State of Wyoming



Department of Health

Are Adults in Wyoming Doing All They Can to Stay Healthy?

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State of Wyoming Department of Health

Are Adults in Wyoming Doing All They Can to Stay Healthy?

is published by the
Public Health Division
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This publication was supported by Grant/Cooperative Agreement
Number U32/CCU822796-05 from the Centers for Disease Control and Prevention.
Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the Centers for Disease Control and Prevention

This document is available in alternative format upon request.

Acknowledgements

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Co-written under contract by:

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The assistance of the Wyoming residents who participated in the survey is gratefully acknowledged.

For more information about the Behavioral Risk Factor Surveillance System (BRFSS), visit the Wyoming BRFSS website at www.health.wyo.gov/PHSD/brfss/index.html or the CDC BRFSS website at www.cdc.gov/brfss.

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Executive Summary

The Behavioral Risk Factor Surveillance System (BRFSS) addresses a number of health behaviors every year, and selected ones, including fruit and vegetable consumption, in odd numbered years. While it is generally well accepted, based on many epidemiological studies, that exercise, eating right, and not smoking are good for health and preventing disease, there is little information on how many adults do these three things. Wyoming based its definition of a Healthy Lifestyle (HLS) on the World Health Organization's Global Strategy on Diet, Physical Activity and Health that addressed three things - eating a healthy diet, increasing physical activity and avoiding tobacco use. We used the standard BRFSS measures for not smoking, getting leisure time physical activity and eating fruits and vegetables five (5) or more times a day to define a HLS. BRFSS data for 2011 were used to study Wyoming adults who were living or not living a HLS.

Key Findings:

- Only 12.9% of all Wyoming adults lived a healthy lifestyle based on the definition above, and 7.6% of all adults reported none of the three behaviors used in the definition.
- Groups less likely to report a HLS included those without a high school diploma (4.7%), the out of work (5.8%), adults in fair or poor health (5.9%), and those unable to work (6.6%).
- Nearly half (46.8%) of all Wyoming adults reported engaging in leisure time exercise and not smoking, and only need to increase fruit and vegetable consumption to live a HLS.
- Adults living a HLS were compared with those not practicing those behaviors on 26 different
 indicators representing health related quality of life (HRQOL) measures, chronic conditions,
 other behavioral health risks, access to health care and other unrelated measures. For 24 of the
 26 measures, adults living a HLS reported significantly better results compared with those not
 living a HLS.
- Logistic regression of the results for 23 of the 24 measures noted in the bullet above, controlling for gender, education, and overweight status, found that 13 of the 23 were still associated with HLS. Thus it is unlikely that the better results for adults living a HLS were simply due to differences in these characteristics.
- State rates of living a HLS ranged from 4.3% in West Virginia to 19.3% in California, with Wyoming's rate of 12.9% just above the median for the 50 states and DC of 12.3%.
- Results suggest that there is room for tremendous improvement in living a HLS and that the easiest way to achieve this may be to promote fruit and vegetable consumption to all adults but especially the nearly half of all adults who are already exercising and not smoking.

I. Introduction

There are many studies showing that exercise, eating right, and not smoking are good for health and preventing diseases such as cancer and heart disease. In the U.S., it has been estimated that 70% of premature deaths are attributable to smoking, poor diet and physical inactivity. Annual health related costs in this country are estimated at \$193 billion for smoking, and it is estimated that \$87 billion per year could be saved through healthier diets and \$92 billion per year could be saved if all inactive U.S. adults became active. Assuming similar rates for Wyoming, these costs would be about \$625 per person for smoking, \$282 per person for diet, and \$298 per person for inactivity, or annual totals of \$352 million, \$159 million, and \$168 million for the state, respectively. In 2004 The World Health Organization (WHO) developed the WHO Global Strategy on Diet, Physical Activity and Health to address these three things - eating a healthy diet, increasing physical activity and avoiding tobacco use.

