

Community Risk Assessment for West Virginia



COMMUNITY RISK REDUCTION

A Community Risk Assessment of West Virginia

With support from the National Fire Incident Reporting System (NFIRS), the State of West Virginia conducted a community risk assessment using a systematic approach to the process. Ultimately, the results of this assessment will be utilized to create a complete Community Risk Reduction (CRR) plan that will include strategies and tactics to mitigate risks to the community.

Two primary categories were examined: service demand and community risks. Service demand consisted of a retrospective analysis of five years of fire department incident data from 2011 through 2015. Data was acquired from the National Fire Incident Reporting System (herein referred to as NFIRS).

As with all other communities, the State of West Virginia has potential risks. Such risks can be human-caused (e.g., preventable injuries, fires) or naturally occurring (e.g., frequently occurring severe weather; earthquakes, hurricanes). During this process, West Virginia identified and prioritized potential and likely risks, and subsequently prioritized them.

Demographic Profile

The State of West Virginia has an estimated 2010 population of 1,852,994, with a land area comprising just over 24,230 square miles. There are an approximate 76.51 persons per square mile. Table 3-1 lists the percentage of age distribution, gender and racial/ethnicity composition of the State. The population has increased by 2.52% since 2000.

State of West Virginia	Percent of Population
Persons under 5 years	5.56%
Persons under 18 years	17.75%
Persons 65 years & over	16.81%
Female persons	50.67%
Caucasian only	93.63%
Black or African American only	3.19%
American Indian & Alaska Native only	0.20%
Asian only	0.71%
Two or more races	1.99%
Hispanic or Latino	1.30%

Source: U.S. Census Bureau

Table 3-1

Social Characteristics

For all persons age 25 or greater, 84% have a high school education or greater, and 18.75% have a Bachelor's degree or higher. There are 742,359 households averaging 2.43 persons per household. The per-capita crime rate in West Virginia for 2013 was 56/100,000 persons.

Economic Characteristics

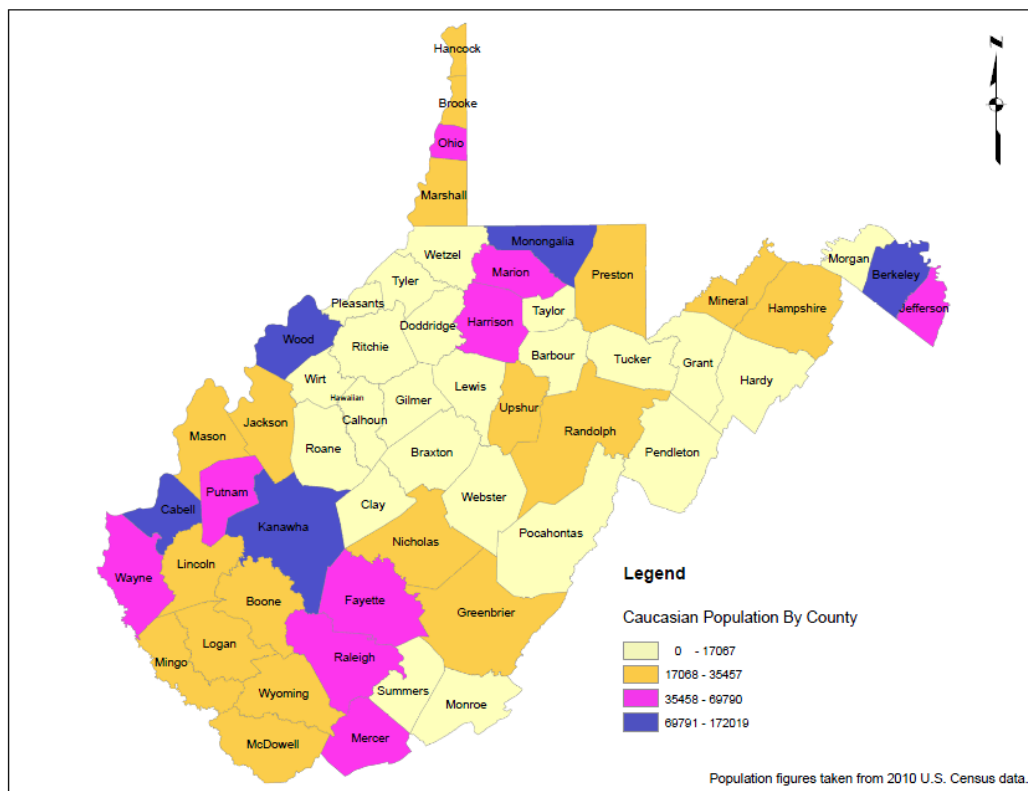
Median household income during the period 2010–2014 was \$41,576. Per capita income during 2014 was \$23,237. Approximately 18.3% of the population is considered below the poverty level. Median gross rent per month is \$630. Current unemployment rate is 7.0%.

