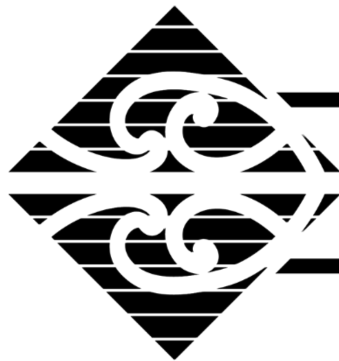
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A Closer Look at Healthy Functioning among Indigenous Peoples: Findings from a Population-Based Study

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Abstract

This paper aims to explore factors contributing to healthy functioning in the American Indian/Alaskan Native (AI/AN) and Native Hawaiian/Pacific Islander (NH/PI) populations in the United States (U.S.). The sample of 6,265 respondents

who self-identified as AI/AN or NH/PI were drawn from the 2022 and 2023 Behavioral Risk Factor Surveillance System (BRFSS) (Centres for Disease Control and Prevention, 2023). Healthy functioning was analyzed as a binary variable comprised of several health factors: Absence of physical limitations, binge drinking and frequent

stress, the presence of life satisfaction, emotional and social support, and optimal self-reported mental and physical health. Three in ten Indigenous respondents met our criteria for healthy functioning. Results revealed that likelihood of healthy functioning is significantly associated with adequate income to meet basic needs, never-smoking, physical activity and fewer chronic health conditions. Many of the factors associated with healthy functioning are modifiable circumstances that could be improved with greater financial security. These findings underscore the importance of addressing the physical, social, and economic determinants of health to enhance the well-being of Indigenous populations in the U.S.

Keywords: Public health, Indigenous, flourishing, American Indian/Alaskan Native, Native Hawaiian/Pacific Islander

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We acknowledge the previous contributions to this field of research that have made the current work possible. Many of these important contributions have been referenced in the paper and help to contextualize this research and to explain our findings.

Introduction

Since colonization, Indigenous populations in the United States (U.S.) have been subjected to racial discrimination, forced relocation, and generational trauma, the impacts of which are still felt today. Previous research has begun to establish a link between the impact of colonialism and historical trauma and adverse health outcomes in Indigenous populations (Gone et al., 2019). Other factors such as higher rates of racist encounters in healthcare (Findling et al., 2019) and inequalities in healthcare access (Marrone, 2007), and high rates of exposure to trauma (Manson et al., 2005) further contribute to these disparities. Historically, research involving Indigenous communities has largely focused on deficits and the factors contributing to negative health outcomes (Brockie et al., 2022). While it is important to understand the ways colonialism and systemic discrimination have impacted Indigenous peoples, the disproportionate focus on deficits in the existing literature has contributed to a discourse that serves to reinforce racist assumptions that positions Indigeneity itself as pathology (Hyett et al., 2019).

Not accounting for the factors that are associated with positive outcomes, despite these adversities, is a failure to acknowledge the inherent strength and

resilience of this diverse population. While it is important to address the underlying causes of adversity, understanding how populations can achieve wellness amidst them can encourage initiatives that aim to bolster these existing sources of strength. Shifting away from a discourse that frames marginalized populations as 'vulnerable' allows for an ideological separation of the community from the causes of inequity, thus redirecting focus onto the structural barriers in place for them (Munari et al., 2023).

Across the literature, strength-based approaches are being explored as an alternative to deficit discourse. These approaches, which may better be understood as a set of conceptual frameworks rather than a single method, incorporate more holistic definitions of health and wellbeing, as well as measures of assets and resilience (Fogarty et al., 2018). Resilience is a term that comes up often in strength-based research and refers to the ability of an individual or group to resist the negative effects of exposure to adversity (Ungar, 2013). Ungar importantly emphasizes that resilience must be understood as a product of the environment and resources available rather than as an individual factor. In a scoping review of factors contributing to resilience in the AI/AN population, factors contributing to resilience were grouped into three domains – social, psychological, and spiritual/cultural (John-Henderson et al., 2024). The authors propose that additional research using strength-based and resilience frameworks is needed to resist hopelessness and inform development of comprehensive and effective public health interventions (John-Henderson et al., 2024). Importantly, strength-based approaches emphasize the value of culture as a protective factor and frame well-being in terms that are culturally relevant (Wexler et al., 2015). Suslovic and Lett (2024) present a valuable critical counterpoint to resilience discourse and suggest that if resilience is framed as an individual-level solution to adversity it will further perpetuate structural discrimination. They argue for a justice-oriented interdisciplinary approach to public health.

This exploratory paper examines some of the factors contributing to healthy functioning for American Indian and Alaskan Native (AI/AN) and Native Hawaiian and Pacific Islander (NH/PI) adults using data from the Behavioral Risk Factor Surveillance System (BRFSS) from 2022 and 2023. The central aim of this research is to better understand the conditions that contribute to life satisfaction and well-being in this population. For the purpose of this paper, the term 'healthy functioning ' is used to capture this state of well-being.

Our measure comprised several dimensions including daily functioning, self-rated physical and mental health, life satisfaction, social connectivity, and lower stress. This measure reflects components that are common elsewhere in the literature pertaining to well-being (Lee & Mayor, 2023; VanderWeele, 2017). Important to note is that many of the measures employed in the study are decidedly Western and that this study examines only some of the relevant factors which may contribute to healthy functioning of Indigenous peoples because our analyses was constrained to the questions asked in dataset we used for our secondary data analyses.

While Western frameworks have historically siloed various dimensions of wellbeing and focused more on pathology and disease, Indigenous cultures view health as more often transcending the self to include family, community, and environment (Biles et al., 2024; Levesque & Li., 2014). Portraying Indigenous wellness as a balance between mental, physical, social, and spiritual wellbeing is fairly consistent across the literature (Hodge & Nandy, 2011; Yurkovich & Lattergrass, 2008). Connectedness to culture and community also emerge as important predictors of wellness in the literature (Biles et al., 2024). For example, Ullrich (2019) describes a connectedness framework to better conceptualize Indigenous child wellbeing. Dimensions of this framework include environmental, community, family, intergenerational, and spiritual connectedness. Future studies that are able to use measures which capture health and well-being as defined by the Indigenous population in question would further advance efforts to decolonize public health research and policy.

Methods

Author positionality statements

Ashley L. Quinn is of the Marten clan, with Anishinaabe and Irish ancestral roots. They have firsthand experience as a former Crown Ward of the child welfare system. Their teaching and research philosophy is grounded in traditional Ojibway teachings of the seven grandfathers or grandparents. These seven principles are wisdom, courage, love, humility, honesty, respect and truth. They guide the first author's scholarly practices by fostering the development of creativity, social justice, and critical inquiry in research pertaining to Indigenous people in Canada and beyond.