But how many Wyoming adults are living a healthy lifestyle (HLS) by eating sufficient fruits and vegetables, engaging in physical activity and not smoking? Are there groups that are at higher risk than others? What apparent effect does living - or not living - a HLS have on their health? And, lastly, what can be done to improve these figures and potentially save lives and money?

II. Methods

The Wyoming Behavioral Risk Factor Surveillance System (BRFSS) collects data from non-institutionalized adults age 18 and older through monthly random digit dial telephone surveys. BRFSS uses a complex sample design to randomly select respondents with either listed or unlisted land line phones and has recently added cell phones to its sampling frame. The first stage for land line phones is the random selection of a possible phone number to reach a household. Once a household is reached (and confirmed), one adult is randomly selected from among the eligible members of the household. In the case of cell phones, the household size is assumed to be one and no random selection is done. BRFSS also uses a two-stage plan to weight the data. Data are first weighted to account for the probability of selection, and then are further weighted to be representative of the total adult population of Wyoming. Starting in 2011, this second step adjusts for age, race, gender, marital status, education, and type of phone service in a "raking" process that continues until the best match with the adult population is obtained. Because of this change in weighting methodology and the addition of cell phone surveys, it is recommended that BRFSS results for 2011 should not be directly compared with those from earlier years.

This report is based on 5,418 land line and 1,452 cell phone interviews conducted during 2011, or a total of 6,870 surveys. Among the cell phone surveys were 36 that were conducted by other states of adults who indicated they lived in Wyoming. Data analysis was conducted using Stata software which accounts for the complex sample design of the BRFSS. Respondents with missing values were excluded from the analysis of that variable unless otherwise noted. A Healthy Lifestyle (HLS) was defined as not being a current smoker, reporting any leisure time physical activity in the past month, and eating fruits and vegetables five (5) or more times a day in response to a series of six questions about consumption of separate items.

When the results include the terms "more likely" or "higher than" in comparisons of percentages, it indicates a statistically significant association based on the Chi Square test, with P values <0.05. These tests rely heavily on the Confidence Interval (CI), or margin of error, which is the range of values within which the true population prevalence would fall in 95 out of 100 samples taken from the population. Point estimates and 95% confidence intervals are included in a Supplemental Table on page 18. When more than two groups are compared, and the P value is <0.05 indicating that the difference is unlikely to result from chance alone, the test does not indicate which of the groups are different. In that case, when two groups had 95% confidence intervals that overlapped, indicating that the "true" value could potentially be the same in both groups, the groups were conservatively assumed to have statistically similar rates, even when the P value was <0.05 indicating statistical significance.

As with all survey data, several limitations of these results should be taken into consideration. The data are self-reported and in many cases the validity of the measure on the BRFSS has not been measured. BRFSS data is subject to possible intentional (e.g. under-reporting of undesirable behavior) or unintentional misrepresentation. Persons without telephones and those who are unable to respond to the survey due to a physical or mental impairment are also excluded. Declining response rates for telephone surveys are another concern. Median BRFSS response rates nationally have declined from about 70% ten years ago to about 50% in recent years. The Wyoming response rate in 2011 was 56.1%. Potential error (or bias) results if the adults not surveyed differ appreciably from those that do participate. However, the BRFSS data have been shown to be comparable to other surveys with higher response rates. While many types of errors cannot easily be measured for a particular survey, the sampling error, which results because only a fraction of the target population answers the questions, can be estimated. The confidence interval estimates the sampling error and provides an indication of the precision of the survey results.

Inquiries: Further information on this analysis or about BRFSS can be obtained by contacting Joe Grandpre, BRFSS Coordinator, Wyoming Department of Health, Qwest Building Suite 510, 6101 Yellowstone Road, Cheyenne, WY 82002 (307-777-6012), Joe.grandpre@wyo.gov.

