



Kansas Health Statistics Report

Kansas Department of Health and Environment – Division of Health
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Sleep Assessment among Adult Kansans: 2009 Kansas Behavioral Risk Factor Surveillance System

Background

Adequate sleep is essential for general healthy functioning [1]. Sleep loss due to voluntary bedtime restriction has become a hallmark of modern society [2]. Many studies have speculated that habitual sleep patterns have changed over the past several decades in the U.S. [3]. Inadequate sleep can cause a range of neurobehavioral deficits, including lapses of attention, slowed working memory, reduced cognitive function, depressed mood, and perseveration of thought [1]. Research has linked inadequate sleep with incidence and prevalence of chronic conditions like hypertension and cardiovascular disease [4]. Some prospective studies in adults have also linked short sleep duration with greater risk of weight gain and obesity [5, 6]. Studies have also reported short sleep duration as a risk factor for type 2 diabetes [2, 7, 8]. Short sleep duration is also a predictor of daytime sleepiness and fatigue [9]. Habitual snoring and daytime sleepiness are risk factors for ischemic stroke [10, 11]. Daytime sleepiness and falling asleep while driving are important risk factors for major vehicle crashes [12].

Objective

This study aims at finding the prevalence of inadequate sleep in a 24-hour period among adult Kansans and various population subgroups. This study also examines prevalence of daytime sleepiness, snoring and drowsy driving among adult Kansans.

Method

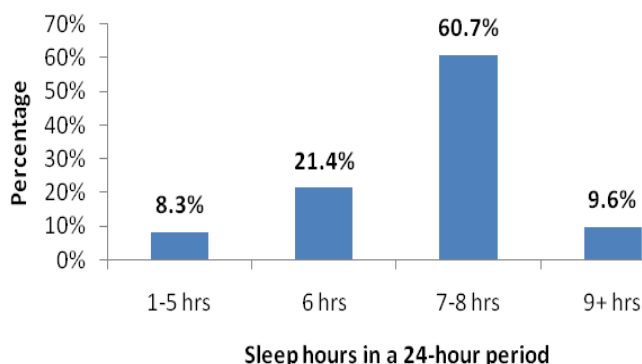
2009 Kansas Behavioral Risk Factor Surveillance System (BRFSS) data were used for this study. Kansas BRFSS is an annual population-based random digit-dial telephone survey, tracking health conditions and risk behaviors of non-institutionalized adults ages 18 years and older, residing in a private residence with a landline telephone. Kansas BRFSS included the CDC optional module 'Inadequate Sleep' for the first time in the 2009 survey. A total of 9,103 respondents were randomly assigned to the questionnaire's version B, where the 'Inadequate Sleep' module was included. Weighted analysis of Kansas BRFSS data was performed using SAS 9.2 software. Research studies have categorized duration of sleep to measure inadequate sleep in various ways. Some studies defined short or inadequate sleep as less than seven hours of sleep in a 24-hour period [7, 13, 14, 15]. A short report from the National Health Interview Survey indicated that the percentage of adults reporting sleeping \leq six hours increased between 1985 and 2004 [3]. Many studies have defined short or inadequate sleep as less than 6 hours in a 24-hour period [3, 16, 17].

The 2009 Kansas BRFSS 'Inadequate Sleep' module asked respondents, "On average, how many hours of sleep do you get in a 24-hour period? Think about the time you actually spend sleeping or napping, not just the amount of sleep you think you should get." For the objective described above, this study categorized sleep hours in a 24-hour period in 4 categories; < 6 hours = "very short sleepers" (described as inadequate

sleep in this study), 6 hours = "short sleepers," 7-8 hours = "reference group," and > 9 hours = "long sleepers [4]." Prevalence of inadequate sleep in a 24-hour period was examined in variables related to demographic characteristics such as age, sex, race, ethnicity, annual household income, education, employment, average hours worked per week and marital status. Prevalence of inadequate sleep was also examined by behavioral risk factors such as weight status (BMI), leisure time physical activity status, smoking status and also by disability status. In addition, prevalence of inadequate sleep was examined in relation to co-morbid conditions such as diabetes, hypertension, asthma, arthritis and Serious Psychological Distress (SPD) and general and mental health status. Prevalence of inadequate sleep was examined by social context variables like living arrangements and stress regarding paying rent/mortgage and buying nutritious meals. This study also examined prevalence of daytime sleepiness, snoring and drowsy driving among adult Kansans.

Results

Figure 1. Percentage of adults by average number of sleeping hours in a 24-hour period, Kansas BRFSS, 2009



Very short sleepers (inadequate sleep): About 1 in 13 adults in Kansas (8.3%) sleeps less than 6 hours in a 24-hour period.
Short sleepers: About 1 in 5 adults in Kansas (21.4%) sleeps for 6 hours in a 24-hour period.

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Table 1. Prevalence of inadequate sleep (<6 hours) in a 24-hour period among adults age 18 years and older by selected demographic characteristics in Kansas, 2009

Population Subgroups (by demographic characteristics)	Prevalence of inadequate sleep in a 24-hour period		
	Weighted Percentage	95% Confidence Interval	
		Lower Limit	Upper Limit
Total	8.3%	7.6	9.1
Gender Groups			
Male	7.6%	6.4	8.8
Female	9.0%	8.0	10.0
Age Groups			
18-24 years	7.5%	3.7	11.4
25-34 years	8.8%	6.6	11.1
35-44 years	10.5%	8.6	12.5
45-54 years	9.4%	8.0	10.9
55-64 years	7.7%	6.4	9.0
65+ years	4.9%	4.1	5.8
Ethnicity Groups			
Hispanic	9.4%	5.2	13.5
Non-Hispanic	8.3%	7.5	9.0
Race Groups			
White Only	7.7%	7.0	8.5
African American Only	17.1%	11.2	23.0
Other Races Only	8.6%	4.8	12.4
More than One Race	17.6%	8.6	26.6
Annual Household Income Levels			
<\$15,000	16.9%	12.2	21.5
\$15,000 to \$24,999	11.7%	9.2	14.1
\$25,000 to \$34,999	8.4%	6.2	10.7
\$35,000 to \$49,999	9.6%	7.4	11.9
\$50,000 or more	6.3%	5.4	7.3
Education Status			
Less than high school graduate/GED	12.3%	8.2	16.4
High school graduate/GED	9.5%	7.9	11.0
Some college	9.3%	7.8	10.7
College graduate	6.0%	19.1	22.8
Employment Status			
Employed for Wages / Self-Employed	8.1%	7.1	9.0
Out of Work	12.3%	7.9	16.7
Homemaker/ Student	6.9%	4.3	9.5
Retired	5.1%	4.1	6.0
Unable to Work	23.6%	18.5	28.8
Average Hours Worked Per Week			
None/Did not Work	6.1%	4.9	7.4
1 hour - <20 hours	5.1%	2.9	7.3
20 hours - <40 hours	7.7%	5.5	10.0
40 hours - <60 hours	7.7%	6.5	8.9
60 hours or more	11.2%	7.9	14.6
Marital Status			
Married/member of an unmarried couple	7.6%	6.8	8.5
Divorced/Separated	13.5%	10.8	16.2
Widowed	7.8%	6.1	9.5
Never married	8.6%	6.0	11.2

*Other races include Asian, American Indian/Alaska Native, Native Hawaiian or Pacific Islander, and any other race.

