



## Abstract

In North Carolina and for the U.S., females are more disproportionately affected with asthma than males and demonstrate significantly higher rates of prevalence, hospitalization, and mortality due to asthma. The objective of this study was to examine the prevalence, hospitalization, and mortality due to asthma among women in North Carolina by demographic characteristics, geographic distribution, and time trends. Data from the North Carolina State Center for Health Statistics (NC SCHS) were used, including those from the North Carolina Behavioral Risk Factor Surveillance System (BRFSS) survey. Asthma questions included lifetime and current asthma, asthma episodes and symptoms, use of healthcare professionals or facilities due to asthma, and use of asthma medications. Hospital discharge data is comprised of hospitalization information such as diagnoses, dates of admittance and discharge, length of stay, information on the patient, patient status at discharge, and payer and total amount billed per hospital stay. NC SCHS detailed mortality reports included asthma as a primary cause of death, coded under the ICD-10 classification as either J45.x (Asthma) or J46.x (Status Asthmaticus). The lifetime and current asthma prevalences for adult women in North Carolina in 2006 were 12.3% and 8.9% as compared to 9.5% and 4.5% for men, respectively. Women were about 1.67 times more likely to be hospitalized than men (158.4 hospitalizations per 100,000 population vs. 94.6). The asthma mortality rate was 16.34 per 1,000,000 population for women, compared to 11.52 for men. For women from 2000 to 2006, asthma prevalence rates peaked in 2004 (lifetime prevalence – 14.7%, current prevalence – 9.8%), asthma hospitalization rates peaked in 2003 (180.9 per 100,000 population), and asthma mortality remained relatively stable, averaging around 16.42 per 1,000,000 population. Western N.C. had the highest prevalence rates and the Piedmont (central) area had the lowest. Selected demographic characteristics showed variations within each category, notably race, education, and household income. The findings indicate that adult asthma among women in North Carolina is a serious public health issue. Prevalence, hospitalization and mortality rates due to this chronic disease remain substantially higher than those for males from 2000 to 2006.

### Background

"From the boardroom, to the weight room, to the classroom and all the way to the bedroom, asthma is disrupting women's lives." – Sophia Cariati, Society for Women's Health Research

"Too many women appear to be letting asthma rule their lives." – Bobby Q. Lanier, M.D. American College of Allergy, Asthma and Immunology

"We need to do a much better job of educating women about asthma so that they can have more active, healthy, and worry-free lives."

- Phyllis Greenberger, Society for Women's Health Research

From: "Asthma Wreaks Havoc on Women's Lives," www.womenshealthresearch.org/site/News2?page=NewsArticle&id=5333&news\_iv\_ctrl=0&abbr=press\_, extracted February 25, 200

## Introduction

In North Carolina and for the U.S., females are more disproportionately affected with asthma than males and demonstrate significantly higher rates of prevalence, hospitalization, and mortality due to asthma.

**Study objective:** To examine the prevalence, hospitalization, and mortality due to asthma among women in N.C. by demographic characteristics, geographic distribution, and time trends

## Methods

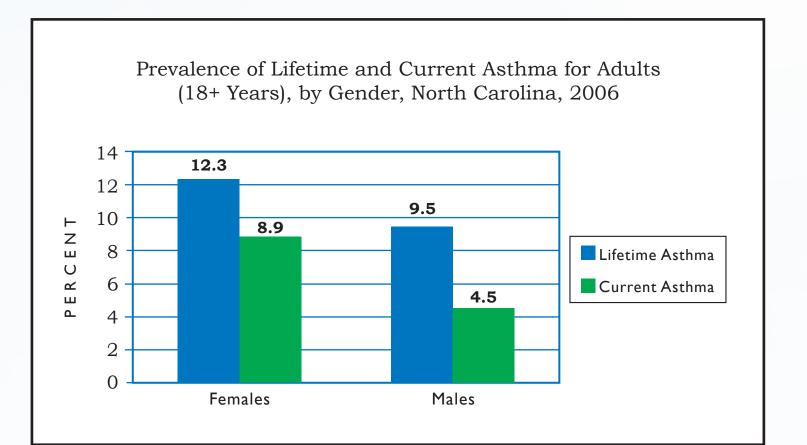
- **Sources of data:** 2000 2006 North Carolina Behavioral Risk Factor Surveillance System data for adults 18 years and older **Variables of interest:**
- \* BRFSS: lifetime prevalence, current prevalence, asthma episodes, inhaler use, asthma medication use, emergency department visits, healthcare provider visits
- \* Hospitalization data: diagnoses, length of stay, information on the patient, patient status at discharge, and payer and total amount billed per hospital stay
- **\* Mortality data:** asthma as a primary cause of death, coded under the ICD-10 classification as either J45.x (Asthma) or J46.x (Status Asthmaticus)

