20-Year Analysis of Northern Kentucky's Health Trends

June 2015

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Executive Summary

The Northern Kentucky Health Department began collecting data in 1993 for the first Northern Kentucky Community Health Plan, published in 1996. This analysis of health trends is an attempt to evaluate long-term health outcomes as a result of the previous community health improvement plans and to provide a foundation for the next community health assessment and planning process.

The Evans and Stoddart framework illustrates the relationship among many factors that determine the health of individuals and the community. The data used in this report represents a sampling of the determinants in this framework and the priorities identified through two decades of community assessment and planning efforts.

BIRTH AND INFANT MORTALITY

Overall, the birth rate in Northern Kentucky, especially the teenage birth rate, has been decreasing over the last 20 years. In addition, the rate of many diseases and conditions associated with pregnancy and early infancy are improving. While breastfeeding is still far below the Healthy People 2020 target, the rate has been steadily increasing. On-going risk factors include the number of women who continue to smoke while pregnant and the increasing use of heroin and other opiates by pregnant women.

MORTALITY

When looking beyond the last 20 years, back to 1910, there has been a significant change in both the rate of death for the top 10 causes, but also a great decrease in death due to infectious and communicable diseases. Today, mortality is more often associated with chronic diseases than infectious diseases. Heart disease has remained near the top of the list for a century. However, in the last decade, cancer has exceeded heart disease as the number one cause of mortality in Northern Kentucky. The rate for both has been decreasing, but in Northern Kentucky, heart disease has decreased at a faster rate. Smoking rates, while still high, have also been dramatically reduced. It is difficult to determine if the lower mortality rates are due to medical advances, reduced smoking, increased exercise, changing diet or a combination of all these factors.

DEMOGRAPHICS AND DIVERSITY

In the last 20 years there has been a 28 percent increase in the population of Northern Kentucky, with the greatest increase in Boone County. In general, the population growth has led to a younger than average population with the largest population cohort being the 50 to 54 age group. The white, non-Hispanic category accounts for more than 90 percent of the population. Increases for the Hispanic population (+1.4 percent), African American (+0.8 percent) and Asian (+0.5 percent) may increase diversity in the next decade.

INFECTIOUS AND COMMUNICABLE DISEASES

Over the last two decades, Northern Kentucky has experienced a number of disease outbreaks. Most notable was the H1N1 influenza pandemic in 2009. Of concern are the increasing trends for acute hepatitis C, pertussis and syphilis.

CHRONIC DISEASES AND INJURY

Overall incidence of chronic diseases has not changed substantially, with the exception of asthma and diabetes, which have both increased substantially. The cause of increasing asthma rates is uncertain. Two triggers are air quality and smoking in the household. Both of these factors are improving. The risk factors for diabetes are overweight and obesity. These have been increasing over the last two decades, but seem to have leveled off in the recent years. This may lead to a decrease in diabetes in the next decade.

UNHEALTHY BEHAVIORS AND RISK FACTORS

Several unhealthy behaviors, including smoking rates, have shown a decrease; however, other behaviors such as heroin use have dramatically increased. There was an increase in people reporting depression between 2002 and 2005 surveys with a slight increase between 2005 and 2013. A similar pattern is reflected in suicide rates. From 1993 to 1999, suicide rates were steady at about 12 per 100,000 population. There was a drop between 1999 and 2002, a sharp increase between 2002 and 2005 followed by a steady decline between 2005 and 2008. Between 2008 and 2012, the rate matches the pre-2002 rate and has remained steady.

ENVIRONMENTAL HEALTH

The relationship of environmental factors and health is often complicated. Most of Northern Kentucky is served by regulated public sewer and water systems. Properties not on public sewage systems rely on on-site systems. These systems are inspected by the Health Department upon installation. Residents not on public water systems rely on cisterns or wells. All of Northern Kentucky has regulated garbage collection and landfills.

ACCESS TO CARE

Access to health care is rapidly changing due to increased medical coverage and Medicaid available through the Affordable Care Act. In general, Northern Kentucky has sufficient medical and dental providers to accommodate the population; however, not everyone has equal access to these services. Two barriers to access include transportation and cost.

SUMMARY

In summary, it is not possible to determine if positive changes are due to developing community health improvement plans or if they are due to other factors. It is likely that there are many factors to consider when setting future priorities. There is improvement in many indicators. Some indicators did not change and still others need improvement. Lasting positive change requires improvements in quality of life, economic status, education and personal behaviors as well as in the health care and public health systems.

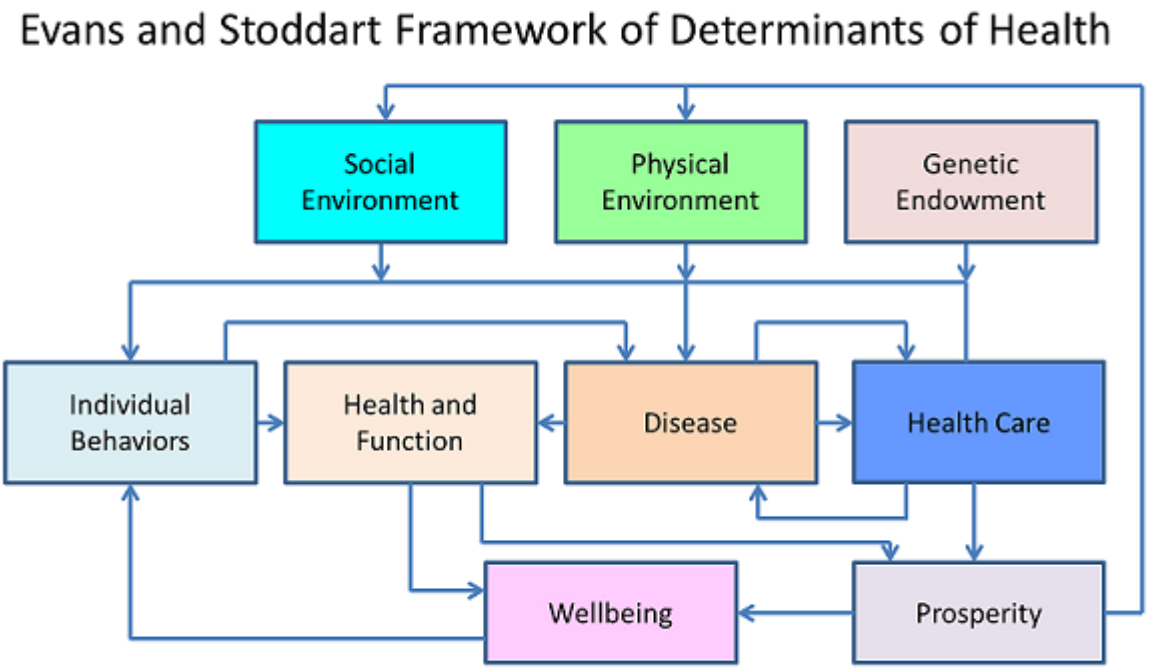
Introduction

In 1993, the Northern Kentucky Health Department began collecting data for the first Northern Kentucky Community Health Plan, published in 1996. This analysis of health trends is an attempt to evaluate the long-term health outcomes as a result of the previous community health improvement plans and to provide a foundation for the next community health assessment and planning process.

The Evans and Stoddart framework in the chart below illustrates the relationship among many factors that determine the health of individuals and the community. (For more information on Evens and Stoddart's framework see: http://wwwn.cdc.gov/CommunityHealth/info/OrganizationKeyTerms). The data used in this report represents a sampling of the determinants in the chart below and the priorities identified through two decades of community assessment and planning efforts. Where feasible, 20 years of data are used to determine trends; however, some data is either not available from 1993 or definitions have changed making comparisons unreliable. Where possible, data was copied from the original source. In some cases secondary data sources were used. Some data from Kentucky Vital Statistics is preliminary data and subject to change.

Graphs and trend data were generated by Microsoft Excel spreadsheets. Healthy People 2020 targets are used for comparisons to national standards where available (See Appendix for notes on age adjusted rates). Most graphs and trends are for the four county Northern Kentucky district (Boone, Campbell, Grant and Kenton Counties). Some data is only available for the eight county area development district (which includes four counties listed previously plus Carroll, Gallatin, Owen and Pendleton Counties.) In some cases individual county data is included where beneficial to illustrate differences.

Diagram 1



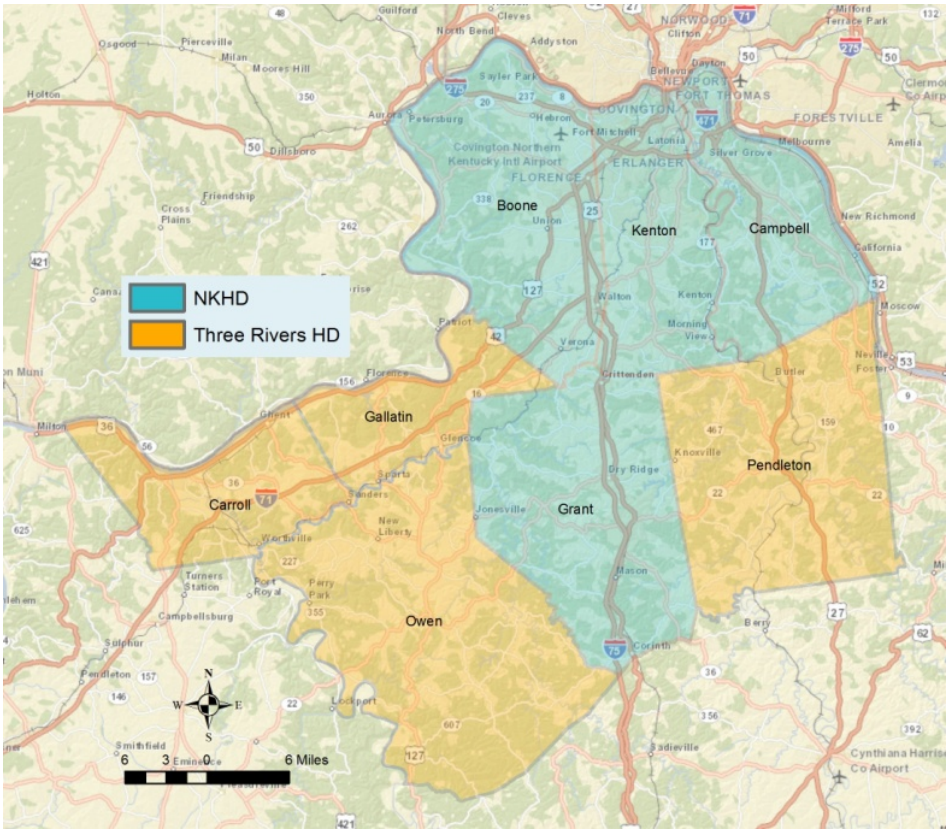
Source: Evans R.G. & Stoddart, G.L. (1990). Producing health, consuming health care. Soc Sci Med. 31(12), 1347-1363

CATEGORIES OF INDICATORS USED IN THIS REPORT:

- **Access to health care** is the ease with which an individual can obtain needed medical services.
- **Demographics** describe important characteristics of a population.
- **Health behaviors** include choices about lifestyle or habits known to influence health outcomes. These choices are often responses to incentives or stimuli from social or physical environments.
- **Morbidity** indicators provide measures of any departure, subjective or objective, from a state of physiological or psychological well-being at a point in time or within a defined time span. Morbidity is usually measured as the percentage of the population with a given condition or the rate of new cases within the population.
- **Mortality** indicators provide measures of the number of deaths in a population within a defined time span. To enable comparisons among peer counties, the mortality data in the CDC's Community Health Status Indicators 2015 are age-adjusted, meaning that the indicators show what the mortality rate would be if all counties had the same age distribution.
- **Physical environment** includes the natural environment (air, water and soil) and the built environment (safe and affordable housing, transportation, access to nutritious and affordable food). The physical environment may directly affect health as well as influence choices and health behaviors.

Source: http://www.cdc.gov/CommunityHealth/info/OrganizationKeyTerms

Diagram 2: Northern Kentucky Health District



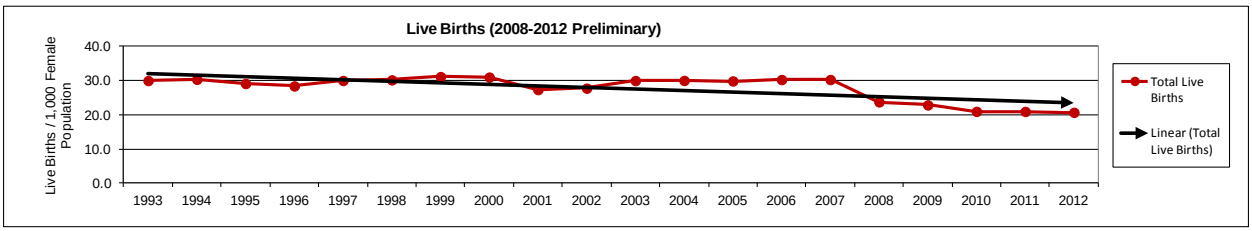
Note: The Northern Kentucky Area Development District includes the Northern Kentucky District Health Department service area of Boone, Campbell, Grant and Kenton Counties and the Three Rivers District Health Department's service area of Carroll, Gallatin, Owen and Pendleton Counties.

Section 1: Birth and Infant Mortality

The Health Department has been tracking birth data since 1993. This report represents a 20 year analysis of births, infant mortality, risk factors and related trends. In 2012, the live birth rate for Northern Kentucky was at a 20-year low. Since 2010, the total number of births has been about 4,170 each year.

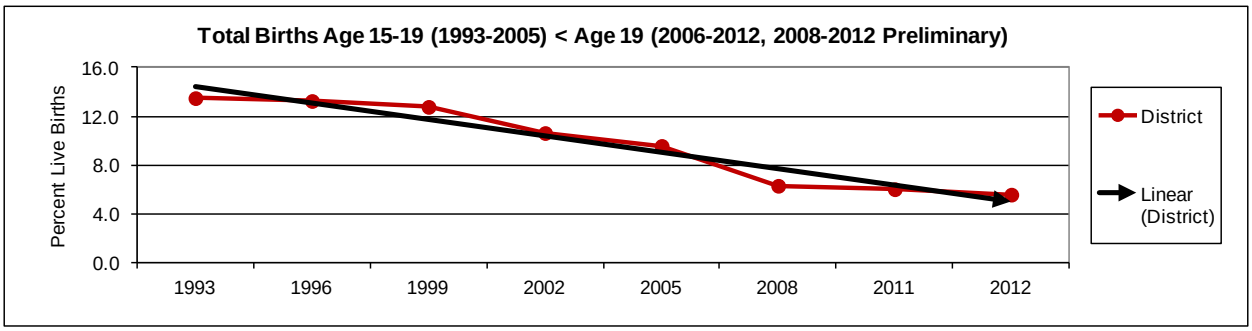
LIVE BIRTHS

In general, the number of births has paralleled the economy. The number of births peaked in good economic years and was less when the economy worsened. This is dramatically illustrated by the beginning of a recession in 2008, when the birth rate dropped by more than 1,000 from 2007. It will be interesting to see if the number of births increase as the economy improves.