The percentage of adults who received inadequate sleep did not vary statistically by gender. An inverted U-shaped prevalence of inadequate sleep was observed among categories of age groups. The youngest (18-24 years old) and the elderly

(65+ years) had lower prevalence of inadequate sleep compared to other age groups. Adults 65 years and older had a low prevalence of inadequate sleep (4.9%). Almost one in 10 adults (10.5%) age 35 to 44 years old reported getting inadequate sleep. The prevalence of inadequate sleep did not differ by ethnicity. African-Americans had significantly higher prevalence of inadequate sleep compared to whites (17.1% vs. 7.7%). The prevalence of inadequate sleep decreased with an increase in annual household income. Adults with annual household income less than \$15,000 had significantly higher prevalence of inadequate sleep compared to adults with annual household income \$50,000 or more (16.9% vs. 6.3%). Adults with less than high school education had significantly higher prevalence of inadequate sleep (12.3%) compared to adults with college or higher level education (6.0%). About 1 in 4 adults who were unable to work (23.6%) reported having inadequate sleep. Adults who were unable to work had significantly higher prevalence of inadequate sleep than any other category of employment status, and it was almost three times the prevalence of inadequate sleep among employed/self-employed adults (8.1%). Adults who worked 60 hours or more per week had significantly higher prevalence of inadequate sleep (11.2%) compared to adults who did not work (6.1%). More than 1 in 10 adults who were divorced or separated (13.5%) reported getting inadequate sleep.

Table 2 - Prevalence of inadequate sleep (<6 hours) in a 24-hour period among adults age 18 years and older by behavioral risk factors and disability status in Kansas, 2009

Population Subgroups (by behavioral risk factors and disability status)	Prevalence of inadequate sleep in a 24-hour period		
	Weighted Percentage	95% Confidence Interval	
		Lower Limit	Upper Limit
Total	8.3%	7.6	9.1
Weight Status			
Normal or Underweight (BMI<25)	6.8%	5.6	8.1
Overweight (25 ≤ BMI < 30)	7.4%	6.2	8.6
Obese (BMI ≥ 30)	10.9%	9.3	12.6
Leisure Time Physical Activity Status			
Participated	7.0%	6.2	7.8
Did Not Participate	12.9%	10.9	14.9
Smoking Status			
Current Smoker	14.5%	12.0	16.9
Non-smoker	7.0%	6.2	7.8
Disability Status			
Living with a Disability	14.7%	12.6	16.7
Living without a Disability	6.6%	5.8	7.4

About 1 in 10 adults who were obese (10.9%) reported getting inadequate sleep compared to 1 in 15 adults who were normal or underweight (6.8%). The percentage of adults getting inadequate sleep was significantly higher among adults who did not participate in leisure time physical activity (12.9%) compared to adults who did (7.0%). The prevalence of inadequate sleep was twice as high among current smokers (14.5%) compared to non-smokers (7.0%). Almost one in seven current smokers reported getting inadequate sleep.

The prevalence of inadequate sleep was significantly higher among adults living with a disability (14.7%) compared to adults living without a disability (6.6%). Almost one in seven adults living with a disability reported getting inadequate sleep.

Table 3 - Prevalence of inadequate sleep (<6 hours) in a 24-hour period among adults age 18 years and older by co-morbid conditions in Kansas, 2009

Population Sub-groups (by co-morbid conditions)	Prevalence of inadequate sleep in a 24-hour period		
	Weighted Percentage	95% Confidence Interval	
		Lower Limit	Upper Limit
Total	8.3%	7.6	9.1
Diabetes			
Present	9.9%	7.7	12.2
Absent	8.2%	7.4	9.0
Hypertension			
Present	10.2%	8.8	11.6
Absent	7.5%	6.6	8.5
Current Asthma			
Present	12.3%	8.9	15.8
Absent	8.0%	7.2	8.8
Arthritis			
Present	12.3%	10.7	13.9
Absent	6.9%	6.1	7.7
Serious Psychological Distress (SPD)			
Present	26.3%	18.1	34.6
Absent	7.7%	7.0	8.5

The prevalence of inadequate sleep was higher among adults with diabetes (9.9%) compared to adults without diabetes (8.2%), but it was not statistically significant. The percentage of adults getting inadequate sleep was significantly higher among adults with hypertension (10.2%) compared to adults without hypertension (7.5%). The prevalence of inadequate sleep was higher among adults with current asthma (12.3%) compared to adults without current asthma (8.0%), but statistically the difference was marginal. More than one in four adults with serious psychological distress (26.3%) reported getting inadequate sleep. The prevalence of inadequate sleep was more than three times higher (statistically significant) among adults with serious psychological distress compared to adults without serious psychological distress (7.7%).

Table 4 - Prevalence of inadequate sleep (<6 hours) in a 24-hour period among adults age 18 years and older by general and mental health status in Kansas, 2009

Population Sub-groups (by general and mental health status)	Prevalence of inadequate sleep in a 24-hour period		
	Weighted Percentage	95% Confidence Interval	
		Lower Limit	Upper Limit
Total	8.3%	7.6	9.1
General Health Status			
Fair or poor	17.6%	14.7	20.5
Excellent to good	7.0%	6.3	7.8
Mental Health Status			
=>14 days mental health not good	22.6%	18.6	26.7
<14 days mental health not good	6.9%	6.1	7.6

General and mental health status showed a substantial influence on the prevalence of inadequate sleep. The prevalence of inadequate sleep was more than twice as high among adults who reported their general health as fair or poor (17.6%) compared to adults who reported their general health as excellent to good (7.0%). The prevalence of inadequate sleep was more than three times as high among adults who reported their mental health was not good on 14 or more days in the past 30

days (22.6%) compared to adults who reported their mental health was not good on less than 14 days in the past 30 days (6.9%).

Table 5 - Prevalence of inadequate sleep (<6 hours) in a 24-hour period among adults age 18 years and older by social context variables in Kansas, 2009

Population Sub-groups (by social context variables)	Prevalence of inadequate sleep in a 24-hour period		
	Weighted Percentage	95% Confidence Interval	
		Lower Limit	Upper Limit
Total	8.3%	7.6	9.1
Living Arrangement			
Own the residence	7.4%	6.7	8.2
Rent the residence	12.2%	9.7	14.8
Other arrangement	10.3%	6.1	14.4
Stress Regarding Paying Mortgage/Rent			
Always, Usually or Sometime	14.0%	11.7	16.4
Rarely-Never	6.9%	6.1	7.6
Stress Regarding Enough Money to Buy Nutritious Meals			
Always, Usually or Sometime	16.8%	13.8	19.8
Rarely-Never	6.9%	6.2	7.7

The prevalence of inadequate sleep was significantly higher among adults who rent their home (12.2%) compared to adults who own their home (7.4%). Adults who either own or rent their home were asked if they were worried or stressed about having enough money to pay their rent/mortgage in the past 12 months. The prevalence of inadequate sleep was significantly higher among adults who were always, usually or sometimes worried (14%) about paying rent/mortgage compared to adults who were rarely or never worried (6.9%) about paying rent/mortgage. All respondents were asked if they were worried or stressed about having enough money to buy nutritious meals. The prevalence of inadequate sleep was significantly higher among adults who were always, usually or sometimes worried (16.8%) about having enough money to buy nutritious meals compared to adults who were rarely or never worried (6.9%).

In addition to the average number of sleep hours in a 24-hour period, the module on 'Inadequate Sleep' also asked questions regarding snoring, daytime sleepiness and drowsy driving.

Table 6 - Prevalence of snoring, daytime sleepiness and drowsy driving in Kansas, 2009

	Weighted Percentage	95% Confidence Interval	
		Lower Limit	Upper Limit
Snoring			
Yes	55.6%	54.2	57.1
No	44.4%	42.9	45.8
Daytime Sleepiness*			
0 days	64.8%	63.5	66.2
1-13 days	28.4%	27.1	29.7
14-30 days	6.8%	6.1	7.4
Drowsy Driving**			
Yes	3.2%	2.7	3.6
No	94.4%	93.8	95.0
Don't Drive	2.2%	1.9	2.6
Don't Have License	0.2%	0.1	0.3

* Daytime Sleepiness - unintentionally falling asleep during the day.

