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## Personal Health and Community Safety Perceptions and their Association with Meeting Physical Activity Guidelines

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## Abstract

**Objective:** To examine whether Vermonters' perceptions of physical health, mental health, and community safety are associated with meeting Healthy Vermonters' (HV) 2020 goals.<sup>1,2,3</sup> Data was collected in 2017 and utilized for the present study, completed May 2020.

**Methods:** Predictor variables for logistic regression analysis were the 4,393 respondents' self-reported 1) physical health, 2) mental health, and 3) community safety for walking. Outcome variables were achievement of the HV 2020 goals for 1) aerobic and muscle-strengthening activity and 2) engagement in leisure-time physical activity (LTPA).

**Results:** The odds of meeting the HV 2020 guidelines for aerobic and muscle strengthening activity for those who ranked their community as "Extremely safe" for walking were higher than for those who ranked their community as "Not at all safe" (OR = 2.48;  $p = .012$ ). Similarly, the odds of engaging in LTPA were higher for those who ranked their community "Extremely safe" than for those who ranked their community "Not at all safe". (OR = 1.7;  $p = .046$ ).

**Conclusion:** Perception of neighborhood safety appears to be significantly related to meeting physical activity goals.

## Introduction

In 1979, the U.S. Department of Health and Human Services created the "Healthy People Initiative," which envisioned a healthier future by setting national health guidelines. These guidelines focus on the cause of preventable diseases, especially physical inactivity.<sup>4</sup> Since 2008, the following physical activity guidelines are suggested for all Americans: 150 minutes of moderate-intensity aerobic activity or 75 minutes of vigorous-intensity aerobic activity, or a combination of both, and two days of strength training for all major muscle groups.<sup>5</sup> Vermont has set statewide guidelines, implementing the "Healthy Vermonters' 2020 Initiative".

The perception of health is a subjective, self-measure of physical and mental health.<sup>6</sup> Previous literature demonstrates that higher levels of community safety are associated with higher perceptions of community cohesiveness and better health outcomes.<sup>7</sup> There is also an established relationship between community infrastructure that enhances residents' perception of their

safety and an increase in physical activity.<sup>8</sup> Physical activity levels are also influenced by perceived physical health and mental health.<sup>9</sup> Previous research has not queried Vermonters' perceptions of their health and community safety.

The purpose of the current study is to examine whether Vermonters' perceptions of physical health, mental health, and community safety are associated with meeting Healthy Vermonters' (HV) 2020 guidelines. We consider population demographic variables and social determinants of health that may influence individual perceptions, using the BRFSS data for the year 2017.<sup>10</sup>

## Methods

### Study Design

A cross-sectional study was conducted using 2017 Vermont Behavioral Risk Factor Surveillance Survey (BRFSS) data from adults age 18 and over. The BRFSS is a nationwide telephone survey that is conducted yearly by the CDC and state health departments on health-related risk behaviors, chronic health conditions, and use of preventive services.<sup>3</sup> The University of Vermont Institutional Review Board has reviewed this project and determined that it qualifies as exempt from additional review.

### Sample

Of the individuals selected to participate, 6,516 (39.9%) responded to the 2017 BRFSS. We excluded 2,123 cases that were missing one or more pieces of data from our predictor, outcome, or covariate variables. The remaining sample size was 4,393.

### Variables

BRFSS variables to describe the basic characteristics of our sample included age in years, sex (male or female), ethnicity (non-Hispanic white or person of color), highest level of education completed (less than grade 12, grade 12 or GED, college 1-3 years, or college 4 years or more), and annual income (income ranges < \$10,000, \$10,000 to <\$15,000, \$15,000 to <\$20,000, \$20,000 to <\$25,000, \$25,000 to < \$35,000, \$35,000 to <\$50,000, \$50,000 to <\$75,000, \$75,000 to <\$100,000, and \$100,000+). Predictor variables were respondents' self-reported 1) physical health, 2) mental health, and 3) community's safety for walking. Both physical and mental health were defined as 0, 1-13, or 14+ out of the previous 30 days when respondents' health

was not good. Respondents rated their community's safety for walking as extremely safe, quite safe, slightly safe, or not at all safe. These were examined for an association with respondents achieving the HV 2020 goals for 1) aerobic and muscle-strengthening activity and 2) leisure-time physical activity (LTPA). For the latter, an affirmative response signified engagement in LTPA in the previous month.

Body mass index (BMI), education level, smoking status (current smoker-smoke every day, current smoker-smoke some days, former smoker, never smoked), disability status (yes to any of: visual disability, difficulty walking, cognitive disability, difficulty doing errands alone, difficulty dressing alone, or hearing disability), and all demographic variables were analyzed as potential confounders. Education level was used as a proxy for socioeconomic status due to a large amount of missing household income data. A sensitivity analysis was performed to ensure education status was a suitable proxy.

### **Data Analysis**

A series of pairwise bivariate logistic regressions were completed to quantify relationships between all potential confounders and our three predictor variables with our two dichotomous outcome variables (defined and numbered above). Outcomes that were statistically significant or biologically important for health and physical activity were included in the final model. Alpha was 0.05 (two-tailed) for all analyses. Analyses were performed using IBM SPSS Statistics 25.