Housing Profile

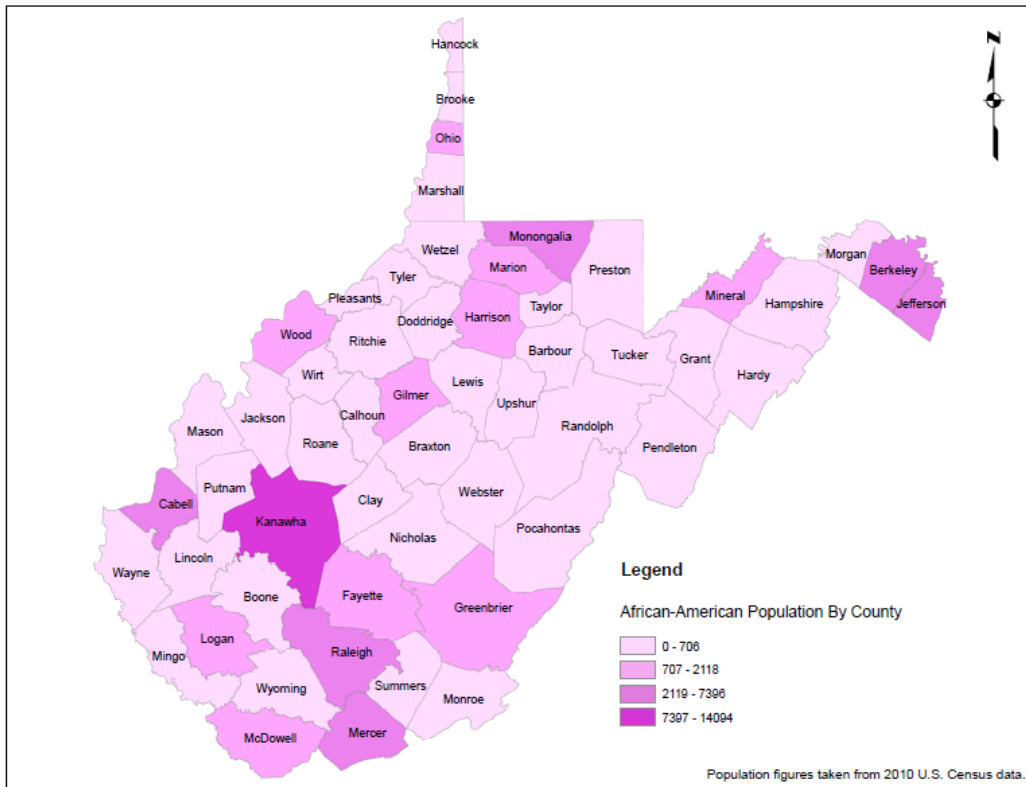
There are 885,475 housing units, with a home ownership rate of 73.0%. Median value of owner-occupied homes is \$100,200.

**Source: US Census Bureau*

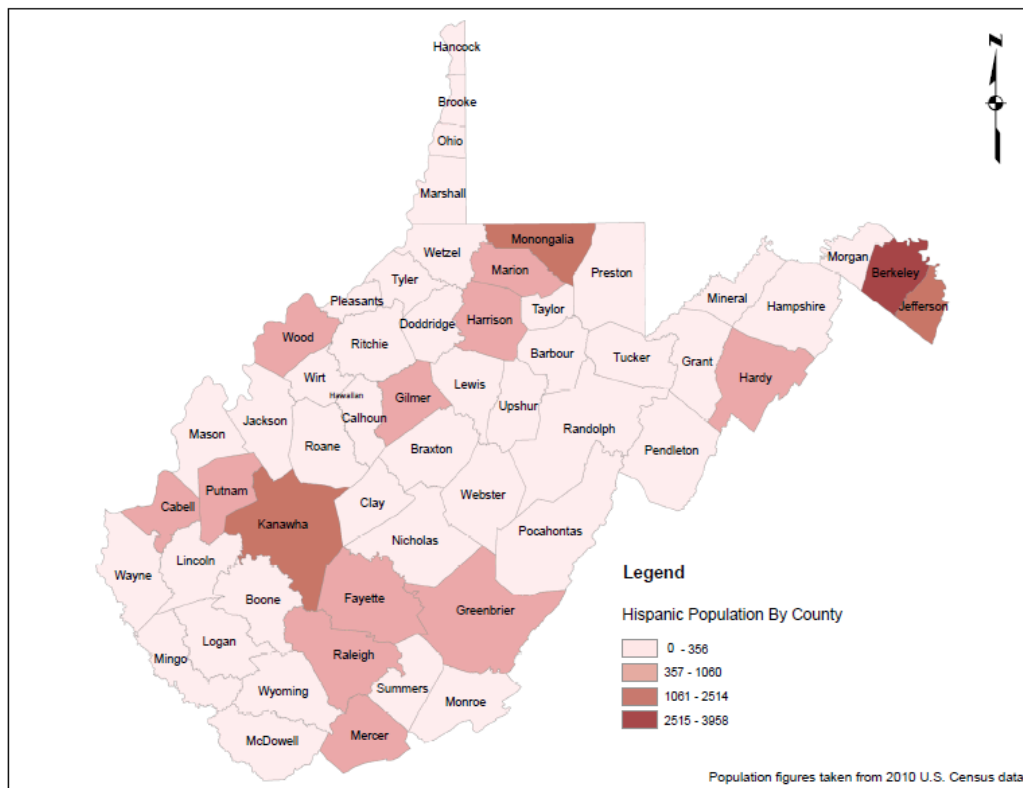
Map 1-1 through 1-7 depicts population distribution by location for each race or ethnic group.



