

WASHINGTON STATE HEALTH SERVICES  
RESEARCH PROJECT

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Firearm Deaths In  
Washington State<sup>i</sup>

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Mass murders – senseless semi-automatic assault-style rifle attacks in movie theaters, shopping malls and even elementary schools – have, sadly, become staples on the evening news. Seemingly before one town’s mourning can come to a close, another town’s begins anew. And yet the dark shadows cast by these horrific events may cloak other equally senseless – and much more prevalent – firearm-related deaths.

In this research brief, we examine firearm deaths by magnitude and intent, gender and age, race and ethnicity, and by regional and small areas. We also identify potential risk factors, compare Washington’s rates with those in British Columbia and our nation, and assess the trend in hand gun purchases within our state.

Broadly we find that contrary to the general public’s perception, firearm deaths are more of a rural than urban blight, and the victims are, in fact, overwhelmingly themselves the perpetrators. We also find that while males are more likely to be killed by a firearm than are females, it is the elderly males (those ages 65 and older) who have the highest rates of all.

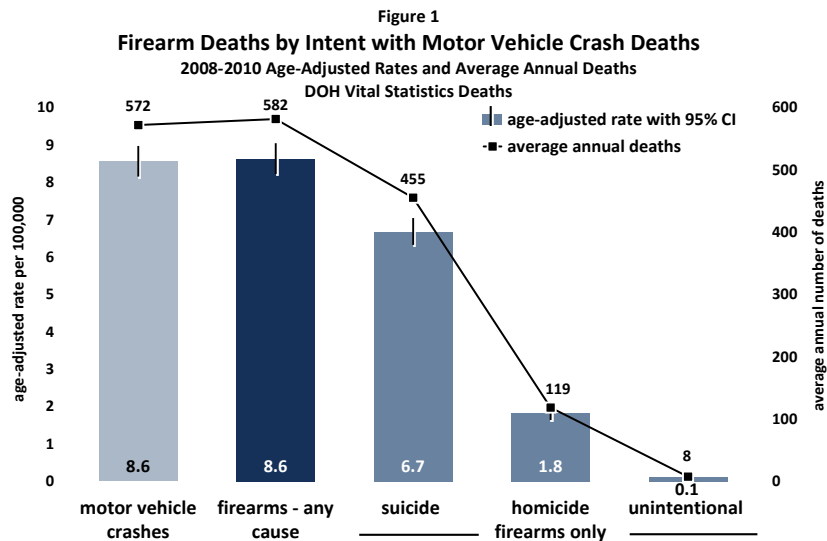
**Magnitude and Intent**

As seen in Figure 1, for 2008-2010 combined, the average annual number (582) and age-adjusted rate (8.6 per 100,000) of all firearm deaths in Washington essentially equals that for motor vehicle crashes (572, 8.6). In fact, in 2009 our state’s firearm deaths exceeded motor vehicle crash deaths for the first time since 1934 (the earliest year’s available data).

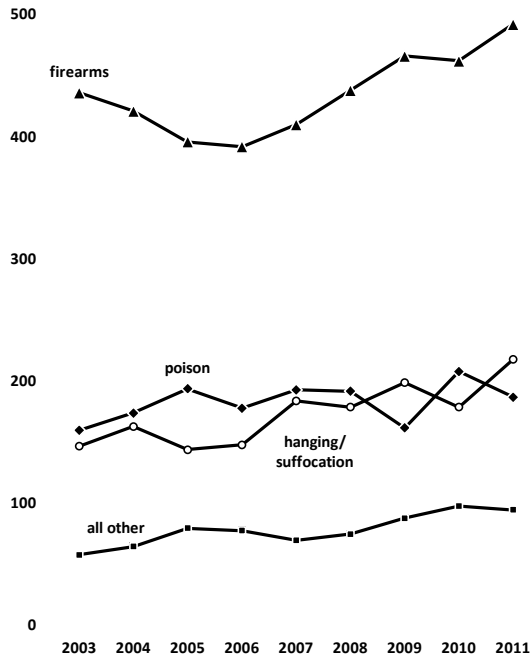
Of the total firearm deaths in 2008-2010, about four out of five (78%) were purposely self-inflicted; in fact, our state’s age-adjusted firearm suicide rate is about four times greater than its firearm homicide rate and over *sixty* times greater than its unintentional firearm-injury death rate.

**KEY FINDINGS**

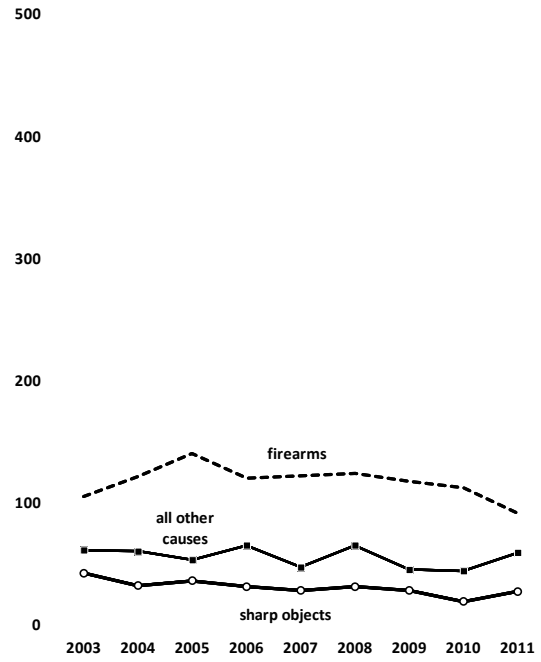
- Firearm deaths currently exceed motor vehicle crash deaths.
- Suicides account for nearly 80% of all firearm deaths.
- Males are at greatest risk for firearm deaths: Older males have the highest suicide rate; younger males, the highest homicide rate.
- Eastern Washington has higher firearm homicide and suicide rates than Western Washington.
- High firearm suicide-rate regions and clusters have corresponding measures of high unemployment, low life satisfaction, little emotional support, poor quality of life, and high firearm availability.
- High firearm homicide-rate regions and clusters have corresponding measures of low income and low educational attainment.
- Washington’s firearm suicide rate is higher than the U.S. rate; Washington’s firearm homicide rate is lower.
- Washington’s firearm sales have been markedly increasing.



