



Brief communication

A comparison of self-reported seat belt usage among the Appalachian and non-Appalachian United States



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ABSTRACT

Purpose: Seat belts are known to effectively prevent death and serious injury among motorists involved in vehicular collisions. Limited research exists regarding seat belt usage in Appalachia. This study compares self-reported seat belt use in the Appalachian and non-Appalachian counties of the United States.

Methods: Data from 2012 Behavioral Risk Factor Surveillance System were used to calculate nationally representative estimates of consistent seat belt usage in each region. These estimates were stratified by age, sex, and rurality. Total and potential lives saved by seat belts were calculated for each region using 2012 Fatality Analysis Reporting System data.

Results: Of the 345,513 respondents (unweighted), Appalachians were 6% less likely than non-Appalachians to always wear a seat belt (relative risk = 0.94, 95% confidence interval, 0.93–0.95). Seat belt usage was consistently lower among Appalachians regardless of sex, age, or rurality. Only 68.1% of rural, Appalachian youth reported always wearing a seat belt. Seat belt usage was highest among non-Appalachian females residing in urban areas (92.5%). With 100% belt compliance, an additional 360 and 1712 potential lives could have been saved in Appalachia and non-Appalachia, respectively.

Conclusions: Regional differences possibly influence seat belt usage. Therefore, public health interventions to increase seat belt usage in Appalachia are likely warranted.

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Introduction

It is well-established in the literature that seat belts effectively prevent death and disability among motorists involved in traffic collisions. It is estimated that seat belts reduce the risk of fatal injuries sustained from motor vehicle collisions by approximately 45% and serious injuries by approximately 50% [1]. From 1975 to 2008, it is projected that seat belts saved approximately 255,000 lives in the United States [2]. As of August 2015, 49 states and the District of Columbia have enacted mandatory seat belt use laws; New Hampshire is currently the only state without such legislation [3].

Despite the afforded protection and the existing legislation, many vehicle occupants still choose not to wear their seat belts. According to the 2012 National Occupant Protection Use Survey,

86% of vehicle occupants were observed wearing a seat belt at randomly sampled intersections throughout the US [4]. Previous research has shown that seat belt use rates can vary. For example, a study conducted in 2004 showed higher seat belt use rates among females compared to males [5] and that teenagers and young adults were less likely to wear seat belts relative to older individuals [6]. Another study found that African Americans were less likely to use seat belts compared to Caucasians [5]. There is also evidence that those residing in rural areas wear seat belts less than those living in suburban and/or urban areas [7]. Seat belt use rates are also higher in states with primary enforcement as opposed to secondary enforcement [8]. Molnar et al. found that religiosity, political leaning, and race were also important in explaining the regional differences in seat belt use [9].

The Appalachian region, home to more than 25 million people, encompasses all of West Virginia and parts of 12 other states and stretches from the southern tier of New York to northern Alabama, Mississippi, and Georgia [10]. Because of its mountainous terrain and geographic isolation, the region possesses a unique culture

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compared to the rest of the US [11–13]. Although endowed with lavish natural resources, the region struggles with poverty, economic, and health related problems [10]. Previous studies have suggested that disparities in traffic safety may be extant in this region [14]. A report produced by the West Virginia Department of Health and Human Resources in 1995 indicated that seat belt use was lower in Appalachian states compared to non-Appalachia [15]. Therefore, the purpose of this study was to compare whether seat belt use does vary in the Appalachian region compared to the non-Appalachian US and to quantify the impact of seat belt use on potential lives saved in each region.

Materials and methods

The primary data source for this analysis was the 2012 Behavioral Risk Factor Surveillance System (BRFSS) survey. BRFSS is a state-based, telephone survey intended to measure behavioral risk factors among adults ≥ 18 years of age living in US households [16]. The methodology of the BRFSS has been described in detail elsewhere [16]. To assess seat belt use, BRFSS respondents were asked, "How often do you use seat belts when you drive or ride in a car?" Responses included always, nearly always, sometimes, seldom, never, or never ride or drive in a car. For this analysis, the outcome of interest was consistent seat belt usage (i.e., those that reported always wearing a seat belt). The exposure of interest was Appalachian residence. Appalachian residence was classified using the Federal