** Drowsy Driving - nodded off or fallen asleep, even just for a brief moment, while driving.

More than half of the adults (55.6%) in Kansas snore. About one in 15 adults (6.8%) reported unintentionally falling asleep during the day for 14 or more days in past 30 days. About one in 30 adults (3.2%) reported that they nodded off or fell asleep, even just for a brief moment, while driving in the past 30 days.

Discussion/Conclusion

Many epidemiological studies have shown the association of inadequate sleep with chronic health conditions and other risk factors [1-17]. Inclusion of the CDC optional module 'Inadequate Sleep' in the 2009 Kansas BRFSS provided baseline estimates for sleep-related information in detail among Kansans. Study results showed that about one in 13 adults in Kansas sleeps less than six hours (inadequate sleep) in a 24-hour period. The prevalence of inadequate sleep was significantly lower among elderly (65 years and older) adults compared to adults 25 to 64 years old. Significantly higher prevalence of inadequate sleep was observed among African-Americans compared to Whites (17.1% vs. 7.7%). The prevalence of inadequate sleep decreased with an increase in annual household income and an increase in education level. Inadequate sleep also showed a relationship to risk factors such as weight status, leisure time physical activity and smoking status. The percentage of adults getting inadequate sleep was significantly higher among adults who were obese, did not participate in leisure time physical activity and those who were current smokers compared to their counterparts. Inadequate sleep was related to co-morbid conditions as well. The percentage of adults getting inadequate sleep was significantly higher among adults with hypertension compared to adults without hypertension. More than one in four adults with serious psychological distress (26.3%) reported getting inadequate sleep compared to about one in 13 adults without serious psychological distress (7.7%). General and mental health status showed a strong influence on the prevalence of inadequate sleep. The prevalence of inadequate sleep was significantly higher among adults who reported poor general and mental health status. Adults who were always, usually or sometimes worried about paying rent/mortgage or having enough money to buy nutritious meals showed a significantly higher prevalence of inadequate sleep. Information on other sleep related variables such as snoring, daytime sleepiness and drowsy driving was also analyzed in this study. More than half of the adults in Kansas reported that they snore. About one in 15 adults reported unintentionally falling asleep during the day for 14 or more days in past 30 days. About one in 30 adults reported that they nodded off or fell asleep, even just for a brief moment, while driving in past 30 days. Thus, inadequate sleep may pose potential adverse health and safety consequences and has a strong influence on overall well-being.

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Kansas *Salmonella* Serotype Summary 1998-2008

Introduction

Salmonellosis is a bacterial illness characterized by acute abdominal pain, diarrhea, and often fever that begins 12 hours to five days after infection. In cases of enterocolitis, fecal excretion usually persists for several days or weeks beyond the acute phase of illness. Antibiotics generally have no effect on the illness; however illness in infants less than 2 months of age, in the elderly, or the immunocompromised should receive antibiotic therapy [1].

A wide range of domestic and wild animals are carriers of *Salmonella*, including poultry, swine, cattle, rodents, iguanas, tortoises, turtles, young poultry, dogs, and cats. The majority of human infections are thought to result from the ingestion of fecally-contaminated food or water. Raw or undercooked produce and products of animal origin such as eggs, milk, meat, and poultry have been implicated as common sources of animal and human salmonellosis. Though uncommon, person-to-person spread can occur in humans via patients, convalescent carriers, and especially, mild and unrecognized cases. The incidence of infection is highest in infants and young children [1].

Identifying the circulating serotypes of *Salmonella* in Kansas assists in recognizing outbreaks of unusual serotypes, identifies seasonal patterns, and assists in understanding the rate of illness attributed to certain serotypes of *Salmonella*.

Background

Since 1993, the Kansas Department of Health and Environment (KDHE) has maintained a surveillance system for human salmonellosis. As specified by Kansas statute, KDHE receives reports of salmonellosis from local health or departments, physicians, hospitals, and laboratories. Clinical diagnostic laboratories in Kansas must also submit *Salmonella* isolates to the Kansas Health and Environmental Laboratories (KHEL) for confirmation and serotyping. The data collected are, in turn, reported to the Centers for Disease Control and Prevention (CDC) through the National Electronic Disease Surveillance System (NEDSS) and through Public Health Laboratories Information System (PHLIS) and Public Health Information Network Messaging System (PHIN MS). This document summarizes surveillance data on culture-confirmed *Salmonella* human isolates from Kansas residents reported to Centers for Disease Control

and Prevention from KHEL for 1998 through 2008 based on the PHLIS dataset.

Methods

Data from the PHLIS dataset was analyzed using SAS 9.2®. Analysis to determine the most frequently identified serotype, median isolates submitted to KHEL, and which year had the most isolates submitted was completed.

Results

A total of 2,951 *Salmonella* isolates were reported to CDC from KHEL from 1998 to 2008. During this same time period there were 4,083 culture-confirmed salmonellosis cases reported to KDHE – Bureau of Epidemiology and Public Health Informatics (BEPHI). The largest number of isolates submitted by KHEL in a single year was 342, which occurred in 2007 (Figure 2). The number of isolates that KHEL serotyped ranged from 195 to 342, with a median of 264 isolates serotyped and an average of 268 isolates serotyped over the 10-year study period.

Figure 2. *Salmonella* Isolates by Year Reported, Kansas, 1998-2008

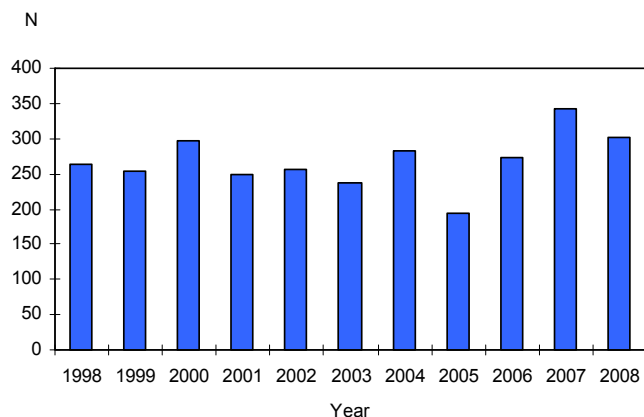


Table 7. The 20 most frequently reported *Salmonella* serotypes from human sources reported from KHEL from 1998-2008

Serotype	Count	Percent
Typhimurium*	796	26.97
Newport	426	14.44
Enteritidis	318	10.80
Heidelberg	147	4.98
Group B†	138	4.68
Montevideo	81	2.74
Muenchen	76	2.58
Oranienburg	74	2.51
Braenderup	73	2.47
Thompson	60	2.03
Javiana	53	1.80
Agona	50	1.69
Paratyphi B Var. L(+) Tartate+ (Formerly Java)	50	1.69
Infantis	45	1.52
SaintPaul	38	1.29
Poona	34	1.15
Norwich	31	1.05
Tennessee	25	0.85
Hadar	19	0.64
Hartford	19	0.64

* Typhimurium includes var 5- (Formerly var. Copenhagen)

† *Salmonella* Group B serotypes were unable to be further identified due to loss of H phase 1 or 2 antigens

From 1998 through 2008, the three most commonly reported serotypes from human sources by KHEL were Typhimurium, Newport, and Enteritidis (Table 7). These three serotypes made up 52 percent of the cases of *Salmonella* reported by KHEL. A number of the different serotypes were tied to specific outbreaks either nationally or locally in Kansas. In 2007, 15 cases of *S. Tennessee* were attributed to the nationwide peanut butter outbreak. During the following year, 18 cases were attributed to the *S. Saintpaul* jalapenos and Serrano peppers outbreak. A local outbreak of *S. Typhimurium* in 2004 infected six people, and in 2008 twenty-four cases of *S. Enteritidis* were attributed to another local outbreak.

