

Preventable Hospitalizations

In Kansas

Office of Health Assessment
Center for Health and Environmental Statistics
Division of Health
Kansas Department of Health and Environment

August 2007

Foreword

Public health is constantly challenged with the need to strategically direct scarce resources in the most effective way to prevent illness and promote the quality of life for all Kansans. Our responsibility is to assess the health of Kansas citizens, assure that preventive health services are equitably and economically made available, and ensure that effective public health policy development fully engages the health care system.

Success can be achieved by using data and information to guide decisions. There is a plethora of Kansas-specific data that may be transformed into usable information for public health. Preventable Hospitalizations in Kansas summarizes key issues that must be addressed to more effectively manage health conditions that do not need to result in hospitalization. The purpose of this report is not to critique the quality of health care providers and facilities, but to furnish basic information on the Kansas health care delivery system.

Trends discussed in this report have significant implications. Program managers, health care providers, researchers, and policy makers across the State need to reflect on how well positioned we are to meet the increasing health care needs at an aging, rural state. The conditions discussed in this report for which hospitalization may be preventable, cost private pay sources an estimated \$63 million in 2005. Public health insurance programs should conduct similar evaluations. In the near future, the Division of Health within KDHE will support activities to bring together disparate information to on health care services in Kansas to better support effective health decision-making. I encourage the reader to communicate to Office of Health Assessment staff health for their information needs to improve health assessment in Kansas.

Howard Rodenberg, MD, MPH

Director and State Health Officer

Division of Health

Kansas Department of Health and Environment

Executive Summary

Hospitalization is the most serious and expensive portion of health care treatment. Avoiding unnecessary hospital visits is a priority strategy for health care cost containment. The Healthcare Cost and Utilization Project (HCUP) was established to guide evaluations of hospital discharge data with specific emphasis on selected health conditions that can be prevented when effectively managed in outpatient settings. High rates of hospitalization for these ambulatory care sensitive conditions (ACSCs) could indicate poor access to outpatient health care and lack of patient compliance to treatment, among other factors. For example, patients with diabetes may be hospitalized for diabetic complications if their conditions are not adequately monitored or if they do not receive the patient education needed for appropriate self-management. Patients may be hospitalized for asthma if primary care providers fail to adhere to evidence-based practice guidelines or to prescribe appropriate treatments. Patients with appendicitis who do not have ready access to surgical evaluation may experience delays in receiving needed care, which can result in a life-threatening condition—perforated appendix and so on.

Prevention Quality Indicators (PQIs) are a set of measures developed through the HCUP program that can be used with hospital inpatient discharge data to identify ACSCs. Even though these indicators are based on hospital inpatient data, they provide insight into the quality of the health care system *outside* the hospital setting. These conditions represent hospitalizations that might have been prevented if proper primary care and patient compliance had been achieved. This report summarizes data from Kansas hospital discharges from 2000-2005 for “preventable” hospitalizations. In addition, some estimations are made regarding the financial burden of these conditions on private health insurance. Areas where Kansas health program managers should focus include:

--*Diabetes*: Admission rates for short-term complications in Kansas diabetics increased 16.8% during 2000-2005. Uncontrolled diabetes without complications decreased 13.9% between 2000 and 2005, but this indicator for Kansas was above the national average. Hospitalizations for diabetic conditions cost private health care sources an estimated \$6.5 million in 2005.

--*Pediatric conditions*: Admission rates for low birth weight hospitalizations during 2000-2005 increased slightly for Kansas (1.7%), but care for low birth weight infants cost the private health care system over \$41 million in 2005. Hospitalization for pediatric asthma increased overall for the state by as much as 7.4 %.

--*Heart-related conditions*: From 2000-2005, admission rates for congestive heart failure and hypertension increased in Kansas 2.0 and 12.9%, respectively. During this same time period, hospitalizations for angina without procedure declined dramatically for Kansas (51.2%). Rates for both angina without procedures and congestive heart failure have remained below the national average.