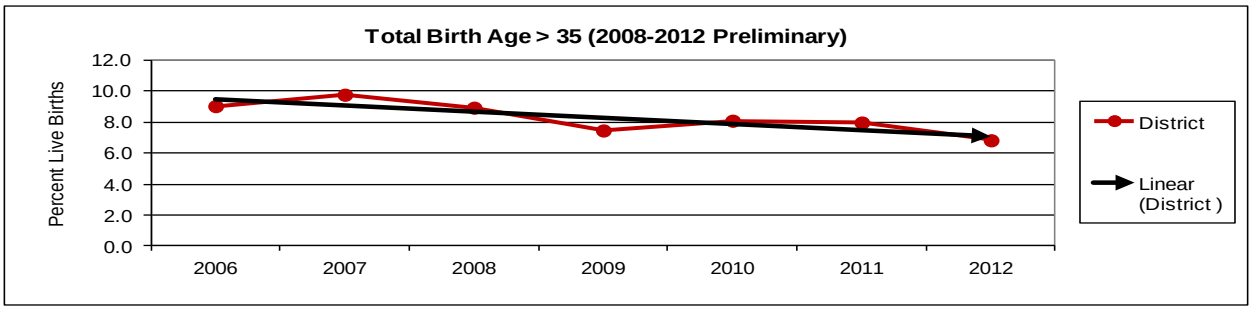
Source: Kentucky Vital Statistics

A similar trend can be seen when looking at the birth rate for teenage mothers. The rate is slightly higher for Grant County (not shown) and slightly lower for Boone County (not shown), but the downward trend holds for all counties (3 year averages).



Source: Kentucky Vital Statistics

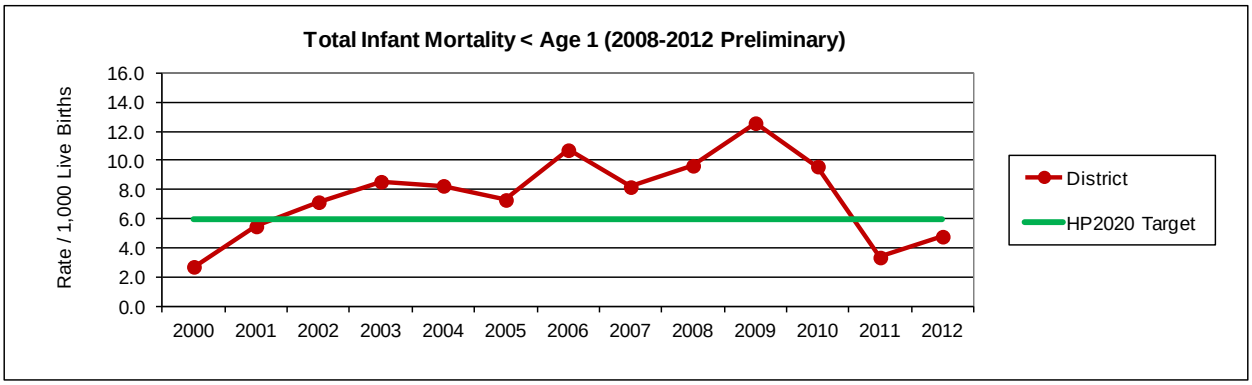
The trend for women over age 35 giving birth has also been decreasing in Northern Kentucky since 2007. In 2012 the birth rate for this group was 6.5 percent of live births.



Source: Kentucky Vital Statistics

INFANT MORTALITY

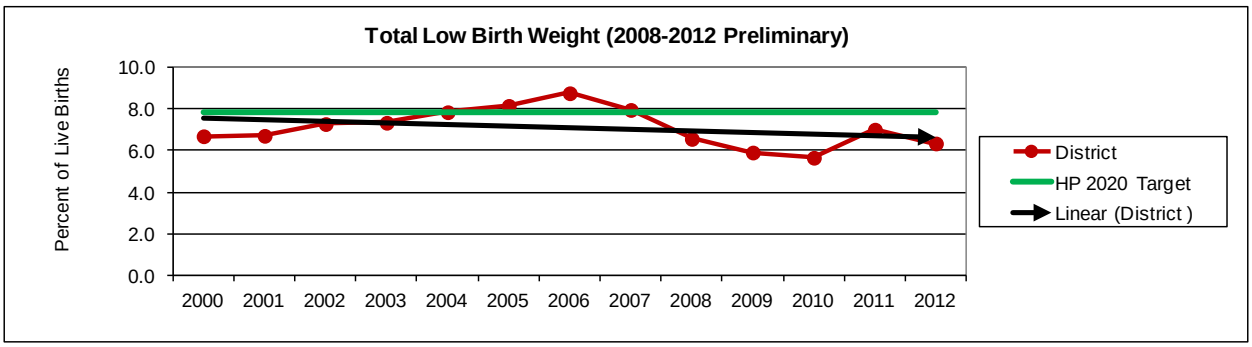
In 2012 there were 4,177 babies born in Northern Kentucky. Of those, 20 did not live to see their first birthday. The rate of infant mortality for the district had been steadily rising to a peak of 12.6 per 1,000 live births. The variable rate since 2000 does not indicate a continuous trend. The three leading causes of infant mortality in Kentucky are prematurity, congenital anomalies and sudden unexpected infant deaths (SUID).



Source: Kentucky Vital Statistics

LOW BIRTH WEIGHT

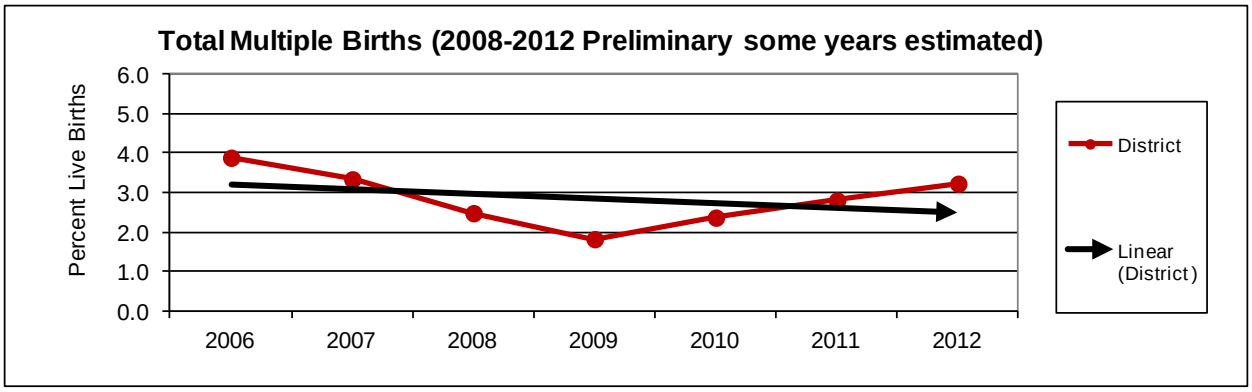
Low birth weight is defined as weight at birth of less than 2,500 grams (5 pounds, 8 ounces) and very low birth weight as less than 1,500 grams (3 pounds, 5 ounces). Low birth weight and especially very low birth weight are contributing factors for infant mortality. The low birth weight rate in Northern Kentucky has remained mostly between 6 and 8 percent of live births. There are too few cases of very low birth weight to report. Preterm birth is the primary contributing factor for low birth weight. The trend was increasing until 2006 but reversed and decreased between 2006 and 2010. Since the total number of births also decreased in these years, the total number of low birth weight babies born in 2012 (265) was nearly half the number born in 2006 (506).



Source: Kentucky Vital Statistics

MULTIPLE BIRTHS

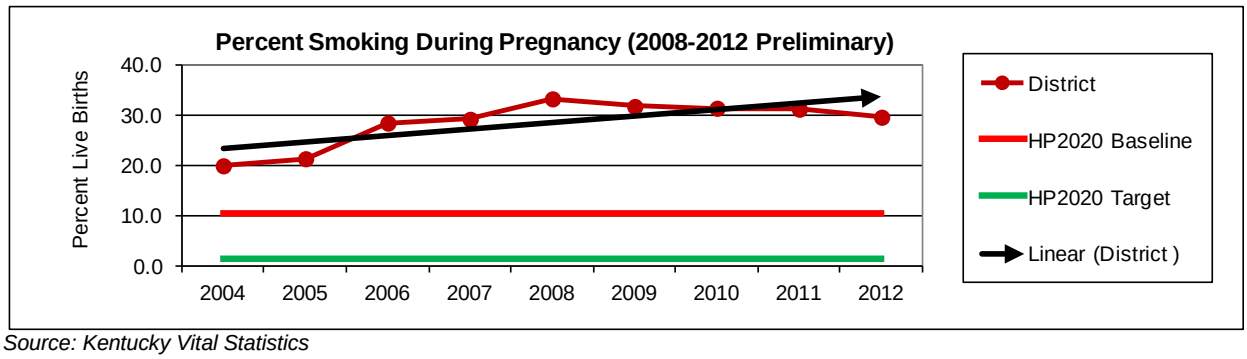
The number of multiple births (twins, triplets or more) has remained relatively low (between 2 and 4 percent). Numbers are too small to indicate county-level data (3 year averages).



Source: Kentucky Vital Statistics

SMOKING DURING PREGNANCY

Despite the overall decline in smoking rates in Northern Kentucky and all the information about the harmful effects of smoking during pregnancy, the rates of smoking while pregnant steadily increased until 2008. The rate has remained relatively constant from 2008 to 2012. There are differences among the four counties, but all are much greater than the Healthy People 2020 baseline of 10.4 percent and target of 1.4 percent.

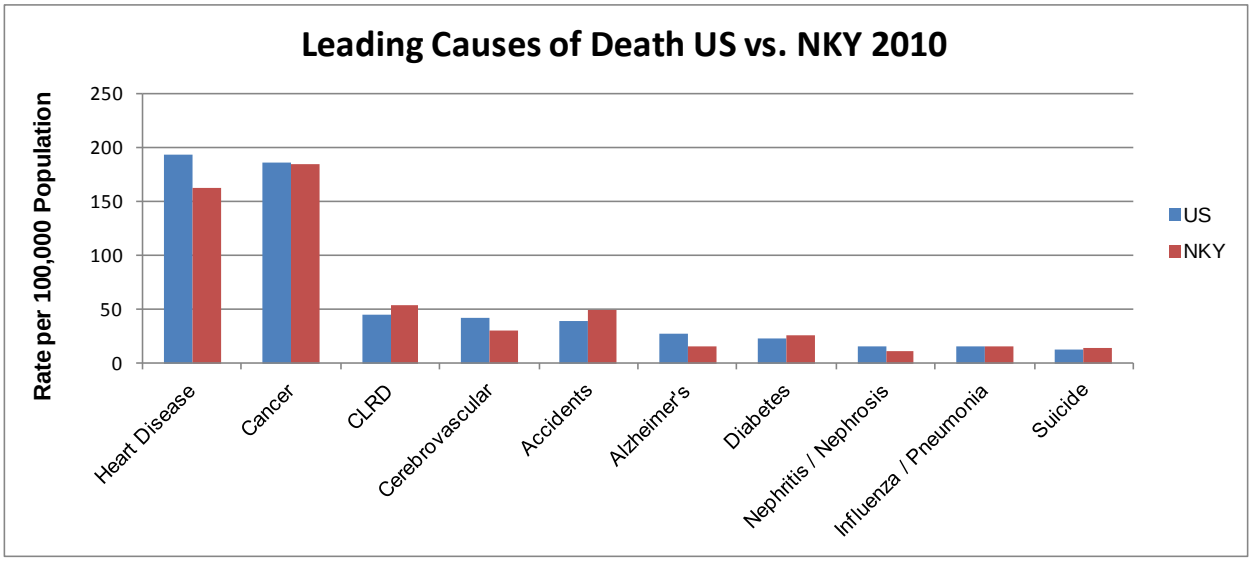


Source: Kentucky Vital Statistics

Section 2: Mortality

Some causes of death like heart disease have changed very little in 100 years. Other causes of death, such as tuberculosis and infectious diseases, have decreased dramatically. Still other causes of death have increased. Among those increasing are cancer, chronic lower respiratory disease and diabetes.

There is not a lot of difference between rates in Northern Kentucky when compared to the United States for 2010. One difference is a shift between cancer being number one in Northern Kentucky and heart disease being second instead of the other way around for the U.S.



Source: Kentucky Vital Statistics for Northern Kentucky data, Centers for Disease Control and Prevention for national data (Note: CLRD is Chronic Lower Respiratory Disease. This includes Chronic Obstructive Pulmonary Disease (COPD), emphysema and bronchitis.)

TOP 10 LEADING CAUSES OF DEATH IN NORTHERN KENTUCKY

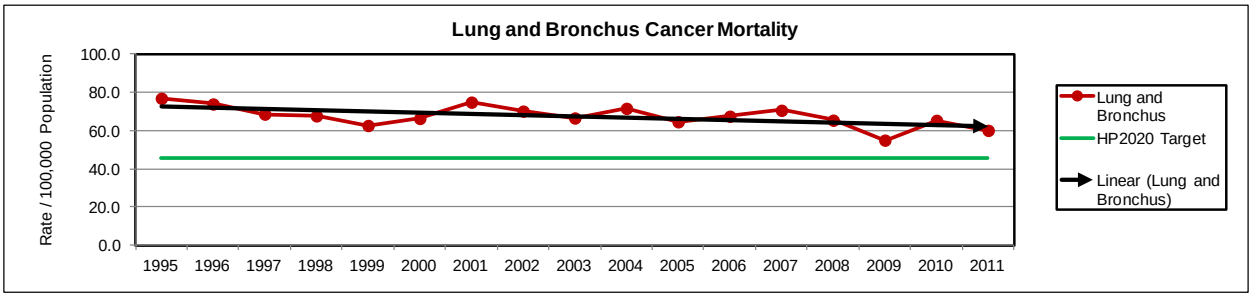
#1 Cancer

Cancer has been the leading cause of death in Northern Kentucky since 2006 when the rate exceeded diseases of the heart. The cancer death rate now exceeds the heart disease rate in three of four Northern Kentucky counties: in Grant County, heart disease is still the number one cause of death.

While cancer deaths now exceed those for heart disease, the rate for both cancer deaths and heart disease deaths are decreasing. The rate of decrease is faster for heart disease than cancer deaths. When measured against total deaths, cancer mortality accounts for about 25 percent of all deaths.