# Epidemiology of Asthma among Women in North Carolina

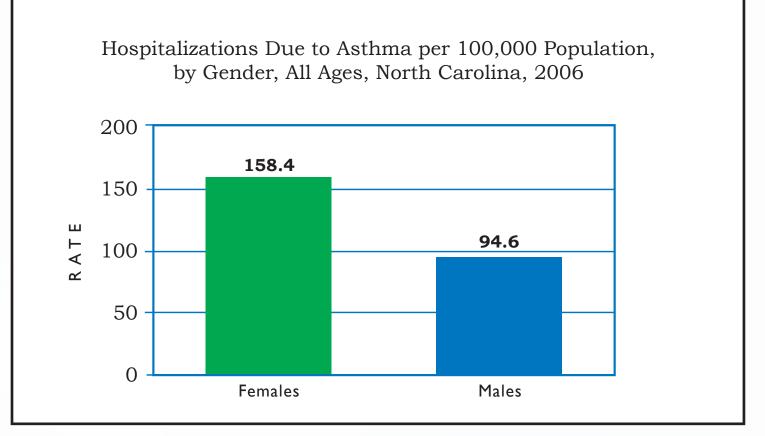
## Caroline Chappell<sup>1</sup>, Winston Liao<sup>1</sup>, Robert Woldman<sup>2</sup>, Matthew Avery<sup>2</sup>, and Yuan Fan<sup>2</sup> <sup>1</sup>Asthma Program and <sup>2</sup>N.C. State Center for Health Statistics