**Figure 2a**  
**Suicide Deaths by Mechanism**  
 2003-2011 Annual Number of Deaths  
 DOH Vital Statistics Deaths



**Figure 2b**  
**Homicide Deaths by Mechanism**  
 2003-2011 Annual Number of Deaths  
 DOH Vital Statistics Deaths



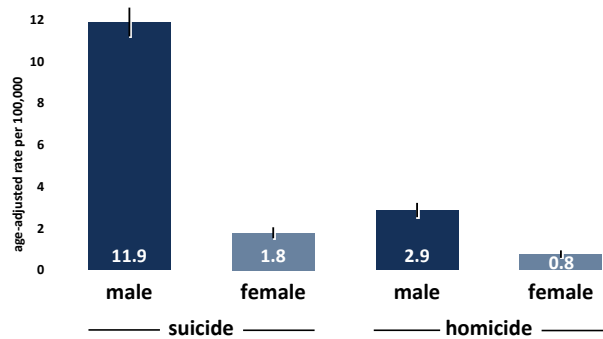
Within suicides and homicides, firearms are the leading mechanism of death. And, as seen in Figures 2a and 2b, firearms have persistently been the leading mechanism of death, often accounting for twice as many or more deaths compared to any of the other major mechanism used in either suicides or homicides.

**Gender and Age**

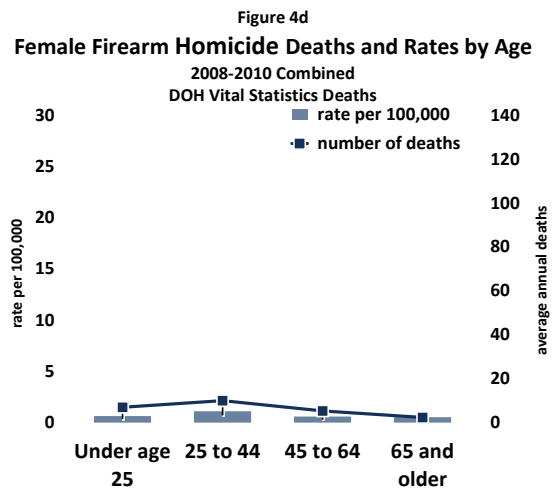
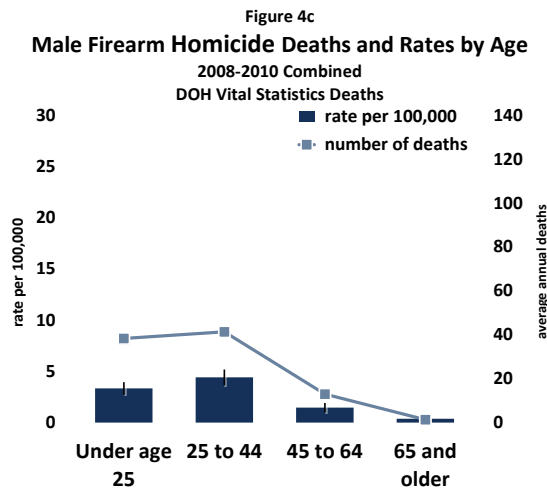
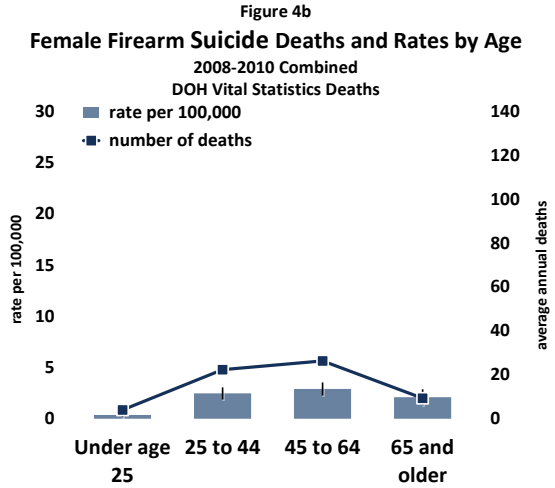
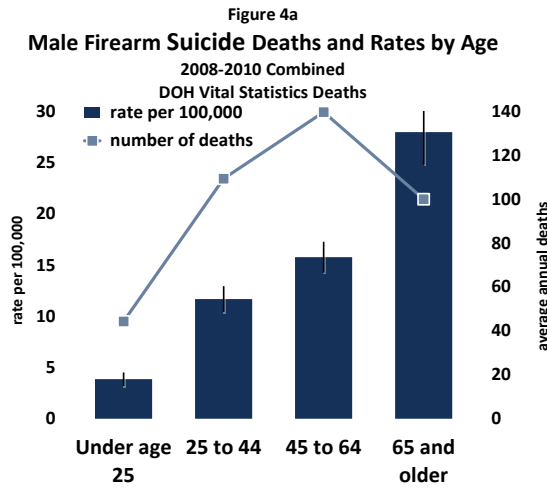
In Figure 3, the age-adjusted rate for suicides committed with a firearm by men (11.9) is more than six times greater than the rate for women (1.8). So, too, the homicide death rate for men (2.9) is more than three times the rate for women (0.8).

Figure 3 also shows that the suicide firearm rate for men is four times greater than their homicide firearm rate. Similarly, the suicide firearm rate for women is two times their homicide firearm rate.

**Figure 3**  
**Firearm Death Rates for Suicide and Homicide by Gender**  
 2008-2010 Age-Adjusted Rates  
 DOH Vital Statistics Deaths



All these differences in the rates are statistically significant ( $p < 0.05$ ), and can generally be discerned as such in any of the Figures shown if the 95% confidence intervals do not overlap.



In Figures 4a through 4d the age-specific rates and average annual deaths for firearm suicides and homicides by gender are shown. All four graphs are on the same scale to highlight the relative magnitude of the rates and counts between age groups, gender and intent.

These four graphs show that the suicide firearm rate for males ages 65 and older is higher than the rate for any other age group regardless of gender or intent. Within Figure 4a we also see that the age-specific rates increase with each successive age group.