Discussion

There are several limitations to this dataset. These data represent only isolates submitted to KHEL and do not include isolates from Kansas residents that are submitted to other state health departments. Approximately one-third of all *Salmonella* cases reported to KDHE are submitted to the Missouri Department of Health and Senior Services State Public Health Laboratory. Those are not included in this preliminary analysis due to the inconsistencies in data reporting and management. Additionally, not all isolates are submitted to KHEL as required. Also, because not all individuals experiencing gastrointestinal illness seek medical attention or submit specimens for testing, the results of this analysis may underestimate the actual burden of salmonellosis in Kansas during this time period.

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Reference

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Adequacy of Prenatal Care Reported

Prenatal care is defined as pregnancy-related health care services provided to a woman between conception and delivery. It is important to track because there is a strong association between prenatal care and pregnancy outcome. Pregnant women who receive inadequate care are at increased risk of bearing infants who have low birth weight, are stillborn, or die within the first year of life [1, 2]. Prenatal care data can be analyzed to suggest population groups and geographic areas in need of intervention, thereby protecting the health of future Kansans.

The report Adequacy of Prenatal Care Utilization Index, 2009, issued by the Bureau of Epidemiology and Public Health Informatics, reviews the most recent available data to assess prenatal care. The adequacy of prenatal care utilization (APNCU) index can be calculated where the number of prenatal visits, date of first prenatal visit, and the date of last menses are reported on the birth certificate. Among the 41,388 Kansas resident live births in 2009, the APNCU index could be calculated for 38,930 (94.1%). Of these 38,930 births, 79.0 percent received adequate or better prenatal care, including 31.3 percent with adequate-plus care; 21.0 percent received less than adequate prenatal care, including 14.9 percent with inadequate care.

Other findings

- Among mothers whose prenatal care utilization was classified as inadequate (5,799), the vast majority (5,548) were due to late initiation of care. Only a minority of women (251) who initiated their care within the first four months of care received inadequate care.
- Among mothers of low birth weight infants, 79.3 percent received adequate or better care, while 17.5 percent received inadequate care.

- The proportion of mothers who received adequate or better prenatal care was highest among the white non-Hispanic population group (83.9%), followed by Asian/Pacific Islander non-Hispanic (80.9%) and Native American non-Hispanic (74.8%) population groups. The Hispanic population group had the lowest percentage of mothers receiving adequate or better prenatal care (62.6%).
- The population groups reporting the highest proportion of mothers with inadequate care were other non-Hispanic (21.6%), black non-Hispanic (24.8%) and Hispanic (27.3%). These rates are almost or more than twice that of white non-Hispanic women, who experienced inadequate care at a rate of 10.9 percent.
- Private insurance was the payer with the highest proportion of mothers who received adequate or better prenatal care (89.6%), followed by Champus/Tricare (80.3%). The payer with the highest proportion of mothers with inadequate prenatal care was self pay (33.2%).
- Among first births, the percent of mothers with adequate or better prenatal care was 81.6 percent, which compares to 77.3 percent for women having a second or successive birth.
- In all age groups, the proportion of mothers with inadequate prenatal care was significantly higher for second and higher order live births than for first births.

Accurate measurement of prenatal care depends on the accuracy of the index used. Beginning with 1998 data, KDHE transitioned from a modified Kessner Index to the Adequacy of Prenatal Care Utilization (APNCU) Index (often referred to as the Kotelchuck Index). [3] This index attempts to characterize prenatal care (PNC) utilization on two independent and distinctive dimensions: adequacy of initiation of PNC and adequacy of received services (once PNC has begun). Because of changes in the method of calculating the month prenatal care began – a key component in creating a PNC value – data from 2005 and successive years are not comparable to that for prior years. The report can be found at <http://www.kdheks.gov/hci/kacui.html>

Bureau of Epidemiology and Public Health Informatics

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Doctors of Osteopathic Medicine in Kansas

Both nationally and in Kansas, a growing population and changing demographics are impacting access to health care. The Kansas population is projected to grow an estimated 12 percent between 2000 and 2020 (2.7 million in 2000 to 3.0 million in 2020), while the Kansas population age 65 and over is expected to expand by 46 percent (356,000 in 2000 to 520,000 in 2020) [1]. The growing population, and especially the population cohort age 65 and over who are most likely to have the greatest medical needs, will place increasing demands on the health care system. The increasing number of doctors of osteopathic medicine (DOs) can help address the growing challenges of access to health care in Kansas.

DOs and Doctors of Medicine (MDs) are similar in many ways, such as education, practice specialties, and licensing; however, DOs belong to a separate branch of American medical care. The philosophy of osteopathic medicine focuses on the unity of all body parts, recognizing the body's ability to heal itself, and the need for patients to take more responsibility for their well-being and to change unhealthy patterns. [2] [3] The American Osteopathic Association estimates that at current growth rates there will be at least 100,000 DOs actively practicing in the U.S. by 2020 [2] [3]. That would nearly double the 67,167 number of 2009. [4] This article provides an overview of osteopathic doctors licensed by the Kansas State Board of Healing Arts (KSBHA).

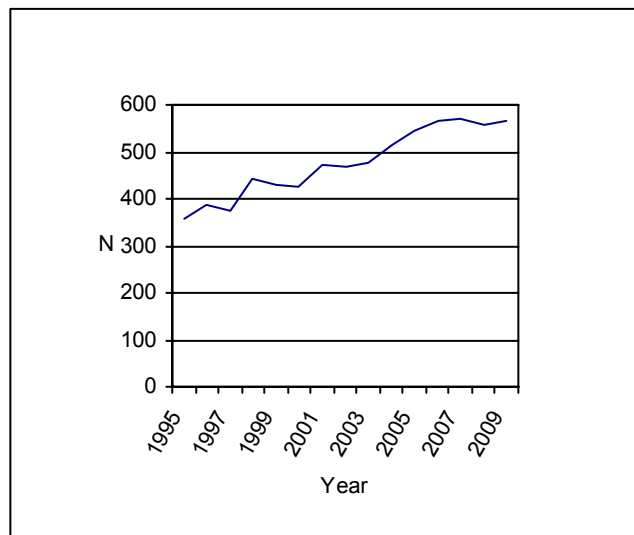
Methods

This report is based on licensure data collected by KSBHA and practice location data gathered by the Kansas Department of Health and Environment (KDHE). The KSBHA provided fourth quarter 2009 licensure data to KDHE. Practice location information was collected through the KSBHA electronic license renewal process and follow-up KDHE telephone contact with Kansas osteopathic physicians providing primary care services. Information about DOs was extracted from the Kansas Information for Communities (KIC) 2009 Health Professionals Standard and Specialties Reports. [5] Age and gender information was obtained from the KSBHA licensure and survey data. Primary Care Full Time Equivalency (FTE) data were obtained from the 2009 Kansas Primary Care Physician FTE by County Report. [6]

Results

Over the past 14 years, the number of practicing DOs in Kansas has risen from 357 to 564, which represents an increase of 58 percent (Figure 3).