Teagan Miller is a settler-ally researcher with a special interest in issues impacting Indigenous people, having worked previously with the first author on studies pertaining to promoting Indigenous pedagogy in social work education and

improving outcomes for Indigenous children and families interacting with the Canadian child welfare system.

As an ally in Indigenous research, **Philip Baiden** is committed to promoting respect, reciprocity, and collaboration with Indigenous communities. His work acknowledges the enduring impact of colonization and centers Indigenous voices in understanding and preventing youth victimization, fostering culturally grounded approaches that support healing, resilience, and well-being.

Esme Fuller-Thomson is a settler ally who has worked closely with Indigenous scholars for 25 years, documenting resiliency, health, well-being and grandparent caregiving among Indigenous peoples in the US and Canada.

Data source and study sample

Data for this study were derived from the public use data files of the 2022 and 2023 Behavioral Risk Factor Surveillance System (BRFSS) (CDC, 2023). As has been described in previous research (Schilke et al., 2025), the BRFSS is a cross-sectional annual survey designed and conducted by the Centers for Disease Control and Prevention (CDC) that collects data on health-related risk behaviors, chronic health conditions, and use of preventive services relating to the leading causes of death and disability from non-institutionalized adult populations (≥ 18 years) residing in the US. Detailed information on the study design of the 2022 and 2023 BRFSS, including the objectives, methodology, and sampling procedure, are available from the U.S. Department of Health and Human Services (CDC, 2023).

BRFSS participants are selected via random-digit dialing with probability sampling and weighting to ensure representativeness. Given that AI/AN populations make up a small proportion of most state populations, some states, for instance, Alaska, Arizona, and New Mexico and tribal governments enter into oversampling agreements with CDC in order to increase the representation of Indigenous respondents (Adakai et al., 2018). Indigenous peoples are included in the BRFSS but not specifically screened for selection bias. Instead, the survey reduces the potential for selection bias through weighting, oversampling, and partnership with Tribal Epidemiology Centers in order to improve representativeness and cultural relevance. (National Indian Health Board, 2023). The BRFSS is valuable for research involving Indigenous populations compared to most other public datasets because it offers a large sample size, broader coverage, flexibility, and cultural

relevance in population health surveillance. Several states and tribal health departments partner with the CDC to oversample Indigenous populations.

Moreover, the use of the BRFSS for research involving Indigenous peoples enhances the ability to monitor health disparities, design community-responsive interventions, and inform equitable public health policy (Adakai et al., 2018). While the BRFSS is a national survey coordinated by the CDC, it has features and practices that support Indigenous sovereignty. For instance, the structure of the BRFSS offers flexibility and allows for tribal participation, data control, and culturally respectful data use respecting Indigenous rights and self-determination in public health research (Rhodes et al., 2024). The CDC's Institutional Review Board approved the study protocol for conducting the BRFSS, and the de-identified data are publicly available.

The BRFSS questionnaire is divided into 1) a core module, which is made up of survey questions administered to residents in all states and territories; and 2) optional modules, which consists of CDC-developed questions that states have the options to include in their questionnaire. The analyses were restricted to respondents who self-identified as American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander (AI/AN or NH/PI). In total, 6,265 respondents self-identified as AI/AN or NH/PI in the 2022 and 2023 BRFSS, constituting the analytic sample for this study. Missing data on all the variables included in the analysis was less than 2%, apart from income, health insurance, and BMI, for which a 'missing category' was created.

We followed Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines in conducting this study (von Elm et al., 2007). The STROBE initiative was formally established in 2004 by a group of international contributors. The guideline is a set of 22-items that serves as international standards to improve how researchers report observational studies and ensure that such studies are reported clearly, enabling policymakers and practitioners to make reliable decisions based on them (von Elm et al., 2007). Following STROBE guidelines when studying Indigenous populations ensures that research is methodologically sound, ethically responsible, and culturally respectful. This approach in turn helps to build trust and credibility while advancing accurate and equitable public health knowledge. Moreover, following STROBE guidelines is especially important when conducting studies involving Indigenous populations because these communities have historically been underrepresented or

misrepresented in public health research. STROBE helps to ensure that such studies are conducted and reported with transparency, rigor, and respect.

Outcome variable

The outcome variable examined in this paper was healthy functioning and it was measured as a binary variable based on the following items: difficulty walking or climbing stairs, difficulty bathing or dressing, self-rated physical health, mental health, binge drinking, satisfaction with life, emotional support, social support, and stress. Respondents were considered as functioning healthily and coded 1, if they: 1) reported not having any difficulty walking or climbing stairs, 2) reported no difficulty bathing or dressing, 3) rated their physical health as excellent/very good/good, 4) did not have any mental health problems over the past 30 days, 5) did not binge drink, 6) were satisfied or very satisfied with their life, 7) always/usually/sometimes have emotional or social support, 8) never/rarely/sometimes feel socially isolated from others, and 9) never/rarely/sometimes reported stress within the past 30 days. Respondents with any one or more of the above conditions were considered not functioning healthily and were coded as 0. (See Appendix 1 for the exact wording of the items used in measuring healthy functioning).

Other variables

Other variables examined in this study were grouped under demographic factors (age, sex, marital status, race/ethnicity, and rural-urban county), socioeconomic status (SES) and social determinant of health (SDOH) measures (education, annual household income, health insurance coverage, home ownership, food security, being able to pay bills, and having a reliable means of transportation), health risk behaviors (cigarette smoking, body mass index (BMI), and physical activity), and chronic health conditions (arthritis, asthma, cancer, coronary heart disease or myocardial infarction, chronic obstructive pulmonary disease (COPD), diabetes, kidney disease, depression, and stroke). We also controlled for the survey year. Detailed information about the exact wording of each item and analytic coding is provided in Appendix 2.

Statistical analyses

Data were analyzed using descriptive, bivariate, and multivariable analytic techniques (Katz, 2011). First, we used frequencies and percentages to examine the general distribution of healthy functioning and the other variables of

interest. Second, we examined the bivariate association between healthy functioning and the other variables using Pearson chi-square test of association. The main analysis of this study involves the use of binary logistic regression to examine the association between our sets of variables of interest and healthy functioning. Four hierarchical binary logistic regression models were fitted. In Model 1, we regressed healthy functioning on survey year and demographic factors. Model 2 consists of variables in Model 1 plus SES and SDOH measures. In model 3, we added health risk behaviors. Finally, the fully adjusted model consists of variables in Model 3 plus chronic health conditions. Model fitness was assessed using the Hosmer-Lemeshow goodness-of-fit test statistic whereby a non-significant chi-square value indicates that the data fit the model, and a significant decrease in the -2 log-likelihood value suggests that the current model is an improvement over the previous model.