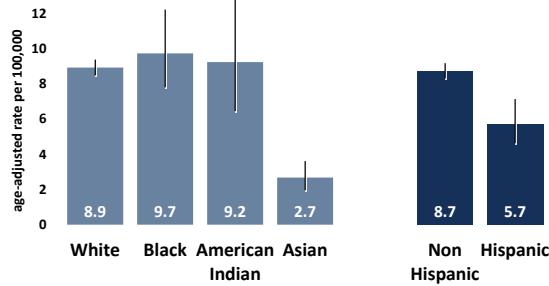
The opposite appears to be the case for the male homicide rates; for those deaths, as Figure 4c shows, the higher rates are seen in the two younger population groups. Together Figures 4a and 4c show that the age-specific male suicide rates are higher than their corresponding age-specific homicide rate, except for those under age 25.

Females under age 25 had a lower firearm suicide rate than those in the other three age categories; any differences among the age-specific rates in the older age categories were not significant. So, too, there were no significant differences between any of the age-specific rates for the female homicide firearm death rates.

However, for each of the female age groups assessed, the firearm suicide rates were higher than their corresponding homicide rates except for those under age 25.

**Race and Hispanic Ethnicity**

**Figure 5a**  
**Age-adjusted Firearm Deaths Rates by Race and Ethnicity**  
 2008-2010 Combined  
 DOH Vital Statistics Deaths



**Figure 5b**  
**Annual Firearm Deaths by Race and Ethnicity**  
 2008-2010 Average Annual Numbers of Deaths  
 DOH Vital Statistics Deaths

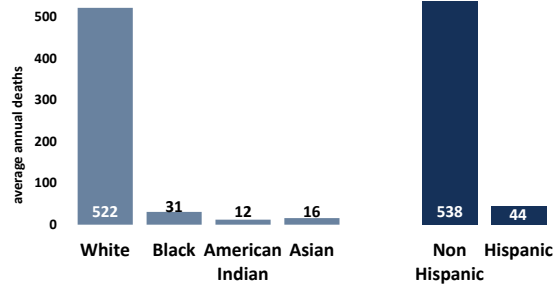
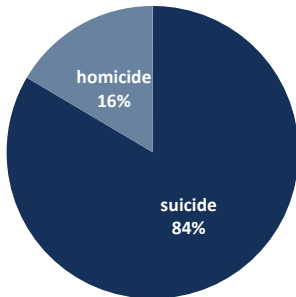


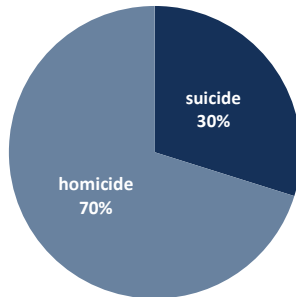
Figure 5a shows the age-adjusted rates for all firearm deaths combined (suicides, homicides and unintentional) by race and Hispanic ethnicity for 2008 through 2010. Figure 5b shows the average annual number of firearm deaths. For the age-adjusted rates, no significant differences exist between the White, Black and American Indian rates; the rate for Asians, however, is lower than all other groups. Similarly, the rate for Hispanics is lower than non-Hispanics.

As Figure 5b indicates, the average annual numbers of all firearm deaths for the non-White populations are relatively small. Therefore, rather than computing rates, Figures 6a to 6f show the percent by intent for each race and ethnicity group and include the total number of deaths for five years, 2007- 2011. As can be seen, Whites, non-Hispanics and American Indians have proportionately more firearm suicides than homicides; Hispanics and Blacks have proportionately more homicides; and, Asians are nearly evenly split.

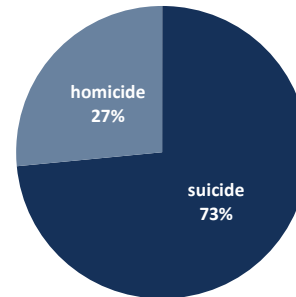
**Figure 6a**  
**White Firearm Deaths by Intent**  
 2007-2011 Combined Deaths = 2573  
 DOH Vital Statistics Deaths



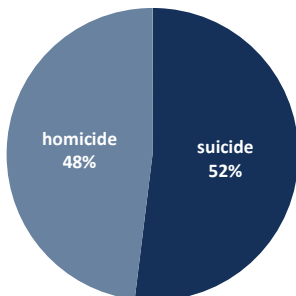
**Figure 6b**  
**Black Firearm Deaths by Intent**  
 2007-2011 Combined Deaths = 134  
 DOH Vital Statistics Deaths



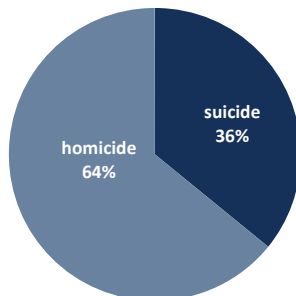
**Figure 6c**  
**Am Indian Firearm Deaths by Intent**  
 2007-2011 Combined Deaths = 49  
 DOH Vital Statistics Deaths



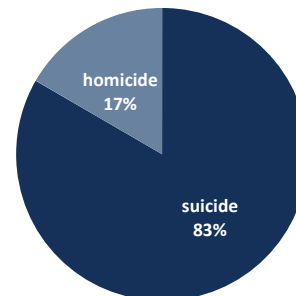
**Figure 6d**  
**Asian Firearm Deaths by Intent**  
 2007-2011 Combined Deaths = 77  
 DOH Vital Statistics Deaths



