



# HSC Statistical Brief



## Asthma Among West Virginia Elderly Brief No. 17

Asthma is a disease of the lungs characterized by inflammation of the air passages. During an asthma episode or attack, airways become blocked or narrowed causing tightness in the chest, difficulty breathing, wheezing, and coughing. There are many “triggers” that may initiate an asthma episode, including allergens, irritants in the air, respiratory infections, exercise, weather, strong emotional expressions, and some medications (1). Asthma symptoms can be controlled through medication and avoidance of identified triggers. However, poor management of the disease can lead to hospitalization and even death.

Unlike other respiratory diseases that typically affect only older adults (e.g. emphysema and chronic lower respiratory disease), asthma affects people of all ages. However, older adults are more likely to experience certain negative health effects and complications related to asthma. In fact, they are more likely to be hospitalized and to die from asthma complications than younger people. In 2004, an estimated 2.7 million US adults and 28,000 West Virginia adults aged 65 and older had asthma (source: Behavioral Risk Factor Survey).

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- Behavioral Risk Factor Survey

**SURVEILLANCE.** National and state data on asthma prevalence, hospitalizations, and mortality are collected annually. Since 1997, national data on the prevalence of asthma among adults have been collected primarily through the National Health Interview Survey. Hospitalizations are estimated by the National Hospital Discharge Survey and deaths are tracked by the National Vital Statistics System. In 2000, the West Virginia Behavioral Risk Factor Surveillance System (BRFSS) began collecting asthma prevalence data from West Virginia adults. Asthma hospitalizations are collected by the West Virginia Health Care Authority from all non-federal hospitals in the state. Asthma mortality data are collected from death certificates by the West Virginia Health Statistics Center.

# PREVALENCE

In West Virginia, adults aged 65 and older are no more likely to have asthma than younger adults. **However, in 2004, the percentage of elderly adults with lifetime and current asthma was significantly higher in West Virginia than the nation as a whole.** Although West Virginia has historically reported a higher prevalence of asthma among the elderly than the United States, 2004 was the first year in which West Virginia’s rates of elderly lifetime and current asthma were significantly higher.

In 2004, approximately 15% of West Virginia elderly had ever been diagnosed with asthma (see Table 1). More than 10% currently had asthma, compared with 7.4% of elderly in the United States. West Virginia had the second highest prevalence of current asthma among the elderly in the country<sup>1</sup> (US range=3.3% to 10.5%). In 2004, more than 28,000 West Virginia adults aged 65 and older currently had asthma.

**Table 1. Current and Lifetime Asthma Among Adults Aged 65 and Older: BRFSS 2000-2004**

Year	CURRENT ASTHMA				LIFETIME ASTHMA			
	WV		US		WV		US	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
2000	7.8	5.2-10.3	6.6	6.1-7.0	9.4	6.7-12.1	8.6	8.1-9.1
2001	8.6	6.4-10.8	6.5	6.1-6.9	11.1	8.7-13.6	9.2	8.7-9.7
2002	7.4	5.4-9.4	7.1	6.7-7.6	9.9	7.7-12.1	10.0	9.4-10.5
2003	8.0	6.1-10.0	7.2	6.8-7.6	10.7	8.4-12.9	10.0	9.6-10.5
2004	10.3	8.0-12.6	7.4	7.1-7.8	15.1	12.4-17.8	10.9	10.5-11.4
2000-2004								
Total	8.4	7.4-9.4	na	na	11.2	10.1-12.3	na	na
Males	8.0	6.4-9.7	na	na	10.3	8.5-12.1	na	na
Females	8.7	7.5-9.9	na	na	11.9	10.5-13.3	na	na