The predictive performance of the model was estimated using the area under the receiver operating characteristic (AUROC) curve for binary outcomes (Cook, 2008). Generally, the area under the ROC curve value ranges from 0.5 to 1.0, with a value of 1.0 indicating a perfect fit model, whereas values closer to 0.5 indicate that the model is no better than that which could have been obtained by chance. Adjusted odds ratios (AOR) are reported with their 95% Confidence Intervals (C.I.). All hypotheses tests were two-tailed, and $p < .05$ was considered statistically significant. Stata's "svyset" command was used to account for the weighting and complex survey design employed by the BRFSS. Analyses were performed using Stata Statistical Software: Release17 (StataCorp, 2021).

RESULTS

Sample characteristics

Appendix 3 shows the general distribution of the study variables. Of the 6,265 AI/AN or NH/PI respondents examined, 29.6% were functioning healthily. The sample was evenly distributed by sex (male = 49.5%). About one in three respondents (33.5%) had an annual household income of less than $35,000, 7.8% had no health insurance, and 6.4% were renting. About one in four AI/AN or NH/PI respondents (24.5%) were food insecure, about one in five (19.1%) had difficulty paying their bills, and about one in seven (14.4%) did not have a reliable means of transportation. With respect to health risk behaviors, 21.5% were currently smokers, 26.7% used to smoke cigarettes, and 51.8% have never smoked a cigarette. A little over one in four respondents (26.5%)

were physically inactive. The most prevalent chronic condition was arthritis (30.0%), followed by depression (21.7%), asthma (18.7%), diabetes (16.8%), and COPD (10.2%). The prevalence of each of the following conditions was less than 10%: cancer, coronary heart disease or myocardial infarction, kidney disease, and stroke.

With the exception of health insurance, there was a significant bivariate association between all the variables included in the analyses and healthy functioning. For instance, about one in three males (32.1%) compared to a little over one in four females (27.5%) were functioning healthily ($\chi^2(1) = 15.45$, $p < .001$). The proportion of respondents who were functioning healthily in 2023 (32.1%) was significantly greater than the proportion of respondents functioning healthily in 2022 (26.9%; $\chi^2(1) = 20.27$, $p < .001$). Respondents were more likely to be functioning healthily if they were older, married, lived in urban counties, graduated from college/technical school, had higher income, owned a house, were food secured, could pay bills, and had a reliable means of transportation. The proportion of respondents who had a chronic condition and were functioning healthily was significantly lower than the proportion of respondents who did not have a chronic condition and were functioning healthily. Full details of the bivariate association between the explanatory variables and healthy functioning are presented in Appendix 2.

Factors associated with healthy functioning

Appendix 3 shows the multivariable binary logistic regression results examining factors associated with healthily functioning. In Model 1, we found that all the demographic factors were significantly associated with healthily functioning. However, marital status and rural-urban county status lost their significance once we controlled for other factors in subsequent models. Sex became non-significant once we controlled for chronic health conditions in Model 4. With the exception of health insurance, all the SES and SDOH measures included were significant in Models 2 and 3. Education and income lost their significance once we controlled for chronic health conditions in Model 4. However, SDOH measures remained significant in the fully adjusted model. All the health risk behaviors included were significant in Model 3 and in the fully adjusted model.

Controlling for the effects of other factors, older respondents were more likely to be functioning healthily. In comparison to those aged 18-29, the association between age in decade and healthy functioning

indicates a dose response relationship of between 40 and 79 increasing from 40% higher odds among those aged 40-49, up to more than double the odds of healthy functioning among those aged 70-79. Those aged 80 and older had approximately 55% higher odds of healthy functioning when compared to the youngest cohort. Controlling for other factors, respondents were more likely to be functioning healthily if they were food-secured (AOR = 1.42, $p < .001$, 95% CI = 1.19-1.70), able to pay their bills (AOR = 2.02, $p < .001$, 95% CI = 1.62-2.53), or had reliable means of transportation (AOR = 2.28, $p < .001$, 95% CI = 1.77-2.95). Compared to respondents who currently smoked cigarettes, respondents who had never smoked a cigarette had 1.44 times higher odds of healthy functioning (AOR = 1.44, $p < .001$, 95% CI = 1.21-1.71). Physically active respondents had 1.38 times higher odds of healthy functioning when compared to their inactive counterparts (AOR = 1.38, $p < .001$, 95% CI = 1.20-1.60). With respect to chronic conditions, the odds of healthy functioning were more than fourfold higher for respondents who did not have depression when compared to their counterparts with depression (AOR = 4.45, $p < .001$, 95% CI = 3.56-5.56). Respondents were also more likely to be functioning healthily if they did not have arthritis (AOR = 1.76, $p < .001$, 95% CI = 1.52-2.05), coronary heart disease or myocardial infarction (AOR = 1.63, $p < .001$, 95% CI = 1.26-2.10), kidney disease (AOR = 1.61, $p < .05$, 95% CI = 1.11-2.32), diabetes (AOR = 1.55, $p < .001$, 95% CI = 1.30-1.84), COPD (AOR = 1.50, $p < .01$, 95% CI = 1.15-1.98), cancer (AOR = 1.46, $p < .01$, 95% CI = 1.13-1.87), or asthma (AOR = 1.35, $p < .01$, 95% CI = 1.22-1.62).

All the model fitness indices indicated that the multivariate models were fit, and the set of factors included made significant contributions to the model. Based on the AUROC curve statistics 58.68% of respondents were correctly classified as functioning healthily versus not functioning healthily in Model 1 (AUROC curve = 0.5868). Adding SES and SDOH factors in Model 2 improved this to 67.64%. In the fully adjusted model, 75.65% of respondents were correctly classified as functioning healthily versus not functioning healthily (AUROC curve = 0.7565).

DISCUSSION

Using a representative community-based sample, this study examined the factors associated with healthy functioning in the AI/AN and NH/PI population. Based on the measure created for this study, the results indicated that nearly a third of the respondents were functioning healthily, indicating a state of overall physical and

mental well-being and satisfaction with life. Rates of healthy functioning were found to be higher in 2023 than 2022, which could be attributed to the negative impacts of the COVID-19 pandemic, which disproportionately affected Indigenous populations in the U.S. and globally (Power et al., 2020). In general, results from the BRFSS show that there are several positive health and social factors among the AI/AN and NH/PI population. One in five respondents had graduated from college or technical school, 88.5% had health care coverage and two-thirds owned their homes. About half of respondents had never smoked, and rates of obesity were found to be slightly lower than that of the general population (37% as compared to 40.3%) (Emmerich et al., 2024). About three-quarters of respondents reported being physically active.

