



## High Blood Cholesterol Update

*Kentucky ranked among nation's top ten for high blood cholesterol levels*

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### Introduction

High blood cholesterol is defined as 240 mg/dL (milligrams per deciliter) or more total cholesterol (high density lipoprotein and low density lipoprotein combined) and is one of the main risk factors for heart attack, coronary heart disease, and stroke. High blood cholesterol does not usually cause symptoms, so a person may not know his or her blood cholesterol is too high. Therefore, blood cholesterol should be checked regularly. Blood cholesterol and triglyceride levels (a type of fat found in the blood) can be checked with a lipoprotein profile. Appropriate levels of blood cholesterol and triglycerides include: total cholesterol less than 200 mg/dL, low density lipoprotein (LDL) cholesterol ("bad" cholesterol) less than 100 mg/dL, high density lipoprotein (HDL) cholesterol ("good" cholesterol) 40 mg/dL or higher, and triglycerides less than 150 mg/dL.

Approximately 105.2 million (48.4%) adults in the U.S. have total blood cholesterol levels at or above the recommended level of 200 mg/dL. Additionally, among all adults in the U.S., 36.6 million (16.8%) have high blood cholesterol.

### Percentage of Kentucky Adults Who Have Ever Had High Blood Cholesterol

Among all adults in the U.S., 16.8% (36.6 million) have high blood cholesterol. Additionally, approximately 105.2 million (48.4%) adults in the U.S. have total blood cholesterol levels at or above the

recommended level of 200 mg/dL.

### Prevalence of High Blood Cholesterol among Kentuckians

The prevalence of high blood cholesterol is determined through questions on the Behavioral Risk Factor Surveillance System (BRFSS), an adult telephone survey co-sponsored by the Centers for Disease Control and Prevention (CDC) and the Kentucky Department for Public Health (DPH). High blood cholesterol awareness questions were included on the survey beginning in 1995 and are asked every other year. Questions ask if the respondent has ever had his/her blood cholesterol checked; approximately how long it had been since it was last checked; and if a doctor, nurse or other health professional had ever said his/her blood cholesterol was high.

In 2005, Kentucky ranked in the top ten for the nation in high blood cholesterol (ninth behind WV, FL, NV, PR, DE, MI, MO, and AL). Between 1995 and 2005, the percentage of Kentucky adults with high blood cholesterol increased from 29.8% to 38.1%. In 2005, the proportion of Kentucky adults that have ever had their blood cholesterol checked was 77.8%, which is an increase from 67.6% in 1995. Additionally, according to the 2005 BRFSS, 73.8% of Kentucky adults had their blood cholesterol checked in the previous five years, and 22.7% had never had it checked. In comparison, both of these are improvements from the 1999 BRFSS, when 67.2% of individuals had it checked in the previous 5 years and 27.9% had never had it checked.

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### High Blood Cholesterol in Demographic Groups

The percentage of Kentucky adults who have ever had high blood cholesterol can be compared across demographic groups such as sex, race, age, education, and income. In Table 1, a slightly higher percentage of women (38.5%) have ever had high blood cholesterol compared to men (37.6%). Among whites, the percentage is slightly higher at 38.6% compared to African Americans at 35.3%. The percentage of Kentucky adults who have ever had high blood cholesterol increases statistically significantly with age, with the highest percentage among adults age 65 years and older. The percentage of high blood cholesterol is also shigher among those who did not graduate from high school (55.0%), compared to those with a high school

**Table 1. Prevalence of Kentucky Adults Who Have Ever Had High Blood Cholesterol by Demographic Groups (Kentucky BRFSS 2005)**

Demographic Groups	% that have ever had high blood cholesterol	95% CI
Prevalence of Kentucky Adults Who Have Ever Had High Blood Cholesterol	38.1	(36.2-39.9)
Sex		
Male	37.6	(34.5-40.7)
Female	38.5	(36.4-40.7)
Race		
White/Non-Hispanic	38.6	(36.7-40.5)
African-American/Non-Hispanic	35.3	(25.8-46.0)
Age*		
18-24	8.4	(4.2-16.0)
25-34	21.6	(17.2-26.7)
35-44	29.7	(25.7-34.1)
45-54	40.6	(36.7-44.6)
55-64	52.1	(48.0-56.2)
65+	53.7	(51.3-59.1)
Education*		
Less than High School	55.0	(50.1-59.7)
High School or Greater	35.3	(31.1-38.3)
Household Income		
Less than \$35,000	43.1	(38.1-48.8)
\$35,000 or Greater	32.7	(28.0-38.0)

\*Difference is significant at  $p < 0.05$ , Chi-Square.

diploma (35.3%), and is higher in households with an income less than \$35,000 (43.1%) compared to 32.7% of household incomes of \$35,000 or greater.