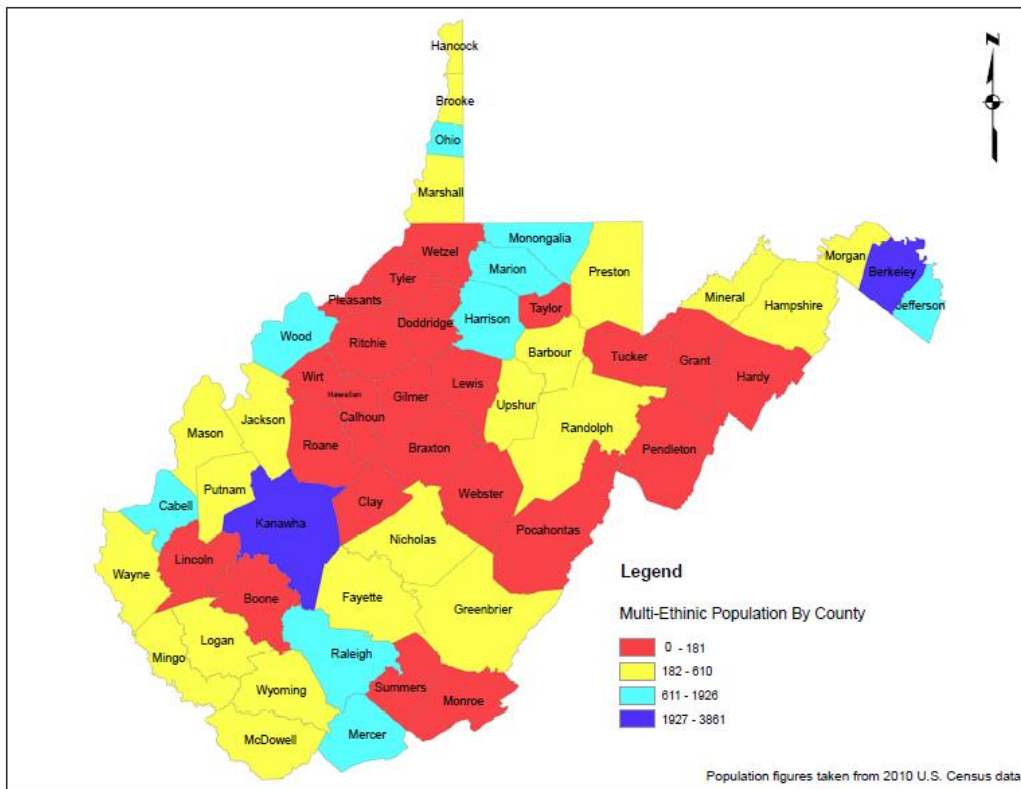
Map 1-7



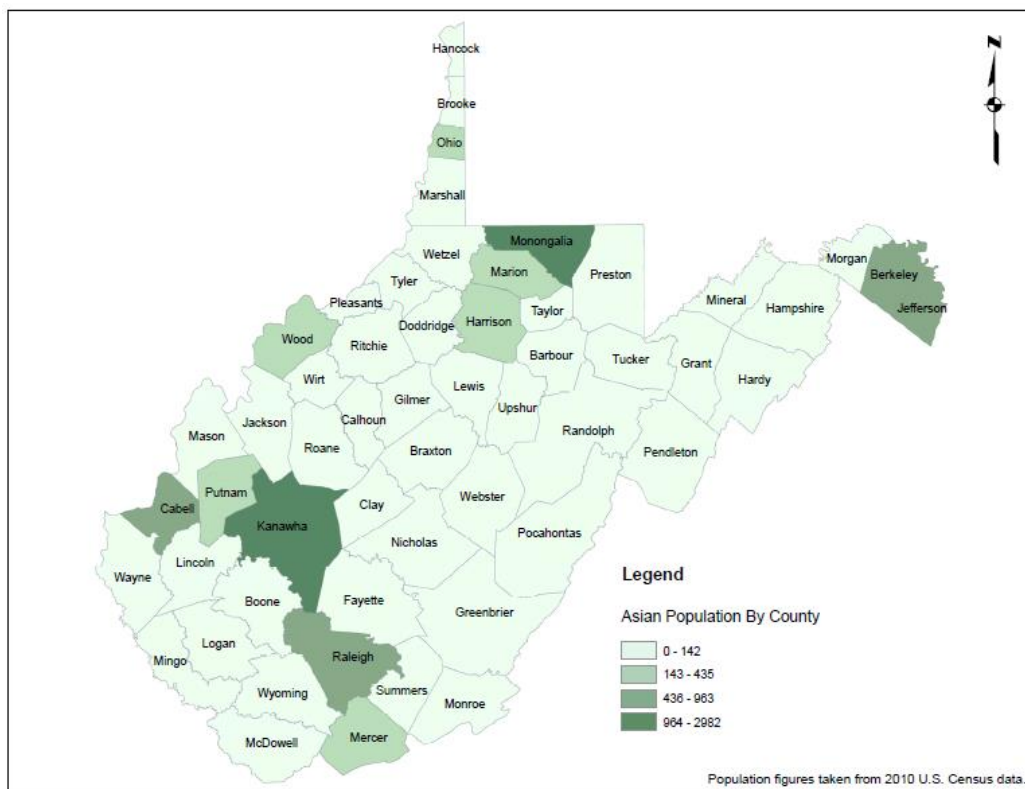
Map 2-7



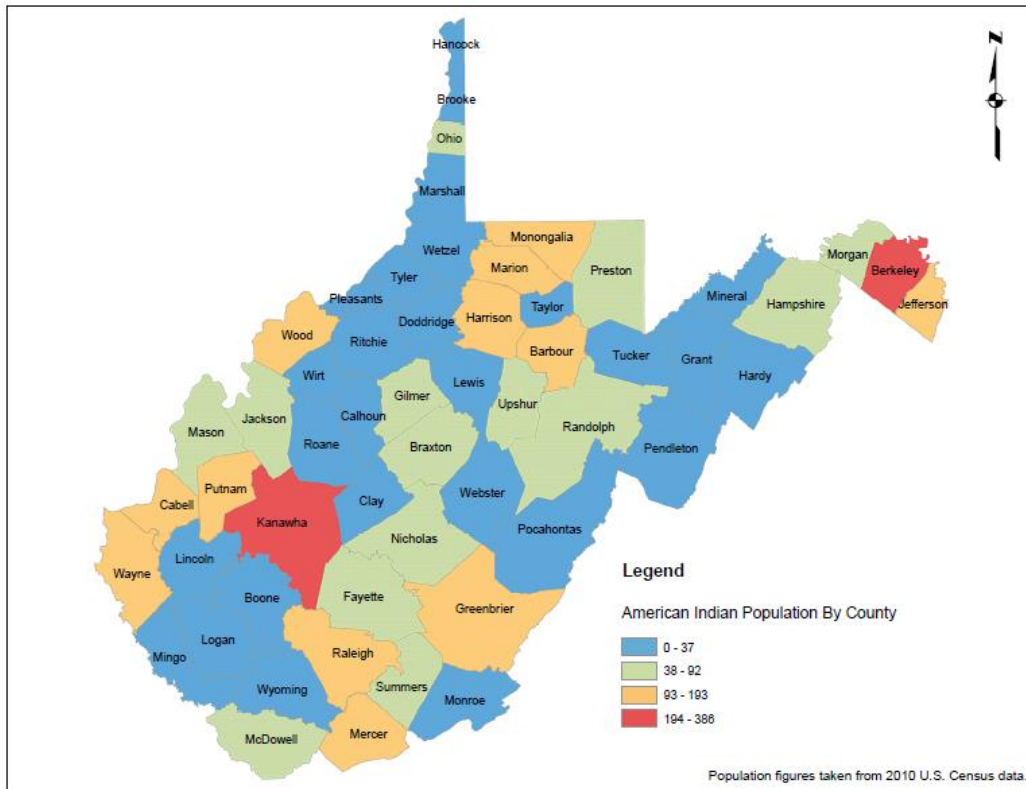
Map 3-7



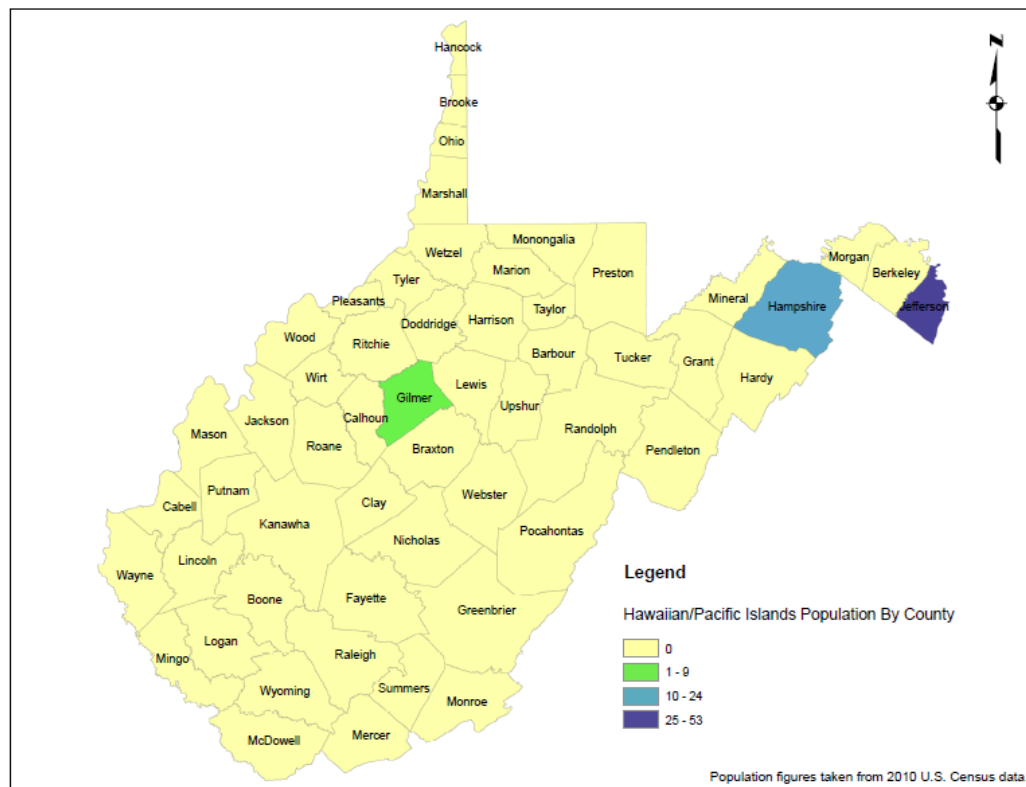
Map 4-7



Map 5-7



Map 6-7



Map 7-7

West Virginia Service Demand

During the 60-month period of January 1, 2011 through December 31, 2015, the West Virginia Fire Departments were dispatched to a total of 641,998 incidents—or an average of 128,399 calls annually. Of these, 71,217 (11.09%) were recorded as “Dispatched and canceled en route.” Excluding those calls in which no apparatus arrived, the total number of incidents evaluated was 570,781. However, this number does include multiple incidents recorded as false alarms and as “no incident found on arrival.” Please note that of the 71,217 incidents listed as “Dispatched and canceled en route”, 44,396 (6.89%) were legitimate incidents while 26,821 (4.17%) were incorrectly coded as “Mutual aid given” according to FEMA.

