THE IMPACT OF HEALTH ON KENTUCKY'S ECONOMY

Danielle Anderson; Linda M. Asher; Elmer Whitler, MA, MPA; Emery A. Wilson, MD

From the Office of Health Research and Development University of Kentucky. Corresponding author: Linda M. Asher, Office of Health Research and Devlopment, 138 Leader Ave, Rm 130, Lexington, KY 40506-9983; Phone: 859.323.5567; Fax: 859.323.1043; E-mail: lmashe2@uky.edu.

All states are strongly committed to economic development policies and activities as participants in national and global competition. However, a sometimes overlooked and perhaps under appreciated influence on economic development is the health of a state's citizens. This study focuses on how the health status of Kentucky profoundly influences its economy, workforce, productivity, and general quality of life. If Kentucky's economy is to improve significantly, as compared to other states, significant improvements in the health status of its citizens must be achieved in the near future and sustained over time. In an era of growing concern about rising health insurance costs and maintaining a reliable and productive workforce, employers are increasingly likely to locate in communities where measures of health status are strongly positive. The latest report from the United Health Foundation indicates that in 2007 Kentucky had the 8th worst health status in the nation based on a set of risk factors and outcomes. These risk factors include personal behaviors, community and environment, and public health policies that culminate in key health outcomes related to quality of life and longevity. While it is a serious challenge, our research demonstrates that many of these risk factors can be lowered through relatively low cost and effective interventions that produce substantial improvements in health and Kentucky's rank. Health education is very effective when it begins early in life and continues to emphasize the importance of healthy behaviors, such as not smoking, healthy diets and exercise, and weight control. Preventive health services that identify and treat diseases and conditions that lead to premature death increase both longevity and economic growth through lower treatment costs for chronic diseases and an increase in human capital. Policy changes, such as primary enforcement of motor vehicle seat belt use and encouragement of the use of safety equipment at work, also saves lives and contributes to economic development. Kentucky has already implemented many programs to begin the necessary transformation to a healthier Commonwealth. Creation of additional programs and expansion of those successful ones in place are keys to producing both significant health change and economic growth.

INTRODUCTION

The capacity of a state to reach its educational and work potential is directly related to the health status of those people living in the state. The health status of Kentucky has profound effects on its economy, workforce, productivity and general quality of life. If Kentucky's economy is to improve significantly, the health status of Kentuckians is in need of substantial change.

The United Health Foundation[1] is a private organization that evaluates the health status and ranks each state annually based on a number of risk factors, including personal behaviors, community and environment, and public health policies that culminate in key health outcomes related to quality of life and longevity. A slight change in any of these risk factors can modify the overall health status and ranking of a state. The latest report from the United Health Foundation indicates that in 2007 Kentucky had the 8th worst health status in the nation based on a set of risk factors and outcomes.

It would seem that Kentucky is a healthy place to live and work. There are very few diseases endemic to the state and there is little heavy industry that might impair one's health. However, many of the health problems in the Commonwealth are due to poor lifestyle choices, which lead to otherwise preventable diseases and premature death.

In this monograph, we propose to review the behaviors that lead to Kentucky's poor health status, identify major diseases that lead to premature death, and determine how these impair Kentucky's workforce supply, its productivity, and overall economy. Finally, we will propose recommendations that will incrementally advance Kentucky's economy by improving the health of its citizens.

KENTUCKY LIFESTYLES CONTAIN MULTIPLE RISK FACTORS THAT LEAD TO POOR HEALTH STATUS AND EVEN PREMATURE DEATH

Many of the factors that have led to Kentucky's poor health status are lifestyle choices with negative impacts. Some diseases are due to risk factors that are non-modifiable such as age, sex, race and genetics, among others. These are factors that we can do little about. Most of the disease risk factors, however, can be prevented or modified to improve health if Kentuckians were only motivated to do so. Listed below are key modifiable, daily behaviors that contribute significantly to preventable disease, premature death and decreased workforce and productivity.