Figure 3. Actively Practicing DOs, Kansas 1995-2009

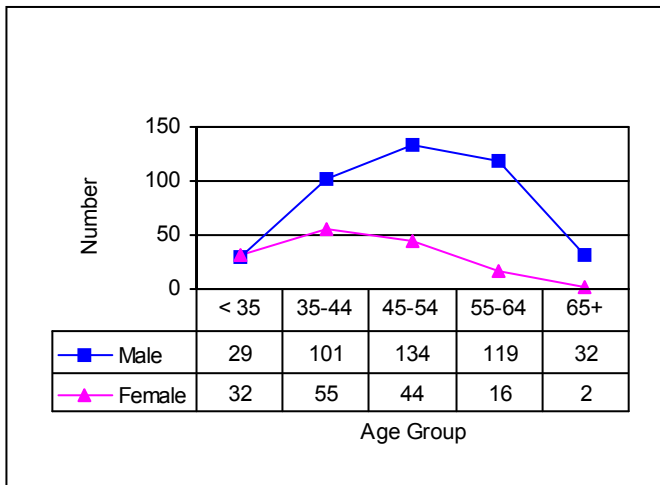


The 2009 fourth quarter licensure data contained 761 DO Active Licenses, 71 DO Exempt Licenses, 31 DO Federal Licenses, and 141 DO Inactive Licenses. Of the DOs with an active license, 564 report a Kansas practice location.

Gender and Age:

In 2009, males made up 74 percent (N=415) of DOs with an active license and practice location in Kansas. The 45-54 age group made up almost one third of the DOs. The largest number of male DOs was in the 45-54 age group, while female DOs had the largest number in the 35-44 age group (Figure 4).

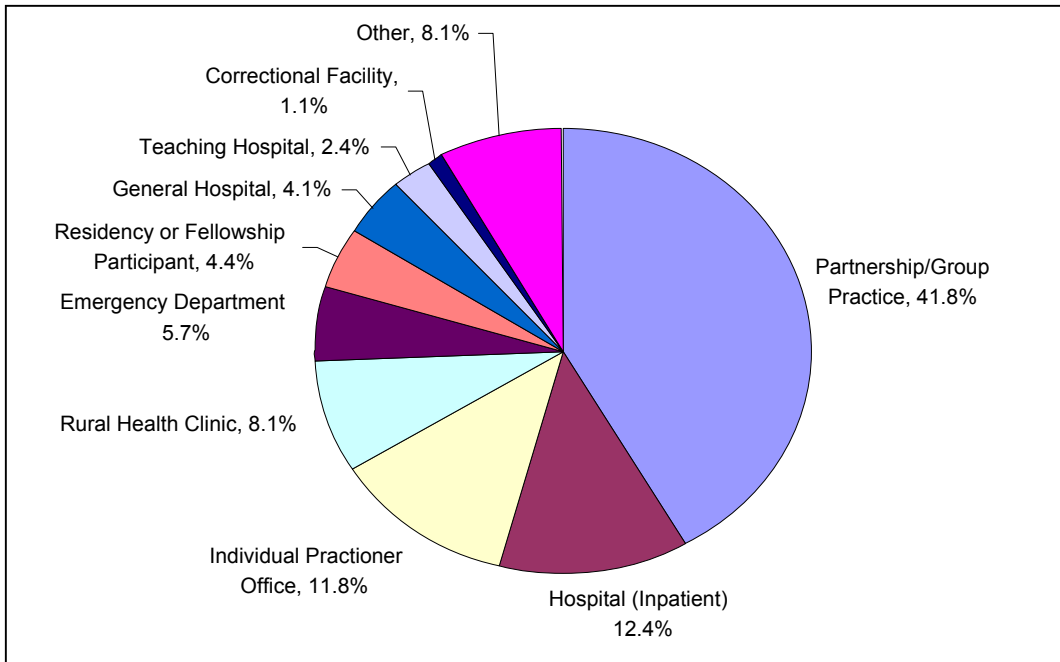
Figure 4. DOs by Age Group by Gender, Kansas 2009



Work Settings:

Of the DOs actively practicing in Kansas in 2009, the greatest percentage (41.8%) reported working in a partnership or group practice office. Providing inpatient care in a hospital setting was the next highest percentage (12.4%) (Figure 5). Over half (53.6%) worked either in a partnership/group practice office or an individual practitioner office. Some of the practice settings in the group “other” include: occupational clinics, community mental health centers, federally qualified health centers, independent laboratories, long-term nursing facilities, and ambulatory surgery centers.

Figure 5. DO Work Settings, Kansas 2009



Specialties

In the annual license renewal process, DOs may self report up to three practice specialties. Of the 564 DOs in the Kansas 2009 Standard Report, 562 listed a first specialty, 147 listed a second specialty and 27 listed a third specialty (Table 8). Family practice was the first specialty of the highest percentage (42.3%). Emergency medicine and internal medicine tied as the second most frequently self reported specialty (7.7% each). Among second self-reported specialties, internal medicine was most frequently reported (15.0%) and family practice ranked second (14.3%). Of those reporting a third specialty, other

Table 8. DOs Self Reported Specialties

Specialty	Specialty 1 N (%)	Specialty 2 N (%)	Specialty 3 N (%)
Family Practice	238 (42.3)	21 (14.3)	1 (2.9)
Emergency Medicine	43 (7.7)	17 (11.6)	4 (11.8)
Internal Medicine	43 (7.7)	22 (15.0)	1 (2.9)
Pediatrics	22 (3.9)	4 (2.7)	1 (2.9)
Anesthesiology	20 (3.6)	n.a.	n.a.
Obstetrics/Gynecology	20 (3.6)	n.a.	1 (2.9)
Surgery, General	17 (3.0)	n.a.	2 (5.9)
General Practice	16 (2.8)	9 (6.1)	n.a.
Psychiatry	16 (2.8)	6 (4.1)	n.a.
Radiology, Diagnostic	13 (2.3)	n.a.	n.a.
Other	114 (20.2)	27 (18.3)	n.a.
Occupational/Industrial	n.a.	10 (6.8)	2 (5.9)
Geriatrics	n.a.	9 (6.1)	n.a.
Hematology	n.a.	3 (2.7)	n.a.
Other Specialty	n.a.	n.a.	10 (29.4)
Geriatrics	n.a.	n.a.	1 (2.9)
General Preventive Medicine	n.a.	n.a.	1 (2.9)
Hematology/Oncology	n.a.	n.a.	1 (2.9)
Sports Medicine	n.a.	n.a.	1 (2.9)
Aerospace Medicine	n.a.	n.a.	1 (2.9)
Not stated	2 (n.a.)	417 (n.a.)	537 (n.a.)

n.a. = not applicable

specialty was of the highest percentage (29.4%). The source data did not contain descriptions for other specialty.

Primary care physicians provide initial diagnosis and care for the majority of people seeking medical care. Their specialties are family practice, general practice, internal medicine, pediatrics, or obstetrics/gynecology. Of the 564 DOs included in the 2009 Standard Report, 384 or 68.3 percent listed at least one specialty as primary care. Of the 382 DOs indicating board certification, 312 or 81.7 percent were board certified in the indicated specialty.