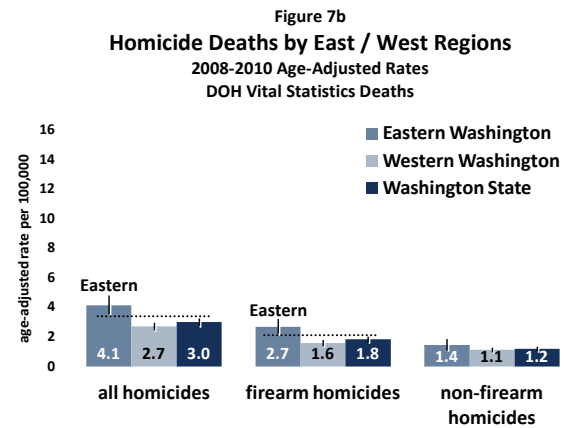
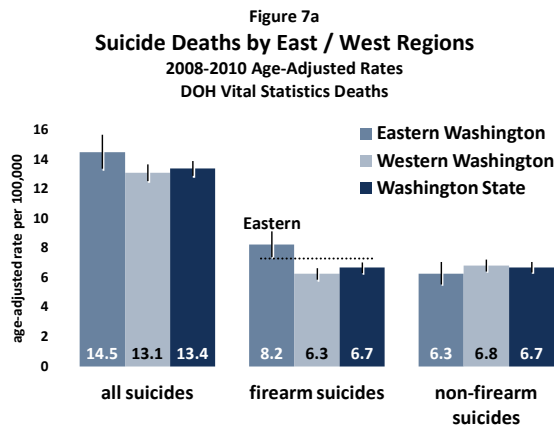
**Figure 6e**  
**Hispanic Firearm Deaths by Intent**  
 2007-2011 Combined Deaths = 209  
 DOH Vital Statistics Deaths



**Figure 6f**  
**Non-Hisp Firearm Deaths by Intent**  
 2007-2011 Combined Deaths = 2630  
 DOH Vital Statistics Deaths



**Regional and Small Area Variations**

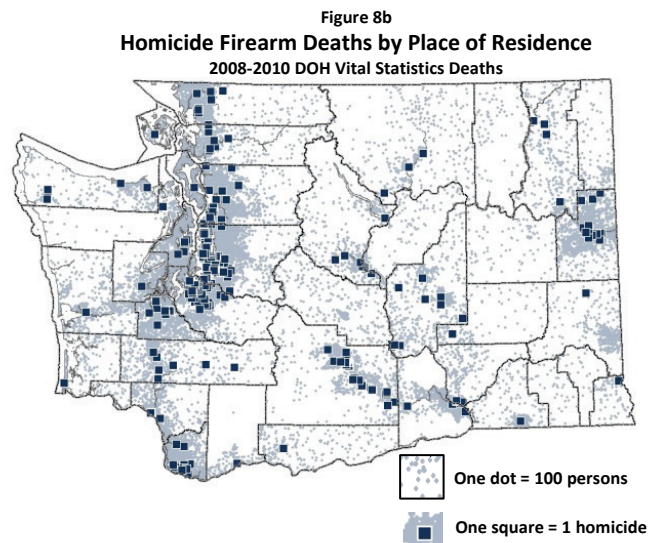
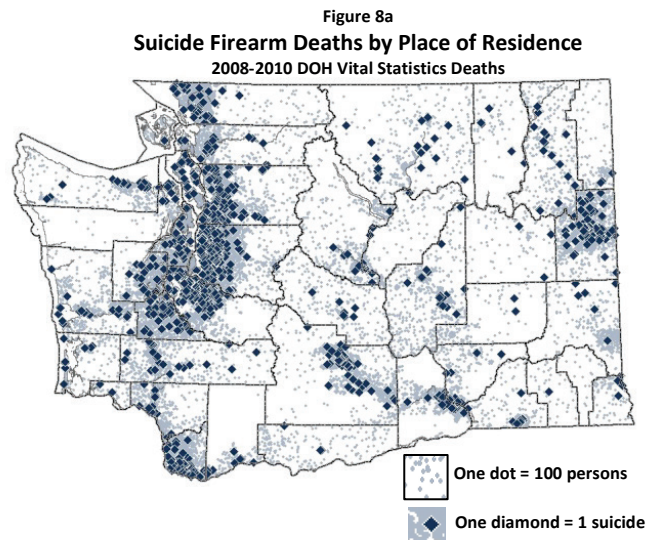


Figures 7a and 7b show the age-adjusted rates for all suicides and homicides as well as firearm and non-firearm related suicides and homicides in Eastern and Western Washington and for the state as a whole.

Looking first at the rates for *all suicides* in Figure 7a we see that there are no significant differences among the three area's rates. Looking next at the *firearm suicide* rates we see that Eastern Washington's is significantly higher than Western Washington's and the state's. Finally, looking at the *non-firearm suicide* rates, we again see that there are no significant differences.

Looking at the rates for *all homicides* in Figure 7b we see that Eastern Washington's rate is significantly higher than Western Washington's and the state's. Looking next at the *firearm homicide* rates we see again that Eastern Washington's are significantly higher than the other two areas. Finally, looking at the *non-firearm homicide* rates, we see that there are no significant differences.

Figures 8a and 8b show the firearm suicide and homicide victims by place of residence for 2008-2010. In comparing the two Figures, it is clear, once again, that the sheer



volume of firearm suicides outstrips firearm homicides. What is also readily evident is that these deaths, in general, cluster around the population centers. This is neither surprising nor concerning; areas with higher populations will likely have more deaths regardless of the cause.

However, significant clusters of diseases can be ascertained through the spatial scan statistic.<sup>ii</sup> Using death data geocoded to the census tract level, such clusters are shown for firearm deaths in Figures 9a and 9b.

In Figure 9a, two large regions were identified as having significantly higher than expected firearm suicide rates; one is labeled “Southwest” and the other “Northeast.”

Within these two large regions, small areas with even higher than expected suicides were identified; these are labeled as “Pacific” and “Stevens” in the Southwest region and “Twisp” in the Northeast region.

One region on the west side of the state had a lower than expected firearm suicide rate; it is labeled “Seattle.” No low rate region was found on the east side.

In Figure 9b, two regions were found to have higher than expected firearm homicide rates; “Seattle/Tacoma” on the west side and “Yakima” in the east. Two regions with lower than expected rates were also found; these are labeled “North Sound” (west) and “Southeast” (east).

While the Seattle/Tacoma region seems relatively small, it is densely populated. We therefore looked for clusters within this high-risk region, and found three areas with even higher than expected numbers of firearm homicides; these are labeled “Duwamish,” “Lakewood” and “Graham.”