### High Blood Cholesterol and Other Risk Factors

High blood cholesterol prevalence can also be examined in light of other risk factors including high blood pressure, smoking status, diabetes, overweight or obesity, fruit and vegetable consumption, and physical activity. For all six risk factors listed in Table 2 (page 3), a higher percentage of Kentucky adults with each risk factor were also found to have ever had high blood cholesterol. However, there is a statistically signifi-

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cant difference in Kentucky adults who ever had high blood cholesterol and the risk factors (ever had high blood pressure, current smoking, diabetes, overweight or obesity, and no exercise in the previous 30 days.

**Table 2. Prevalence of Kentucky Adults Who Have Ever Had High Blood Cholesterol by Risk Factor or Health Condition (Kentucky BRFSS 2005)**

<b>Risk Factor or Health Condition</b>	<b>% that have ever had high blood cholesterol</b>	<b>95% CI</b>
Prevalence of Kentucky Adults Who Have Ever Had High Blood Cholesterol	38.1	(36.2-39.9)
Ever Had High Blood Pressure*		
Yes	56.6	(53.6-59.6)
No	28.6	(25.6-30.0)
Current Smoker*		
Yes	41.6	(37.9-45.5)
No	36.9	(34.8-39.0)
Diabetic*		
Yes	56.9	(51.3-62.4)
No	35.3	(33.4-37.3)
Overweight or Obese (BMI > 25 kg/m <sup>2</sup> )*		
Overweight/Obese	42.3	(40.0-44.7)
Not Overweight/Obese	29.6	(26.7-32.7)
Daily consumption of fruits and vegetables		
Less than 5 fruits, vegetables per day	38.4	(36.3-40.5)
5 or more fruits, vegetables per day	36.3	(32.0-40.7)
Physical Inactivity*		
Exercise in past 30 days	33.9	(31.7-36.1)
No exercise in past 30 days	47.3	(40.0-50.5)
General Health*		
Excellent, Very Good, Good	31.2	(26.9-33.7)
Fair or Poor	57.7	(51.3-63.2)
Number of Days of Poor Physical Health in Past 30 Days		
Less than 14	35.6	(24.9-48.7)
14 or greater	56.6	(43.7-65.6)
Number of Days of Poor Mental Health in Past 30 Days		
Less than 14	36.6	(28.8-41.6)
14 or greater	48.6	(42.2-60.9)
Activities Limited by Health Problem*		
Yes	53.5	(50.0-57.0)
No	33.1	(31.0-35.3)

\*Difference is significant at  $p < 0.05$ , Chi-Square.

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### High Blood Cholesterol and Health Outcomes

High blood cholesterol is a main risk factor for health outcomes such as heart attack, coronary heart disease, and stroke. In 2005, among all Kentucky adults, 6.1% had been told they had a heart attack, 5.6% had been told they had coronary heart disease, and 3.2% had been told they had a stroke. Kentucky adults that had been told by a doctor, nurse, or other health professional that they had a heart attack, coronary heart disease, or stroke also had higher percentages of ever having had high blood cholesterol compared to those without the same health outcome. For all three health outcomes, there was a statistically significant difference in ever had high blood cholesterol (Table 3).

**Table 3. Prevalence of Kentucky Adults Who Have Ever Had High Blood Cholesterol by Health Outcome: Heart Attack, Coronary Heart Disease, and Stroke (Kentucky BRFSS 2005)**

Health Outcome	% that have ever had high blood cholesterol	95% CI
Prevalence of Kentucky Adults Who Have Ever Had High Blood Cholesterol	38.1	(36.2-39.9)
Heart Attack*		
Yes	70.1	(63.9-75.7)
No	35.3	(33.4-37.2)
Coronary Heart Disease*		
Yes	66.2	(59.8-72.1)
No	35.6	(33.7-37.6)
Stroke*		
Yes	68.4	(59.7-76.0)
No	36.9	(35.0-38.8)

\*Difference is significant at  $p < 0.05$ , Chi-Square.