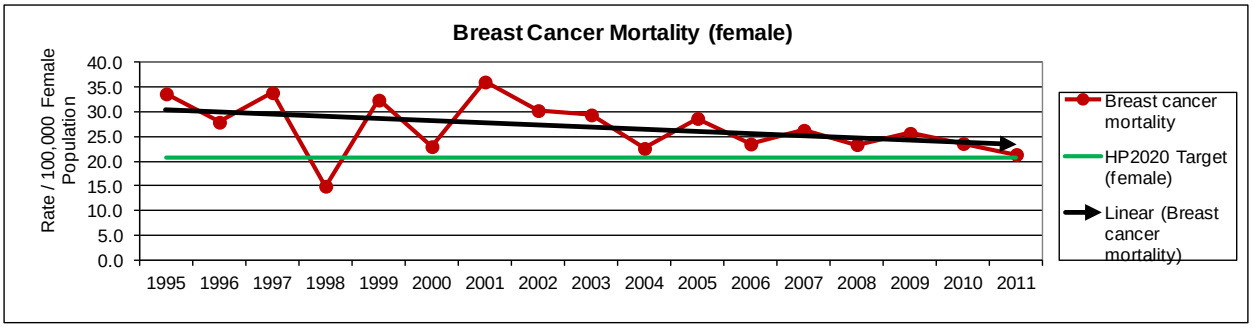
There are several types of cancer tracked by the Kentucky Cancer Registry. The Health Department has been tracking seven cancers that have been identified as being preventable by limiting exposure (lung and melanoma) or preventing mortality through early detection and treatment (breast, colorectal, cervical, prostate and oral cancers). With the HPV vaccine, cervical cancer is preventable but the vaccine is relatively new and vaccination rates are too low to be reflected in the data. Melanoma, prostate and oral cancer deaths are too few to establish reliable trends.

Lung cancer mortality rates are by far the highest. While the rates are decreasing, the 2011 district rate of 60.1 per 100,000 population (239 total deaths) is much greater than the Healthy 2020 target of 45.5 per 100,000 (age adjusted).



Source: Kentucky Cancer Registry

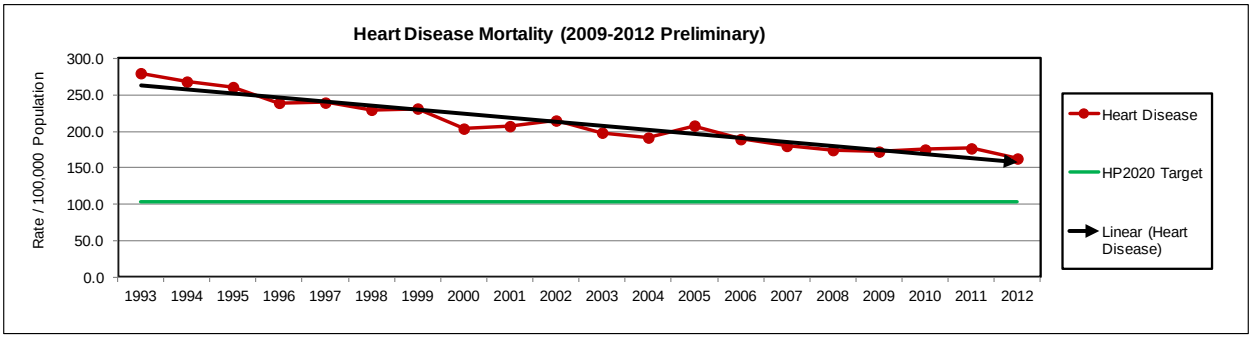
Breast cancer has the second highest cancer mortality rate at 21.4 per 100,000 females (43 total deaths). This is just slightly higher than the Healthy People 2020 target of 20.7 deaths per 100,000 females (age adjusted).



Source: Kentucky Cancer Registry

#2 Diseases of heart

Diseases of the heart are the second highest cause of death in Northern Kentucky. Mortality due to heart disease has been steadily decreasing since the Health Department began tracking it in 1993. Tobacco use is a major risk factor for both heart disease and lung cancer, thus, the decreasing trend for these causes of death may be related to the decrease in tobacco use. However, other factors like early and better treatment options may have also played a role in the decreasing mortality rates. The rate of decline for heart disease has exceeded that of cancer mortality. Heart disease deaths have decreased from about 33 percent of all deaths in 1993 to less than 22 percent of deaths.

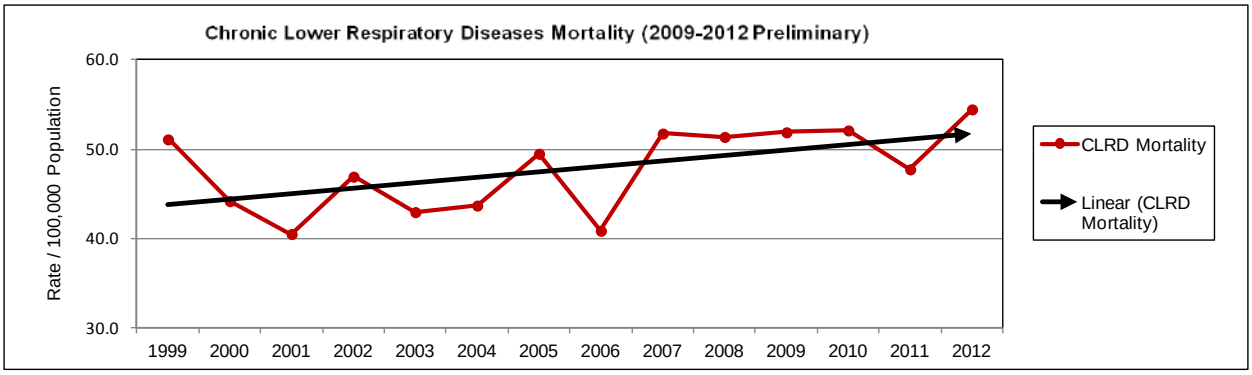


Source: Kentucky Vital Statistics

The rate of 162.8 per 100,000 population (652 total deaths) still far exceeds the Healthy People 2020 target of 100.8 per 100,000 (age adjusted) rate. The rate has been declining in all four Northern Kentucky counties, but less so in Grant County where heart disease (58 total deaths) is still the number one cause of death (236.9 per 100,000 in 2012).

#3 Chronic lower respiratory diseases

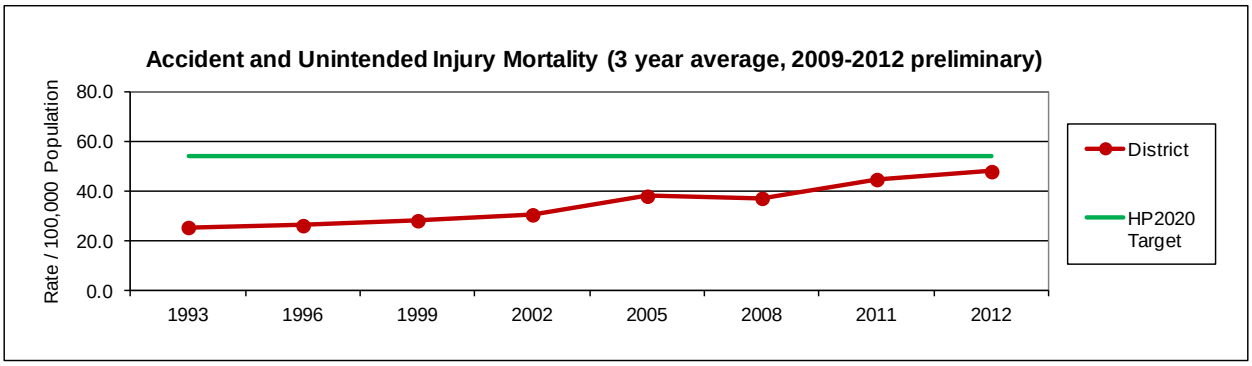
Chronic lower respiratory disease mortality has been increasing. CLRD includes chronic obstructive pulmonary disease (COPD), emphysema and chronic bronchitis. The reason for this increase is unclear since the risk factors of smoking and outdoor air quality are improving. Since this is mortality data, perhaps the long-term effects of tobacco use and outdoor air quality are cumulative and improvement in the indicator may be several years away.



Source: Kentucky Vital Statistics (Data note: Vital Statistics listed COPD as a category of death until 1998. In 1999 the category changed to Chronic Lower Respiratory Disease. (ICD 10 codes: CLRD = J40 to J47)

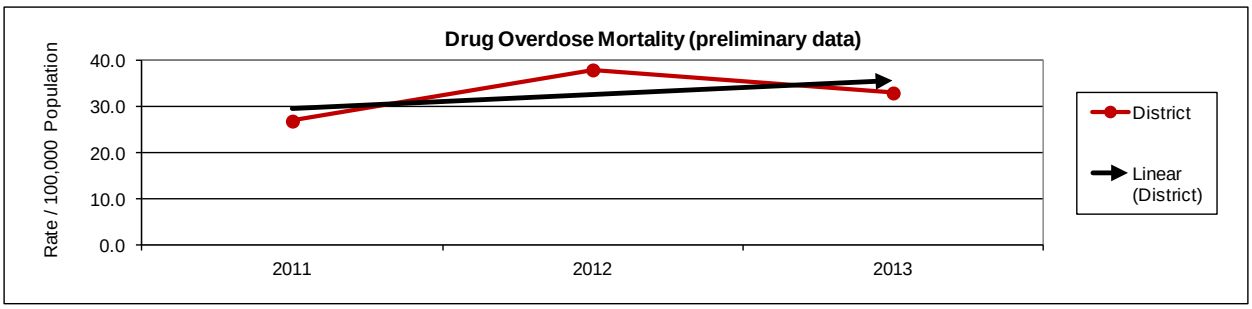
#4 Unintentional injuries (Accidents)

The fourth leading cause of mortality in Northern Kentucky is death from unintentional injury. This is the only cause of death in the top 10 that is not related to a chronic or infectious disease. Many accidental deaths are preventable. Mortality due to unintentional injuries is increasing but is still less than the Healthy People 2020 target (age adjusted). Compared to total deaths, unintentional injury deaths have increased from 3 percent to nearly 7 percent (199 total deaths in 2012) of all deaths.



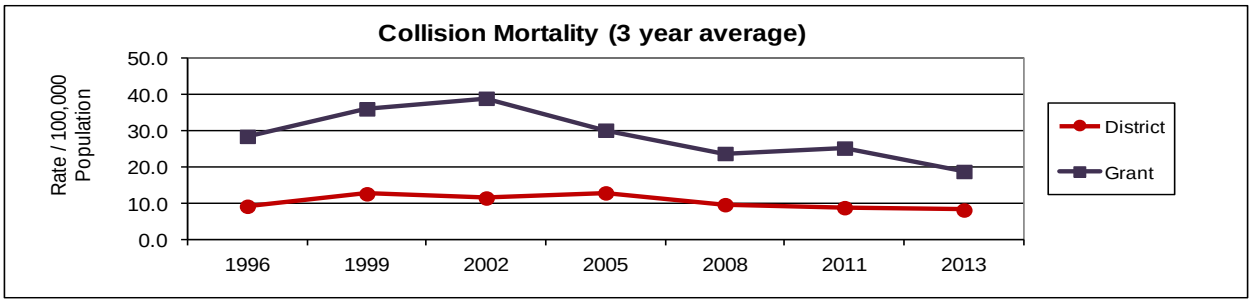
Source: Kentucky Vital Statistics

There is an increasing trend for accidental drug overdoses including opiods and heroin that are included in this category. Drug overdoses, especially heroin, rose dramatically in 2011 and 2012 in Northern Kentucky and statewide.



Source: Kentucky Vital Statistics (Drug overdose deaths by county of residence; data preliminary as of June 26, 2014, and subject to change)

A substantial number of unintended injury mortality is the result of collisions involving a motor vehicle. According to Kentucky State Police reports, mortality due to motor vehicle crashes is decreasing.

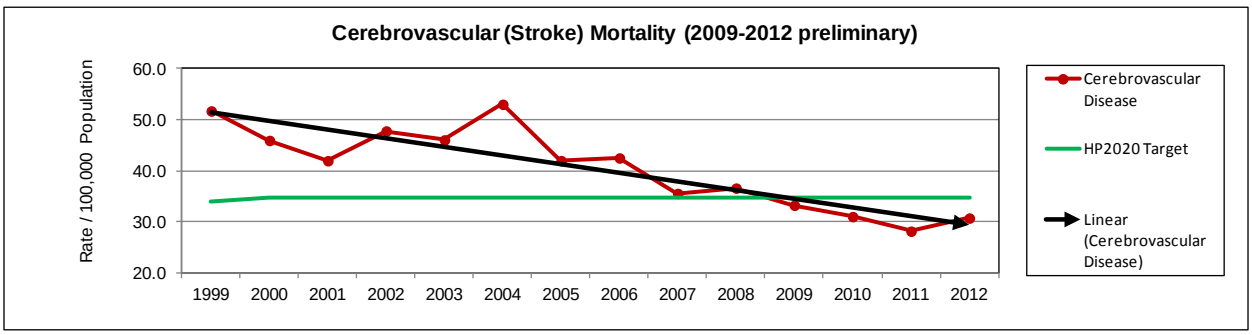


Source: Kentucky State Police Note: mortality rate for police reports is based on the county of occurrence while the mortality rate for vital statistics is based on county of residence

It is noteworthy that collision mortality rates for Grant County are substantially higher than the other counties in the district. Since the state police reports mortality by county of incidence and not county of residence, the Grant County rate likely includes many deaths of people who were not Grant County residents.

#5 Stroke

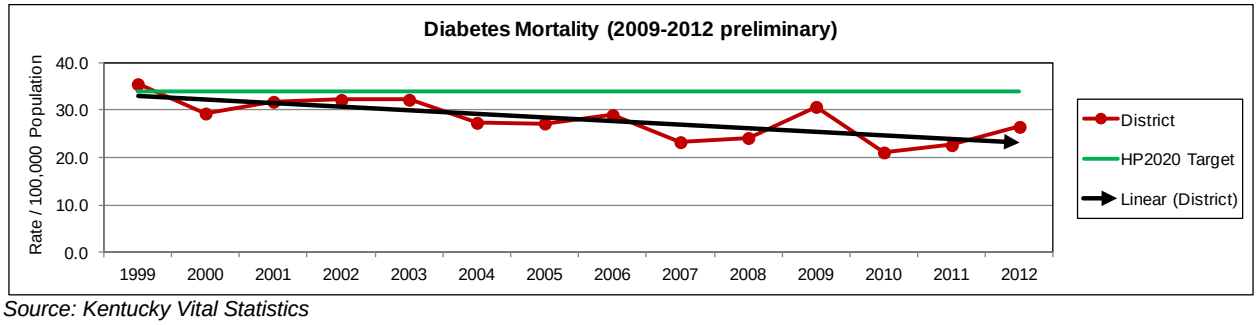
The rate for stroke, or cerebrovascular diseases, has been dramatically reduced in the last 20 years. This may be due to better education and preventive measures to reduce risk. The rate for Northern Kentucky has been less than the Healthy People 2020 target of 33.8 per 100,000 population (age adjusted) since 2009. Stroke mortality has decreased from around 7 percent in 1993 to near 4 percent of all deaths in 2012.