--*Infectious conditions and perforated appendix*: Kansas admission rates for bacterial pneumonia and perforated appendix were higher than the national average through 2000 and 2003, however, rates of perforated appendix in Kansas appear to be declining. Bacterial pneumonia admission rates increased 12.8% in Kansas from 2000-2005. Admission rates on urinary tract infections have increased in Kansas almost 36% from 2000-2005. These conditions cost the private health care system an estimated \$7.6 million in 2005.

--*Respiratory conditions*: While both rates fall below the national average, Kansans experienced a decrease in the admission rate for chronic obstructive pulmonary disease during 2000-2005, but

hospitalizations for adult asthma increased 38.9% in Kansas for the same time period and cost private pay sources \$2.4 million.

Since hospitalizations are the most expensive portion of health care treatment, one goal of health care cost containment efforts must be to avoid preventable hospitalization where possible. Kansas health program managers should routinely evaluate prevention quality indicators, consider where targeted interventions can minimize the risk of costly treatments and devise programs to assist patients in treatment regimen compliance. Information such as the prevention quality indicators can provide insight for more informed health decision-making.

Preventable Hospitalizations in Kansas

Introduction:

Hospitalization is the most serious and expensive portion of health care treatment. Avoidance of unnecessary hospital visits is a priority strategy for health care cost containment. The Agency for Healthcare Research and Quality (AHRQ) indicates there are “*health conditions for which good outpatient care can potentially prevent the need for hospitalization, or for which early intervention can prevent complications or more severe disease*”.¹ The Healthcare Cost and Utilization Project (HCUP) was developed by AHRQ to guide evaluations of hospital discharge data specifically emphasizing selected health conditions. These conditions represent hospitalizations that might have been prevented if proper primary care and patient compliance had been achieved. This report summarizes data from Kansas hospital discharges from 2000-2005 for “preventable” hospitalizations.

Why Are Kansans Hospitalized?

Kansans experienced over 360,000 hospitalizations and discharges in 2005. The conditions, noted in Table 1 are summarized using the Clinical Classification Software (CCS) system developed by AHRQ. Rate comparisons indicate that since 2000, Kansans experienced fewer hospitalizations for conditions such as Neoplasms and Cardiovascular Diseases (7.6% and 5.8% decrease, respectively). Declines in hospitalizations for neoplasm and cardiovascular conditions are likely multi-factorial, but could potentially reflect improvements in care where delivery is provided in outpatient settings. The highest percent of increase in hospitalization have been observed in Diseases of the Skin and Subcutaneous Tissue (38.6%), Infectious and Parasitic Diseases (29.9%), Diseases of Musculoskeletal System and Connective Tissue (22.5%) and Endocrine, Nutritional, Metabolic and Immunity Disorders (18.8%).

Table 1. Kansas Resident Hospital Discharges by Diagnosis*, Number and Rate
All Ages
Kansas, 2000, 2005**

Diagnosis	2000		2005		Percent Difference in rate—2000 and 2005
	Number	Rate	Number	Rate	
1. Infectious and parasitic diseases	4,146	15.4	5,477	20.0	29.9
2. Neoplasms	14,827	55.1	13,959	50.9	-7.6
3. Endocrine, nutritional, metabolic, & imm. disorders	10,897	40.5	13,213	48.1	18.8
4. Diseases of blood and blood-forming organs	2,432	9.0	2,861	10.4	15.6
5. Mental disorders	15,934	59.2	17,529	63.9	7.9
6. Diseases of nervous system and sense organs	6,110	22.7	6,977	25.4	11.9
7. Disease of the circulatory system	56,169	208.6	53,928	196.5	-5.8
8. Diseases of the respiratory system	30,716	114.1	35,269	128.5	12.6
9. Diseases of the digestive system	29,379	109.1	31,163	113.5	4.0
10. Diseases of the genitourinary system	16,597	61.6	17,119	62.4	1.3
11. Compl. of pregnancy, childbirth, & puerperium	39,857	148.0	41,848	152.5	3.0
12. Diseases of the skin and subcutaneous tissue	3,567	13.2	5,015	18.3	38.6
13. Dis of musculoskeletal system & connective tissue	14,006	52.0	17,483	63.7	22.5
14. Congenital anomalies	1,140	4.2	1,148	4.2	0.0
15. Normal newborn/cond. originat/perinatal period	36,896	137.0	38,940	141.9	3.6
16. Injury and poisoning	24,572	91.3	27,225	99.2	8.7
17. Sympt., signs & ill-defined cond/factors infl health	10,043	37.3	11,614	42.3	13.4
18. Other Unclassified	573	2.1	712	2.6	23.8
Total	317,861	1,180.5	341,480	1,244.1	5.4