### Geographic Distribution of High Blood Cholesterol

Geographically, the prevalence of Kentucky adults who have ever had high blood cholesterol ranges from 34.1% in Barren River Area Development District (ADD) to 49.1% in Big Sandy ADD according to data from the 2005 BRFSS. The highest prevalence of Kentucky adults who have ever had high blood cholesterol is in the eastern and southeastern regions of the state, which include Kentucky's Appalachian counties (Table 4, page 5). These regions also have the highest proportion of Kentucky adults with risk factors described previously in this article, as well as the highest prevalence of Kentucky adults with heart attack, coronary heart disease, and stroke.

### Conclusion

In 2005, more than a third of Kentucky adults reported they had high blood cholesterol, an increase from 1995. Kentucky ranks in the top ten for high blood cholesterol, and most Kentucky adults who have ever had high blood cholesterol also have other risk factors, including high blood pressure, smoking, diabetes, overweight or obesity, low fruit and vegetable consumption, and physical inactivity. Kentucky adults who have ever had high blood cholesterol were more likely to have fair or poor health, have more days of poor physical or mental health, and have activities that are limited by a health problem. Additionally, Kentucky adults that have had a heart attack are more than twice as likely to have high blood cholesterol, and adults

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that had coronary heart disease or stroke are almost twice as likely to have high blood cholesterol. However, awareness about blood cholesterol is increasing, and more than 75% of Kentucky adults have ever had their blood cholesterol checked.

**Table 4. Prevalence of Kentucky Adults Who Have Ever Had High Blood Cholesterol by Area Development District (Kentucky BRFSS 2005)**

Area Development District	% that have ever had high blood cholesterol	95% CI
Prevalence of Kentucky Adults Who Have Ever Had High Blood Cholesterol	38.1	(36.2-39.9)
Big Sandy	49.1	(42.2-56.1)
Kentucky River	46.2	(39.5-53.1)
FIVCO	43.4	(36.7-50.3)
Gateway	42.5	(35.8-49.4)
Lake Cumberland	40.7	(35.0-46.8)
Cumberland Valley	40.4	(34.2-47.1)
Purchase	39.9	(33.7-46.5)
Buffalo Trace	39.5	(32.8-46.8)
Green River	39.0	(32.8-45.6)
Bluegrass	37.6	(32.4-43.0)
Lincoln Trail	37.4	(31.4-43.9)
Pennyrile	37.3	(30.7-44.4)
Northern Kentucky	36.0	(30.5-41.9)
Kentuckiana	35.2	(30.4-40.3)
Barren River	34.1	(28.6-40.0)

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**Kentucky Department  
for Public Health**

### Quadrivalent Human Papillomavirus (HPV) Vaccine Availability In Kentucky

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In June 2006, the U.S. Food and Drug Administration (FDA) licensed GARDASIL, a quadrivalent human papillomavirus (HPV) vaccine (Merck & Co., Inc.) for use in females ages 9 – 26 years old. The Advisory Committee on Immunization Practices (ACIP) voted at the June 2006 meeting to recommend the routine use of the quadrivalent HPV vaccine as a three-dose series for females ages 11-12 years. Quadrivalent HPV vaccine is also recommended for females ages 13-26 years who did not complete or receive the vaccine when they were younger. The series can be started in females as young as nine years of age. This vaccine provides protection from two types of HPV, the sexually transmitted disease which causes 70% of cervical cancers, and two types of HPV which cause 90% of genital warts.

In order to provide access to this important vaccine to as many patients as possible, please note the various ways physicians may provide this vaccine to their patients:

**1) Vaccine for Children (VFC) program:** If the provider is a VFC provider, the Kentucky VFC program will provide HPV vaccine to VFC-eligible female patients ages 9 – 18 years old.

**2) Department for Medicaid Services (Kentucky Care Program):** The Kentucky Department for Medicaid Services will reimburse for the cost of the HPV vaccine for Medicaid-eligible female patients ages 19 – 26 years old who present to their local health department.