Source: Kentucky Vital Statistics

#6 Diabetes

Despite increasing obesity rates and Type II diabetes diagnoses, the mortality rate for diabetes has decreased. It is uncertain if this is due to better treatment or other health issues listed as the primary cause of death and diabetes listed as an underlying or secondary cause. Since 2000, the mortality rate for diabetes is less than the Healthy People 2020 target of 33.8 per 100,000 (age adjusted). Diabetes mortality remained nearly constant between 3 and 4 percent of all deaths from 1993 to 2012.



Source: Kentucky Vital Statistics

#7 Alzheimer's disease

There was an increase in Alzheimer's disease mortality between 2001 and 2004, but the trend has not changed significantly between 2005 and 2012. There is not a Healthy People 2020 objective directly related to Alzheimer's disease mortality rates. Alzheimer's disease accounts for between 2 and 4 percent of all mortality.

#8 Influenza and pneumonia

Influenza and pneumonia mortality is the only infectious or communicable disease among the top 10 causes of death. The rate per 100,000 population declined between 2000 and 2012 in Northern Kentucky with peak years in 2002, 2005 and 2010. Data from 2010 included the H1N1 influenza pandemic. Influenza and pneumonia deaths have decreased from around 4 percent in 1993 to around 2 percent of all deaths in 2012. Influenza and pneumonia mortality have been slowly decreasing in number. This may be due both to increasing vaccination rates and better treatment options.

#9 Kidney diseases

Nephritis, nephrotic syndrome and nephrosis are diseases related to kidney failure and may have a variety of causes. There is not an identifiable trend. On average, there is little variation. Kidney diseases account for about 1 to 2 percent of all deaths.

#10 Chronic liver disease and cirrhosis

Chronic liver disease and cirrhosis mortality, while having a small variation by year and county, has not changed much over the last two decades. While cirrhosis is often associated with alcohol abuse, the recent surge in hepatitis C and recent studies linking obesity to liver disease may indicate a possible future increase in liver disease mortality in the next decade. Liver diseases account for about 1 to 2 percent of all deaths.

Other causes of death

The remaining 25 percent of deaths are divided into 37 categories with only a few deaths and no measurable trends. However, there are a few categories that are of interest or that should be followed.

One of these is intentional harm. This category includes self-harm (suicide) and homicide. The trends for both suicide and homicide have not varied in the last 20 years. Suicide has remained near 12 deaths per 100,000 and homicides near 4 per 100,000.

Tuberculosis was the third leading cause of death in the U.S. in 1910 with a rate of 153.8 per 100,000. Today, it is only rarely a cause of death in Northern Kentucky. However, tuberculosis is still present and new drug-resistant strains are a cause for concern.

Other communicable or infectious diseases of note are viral hepatitis with 59 deaths (2006-2012) and HIV with 30 deaths (2006-2012). These are of particular concern as the district continues to address the heroin epidemic and IV drug use.

SUMMARY AND CONCLUSIONS

In looking at the trends for the top 10 leading causes of death in Northern Kentucky in 2012, five (cancer, heart disease, stroke, diabetes, and influenza and pneumonia) are improving, three (Alzheimer's disease, kidney disease and liver disease) have remained about the same and two (chronic lower respiratory disease and unintended injuries) are increasing.

Between 2006 and 2012, the total number of deaths in the district has remained nearly constant at about 3,000 per year. Since the population is increasing, the overall rate of death is decreasing. This is likely to change as the population ages. The challenge is not to prevent death but to ensure a better and more active quality of life for the aging population.

Top 10 Causes of Death in Northern Kentucky

Rank NKY	2012	Rate	Trend 1993-2012
1	Malignant neoplasms	184.1	
2	Diseases of heart	162.8	
3	Chronic lower respiratory diseases	54.4	
4	Accidents (Unintentional injuries)	49.7	
5	Cerebrovascular diseases (stroke)	30.7	
6	Diabetes mellitus	26.0	
7	Alzheimer's disease	16.0	
8	Influenza and pneumonia	15.2	
9	Kidney diseases (Nephritis and nephrosis)	11.7	
10	Chronic liver disease and cirrhosis	10.0	

Source: Kentucky Vital Statistics

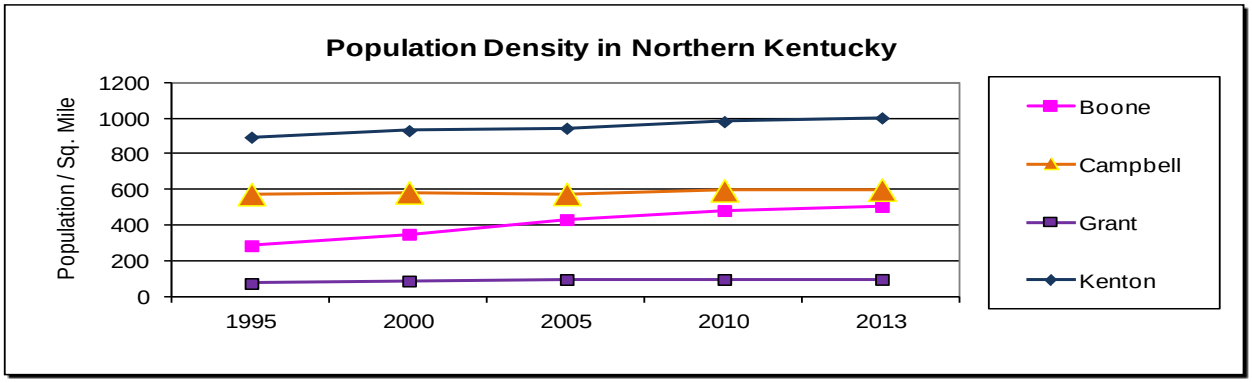
Note: Chart trends: GREEN is improving, YELLOW is about the same and RED is increasing.

Section 3: Demographics and Diversity

TOTAL POPULATION

The changes in population for Northern Kentucky can best be illustrated by comparisons with population density. As population increases, the county population density also increases.

The graph below clearly shows the greatest population growth was in Boone County with the population nearly doubling between 1993 and 2013, increasing from 65,318 to 124,442, a gain of 59,124 residents.



Source: Kentucky State Data Center

Population by county

County	1993	2013	Increase	Percent Change
Boone	65,318	124,442	59,124	90.5%
Campbell	86,147	90,988	4,841	5.6%
Grant	17,663	24,753	7,090	40.1%
Kenton	145,521	163,145	17,624	12.1%
District	**314,649**	**403,328**	**88,679**	**28.2%**

Source: Kentucky State Data Center

Over the last decade, race and ethnicity has had only small changes in percent of the total population. The white population has decreased by 3.4 percent but is still the predominant race with more than 91 percent of the population. The greatest increase from 2000 to 2010 has been the Hispanic population with more than 6,000 new residents. Also increasing are the African American (+0.8 percent) and mixed race (+0.7 percent) populations.

RACE AND ETHNICITY

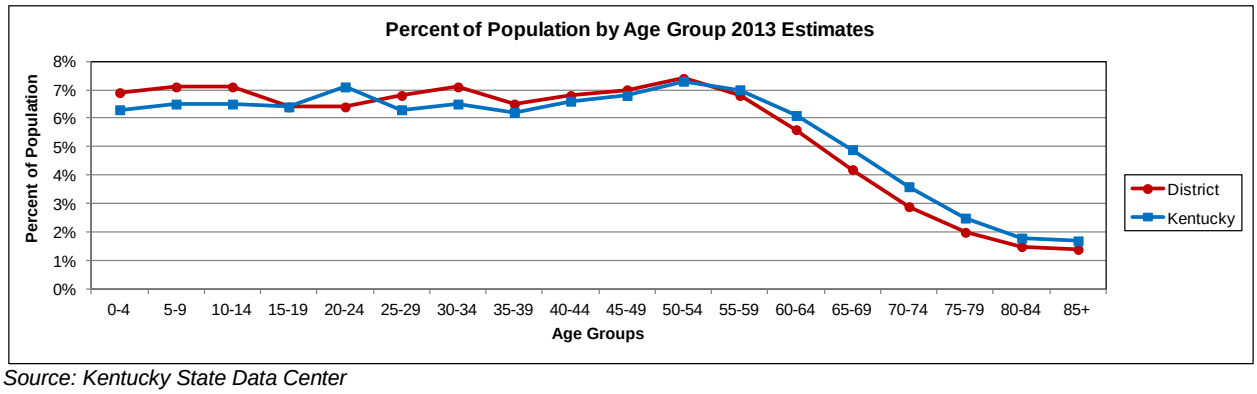
	2000	2010	Percent Change
White, not Hispanic	94.5%	91.1%	-3.4%
African American, not Hispanic	2.4%	3.2%	0.8%
American Indian / Alaska Native, not Hispanic	0.2%	0.1%	0.0%
Asian, not Hispanic	0.7%	1.2%	0.5%
Native Hawaiian / Other Pacific Islander, not Hispanic	0.0%	0.1%	0.0%
Other race, not Hispanic	0.1%	0.1%	0.0%
Two or more races, not Hispanic	0.8%	1.5%	0.7%
Hispanic	1.3%	2.7%	1.4%

Source: Kentucky State Data Center

AGE

Age trends indicate that in general, Northern Kentucky has a younger population than the state with a smaller percent of the population over age 55 than the state average.

In the chart below, Northern Kentucky has a higher percentage of the population in the less than age 55 groups and a lower percentage of population in the over age 55 groups compared to statewide rates. While there is a peak at age 50-54, the fears of an aging Baby Boomer generation overwhelming the health care system are largely unfounded for Northern Kentucky.

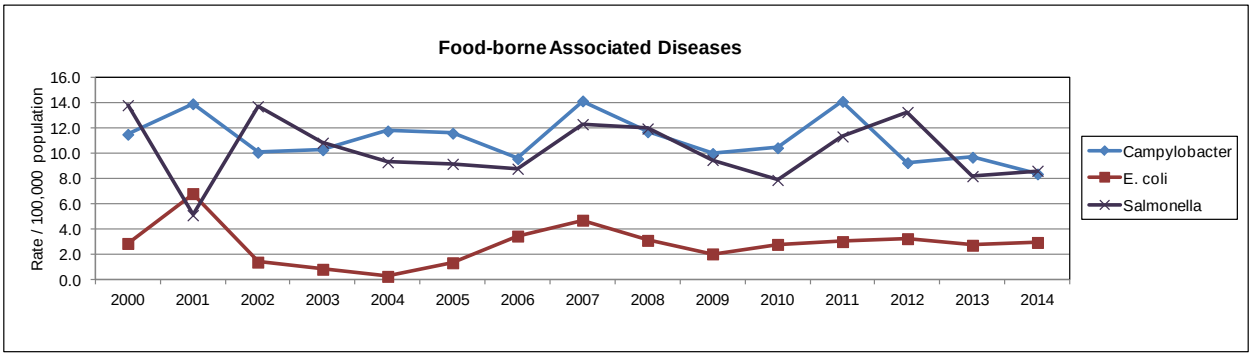


Source: Kentucky State Data Center

Section 4: Infectious and Communicable Diseases

FOOD-BORNE DISEASES

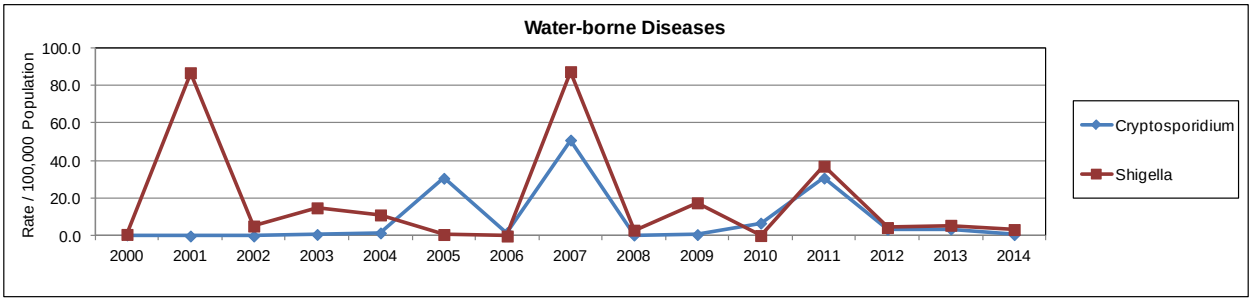
These diseases are often associated with improperly cooked, handled or stored food. The most commonly reported diseases are Campylobacter, E. coli and Salmonella. While there are several diseases associated with food consumption, only these three are common in Northern Kentucky. These diseases are usually not fatal and are often not reported. There have been no widespread infections or patterns in the reported cases.



Source: Northern Kentucky Health Department (unpublished reports)

WATER-BORNE DISEASES

The two most common water-borne diseases in Northern Kentucky include Cryptosporidium and Shigella. Recent outbreaks in Northern Kentucky have been traced to swimming pools and child care centers. These diseases tend to be cyclic every two years. There was a large outbreak in 2007 and a smaller outbreak in 2011. Preventive measures (hand washing, surface disinfection and other education) were initiated in 2011 which reduced the severity and nearly eliminated exposure in 2013.

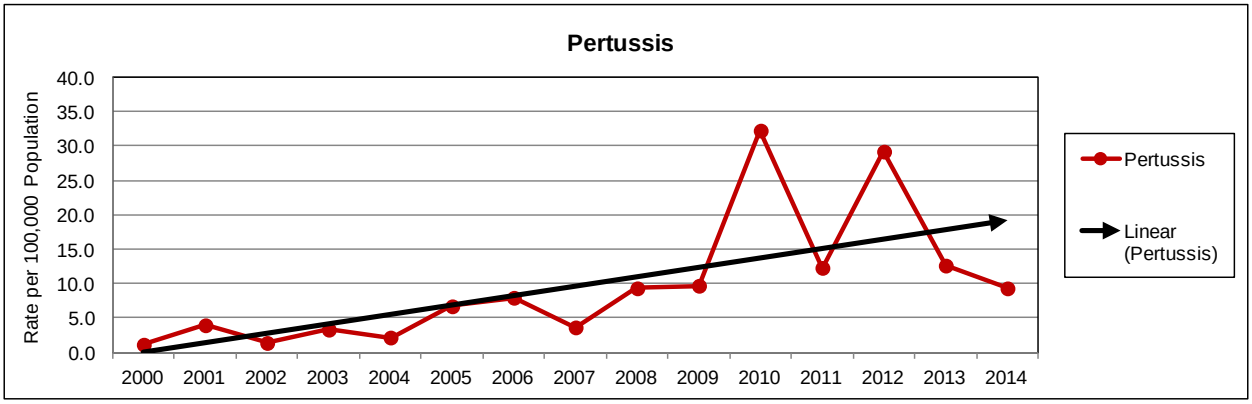


Source: Northern Kentucky Health Department (unpublished reports)

VACCINE PREVENTABLE DISEASES

Measles outbreaks in Ohio in 2014 and California in 2015 illustrates how vaccine preventable diseases are still a threat. Fortunately, Northern Kentucky has not had a large scale outbreak of these diseases in many years. The exception to this is pertussis (whooping cough) which has been on the rise since 2006 with a peak in 2010 and 2012. There are several reasons that could explain the increase in cases. There is improved testing available, doctors are more conscious of the disease now and look for it, and there is better reporting to the Health Department. The single most likely reason the number of cases are increasing is a natural waning of the vaccine as people age. The acellular

vaccine, while causing fewer side effects, does not provide protection for as long a time as the whole cell vaccine. The acellular vaccine given to children (DTaP) provides the highest amount of protection in the year after receiving the fifth dose, after that the effectiveness begins to wane.