### **Results**

Our study population had a mean age of 56.7 years with a SD of 16.7 years. Our population was 47.2% male, predominantly non-Hispanic white (92.9%), relatively well educated with 45.5% having a four-year college degree or higher and an additional 24.4% having completed some college.

There was a statistically significant association (OR = 2.48; 95% CI = 1.22, 5.03) between meeting the Healthy Vermonters' 2020 guidelines for aerobic and muscle strengthening activity for those who ranked their community as "extremely safe" (reference group) for walking as compared to those who ranked their community as "not at all safe" for walking when accounting for

confounding variables: age, gender, body mass index, smoking status and disability status (Table 1).

Table 1:  
Associations between Self Reported Physical Health, Mental Health and Community Safety with Physical Activity

	Met PA Guideline OR (95% CI)	Engaged in LTPA OR (95% CI)
<u>Rating – Community Safety for Walking</u>		
Extremely Safe compared to:		
Quite safe	1.15 (0.99, 1.34)	0.99 (.84, 1.16)
Slightly Safe	1.12 (0.83, 1.52)	0.84 (.60, 1.17)
Not at all safe	2.48** (1.2, 5.0)	1.7* (1.0, 2.9)
<u>Rating – Physical Health Status</u>		
Zero days when health is not good compared to:		
1-13 days when health not good	1.07 (0.90, 1.28)	1.02 (0.85, 1.22)
14+ days when health not good	0.93 (0.74, 1.15)	0.92 (0.72, 1.17)
<u>Rating – Mental Health Status</u>		
Zero days when health is not good compared to:		
1-13 days when health not good	1.04 (0.87, 1.24)	0.89 (0.74, 1.08)
14+ days when health not good	1.00 (0.79, 1.27)	0.91 (0.71, 1.18)

\*p = 0.046

\*\*p = 0.012

Abbreviation Key:

CI = Confidence Interval; OR = Odds Ratio; PA = Physical Activity; LTPA = Leisure-Time Physical Activity.

Note: ORs estimated in logistic regression models controlled for age, gender, body mass index, smoking status, and disability status.  
Data source: Vermont Behavior Risk Factor Surveillance Survey – 2017

The association between those who ranked their community as “extremely safe” and those who ranked their community as “quite safe” or “slightly safe” was not significant.

There was also a statistically significant association (OR = 1.71; 95% CI = 1.0, 2.9) between participants engaging in leisure-time physical activity and their ranking of their community’s safety for walking as “extremely safe” compared with ‘not at all safe’ when accounting for the same confounding variables (Table 1). The association was not significant when comparing “extremely safe” with either “quite safe” or “slightly safe”.

No association was present between participants’ self-reported physical or mental health status and meeting the HV 2020 guidelines for aerobic and muscle strengthening activity or engaging in LTPA when accounting for the confounding effects of age, gender, BMI, smoking status, and disability status.

## Discussion

We found a significant positive association between the perception of community as safe or extremely safe for walking and meeting the HV 2020 physical activity guidelines. Our findings are consistent with previous research reported from the BRFSS in Austin, Texas, which reported that the most important factor to meeting recommendations for leisure-time physical activity was perceived neighborhood safety.<sup>11</sup>

Contrary to previous literature, our research revealed no association between physical and mental health status, and meeting the Healthy Vermonters' 2020 guidelines for aerobic, muscle strengthening, and leisure time activity. Previous studies approach the association from the perspective of physical activity preventing and treating symptoms of mental health problems, making a direct comparison to our findings difficult.<sup>12</sup>

In our sample of 2017 Vermont BRFSS respondents, 62% met the aerobic activity guideline, only 31% met the muscle strengthening guideline, and 23.5% met both the aerobic and muscle strengthening goals. This is in comparison to the 2014 national average of 54.2% of adults who achieved both goals.<sup>4</sup> We further found that 30% of 2017 respondents reported no LTPA.

Our study has a number of limitations. First, individuals self-rated their physical activity levels, which may be higher or lower than their actual physical activity levels. Second, a majority of respondents rated their neighborhoods as "quite safe" and "extremely safe", which may not present with any qualitative difference such as features that influences community safety for walking ratings, e.g., sidewalks, lighting, street connectivity.

## Conclusion

Our research found a significant positive association between the perception of community as safe for walking and meeting the Healthy Vermonters' 2020 recommended physical activity goals. It did not, however, reveal an association between physical and mental health and meeting the Healthy Vermonters' 2020 physical activity guidelines. We found that the percentage of respondents who met the muscle strengthening guidelines was lower than the percentage who met aerobic activity guidelines, indicating that more education is warranted regarding the value of strengthening exercise. Our research suggests that community stakeholders could clarify the

definitions of “not safe”, “slightly safe”, “quite safe”, and “extremely safe” to create more actionable data. Preventative programs aimed at improving community safety could address those individuals rating their community “not safe”.

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