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Asthma

The word asthma comes from the Greek, *aazein*, which translates as “to breathe with open mouth or to pant”. It first appeared in Homer’s *Iliad* meaning short of breath, and probably was first used in a medical sense by Hippocrates. Today the general consensus that is emerging is that asthma is unlikely to be a single disease entity, but rather a clinical manifestation of several distinct diseases. Therefore, it has been proposed that the term asthma should be abolished altogether.¹⁰⁴

Asthma is a chronic lung condition. It is characterized by difficulty in breathing. People with asthma have extra sensitive or hyperresponsive airways that react by narrowing or obstructing when they become irritated. This narrowing or obstruction can cause one or a combination of the following symptoms: wheezing, coughing, shortness of breath, and chest tightness. This narrowing or obstruction is caused by airway inflammation and broncho-constriction. Two factors provoke asthma: triggers which result in broncho-constriction, and inducers which result in inflammation of the airways. Common triggers of broncho-constriction include everyday stimuli such as cold air, dust, strong fumes, exercise, inhaled irritants, emotional upsets, and smoke. Second-hand smoke has been shown to aggravate asthma symptoms, especially in children.

In contrast to triggers, inducers cause both airway inflammation and airway hyper-responsiveness and hence are recognized as causes of asthma. Inducers result in symptoms which may last longer, are delayed and less easily reversible than those caused by triggers. The most common inducers are allergens and respiratory viral infections.

According to the Centers for Disease Control and Prevention (CDC), asthma prevalence, morbidity and mortality increased among adults in the United States between 1980 and 1999. Yet, in other industrialized countries (Canada, England, Australia, and New Zealand) the asthma mortality rates have been decreasing.

In 2005, 9 million children <18 y of age in the US had been diagnosed with asthma, with boys (15%)

¹⁰⁴ Anon. 2006. A plea to abandon asthma as a disease concept. *Lancet* 368:705.



more likely than girls (9%) to be diagnosed.¹⁰⁵ Black children are more likely to have asthma (13% vs 9% for Hispanics and 8% for whites) and to experience emergency department visits for asthma than whites.¹⁰⁶ And, children from poor families (11%) were more likely to be diagnosed with asthma than children from families that were not poor (9%). This latter observation may be related to cockroach allergens in the home environment.¹⁰⁷ Children in fair or poor health are 5 times more likely to have asthma 40% as children in excellent or very good health (7%). Among high school students, 16.1% are current asthmatics.¹⁰⁸

A child's birthweight and gestational age may influence their risk of developing asthma. Canadian researchers found that 10.4% of the pregnant women they studied were asthmatic and that among children born after <37 weeks gestation the prevalence rate of asthma was 6.3% and 4.9% if they were <2,500 g at birth (Reuters News 3/7/06). US researchers have reported that low-birthweight children were twice as likely as normal birthweight children to have an asthma diagnosis, 34% vs 18%, respectively, at 3 years of age.¹⁰⁹ Neighborhood housing characteristics were strong predictors of childhood asthma.

Using 2002 BRFSS data, Missouri adults had a lifetime prevalence rate for asthma of 12.5% and a current asthma rate of 8.5%.¹¹⁰ Nationally, these same rates were 11.8% and 7.5%, respectively. Women have a higher lifetime prevalence rate of asthma, 11.6%, compared to 10.6% for men. Also, there is an association between obesity and asthma, and this is stronger among women than men; this association holds for most racial and ethnic subgroups.¹¹¹ The rates are higher among certain

¹⁰⁵ National Center for Health Statistics. 2006. Summary health statistics for US children: National Health Interview Survey, 2005. National Center for Health Statistics, *Vital Health Stat* 10(231), 138 p. www.cdc.gov/nchs.

¹⁰⁶ McDaniel M et al. 2005. Racial disparities in childhood asthma in the United States: evidence from the National Health Interview Survey, 1997 to 2003. *Pediatrics* 117:e868-e877.

¹⁰⁷ Gruchalla RS et al. 2005. Inner City Asthma Study: relationships among sensitivity, allergen exposure, and asthma morbidity. *J Allergy Clin Immunol* 115:478-485.

¹⁰⁸ Merkle S et al. 2005. Self-reported asthma among high school students – United States, 2003. *MMWR* 54:766-767.

¹⁰⁹ Nepomnyaschy L, Reichman NE. 2006. Low birthweight and asthma among young urban children. *Am J Public Health* 96:1604-1610.

¹¹⁰ Centers for Disease Control and Prevention. 2004. Asthma prevalence and control characteristics by race/ethnicity – United States, 2002. *MMWR* 53:145-148.

¹¹¹ Kim S, Camargo CA. 2003. Sex-race differences in the relationship between obesity and asthma: The Behavioral Risk Factor Surveillance System, 2000. *Am J Epidemiol* 13:666-673.