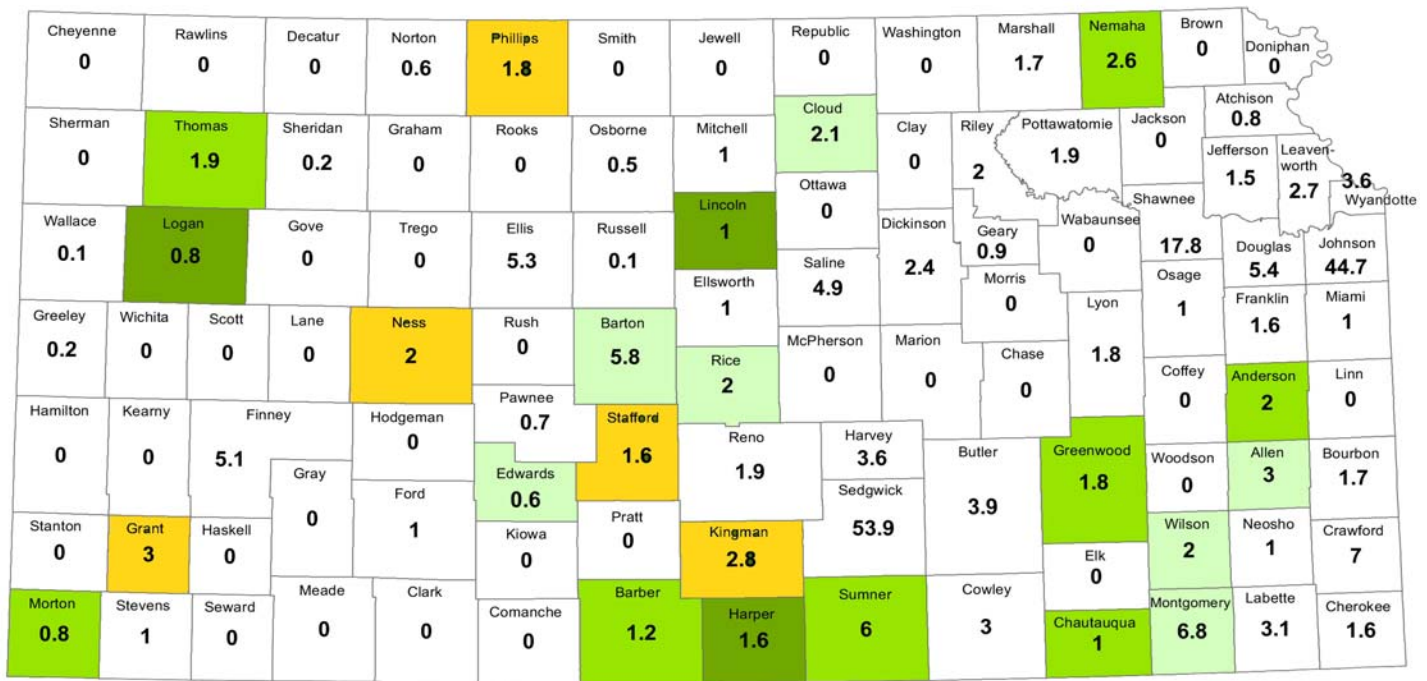
There were 31 DOs who listed surgery of any kind as a specialty. Of the 30 that indicated whether or not they were board certified, 23 or 76.7 percent answered in the affirmative (Table 9).

Table 9. DO Primary Care and Surgical Specialties*

Specialty Category	Reported Specialty		Reported Board Certification	
	Number	Percent	Number	Percent
Primary Care	384	68.3	312	81.7
Surgery	31	5.5	23	76.7

*Specialty 1, 2, or 3

Figure 6. Distribution of Kansas Primary Care DO FTE by County, 2009



* Ratio of 2009 Adjusted Population to Primary Care DO FTEs



Primary Care DO FTE by County of Practice:

A way of examining the availability of DOs is by use of full-time equivalent (FTE) statistics. The Health Resource Survey of DOs upon which this report is based [5] gathers information on the distribution of primary care service hours by practice location. This data allows for the calculation of primary care full-time equivalency statistics by practice location for each responding physician. There were 43 counties with no primary care DO FTEs, and another twelve counties with less than 1.0 primary care DO FTE (Figure 6). Adjusted population to primary care DO FTE ratios are calculated by county using this data. As indicated by the darkest map shading (Figure 6), counties with the fewest persons to primary care DO FTE include Ness (1,378), Grant (2,427), Kingman (2,643), Stafford (2,681), and Phillips (2,881). The lightest shading indicates either a person to primary care DO FTE ratio of 5,000 or greater or no DO FTE in that County.

National Comparisons:

In 2009 Kansas ranked 12th among all states for the number of persons per DO. Using the figures from the Osteopathic Medical Profession Report for 2009 [4], and the U.S. Census Bureau figures for states' population [7], the number of persons per DO for Kansas was calculated at 4,121 as compared to 1,934 persons per DO in Michigan and to 30,352 persons per DO in Louisiana. Nationally, there were 4,571 persons per DO in 2009.

Discussion:

As the population continues to grow and change, the increasing number of DOs in Kansas can help to address the challenges of accessing health care for Kansans. The number

of DOs in Kansas has increased by 58 percent over the last 14 years, and the number of DOs is expected to nearly double by 2020. Although DOs are just one among several health care professionals addressing the health care needs in Kansas, their increasing numbers will help to reduce health care access issues.

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Teen Pregnancy Report Issued

The Bureau of Epidemiology and Public Health Informatics has issued the 2009 Adolescent and Teen Pregnancy Report. The report contains a series of summary tables detailing pregnancy outcomes (live births, abortions, and stillbirths, excluding miscarriages below 351 grams) for women aged 10-19.

Pregnancies to teenage females (aged 10-19) accounted for eleven percent (10.9) of all reported pregnancies (N=46,381) in 2009. Eighty-five percent (84.7) of the teenage pregnancies resulted in a live birth (N=4,265), fifteen percent (15.0) in abortion (N=756) and the remainder in stillbirths (N=15, 0.3%).

Other findings include:

- The pregnancy rate for females ages 10-19 was 26.8 per 1,000 females in 2009, down 6.3 percent from 2008 (28.6).
- The rates for subgroups 10-14, 10-17 and 15-19 were 0.6, 10.0, and 51.6 births per 1,000 females. These rates declined 14.3, 8.3, and 6.2 percent, respectively, from the corresponding rates for 2008.
- The number and rate of teenage pregnancies (10-19) decreased in 2009, reversing a series of increases in each of the four previous years (2005-2008). The longer term trend is also downward. Teenage pregnancy rates (10-19) dropped 23.6 percent overall during the past two decades (1990-2009).

The report can be found at <http://www.kdheks.gov/hci/teenpreg.html>

Table 10. Teenage Pregnancies* by Number and Rate for Mothers Under 20, Kansas Residents, 1990-2009

Year	# (10-19)	Age-Group				Rate† (10-19)	Pregnancy Rate†		
		10-14	15-17	18-19	15-19		10-14	10-17	15-19
1990	5,993	93	1,930	3,970	5,900	35.1	1.1	15.0	70.5
1991	5,743	98	1,904	3,741	5,645	33.3	1.1	14.4	69.0
1992	6,165	111	2,110	3,944	6,054	34.8	1.2	15.4	72.6
1993	6,405	133	2,219	4,053	6,272	35.2	1.4	15.9	73.3
1994	6,500	124	2,302	4,074	6,376	34.8	1.3	15.9	71.9
1995	6,552	153	2,332	4,067	6,399	34.5	1.6	16.1	69.5
1996	6,498	133	2,276	4,089	6,365	33.9	1.4	15.6	67.0
1997	6,469	123	2,260	4,086	6,346	33.3	1.3	15.3	64.7
1998	6,444	108	2,087	4,249	6,336	32.4	1.1	13.8	62.0
1999	6,402	103	1,979	4,320	6,299	31.9	1.1	13.1	60.7
2000	6,090	94	1,819	4,177	5,996	30.3	0.9	12.0	58.7
2001	5,818	79	1,819	3,920	5,739	28.8	0.8	11.9	56.0
2002	5,586	86	1,684	3,816	5,500	28.3	0.9	11.3	54.7
2003	5,174	73	1,559	3,542	5,101	26.4	0.8	10.5	51.3
2004	5,026	71	1,492	3,463	4,955	26.1	0.8	10.3	50.3
2005	5,044	69	1,483	3,492	4,975	26.7	0.8	10.4	50.8
2006	5,192	85	1,507	3,600	5,107	27.1	0.9	10.4	52.2
2007	5,268	70	1,573	3,625	5,198	27.8	0.8	10.9	53.2
2008	5,371	66	1,552	3,753	5,305	28.6	0.7	10.9	55.0
2009	5,036	56	1,417	3,563	4,980	26.8	0.6	10.0	51.6

*Teenage pregnancies are the sum of live births, stillbirths and abortions.