Smoking

The biggest modifiable risk factor in Kentucky is smoking and the use of tobacco products. From 1990 to 2003, an average of 30% of Kentucky adults were smokers.[1] Beginning in 2004 the rate dropped to 27.5%, but increased again to 28.7% in 2005 and was reported to be 28.5% in 2006. Throughout these years to the present Kentucky has ranked number one among the 50 states in the percentage of smokers.

Smoking is the main cause of lung cancer and is a major contributor to other deadly diseases such as cardiovascular disease and chronic obstructive pulmonary disease. More than one-half of the persons who smoke will die of a smoking-related illness, and more than 23% of all Kentucky deaths are attributed to smoking.[2] Of concern also is the young age at which so many Kentuckians start smoking. Ten percent of 6th graders and 28% of 7th graders smoke, according to the Kentucky Youth Tobacco Survey,[3] and smoking among adolescents increases to 42% for high school seniors. Certainly, if smoking-related diseases are to be prevented, smoking cessation and prevention programs should be directed at very young populations. Kentucky leads the nation with the highest mortality rates for lung and bronchus cancer deaths for both males and females and for whites and African-Americans. Although smoking and related lung/bronchus cancer mortality rates are a problem throughout Kentucky, these rates appear to be significantly higher in eastern and south-central Kentucky.[4] It was estimated that Kentucky would experience $850,000 in lost productivity in 2007 because of lung cancer, not accounting for additional losses because of other lower respiratory diseases. The loss due to lung cancer is projected to be $2 billion or more by 2023, at current trend in smoking rates. This loss can be reduced by 40%, to $1.21 billion, by even moderate efforts to reduce smoking and the ill effects of side-stream tobacco smoke.[5]

Obesity and Limited Physical Activity

Healthy eating habits and exercise are essential to maintaining a healthy weight. Poor nutrition and limited activity have led to an increase in overweight and obese people throughout the country, but more so in Kentucky. Thirty-eight percent of Kentuckians are considered overweight and 24% are obese.[6] Twenty-seven percent of Kentuckians report no physical activity, which ranks second in the country.[6] Kentucky ranks 6th nationally in the percentage of overweight and obese people. These risk factors have been directly related to increased cardiovascular disease, diabetes, neurovascular accidents, and other disorders. Kentucky ranks first in the percentage of children and adolescents ages 10-17 who are obese (21%) compared to US rates (15%).[7]

Kentucky ranks 6th in adult diabetes, which is attributable to obesity and physical inactivity.

It is estimated that the state will suffer an economic loss of $2.19 billion in 2007 because of diabetes, and that this could be as much as $5.14 billion by 2023. With improved prevention and treatment, this could be lowered 21%, or $1.06 billion.[5]

Seat Belt Use

The importance of seat belt use to the safety of Kentuckians and the economy is underestimated. The use of seat belts by Kentuckians (67%) is considerably lower than the national average (82%), which ranks Kentucky 47th among other states.[8] The lack of safety restraint has both physical and economic consequences. The Kentucky Institute of Medicine attributes 64% of traumatic brain injuries and 35% of spinal cord injuries to motor vehicle crashes in which seat belts were not used.[9] The associated acute and chronic injuries increase medical costs. The recently enacted mandatory seat belt law is projected to increase seat belt use 11% and save the Kentucky Medicaid fund at least $40 million during the next ten years.

All-Terrain Vehicles

A new and growing phenomenon for Kentucky are costly and unnecessary injuries involving both adults and children from the use of all-terrain vehicles (ATVs). ATVs are either three- or four-wheeled, motorized vehicles used in recreational and work-related outdoor activities. Most ATVs are used for *off-roading*, or riding in natural conditions. Many ATVs can go as fast as 55 miles per hour and can weigh as heavy as a quarter of a ton. This is a very popular activity in rural areas of Kentucky. Increasingly, farmers are riding ATVs from chore to chore. Rollover injuries and deaths are on the rise among those who use ATVs for recreation and farming. About 75% of ATV accidents result in serious damage to the head or spinal cord of the accident victim. Head and spinal cord injuries are a major cause of serious, life-threatening or lifelong physical problems and ailments.