Information Processing Standard County Code according to the Appalachian Regional Commission's classification [10]. Those with missing county of residence information and respondents from US protectorates were excluded ($n = 61,139$). Within each region (i.e., Appalachia or non-Appalachia), weighted frequencies and proportions of consistent seat belt use were calculated. Relative risks and 95% confidence intervals were estimated; non-Appalachian residence served as the referent group. Estimates were stratified by the respondents' age group (18–24, 25–34, 35–44, 45–54, 55–64, and ≥ 65), sex, and rurality. Rurality was dichotomized as urban or rural which was based on whether the respondent lived in a metropolitan statistical area as noted in BRFSS.

To translate the regional self-reported seat belt use rates into potential lives saved, the number of actual fatalities experienced by belted and unbelted occupants of passenger vehicles ≥ 18 years of age by region was obtained from the Fatality Analysis Reporting System (FARS) for 2012. FARS is database maintained by the National Highway Traffic Safety Administration of all fatal crashes in the US where at least one person involved in the collision dies within 30 days of the incident; the methodology of FARS has been described in detail elsewhere [17]. The calculations for total lives saved [total lives saved = fatalities_(belted) \times (effectiveness/(1–effectiveness))] and potential lives saved [potential lives saved = (fatalities_(total) + lives saved) \times effectiveness] were based on equations and methodology used by National Highway Traffic Safety Administration [18]. The effectiveness of seat belts has been

Table 1
Comparison of 2012 Behavioral Risk Factor Surveillance System participants living in Appalachia versus non-Appalachia who reported always wearing a seat belt*

	Appalachia ($n = 43,068$)		Non-Appalachian US ($n = 371,480$)		Relative risk (95% CI)
	N	%	N	%	
Total	35,322	81.6	310,191	86.9	0.94 (0.93–0.95)
Urban	17,212	85.2	186,461	89.8	0.95 (0.94–0.96)
Rural	12,639	79.7	65,583	84.2	0.95 (0.93–0.96)
Sex					
Male					
Total	12,538	76.0	116,987	83.2	0.91 (0.90–0.93)
Urban	5890	80.3	66,677	86.5	0.93 (0.91–0.95)
Rural	4182	72.7	22,498	78.4	0.93 (0.90–0.96)
Female					
Total	22,784	86.8	193,204	90.3	0.96 (0.95–0.97)
Urban	11,322	89.1	119,784	92.5	0.96 (0.95–0.97)
Rural	8457	85.6	43,085	89.0	0.96 (0.95–0.98)
Age (years)					
18–24					
Total	1299	72.2	13,376	78.7	0.92 (0.88–0.96)
Urban	266	73.5	3709	81.9	0.90 (0.82–0.98)
Rural	257	68.1	1138	77.1	0.88 (0.78–1.00)
25–34					
Total	2727	78.0	28,099	83.4	0.94 (0.91–0.96)
Urban	822	81.8	10,687	86.2	0.95 (0.91–0.99)
Rural	730	71.5	3125	77.8	0.92 (0.85–0.99)
35–44					
Total	4065	80.7	39,231	87.1	0.93 (0.91–0.95)
Urban	1712	83.7	22,457	89.9	0.93 (0.90–0.96)
Rural	1256	79.2	5876	83.6	0.95 (0.90–0.99)
45–54					
Total	6126	81.8	55,242	88.7	0.92 (0.91–0.94)
Urban	2852	84.2	33,692	90.5	0.93 (0.91–0.95)
Rural	2190	79.6	10,452	83.5	0.95 (0.92–0.99)
55–64					
Total	8267	85.2	68,994	89.8	0.95 (0.94–0.96)
Urban	4294	88.1	44,037	91.4	0.96 (0.95–0.98)
Rural	3124	81.2	16,411	85.8	0.95 (0.92–0.97)
>65					
Total	12,576	86.8	102,606	90.6	0.96 (0.95–0.97)
Urban	7112	88.1	69,969	91.7	0.96 (0.95–0.97)
Rural	4990	85.1	28,131	87.3	0.97 (0.96–0.99)

* Presents number and weighted percentage of participants who reported that they always wore a seat belt. Non-Appalachian United States served as the denominator in relative risk calculations.

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