Figures 10a and 10b show the age-adjusted rates for the high and low regions and clusters where the number of deaths were large enough to calculate those rates. Note that there is nearly a two-fold difference between the scales on these two Figures, 0-25 in 10a, 0-14 in 10b.

For those clusters where the numbers were too small to calculate rates, we calculated the expected number of deaths and compared those expected numbers with the actual or observed number of deaths. Hence, as seen in Figure 10a, for firearm suicides in Twisp our expected number of deaths was 1.1 while the actual or observed was 7; for Stevens the expected was 0.9 and the observed was 9.

Figure 9a  
Suicide High / Low Firearm Death Rate Clusters  
2008-2010 DOH Vital Statistics Deaths

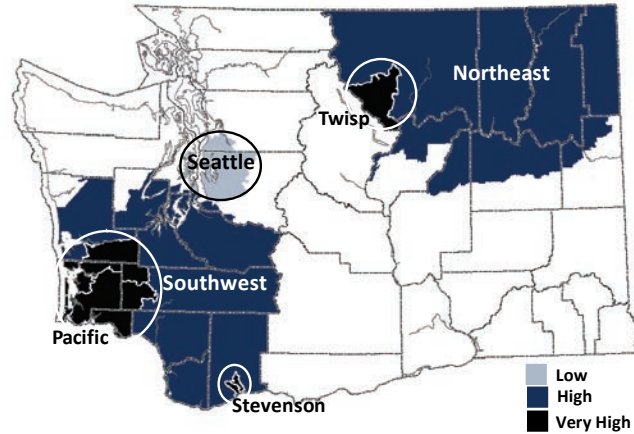
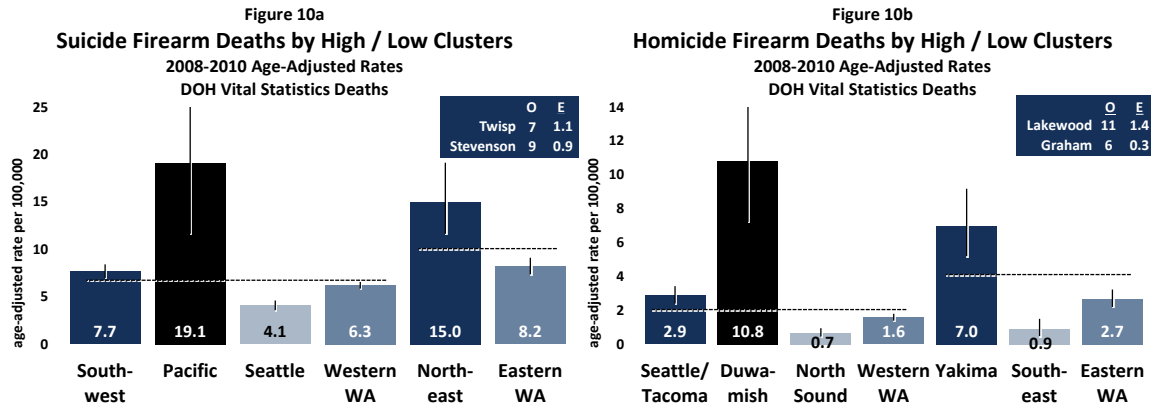


Figure 9b  
Homicide High / Low Firearm Death Rate Clusters  
2008-2010 DOH Vital Statistics Deaths



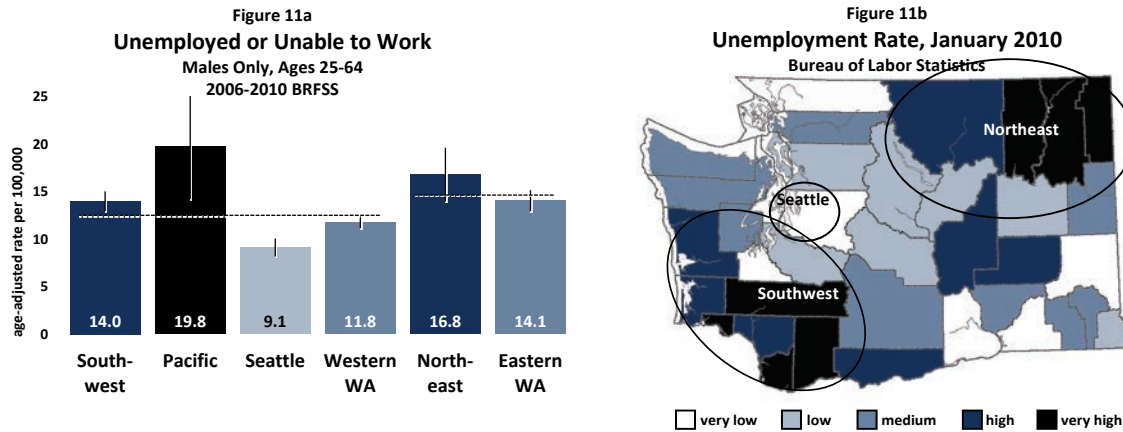
Similarly, in Figure 10b, for firearm homicides in Lakewood the expected number of deaths was 1.4 and the observed was 11, while in Graham the expected was 0.3 and the observed was six. All these differences are statistically significant.



For the remaining regions and clusters, the high- and low-risk areas are significantly higher or lower than their reference areas, i.e., Seattle’s is lower and Southwest’s and Pacific’s are higher than Western Washington’s rate, and Northeast’s is higher than Eastern Washington’s.

