



## Rabies in Kentucky—2005

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The Kentucky Department for Public Health Division of Laboratory Services and the Breathitt Veterinary Center received 995 animal specimens from Kentucky counties for rabies testing in 2005. There were 61 (6.1%) samples unsuitable for testing because of decomposition or extreme traumatic damage to the brain. There were 17 (1.7%) specimens that tested positive for rabies. There were no positive domestic animals, 11 positive bats (previous 5 year mean= 6.2) and 6 positive skunks (previous 5 year mean= 15.2) (Table 1, page 3).

The total of 17 rabies cases is 41.6% lower than the preceding 5-year mean of 29.1 animal rabies cases and the lowest number of cases from documented records dating back to 1929. For the first time since 1929, there were no domestic animal cases. In the preceding 5 years (2000-2004), there were 26 rabid domestic animals (4 cats, 15 dogs, 3 cattle, 1 goat, and 3 horses). Theoretically, there should be no rabid adult dogs, cats or ferrets in Kentucky since there is a statewide law requiring that they be vaccinated against rabies by 4 months of age.

The statewide distribution pattern of positive rabies cases shown in Figure 1 may not be completely representative of rabies activity in the state; it may only reflect the distribution of samples submitted for testing. Almost all the samples submitted were due to some form of suspicious interaction between the animal tested and a human or domestic animal, and 92.7% of all submissions involved a bite or other physical contact with a human or domestic animal. For positive animals, 70.6% were known to involve rabies exposure to a human or other animal. Unexpectedly, positive bats accounted for the

majority of animals that tested positive for rabies in Kentucky. Unlike Ohio, Tennessee, and the states east of the Appalachian Mountains, Kentucky does not have the raccoon rabies strain epizootic. However, the Centers for Disease Control and Prevention considers Kentucky at risk for the introduction of the raccoon rabies variant from West Virginia or Tennessee. Multiple federal and state agencies are actively engaged in preventing the spread of raccoon

### 2005 - An Unusual Year for Rabies in Kentucky

For the first time, Kentucky had no cases of rabies in a domestic animal and the lowest total number of cases (17) found in our records which date back to 1929. Another oddity was the species and temporal distribution of wildlife rabies cases. Generally, skunks represent the majority of cases and rabid skunks are found throughout the year. In 2005, there were more rabid bats (11) found than rabid skunks (6), and all the rabid skunks were found January through May while all the rabid bats were found June through November. No immediate explanation could be determined for the overall decrease in rabies cases and the unusual temporal distribution of wildlife cases.

rabies westward from states in which it is already epizootic.

### Rabies Postexposure Prophylaxis

Beginning June 16, 1997, rabies postexposure prophylaxis (PEP) became a reportable treatment. This

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surveillance activity was mandated in order to estimate how many patients in Kentucky receive this expensive treatment. Surveillance of PEP allows the Kentucky Department for Public Health (KDPH) to follow trends in PEP administration which would reflect any changes in the number of human exposures due to an increase in rabid or suspected rabid animals. This may serve as an early warning of any rabies epizootics. It also allows KDPH to estimate the financial burden of this public health intervention. Both private and public reporters can report through the Disease Surveillance Module of the Kentucky Electronic Public Health Record or they may use the paper form EPID 200 PEP, which is designed to guide the user through questions that may be useful in determining if PEP is indicated.

For 2005, 76 PEP events were reported to KDPH as required; 62 reports were from 14 health departments and 14 reports were from 9 hospitals. Unfortunately, the actual number of persons administered PEP compared to those reported is difficult to determine. It is known from Division of Epidemiology and Health Planning phone consultations that not all PEP administrations are properly reported.