**3) Merck's Vaccine Patient Assistance Program:** For uninsured females ages 19 – 26 years old, *Gardasil*<sup>™</sup>, is covered for patients who meet certain eligibility requirements. The program is available in the private offices of licensed prescribers. (Practices which are wholly owned and operated by

the government are not eligible for the Merck Vaccine Patient Assistance Program at this time.) For more information about this program, visit Merck's Web site at:

<http://www.merck.com/merckhelps/vaccines/home.html>.

**4) Private insurance patients:** Please check with the patient's insurance carrier to determine their benefit coverage.

### Become an Influenza Surveillance Site

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State Influenza Coordinator,  
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Public Health

Influenza is a contagious viral respiratory illness that can cause mild to severe illness and even death. According to Centers for Disease Control and Prevention (CDC) influenza (flu) is responsible for approximately 200,000 hospitalizations and 36,000 deaths annually in the U.S.

Signs and symptoms of influenza include:

- Fever (usually high)
- Headache
- Extreme tiredness
- Dry cough
- Sore throat
- Runny or stuffy nose
- Muscle aches
- Nausea, vomiting, and diarrhea (more common in children)

Complications of influenza include:

- Bacterial pneumonia
- Ear infections
- Sinus infections
- Dehydration
- Worsening of chronic medical conditions such as congestive heart failure, diabetes, and asthma

The flu virus is spread mainly from person-to-person through coughing and sneezing of individuals that are ill. One may become ill by touching ob-

**Cases of Selected Reportable Diseases in Kentucky  
(YTD Through MMWR Week 26) Preliminary Totals**

<b>DISEASE Jan 1-June 30</b>	<b>2007*</b>	<b>5 Year Median</b>
AIDS**	99	99
Chlamydia	3867	4103
Gonorrhea	1450	1569
Syphilis (all forms)	87	87
Group A Streptococcus	30	30
Meningococcal Infections (Neisseria)	6	8
<i>Haemophilus influenzae</i> , invasive	2	2
Hepatitis A	9	11
Hepatitis B - acute	29	36
Hepatitis C - acute	14	14
E. coli Shigatoxin Positive (STEC)	17	12
Salmonella	207	155
Shigella	135	105
Tuberculosis	55	51
Animal Rabies	10	10
Legionella	12	12

<b>VACCINE PREVENTABLE</b>	<b>2007 YTD</b>	<b>5 Year Median</b>
<i>Haemophilus influenzae</i> , invasive	6	2
Influenza Isolates	734	576
Measles	0	0
Mumps	0	0
Pertussis	5	15
Rubella	0	0
<i>Streptococcus pneumoniae</i>	19	19
Tetanus	0	0

<b>VECTOR-BORNE</b>	<b>2007 YTD</b>	<b>5 Year Median</b>
Rocky Mtn. Spotted Fever	4	0
Lyme Disease	0	0
Ehrlichiosis	2	1
Tularemia	0	0
Arboviral Encephalitis	0	0
Malaria	4	1

NOTE: These should be considered preliminary totals.

\*Lower numbers for 2007 may reflect a delay in reporting.

\*\*Does not include those who are only HIV positive

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jects that have been contaminated with the flu virus. According to the CDC, most healthy adults may be able to infect others beginning one day **before** symptoms develop and up to five days **after** becoming sick. The best method of prevention is to receive an annual influenza vaccination.

College campuses are an excellent avenue for the spread of influenza disease due to dormitory living arrangements, crowded classrooms, and the lifestyle of young adults. Since this population receives much of their medical care via the campus health centers, colleges would be an ideal source for reporting influenza-like-illness (ILI) to the State Influenza Coordinator by becoming sentinel surveillance sites.

The Kentucky Immunization Program is currently recruiting additional physician practices and hospitals to be influenza sentinel surveillance sites for the 2007-2008 influenza season. Each week, influenza sentinel surveillance sites report directly to CDC via a dedicated Web site on the numbers of patients seen exhibiting ILI along with the total number of patients seen (as a reference). The information on weekly ILI activity contributes to the ongoing assessment of influenza activity in Kentucky. If your practice, hospital or campus health center is interested in participating in this important work as a CDC-approved influenza sentinel surveillance site, please contact Emily Adkins, R.N., State Influenza Coordinator at (502) 564-4478 Ext. 3516 or via email at [Emily.Adkins@ky.gov](mailto:Emily.Adkins@ky.gov).