**Potential Risk Factors: Suicide Firearm Deaths**

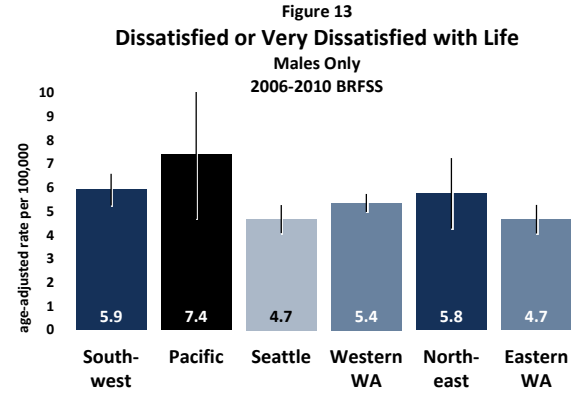
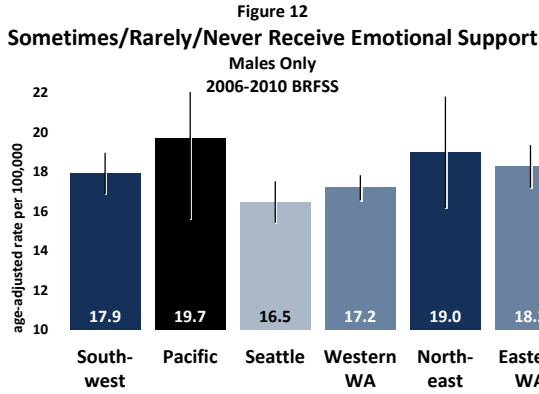
Looking first at firearm suicides, we assessed some potential risk-factors in the high- and low-rate areas, generally focusing on males only since, as previously shown, they are at higher risk.



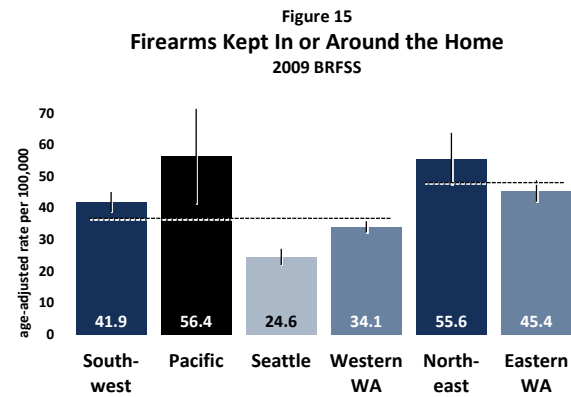
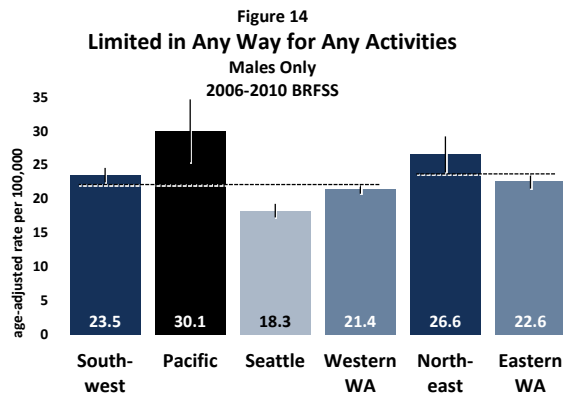
As seen in Figure 11a, the percent of males, ages 25 to 64, who reported to the Behavioral Risk Factor Surveillance System (BRFSS) in 2006 to 2010 that they were unemployed or unable to work is similar to the pattern seen for the firearm suicide death rates in Figure 10a: high unemployment in high suicide regions, low in low ones. On the west side these differences are significant; on the east side they are not, but the general pattern holds with elevated percentages seen in the high suicide region.

Figure 11b further validates this finding, showing that those counties with the highest unemployment rates, as reported by the Bureau of Labor Statistics, fall within one of the two high firearm suicide regions. These include Ferry, Stevens and Pend Oreille in the Northeast region, and Wahkiakum, Lewis, Clark and Skamania in the Southwest region.

Additional measures for potential risk factors reported in BRFSS also generally correspond with the high and low suicide areas, although the differences are often not statistically significant. These include the percent of males who reported feeling that they sometimes or rarely or never receive needed emotional support (Figure 12), and the percent of males who reported they were dissatisfied or very dissatisfied with their lives (Figure 13).



It is not surprising that these subjective measures of “feelings” do not significantly differ from one another; after all they are measures of a community’s aggregate emotional outlook. But it is nonetheless noteworthy that these general community feelings do seem to follow the pattern seen for firearm suicide deaths.



In what might be considered a slightly less subjective measure, we see in Figure 14 that the percent of males who reported that they were limited in any way for any activity is significantly higher in the high firearm suicide areas and lower in the low suicide one. We examined the age differences within these communities since older males are at higher risk, and found that age alone was not the sole explanatory factor. Perhaps more broadly this inability to “do” is particularly undermining to men’s sense of self-worth.

Finally, in looking at a completely objective measure, we see in Figure 15 that the percent of respondents reporting that firearms are kept in or around their home is significantly higher in the high firearm suicide regions and lower in the low ones. Note that even though the confidence limits for the high-risk Northeast region and Eastern Washington slightly overlap, these differences are nonetheless statistically significant.

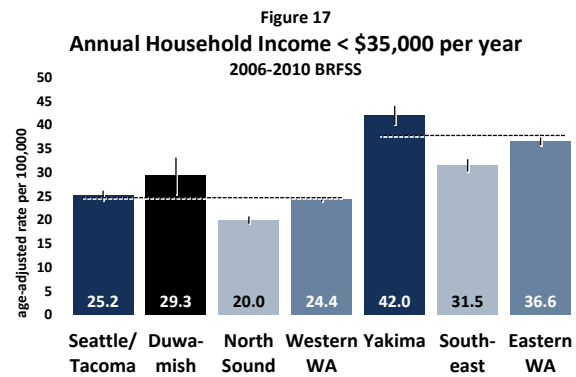
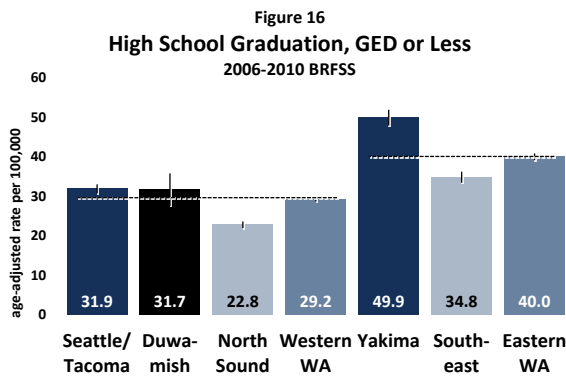


While no one risk factor likely explains the high and low firearm suicide rates in each of the areas assessed, a combination of high unemployment, low emotional support, high dissatisfaction with life, and a general limitation on activities – together with readily available firearms – may constitute a “perfect storm” for those individuals living in the high firearm suicide communities.