Incident Types

Call (incident) types were based on the *National Fire Incident Reporting System* (NFIRS) Version 5.0 standard definitions, as developed through the *U.S. Fire Administration, National Fire Data Center*. “Incident Type” is defined as the situation found by emergency personnel on arrival at the scene, and includes the full spectrum of fire department activities from fires to EMS to public service. NFIRS incident types are organized into nine series. Within each of these are additional codes that define the incident more specifically. The primary incident-types are listed in Table 3-2, with the total volume of each for 2011-2015:

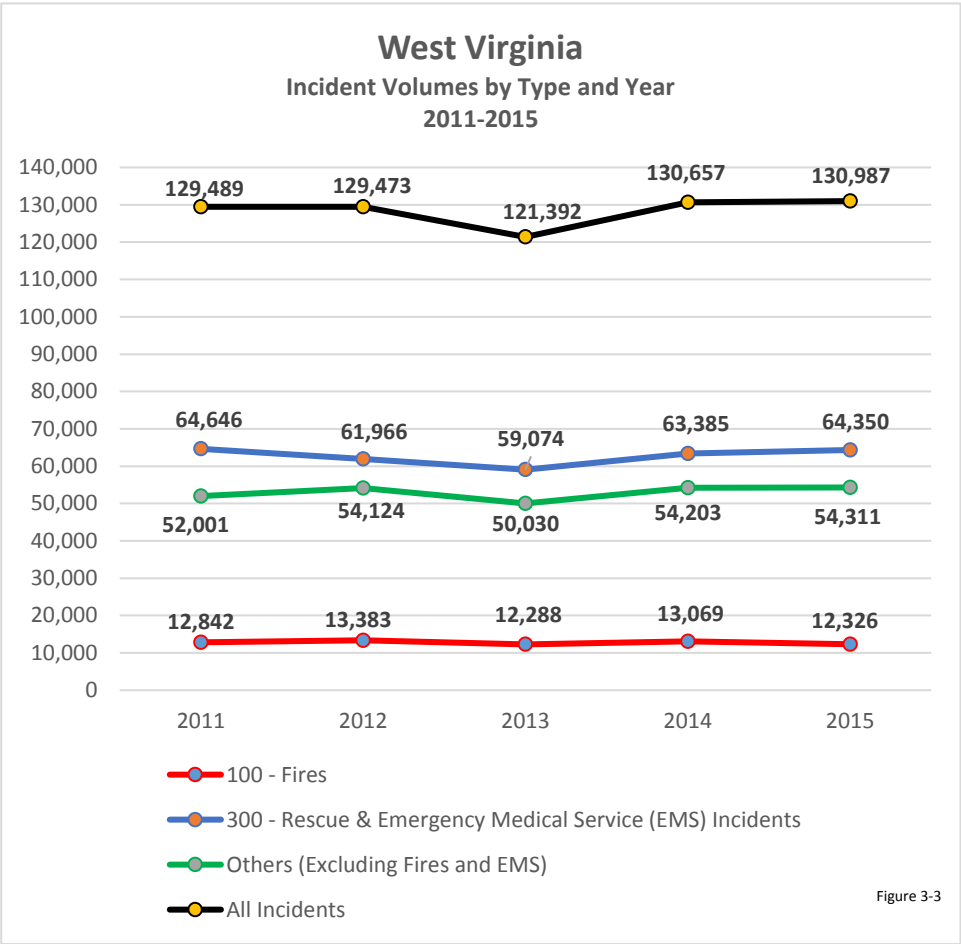
West Virginia Service Demand

NFIRS Incident Type Series Code/Title	2011	2012	2013	2014	2015	Grand Total
100 - Fires	12,842	13,383	12,288	13,069	12,326	63,908
200 - Overpressure Rupture, Explosion, Overheat (No Fire)	404	376	350	349	359	1,838
300 - Rescue & Emergency Medical Service (EMS) Incidents	64,646	61,966	59,074	63,385	64,350	313,421
400 - Hazardous Condition (No Fire)	11,028	11,264	9,212	9,137	9,187	49,828
500 - Service Call	11,235	10,842	10,004	11,981	11,917	55,979
600 - Good Intent Call	17,585	20,169	20,441	21,848	21,090	101,133
700 - False Alarm and False Call	10,245	9,608	9,014	9,871	10,610	49,348
800 - Severe Weather	989	1,381	531	552	730	4,183
900 - Special Incident Type	509	473	470	457	418	2,327
UUU - Unknown or Coded Incorrectly	6	11	8	8	0	33
Grand Total	129,489	129,473	121,392	130,657	130,987	641,998

Note: Includes *all* calls dispatched, including cancelled en route.

Table 3-2

Figure 3-3 depicts annual incident volumes by type and year. Incident types were placed in three categories: fires, EMS, and others. The data show that overall demand for service has increased by 1.15% since 2011. Incidents of fires have remained relatively steady over the last 60 months, with a slight increase (4.44%) in other calls.



