernández-F M, Batis C, Rivera JA, Colchero MA. Reduction in purchases of energy-dense nutrient-poor foods in Mexico associated with the introduction of a tax in 2014. *Prev Med*. 2019;118:16-22.
- Colchero MA, Zavala J, Batis C, Shamah-Levy T, Rivera-Dommarco J. Changes in prices of taxed sugar-sweetened beverages and nonessential energy dense food in rural and semi-rural areas in Mexico. *Pan Am J Public Health*. 2017;59:137-146.
- Colchero MA, Molina M, Guerrero-López CM. After Mexico implemented a tax, purchases of sugar-sweetened beverages decreased and water increased: difference by place of residence, household composition, and income level. *J Nutr*. 2017;147(8):1552-1557.
- Colchero MA, Rivera-Dommarco J, Popkin BM, Ng SW. In Mexico, evidence of sustained consumer response two years after implementing a sugar-sweetened beverage tax. *Health Aff*. 2017;36(3):564-571.
- Falbe J, Thompson HR, Becker CM, Rojas N, McCulloch CE, Madsen KA. Impact of the Berkeley excise tax on sugar-sweetened beverage consumption. *Am J Public Health*. 2016;106(10):1865-1871.
- Roberto CA, Lawman HG, LeVasseur MT, et al. Association of a beverage tax on sugar-sweetened and artificially sweetened beverages with changes in beverage prices and sales at chain retailers in a large urban setting. *JAMA*. 2019;321(18):1799-1810.
- Yazzie D, Tallis K, Curley C, et al. Tax revenue of a 2% Navajo Nation tax on foods of minimal-to-no-nutritious value. *Prev Chronic Dis*. 2020;17:1-4.
- MacKenzie OW, George CV, Pérez-Escamilla R, et al. Healthy stores initiative associated with produce purchasing on Navajo Nation. *Curr Dev Nutr*. 2019;3(12):nzz125.
- Pardilla M, Prasad D, Suratkar S, Gittelsohn J. High levels of household food insecurity on the Navajo Nation. *Public Health Nutr*. 2014;17(1):58-65.
- Kumar G, Jim-Martin S, Piltch E, et al. Healthful nutrition of foods in Navajo Nation stores: availability and pricing. *Am J Health Prom*. 2016;30(7):501-510.
- Hansen AY, Meyer MR, Lenardson JD, Hartley D. Built environments and active living in rural and remote areas: a review of the literature. *Curr Obes Rep*. 2015;4(4):484-493.
- Lombard KA, Beresford SA, Ornelas IJ, et al. Healthy gardens/healthy lives: Navajo perceptions of growing food locally to prevent diabetes and cancer. *Health Promot Pract*. 2014;15(2):223-231.
- Browne J, Lock M, Walker T, Egan M, Backholer K. Effects of food policy actions on indigenous peoples' nutrition-related outcomes: a systematic review. *BMJ Glob Health*. 2020;5(8):e002442.
- Umstätt Meyer MR, Perry CK, Sumrall JC, et al. Physical activity-related policy and environmental strategies to prevent obesity in rural communities: a systematic review of the literature, 2002-2013. *Prev Chronic Dis*. 2016;13:E03.
- Dankwa-Mullan I, Pérez-Stable EJ. Addressing health disparities is a place-based issue. *Am J Public Health*. 2016;106(4):637-639.
- Desmarais AA, Wittman AA, H. Farmers, foodies and First Nations: getting to food sovereignty in Canada. *J Peasant Stud*. 2014;41(6):1153-1173.
- Walker J, Lovett R, Kukutai T, Jones C, Henry D. Indigenous health data and the path to healing. *Lancet*. 2017;390(10107):2022-2023.
- Francisco S., Foley D, Antone-Nez R., Kinlacheeny JB, Yazzie D. *Report of the Navajo Behavioral Risk Factor Surveillance Survey, 2013, 2015, 2016*. Window Rock, AZ: Navajo Epidemiology Center, Navajo Department of Health, The Navajo Nation; 2017.