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racial and ethnic minorities than whites. Data from CDC's Asthma Surveillance Survey show that Puerto Ricans have the highest lifetime prevalence of asthma at 19.6%. That level is considerably higher than 8.3% for Hispanics, overall, and 6.1% for Mexicans (www.cdc.gov/asthma). For whites the rate is 13.8% and for blacks, 11.1%. Native Americans have a rate of 13.3%. The lifetime prevalence rate for persons <18 y of age is 12.2% versus 10.6% among older persons.

BRFSS data also indicate that among Missourians with asthma, 28.4% were current smokers (compared to 26% for persons without asthma) and that regular exposure to second hand smoke was common.¹¹² The prevalence of exposure to second hand smoke varied between 19.9% and 36.4% depending on the setting: 22% in the home, 36% in a vehicle, and nearly 20% in the workplace. Those asthmatics with college or technical school education, and blacks were less likely to be current smokers, although among non-current smokers, blacks were more likely to be exposed to second hand smoke. Of the asthmatic current smokers who had visited a physician in the past 12 months, 30% were not advised to quit smoking.

The prevalence of current asthma sufferers is lower than the lifetime prevalence rate. Overall, 7.2% of persons in the US are current asthmatics. Again, the rates are higher among women, 8.1%, than men, 6.2%. Puerto Ricans have the highest rate, 13.1% compared to 4.9% for Hispanics, overall, and 3.6% for Mexicans. Rates for whites, blacks, and Native Americans are 9.5%, 7.2%, and 9.9%, respectively. The prevalence is higher among persons <18 y of age, 8.3%, compared to 6.8% for older individuals.

The differences between Hispanic groups may close over time. Research now suggests that Mexican-American children born in the US are twice as likely to develop asthma as those born in Mexico.¹¹³

CDC reports that, in 2002, 4.3% of the population had experienced at least one asthma attack in the

¹¹² Yun S et al. 2006. Active and passive smoking among asthmatic Missourians: implications for health education. *Prev Med* 42:286-290.

¹¹³ Holguin F et al. 2005. Country of birth as a risk factor for asthma among Mexican Americans. *Am J Respir Crit Care Med* 171:103-108.



prior year. The data for sex, age, and race/ethnicity mirror that described above. It is estimated that children 5-17 years of age missed more than 14.7 million school days in 2002 due to asthma and that employed adults missed 11.8 million work days.

A 2004 telephone survey commissioned by the Kansas City Health Department found a 12.5% prevalence rate for asthma among respondents.¹¹⁴ Earlier estimates of the prevalence of asthma in the Kansas City metropolitan area were compiled by American Lung Association (ALA) for 1996. The ALA estimated there were 34,743 adults and 14,195 adolescents and children (<18 y of age) with asthma in Clay, Jackson, and Platte counties. There were 15 asthma related deaths that year, 14 in Jackson County and 1 in Clay County. Of those persons with asthma, approximately 24,300 individuals lived in Kansas City (15,900 adult and 8,400 adolescents and children).

About 60% of persons with asthma suffer from allergic asthma. For these individuals, Kansas City is not the not the worst environment, but it is far from the best. Rankings of metropolitan areas across the nation for 2006 by the Asthma and Allergy Foundation of America placed Kansas City as the 25th leading "US Spring Allergy Capital" out of 100 communities with a rating of worst than average (www.aafa.org). Kansas City was 37th in the 2004 ranking. In 2006, St Louis City ranked 33rd, compared to 10th in 2005. When the Asthma and Allergy Foundation of America ranked communities for asthma, however, in 2006 Kansas City was the 56th leading "US Asthma Capital" out of 100 communities with a rating of average. Kansas City was 52nd in 2005. St Louis City ranked 6th in 2005 and 9th in 2006.

For the period 2000-2004, the death rate in Missouri from asthma was 1.4 per 100,000 population, while in Kansas City the rate was 1.9 compared to 3.4 in St Louis City. Of the 40 asthma deaths in Kansas City, 25 were among blacks and 14 among whites.

Asthma was the 3rd leading cause of visits to Kansas City emergency departments in 2003, with 4,424 visits. Among blacks and Hispanics it was the 3rd leading cause, but it was only the 5th leading cause for whites. This racial and ethnic disparity was consistent with the national data. It was the 8th overall cause of hospitalization that year and was the 3rd leading cause for persons under 25 years of

¹¹⁴ Kansas City Health Department. 2004. 2004 Health Assessment Survey. www.kcmo.org/health.



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age. For blacks asthma was the 6th leading cause for hospitalization.

Asthma visits to emergency departments and hospitalizations peak in Kansas City during May and October each year. The specific causes for these peaks is not known, although Canadian researchers believe the Fall peak in their country is driven by kids, colds, and the return to school.¹¹⁵

Nationally, important differences exist in charges incurred by children with asthma based on patient and hospital characteristics.¹¹⁶ Charges are lower for non-children's hospitals, higher for minority children, and higher for children on Medicaid.

¹¹⁵ Johnston NW et al. 2006. The September epidemic of asthma hospitalizations: school children as disease vectors. *J Allergy Clin Immunol* 117:557-562.

¹¹⁶ Gupta RS et al. 2006. Predictors of hospital charges for children admitted with asthma. *Ambulatory Pediatr* 6:15-20.