Source: Northern Kentucky Health Department (unpublished reports)

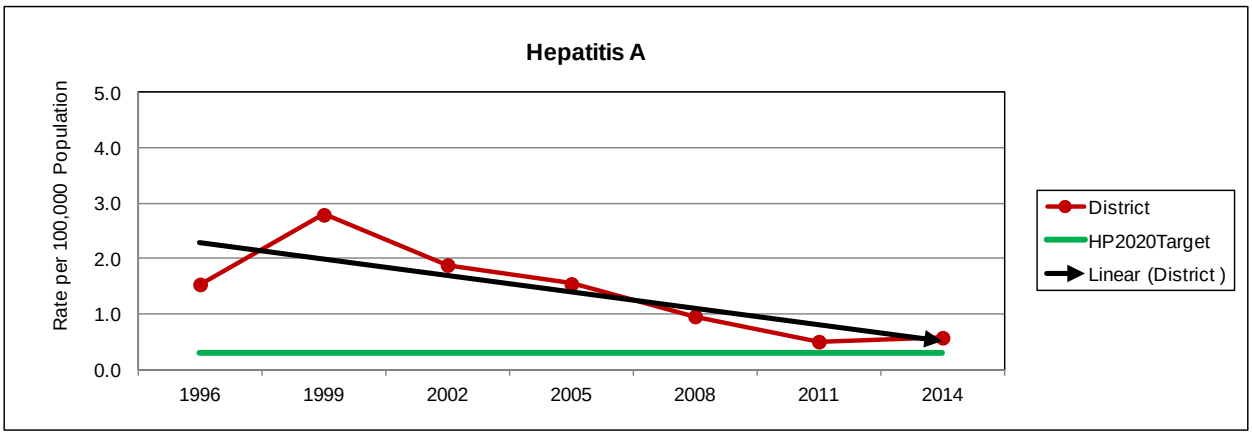
VIRAL HEPATITIS

Hepatitis means inflammation of the liver. The liver is a vital organ that processes nutrients, filters the blood and fights infections. When the liver is inflamed or damaged, its function can be affected. Hepatitis is most often caused by a virus. In the United States, the most common types of viral hepatitis are hepatitis A, hepatitis B and hepatitis C. Heavy alcohol use, toxins, some medications, and certain medical conditions can also cause hepatitis.

Hepatitis A

Hepatitis A is a highly contagious liver infection caused by the hepatitis A virus. It can range in severity from a mild illness lasting a few weeks to a severe illness lasting several months. Hepatitis A is usually spread when a person ingests fecal matter—even in microscopic amounts—from contact with objects, food or drinks contaminated by feces or stool from an infected person.

Reported cases of hepatitis A have been decreasing since 1999 and holding steady just slightly above the Healthy People 2020 target since 2011.

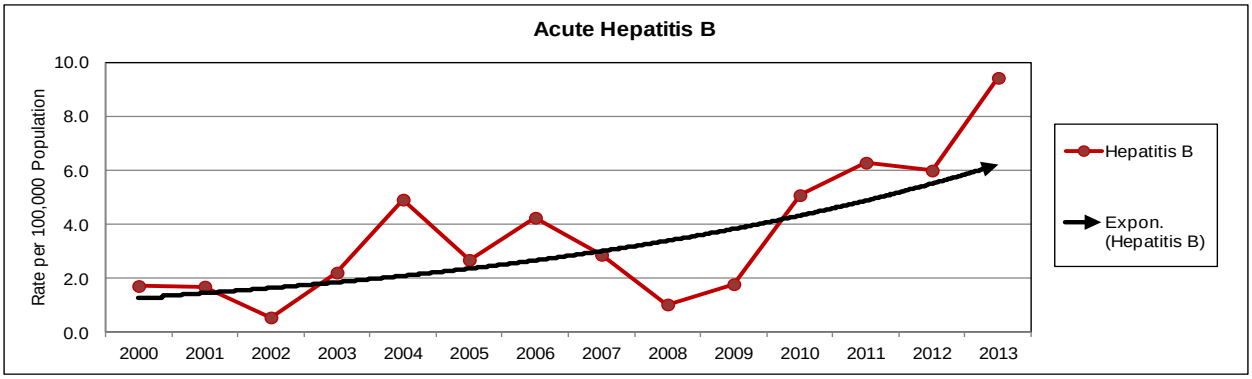


Source: Northern Kentucky Health Department (unpublished reports)

Hepatitis B

Hepatitis B is a contagious liver disease that results from infection with the hepatitis B virus. When first infected, a person can develop an acute infection, which can range in severity from a very mild illness with few or no symptoms to a serious condition requiring hospitalization. Acute hepatitis B refers to the first 6 months after someone is exposed to the hepatitis B virus. Hepatitis B is usually spread when blood, semen, or other body fluids from a person infected with the hepatitis B virus enter the body of someone who is not infected. This can happen through sexual contact with an infected person or sharing needles, syringes, or other injection drug equipment.

Acute hepatitis B has varied in number from year to year, but the overall trend is increasing. Since 2008, there has been a sharp increase in the trend. Note the exponential trend line in the graph below. The number of cases varied between 5 and 10 cases a year until 2010 when there was a sharp increase. There were 35 cases reported in 2014 in Northern Kentucky.

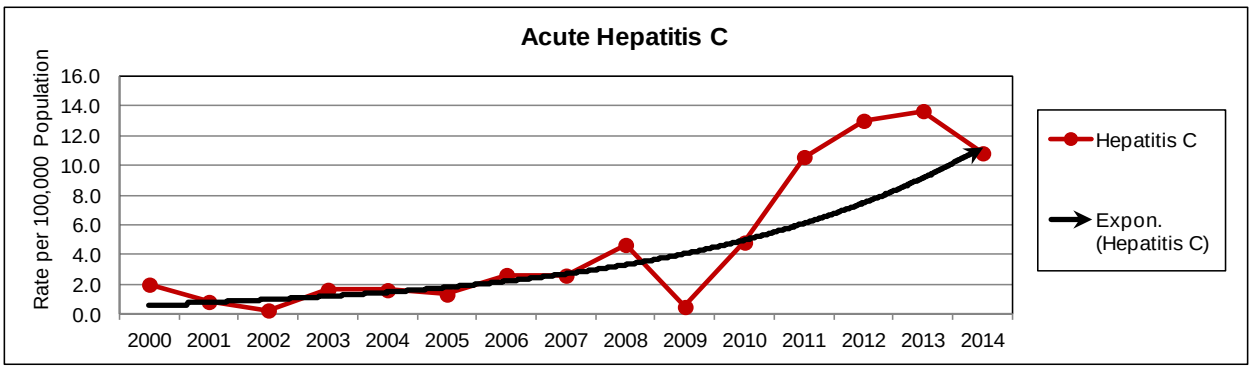


Source: Northern Kentucky Health Department (unpublished reports)

Hepatitis C

Hepatitis C is an infection of the liver that results from the hepatitis C virus. Acute hepatitis C refers to the first several months after someone is infected. Acute infection can range in severity from a very mild illness with few or no symptoms to a serious condition requiring hospitalization. Hepatitis C is usually spread when blood from a person infected with the hepatitis C virus enters the body of someone who is not infected. Today, most people become infected with hepatitis C by sharing needles, syringes or any other equipment to inject drugs. Hepatitis C can also be spread through tattoos and body piercings from unlicensed facilities, informal settings, or with non-sterile instruments.

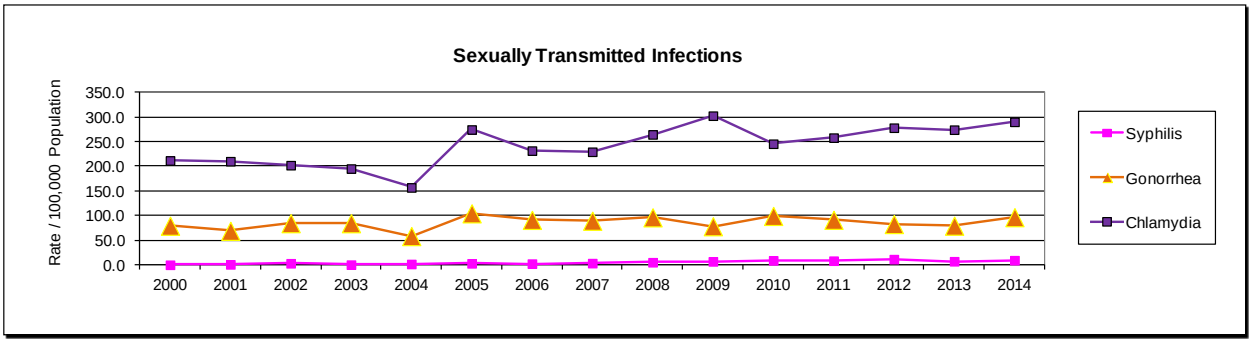
There has also been a surge in hepatitis C cases especially since 2009. Much of this surge has been associated with IV drug use. Untreated hepatitis C results in irreversible liver failure. Treatment is a long and very expensive process. Note the exponential trend line in the graph below. Like hepatitis B, there were few cases of hepatitis C reported annually until 2010 when there was an exponential increase in reported cases. The number of cases peaked in 2013 with 55 cases. Slightly fewer cases were reported in 2014.



Source: Northern Kentucky Health Department

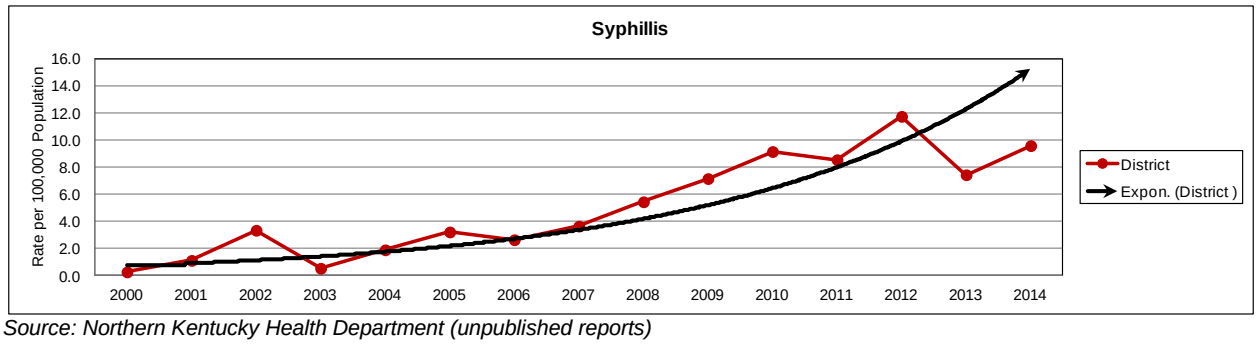
SEXUALLY TRANSMITTED INFECTIONS

Sexually transmitted infections are widespread and easily transmitted. Of the sexually transmitted infections, Chlamydia is the most common followed by gonorrhea. While there are many fewer cases of syphilis, there has been a dramatic increase in the number of reported cases in the last few years. Untreated syphilis in a pregnant woman can lead to miscarriage or still birth. It can cause deafness, neurological disorders or bone deformity in infants. In adults who are untreated, syphilis can progress to cause decreased muscle coordination, paralysis, blindness, dementia, organ damage and death.



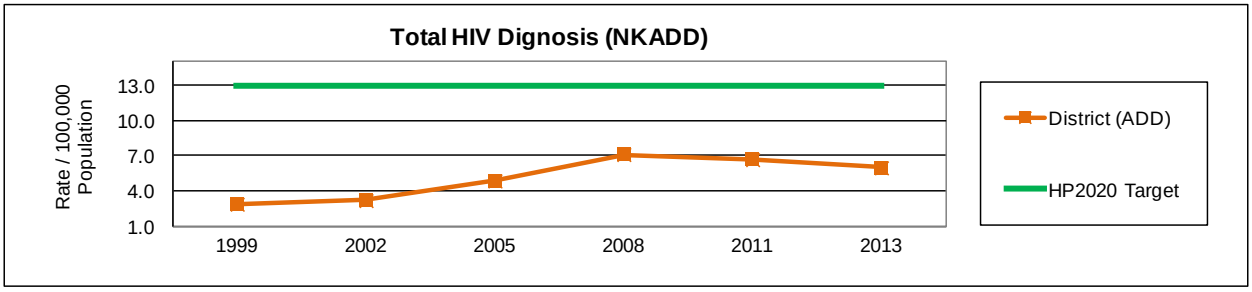
Source: Northern Kentucky Health Department (unpublished reports)

The detail graph of reported syphilis cases in Northern Kentucky illustrates the exponential increase since 2006. There is a slight decrease in 2013 and 2014, but it is too soon to determine if the trend has changed. While there are many more cases of Chlamydia and gonorrhea reported, the trend is not as dramatic. Further, the two disease are more easily treated and the consequences are not as severe compared to those from syphilis.



Source: Northern Kentucky Health Department (unpublished reports)

HIV infections are only reported for the eight county area development district. The rate of HIV diagnosis was rising steadily through 2006. Since then, the rate has remained relatively steady. The average Northern Kentucky rate (6.4 since 2006) is below the Healthy People 2020 target of 13 per 100,000 (age-adjusted) population (3 year averages). In 2013 there were 19 newly diagnosed cases of HIV. This is down from 31 new cases in 2012 in the 8 county area development district.



Source: Kentucky Department for Public Health

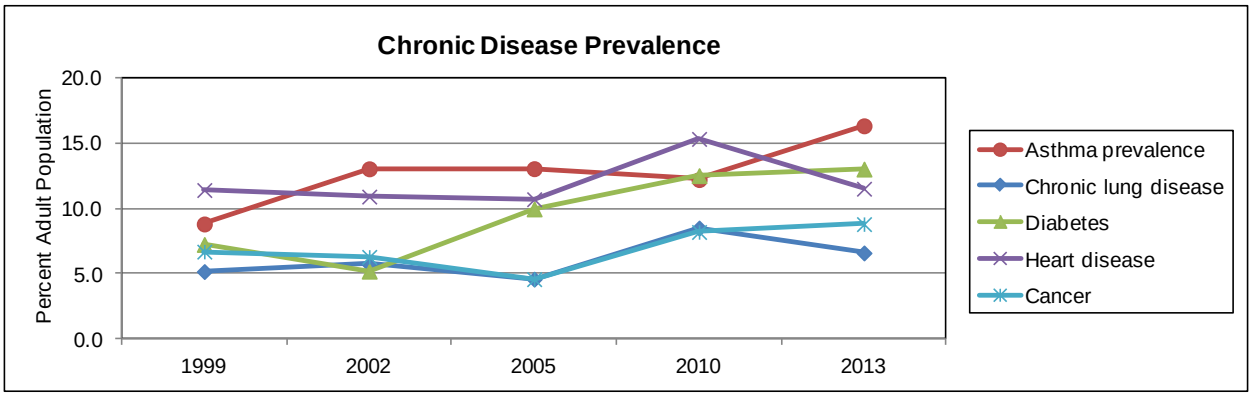
TUBERCULOSIS

There have been few new TB cases in the last decade, but the cases that are diagnosed are more complex and often are resistant to routine treatment, requiring a more aggressive and longer treatment regimen. While the rate is near the Healthy People 2020 target, the disease continues to be a threat.