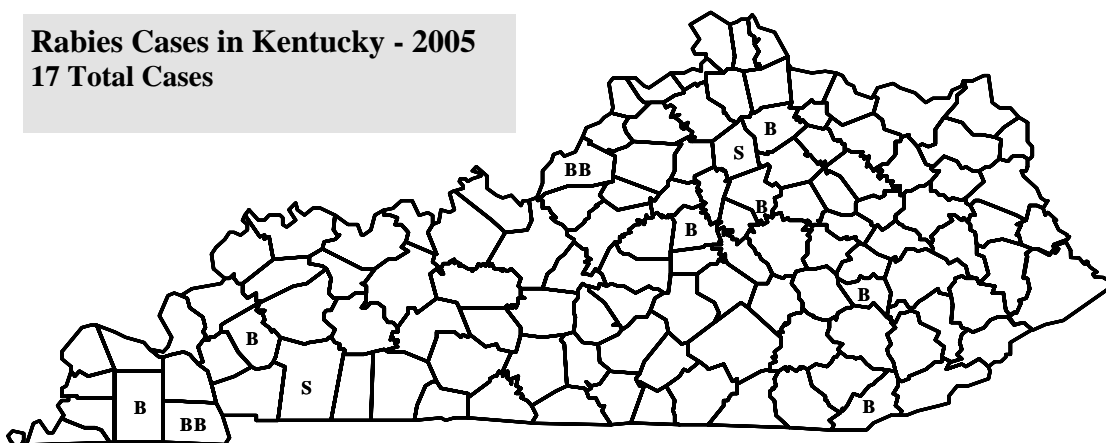
For the 76 patients for whom PEP was appropriately reported, slightly over half (56.6%) of persons receiving PEP were male, and the age distribution ranged from 2 years to 92 years old with a median age of 31 years. Less than half (38.2%) of PEP patients were reported to be covered by private medical insurance or workers compensation. Exposure incidents were due to contact with 28 dogs (36.8%), 18 bats (23.7%), 17 cats (22.4%), 8 raccoons (10.5%), 3 skunks (3.9%), 1 opossum (1.3%), and 1 “flying creature” (1.3%). An animal was available for rabies testing or observation for only 9 (11.8%) of the patients receiving PEP (3 bats (all rabies positive), 4 cats, 1 dog and 1 raccoon). Four of these patients suspended completion of PEP once a negative test result was known (3 cats and 1 raccoon). The dog was inadvertently destroyed during observation and not tested, and 1 cat died during observation and was not tested. In most of the cases requiring PEP (88.2%), the animal was either killed and disposed of without testing, or allowed to escape and not captured for observation or testing. Victims of bites adversely contribute to the outcome of the event by not capturing the animal or by improperly killing the biting animal. (The brain must remain intact for testing; gunshot to the head or clubbing are not acceptable euthanasia methods.) Kentucky Revised Statute 258.065 requires all medical providers, parents of children bitten or adults bitten that don't require medical care to report animal bites to the **local health department** within 12 hours of the incident or the next working day if the local health department is closed. This provides an opportunity for local health department personnel to either quarantine the domestic animal for observation or have the animal (wild or domestic) tested for rabies. If the incident is reported after a lengthy time delay, the chances of recovering the animal for testing or observation are remote.

For more information on rabies, PEP, or reporting PEP, you may call the Division of Epidemiology and Health Planning at (502)564-3418 or toll free at (888)9REPORT.

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### Rabies Cases in Kentucky - 2005

17 Total Cases



Bell - 1 Bat  
 Caldwell - 1 Bat  
 Calloway - 2 Bats  
 Christian - 1 Skunk  
 Graves - 1 Bat  
 Fayette - 1 Bat, 4 Skunks  
 Harrison - 1 Bat  
 Jefferson - 2 Bats  
 Mercer - 1 Bat  
 Owsley - 1 Bat  
 Scott - 1 Skunk