## Results

#### Lifetime Prevalence and Current Prevalence, 2006



#### **Hospitalizations Due** to Asthma, 2006

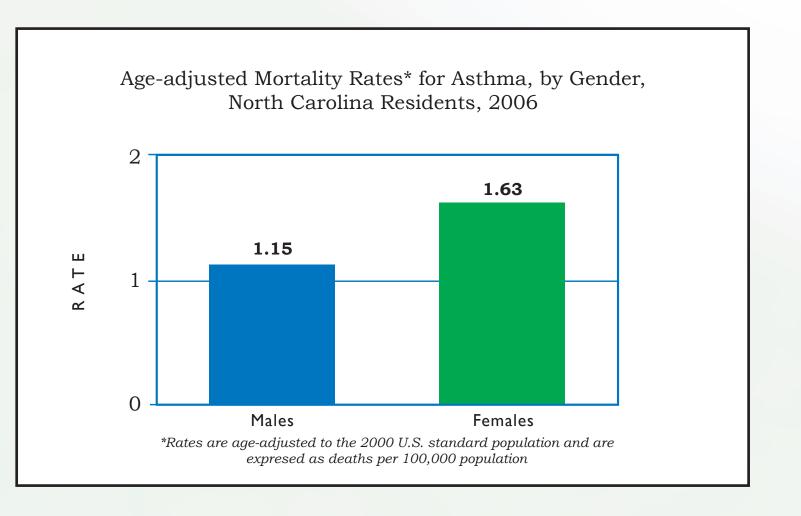


#### Hospitalizations Due to Asthma, Length of Stay and Charges, 2006

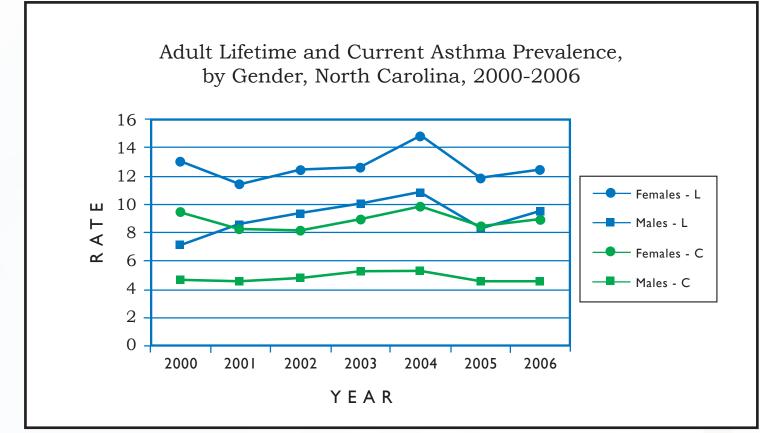
		FEMALES		MALES			
	<18 Years	18+Years	All Ages	<18 Years	18+Years	All Ages	
Total Length of Stay (Days)	2,360	24,420	26,780	3,949	7,521	11,470	
Total Charges	\$7,434,812	\$63,973,721	\$71,408,533	\$10,345,496	\$22,593,609	\$32,939,105	
Total Discharges	1,042	5,737	6,779	1,820	1,927	3,747	
Average Length of Stay (Days)	2.26	4.26	3.95	2.17	3.90	3.06	
Charges per Stay	\$7,135	\$11,151	\$10,534	\$5,684	\$11,725	\$8,791	

#### **Asthma-related Mortality,** 2006

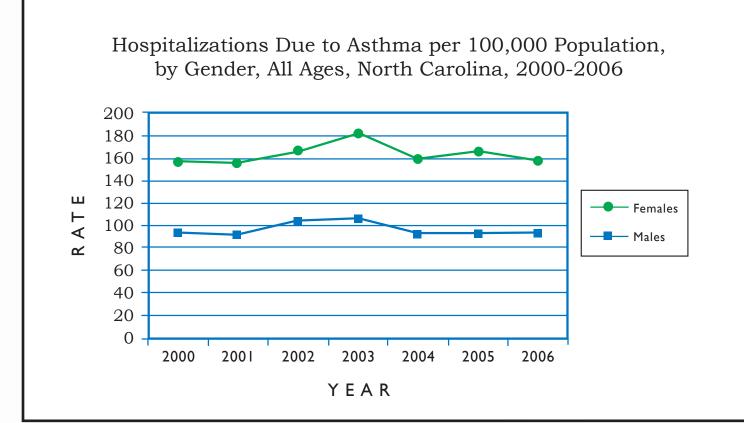
Source: State Center for Health Statistics, N.C. DHHS, 2006 Provisional Hospitalization Data