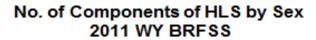
III. Results

A. Who is living a healthy lifestyle?

1. High risk groups

Among all Wyoming adults in 2011, only 12.9% were classed as living a HLS by not smoking, reporting any leisure time physical activity in the past month and eating fruits and vegetables five (5) or more times a day. This represents an estimated 377,000 Wyoming adults who are not living a healthy lifestyle. Included among those not living a HLS were 7.6% of Wyoming adults who practiced *none* of these healthy behaviors by reporting current smoking, no recent physical activity and eating fruits and vegetables fewer than five (5) times a day. The number of components of a HLS, ranging from zero to three with three representing a HLS, is shown in Figure 1, along with gender differences. Compared with men, women were significantly more likely to report a HLS (three components) and less likely to report one, but equally likely to report zero or two components. The mean number of components reported by Wyoming adults was 1.69. Adults with less education and income, those reporting fair or poor general health, being out of work or unable to work and the uninsured reported lower rates of living a HLS and higher rates of none of the components of a HLS (Figures 2 & 3). While there were no regional differences for a HLS, the Northwest region had significantly fewer adults with zero components of a HLS compared with adults in the Southwest, Northeast or Central regions. Additional results are shown in a Supplemental table in the Appendix on page 18.

Figure 1.

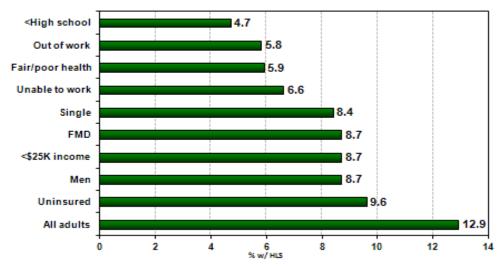




Components: Eating fruits & vegetables 5 or more times/day, reporting leisure time physical activity in past month and not smoking, therefore adults with zero components are smokers who don't exercise and who eat fruits and vegetables <5X/day

Figure 2.

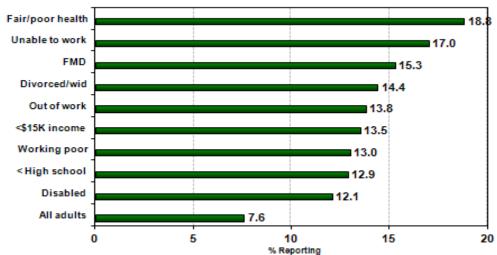
High Risk Groups for Healthy Lifestyle (HLS) 2011 WY BRFSS



FMD: Frequent mental distress defined as 14+ days of poor mental health in past 30 days.

Figure 3.

High Risk Groups for Zero Components of HLS 2011 WY BRFSS



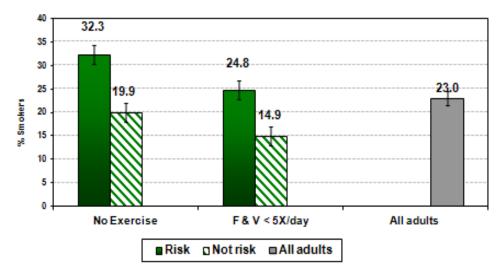
Components: Eating fruits & vegetables 5 or more times/day, reporting leisure time physical activity in past month and not smoking, therefore adults with zero components are smokers who don't exercise and who eat fruits and vegetables <5X/day. FMD: Frequent mental distress.

2. What separate measures tell us

Because the BRFSS usually reports measures in terms of the "risk," the components of a HLS will be discussed in terms of the three risk factors of smoking, no leisure time exercise, and eating fruits and vegetables fewer than five (5) times per day. The prevalence rates for those were 23.0% for smoking, 25.5% for not reporting leisure time physical activity in the past month, and 82.7% for eating fruits and vegetables fewer than five times per day. The latter behavior is the one that affects the largest number of people not living a HLS. Because rates of smoking and lack of leisure time exercise were similar for Wyoming men and women, it is likely that the gender differences in the number of HLS components seen in Figure 3 above are due to differences in fruit and vegetable consumption where women were more likely than men to report eating fruits and vegetable five or more times a day. The separate risk factors are closely associated as shown in Figures 4-6. In all cases respondents who reported a risk factor were significantly more likely than those that did not to report the other two risk factors.