**Potential Risk Factors: Homicide Firearm Deaths**

Shifting our focus to the high and low firearm homicide regions shown in Figure 9b together with their rates shown in Figure 10b (pages 6-7), we identified risk factors generally associated with gun violence: gang activity, gun accessibility, arguments and brawls, education, income, and employment. Many of these risk factors can be assessed using BRFSS data.

Looking first at education and income we find a good degree of consistency with our expectations, but not complete concordance.

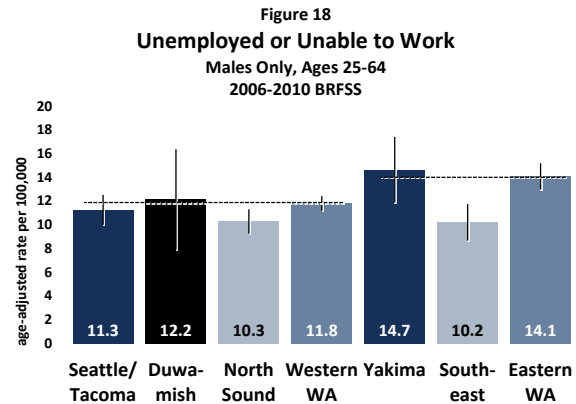


In Figure 16, which measures poor or low educational attainment, we generally see a high percent of people with low educational attainment in the high firearm homicide regions and a low percent in the low firearm homicide ones. This is true for the east and west sides of the state except in the Duwamish area; there the percent of low educational attainment is about the same as Western Washington’s.

In Figure 17 we see high percents of low income households in the Yakima and Duwamish regions, and low percents of low income households in the Southeast and North Sound regions. The percent of low income households in the Seattle/Tacoma region does not, however, differ from the west side as a whole.

It may be worth noting that these income levels have not been adjusted for geographic variations in cost-of-living,

In Figure 18 we see, somewhat surprisingly, that the unemployment rates do not generally correspond with the high and low firearm homicide regions.



Similarly, in Figure 19, we also see little concordance between reported firearm availability and the high and low firearm homicide regions.

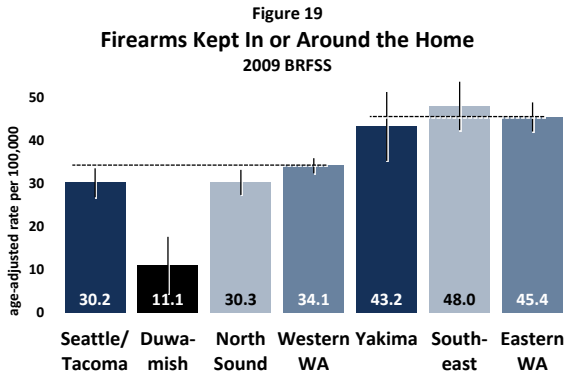
While any number of explanations for this lack of a concordance exists – including the possibility that there truly is no correlation – a likely explanatory factor may be found in the BRFSS sampling frame itself.

Up until 2010, the BRFSS sample was drawn exclusively from households with a landline telephone. In 2010, a pilot was initiated to sample households with cell phones only. Among other findings, this pilot indicated that households with cell phones only tended to include higher proportions of minorities and young adults than the landline survey. As seen in Figure 4c, firearm homicide deaths are highest among young adults, and as seen in Figures 6a-f they are also higher among minority populations.

In short, by being limited to households with landlines only, the BRFSS sample may have missed an appreciable proportion of those populations at highest risk for firearm homicide deaths.

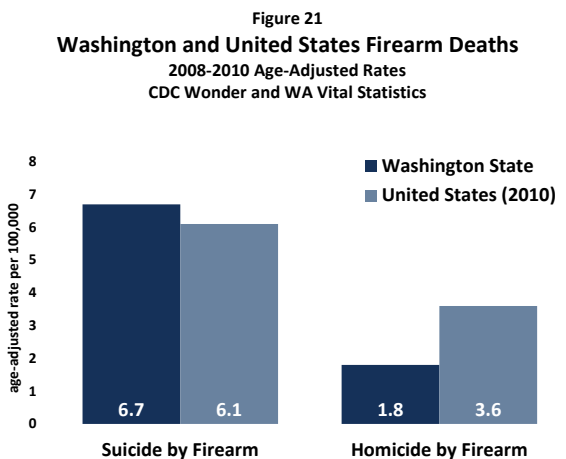
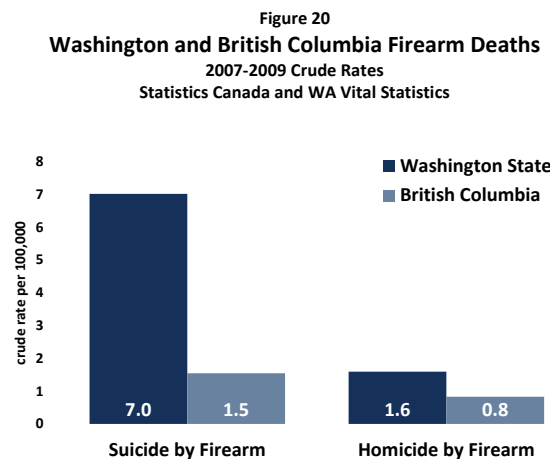
(It may be worth noting that since firearm *suicides* tended to be highest among Whites and older persons, this potential sampling frame problem did not apply. It may also be worth noting that while the high and low homicide regions did not generally correspond with their reported unemployment and firearm availability rates, the differences between Eastern and Western Washington did comport with our expectation: higher rates are seen in Eastern Washington for firearm homicides and all risk factors assessed when compared to Western Washington's. This was also true in comparing firearm suicides and risk factors in Eastern and Western Washington.)

Other risk factors for firearm homicides, including gang activities and arguments and brawls could not be ascertained through BRFSS or other data sets readily available to us. However, media reports certainly suggest that the Seattle/Tacoma region as well as the City of Yakima environs have a strong gang presence.