Additional analysis of West Virginia’s incidents showed, when considering day-of-week or month-of-year that the busiest day of the week was Friday and the busiest months of the 5 year trend was January and July. The conclusion drawn is that the department’s call volume by incident type remains somewhat consistent throughout the year. The frequency of incidents, by hour-of-the-day, is analyzed for the purpose of predictability. The busiest periods for West Virginia fire departments is between the hours of 0900 (9:00 am) and 2100 (9:00 pm) daily. These times are consistent among all incident types.

Fire Incidents

An analysis of fire incidents categorized within the NFIRS 100 series was conducted to determine a more detailed insight. Table 3-3 lists the top five most frequent fire-related incidents, by year, during 2011–2015. As shown, building fires, passenger vehicle fires and brush fires were the three most common.

Five Most Frequent Fire-Related Incidents by Year

NFIRS Incident Type	2011	2012	2013	2014	2015	TOTALS
111-Building fires	5,199	5,127	4,908	5,217	4,963	25,414
131-Passenger vehicle fires	1,338	1,308	1,234	1,148	1,227	6,255
142-Brush or brush-and-grass mixture fires	921	1,160	1,051	1,365	1,149	5,646
113-Cooking fires	765	833	740	772	685	3,795
151-Outside rubbish, trash or waste fire	646	756	568	556	502	3,028
Annual Totals:	8,869	9,184	8,501	9,058	8,526	44,138

Table 3-3

Nearly 44% of building fires occurred in 1- or 2-family dwellings or multifamily dwellings. About 7.4% of these originated in the kitchen area and extended to other rooms. The other .5% of building fires occurred in a wide variety of property types.

The frequency of passenger vehicle fires (NFIRS 131) and brush fires (NFIRS 142) over the previous five years are approximately the same, and represent the second and third highest number of incidents.

Fire Fatalities

Table 3-4 shows that the highest percentage of fire fatalities in males is the 51-61 age group and females is the 0-17 age group. Over all, the highest percentage of fire related fatalities in West Virginia is males (62%).

**Fire Related Fatalities by Age Group & Gender
2011-2015**

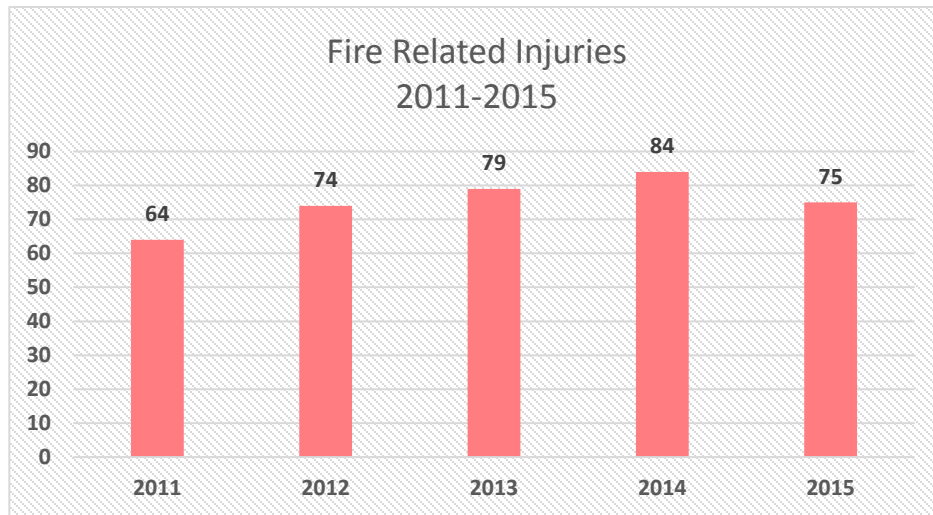
Age Range	Males		Females	
0 - 17	18	9%	19	9%
18 - 28	11	5%	4	2%
29 - 39	15	7%	8	4%
40 - 50	19	9%	11	5%
51 - 61	24	12%	9	4%
62 - 72	21	10%	14	7%
73 - 96	21	10%	13	6%
Totals	129	62%	78	38%

Table 3-4

Fire Related Injuries

Graph 1 shows fire related injuries that fall under the 100 series in the NFIRS system, meaning almost all injuries reported in this manner are caused from structure fires.

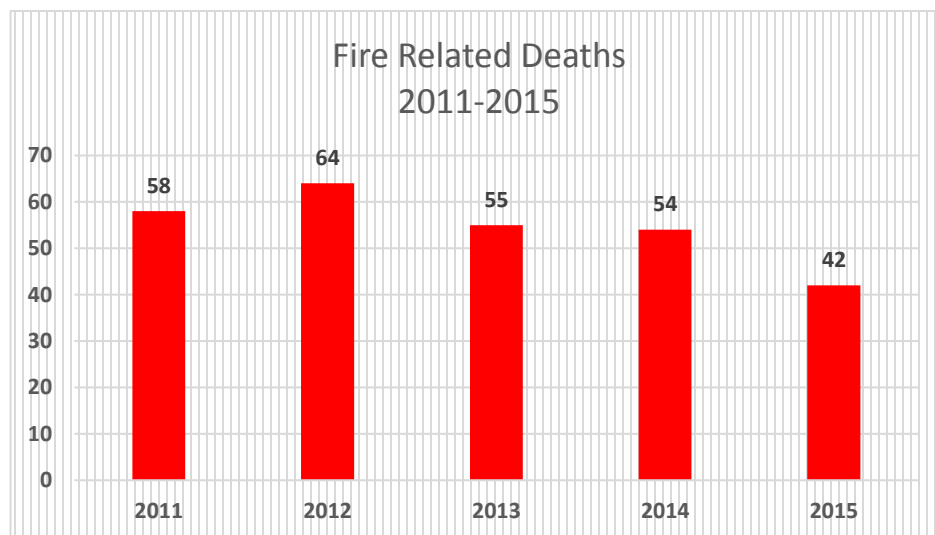
An all-time high of 84 injuries were reported in 2014 (7,546 fires were reported in 2014). The following year, 2015, injuries dropped to 75 from 84, a difference of 9 injuries and 475 less fires occurred than the previous year.