**TABLE 1. ANIMALS SUBMITTED FOR TESTING AND NUMBER OF POSITIVES BY SPECIES**

Species	Number Received	% of Total	Number Positive	% Positive/# Tested
Canine (domestic)	304	30.6	0	0.0
Feline (domestic)	266	26.7	0	0.0
Bovine	44	4.4	0	0.0
Equine	52	5.2	0	0.0
Other Domestic	8	0.8	0	0.0
Rodents/Rabbits	34	3.4	0	0.0
Bat	119	12.0	11	9.2
Fox	21	2.1	0	0.0
Raccoon	99	9.9	0	0.0
Skunk	22	2.2	6	27.3
Other Wildlife	26	2.6	0	0
Totals	995	99.9*	17	1.7

\* < 100.0% due to rounding

### Kentucky Food Safety Update

Charles E. Seay

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Assuring the safety and security of the food supply is a vital part of the Kentucky Department for Public Health (DPH) Food Safety Branch's mission. The Food Safety Branch, along with local health department food inspectors, ensure that Kentucky's food supply is safe, wholesome, free from adulteration, and not misbranded. Specifically, food consumption should not cause injury or illness by unintentional mishandling or deliberate tampering of food. To achieve this goal, food establishments (wholesale food manufacturers, restaurants, groceries, hospitals, nursing homes, daycares, schools, hotels, vending machines, temporary food concession stands, bed and breakfast lodgings, and any other food establishment that routinely serves food to the public) are regulated and inspected on a routine basis by food inspectors.

Currently, 45 of Kentucky's 120 counties have a

mandatory food safety training program for food service managers and food handlers. The Food Safety Branch is currently working with Kentucky's retail food industry on updating the 1976 Kentucky Food Code and expanding food safety training across the entire state.

DPH understands the importance of food security issues and recognizes that an intentional attack on our food supply could occur anywhere in the U.S. A food safety task force was first organized in Kentucky in 2001 with a security portion added in 2004 as part of a national effort to address issues concerning intentional food tampering and food-related bioterrorism. The task force is comprised of state health department, local health department, and state agriculture officials, as well as many representatives of Kentucky's food industry and academia. The Food Safety Branch has developed a concise food safety security information sheet distributed to all permitted food establishments in Kentucky. The purpose of the information sheet is to heighten awareness and increase dialogue between the food inspector and the food industry regarding food se-

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curity and address specific security measures that can be utilized in their establishment such as employee background checks, authorized personnel in food processing areas, reporting signs of food tampering, and the assignment of specific staff to monitor buffet lines.

A food security vulnerability study was completed in 2004 by DPH requiring food industry personnel to answer questions regarding food security issues within their facility. Both the confidential survey and food security measures are not mandatory requirements, but did identify and heighten awareness of the food production facilities in Kentucky that were most vulnerable for an intentional attack. Although food tampering seldom occurs, some cases have been documented. One example of food bioterrorism occurred in 1984 in Wasco County, Oregon when a religious cult attempted to win the local election by sprinkling salmonella bacteria on open food in groceries and on salad bars in restaurants, hoping that the incident would keep the local residents from voting. As a result of the incident, approximately 700 people became ill.

Occasionally, a foodborne illness outbreak occurs in Kentucky. The diseases reported in the state that can be spread by food consumption include: campylobacteriosis; *E. coli* 0157:H7; hepatitis A; listeriosis; salmonellosis and shigellosis.

Physicians, hospitals and laboratories are required by law to report foodborne illnesses. Reports can be made by contacting the local public health department or by calling the Kentucky State Health Department Report Hot Line at 1-888-973-7678. The immediate laboratory testing of the ill patient to determine the causative organism is an essential part of the foodborne investigation. Most reference laboratories can provide these tests with the exception of Norwalk-like virus disease. If a Norwalk-like virus is suspected, the Kentucky State Public Health Department Laboratory may be contacted directly at (502) 564-4446 for assistance with the sample submission.

For further information regarding food safety issues, contact the Food Safety Branch at (502) 564-7181 or visit the Web site at

[www.chfs.ky.gov/dph/info/phps/food.htm](http://www.chfs.ky.gov/dph/info/phps/food.htm).