Section 5: Chronic Diseases and Injury

CHRONIC DISEASES

Eight of the top 10 causes of death are the result of chronic diseases that may persist over long periods of time. These diseases result in a large percentage of health care costs including physician care, hospitalizations and long-term dependence on pharmacological products. This does not include lost productivity and a degraded quality of life. This report looks at conditions and trends from the Greater Cincinnati Community Health Status Survey, which is conducted every 3-5 years by Interact for Health in partnership with the Institute for Policy Research. The survey covers a variety of topics, including insurance status, concerns about health coverage, health services and others. Data sets from the 2010, 2005, 2002 and 1999 surveys are available online.

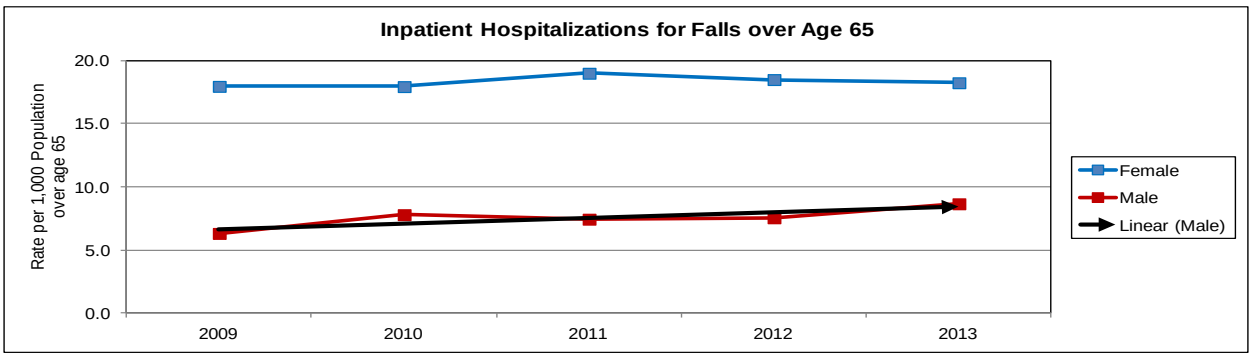


Source: Greater Cincinnati Community Health Status Survey (1999: Boone, Campbell and Kenton counties; 2002-2013 Grant County was added)

The survey asked, "Has a doctor or other health care provider ever told you that you had . . .?" for all conditions in the chart above. The long-term trend for asthma prevalence seems to be increasing. Chronic lung disease and heart disease both have had little change when looking at long term trends. Diabetes steadily increased from 2002 to 2013, but the rate of increase seemed to taper off in 2013. Cancer rates have had little change since 1999. (Note: Apparent differences for Northern Kentucky may not be statistically valid due to a small regional sample size and sampling error.)

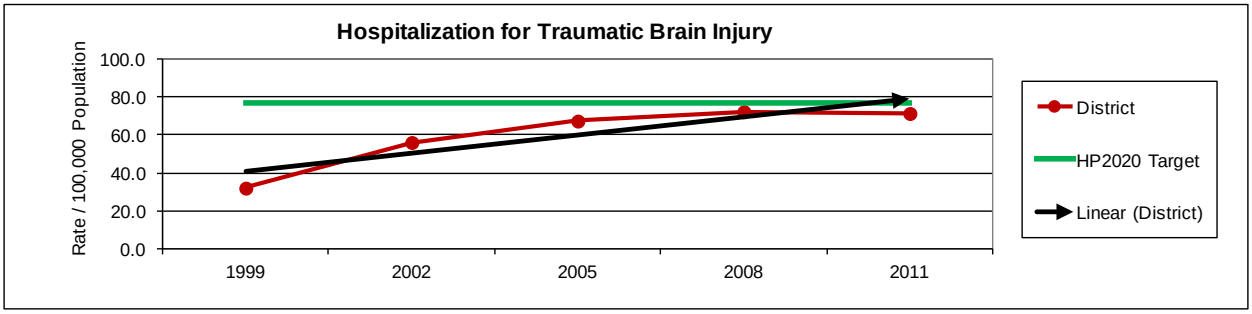
UNINTENTIONAL INJURY

Falls are a common cause of hospitalization for the population over age 65. Falls are much more common among females than males in this age group. Overall, the rate of hospitalization has not changed much for females, but is increasing slightly for males.



Source: Kentucky Injury Prevention and Research Center (Note: the reporting criteria changed in 2009.)

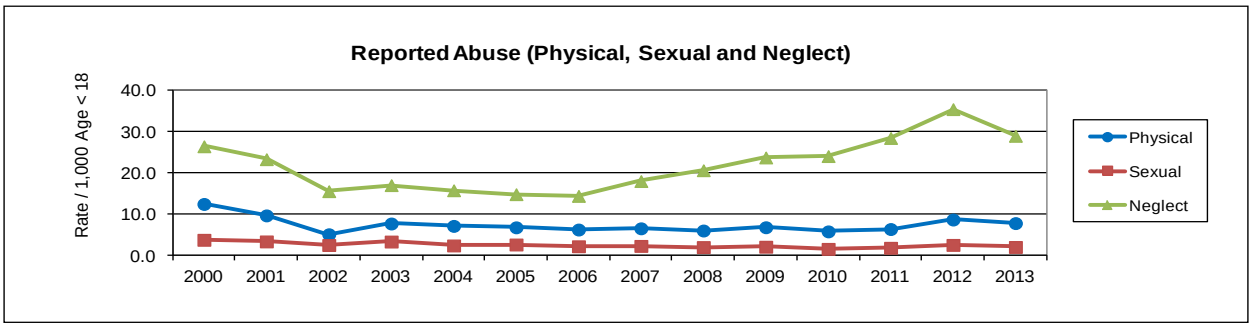
Hospitalization for traumatic brain injury may be intentional or unintentional but most are likely unintentional. The trend shows a steady increase between 1999 and 2008. Between 2008 and 2011, the rate has remained steady. The crude rate in 2011 is slightly less than the age adjusted Healthy People 2020 target.



Source: Kentucky Injury Prevention and Research Center

CHILD ABUSE AND NEGLECT

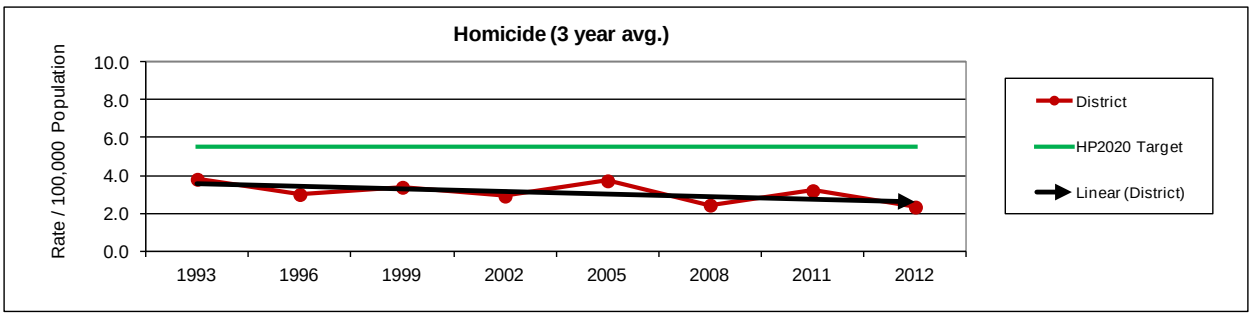
Reported cases of physical and sexual child abuse have not changed substantially between 2001 and 2013. Cases of neglect were also relatively unchanged from 2002 to 2006 but then steadily increased between 2007 and 2012. It is too soon to know if the slight decrease in 2013 is a temporary shift or a continuing change. Substantiated cases are fewer, but follow the same pattern. Change in definition for substantiated cases of abuse makes trending difficult to graph.



Source: KIDS COUNT data center

HOMICIDE

There have been only a few cases of homicide in Northern Kentucky since 1993. While there are annual variations, the overall trend is decreasing.



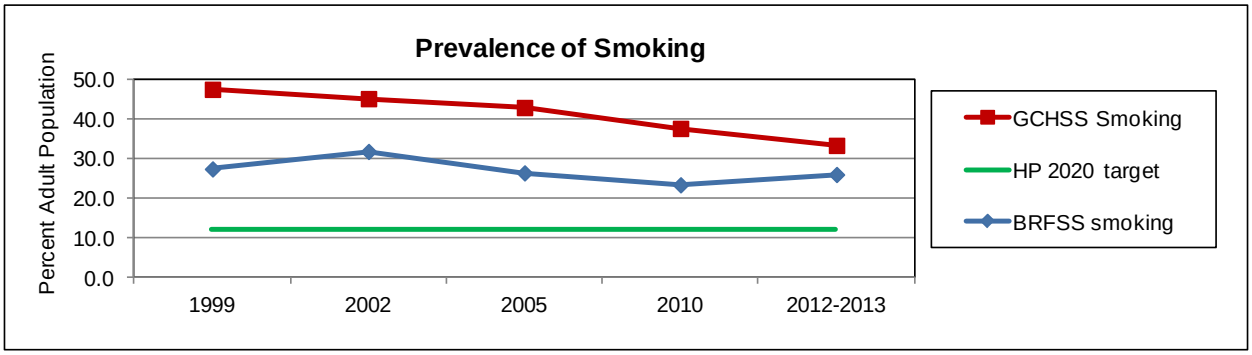
Source: *Kentucky Vital Statistics*

Section 6: Unhealthy Behaviors and Risk Factors

Unhealthy weight and use of tobacco products are often considered the greatest risk factors for developing chronic diseases. Smoking and exposure to tobacco smoke are identified risk factors for cancer, heart disease, chronic lower respiratory disease, stroke and Alzheimer's disease. Unhealthy weight is also a risk factor for diabetes and many of the leading causes of death in Northern Kentucky.

TOBACCO USE

Estimates of smoking rates for Northern Kentucky vary according to the survey used. The Greater Cincinnati Community Health Status Survey generally found higher rates and a greater decrease than the Behavior Risk Factor Surveillance Survey sponsored by CDC. Both surveys indicate a decreasing number of adults smoking but both indicate a smoking rate much greater than the Healthy People 2020 target.



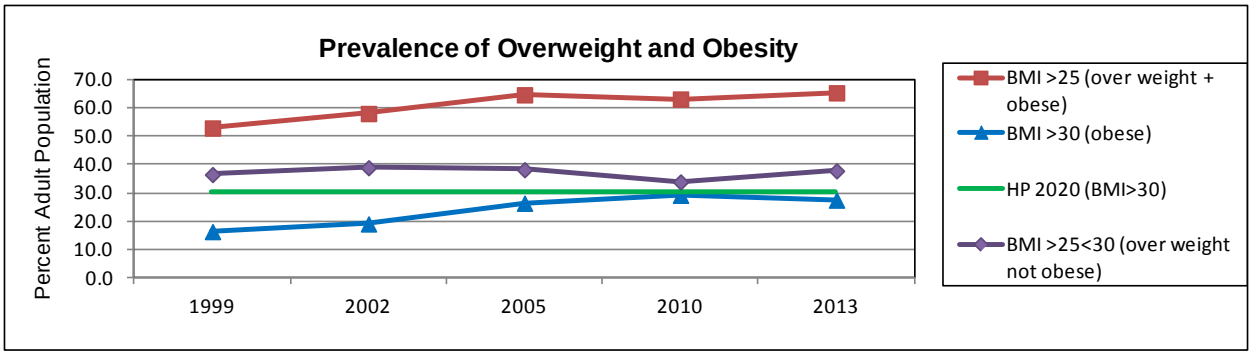
Source: Greater Cincinnati Community Health Status Survey (1999-2013), Kentucky Cabinet for Health and Family Services (1999-2012), Greater Cincinnati Community Health Status Survey (1999-2002: Boone, Campbell and Kenton counties; 2005-2013 Grant County was added) Note: BRFSS includes the eight county area development distric)

UNHEALTHY WEIGHT

The risk factors for an unhealthy weight generally include eating habits, the amount of exercise and genetic disposition. Unhealthy weight has been linked to cancer, heart disease, stroke and diabetes.

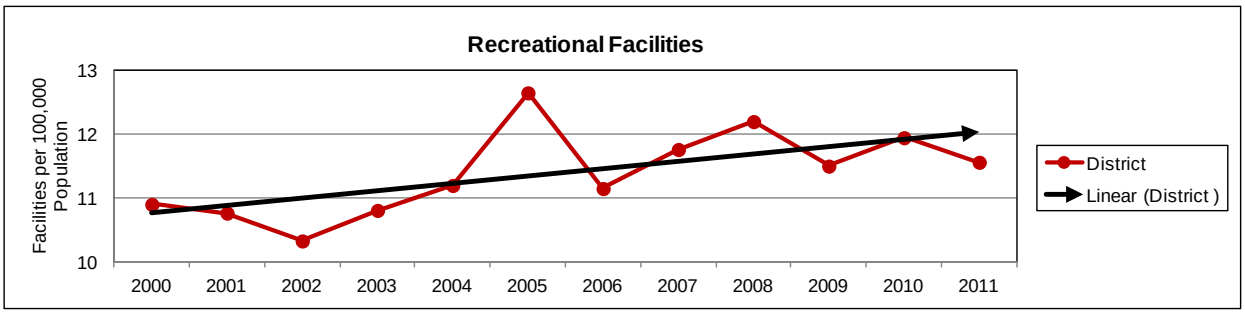
Overweight and obesity rates increased dramatically between the 1999 and 2005 Greater Cincinnati Community Health Status Surveys, but have remained at about the same level since 2005. The Northern Kentucky rate for obesity (a body mass index greater than 30) was less than the Healthy People 2020 target until 2005. Since then the rate has held steady at about the same as the Healthy People 2020 target (30.5 percent of adults). Likewise, the overweight (which includes obese rates) has remained relatively steady since 2005.

Note: In the Community Health Status Survey, the body mass index is calculated from self-reported height and weight. This may result in under-reported values. Apparent variations may be due to sampling error and not statistically significant differences.



Source: Greater Cincinnati Community Health Status Survey (1999-2002: Boone, Campbell and Kenton counties; 2005-2013 Grant County was added.)