Absence of chronic diseases such as diabetes, arthritis, cancer, and asthma were found to be positively associated with healthy functioning. Other research has also found that, even after adjusting for sociodemographic characteristics, greater prevalence of chronic illness is associated with an increase in days of physical and mental distress, as well as lower reported life satisfaction (Strine et al., 2008). Chronic illness is also linked to disability and functional limitations. It has been shown that even when chronic illness is present, adverse outcomes such as depressive symptoms are less common among those without functional limitations associated with the disease (Parajuli et al., 2021).

Arthritis was the most prevalent disease in the current sample with one-third of respondents reporting a diagnosis of this condition. Arthritis is a condition that can cause significant functional deficits and is associated with lower quality of life for those who suffer from it (Haroon et al., 2007) so it is not surprising that we found those without arthritis had 76% higher odds of healthy functioning when compared to their peers without arthritis.
Absence of depressive symptoms was found to be closely linked to healthy functioning, with respondents who reported good mental health found to be four times more likely to be functioning healthily. Previous research suggests both the AI/AN and NH/PI populations experience higher rates of depressive symptoms (Ka'apu & Burnette, 2019; Subica et al., 2024). These mental health disparities have been linked to historic and ongoing exposure to trauma, discrimination, and adverse childhood experiences. Any efforts to reduce depression in these populations must incorporate Indigenous perspectives on mental health and wellness, emphasizing the interconnectedness of wellness with

community, family, ancestors, land, and spirituality (O'Keefe et al., 2022).

Food security, home ownership, and access to reliable transportation were also significantly related to healthy functioning, in keeping with the findings of earlier research studies. Food insecurity has been shown to result in greater risk for poor mental health and higher rates of psychosocial distress (Pourmotabbed et al., 2020). Home ownership may increase the likelihood of healthy functioning due to an increased sense of control and stability (Manturuk, 2012). However, difficulty with housing affordability can negatively impact psychological well-being and offset the advantages of home ownership (Park & Kim, 2023). In the present study, respondents who reported no difficulty with paying their bills were twice as likely to be functioning healthily. Access to transportation is linked to greater quality of life due to enabling individuals to connect with health care, employment, social supports, and other essentials (Mattson et al.,2021). These findings underscore the importance of initiatives aimed at ensuring a minimum standard of living and access to basic needs of housing, food, and transportation. The relationship between SES and health is nuanced and there is evidence to support how they inform each other in different ways. This being said, previous research has shown that lower SES is associated with conditions that increase risk of exposure to chronic stress which in turn is associated with poor physical and mental health outcomes (Baum et al., 1999).

Age, sex, and marital status were all included in our analysis, however age was the only variable to remain statistically significant after controlling for other factors. Older respondents had higher odds of healthy functioning compared to the youngest cohort, with the highest odds of healthy functioning among those aged 70-79. Resilience among AI/AN elders has been studied and documented across many sources. In a review of literature pertaining to AI/AN resilience across the life course, common threads of cultural values, beliefs, and practices emerged as essential contributors to older Indigenous adults' resilience (Oré et al., 2016). Being older was also found to be a contributing factor to recovery in Indigenous peoples who had previously been suicidal (Fuller-Thomson et al., 2020). Other studies have reinforced the importance of inter-generational connection and relationships as a means of bolstering mental health and well-being for Indigenous youth (Rao et al., 2017). A recent study indicates that despite experiencing disproportionately higher levels of adverse childhood experiences as compared to non-AI/AN counterparts, older AI/AN adults report equivalent levels

of depressive symptoms (Burnette et al., 2017). Further research into the sources of strength and resilience among AI/AN elders could help to inform public health initiatives aimed to support this group and to guide interventions for those younger Indigenous populations who do not seem to be in as optimal health and well-being as their elders.

Smoking also emerged as an important determinant of healthy functioning. Those who had never smoked, as well as former smokers were more likely to be functioning healthily than current smokers. Smoking has been associated with lower psychological well-being and subjective well-being, as well as greater prevalence of chronic disease (Lappan et al., 2020; McCann, 2010). Smoking prevalence among the AI/AN and NH/PI population is higher than that of the general population in the U.S (CDC, 2023; Moy et al., 2010; Odani et al., 2017). There are currently very few smoking cessation programs that are tailored specifically to marginalized communities. Among these few programs, most focus on individual behavior change and do little to address the social determinants that increase the likelihood of smoking (Alcantara et al., 2025). Programs that include specific representation of the target population, contain culturally relevant messaging and themes, and acknowledge the diversity within communities may be more effective in reducing smoking rates (Anderson et al., 2019). Physical activity was also found to be associated with healthy functioning. Just over one quarter of respondents reported being physically inactive. Other studies have found that rates of physical inactivity among AI/AN and NH/PI are below recommended levels (Moy et al., 2010; Zhao et al., 2022). Insufficient physical activity is a major risk factor for obesity and mortality secondary to chronic disease (Kokenge et al., 2022).

It should not be overlooked that approximately two thirds of respondents did not meet the criteria for healthy functioning. This fact provides further evidence for the need to improve public health initiatives aimed to support Indigenous people in the U.S. Understanding some of the factors contributing to positive outcomes can be mobilized to inform these initiatives in order to prioritize those areas that are most directly connected to healthy functioning.

Limitations

It is important to acknowledge that this study could not explore within-group differences in healthy functioning among the AI/AN and NH/PI populations, due to limitations of the BRFSS data set. There is significant diversity within these

populations and further research should explore these differences to more accurately determine sources of strength and areas of need for specific communities. Another limitation of the current study was the sample size. Prior to 2022, the questions that comprised the healthy functioning measure were not included in the BFRSS and so additional data from these years could not be added in order to increase the sample size. It is also of note that some differences may be observed over the coming years as the effects of the COVID-19 pandemic become less acute over time. There is also a significant risk of selectivity bias in our sample due to the optional nature of the BRFSS. It is possible that some individuals did not respond due to physical or mental illness which could skew the data to appear more positive than in reality.

It is also important to acknowledge that the study does not ask participants about their subjective rating of the health of their family or community. As previously discussed, many Indigenous conceptions of health acknowledge the connections between individuals and their environment as a dimension of overall health and well-being. To add further nuance to the understanding of influences contributing to healthy functioning, future research should explore these connections in addition to other aspects key to Indigenous wellness such as social, cultural, spiritual and environmental factors (Hodge & Nandy, 2011; Yurkovich & Lattergrass, 2008; Biles et al., 2024).

