# Obesity and Overall Health Status of Residents in the States with Appalachian Counties

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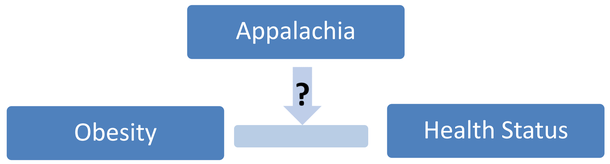
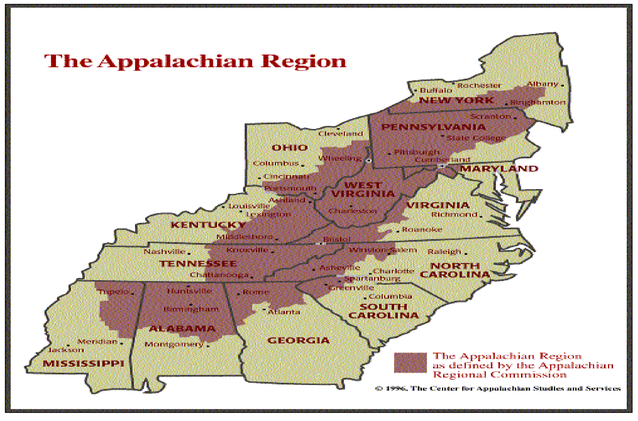
**Objective:** To investigate differences in the relationship of obesity and overall health status between Appalachian and non-Appalachian residents of the states within the Appalachian region using the 2007 Behavioral Risk Factor Surveillance System (BRFSS) data.

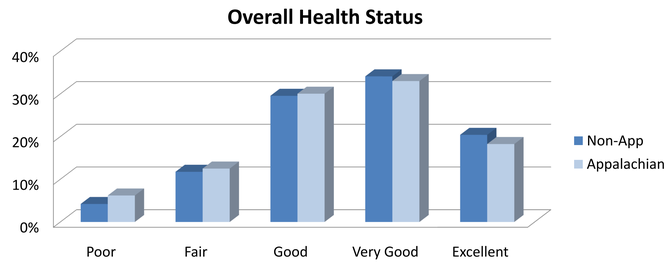


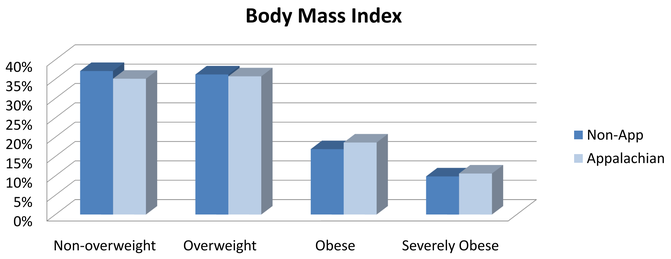

**Setting:** Appalachia represents an area of the eastern United States (U.S.) consisting of 410 counties within all of West Virginia and parts of 12 other states. It is typified by higher levels of the characteristics commonly linked to obesity, such as low socio-economic status, poverty, poor health and shorter overall life expectancy.

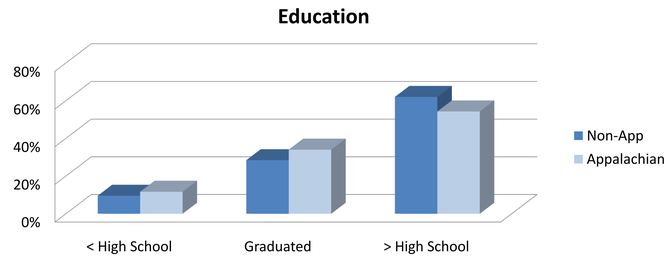



**Methods:** A cross-sectional multi-stage probability sample study of 110,345 residents of states with Appalachian counties who responded to the 2007 BRFSS survey. Self-reported data on Health-Related Quality of Life was used to investigate the effects of Appalachian residence and obesity on the overall self-rated health status of the survey respondents. A five-level ordinal variable measuring the overall health status of the survey respondents was analyzed using the ordered logistic regression without the loss of information that would have occurred with dichotomization required for logistic regression. Features of the BRFSS sampling design allowed for weighting of the data.