Figure 4.

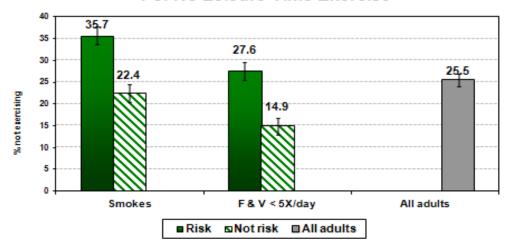
Components of HLS Compared, 2011 WY BRFSS For Current Smoking



HLS: Healthy lifestyle, defined as eating fruits & vegetables 5 or more times/day, reporting leisure time physical activity in past month and not smoking. Error bars are approximate: all P values < 0.05

Figure 5.

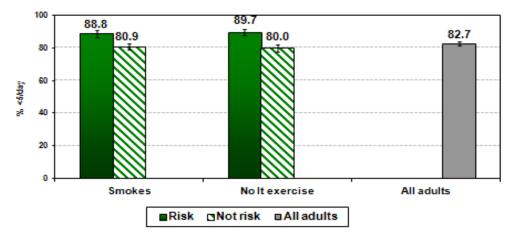
Components of HLS Compared, 2011 WY BRFSS For No Leisure Time Exercise



HLS: Healthy lifestyle, defined as eating fruits & vegetables 5 or more times/day, reporting leisure time physical activity in past month and not smoking. Error bars are approximate; all P values <0.05

Figure 6.

Components of HLS Compared, 2011 WY BRFSS Fruits & Vegetables Fewer Than 5X/day

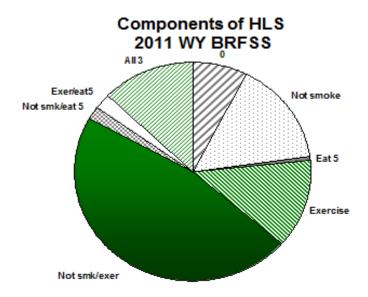


HLS: Healthy lifestyle, defined as eating fruits & vegetables 5 or more times/day, reporting leisure time physical activity in past month and not smoking. Error bars are approximate; all P values < 0.05

3. Combinations of components

Knowing which health risks or components tend to be associated may be helpful in designing interventions to improve rates of living a HLS. The largest group of Wyoming adults (46.8%), were those who do not smoke and report leisure time physical activity (Figure 7). From this same pie chart it is quite clear that most adults who eat fruits and vegetables five (5) or more times a day fall in the HLS group reporting all three components, which is 12.9% of the pie. The other pie slices that include adults who eat fruits and vegetables five (5) times a day represent 0.6% (for just that measure), and 2.0% each for eating fruits and vegetables and not smoking and eating fruits and vegetables and exercising, for a total of just 4.6%.

Figure 7.



Components: Eating fruits & vegetables 5 or more times/day, reporting leisure time physical activity in past month and not smoking, therefore adults with zero components are smokers who don't exercise and who eat fruits and vegetables <5X/day and all 3 represent a HLS.