A reported 328 ATV deaths occurred from 1984-2004, with an average age at death of 29 years. One hundred nineteen deaths occurred in children aged 1-17 years. Fourteen deaths were among people over 65 years, the oldest being 88 years of age. One hundred eighty-one deaths occurred from 2000-2004, with 17% female and 83% male.

Fourteen counties in eastern Kentucky have the highest ATV death rates. Pike County, which had 8 ATV deaths from 2000-2004, leads all Kentucky counties. These deaths rates do not reflect the life-long injuries that occur from ATV accidents that do not result in death.

Kentucky averaged 11 ATV accident deaths per year through the 1990s; however, this rate has increased to 35 deaths per year beginning with the year 2000. Kentucky ranks 8th among states for this costly and preventable source of death and serious injuries.[10]

Drug Abuse

Drug abuse is a major risk factor in Kentucky both as a cost to the user and a cost to the state. In 2003, the total US cost of drug-related problems was $181 billion, accounting for loss of productivity, healthcare costs, and drug-related crime.[11] The estimated cost of drug abuse in Kentucky is $2.5 billion to $3.6 billion, annually. According to the Kentucky Needs Assessment program, about 375,000 adults and over 50,000 adolescents need substance abuse treatment and are not receiving it.[12]

The availability of drugs has had an impact on the amount of substance abuse in the Commonwealth. The Kentucky Office of Drug Control Policy identifies marijuana and cocaine as high in demand and availability.[13] Cocaine abuse is more prevalent in north-central Kentucky, whereas opiate abuse, which is mostly from prescription drugs, is more common in eastern Kentucky. The use of tranquilizers, stimulants, and marijuana is widespread throughout Kentucky, but methamphetamine use is more prevalent in western Kentucky. The use of methamphetamine has been a problem, but the availability is declining, due to Kentucky's new

regulation on purchasing over-the-counter drugs containing one of its main ingredients, pseudoephedrine. More methamphetamine is now being manufactured outside the country and imported into Kentucky.

In order to reduce illegal prescription drug use, Kentucky has enhanced the Kentucky All Schedule Prescription Electronic Reporting (eKASPER) system to monitor the amount of prescription drugs being prescribed. The eKASPER program helps hold physicians responsible for eliminating over-prescribed drugs. However, there are many Internet sites where opiates can be obtained without a prescription, so control is difficult.

The negative impact of substance abuse in terms of unnecessary illness, premature death, violence, social rejection, and economic loss is staggering. The estimated economic cost for *emotional disturbances* for Kentucky in 2007 is $2.69 billion. Substance abuse is a major contributing cause to these problems. With targeted education to the young and early intervention and treatment for everyone in need, this loss can be reduced from a projected cost of $6.48 billion in 2023 to $5.48 billion, or 15.4%.[5]

Occupational Injuries

Occupational injuries are a major cause of loss of work productivity. Kentucky leads the nation in work-related injuries and illnesses. Non-fatal injuries are 28% higher, and fatal injuries are 75% higher than the national rate.[14] These rates are due to people employed in high-risk industries such as mining, agriculture, and automobile manufacturing. The failure to use safety equipment and to follow safety procedures is a major contributing factor to these high injury rates.