Residence data

*Based on Clinical Classification System Software (CCS), Source: AHRQ

**Rate per 10,000 population

Table extracted from Kansas Information for Communities System (KIC), <http://kic.kdhe.state.ks.us/kic/>

Source data: Kansas Hospital Association

Can Hospitalizations be Prevented?

If a patient requires hospitalization, the inherent implication is that their health condition is too severe to be managed in a physician's office or other outpatient clinic. For example, "diabetes is a disease for which regular physician visits can help to control blood sugar (glucose), fats (lipids) and blood pressure; screen for diabetes-related eye, foot, and kidney problems; and provide early treatment and patient education in self-management. Physician visits and early treatment can prevent otherwise avoidable

hospitalizations and serious illness and injuries to patients. Diabetes complications include loss of consciousness, heart disease, stroke, circulation disorders, kidney and nerve damage, impotence, blindness, amputation of extremities, and death”.² One method to measure whether hospitalizations Kansans are experiencing can be prevented is evaluation of hospital discharge data through analyses of conditions commonly referred to as Ambulatory Care Sensitive Conditions (ACSCs).

Why Is It Important to Evaluate Preventable Hospitalizations?

ACSCs are conditions for which hospitalization can usually be prevented when they are effectively managed in outpatient settings. High rates of hospitalization for ACSC could indicate poor access to outpatient health care. For example, asthma usually can be managed in an outpatient setting, precluding the need for hospitalization. Examining rates of hospitalization can help to identify populations or areas where access to medical care is inadequate or where the systems for providing care are not working. Effective management of ACSCs includes control of exposure to factors that trigger exacerbations of disease, adequate pharmacological management, continual monitoring of disease status, patient education and early intervention to prevent more severe disease. Statistically tested tools are available to assess preventable hospitalizations. Prevention Quality Indicators (PQIs) are a recommended method for analysis <http://www.ahrq.gov/> to evaluate ACSCs.

What Are Prevention Quality Indicators?

Prevention Quality Indicators (PQIs) are a set of measures that can be used with hospital inpatient discharge data to identify ACSCs. Even though these indicators are based on hospital inpatient data, they provide insight into the quality of the health care system *outside* the hospital setting. For example, patients with diabetes may be hospitalized for diabetic complications if their conditions are not adequately monitored or if they do not receive the patient education needed for appropriate self-management. Patients may be hospitalized for asthma if primary care providers fail to adhere to evidence-based practice guidelines or to prescribe appropriate treatments. Patients with appendicitis who do not have ready access to surgical evaluation may experience delays in receiving needed care, which can result in a life-threatening condition—perforated appendix. The PQIs consist of the following 14 ambulatory care sensitive conditions, determined from ICD-9 CM coding specifications, which are measured as rates of admission to the hospital:

Prevention Quality Indicators

- Diabetes short-term complication admission rate
- Perforated appendix admission rate
- Diabetes long-term complication admission rate
- Chronic obstructive pulmonary disease admission rate
- Hypertension admission rate
- Congestive heart failure admission rate
- Low Birth Weight
- Dehydration admission rate
- Bacterial pneumonia admission rate
- Urinary tract infection admission rate
- Angina admission without procedure
- Uncontrolled diabetes admission rate
- Adult asthma admission rate
- Rate of lower-extremity amputation among patients with diabetes

Although other factors outside the direct control of the health care system such as environmental conditions, lack of patient adherence to treatment recommendations or the influence of other social determinants of health can result in hospitalization, the PQIs provide a starting point for assessing quality of health services in the community. Because the PQIs are calculated using readily available hospital administrative data, they are an easy-to-use and inexpensive screening tool. They can be used to provide a window into the community—to identify unmet community health care needs, to monitor how well complications from a number of common conditions are being avoided in the outpatient setting, and to compare performance of local health care systems across communities (<http://www.ahrq.gov/>).