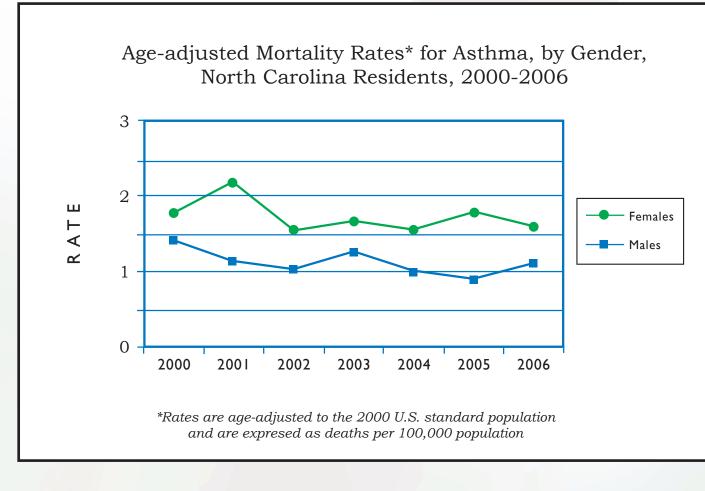


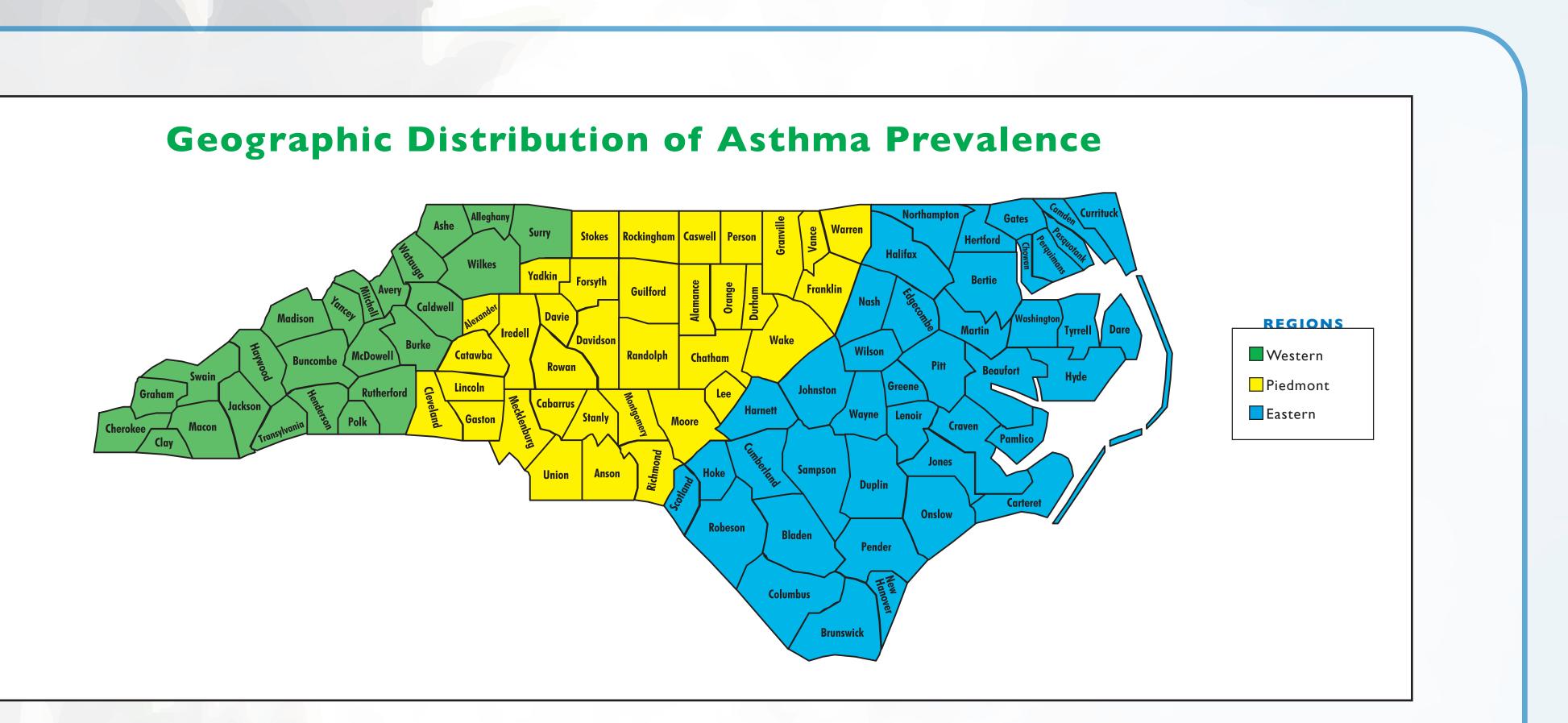


#### Hospitalizations Due to Asthma, 2000-2006



#### Asthma-related Mortality, 2000-2006





#### **Geographic Distribution of Asthma Prevalence**

		WESTERN		ΡΙΕΟΜΟΝΤ		EASTERN	
		Lifetime Asthma	Current Asthma	Lifetime Asthma	Current Asthma	Lifetime Asthma	Current Asthma
Gender	FEMALES	12.6	9.5	12.1	8.6	12.5	9.3
	MALES	11.6	4.2	9.0	4.0	9.8	5.6
Race/Ethnicity	WHITE	12.3	6.9	11.0	6.8	10.5	6.8
	A F R I C A N - A M E R I C A N	8.2**	8.2**	11.8	7.8	14.4	9.9
Education	<high school<="" td=""><td>15.3</td><td>8.1</td><td>13.8</td><td>10.5</td><td>13.6</td><td>10.4</td></high>	15.3	8.1	13.8	10.5	13.6	10.4
Income	< \$   5 , 0 0 0	20.1	14.1	15.9	12.8	16.9	14.6

Expressed as percent \*\* Based on numerator less than 20, interpret with caution

# Conclusions

- than males from 2000 to 2006
- Society for Women's Health Research
- North Carolina DHHS Public Affairs
- Emily Iversen, Asthma Program

#### The authors dedicate this presentation in memory of Janet Reaves.

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Adult asthma among women in North Carolina is a serious public health issue

Prevalence, hospitalization and mortality rates due to asthma remain substantially higher in females

Demographic variability exists across the three regions in North Carolina

## Acknowledgments

State Center for Health Statistics, Division of Public Health, N.C. Department of Health & Human Services