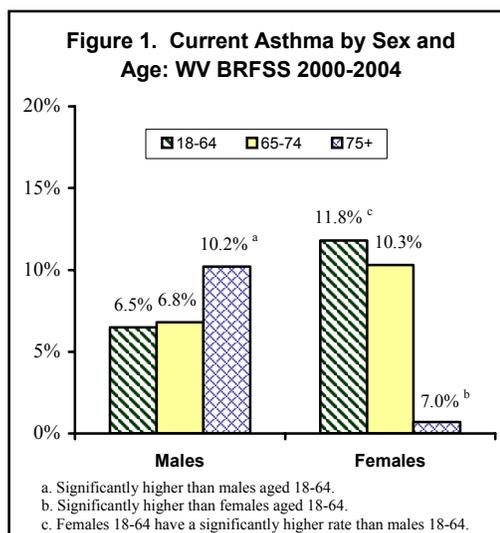
Lifetime asthma: Ever been diagnosed with asthma by a doctor, nurse, or other health professional.

Current asthma: Ever been diagnosed with asthma by a doctor, nurse, or other health professional and still have asthma.

US estimates for years 2000-2003 include 50 states and the District of Columbia. In 2004, data for Hawaii not available. US territories excluded.

During the period 2000-2004, West Virginia females had a significantly higher prevalence of current asthma than males. In fact, females reported a significantly higher prevalence than males at ages 25-34, 35-44, 45-54, and 55-64. Elderly females did not have a significantly higher prevalence of current asthma than elderly males (8.7% versus 8.0%) (see Table 1).

Overall, the prevalence of current asthma did not significantly differ by age among the elderly – 8.7% of West Virginia adults aged 65-74 had asthma, compared with 8.1% of those aged 75 and older. However, the likelihood of having asthma differed by age for men and women. **Whereas the prevalence of asthma decreased with age among women, men were significantly more likely to have asthma at older ages** (see Figure 1).



<sup>1</sup> US total includes 49 states and the District of Columbia. Data not available for Hawaii. US territories excluded.

# HOSPITALIZATIONS

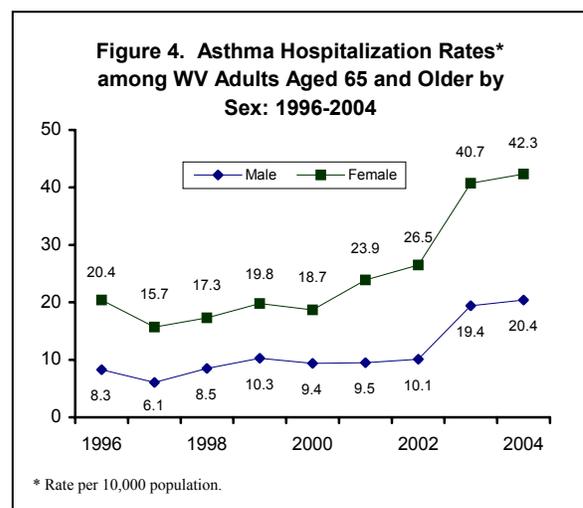
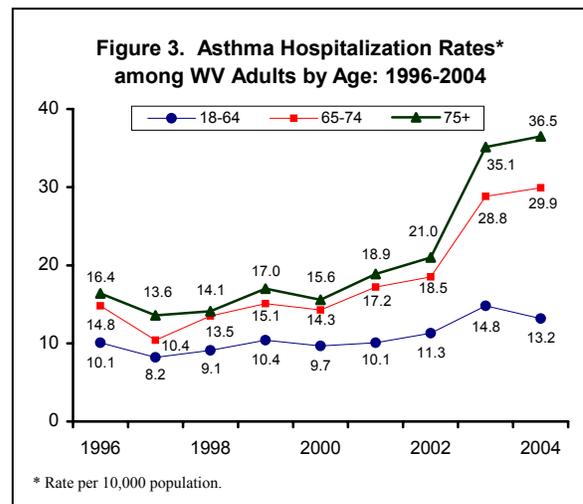
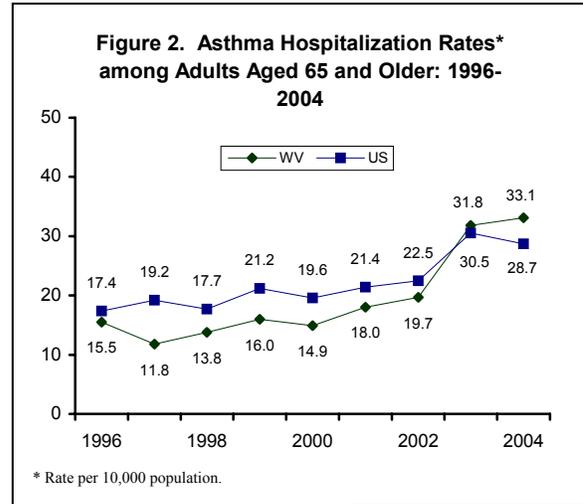
According to the West Virginia Health Care Authority (WVHCA)<sup>2</sup>, 3,202 hospitalizations with a primary diagnosis of asthma (ICD-9-CM 493) occurred among West Virginians (rate of 17.6 per 10,000) in 2004. More than one-fourth (28.8%) of these were among adults aged 65 and older (921 hospitalizations). In 2003 and 2004, West Virginia elderly had a higher rate of asthma hospitalizations than West Virginians aged 0-14, 15-44, and 45-64.