**Healthy Kentuckians 2010 Mid-Decade Review**  
**Tracking Kentucky's Public Health Objectives**  
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For the first half of this decade, the goals and objectives of *Healthy Kentuckians 2010* (HK 2010) set the agenda for Kentucky's public health initiatives (1). This document, which was based on the U.S. Department of Health and Human Services' document, *Healthy People 2010* (2), has two overarching goals: extending years of healthy life and eliminating health disparities. HK 2010 has been used extensively in program planning, targeting prevention initiatives, grant preparation, and forming health policy.

In March, the Kentucky Department for Public Health released the *Healthy Kentuckians 2010 Mid-Decade Review*. In this update to HK 2010, each of the over 500 objectives and sub-objectives were tracked to determine where Kentucky is making progress and where added emphasis is needed. Changes to certain objectives were also included. Some objectives were revised to reflect data from new or modified data sources. Other objectives were deleted due to the fact that no data source exists for the objective, and none is expected in the near future. Due to the changing emphasis on certain public health issues and the development of additional data sources, new objectives were added to certain chapters. In fact, an entire chapter on public health preparedness was added to reflect the state's commitment to this issue. The resulting document includes the objectives that will guide public health initiatives for the last half of this decade.

### **Overall Status**

The Mid-Decade Review shows that the percentage of objectives in which Kentucky is making progress is higher than the percentage of objectives in which no progress has been made. Among all objectives reviewed, targets have already been achieved for 12.6%. For 25.5%, the target has not yet been achieved, but progress is being made. No progress

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has been made on 18.1% of the objectives. Baseline data are only available for 20.4%; therefore, no progress on these objectives can be tracked at this time. For 8.1% of the objectives, a baseline has not yet been developed, and 15.3% have been deleted.

### **Progress**

From decreasing tobacco use to the creation of a database for tracking prescription drugs, progress has been made in various public health areas. Listed below are specific highlights of public health successes at mid-decade.

**Tobacco Use:** Although Kentucky still ranks number one in the nation for current smoking among adults, tobacco use has declined for both adults and adolescents. The percentage of Kentucky adults who are current smokers declined from 30.8% in 1998 to 27.5% in 2004. Among Kentucky high school students, the percentage who smoked cigarettes in the past 30 days declined from 37% in 2000 to 28% in 2004. The proportion of young people in grades 9 through 12 who have never smoked increased from 26% in 2000 to 31% in 2002.

**Cancer Mortality and Screening:** Progress has been made on all the objectives that pertain to cancer mortality. The age adjusted mortality rate for cancer of the uterine cervix declined from 4.3 per 100,000 women in 1997 to 2.4 deaths per 100,000 women in 2002. The HK 2010 target has been achieved for this objective. The percentage of adult Kentuckians age 50 and older who have ever had a sigmoidoscopy or colonoscopy has increased from 34% in 1997 to 47.2% in 2004, far exceeding the HK 2010 target of 40%.

**Immunization:** Kentucky has surpassed the national childhood immunization coverage rates for children 19-35 months of age for the vaccination series of DTaP, polio, MMR, Hib, hepatitis B, and varicella. The percentage of children in this age group adequately immunized has increased from 77% in 2000 to 81.2% in 2004. The percentage of non-institutionalized Kentuckians 65 and older who have been immunized against influenza has increased from 60.9% in 2001 to 64.9% in 2004; the percentage immunized against pneumonia has increased from 55.1% in 2001 to 57.7% in 2004.

**Infectious Diseases:** Kentucky has made progress in the majority of objectives that pertain to infectious disease. In 2004, the tuberculosis rate (3.1 per 100,000) showed a decline from 5.4 per 100,000 in 1998 and was at a historic low in Kentucky. The AIDS incidence rate among adults and adolescents declined from 7.1 per 100,000 in 1998 to 5.0 per 100,000 in 2004, surpassing the target rate of 5.4 per 100,000.