How are hospitalizations evaluated for this report?

ACSCs refer to those conditions for which hospitalizations could have been avoided, or conditions that could have been less serious, if they had been treated early and appropriately. Good outpatient management dramatically reduces the risk of hospitalization. A risk-adjusted hospitalization rate is used as a basis for comparison. Lower rates are associated with increased efficiency of outpatient arrangements. Listed below are the definitions pertinent to this rate calculation (See Guide to Prevention Quality Indicators, Version 3.1, March 2007, www.qualityindicators.ahrq.gov for more detail on indicators):

Risk-adjusted rate

The risk-adjusted rate is the rate of hospitalizations of Kansas residents for the specific diagnosis per Kansas population, adjusted for age and gender.

Numerator

Number of Kansas hospitalizations by diagnosis by particular age-group or category.

Denominator

Diabetes, Short Term Complications, per 100,000 population \geq age 18
Perforated Appendix, per 1,000 appendicitis discharges
Diabetes, Long Term Complications, per 100,000 population \geq age 18
Chronic Obstructive Pulmonary Disease, per 100,000 population \geq age 18
Hypertension, per 100,000 population \geq age 18
Congestive Heart Failure, per 100,000 population \geq age 18
Low Birth Weight, per 1,000 neonates
Dehydration, per 100,000 population
Bacterial Pneumonia, per 100,000 population
Urinary Tract Infection, per 100,000 population
Angina Without Procedure, per 100,000 population \geq age 18
Uncontrolled Diabetes, Without Complications, per 100,000 population \geq age 18
Adult Asthma, per 100,000 population \geq age 18
Lower Extremity Amputation/ Diabetes Patients, per 100,000 population \geq age 18

Data Interpretation Issues

AHRQ Prevention Quality Indicators (PQIs) exclude cases that may result in over-counting: (maternal cases, neonates, and transfers from other institutions are excluded). The Kansas Prevention Quality Indicators are risk-adjusted by age and gender so that comparison with the national rate is more meaningful. Confidence intervals of 95% are the criterion used to

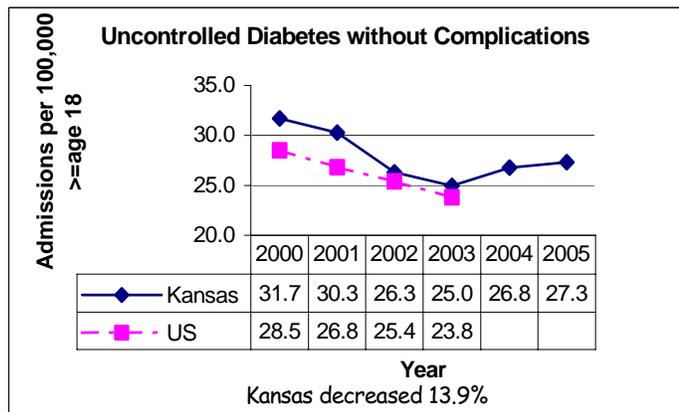
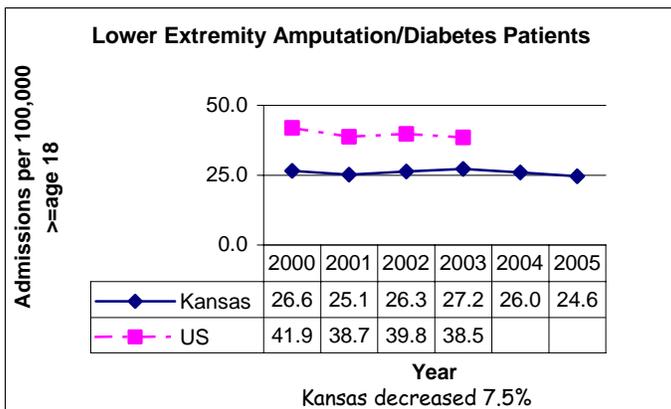
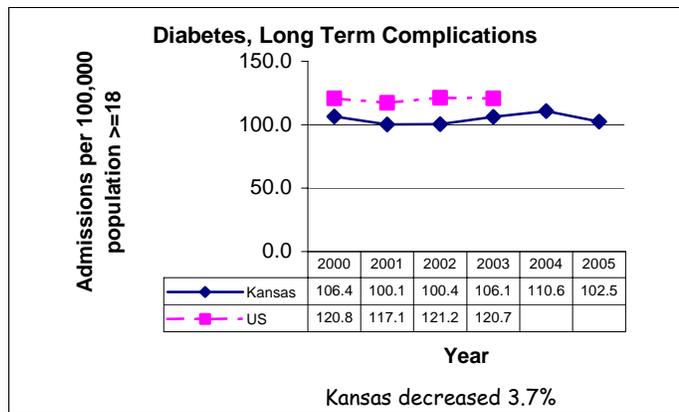
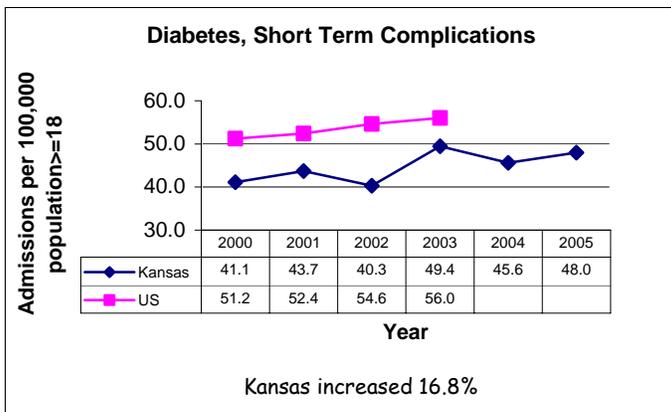
determine statistical significance (they indicate whether differences are real or due to "noise" in the data).