Immunizations

The Centers for Disease Control and Prevention (CDC) recommend that all adults over 50 years of age receive vaccination for influenza. Only 68% of adults over 65 in Kentucky are immunized for influenza, which ranks 11th nationally.[15] Kentucky has 24.0 deaths/100,000 population compared to 19.8 deaths/100,000 population nationally. From 1994-2004, Kentucky had 1,572 deaths attributed to influenza, with this accounting for 23,474 years of premature death before age 75.[15]

Health Insurance

The number of Kentuckians (86%) with some form of health insurance (eg, commercial, Medicare, Medicaid) compares favorably to the national population at 83.4%.[16] The relatively high coverage rate for Kentucky is partially explained by the fact that more Kentuckians are on Medicare and Medicaid. Large companies are more likely to provide health insurance for their employees, but small companies (less than 50 employees) are less likely to do so. In Kentucky, 96% of all small companies have fewer than 25 employees, with only 43% providing health insurance to their employees, thus accounting for a substantial proportion of the state's uninsured population. Since 2002, changes in insurance plan coverage have included a 60% increase in deductibles and copays, 39% fewer benefits, 15% more employee contribution, and 14% less provider choice.

Despite these changes, or as a result of them, 97% of the small companies plan to continue to offer coverage. On the other hand, 93% of small companies which now do not offer health insurance also plan not to offer it in their next business year because it is too expensive (69%), other family members have coverage (34%), employees cannot afford it or prefer higher wages (30%), or it is considered an administrative burden (9%). Whether people have health insurance has a lot to do with where or whether they seek appropriate care. People with insurance (81%) are more likely to see a private doctor, whereas those without insurance are more likely to go to a free clinic or to an emergency room. The uninsured are less likely to seek care (70% vs 22%), fill a prescription (54% vs 21%) or obtain a diagnostic test (53% vs 26%) compared to those with insurance.[16] So, whether people have insurance can be a risk factor for disease or, as importantly, whether they are treated for that disease.

Education

Only 72% of Kentucky adults are high school graduates, and only 17% have college degrees.[17] The link between education and health should not be underestimated. Many of Kentucky's noncommunicable diseases can be avoided or significantly reduced through education about the risk factors that lead to these diseases. The importance of health should be stressed at a young age because many of the behavioral risks that detract from good health, such as smoking, are adopted during childhood or adolescence, and healthy lifestyles are easier to teach to the young. Outside the home, school systems provide the best environment to educate children about the importance of healthy behaviors, giving crucial importance to student retention through high school graduation.

Poverty

Poverty is a potentially modifiable health risk factor, and Kentucky is a relatively poor state. Whereas poverty is a problem throughout Kentucky, 43 of the 442 US persistent poverty counties (meaning greater than 20% of the population live in poverty) are located in Kentucky, with most of these counties in the Appalachian region of eastern and south central Kentucky.[18]

Risk factors and health status indicators create a foundation for determining the overall health of the people. According to the CDC,[19] the leading causes of death in Kentucky are from cardiovascular disease (38%); cancer (23%); chronic respiratory disease, influenza and pneumonia (9%); injuries (5%); diabetes (3%); and other causes (22%). Many of these causes of death are directly related to the risk factors above and are preventable. For example, most of the deaths from cancer are evenly distributed throughout Kentucky; however, the overall pattern of cancer deaths is greater in eastern Kentucky because of the predominance of lung cancer in the region, a pattern that is also similar to the prevalence of smoking. Mortality from lower respiratory illness is also greater in eastern Kentucky, which might be attributed to both smoking and mining, but women have essentially the same mortality pattern as men. With fewer women working in the mines, it is reasonable to conclude that mortality due to lower respiratory illness is more likely related to smoking.

Adult onset of diabetes is associated with a number of both non-modifiable (age and family history, eg) and modifiable risk factors (obesity, physical activity, diet, etc). As a result, there is wide distribution of diabetes in Kentucky, but it is concentrated more in eastern and south central Kentucky and in the Purchase Area of western Kentucky.