**Maternal and Child Health:** Many objectives pertaining to maternal and child health have shown progress at mid-decade. The pregnancy rate among females 15-17 has declined from 31.9 per 1,000 in 2000 to 25.8 per 1,000 in 2004. Progress was noted in preventing neural tube defects which have declined from 8.7 per 10,000 births in 2000 to 6.5 births per 10,000 in 2004. The infant mortality rate has also declined slightly from 6.7 deaths per 1,000 live births in 2000 to 6.5 deaths per 1,000 live births in 2004.

**Substance Abuse:** Although Kentucky still faces many challenges pertaining to substance abuse among adolescents, progress in areas relating to alcohol and marijuana use occurred. The prevalence of adolescents who report using alcohol in the past 30 days declined from 49.3% in 1997 to 45% in 2003. The percentage of adolescents who reported using marijuana in the past 30 days declined from 28.4% in 1997 to 21% in 2003.

One achieved target that relates to the prevention of substance abuse is the creation of the Kentucky All Schedule Prescription Database (KASPER). This electronic database was designed to capture information on prescriptions for controlled substances that are dispensed within Kentucky. This informational system facilitates targeting of individuals (prescribers, dispensers, and end users) who are in violation of Kentucky's Controlled Substances Act. The electronic information system also provides valuable information to prescribing health care professionals on other controlled substances that the patient may be using.

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## **Challenges**

Many of the areas in which no progress has been made at mid-decade pertain to obesity (body mass index (BMI) greater than or equal to 30) and the chronic conditions that result from this risk factor. Health care access issues are also a major concern.

**Obesity:** Obesity among adult Kentuckians ages 20 and older has increased from 23.5% in 2000 to 26.1% in 2004. The percentage of adolescents in high school who are overweight (at or above the 95% percentile for BMI) has increased from 12.3% in 2001 to 14.6% in 2003.

**Nutrition:** The percentage of adult Kentuckians who consume five or more vegetables a day declined from 22.7% in 2000 to 18.2% in 2003. The percentage of adolescents in high school who consumed five or more a day declined from 19.2% in 2001 to 13.2% in 2003.

**Diabetes:** The percentage of adult Kentuckians who have been told by a doctor that they have diabetes increased from 5 percent in 1996-98 to 7.5 percent in 2004. In Kentucky, the age-adjusted death rate from diabetes as a leading or contributing cause of death increased from 76 per 100,000 in 1999 to 78 per 100,000 in 2002.

**Respiratory Disease:** The prevalence of asthma among Kentucky adults has increased from 7.8 percent in 2000 to 8.3 percent in 2004. Although the target was achieved for the age-adjusted asthma death rate that declined from 20 per million population in 1997 to 13 per million in 2003, the hospitalization rates for both asthma and chronic lower respiratory disease (CLRD) increased. The asthma hospitalization rate increased from 15.5 per 10,000 in 2000 to 17.6 per 10,000 in 2003, and the hospitalization rate for CLRD increased from 57 per 10,000 in 2000 to 68.3 per 10,000 in 2003.

**Health Care Access:** The proportion of adult Kentuckians without health care coverage has increased from 14.3 percent in 1998 to a high of 18.2% in 2002. The prevalence in 2004 was 14.9 percent. The proportion of adults who have a specific source of ongoing primary care has decreased from 84.4% in 2001 to 82.9% in 2004. The percentage of adults

who report that they did not get all of the health care that they needed increased from 13.8% in 2000 to 17.9% in 2003.

## **Document Framework**

All of the statistics presented previously can be found in the main HK 2010 Mid-Decade Review document as well as the summary report. Both documents have been designed to provide easy access to the mid-decade status of each objective. The main HK 2010 Mid-Decade Review document begins with a summary of the mid-decade status of objectives pertaining to the the ten leading health indicators. These are indicators which reflect areas of major public health importance as determined by the federal Department of Health and Human Services. Following the leading health indicators, 26 chapters each related to a specific health topic are included. Each chapter includes an description of the overall goal, a chapter overview, and a summary of progress for the chapter objectives. Also included is a summary table that lists each objective, the baseline, HK 2010 target, mid-decade status, whether progress was made, and the data source. More extensive information on each objective, such as data trends and strategies to achieve the objective, can also be found in the study. The summary report includes the leading health indicators, and each chapter includes an overview, summary of progress and a summary table.