†Rate per 1,000 female age-group population

Selected Statistics, Stillbirths and Infant Deaths, Kansas, 2009 Report Issued

The Bureau of Epidemiology and Public Health Informatics has issued the 2009 Selected Statistics, Stillbirths and Infant Deaths Report summarizing vital records data on stillbirths and infant deaths.

The purpose of this report is to move beyond single-year statistics reported in the *Annual Summary of Vital Statistics* and provide a more long term view of stillbirth and infant mortality data and statistics. In an attempt to increase data reliability, years are combined with preselected intervals. The intervals include 5 years, 20 years or approximately 100 years.

Findings included the following:

- In the last century, the infant mortality rate (IMR) has decreased dramatically (90.2%), from 73.5 deaths per 1,000 live births in 1912 (2,795 infant deaths) to 7.0 in 2009 (290 infant deaths).
- Even when considering the last 20 years (1990-2009), the overall trend in infant mortality rates decreased significantly, from 8.4 in 1990 to 7.0 in 2009.
- There was not a statistically significant decline in infant mortality in the last five years.
- In the last 20 years (1990-2009), the black non-Hispanic infant mortality rate has remained at least twice that of the white non-Hispanic population in most years, with an average ratio of 2.6.

- Analysis of the underlying cause of death by population group (2005-2009) shows that prematurity or low birthweight was the leading cause of death among black non-Hispanic infants, with congenital anomalies being the leading cause of death among White non-Hispanic and Hispanic infants.
- The counties with the highest number of infant deaths (2004-2008) included Sedgwick County (332 or 21.9% of the total), Johnson County (230 or 15.2% of the total), Wyandotte County (128 or 8.4% of the total) and Shawnee County (120 or 7.9% of the total). These four counties accounted for 53.4 percent of the infant deaths.
- The counties with the highest infant mortality rates and a relative standard error of 30 percent or lower included Marion (20.6), Neosho (13.9), Allen (12.4), Geary (11.9) and Shawnee (9.4), while the counties with the lowest rates were Butler (4.9), Leavenworth (5.7), and Johnson, Finney, Montgomery and Douglas, all with a rate of 6.0.
- Analysis of the linked birth/death file (2005-2009) shows that prematurity (less than 37 weeks gestation) was a primary risk factor in about 62 percent (61.5) of all infant deaths even when the underlying cause of death was not prematurity or low birth weight.

- ◊ Prematurity was an important risk factor for the non-Hispanic black population (72.8% of infant deaths), non-Hispanic white population (58.6%) and the Hispanic population (59.6%).
- ◊ Gestational age specific analysis showed an infant mortality rate of 46.2/1,000 live births for infants born prematurely, 15 times that for infants born term.
- ◊ Similarly, the infant mortality rate for very premature* infants (212.1/1,000) was 71 times higher than the rate for infants born term.

This report, summarizing vital records data on stillbirths and infant deaths, can be found at http://www.kdheks.gov/hci/infant_mortality.htm. Persons inquiring about additional data needs can call (785) 296-8627.

Bureau of Epidemiology and Public Health Informatics.

Footnote

*Very premature = <32 weeks

Maternal and Child Health Trends Reported

The Kansas Department of Health and Environment, Bureau of Family Health has published the third edition of the Kansas Maternal and Child Health (MCH) Biennial Summary, 2010. The report presents summaries of 31 important health issues for women of reproductive age and infants, children and adolescents, children and youth with special health care needs, and MCH health systems indicators in Kansas.

Women of Reproductive Age and Infants

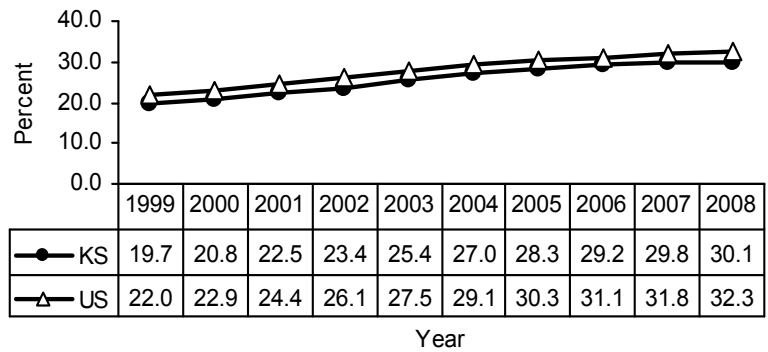
In Kansas, 1999-2008, there was an increasing trend in the percent of women aged 18-44 who lacked health insurance, with about 18.0 percent of women lacking health insurance in 2008. In 2008, women at greatest risk of being uninsured were Hispanic, had less than a high school education, earned less than \$25,000 and resided in a densely-settled rural county, and were widowed, divorced or separated. The percent of Hispanic women aged 18-44 with no health insurance was increasing and was about 43.5 percent in 2008.

In 2008, the percent of pregnant women reporting smoking during pregnancy was 16.6 percent. The rates of smoking during pregnancy among non-Hispanic white and non-Hispanic black mothers were highest at 23.7 percent and 23.0 percent, respectively. Hispanic mothers had the lowest rate (5.9%). Teenagers 18-19 years and women in their early twenties had the highest smoking rates (24.7% and 23.5%, respectively). Smoking rates for women in their thirties and older were sharply lower, around 9 percent.

In 2008, the rate for preterm births, those occurring before 37 weeks gestational age, was 9.3 percent. The non-Hispanic black prematurity rate was 40.2 percent higher than the non-Hispanic white rate (12.9% and 9.2%, respectively). The Hispanic prematurity rate met the Healthy People 2010 goal at 7.6 percent.

About one-third (30.1%) of Kansas births were delivered by cesarean, a 52.8 percent increase from 19.7 percent in 1999. There was an increase in cesareans among all gestational age groups. The induction rate increased 67.1 percent from 17.0 percent in 1999 to 28.4 percent in 2008. An increasing trend was observed in inductions among all gestational age groups.

Figure 7. Total Cesarean Delivery Percent, Kansas and U.S., 1999-2008



Source: Bureau of Epidemiology and Public Health Informatics; National Vital Statistics Reports

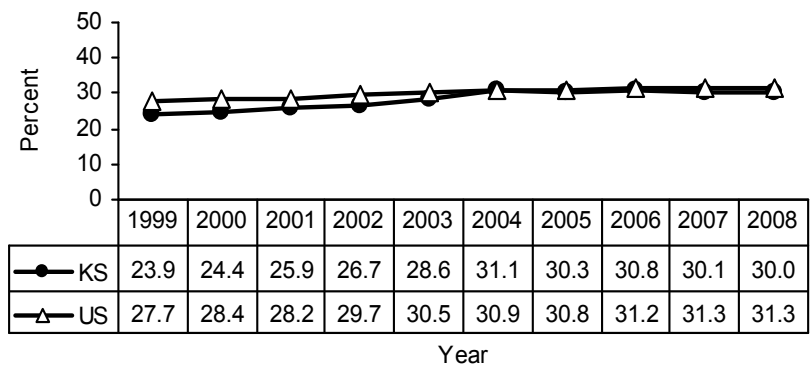
In 2008, low birth weight (LBW)* and very low birth weight (VLBW)* infants contributed heavily to the total infant mortality rate. Almost two thirds (61.4%) of infant deaths occurred among the 7.2 percent of infants who were born at LBW. Similarly, 44.4 percent of infant deaths occurred among the 1.4 percent of infants born at VLBW. The risk of delivering a LBW infant was greater among non-Hispanic black mothers and differed by maternal age, with the highest risk for the youngest and oldest mothers regardless of race.