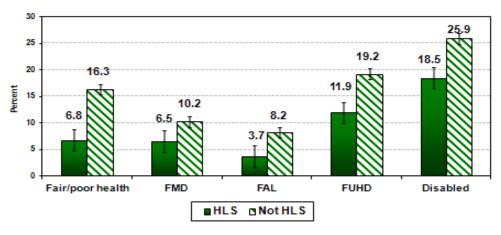
B. Comparison of adults living and not living a HLS

1. Health Related Quality of Life (HRQOL)

The two groups of respondents - those reporting living a HLS and those not - were compared on a number of categories of measures, the first being health related quality of life (HRQOL). Compared with respondents not living a HLS, those living a HLS were less likely to report fair or poor health (6.8% vs. 16.3% respectively), frequent mental distress or FMD, defined as 14 or more days in the past 30 when mental health was not good (6.5% vs. 10.2%), frequent physical distress (6.7% vs. 12.1%), frequent activity limitation (3.7% vs. 8.2%), frequent unhealthy days (total of poor physical and poor mental health days) (11.9%, vs. 19.2%), and being disabled (18.5% vs. 25.9%)(Figure 8). Because HLS and many of the measures being examined were associated with education, gender, and overweight status, some simple logistic regression was done to see if these associations would remain significant when controlled for these three variables. Age was not included because HLS was not found to be associated with age group. In the case of the HRQOL measures, only the association between frequent mental distress and HLS was no longer significant when controlled for gender, education and overweight status. Of course, persons whose quality of life is so poor that are not able to exercise at all will be unable to meet the criteria for a HLS but 62% of disabled persons and 51% of those reporting fair or poor health did report engaging in leisure time exercise.

Figure 8.

Adults Living and Not Living a HLS, 2011 WY BRFSS HRQOL Measures



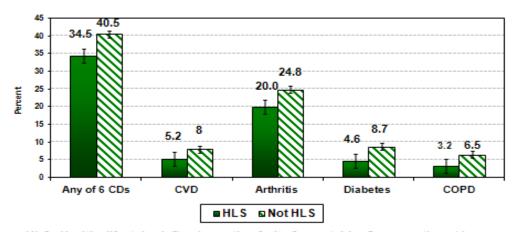
HLS: Healthy lifestyle, defined as eating fruits & vegetables 5 or more times/day, reporting leisure time physical activity in past month and not smoking. HRQOL: Health related quality of life measures

2. Chronic conditions (CDs)

Six chronic diseases are being monitored as a group as part of Healthy People 2020: cardiovascular disease (CVD), arthritis, diabetes, asthma, cancer other than skin, and Chronic Obstructive Pulmonary Disease or COPD. Baseline data indicate that nearly one in every two adults ages 18 and over have one of these six chronic conditions. Comparing respondents living a HLS with those that were not living a HLS found that the former were significantly less likely to report diabetes, COPD, CVD, and arthritis, and any of the six conditions (Figure 9), but were equally likely to report cancer and asthma (not shown). Once logistic regression was run to control for sex, education and weight status, only diabetes, COPD, and any of the six conditions were still associated with a HLS.

Figure 9.

Adults Living and Not Living a HLS, 2011 WY BRFSS Chronic Conditions (CDs)



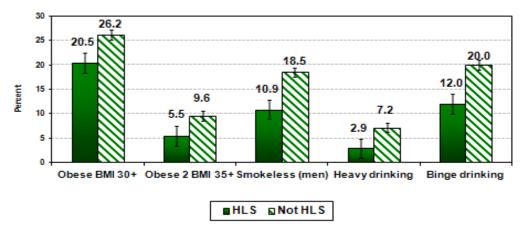
HLS: Healthy lifestyle, defined as eating fruits & vegetables 5 or more times/day, reporting leisure time physical activity in past month and not smoking. Error bars are approximate; All P values <0.05. CDs are CVD, arthritis, diabetes, COPD, cancer other than skin, and asthma.

3. Other behavioral health risks

Wyoming adults who were living a healthy lifestyle were also less likely than those not living a HLS to report obesity (BMI ≥30), or obese class 2 and above (BMI ≥35), heavy drinking, binge drinking, and smokeless tobacco use among men (Figure 10). After controlling for sex, education and weight status using logistic regression, the variables of obese class 2 and above, heavy drinking, and binge drinking were still significant and negatively associated with HLS, while obesity (BMI≥30) and smokeless tobacco use among men were not.