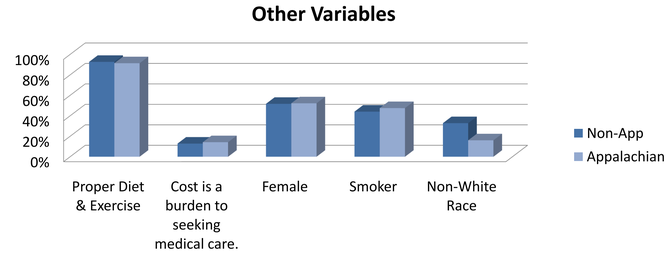
**Descriptive Statistics:** The charts below display descriptive statistics for Appalachian and non-Appalachia residents.








Statistically significant differences in age AND respondents' residence and body mass index categories were found using a one-way ANOVA test ($p<0.05$). A chi-square test of independence revealed statistically significant differences for all variables except gender between Appalachian and non-Appalachian residents ($p<0.05$), and BMI was found to be associated with all variables except race ($p<0.05$) .
Additionally, we analyzed "income", "education", and "cost" variables for possible multicollinearity and did not find it to be a problem.

**Results:** The table below indicates that being overweight significantly increased the odds of experiencing poor health, regardless of residence and other variables included in the model. Although statistically significant differences existed between Appalachian and non-Appalachian residents for all of the covariates except gender and statistically significant differences based on body mass index category for all of the covariates except race, Appalachian residence (an "Appalachia effect") was not statistically significant when education and income levels were considered as indicated in Model 4 below.

| Ordered Logistic Regression Models with State Fixed Effects | | Health Status Odds Ratios♦ for Model 1 (N = 84,288) | Model 2 (N = 84,191) | Model 3 (N = 73,387) | Model 4 (N = 73,345) |
|---|---|---|---|---|---|
| BMI | Non-overweight | Reference | Reference | Reference | Reference |
| | Overweight | 0.77* | 0.76* | 0.73* | 0.73* |
| | Obese | 0.48* | 0.48* | 0.45* | 0.46* |
| | Severely Obese | 0.27* | 0.27* | 0.26* | 0.27* |
| Appalachia | No | Reference | Reference | Reference | Reference |
| | Yes | 0.89* | 0.93* | 0.97 | .98 |
| Education | < High School | | Reference | | Reference |
| | = High School | | 1.94* | | 1.60* |
| | > High School | | 3.15* | | 2.09* |
| Income | ≤ $24, 999 | | | Reference | Reference |
| | $25,000 - $49,999 | | | 2.09* | 1.87* |
| | ≥ $50,000 | | | 3.40* | 2.80* |

♦ Adjusted for by age, race, gender, nutrition & exercise, smoking & cost burden of seeking medical care.
• N varies due to case-wise deletion of missing values in Intercooled Stata 9.0 for Windows.
*$p < 0.05$ – level of statistical significance.

**Conclusion:** Consistently identified as less healthy than the general population, residents of Appalachia are one of the vulnerable populations in the U.S. This study explored whether Appalachian residence might exacerbate the well-established relationship between obesity and overall health. The impact of obesity was confirmed. However, Appalachian residence did not worsen the effects of obesity on general health. Any contextual effects of living in Appalachia were outweighed by the compositional effects associated with the individuals living there. To eliminate health disparities – one of the top priorities of Healthy People 2010 – this study suggests that public health officials would benefit from continued focus on policies that reduce compositional disparities by increasing educational levels and reducing poverty levels (i.e., "shift the curve" as opposed to the "bad apples" approach).