*Healthy Kentuckians 2010 Mid-Decade Review* reflects the objectives that Kentucky will be tracking for the next half of this decade (from FY 2006 through FY 2010). This updated document provides the framework for developing public health prevention initiatives geared to improving the health status of all Kentuckians. The report can be found on the Web at <http://chfs.ky.gov/dph/hk2010MidDecade.htm> For hard copies of the HK 2010 Mid-Decade Review or information on how to use this document in public health planning, please contact the Kentucky Department for Public Health, Division of Epidemiology and Health Planning at (502) 564-3418.

## **References**

References are available upon request.

## 2002-2004 Kentucky Reportable Disease Summary

Disease	2002 Case Count/ <i>Crude Rate Per 100,000<sup>(1)</sup></i>	2003 Case Count/ <i>Crude Rate Per 100,000<sup>(1)</sup></i>	2004 Case Count/ <i>Crude Rate Per 100,000<sup>(1)</sup></i>
AIDS	198/ <b>4.90</b>	174/ <b>4.30</b>	158/ <b>5.00</b>
Botulism, Infant	0	0	1/ <b>0.02</b>
Brucellosis	1/ <b>0.02</b>	0	2/ <b>0.05</b>
Campylobacteriosis	198/ <b>4.90</b>	253/ <b>6.20</b>	273/ <b>6.60</b>
Chlamydia	8755/ <b>216.4</b>	7959/ <b>198.9</b>	6470/ <b>157.1</b>
Cryptosporidiosis	10/ <b>0.20</b>	27/ <b>0.65</b>	47/ <b>1.1</b>
Encephalitis, California	2/ <b>0.05</b>	3/ <b>0.07</b>	1/ <b>0.02</b>
Encephalitis, West Nile	53/ <b>1.3</b>	11/ <b>0.27</b>	1/ <b>0.02</b>
Escherichia coli Non-O157:H7	0	2/ <b>0.05</b>	1/ <b>0.02</b>
Escherichia coli O157:H7	40/ <b>1.0</b>	29/ <b>0.70</b>	31/ <b>0.75</b>
Escherichia coli SHI NG	8/ <b>0.2</b>	6/ <b>0.2</b>	10/ <b>0.24</b>
Ehrlichiosis <sup>(2)</sup>	2/ <b>0.05</b>	5/ <b>0.1</b>	2/ <b>0.05</b>
Gonorrhea <sup>(3)</sup>	3772/ <b>92.26</b>	3565/ <b>86.60</b>	2758/ <b>66.59</b>
<i>Haemophilus influenzae</i>	10/ <b>0.20</b>	12/ <b>0.30</b>	16/ <b>0.39</b>
Hansen	2/ <b>0.05</b>	0	0
Hepatitis A	47/ <b>1.2</b>	36/ <b>0.87</b>	31/ <b>0.75</b>
Hepatitis B	67/ <b>1.6</b>	95/ <b>2.3</b>	85/ <b>2.1</b>
Hepatitis B , perinatal	1/ <b>0.02</b>	0	0
Hepatitis C <sup>(4)</sup>	5/ <b>0.1</b>	26/ <b>0.6</b>	27/ <b>0.65</b>
Histoplasmosis	40/ <b>1.0</b>	39/ <b>1.0</b>	47/ <b>1.13</b>
Legionellosis <sup>(5)</sup>	22/ <b>0.5</b>	46/ <b>1.1</b>	44/ <b>1.1</b>
Listeriosis	4/ <b>0.1</b>	9/ <b>0.2</b>	4/ <b>0.10</b>
Lyme Disease	25/ <b>0.6</b>	17/ <b>0.4</b>	15/ <b>0.4</b>
Malaria	8/ <b>0.2</b>	11/ <b>0.27</b>	5/ <b>0.1</b>
<i>Neisseria meningitidis</i>	18/ <b>0.4</b>	23/ <b>0.56</b>	18/ <b>0.4</b>
Pertussis <sup>(6)</sup>	103/ <b>2.5</b>	53/ <b>1.3</b>	98/ <b>2.4</b>
Q Fever	9/ <b>0.2</b>	9/ <b>0.2</b>	6/ <b>0.2</b>
Rabies(Animal) <sup>(7)</sup>	28/ <b>21</b>	39/ <b>32</b>	23/ <b>19</b>
RMSF <sup>(8)</sup>	5/ <b>0.1</b>	3/ <b>0.7</b>	3/ <b>0.7</b>
Salmonellosis	415/ <b>10.2</b>	404/ <b>9.81</b>	361/ <b>8.72</b>
Shigellosis <sup>(9)</sup>	210/ <b>5.2</b>	136/ <b>3.3</b>	75/ <b>1.8</b>
Streptococcal Disease, Invasive Group A	24/ <b>0.59</b>	52/ <b>3.3</b>	62/ <b>1.5</b>
<i>Streptococcus pneumoniae, Drug-Resistant Invasive Disease</i>	19/ <b>0.46</b>	31/ <b>0.75</b>	32/ <b>0.77</b>
Syphilis	212/ <b>5.19</b>	160/ <b>3.89</b>	151/ <b>3.65</b>
Tetanus	0	0	2/ <b>0.05</b>