The percent of Kansas WIC infants (Special Supplemental Nutrition Program for Women, Infants, and Children) ever breastfed increased by 12.0 percent in the last 10 years, from 60.7 percent in 1999 to 68.0 percent in 2008. However, the percent breastfed at least 6 months and 12 months decreased.

Children and Adolescents

The percent of Kansas WIC children (ages 24-59 months) who were overweight or obese[†] increased by 25.5 percent from 23.9 percent in 1999 to 30.0 percent in 2008. In 2008, 33.5 percent of Hispanic children and 40.3 percent of American Indian/Alaskan Native children participating in WIC were overweight or obese.

Figure 8. Percent of WIC Children (24-59 months) who are Overweight and Obese, Kansas and U.S., 1999-2008



Source: Pediatric Nutrition Surveillance System

In Kansas, for adolescents and young adults aged 15-24 (2007-2008), 73.4 percent of unintentional injury deaths were caused by motor vehicle crashes, 12.1 percent were caused by poisonings, and 3.2 percent were caused by drowning. In non-Hispanic white and Hispanic adolescents and young adults, unintentional injury caused the highest percent of injury deaths. However, in non-Hispanic black adolescents and young adults, homicides caused more deaths than unintentional injuries.

Children and Youth with Special Health Care Needs

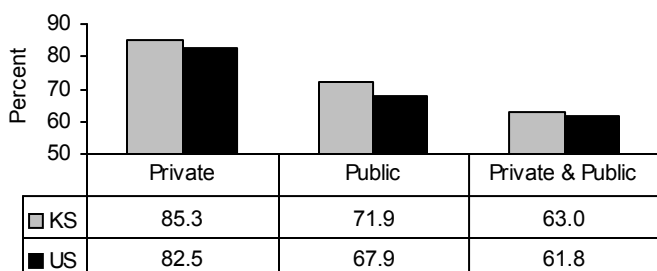
Overall, Kansas children and youth with special health care needs (CYSHCN) did better than U.S. CYSHCN. The 2005-2006 National CSHCN Survey estimates that 28.6 percent of Kansas CYSHCN ages 0-11 served by care systems met all five core outcomes compared to 20.4 percent of the U.S., and Kansas ranked first in the nation. For CYSHCN ages 12-17, 20.2 percent met all six* core outcomes compared to 13.7 percent of the U.S., and Kansas ranked second in the nation. (*The sixth, transition to adulthood, was asked only for CYSHCN ages 12-17.)

In Kansas, an estimated 62.9 percent of CYSHCN have adequate health insurance coverage compared to the national average of 62.0 percent. "Adequate" private and/or public insurance is defined as access to health services including preventive care, primary care and tertiary care. Many Kansas families have policies that cover only well visits or catastrophic care.

In Kansas, 50.3 percent of youth with special health care needs receive services necessary to transition to all aspects of adult life compared to the national average of 41.2 percent. Generally, the vocational/education transition is more comprehensive than transition to adult medical services.

In Kansas, eight out of ten Kansas parents who have CYSHCN reported that their child's condition did not cause financial strain for their families. The percent of families reporting no financial strain in Kansas is similar to that reported nationally.

Figure 9. CYSHCN Whose Condition Did Not Affect the Parents' Employment by Insurance Type, Kansas and U.S., 2005-2006



Source: National CSHCN Survey, 2005-2006 (Age 0-17 yrs.)

To view the report, please visit http://www.kdheks.gov/bfh/download/MCH_2010_Summary.pdf. For more information, please contact Jamie Kim at jkim@kdheks.gov or Garry Kelley at gkelley@kdheks.gov.

Bureau of Family Health

Footnote

*Very low birth weight is a less than 1,500 grams. Low birth weight is less than 2,500 grams.

†For children and adolescents (aged 2-19 years), the BMI value is plotted on the CDC growth charts to determine the corresponding BMI-for-age percentile. Overweight is defined as a BMI at or above the 85th percentile and lower than the 95th percentile. Obesity is defined as a BMI at or above the 95th percentile for children of the same age and sex.

Summary - Vitamin D Supplementation: An Update

According to U.S. Pharmacist [1], an increasingly common global vitamin D deficiency is estimated to affect 1 billion people. This may result from less sun exposure due to climate, lifestyle and / or skin cancer concerns. "Vitamin D is a fat-soluble vitamin that acts as a steroid hormone...vitamin D has a role in regulating the immune system and has a strong anti-inflammation effect." [1] The author cites that recent studies that

suggest increased minimum vitamin D quantities between 1,000 and 2,000 IUs with the recommendation of a health care provider may be needed for optimal body function and disease prevention. Recent studies show a connection between adequate vitamin D levels and reduced risk for certain cancer, heart disease, bone fractures and falls, autoimmune diseases and influenza, and type 2 diabetes and depression [2].

Vitamin D food sources include fortified dairy products and breakfast cereals, fatty dishes, cod liver oil, beef liver, and egg yolks. A variety of sources are available for vitamin D supplements; however, vitamin D₃ is preferred since it is more effective at raising blood level concentrations. Gonzales [1] concludes that "While considerable research support the importance of vitamin D beyond bone health, further trials are required before broad claims can be made about vitamin D and prevention of chronic disease....As the number of people with a vitamin D deficiency continues to increase, the importance of this hormone in overall health and the prevention of chronic diseases is at the forefront of research. The best evidence for the possible role of vitamin D in protecting against cancer comes from colorectal cancer studies. Evidence also is strong for the role of vitamin D in preventing fractures and falls. At this time, further studies are needed to evaluate the role of vitamin D in protecting against heart disease, autoimmune diseases, influenza, diabetes, and depression." [1]

Summary by Rachel Lindbloom, MA, LSCSW
Bureau of Epidemiology and Public Health Informatics
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Kansas Department Health and Environment New Secretary



Robert Moser, M.D. is the new Secretary of the Kansas Department of Health and Environment. Dr. Moser was born in Denver, Colorado and raised in Tribune, Kansas. He attended the KU School of Pharmacy, KU School of Medicine and completed his residency in Family Medicine at the Smoky Hill Family Practice Residency in Salina, Kansas.

Dr. Moser practiced for 22 years in Tribune, building his practice from one physician to a health care system that covered three counties in western Kansas. Still in operation, the Greeley County Health Services Clinic provides obstetrics care, surgery, physical therapy, cardiac rehabilitation, and mental health and substance abuse counseling to those in rural Kansas. In August 2010, he left Tribune to join the KU School of Medicine-Wichita, Family and Community Medicine Department as the Director of Rural Health and Outreach. Dr. Moser and his wife Dalene have been married for 29 years and have two daughters.

The Public Health Informatics (PHI) of the Kansas Department of Health and Environment's Bureau of Epidemiology and Public Health Informatics produces *Kansas Health Statistics Report* to inform the public about availability and uses of health data. Material in this publication may be reproduced without permission; citation as to source, however, is appreciated. Send comments, questions, address changes and articles on health data intended for publication to: PHI, 1000 SW Jackson, Suite 130 Topeka, KS, 66612-1354, Kansas.Health.Statistics@kdheks.gov, or 785-296-8627. Robert Moser, MD, Secretary KDHE; D. Charles Hunt, MPH, State Epidemiologist and Director, BEPHI; Elizabeth W. Saadi, PhD, State Registrar, Deputy Director, BEPHI; Greg Crawford, Editor.

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