How Are We Doing in Kansas?

In many health indicators evaluated for Kansas, State averages typically fall below the national average. Most of the rates for preventable conditions are below the national average (for 2000 through 2003). However, there are some conditions where Kansas' rates for preventable hospitalizations require consideration.

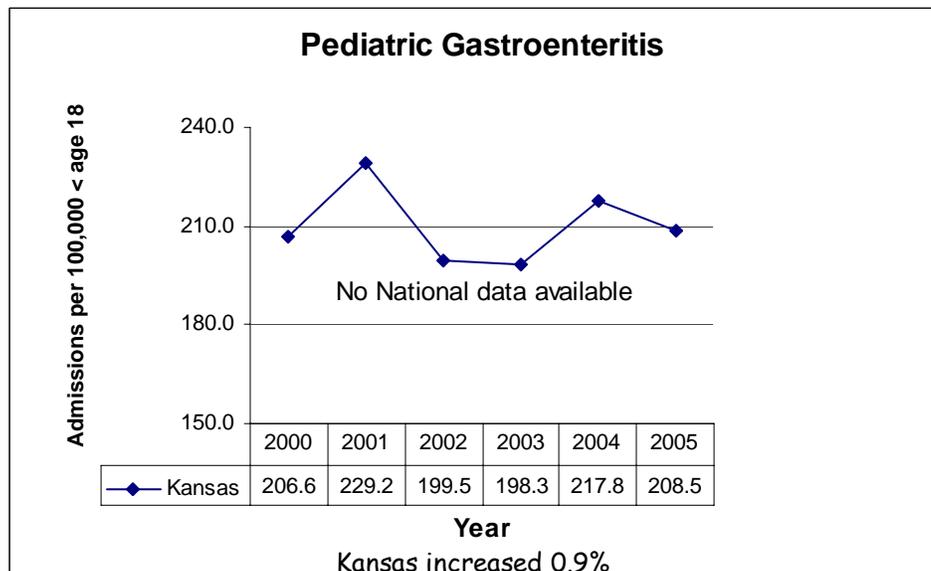
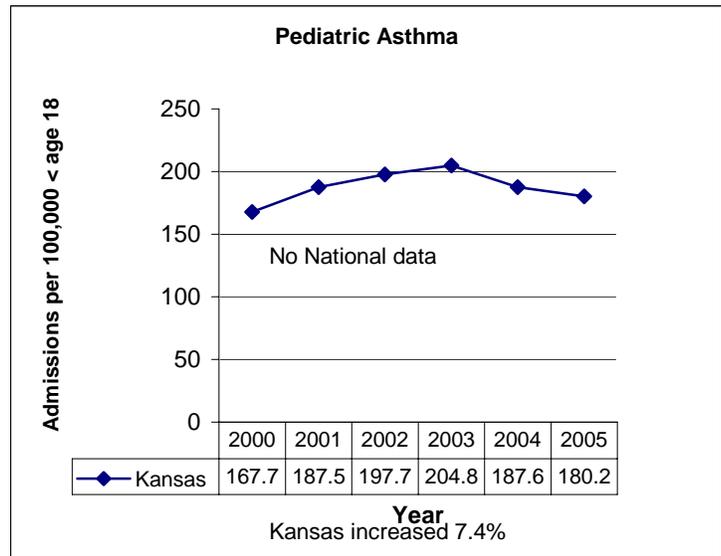
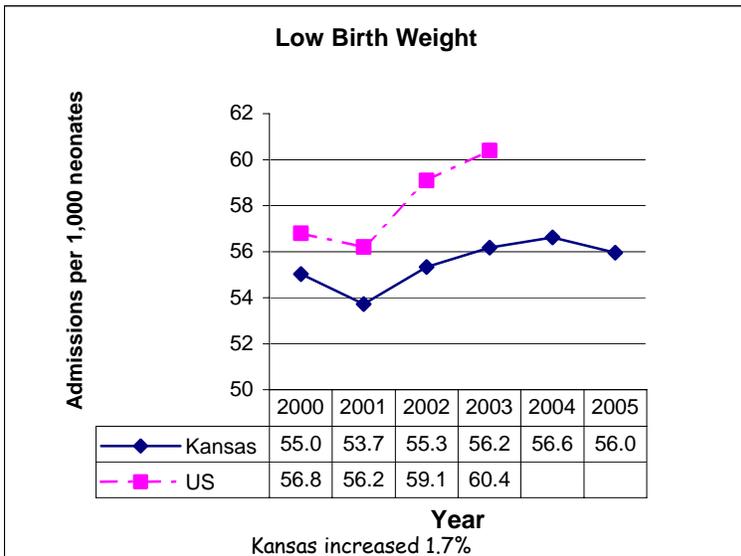
Diabetes: Admission rates for short-term complications in Kansas diabetics increased 16.8% during 2000-2005. However, admission rates for long term complications and lower extremity amputations declined and remained below the national average. **Uncontrolled diabetes without complications decreased 13.9% between 2000 and 2005 but this indicator for Kansas was above the national average** (see Figure 1).

**Figure 1: HCUP/AHRQ Prevention Quality Indicators (PQIs) for Hospitalization
Diabetes, Risk Adjusted by Age and Sex; Kansas 2000-2005**