CONCLUSION

By identifying some of the factors associated with healthy functioning in the AI/AN and NH/PI population, this study contributes to the growing body of research that explores sources of strength and resilience in these communities. While this study is limited by use of a single measure, it provides an example of how research into strengths can serve public health efforts. Despite facing disproportionate adversities due to the legacy of colonialism and ongoing discrimination, three in ten Indigenous respondents in the 2022 and 2023 BRFSS were functioning healthily per our measure. Chronic conditions, socioeconomic factors, social determinants of health, and health behaviors were all found to have a significant impact on healthy functioning.

Our findings underscore the importance of a holistic approach to public health initiatives that address the different dimensions of health and well-being, at the individual and community level. Further research that focuses on factors that contribute to healthy functioning within

AI/AN and NH/PI populations is warranted in order to better support existing sources of strength and challenge negative assumptions about the vulnerability of these communities.

References

Adakai, M., Sandoval-Rosario, M., Xu, F., Aseret-Manygoats, T., Allison, M., Greenlund, K. J., & Barbour, K. E. (2018). Health disparities among American Indians/Alaska Natives—Arizona, 2017. *Morbidity and Mortality Weekly Report*, *67*, 1314-1318.

Alcantara, I. C., Villaluz, N., McAleer, K., Valliani, I., & Ross, L. W. (2025). Rev. of Commercial Tobacco Cessation Interventions for American Indian and Alaska Native Persons Living in the United States: A Narrative Systematic Review of Effectiveness Using a Health Equity Lens. *American Journal of Health Promotion*, *39*(2), 330–347. doi:10.1177/08901171241293419

Anderson, K. M., Kegler, M. C., Bundy, L. T., Henderson, P., Halfacre, J., & Escoffery, C. (2019). Adaptation of a brief smoke-free homes intervention for American Indian and Alaska Native families. *BMC Public Health*, *19*, 1-9. doi:10.1186/s12889-019-7301-4.

Baum, A., Garofolo, J. P., & Yali, A. M. (1999). Socioeconomic Status and Chronic Stress: Does stress account for SES effects on health? *Annals of the New York Academy of Sciences*, *896*(1), 131–144. doi:10.1111/j.1749-6632.1999.tb08111.x

Biles, B. J., Serova, N., Stanbrook, G., Brady, B., Kingsley, J., Topp, S. M., & Yashadhana, A. (2024). What is Indigenous cultural health and wellbeing? A narrative review. *The Lancet Regional Health. Western Pacific*, *52*, Article 101220. https://doi.org/10.1016/j.lanwpc.2024.101220

Brockie, T. N., Hill, K., Davidson, P. M., Decker, E., Krienke, L. K., Nelson, K. E., ... & Around Him, D. (2022). Strategies for culturally safe research with Native American communities: an integrative review. *Contemporary Nurse*, *58*(1), 8-32. doi:10.1080/10376178.2021.2015414.

Burnette, C. E., Roh, S., Lee, K. H., Lee, Y. S., Newland, L. A., & Jun, J. S. (2017). A comparison of risk and protective factors related to depressive symptoms among American Indian and Caucasian older adults. *Health & Social Work*, *42*(1), e15-e23. doi:10.1093/hsw/hlw055.

Centers for Disease Control and Prevention (CDC). (2023). *Behavioral Risk Factor Surveillance System: 2023 Summary Data*

Quality Report. Atlanta, GA: U.S. Department of Health and Human Services.

Cook, N. R. (2008). Statistical evaluation of prognostic versus diagnostic models: beyond the ROC curve. *Clinical Chemistry*, *54*(1), 17-23. doi:10.1373/clinchem.2007.096529.

Emmerich, S.D. et al. (2024). *Obesity and severe obesity prevalence in adults: United States, August 2021–August 2023*. NCHS Data Brief, no 508. Hyattsville, MD: National Center for Health Statistics.

Findling, M. G., Casey, L. S., Fryberg, S. A., Hafner, S., Blendon, R. J., Benson, J. M., Sayde, J. M., & Miller, C. (2019). Discrimination in the United States: Experiences of Native Americans. *Health Services Research*, *54*(6), 1431–1441. https://doi.org/10.1111/1475-6773.13224

Fogarty, W., Lovell, M., Langenberg, J., & Heron, M. J. (2018). *Deficit discourse and strengths-based approaches. Changing the Narrative of Aboriginal and Torres Strait Islander Health and Wellbeing.* Melbourne: The Lowitja Institute.

Fuller-Thomson, E., Sellors, A. E., Cameron, R. E., Baiden, P., & Agbeyaka, S. (2020). Factors Associated with Recovery in Aboriginal People in Canada Who Had Previously Been Suicidal. *Archives of Suicide Research*, *24*(2), 186–203. https://doi.org/10.1080/13811118.2019.1612801

Gone, J. P., Hartmann, W. E., Pomerville, A., Wendt, D. C., Klem, S. H., & Burrage, R. L. (2019). The impact of historical trauma on health outcomes for indigenous populations in the USA and Canada: A systematic review. *The American Psychologist*, *74*(1), 20–35. doi:10.1037/amp0000338.

Haroon, N., Aggarwal, A., Lawrence, A., Agarwal, V., & Misra, R. (2007). Impact of rheumatoid arthritis on quality of life. *Modern Rheumatology*, *17*, 290-295. doi:10.1007/s10165-007-0604-9.

Hodge, F. S., & Nandy, K. (2011). Predictors of Wellness and American Indians. *Journal of Health Care for the Poor and Underserved*, *22*(3), 791–803. https://doi.org/10.1353/hpu.2011.0093

John-Henderson, N. A., White, E. J., & Crowder, T. L. (2023). Resilience and health in American Indians and Alaska Natives: A scoping review of the literature. *Development and Psychopathology*, *35*(5), 2241–2252. https://doi.org/10.1017/S0954579423000640

Ka'apu, K., & Burnette, C. E. (2019). A culturally informed systematic review of

mental health disparities among adult Indigenous men and women of the USA: What is known? *The British Journal of Social Work*, *49*(4), 880-898. doi:10.1093/bjsw/bcz009.

Katz, M. H. (2011). *Multivariable Analysis: A Practical Guide for Clinicians and Public Health Researchers* (3rd ed.). Cambridge University Press.

Kokenge, M. C., Ruppar, T. M., & Buchholz, S. (2022). Physical activity interventions among American Indian and Alaska Native persons: A systematic review. *American Journal of Health Promotion*, *36*(8), 1350-1370. doi:10.1177/08901171221097687.

Lappan, S., Thorne, C. B., Long, D., & Hendricks, P. S. (2020). Longitudinal and reciprocal relationships between psychological well-being and smoking. *Nicotine and Tobacco Research*, *22*(1), 18-23. doi:10.1093/ntr/nty185.