Graph 1

Fire Related Deaths

Fire Fatality statistics in Graph 2 shows only fatalities related to a structure fire. Vehicle fires are not included in these numbers. The year 2015 saw the lowest number of recorded fire related fatalities at 42. The highest number of fatalities between the years 2011-2015 is 64, recorded in 2012. In 2012 7,485 fires were reported, this year marks the downward trend in fires.



Graph 2

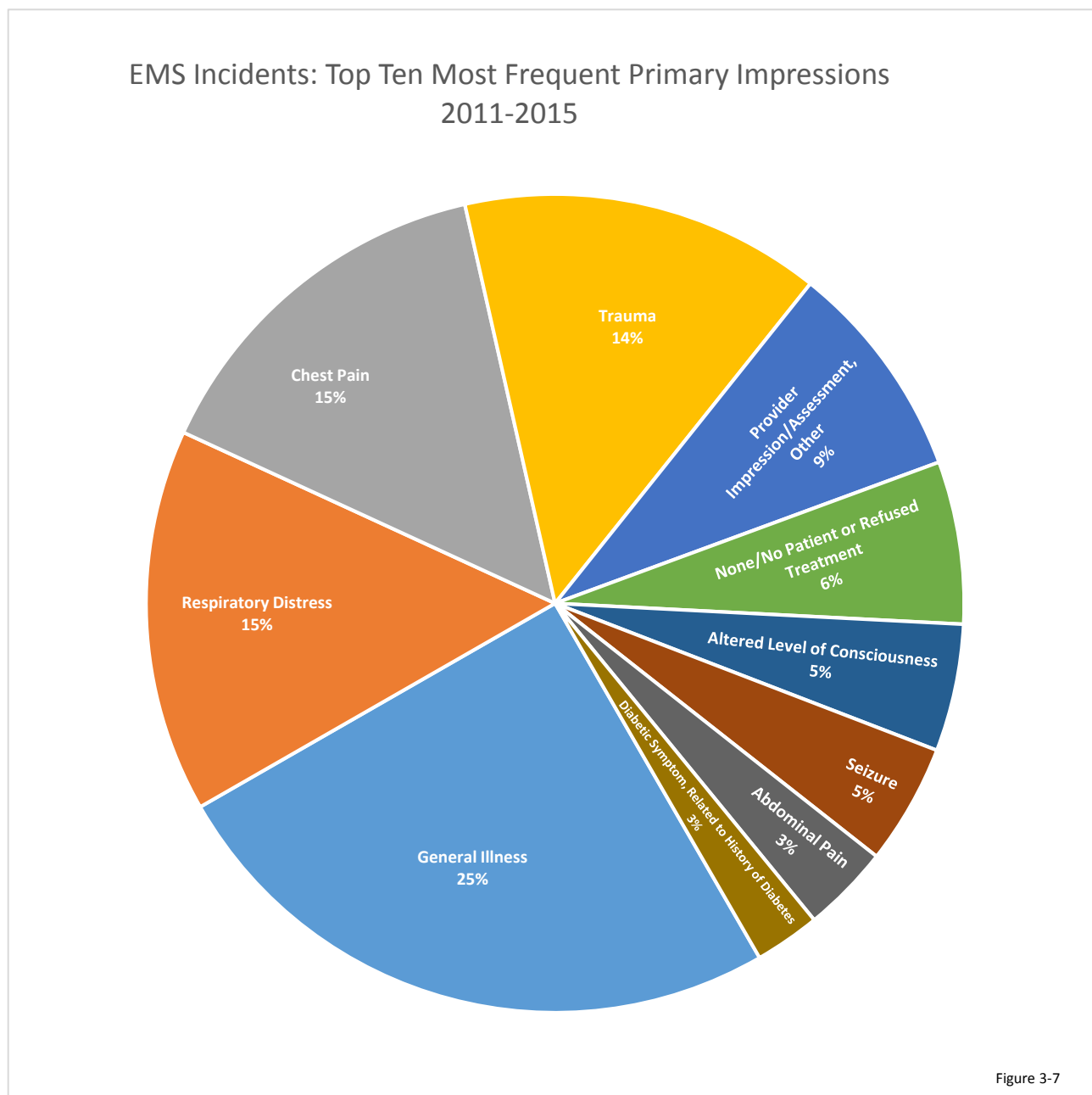
EMS Incidents

Incident records indicated that during 2011–2015, there were a total of 19,528 patient encounters (consisting of 27,758 separate incidents); resulting in an annual average of 5,533. Patient gender consisted of 45% males, and 55% females.

Ages ranged from less than 1 to 112 years, with an average of 40 (mean 55). Female patients averaged 54 years, and males 49. Individuals aged 16 or younger, comprised 19.95% of the patients. Note: Numbers are not absolute as some records in NFIRS were not documented correctly. Some showed age but no gender or gender but no age.