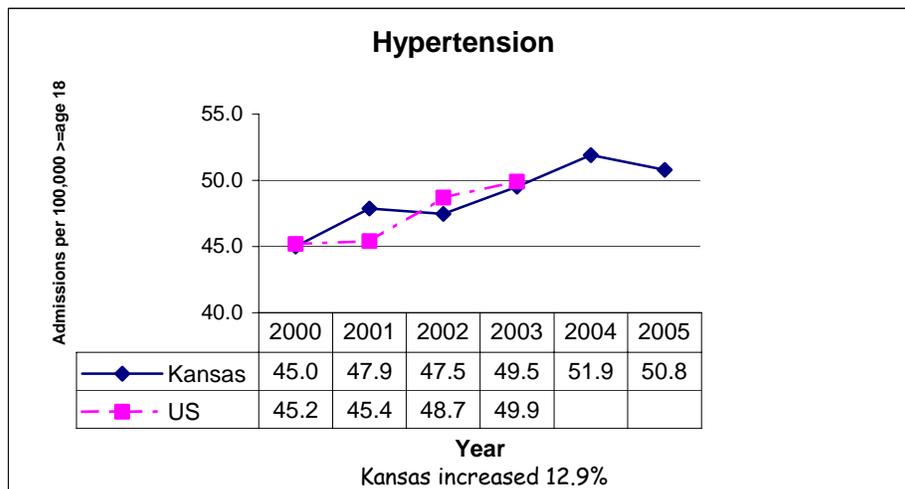
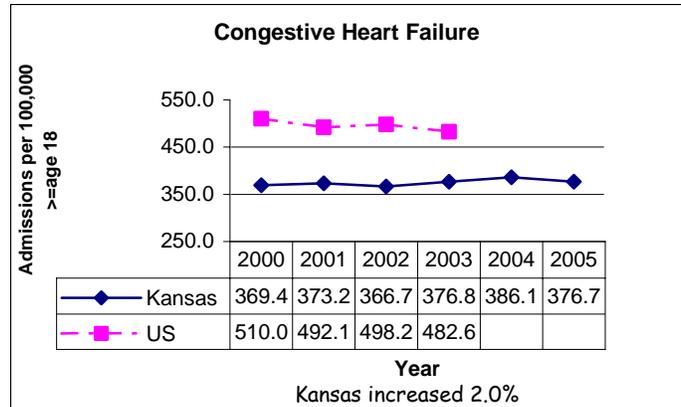
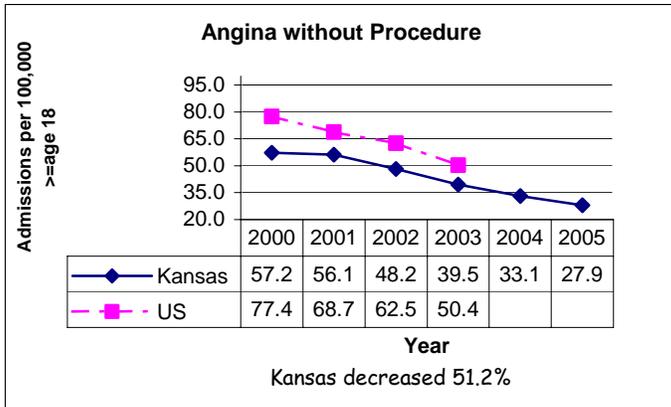
Pediatric conditions: Admission rates for low birth weight hospitalizations during 2000-2005 increased slightly for Kansas (1.7%). Hospitalization for **pediatric asthma increased overall for the state by as much as 7.4 %** . **Pediatric gastroenteritis admissions have fluctuated but increased slightly (0.9%)**. (no national averages available as of this writing, see Figure 2).

Figure 2: HCUP/AHRQ Prevention Quality Indicators (PQIs) for Hospitalization Pediatric Conditions, Risk Adjusted by Age and Sex; Kansas 2000-2005



Heart-related conditions: From 2000-2005, **admission rates for congestive heart failure and hypertension increased in Kansas 2.0 and 12.9%, respectively.** During this same time period, hospitalizations for angina without procedure declined dramatically for Kansas (51.2%) (see Figure 3). Rates for both angina without procedures and congestive heart failure have remained below the national average.