Asthma hospitalizations have increased among the elderly in both West Virginia and the United States over the past nine years (see Figure 2). *In fact, while the asthma hospitalization rate among younger West Virginians remained relatively stable between 1996 and 2004, the rate more than doubled among those aged 65 and older.* During this time, West Virginia experienced a greater increase than the United States in the elderly asthma hospitalization rate. *In 2004, adults aged 65 and older were hospitalized because of asthma complications at a rate of 33.1 per 10,000 in West Virginia, compared with 28.7 per 10,000 in the US.*

Asthma hospitalizations differ by age and sex among the elderly. Between 1996 and 2002, there was little difference in the asthma hospitalization rate among West Virginians aged 65-74 and those aged 75 and older (see Figure 3). However, in 2003, the rate among adults aged 75 and older increased sharply, surpassing the rate among those aged 65-74.

In every year from 1996 to 2004, West Virginia females had a higher rate of asthma hospitalizations than males. The same was true among the elderly (see Figure 4). *In 2004, West Virginia females aged 65 and older were hospitalized because of asthma complications at a rate more than twice that of males (42.3 per 10,000 versus 20.4 per 10,000).* In addition, between 1996 and 2004, elderly females experienced a greater increase in the rate of asthma hospitalizations than elderly males.

When hospitalized with asthma complications in 2004, West Virginia elderly spent an average of five days in the hospital. Hospitalization charges averaged \$9,000 per stay and totaled nearly \$8.4 million.



<sup>2</sup> The WVHCA collects hospital discharge data from all non-federal licensed hospitals in the state. National hospital discharge rates are obtained from the National Hospital Discharge Survey annual summary publications.

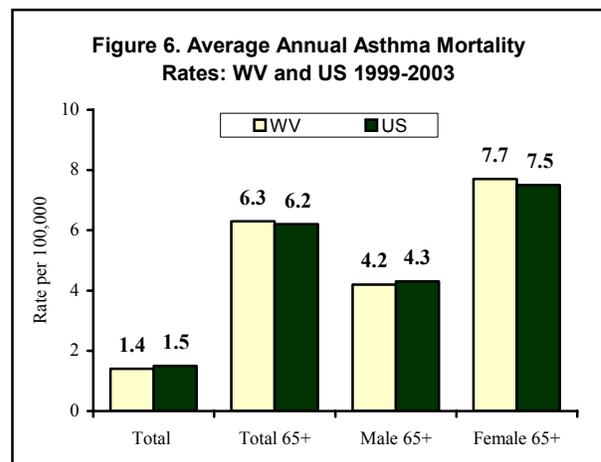
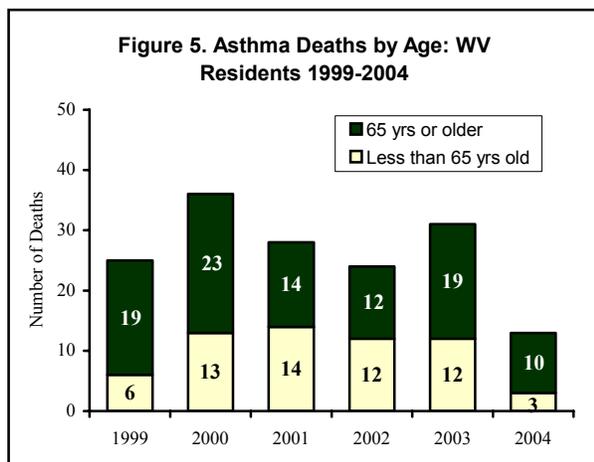
# MORTALITY