All of the health indicators lead to decreased workforce and work productivity through acute illness and absenteeism, disability, intentional and unintentional injuries, and premature death. Premature death, defined as death occurring at less than 75 years of age, resulted in a loss in 2005 of 9,111 years per 100,000 population.[19] This is the equivalent of 5,070 lives lost due to premature death, most of which are caused by unintentional injuries (22%), cancer (17%), cardiovascular disease (15%), and suicide (6%). Kentucky ranks 9th nationally in the number of premature deaths.[19]

Firearm Deaths and Violent Assaults

Kentucky ranks 16th in firearm deaths among the states, at an age-adjusted rate of 13.1 deaths per 100,000 population, compared with the US average of 11.5. From 1999-2004, Kentucky has had 1,213 homicides, with a loss of 49,483 years of premature death before age 75. A total of 807 (67%) of these homicides involved firearms. Education in the safe use of firearms and control to make it harder for criminals to possess guns can reduce this loss of life and economic potential for our Commonwealth.[20]

HEALTH AND THE ECONOMY

Health and economics have a symbiotic relationship. Although good health is considered to be highly dependent on the prosperity and education of the populace, the economy depends

to a great extent on the health of the workforce. The wealthiest countries have proven to be also the healthiest because health affects many economic outcomes such as higher productivity, higher labor supply, improved skill resulting from increased education and training, and increased savings for investment in other endeavors.[21] As shown in Figure 1, many factors including education, wealth, lifestyle, environment, and genetics contribute to a population's health, and health is a major contributor to economic development by increasing the number of people in training, the labor supply, productivity of the workforce, and even capital formation, if only from the increased savings of the larger workforce. In short, the healthier people are, the longer they will stay in the workforce and benefit the economy.

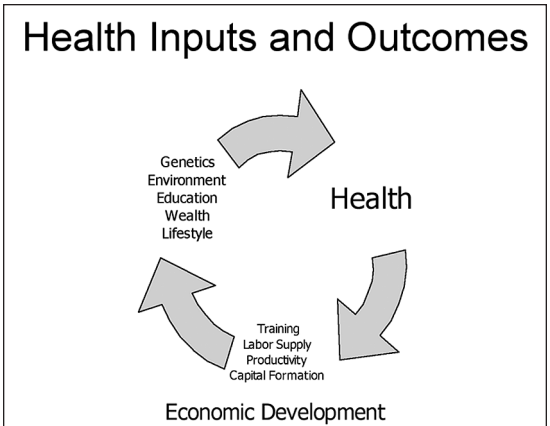

Figure 1. Many factors are involved in the promotion of good health, which is itself a major factor in economic development.

WHAT CAN WE DO?

The poor health status of the Commonwealth is not a new finding. The state has already implemented many programs to begin the necessary transformation to a healthier Kentucky. Creation of additional programs and expansion of those successful ones in place are keys to producing significant change. We focus here on only a few of the more important ones.

Expand Lay Health Workers

A successful program currently in place that is in need of expansion is Kentucky Homeplace. This state-funded program uses lay health workers trained as family healthcare advisors. These family health advisors help people in their communities assess their own health and aid them in finding services that are affordable or, in many cases, free to the patient. Kentucky Homeplace has 39 lay health workers in 58 counties. In 2005 alone, these caregivers provided 374,165 services to 23,298 patients with a value of $26,757,524, much of which was in the form of free medications from pharmaceutical companies.[22] The cost for this program to the state is slightly less than $2 million. Such efforts are important to provide preventive care and to reduce the number of patients seeking care in emergency rooms. This program should be expanded to all 85 rural counties, at least, and possibly to all Kentucky counties to assist persons at high risk of poor health.

Develop More Community Health Centers

In the past three years, the State Office of Rural Health has been instrumental in converting 31 small rural hospitals that were financially at risk into critical access hospitals. Critical access hospitals must agree to have no more than 25 acute care beds and an average patient stay of 96 hours in order to qualify for cost-based federal subsidy. This program has preserved hospital services that otherwise would have been lost in many rural areas, and they add to the local economy. Each critical access hospital has been estimated to have a local economic impact of $15 million annually.[23] The federal government has now terminated this program and started to emphasize the creation of community health centers, which are federally subsidized, cost-based clinics for medically underserved areas. Federally Qualified Community Health Centers (FQHCs) provide care without regard to ability to pay and offer a sliding-fee schedule for patients who do not have some form of health insurance. Kentucky currently has 15 FQHCs, but

there are an additional 30 medically underserved areas, most of which are located in high-poverty counties, that would qualify for these community health centers.