Figure 10.

Adults Living and Not Living a HLS, 2011 WY BRFSS Other Risk Factors



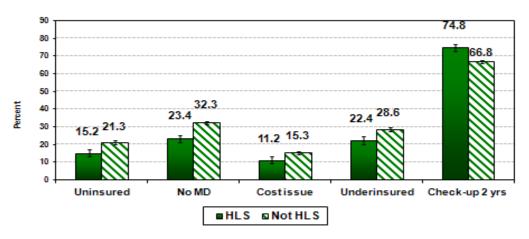
HLS: Healthy lifestyle, defined as eating fruits & vegetables 5 or more times/day, reporting leisure time physical activity in past month and not smoking. Error bars are approximate; all P values <0.05.

4. Access to health care

Better access to health care through having a personal doctor and regular routine check-ups could logically be associated with living a healthy lifestyle, and indeed the crude results shown in Figure 11 support this hypothesis. But once the results were controlled for gender, education and overweight status, only reporting a cost issue (needing to see doctor in the past year but could not due to cost) was still significantly associated with living a HLS. This is likely due to the highly significant association between all access to care measures and education level, with many measures also associated with gender.

Figure 11.

Adults Living and Not Living a HLS, 2011 WY BRFSS Access to Health Care



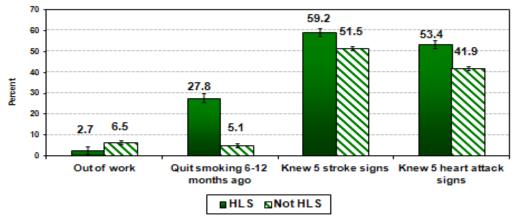
HLS: Healthy lifestyle, defined as eating fruits & vegetables 5 or more times/day, reporting leisure time physical activity in past month and not smoking. Error bars are approximate; all P values <0.05.

5. Other factors (signs and symptoms of heart attack and stroke, quit smoking)

Living a HLS was also significantly associated with several other measures as shown in Figure 12. Adults living a HLS were significantly less likely to be out of work compared with those not living a HLS, and were also more likely to know both the five signs and symptoms of a heart attack and those of stroke. Logistic regression confirmed the association of HLS with knowing the heart attack signs and being out of work, but not with knowing the signs of stroke. The quit smoking measure is of special interest because only persons who smoked at the beginning of the year were included in the measure, thus excluding adults living a HLS. Looking at the pie chart in Figure 7, this would include those adults reporting zero components, just eating fruits and vegetables, just exercising, or those doing both. These four groups total 23.1% of all adults, which represents the denominator for the quit smoking measure, and only the 2% who exercise and eat fruits and vegetables can join the group living a HLS by quitting smoking. Thus Figure 12 shows the difference between smokers who already exercise and eat fruits and vegetables (the 5.1% who are still among those not living a HLS even though they quit smoking). Logistic regression was not run on this measure.

Figure 12.

Adults Living and Not Living a HLS, 2011 WY BRFSS Other Measures



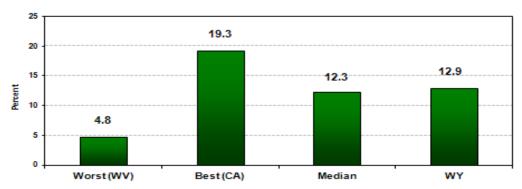
HLS: Healthy lifestyle, defined as eating fruits & vegetables 5 or more times/day, reporting leisure time physical activity in past month and not smoking. Error bars are approximate; all P values <0.05. Denominator for successful quitters is persons who smoked at beginning of year.

6. State Comparisons

Among the 50 states and the District of Columbia there was wide variation in the percentage of all adults living a HLS, ranging from 4.8% in West Virginia to 19.3% in California (Figure 13). The median value for these 51 "states" was 12.3% so the Wyoming figure of 12.9% was above the median. Ranges of values for the components (reported as those at risk) are shown in Figures 14-16). Wyoming values were near the median in all cases.