Lee, M. T., & Mayor, I. (2023). Health and flourishing: An interdisciplinary synthesis. In M. Las Heras, M. Grau Grau, & Y. Rofcanin (Eds.), *Human flourishing: A multidisciplinary perspective on neuroscience, health, organizations and arts* (pp. 49–68). Springer. https://doi.org/10.1007/978-3-031-09786-7_4

Levesque, A., & Li, H. Z. (2014). The Relationship Between Culture, Health Conceptions, and Health Practices: A Qualitative–Quantitative Approach. *Journal of Cross-Cultural Psychology*, *45*(4), 628–645. https://doi.org/10.1177/0022022113519855

Manson, S. M., Beals, J., Klein, S. A., Croy, C. D., & AI-SUPERPFP Team. (2005). Social Epidemiology of Trauma Among 2 American Indian Reservation Populations. *American Journal of Public Health (1971)*, *95*(5), 851–859. https://doi.org/10.2105/AJPH.2004.054171

Manturuk, K. R. (2012). Urban homeownership and mental health: mediating effect of perceived sense of control. *City & Community*, *11*(4), 409-430. doi:10.1111/j.15406040.2012.01415.x.

Marrone, S. (2007).Understanding barriers to health care: a review of disparities in health care services among indigenous populations. *International Journal of Circumpolar Health, 66*(3):188-98. doi: 10.3402/ijch.v66i3.18254. PMID: 17655060.

Mattson, J., Brooks, J., Godavarthy, R., Quadrifoglio, L., Jain, J., Simek, C., & Sener, I. (2021). Transportation,

community quality of life, and life satisfaction in metro and non-metro areas of the United States. *Wellbeing, Space and Society*, *2*, 100056. doi:10.1016/j.wss.2021.100056.

McCann, S. J. (2010). Subjective well-being, personality, demographic variables, and American state differences in smoking prevalence. *Nicotine & Tobacco Research*, *12*(9), 895-904.ndoi:10.1093/ntr/ntq113.

Moy, K. L., Sallis, J. F., & David, K. J. (2010). Health indicators of Native Hawaiian and Pacific Islanders in the United States. *Journal of Community Health*, *35*(1), 81–92. https://doi.org/10.1007/s10900-009-9194-0

Munari, S. C., Wilson, A. N., Blow, N. J., Homer, C. S., & Ward, J. E. (2023). Rethinking the use of 'vulnerable'. *Australian and New Zealand Journal of Public Health*, *45*(3), 197. doi:10.1111/1753-6405.13098

National Indian Health Board (2023). *White Paper:* Tribal Public Health Infrastructure. Washington, DC: NIHB. https://www.nihb.org/wp-content/uploads/2025/03/TPHI-White-Paper-FINAL-2.2023.pdf

Odani, S. (2017). Prevalence and disparities in tobacco product use among American Indians/Alaska Natives—United States, 2010–2015. *MMWR. Morbidity and Mortality Weekly Report*, *66*. doi:10.15585/mmwr.mm6650a2.

O'Keefe, V. M., Fish, J., Maudrie, T. L., Hunter, A. M., Tai Rakena, H. G., Ullrich, J. S., ... & Barlow, A. (2022). Centering Indigenous knowledges and worldviews: Applying the Indigenist ecological systems model to youth mental health and wellness research and programs. *International Journal of Environmental Research and Public Health*, *19*(10), 6271. doi:10.3390/ijerph19106271.

Oré, M. C. E., Teufel-Shone, N. I., & Chico-Jarillo, M. T. M. (2016). American Indian and Alaska Native resilience along the life course and across generations: A literature review. *American Indian and Alaska Native Mental Health Research (Online)*, *23*(3), 134 doi:10.5820/aian.2303.2016.134.

Parajuli, J., Berish, D., & Jao, Y. L. (2021). Chronic conditions and depressive symptoms in older adults: The mediating role of functional limitations. *Aging & Mental Health*, *25*(2), 243-249.

Park, G. R., & Kim, J. (2023). Trajectories of life satisfaction before and after homeownership: The role of housing affordability stress. *Journal of Happiness Studies*, *24*(1), 397-408. doi:10.1007/s10902-022-00601-7.

Pourmotabbed, A., Moradi, S., Babaei, A., Ghavami, A., Mohammadi, H., Jalili, C., ... & Miraghajani, M. (2020). Food insecurity and mental health: a systematic review and meta-analysis. *Public Health Nutrition*, *23*(10), 1778-1790. doi:10.1017/S136898001900435X.

Power, T., Wilson, D., Best, O., Brockie, T., Bearskin, L. B., Millender, E., & Lowe, J. (2020). COVID-19 and Indigenous Peoples: An imperative for action. *Journal of Clinical Nursing*, *29*(15-16),2737. doi:10.1111/jocn.15320.

Rao, S., Pell, D., & England-Kennedy, E. S. (2017). Suicide, resilience, and connectedness across the lifespan: Lessons from American Indian and Alaska Native elders. *Family & Community Health*, *40*(4), 347-356. doi:10.1097/FCH.0000000000000164.

Rhodes, K. L., Echo-Hawk, A., Lewis, J. P., L. Cresci, V., E. Satter, D., & A. Dillard, D. (2024). Centering data sovereignty, tribal values, and practices for equity in American Indian and Alaska Native public health systems. *Public Health Reports*, *139*(1_suppl), 10S-15S.

Schilke, M. K., Baiden, P., & Fuller-Thomson, E. (2025). Parental divorce's long shadow: Elevated stroke risk among older Americans. *PloS One*, *20*(1), e0316580-. doi:10.1371/journal.pone.0316580

StataCorp. (2021). Stata Statistical Software: Release 17 [Computer software]. College Station, TX: StataCorp LLC.

Strine, T. W., Chapman, D. P., Balluz, L. S., Moriarty, D. G., & Mokdad, A. H. (2008). The associations between life satisfaction and health-related quality of life, chronic illness, and health behaviors among US community-dwelling adults. *Journal of Community Health*, *33*, 40-50. doi:10.1007/s10900-007-9066-4.

Subica, A. M., Soakai, L., Tukumoeatu, A., Johnson, T., & Aitaoto, N. (2024). Trauma and mental health in Pacific Islanders. *International Journal of Social Psychiatry*, 00207640241236109. doi:10.1177/00207640241236109.