Assess the Health of Kentucky Locally

All health care is local and all great change is incremental. Smoking cessation, weight loss, and other changes in lifestyles cannot be accomplished all at once. These must be achieved incrementally, and programs must be implemented at the local community or county level. However, many health statistics are available and reported only at the state or regional levels, and aggregate statistics of this type can hide problems. For example, lung cancer death rates (per 100,000 population) for the US are 55.7 and for Kentucky are 78.6, the highest in the country, but Breathitt County has a lung cancer death rate of 125.3, more than twice the national average, and Larue County only 52.6, less than the national average.[24] For these reasons, the Kentucky Institute of Medicine conducted a study, funded by the Foundation for a Healthy Kentucky, to identify the health status indicators for each county. These data, specific to each county, can then be used to introduce interventions that are specific to the health problems of each locale.

Create Commissions on Macroeconomics and Health

Since many health problems differ from county to county, creating Commissions on Macroeconomics and Health in each county would manage resources, target local health problems, and emphasize the association between health and the economy. The commissions would initiate a close-to-client healthcare system that is responsive, develop innovative answers to local health problems, coordinate local health providers and initiatives, ensure people take advantage of local services, and promote health as a means to develop the economy.

Local health statistics obtained by the Kentucky Institute of Medicine were made available to the local commissions so that the problems specific to each community can be addressed. Local commissions coordinated by a single statewide commission would allow for leadership and increased organization at the state and county levels. Community level involvement, enhanced by a community-based decision-making process that can be facilitated by the State Office of Rural Health, would encourage better health care, thereby improving the workforce and the economy of the community.

Promote Universal Coverage

The ultimate solution to improving the health of all Kentuckians is universal coverage. Although this may seem an unlikely solution, the amount of money Kentucky is currently spending on health care is sufficient to provide health insurance for every man, woman, and child in the state. More specifically, the total healthcare expenditures last year in Kentucky were $22.6 billion. With a population of 4.1 million people, the average healthcare expenditure is $5,521 per person. The Kaiser Foundation estimates the cost of health insurance to be between $3,500 and $5,500 for each adult, and $10,000 for a family of four. The US National Health Insurance Act proposed by members of Congress projects costs for universal coverage using Medicare coverage of $6,200. Therefore, universal coverage within current expenditures is quite possible and should be at least considered either at the state—similar to the Massachusetts plan—or national levels.

SUMMARY

Many Kentuckians have developed lifestyles that have placed them at risk for preventable diseases and even premature death. These health factors have had a negative effect on Kentucky's economy by reducing workforce and productivity. Although the economy is a factor in the health of Kentuckians, health is an even more important component of Kentucky's economy. If Kentucky wants to improve its economy, it must first improve the health of its citizens. Saving years of life for Kentuckians by reducing

premature death through education and crucial health services is essential to building our economy and improving quality of life as well.[25]