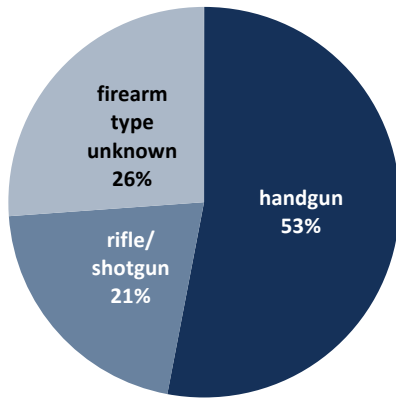
**Comparisons and Trends**

To put Washington's rates in perspective we compared them with those in British Columbia, where the populations are similar but the laws differ, and with those in the United States.

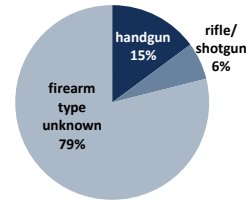


In Figure 20 we see that the firearm suicide rate in Washington is more than four-and-a-half times that seen in British Columbia, and our firearm homicide rate is twice British Columbia's. In Figure 21 we see that the firearm suicide rate in Washington is higher than the United States rate, but our firearm homicide rate is only half the United States. Although confidence intervals are not shown in Figures 20 and 21 the differences noted are significant.

**Figure 22**  
**Type of Firearm used in Suicides**  
2008-2010 WA Vital Statistics



**Figure 23**  
**Type of Firearm used in Homicides**  
2008-2010 WA Vital Statistics

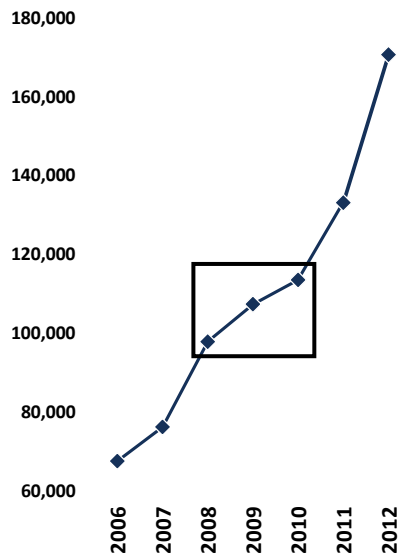


Figures 22 and 23 show the reported type of firearm used in Washington's suicides and homicides. The sizes of the pie charts are intended to show the relative magnitude of deaths; however, if true to scale the homicide chart would be even smaller.

For firearm suicides, handguns appear to be the most common type of firearm used. For firearm homicides, the type of firearm used was unknown or unreported in the vast majority of cases; however, of those reported, handguns are twice as often used as rifles or shotguns.

In Figure 24, we see the number of handguns sold each year by licensed dealers in Washington state. The annual increase is nearly exponential, and the three years highlighted, 2008-2010, were the years used for most of the data in this report.

**Figure 24**  
**Handguns Sold per Year by Licensed Firearm Dealers**  
2006-2012  
WA Department of Licensing



**Summary and Conclusions**

Suicides have consistently been among the top ten causes of death in Washington state. What we have seen in this brief is that more than half of those suicides are typically caused by a firearm. We also found that the most likely victims are males – their firearm suicide rate is more than six times females – and that it is older males in particular who are at highest risk.

Firearm suicide rates appear to be generally higher in rural rather than urban areas, and Eastern Washington's rates are higher than Western Washington's. We were able to identify regions and

small areas on both sides of the state with particularly high and low rates, and found that measures of unemployment, life satisfaction, emotional support, quality of life, and firearm availability within those areas generally corresponded in an expected manner with their high or low firearm suicide rates.

We saw, too, that the firearm suicide rate in Washington was more than four times the rate in British Columbia, and was significantly higher than the rate for the United States as a whole.

For firearm homicides we saw that the rate was only about one-fourth that seen for firearm suicides. Here, too, we saw that males were at highest risk with a rate that is more than three times greater than females. Younger males, especially those ages 25 to 44, had the highest rates.

We found, too, that although regions with especially high rates were urban, the overall rate in Eastern Washington was higher than that seen in Western Washington.

Looking at those regions and small areas with especially high or low firearm homicide rates, we found that educational attainment and income generally corresponded with our expectations. However, we also found that there was no apparent relationship between those areas' firearm homicide rates and either their employment rates or their firearm availability; we suspect that this lack of concordance may be a function of the exclusion of cell phone-only households in the sampling frame used for the BRFSS survey.

We saw, too, that our firearm homicide rates were twice those in British Columbia, but only half that for the United States as a whole.

We also found that for firearm deaths in general (suicide and homicide combined), the rates were lowest for Asians and Hispanics, while those for Whites, Blacks and American Indians were basically the same. However, we saw proportionately more firearm suicides among Whites and American Indians; more firearm homicides among Blacks and Hispanics; and essentially an even divide between firearm homicides and suicides among Asians.

For both firearm suicides and homicides, handguns appeared to be the weapon of choice, although there are high numbers of instances where no specific firearm type was reported, especially in the case of homicides.

Finally, we saw that handgun sales are on the rise.

It is difficult to imagine the pain of suddenly losing a loved one to either a firearm homicide or suicide. It is difficult, too, to think that either type of loss – homicide or suicide – would be easier or harder to accept. Yet given the relative magnitude of firearm suicides compared to firearm homicides, it is also difficult to understand the disproportionate focus that seems to have been put on firearm homicides alone.

To obtain this document in an alternative format, contact the Washington State  
Office of Financial Management at 360-902-0599.

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<sup>i</sup> This Research Brief was developed, in part, to address questions that were raised at a presentation the author made to the House Health Care and Wellness Committee during a work session on the roles Critical Access Hospitals play in meeting communities' needs, and, in part, per a request for a presentation to a Joint House Health Care and Wellness Committee and Education Committee work session on injury prevention.

<sup>ii</sup> Software: Kulldorff M. and Information Management Services, Inc. SaTScan™ v8.0: Software for the spatial and space-time scan statistics. [<http://www.satscan.org/>], 2013.