Figure 13.





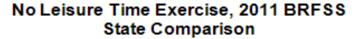
HLS: Healthy lifestyle, defined as eating fruits & vegetables 5 or more times/day, reporting leisure time physical activity in past month and not smoking.

Figure 14.

Smoking, 2011 BRFSS State Comparison



Figure 15.



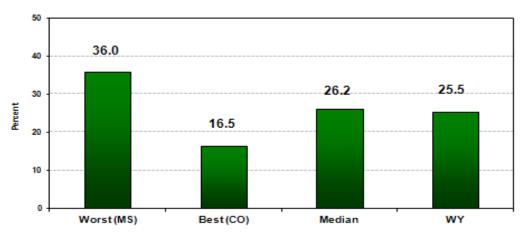
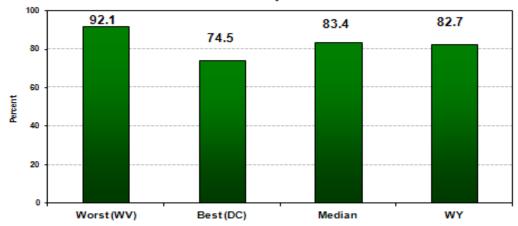


Figure 16.

Eat Fruits & Vegetables Fewer Than 5X/day, 2011 BRFSS State Comparison



The three separate components of HLS show variation, but none as wide-ranging as for HLS, even if the measures are reversed. For example, considering eating fruits and vegetables five (5) or more times a day would make the range of values 7.9%-25.5%, or just over a three-fold difference, while the range in values for HLS represents a four-fold difference (19.3%/4.8%).

IV. Discussion

To summarize the results for Wyoming adults, only 12.9% reported behaviors in 2011 that would indicate they were living a healthy lifestyle. Groups reporting the worst rates included those with less education, those out of work or unable to work, and those reporting fair or poor general health. Adults living and not living a HLS were compared on a total of 26 measures, including five HRQOL measures, seven chronic conditions, five access to care measures, five additional risk factors not directly related to the ones used to define a HLS, and four indicators in other areas. Analyses indicated that for 24 of the 26 measures, representing all five general areas, results for those living a HLS were significantly better than for those not living a HLS. When 23 of these 24 associations were controlled for education, gender and overweight status (in three categories) in logistic regression analysis, 13 of the 23 measures were still found to be positively associated with HLS, again representing all five areas of study. Due to the limited focus of this report, more extensive logistic regression controlling for additional factors was not done. It is possible that including additional variables in the analysis would produce different results.

One of the striking findings in this study was the wide variation for a HLS across the states, ranging from only 4.8% in West Virginia to a high of 19.3% in California. A total of 14 states had reported rates of HLS below 10% and only ten states had rates above 15%. Results - at least for Wyoming - were not associated with age or race/ethnicity, suggesting that the wide range of state values for HLS is not due to population differences in those demographic areas, although state-to-state educational differences could play a large role.

Several factors should be kept in mind when considering ways to promote a healthy lifestyle. Success in raising HLS rates will depend on how many and which behaviors need to be changed, but that should not be considered the only measure of success. Improving any of the behaviors considered in the definition of a HLS is a positive result which will increase the mean number of components reported and shift adults along the 0-3 spectrum. But the most effective way to increase the percentage of adults living a HLS is probably motivating behavior change among the half (50.8%) of all adults who already report two of the three components. Further examination of this group finds that virtually all of them (46.8% of all adults) engage in leisure time exercise and do not smoke. Thus if this group can be encouraged to eat fruits and vegetables five (5) or more times a day, the percentage of adults living a HLS has the potential to improve greatly. This of course is consistent with results from the separate measures, indicating that eating fruits and vegetables fewer than five times a day has by far the highest prevalence rate. Both of these results suggest that this behavior is the one to promote with the most energy and resources, providing the interventions can be shown to be effective.