Suslovic, B., & Lett, E. (2024). Resilience is an Adverse Event: A Critical Discussion of Resilience Theory in Health Services Research and Public Health. *Community*

Health Equity Research & Policy (Print), *44*(3), 339–343. https://doi.org/10.1177/2752535X231159721

Ullrich, J. S. (2019). For the love of our children: An indigenous connectedness framework. *AlterNative : An International Journal of Indigenous Peoples*, *15*(2), 121–130. https://doi.org/10.1177/1177180119828114

Ungar, M. (2013). Resilience, Trauma, Context, and Culture. *Trauma, Violence & Abuse*, *14*(3), 255–266. https://doi.org/10.1177/1524838013487805

VanderWeele, T. J. (2017). On the promotion of human flourishing. *Proceedings of the National Academy of Sciences - PNAS*, *114*(31), 8148–8156. https://doi.org/10.1073/pnas.1702996114

von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gøtzsche, P. C., & Vandenbroucke, J. P. (2007). The strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. *The lancet*, *370*(9596), 1453-1457. doi:10.1097/EDE.0b013e3181577654.

Wexler, L., Chandler, M., Gone, J. P., Cwik, M., Kirmayer, L. J., LaFromboise, T., ... & Allen, J. (2015). Advancing suicide prevention research with rural American Indian and Alaska Native populations. *American Journal of Public Health*, *105*(5), 891-899. doi:10.2105/AJPH.2014.302517.

Yurkovich, E. E., & Lattergrass, I. (2008). Defining health and unhealthiness: Perceptions held by Native American Indians with persistent mental illness. *Mental Health, Religion & Culture, 11*(5), 437–459. https://doi.org/10.1080/13674670701473751

Zhao, G., Hsia, J., Vigo-Valentín, A., Garvin, W. S., & Town, M. (2022). Health-related behavioral risk factors and obesity among American Indians and Alaska Natives of the United States: assessing variations by Indian health service region. *Preventing Chronic Disease*, *19*, E05. doi:10.5888/pcd19.210298.

Appendix 1 List of items used in measuring flourishing

	Variable name	Questionnaire wording	Analytic coding
1	Difficulty walking/climbing	Do you have serious difficulty walking or climbing stairs?	No vs. Yes
2	Difficulty bathing	Do you have difficulty dressing or bathing?	No vs. Yes
3	Self-rated physical health	Would you say that in general your health is:	Excellent/very good/good vs. fair/poor
4	Poor mental health	Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?	0 days vs. 1 or more days
5	Binge drinking	Considering all types of alcoholic beverages, how many ti mes during the past 30 days did you have 5 or more drink s for men or 4 or more drinks for women on an occasion?	0 days vs. 1 or more days
6	Life satisfaction	In general, how satisfied are you with your life?	Very satisfied/satisfied vs. Dissatisfied/very dissatisfied
7	Social and emotional support	How often do you get the social and emotional support you need?	Always/usually/someti mes vs. Rarely/never
8	Social isolation	How often do you feel socially isolated from others? Is it …	Never/rarely/sometime s vs. Always/usually
9	Stress	Stress means a situation in which a person feels tense, restless, nervous, or anxious, or is unable to sleep at night because his/her mind is troubled all the time. Within the last 30 days, how often have you felt this kind of stress?	Never/rarely/sometime s vs. Always/usually

Appendix 2 List of variables

Variable name	Questionnaire wording	Analytic coding
Demographic characteristics		
Survey year		0 = 2022
		1 = 2023
Age		0 = 18-29 years
		1 = 30-39 years
		2 = 44-49 years
		3 = 50-59 years
		4 = 60-69 years
		5 = 70-79 years
		6 = 80 years and above
Sex	Are you male or female?	0 = Male
		1 = Female
Marital status	Are you (marital status)?	0 = Married
		1 = Divorced/Separated
		2 = Widowed
		3 = Single/Never married
Urban-Rural County Status	In what county do you currently live?	0 = Rural county
		1= Urban county
Socioeconomic status and SDOH measures		
Highest level of education	What is the highest grade or year of school you completed?	0 = Less than High School
		1 = High School
		2 = Attended college/technical school
		3 = Graduated from college/technical school
Income	Is your annual household income from all sources?	0 = Less than $20,000
		1 = $20,000-$34,999
		2 = $35,000-$49,999
		3 = $50,000-$74,999
		4 = $75,000-$99,999
		5 = $100,000 and above
		6 = Missing data
Has health insurance coverage	Adults who had some form of health insurance	0 = No
		1 = Yes
		2 = Missing data
Home ownership	Do you own or rent your home?	0 = Renting

		1 = Owned 2 = Other arrangement
Is food secured	During the past 12 months how often did the food that you bought not last, and you didn't have money to get more?	0 = Always/Usually/Sometimes 1 = Rarely/Never
Able to pay bills	During the last 12 months, was there a time when you were not able to pay your mortgage, rent or utility bills?	0 = Yes 1 = No
Has a reliable means of transportation	During the past 12 months has a lack of reliable transportation kept you from medical appointments, meetings, work, or from getting things needed for daily living?	0 = Yes 1 = No
Health risk behaviors		
Cigarette smoking	Have you smoked at least 100 cigarettes in your entire life? Do you now smoke cigarettes every day, some days, or not at all?	0 = Currently smoke cigarette 1 = Used to smoke cigarette 0 = Never smoke cigarette
BMI category	Calculated variable for Body Mass Index (BMI)	0 = Obese 1 = Overweight 2 = Normal BMI 3 = Missing data
Physically active	During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?	0 = No 1 = Yes
Chronic health conditions		
Arthritis	Has a doctor, nurse or other health professional EV ER aid that you had one form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia? (Arthritis diagnoses include rheumatism, polymyalgia rheumatica; osteoarthritis (not osteoporosis); tendonitis, bursitis, bunion, tennis elbow, carpal tunnel syndrome, tarsal tunnel syndrome; joint infection, etc.)	0 = Yes 1 = No
Asthma	Has a doctor, nurse or other health professional EV ER said that you had asthma?	0 = Yes 1 = No

Cancer	Has a doctor, nurse or other health professional EVER said that you had melanoma or any other types of cancer?	0 = Yes 1 = No
Coronary heart disease or myocardial infarction	Has a doctor, nurse or other health professional EVER said that you had coronary heart disease (CHD) or myocardial infarction (MI)?	0 = Yes 1 = No
COPD	Has a doctor, nurse or other health professional EVER said that you had C.O.P.D. (chronic obstructive pulmonary disease), emphysema or chronic bronchitis?	0 = Yes 1 = No
Diabetes	Has a doctor, nurse or other health professional EVER said that you had diabetes?	0 = Yes 1 = No
Kidney disease	Not including kidney stones, bladder infection or incontinence, were you EVER told you had kidney disease?	0 = Yes 1 = No
Depression	Has a doctor, nurse or other health professional EVER said that you had depressive disorder (including depression, major depression, dysthymia, or minor depression)?	0 = Yes 1 = No
Stroke	Has a doctor, nurse or other health professional EVER said that you had a stroke?	0 = Yes 1 = No