Nationally, asthma mortality has declined since 1999. In 2004, 3,780 people died of asthma in the United States (age-adjusted rate of 1.3 per 100,000) (2). Asthma mortality has fluctuated in West Virginia over the years. **Between 1999 and 2004, 157 West Virginians died of asthma, an average of 26 deaths per year** (average annual age-adjusted rate of 1.3 per 100,000) (ICD-10 J45-J46) (see Figure 5).

A majority of asthma deaths in West Virginia occur among the elderly. Between 1999 and 2004, 61.8% of asthma deaths in West Virginia were among adults aged 65 and older (see Figure 5). In the United States, 47.7% (1,955) of the 4,099 asthma deaths in 2003<sup>3</sup> were among the elderly (3).

The asthma mortality rate among WV elderly declined from an average annual rate of 6.7 per 100,000 in the years 1999-2001 to 4.9 per 100,000 in the period 2002-2004. The decline is mostly explained by the low number of deaths in 2004. Unfortunately, there does not appear to be a declining trend. Preliminary West Virginia vital statistics data indicate that 30 West Virginians died of asthma in 2005.

Females are more likely to die of asthma complications than males in both West Virginia and the United States. 70.7% (111) of the 157 WV elderly asthma deaths in 1999-2004 were among females. **The 1999-2003 average annual asthma mortality rate among West Virginia elderly was 4.2 per 100,000 for males compared with 7.7 per 100,000 for females** (see Figure 6). Elderly males and females in the United States have similar asthma mortality rates as those in WV (see Figure 6).



<sup>3</sup> 2004 US deaths by age not yet available from the National Center for Health Statistics.

## CONCLUSION

West Virginia adults aged 65 and older are significantly more likely to have asthma than those nationwide (10.3% versus 7.4% in 2004). In 2004, West Virginia had the second highest prevalence of asthma among the elderly in the country. This is the first time since West Virginia began collecting asthma data in 2000 that the prevalence of asthma among the elderly was significantly higher in West Virginia than the United States as a whole.

In addition, in 2003 and 2004, the rate of asthma hospitalizations among adults aged 65 and older was higher in West Virginia than the United States. Despite an increase in the asthma prevalence and hospitalization rate, West Virginia elderly maintained a slightly lower rate of asthma mortality than elderly adults nationwide for the years 1999-2003.

Although in West Virginia the elderly are no more likely to have asthma than younger people, they are more likely to experience complications related to asthma, such as hospitalization and death. Elderly females have higher rates of asthma related hospitalizations and mortality than elderly males, although they do not have a higher prevalence of asthma. In 2004, the asthma hospitalization rate was more than two times higher among elderly females than males in West Virginia.

In 2004, the West Virginia Asthma Education and Prevention Program (WV-AEPP), housed within the Bureau for Public Health and funded by the Centers for Disease Control and Prevention, began implementing asthma interventions across the state. In collaboration with the American Lung Association of West Virginia, WV-AEPP formed the West Virginia Asthma Coalition (WVAC). WVAC comprises individuals and organizations interested in reducing the burden of asthma in the state. WVAC members meet multiple times a year to collaborate and work on projects aimed at ensuring quality health care, promoting healthy trigger-free environments, identifying and addressing needs of children with asthma, and distributing information about the disease. For additional information, visit the following websites.