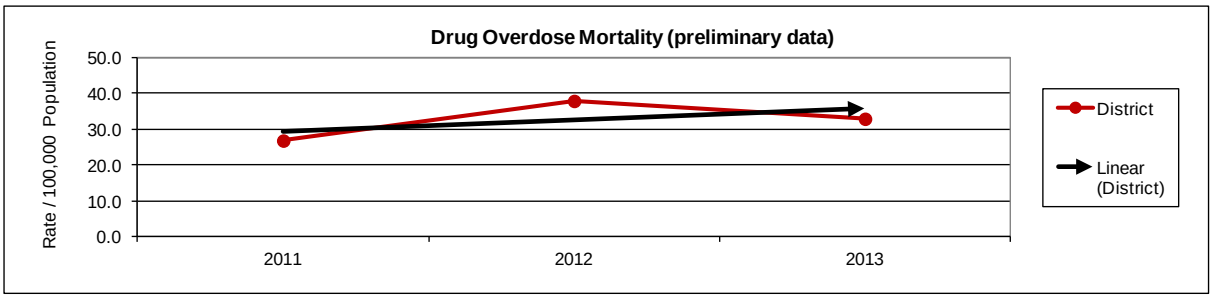
Communities with plentiful opportunities for physical activity tend to have lower rates of obesity. There were nearly 50 recreational facilities located in Northern Kentucky in 2011. This is about 12 facilities for every 100,000 residents. While there is a yearly variation, the trend is an increasing number of facilities in all counties.



Source: KIDS COUNT Data Center

SUBSTANCE ABUSE AND HEROIN USE

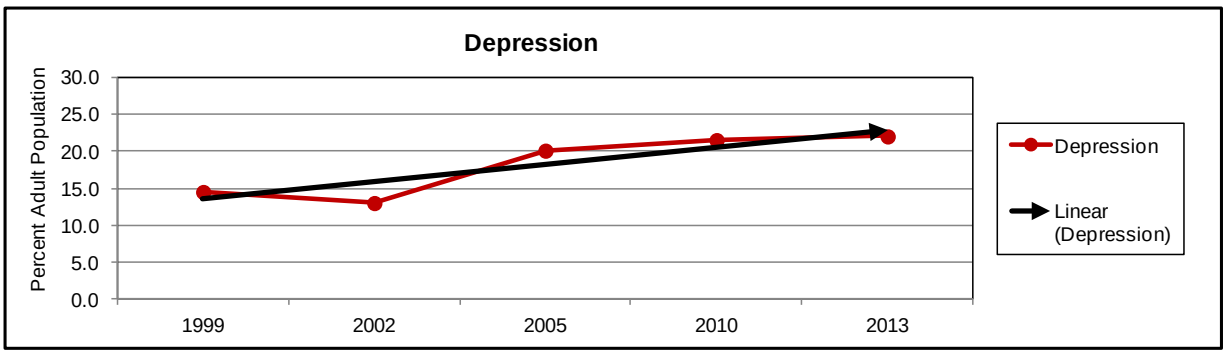
As noted previously, drug overdose mortality accounts for a large part of the increase unintentional injury (accidental) deaths. The recent overdose epidemic has prompted a closer look at heroin and other narcotic drug diagnostic codes.



Source: Kentucky Vital Statistics (preliminary mortality data includes heroin and other drug overdose diagnoses)

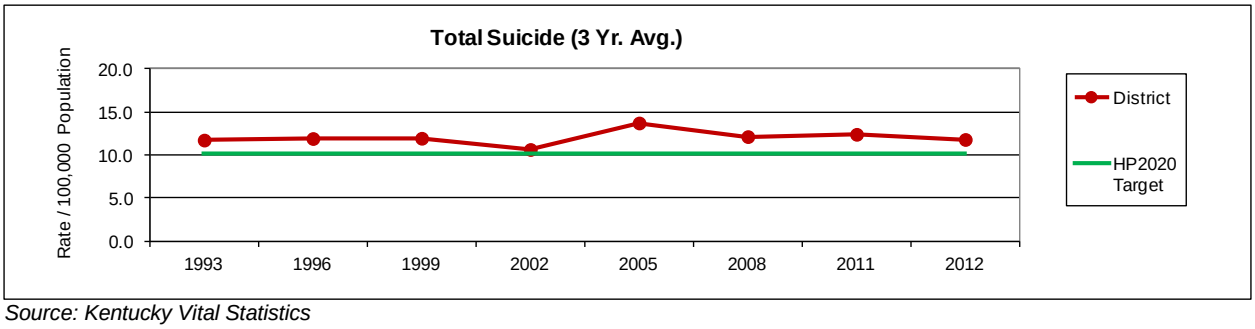
DEPRESSION AND SUICIDE

Depression is a risk factor for suicide. The Greater Cincinnati Community Health Status Survey has indicated a slight increase in those reporting that they have been told by a medical provider that they suffer from depression. (Note: The 2002 survey was administered in 2001, before the September 11 terrorist attacks.)



Source: Greater Cincinnati Community Health Status Survey (1999-2002: Boone, Campbell and Kenton counties; 2005-2013 Grant County was added.) Note: yearly variations may be due to sampling error and not a statically significant trend.

The suicide mortality crude rate in Northern Kentucky has not changed much since 1993. The graph reflects a slight drop in 2002, a peak in 2004 and a leveling off at a level slightly higher than the Healthy People 2020 age-adjusted target.



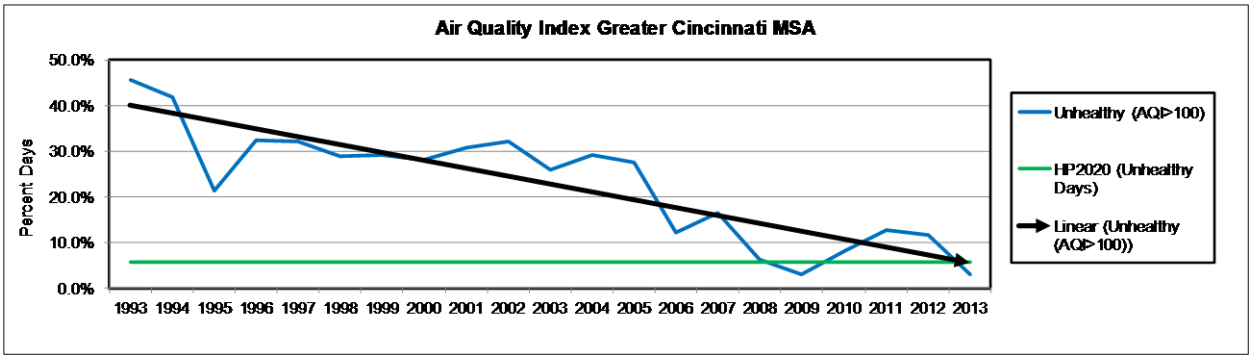
Source: Kentucky Vital Statistics

Section 7: Environmental Health

Environmental health is the complex relationship between our physical environment and the health of our population. Environmental health risks include a variety of indicators of factors that influence human health.

AIR QUALITY

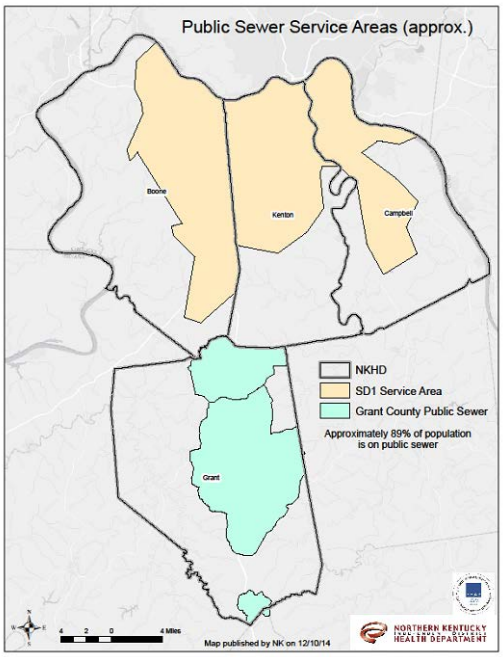
The U.S. Environmental Protection Agency has data for air quality since 1980. This report accessed EPA data for the Greater Cincinnati Metropolitan Statistical Area that includes parts of Ohio, Kentucky and Indiana. Although Northern Kentucky has air quality monitoring stations in Boone and Campbell Counties, data for the entire tri-state area provides a more stable statistical reading than any one monitoring station on a given day. The graph below tracks the percent of days where the air quality was rated as unhealthy (air quality index greater than 100). The Healthy People 2020 target is based on a ratio of the air quality index and population. Overall, the trend is for significantly cleaner air than in 1993. Outdoor air quality is a risk factor for many lung diseases including lung cancer, chronic lower respiratory disease (CLRD), chronic obstructive pulmonary disease (COPD including emphysema and bronchitis) and asthma.



Source: U.S. Environmental Protection Agency

PUBLIC SEWER SYSTEMS

Approximately 89 percent of Northern Kentucky's population is served by a public sewer system. About 45,000 mostly rural residents have an on-site sewage system or are served by a small package treatment facility. Many of the existing urban sewer systems are old combined sanitary and storm water drains that are prone to overflow during periods of heavy precipitation. Untreated sewage is a risk factor for many gastrointestinal diseases and skin diseases. Publicly regulated sewer systems generally are better at treating sewage than home on-site systems that are not regularly inspected and may not always be well maintained.

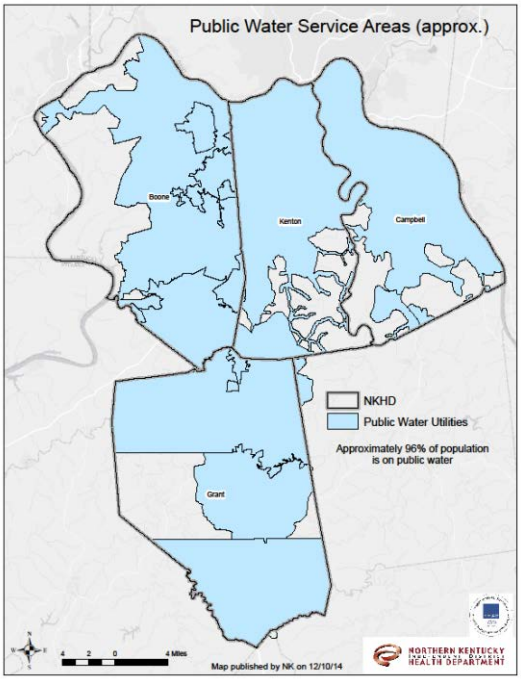


Source: Kentucky Division of Water

PUBLIC WATER SYSTEMS

Approximately 96 percent of Northern Kentucky's population is served by public water systems. Only about 20,000 residents, mostly in rural areas, are without a regulated water system. Though some have private wells, most of these residents rely on cisterns filled by untreated rain water or water trucked in from regulated suppliers. Untreated water may be a risk factor for a variety of diseases and parasites.

There are 21 licensed water suppliers in Northern Kentucky. They include 14 in Boone County, one in Campbell County, four in Grant County and two in Kenton County.



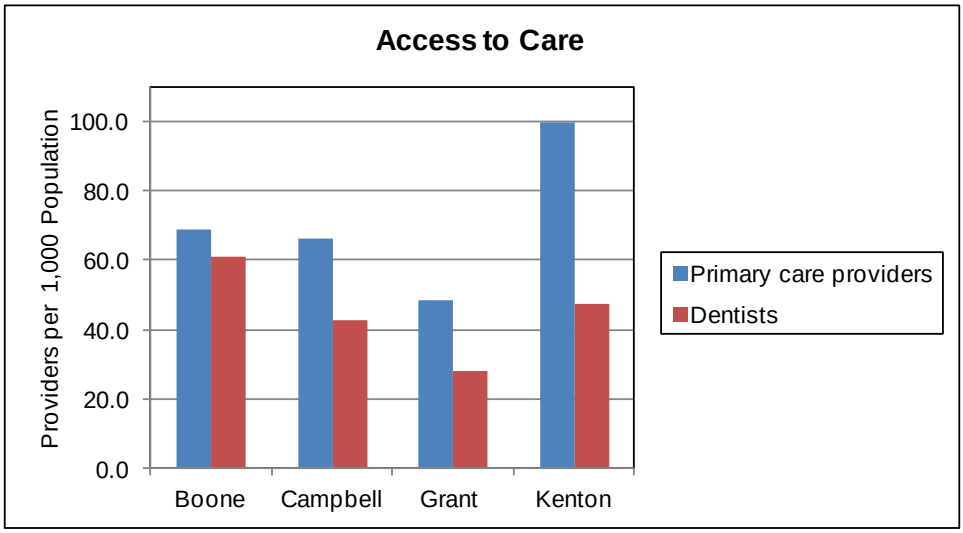
Source: Kentucky Division of Water

Section 8: Access to Care

Access to health care has been identified as a priority health concern in the *Community Health Plan* in 1996, *Master Health Plan* in 2005 and the *Vision for a Healthy and Vibrant Community* in 2009. Analysis of the issue indicated that the number of providers is not as much of an issue as getting to the provider, knowing which provider (level of care) is most appropriate, and being able to pay for the service provided.

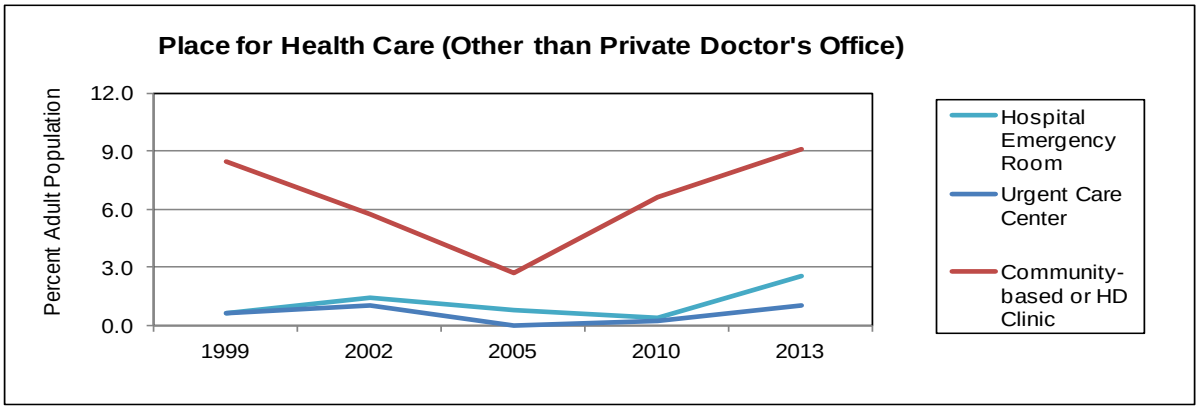
ACCESS TO CARE

The graph below indicates the number of providers for every 1,000 population by county. Providers tend to be clustered around major highways. This is expected due to the great reliance on private automobiles for transportation. It is difficult for some who are unable to drive or who are without other means of transportation to access health care providers. In many cases for those of low income, travel by taxi or bus is not an option.