BMI = Body mass index

COPD = Chronic obstructive pulmonary disease

Appendix 3
Multivariable logistic regression analysis of factors associated with flourishing of Indigenous respondents from the 2022 and 2023 Behavioral Risk Factor Surveillance Survey (BRFSS) (N = 6,265)

Variables	AOR (95% C.I)	AOR (95% C.I)	AOR (95% C.I)	AOR (95% C.I)
Demographic variables				
Survey year (2022)				
2023	1.30 (1.16-1.45)***	1.32 (1.18-1.48)***	1.32 (1.18-1.48)***	1.26 (1.12-1.42)***
Age (18-29 years)				
30-39 years	0.90 (0.72-1.13)	0.94 (0.74-1.19)	1.09 (0.86-1.39)	1.03 (0.80-1.32)
40-49 years	1.10 (0.88-1.37)	1.12 (0.88-1.43)	1.37 (1.07-1.76)*	1.40 (1.08-1.81)*
50-59 years	1.06 (0.84-1.32)	1.06 (0.84-1.35)	1.32 (1.03-1.69)*	1.55 (1.20-2.00)**
60-69 years	1.18 (0.94-1.47)	1.12 (0.88-1.43)	1.35 (1.06-1.73)*	1.84 (1.41-2.39)***
70-79 years	1.36 (1.06-1.74)*	1.18 (0.90-1.54)	1.44 (1.10-1.90)**	2.23 (1.66-3.01)***
80 years and above	1.38 (1.01-1.88)*	1.12 (0.81-1.55)	1.30 (0.93-1.82)	1.69 (1.19-2.40)**
Sex (Female)				
Male	1.22 (1.09-1.37)***	1.16 (1.03-1.30)*	1.17 (1.04-1.32)**	1.06 (0.93-1.20)
Marital status (Single/never married)				
Widowed	0.79 (0.77-1.87)	0.79 (0.61-1.00)	0.81 (0.64-1.04)	0.95 (0.73-1.23)
Divorced/separated	0.89 (0.12-0.46)	0.90 (0.74-1.09)	0.93 (0.76-1.12)	1.05 (0.85-1.28)
Married	1.42 (1.23-1.64)***	1.03 (0.87-1.21)	1.04 (0.88-1.22)	1.12 (0.95-1.33)
Rural urban county (Rural county)				
Urban county	1.16 (1.03-1.30)*	1.09 (0.97-1.23)	1.05 (0.92-1.18)	1.14 (1.00-1.29)
Socioeconomic status and SDOH measures				
Education (Less than High School)				
High school		1.40 (1.10-1.77)**	1.30 (1.02-1.65)*	1.24 (0.96-1.59)
Attended college/technical school		1.19 (0.93-1.51)	1.08 (0.85-1.38)	1.09 (0.84-1.40)
Graduated from college/technical school		1.21 (0.94-1.56)	0.99 (0.77-1.28)	1.00 (0.77-1.31)
Household income (Less than $20,000)				
$20,000-$34,999		1.17 (0.94-1.45)	1.18 (0.95-1.48)	1.18 (0.93-1.48)
$35,000-$49,999		1.28 (1.00-1.62)*	1.25 (0.98-1.60)	1.22 (0.95-1.58)
$50,000-$74,999		1.33 (1.04-1.69)*	1.31 (1.02-1.67)*	1.20 (0.93-1.55)
$75,000-$99,999		1.23 (0.95-1.61)	1.22 (0.93-1.59)	1.12 (0.85-1.49)
$100,000 and above		1.47 (1.15-1.90)**	1.37 (1.06-1.77)*	1.23 (0.94-1.60)
Missing data		1.60 (1.26-2.02)***	1.52 (1.20-1.93)**	1.49 (1.16-1.91)**

Has health insurance (no)				
Yes		0.98 (0.77-1.25)	1.02 (0.80-1.30)	1.21 (0.94-1.57)
Missing		0.74 (0.50-1.09)	0.75 (0.51-1.11)	0.81 (0.54-1.22)
Home ownership (Renting)				
Owned		1.21 (1.05-1.40)*	1.16 (1.00-1.35)*	1.10 (0.94-1.28)
Other		0.71 (0.54-0.95)*	0.70 (0.52-0.93)*	0.67 (0.50-0.91)**
Is food secured (No)				
Yes		1.55 (1.31-1.84)***	1.50 (1.26-1.78)***	1.42 (1.19-1.70)** *
Able to pay bills (No)				
Yes		2.36 (1.91-2.92)***	2.36 (1.90-2.92)***	2.02 (1.62-2.53)***
Has reliable means of transportation (No)				
Yes		2.71 (2.12-3.46)***	2.63 (2.05-3.37)***	2.28 (1.77-2.95)***
Health risk behaviors				
Cigarette smoking (Currently smoke cigarette)				
Used to smoke cigarette			1.21 (1.01-1.45)*	1.20 (1.00-1.45)
Never smoke cigarette			1.71 (1.45-2.02)***	1.44 (1.21-1.71)***
BMI (Obese)				
Overweight			1.30 (1.14-1.49)***	1.18 (1.02-1.36)*
Normal			1.41 (1.20-1.65)***	1.21 (1.03-1.43)*
Missing			1.54 (1.16-2.03)**	1.42 (1.06-1.90)*
Physically active (No)				
Yes			1.57 (1.37-1.80)***	1.38 (1.20-1.60)***
Chronic health conditions				
Arthritis (Yes)				
No				1.76 (1.52-2.05)***
Asthma (Yes)				
No				1.35 (1.22-1.62)**
Cancer (Yes)				
No				1.46 (1.13-1.87)**
Coronary heart disease or myocardial infarction (Yes)				
No				1.63 (1.26-2.10)***
COPD (Yes)				
No				1.50 (1.15-1.98)**

Diabetes (Yes)					
	No				1.55 (1.30-1.84)***
Kidney disease (Yes)					
	No				1.61 (1.11-2.32)*
Depression (Yes)					
	No				4.45 (3.56-5.56)***
Stroke (Yes)					
	No				1.25 (0.90-1.73)
Model fitness indices					
	Hosmer-Lemeshow G.O.F. test (sig)	219.45 (*p* = .190)	4755.53 (*p* = .544)	6009.72 (*p* = .199)	6069.84 (*p* = .599)
	-2 log-likelihood value	-3743.74	-3525.54	-3460.08	-3213.13
	C-statistics	0.5868	0.6764	0.7013	0.7565

About the authors

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