WV-AEPP: <http://www.wvdhhr.org/bph/oehp/asthma/default.htm>

WVAC: [http://www.alawv.org/WVAC\\_folder/WVAC.htm](http://www.alawv.org/WVAC_folder/WVAC.htm)

## METHODOLOGY NOTES

**BRFSS Estimates and Confidence Intervals:** Prevalence rates calculated from the Behavioral Risk Factor Survey are considered estimates since they are based on responses from a sample of the WV adult population, rather than all adults in the population. Confidence intervals are an indication of the reliability of an estimate. They represent the range of values among which the true value would be found. This brief presents 95% confidence intervals (95% CI), meaning that the true value would be within the given interval 95% of the time. Confidence intervals are derived from the survey procedures in SAS, a statistical software package.

**Determining Significance:** The term “significant” is used to describe estimates that are different. Statistically significant differences between groups must be determined using statistical tests such as a t-test or chi-squared test. Often when analyzing results of a survey with a large number of respondents, such as the BRFSS, statistical tests will indicate significant differences between groups even when there are only small differences in prevalence. Therefore, we use a more conservative method for determining significance that identifies meaningful differences for health promotion intervention. In this brief, when the confidence intervals for the two estimates do not overlap, the estimates are considered to be significantly different.

**Calculating Rates:** Hospitalization and mortality rates are calculated by dividing the number of cases by the number of people in the population. WV Population estimates are obtained from the US Census Bureau. Between each census, the Census Bureau annually updates population estimates for each year since the last census. The rates presented in this brief are dependent on the population estimates being used in the rate calculation. Using different population estimates may yield slightly different rates.

WV Estimates for the years 1996-1999 are Census Bureau intercensal resident estimates released 6/23/03. Estimates for 2000-2004 are Census Bureau Vintage 2004 resident estimates released 8/11/05.

US Estimates for the years 1999-2003 are National Center for Health Statistics (NCHS) Bridged Race resident estimates. 1999 estimates are intercensal estimates released in 2003. 2000-2004 estimates are Vintage 2004 estimates released 9/9/05.

## REFERENCES

1. Asthma and Allergy Foundation of America. *Asthma Overview: What Causes Asthma*. Online. <http://www.aafa.org/display.cfm?id=8&cont=6>.
2. Minino, AM, Heron, MP, Smith, BL. *Deaths: Preliminary Data for 2004*. National vital statistics reports; vol 54 no 19. Hyattsville, MD: National Center for Health Statistics. 2006. (Table 2).
3. Hoyert, DL, Heron, MP, Murphy, SL, Hsiang-Ching K. *Deaths: Final Data for 2003*. National vital statistics reports; vol 54 no 13. Hyattsville, MD: National Center for Health Statistics. 2006. (Table 10).

## ADDITIONAL RESOURCES

Behavioral Risk Factor Survey, 2000-2004. Sponsored by the Centers for Disease Control and Prevention. WV BRFSS conducted by the WV Health Statistics Center.

National Hospital Discharge Survey: Annual Summary with Detailed Diagnosis and Procedure Data. National Center for Health Statistics. (1996-2003). Online. <http://www.cdc.gov/nchs/about/major/hdasd/nhds.htm>.

WV Vital Statistics Mortality Data. (1999-2004). WV Health Statistics Center.

National Vital Statistics Reports. Deaths: Final Data. National Center for Health Statistics. (1999-2003). Online. <http://www.cdc.gov/nchs/products/pubs/pubd/nvsr/54/54-pre.htm>.

National Center for Health Statistics Mortality Tables: Online. <http://www.cdc.gov/nchs/datawh/statab/unpubd/mortabs.htm>.

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