Many interventions have been conducted around the world to increase consumption of fruits and vegetables, ^{9,10} with varying degrees of success. Invention sites have included supermarkets, African-American churches, worksites, and the general population. In a 2005 review of studies, ⁹ most reported positive changes, with the greatest affects found among persons who were at higher risk for disease. Computer based information that could be individually tailored to the individual seemed to be a cost effective alternative to face to face contact. Another review ¹⁰ conducted about the same time which may include some of the same studies, included a wide variety of interventions promoting diets high in

fruits and vegetables, with at least a three-month follow-up where outcome data on change in fruit and vegetable intake could be obtained. Study populations for adults included general populations, churches, worksites, supermarkets, low income populations, and health care settings, for a total of 32 studies. Worksites appeared to have the best rates of statistically significant positive results, using a variety of interventions, but studies involving other sites also showed improvement. Looking at results by intervention type: A) individualized paper or computer based information; B) telephone contact plus supportive paper-based information; C) face to face counseling/intervention, and D) multicomponent interventions found positive net effects in all types, with only one of four in type A and one of five type D showing no improvement. All nine type C type interventions showed significant increases in fruit and vegetable intake while none of the 32 studies found a reduction in fruit and vegetable consumption. A more recent study conducted in eight black churches North Carolina and Michigan in 2008-2010¹¹ found slight increases in fruit and vegetable consumption. Barriers to the effectiveness of these interventions, such as cost and quality consistency, must always be kept in mind. The results in this report suggest that successful interventions to improve fruit and vegetable consumption that increase the percentage of adult living a HLS might have added benefits if a HLS is associated with reduced health risks and better health related quality of life.

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¹¹ http://www.cdc.gov/pcd/issues/2013/12 0161.htm accessed July 18, 2013

Appendix: Table: Healthy lifestyle by demographics, 2011 Wyoming BRFSS

Population Group	Percent	95% CI	Number	Sample Size
Total	12.9	11.8 - 14.1	959	6,501
Gender				
Males	8.7	7.4 - 10.2	254	2,684
Females	17.2	15.4 - 19.1	705	3,817
P value	<0.0001			
Age (years)				
18-24	10.1	6.6 - 15.0	26	296
25-34	14.9	12.3 - 18.0	116	708
35-44	12.1	9.6 - 15.3	108	804
45-54	13.3	10.7 - 16.4	163	1,160
55-64	14.1	11.6 - 17.0	262	1,560
65+	12.3	10.4 - 14.5	279	1,924
P value	0.321			
Education				
<high school<="" td=""><td>4.7</td><td>2.6 - 8.3</td><td>23</td><td>378</td></high>	4.7	2.6 - 8.3	23	378
High school	9.0	7.2 - 11.1	177	2,007
Some college	14.4	12.4 - 16.6	314	2,085
College grad	19.7	17.3 - 22.3	445	2,009
P value	<0.0001			
Income				
<\$25K	8.7	6.9 - 11.0	145	1,444
\$25K-\$49,999	12.4	10.0 - 15.3	201	1,534
\$50K-\$74,999	13.8	11.3 - 16.9	168	1,088
\$75K+	18.2	15.7 - 21.0	339	1,700
P value	< 0.0001			
Employment				
Employed/SE	13.2	11.7 - 14.8	543	3,675
Out of work	5.8	3.3 - 9.8	21	270
Homemaker	19.3	14.9 - 24.5	102	490
Student	13.0	7.2 - 22.6	14	124
Retired	13.5	11.4 - 15.9	262	1,643
Unable to work	6.6	2.9 - 14.3	15	277
P value	0.004			
Weight				
Not overweight	16.0	13.9 - 18.4	418	2,372
Overweight only	11.4	9.7 - 13.4	310	2,274
Obese	10.4	8.6 - 12.6	190	1,587
P value	0.0002			