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**2002 - 2004 Kentucky Reportable Disease Summary (continued)**

Disease	2002 Case Count/Crude Rate Per 100,000 <sup>(1)</sup>	2003 Case Count/Crude Rate Per 100,000 <sup>(1)</sup>	2004 Case Count/Crude Rate Per 100,000 <sup>(1)</sup>
Toxic Shock Syndrome	5/0.1	6/0.2	11/0.27
Toxoplasmosis	0	0	1/0.02
Tuberculosis	146/3.57	138/3.35	127/3.11
Tularemia	2/0.05	2/0.05	5/0.1
Typhoid Fever	4/0.1	1/0.02	3/0.07
<i>Vibrio vulnificus</i>	0	0	1/0.02
<i>Vibrio parahaemolyticus</i>	0	1/0.02	2/0.05
West Nile Fever, Human <sup>(10)</sup>	22/0.54	3/0.07	6/0.2

**NO CASES REPORTED (2002 - 2004)**

Anthrax, Chancroid, Cholera, Diphtheria, Granuloma inguinale, Hantavirus Pulmonary Syndrome, *Lymphogranuloma venereum*, Measles, Plague, Poliomyelitis, Psittacosis, Rabies (human), Rubella, Yellow Fever

<sup>1</sup> Source: Kentucky State Data Center (<http://ksdc.louisville.edu/kpr/popest/nst-est2005-01.xls>)

<sup>2</sup> Combined HME and unspecified.

<sup>3</sup> The downward trend is indicative of community disease status.

<sup>4</sup> Interpretation of the present case definition (staff changes), and change in case definition.

<sup>5</sup> The case/rate variation in 2002 may be due to changes in the lab testing requirements and requirements for reporting.

<sup>6</sup> Case count decrease attributable to outbreaks in 2002 and 2004.

<sup>7</sup> Method of Calculation: Annual number of confirmed cases of rabies in animals/Total number of animals tested in that year x 1000

<sup>8</sup> Rocky Mountain Spotted Fever

<sup>9</sup> Variation in case counts maybe due to natural fluctuations in disease and reporting

<sup>10</sup> Complex interactions between the virus, birds and other animals, mosquitoes, and the environment have influenced the pattern of West Nile virus emergence and distribution and the outcomes of West Nile Fever in humans.