REFERENCES

1. United Health Foundation Home Page, America's Health Rankings: A Call to Action for People and Their Communities. Retrieved June 13, 2008, from *http://www.unitedhealthfoundation.org/ahr2006/index.html*
2. Kentucky Behind the Scenes. American Lung Association: State of Tobacco Control 2004. Retrieved from *http://lungaction.org/reports/state-narrative04.tcl?geo_area_id=21*
3. 2006 Youth Tobacco Survey. Retrieved from *http://chfs.ky.gov/NR/rdonlyres/D935247F-AD83-4AE1-A133-370BDA67573D/0/2006KYTS.pdf*
4. Tobacco Use in Kentucky, 2005. Cabinet for Health and Family Services, Kentucky Department for Public Health. Division of Adult and Child Health Improvement, Chronic Disease Prevention and Control Branch, Tobacco Prevention and Cessation Program. *http://chfs.ky.gov/NR/rdonlyres/538D79CE-C96D-4777-BD83-51B6E2680656/0/whitepaper.pdf*
5. An Unhealthy America: the Economic Burden of Chronic Disease. The Milken Institute. Retrieved from *http://www.chronicdiseaseimpact.com/ebcd.taf*
6. The Kentucky Obesity Epidemic, 2004. Kentucky Department for Public Health, Obesity and Chronic Disease Prevention Program. Retrieved from *http://www.fitky.org/*
7. State Health Facts. The Henry J. Kaiser Family Foundation. Retrieved from *http://www.statehealthfacts.org/profileglance.jsp?rgn=19*
8. Governor's Highway Safety Program: Occupant Protection-Seat Belt Safety. Retrieved from *http://www.ghsp.ky.gov/seat_belt_ky_law.htm*
9. Kentucky Institute of Medicine Task Force Report "Saving Lives, Saving Money: the Impact of a Kentucky Primary Seat Belt Law," November 2005. Available at *http://www.kyiom.org/seatbelt.html*
10. ATV-related Deaths, 1984-2004. Retrieved from *http://c-jonline.com/atv/search.php*
11. Substance Abuse and Mental Health Services Administration. (2004). *Results from the 2003 National Survey on Drug Use and Health: National Findings.* (Office of Applied Studies, NSDUH Series H–25, DHHS Publication No. SMA 04–3964). Rockville, MD. Retrieved from *http://www.drugabusestatistics.samhsa.gov/nhsda/2k3nsduh/2k3Results.htm*
12. Kentucky Needs Assessment Project (KNAP) Description, Adult and Adolescent Household Surveys. University of Kentucky Center on Drug and Alcohol Research. Retrieved from *http://cdar.uky.edu/knap/*
13. Kentucky Office of Drug Control Policy. Available at *http://www.odcp.ky.gov/*
14. US Center for Disease Control, National Center for Injury Prevention and Control. Available at *http://www.cdc.gov/ncipc/wisqars/*
15. Kaiser Family Foundation. State Health Facts: Percent of Adults Aged 65 and Older Who Has a Flu Shot in the Last Year, 2005. Available at *http://www.statehealthfacts.kff.org/cgi-bin/healthfacts.cgi?action=compare&category=Health+Status&subcategory=Adult+Immunizations&topic=Pneumococcal+Vaccines*
16. Samuels M, Whitler E. Kentucky State Health Insurance Survey, 2005. University of Kentucky Center for Excellence in Rural Health.
17. US Census State and County Quick Facts, Kentucky. Retrieved from *http://quickfacts.census.gov/qfd/states/21000.html*
18. USDA, Economic Research Service. Rural Income, Poverty, and Welfare: High Poverty Counties. Available at *http://www.ers.usda.gov/Briefing/IncomePovertyWelfare/HighPoverty/*
19. US Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Available at *http://www.cdc.gov/ncipc/wisqars/*
20. WISQARS, Centers for Disease Control. Accessed at *http://0-www.cdc.gov.mill1.sjlibrary.org/ncipc/wisqars/*
21. Murphy K, Topel RH. The value of health and longevity. *J Polit Econ.* 2006;114:871-904.
22. Kentucky Homeplace Annual Report, 2005. University of Kentucky Center for Excellence in Rural Health.
23. Kentucky State Office of Rural Health and University of Kentucky College of Agriculture, Department of Economic Agriculture. Economic Impact Studies of Critical Access Hospitals, 2002-2004.
24. Kentucky Cancer Registry. Lung/Bronchus Cancer Mortality Rates by County 1999-2003. Available at *http://cancer-rates.info/ky/kymort.html*
25. Becker GS. Health and human capital: the T.W. Schultz Award. *Rev Agricultural Econ.* 2004;28:223-225.