The NFIRS categories give a very broad description of most EMS incidents, but are inadequate in describing more specific details of illnesses and injuries. For example, the majority of EMS incidents were categorized as *321–EMS call (includes patient refusals)*. In order to get a more complete perspective of EMS, it was necessary to examine patient records greater detail. This was done by evaluating the primary impressions and causes of each case.

Figure 3-7 shows that the most frequent primary impression involved general illness (25%); followed by chest pain (15%), Respiratory Distress (15%), trauma (14%), and Provider Impression/Assessment, Other (9%). The data showed that 30% of traumatic injuries were a result of a fall. Of these, the majority were ground-level falls involving female patients 73 years of age or older.



Percent of Injuries from Falls by Age Group & Gender

2011–2015

Age Range	Females*	Males*
0–17 years	8%	7%
18–28 years	2%	3%
29–39 years	3%	3%
40–50 years	4%	4%
51–61 years	7%	5%
62–72 years	8%	5%
73–96 years	24%	8%

*Percent of all documented falls (percentages rounded)

Table 3-5

Non-traumatic cardiopulmonary arrest cases represented a relatively small number of EMS incidents. Approximately 5% presented with an initial rhythm of ventricular fibrillation.

Other Incidents

After excluding fires (NFIRS 100) and EMS (NFIRS 300), the remaining types were placed in the “Other Incidents” category. Table 3-5 lists these in order of quantity.

Other Incident Types	Total WV Incidents 2011-2015
600 - Good Intent Call	101,133
500 - Service Call	55,979
400 - Hazardous Condition (No Fire)	49,828
700 - False Alarm and False Call	49,348
800 - Severe Weather	4,183
900 - Special Incident Type	2,327
200 - Overpressure Rupture, Explosion, Overheat (No Fire)	1,838
UUU - Unknown or Coded Incorrectly	33
Grand Total	264,669
	Table 3-6

The top three *other incidents* (NFIRS 600, 500, 400) represented 41% of *all* incident types in which all departments were dispatched over the last five years. Within each of the NFIRS categories are subcategories that provide a more specific description of the incident.

The most common types within the *NFIRS 600–Good Intent Call* category were:

- 611–Calls Dispatched & canceled en route (70%)
- 600–Good intent call, other (8%)
- 622–No incident found on arrival at dispatch address (6%)

Within the *NFIRS 700–False Alarm & False Call* category, 700–False alarm or false call, other represented the most common. False alarms occurred most frequently in single- and multi- family residences (31%), (excluding Blank or None (15%) followed by Highway or divided highway (5%), and hospitals (3%).

Within the *NFIRS 500–Service Call* category, the most common types were:

- 553–Public service was the most frequent (18%)
- 500–Service call, other (16%)
- 571–Cover assignment, standby, move up (12%)

Community Risk Priorities

Based on the assessment of incident and demographic data from the State of West Virginia, the top three priorities for community risk have been identified. These are potential risks that can ultimately be mitigated through various strategies; which will be addressed through a comprehensive community risk reduction plan.

Priority 1: Fire Fatalities

FY2015 saw the lowest number of fatal fires and the lowest number of fire fatalities (42) in our state's history. The leading causes of these fatal fires involved smoking, cooking, heating, and electrical distribution. There were 6 multiple fatality incidents in FY2015. This number is fortunately down from FY2014. The biggest contributing factor to these fatalities is the lack of installation of and the lack of operable smoke alarms being present within the residential (one- and two-family) structures. 57% of fatal house fire victims were male in FY2015. Nationally, women have a higher risk of dying in residential fires than men. Kanawha, the most populous county in West Virginia, led the state with 7 fire fatalities. During the CRR planning process, it will be necessary to consider a plan that targets all neighborhoods with both educational materials and a program of home visits to conduct home safety surveys. This will include the installation of smoke alarms and instruction on fire prevention safety tips.

Priority 2: Cooking Fires

There has been a somewhat steady increase in cooking fires over the last five years. Some confined to the kitchen area, and others originating in the kitchen and extending into other rooms; eventually resulting in building fires. 36% of the residents had none or non-working smoke alarms, and the inability (absence of a fire extinguisher or other means) or unfamiliarity with procedures for properly suppressing cooking-related fires. During the CRR planning process, it will be necessary to consider a plan that targets specific neighborhoods with both educational materials (in both Spanish and English) and a program of home visits. This should include installation of smoke alarms and proper methods of extinguishing cooking-related fires.

Priority 3: Ground-Level Falls

EMS-incident data showed that the majority of ground-level falls occurred among females aged 73 years and older. The types of injuries were usually hip and lower-extremity fractures. While such injuries can be significant in younger persons, they are often much more devastating in the elderly. They frequently result in long-term functional impairment, nursing home admission and increased mortality.

Ground-level falls are preventable in many cases by make homes safer by reducing tripping hazards; improved lighting; and adding grab rails in bathrooms. In addition, regular exercise to improve strength and balance; annual eye exams; taking calcium and Vitamin D supplements; and ensuring that any medicines they are taking do not have side effects such as dizziness or drowsiness can all help to reduce the potential for falls.

Conclusion

Utilizing the results of this risk assessment, the State of West Virginia will begin the next steps in the Community Risk Reduction planning process. This will start with the development of strategies and tactics to mitigate risks, followed by the preparation and implementation of a CRR plan. After implementation, the State will monitor, evaluate and modify the plan as necessary.