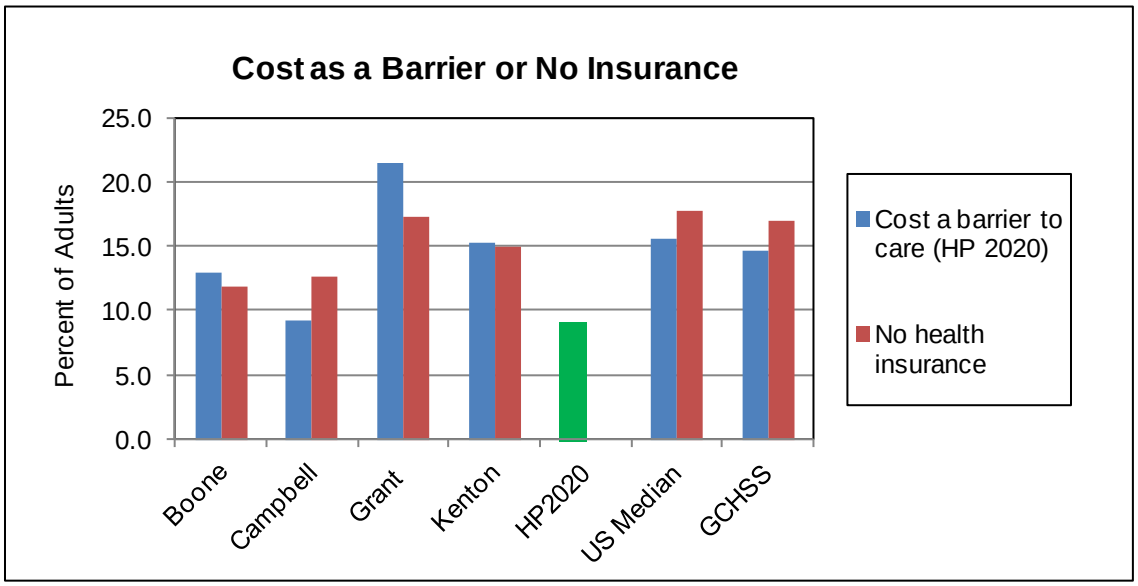
Source: CDC Community Health Status Indicators CHSI 2015

While the number of primary care providers and dentists in Northern Kentucky is adequate for the population, access is not always equal among those of low income or those with transportation issues. The graph below represents survey responses prior to implementation of the Accordable Care Act. These numbers may change in the future.



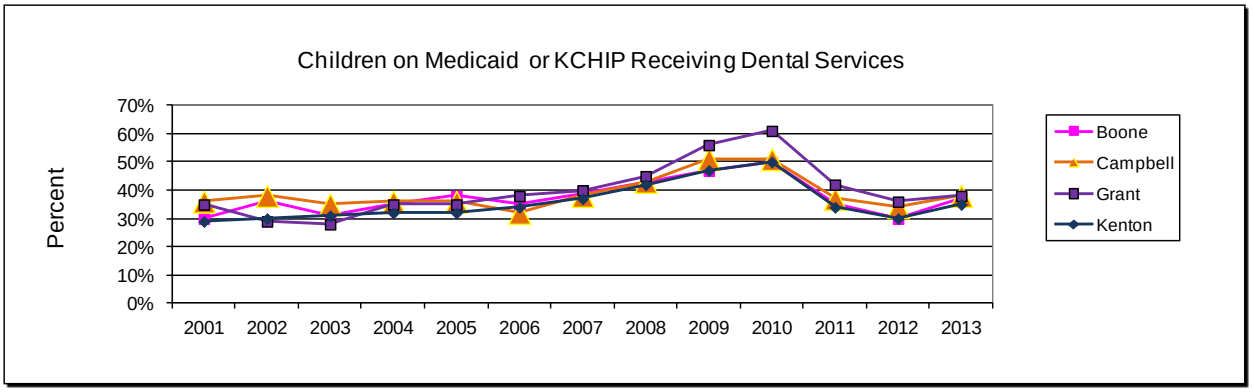
Source: Greater Cincinnati Community Health Status Survey (1999-2002: Boone, Campbell and Kenton counties; 2005-2013 Grant County was added.)

Cost is a significant barrier to seeking health care as is lack of health insurance. These surveys were prior to the full implementation of the Affordable Care Act.



Source: CDC Community Health Status Indicators (CHSI 2015), Greater Cincinnati Community Health Status Survey (2013)

The percent of children on Medicaid receiving dental services increased steadily between 2001 and 2010, but then decreased in 2010-2011. There was a slight increase in 2013 according to KIDS COUNT.

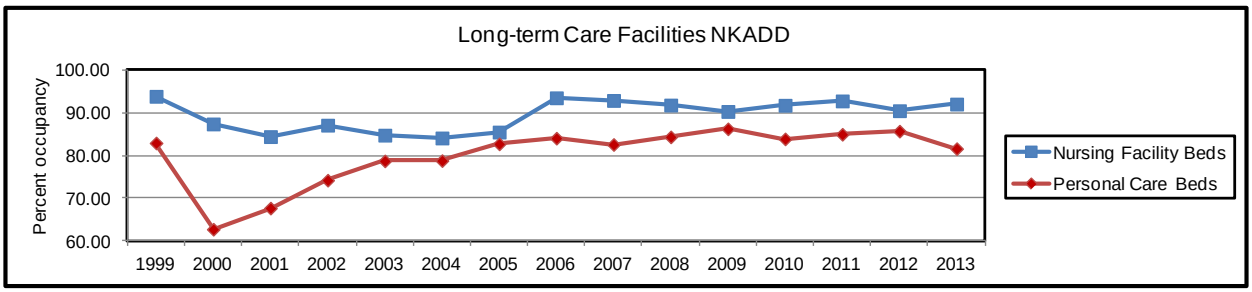


Source: KIDS COUNT Data Center

LONG-TERM CARE FACILITIES

In 2013 there were 14 facilities with nursing beds and 11 facilities with personal care beds in Northern Kentucky. There were four additional nursing facilities and four additional personal care facilities in the four additional counties that are part of the area development district. The occupancy rate for long-term care facilities in the area development district has remained fairly stable since 2006 with a rate a little over 90 percent for nursing facility beds and slightly less for personal care beds varying between 82 and 86 percent occupancy.

While much of the country is experiencing a surge in the population over age 65, the Northern Kentucky population over 65 is not expected to peak until the next decade. The beds in long-term care facilities are primarily occupied by those over 65 years of age. While there is no immediate concern, with occupancy rates over 90 percent for nursing facility beds, there is very little surge capacity. Should one of the large facilities close unexpectedly or if there is a rapid increase in population needing this type of care, there might be an urgent need to find additional capacity. There are no Healthy People 2020 objectives related to long-term care occupancy rates.



Source: Kentucky Cabinet for Health and Family Services

HOSPITAL UTILIZATION

Should a disaster or other public health emergency occur, hospital utilization rates indicate that there is a "surge capacity" based on the number of licensed beds and occupancy rates. Occupancy rates, however, do not indicate staff capacity to accommodate and administer to a surge in occupancy. It is difficult to forecast what changes in rates might result from the implementation of the Affordable Care Act.

Hospital utilization for Northern Kentucky Area Development District, 2013

	Licensed Beds	Admiss-ions	Patient Days	Percent Occupancy
Psychiatric inpatient utilization				
Northkey Community Care Intensive Service	51	654	4,231	22.7%
St. Elizabeth Edgewood	44	2,365	11,072	68.9%
St. Elizabeth Florence	22	966	4,800	59.8%
Total	**117**	**3,985**	**20,103**	**47.1%**
Acute non-psychiatric and critical access inpatient utilization				
Carroll County Memorial Hospital	25	667	2,325	25.5%
New Horizons Medical Center	25	315	1,449	15.9%
St. Elizabeth Edgewood	450	24,717	107,752	65.6%
St. Elizabeth Florence	131	7,924	31,773	66.4%
St. Elizabeth Fort Thomas	245	5,945	27,538	30.8%
St Elizabeth Grant	25	269	878	9.6%
Total	**901**	**39,837**	**171,715**	**52.2%**

	Licensed Beds	Admiss-ions	Patient Days	Percent Occupancy
Physical rehabilitation inpatient utilization				
Gateway Rehabilitation Hospital Florence	40	1,203	12.083	82.8%
Healthsouth Northern Kentucky Rehabilitation Hospital	40	1,130	13,293	91.0%
Total	**80**	**2,333**	**25,376**	**86.9%**

Source: Kentucky Cabinet for Health and Family Services

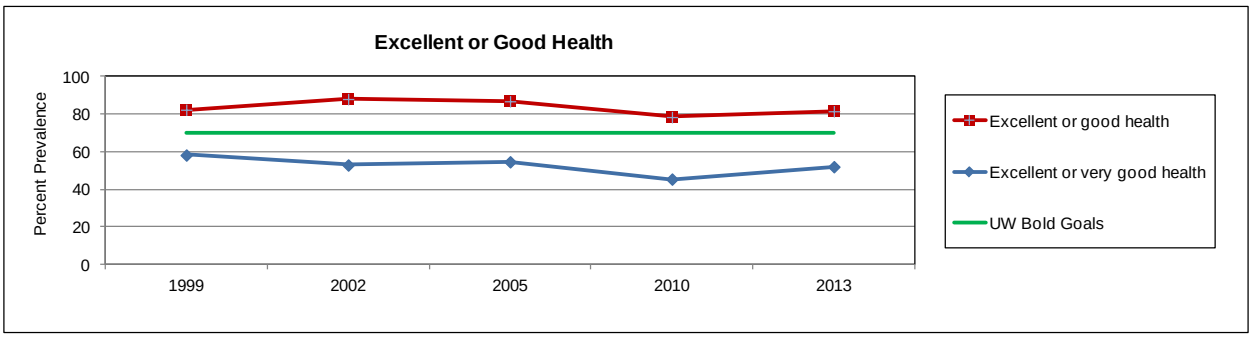
	ER Outpatient Visits	Other Outpatient	Total Outpatient
Carroll County Memorial Hospital	10,288	13,196	23,484
New Horizons Medical Center	4,101	4,424	8,525
St. Elizabeth Edgewood	65,064	160,231	225,295
St. Elizabeth Florence	48,385	48,216	96,601
St. Elizabeth Fort Thomas	35,280	38,633	73,913
St. Elizabeth Grant	16,677	17,710	34,387
Total	**179,795**	**282,410**	**463,205**

Source: Kentucky Cabinet for Health and Family Services

Summary

It is not possible to determine if positive changes are due directly to developing and implementing community health improvement plans or if they are due to other factors. It is likely that there are many factors to consider when setting future priorities. There is improvement in many indicators such as heart and cancer mortality, tobacco use, teenage birth rates and outdoor air quality. Some indicators did not change much such as suicide rates and child abuse. Still others need to improve like unintended injury, hepatitis B and C and sexually transmitted infections. Lasting positive change takes improving the quality of life, economic status, education and personal behaviors as well as improvements in the health care and public health systems.

United Way of Greater Cincinnati has joined with other major organizations in the Greater Cincinnati area to identify and adopt Bold Goals in the areas of Health, Income and Education. One of the Bold Goals in the area of Health is to have 70% of the Cincinnati community reporting that they are in excellent or very good health. The graph below indicates little change in the survey response to questions about state of personal health.



Source: Greater Cincinnati Community Health Status Survey (1999-2002: Boone, Campbell and Kenton counties; 2005-2013 Grant County was added.) Note: yearly variations may be due to sampling error and not a statically significant trend. Note the GCHSS refers to adult health indicators.

Appendix: Notes and Data Sources

DATA NOTES

Where available, rates are benchmarked against the Healthy People 2020 targets. However, the target rates are based on age-adjusted rates. Age-adjusted rates are based on the 2000 Standard Population. In 2000, the population in Northern Kentucky closely resembled the Standard Population. Due to population changes, the gap between the Northern Kentucky population and the Standard Population is increasing the error of comparing crude rates to age-adjusted rates. For more information, see: http://www.cdc.gov/cancer/npcr/uscs/technical_notes/stat_methods/rates.htm.

Some data presented in this report is from the Vital Statistics Office of the Kentucky Department for Public Health. The data for 2009 – 2012 is preliminary data. The rates are crude rates based on population estimates from the Kentucky State Data Center at the University of Louisville. The definitions for some ICD10 codes, used on death certificates, changed in 1999. Data prior to 1999 may not be reliable for trending purposes for some categories.

From 1993 to 2012, the top 10 causes of death account for 75 to 80 percent of all deaths. In general, rates measured against the population yields similar trends as against total deaths.

DATA SOURCES

Centers for Disease Control and Prevention

1910 US Mortality Data http://www.cdc.gov/nchs/data/dvs/lead1900_98.pdf
2010 US Mortality Data http://www.cdc.gov/nchs/data/nvsr/nvsr62/nvsr62_06.pdf
Introduction: http://wwwn.cdc.gov/CommunityHealth/info/OrganizationKeyTerms
Community Health Status Indicators (CHSI 2015): http://wwwn.cdc.gov/CommunityHealth

Interact for Health

Greater Cincinnati Community Health Status Survey (1999, 2002, 2005, 2010, 2013) https://www.interactforhealth.org/greater-cincinnati-community-health-status-survey and www.oasisdataarchive.org.

Healthy People 2020

http://www.healthypeople.gov/2020/topicsobjectives2020/default

Kentucky Cabinet for Health and Family Services

Vital Statistics Report 1998 - 2005 (online reports) and *Annual Vital Statistics Report* 1993 - 1997 (published documents), http://chfs.ky.gov/dph/vital/vitalstats.htm
Unpublished data 2006-2012 provided by Epidemiologist, Administrative & Quality Assurance Section
Birth data for 2008 – 2012 and mortality data for 2009 – 2012 is preliminary data
Data Resource Gallery: Long-term Care Reports 1999 – 2013, http://chfs.ky.gov/ohp/dhppd/dataresgal.htm

Kentucky Division of Water

http://water.ky.gov/Pages/default.aspx

Kentucky State Police

Kentucky State Police Annual Reports and Traffic Collisions in Kentucky Annual Reports 1995-2012, http://www.kentuckystatepolice.org/data.htm

KIDS COUNT Data Center

http://datacenter.kidscount.org/data#KY/2/0

University of Kentucky

College of Nursing, Kentucky Cancer Registry, http://www.cancer-rates.info/ky/index.php
Kentucky Injury Prevention and Research Center,
http://www.mc.uky.edu/kiprc/projects/tbi/index.html and http://www.safekentucky.org/

University of Louisville

Kentucky State Data Center: http://ksdc.louisville.edu/

U.S. Environmental Protection Agency

http://www.epa.gov/airquality/airdata/ad_rep_aqi.html

DISCLAIMER

The purpose of this report is assist and direct community efforts to improve the health status of Northern Kentucky. Much of the data has been copied, recalculated and reformatted. While every effort has been made to assure the accuracy of the data provided, mistakes inevitably will be made. All data should be verified against the original source before publication or policy decisions are made based on the data provided.