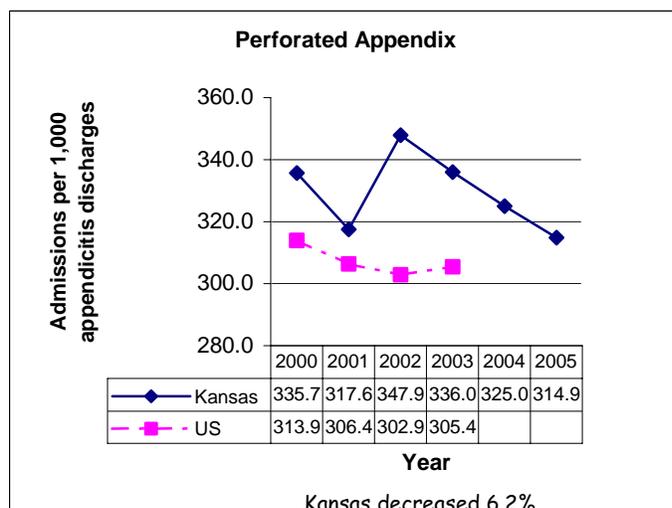
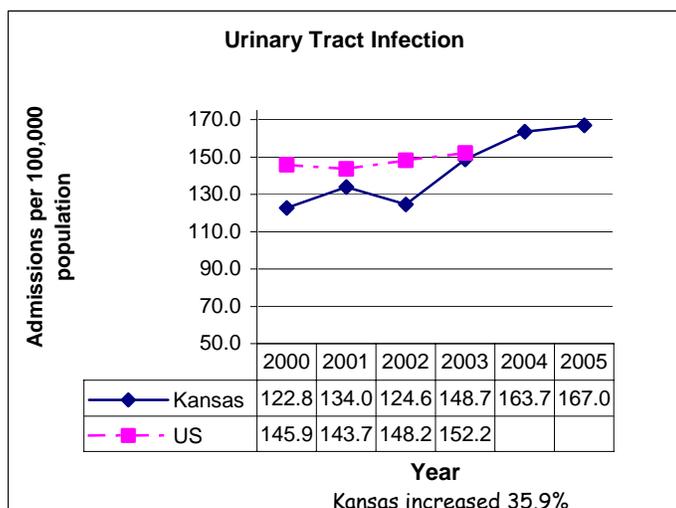
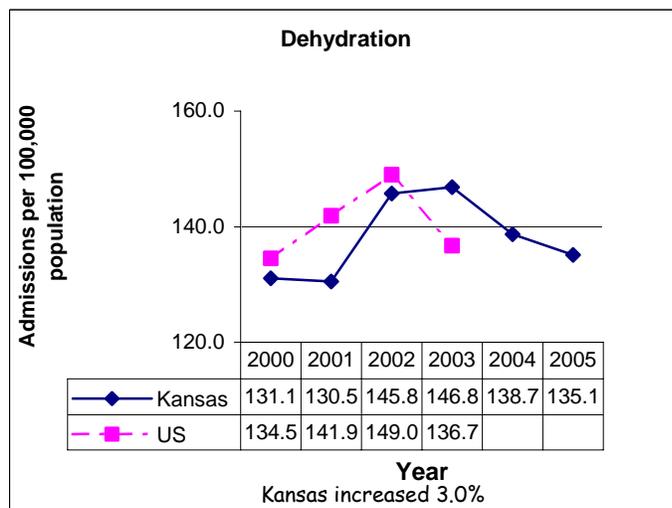
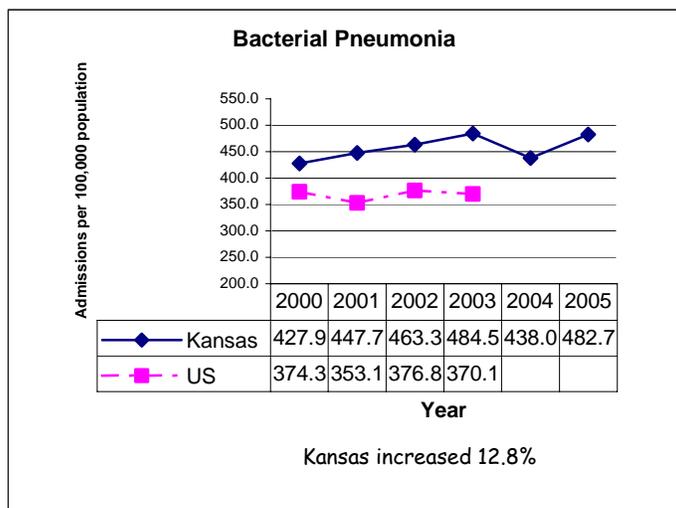
**Figure 3: HCUP/AHRQ Prevention Quality Indicators (PQIs) for Hospitalization
Heart-Related Conditions, Risk Adjusted by Age and Sex; Kansas 2000-2005**



Infectious conditions and perforated appendix: **Kansas admission rates for bacterial pneumonia and perforated appendix were higher than the national average through 2000 and 2003, however, rates of perforated appendix in Kansas appear to be declining. Bacterial pneumonia admission rates increased 12.8% in Kansas from 2000-2005.** Dehydration admission rates are similar to the national average for 2000-2003 and appear to be declining. While more information is needed, **admission rates on urinary tract infections have increased in Kansas almost 36% from 2000-2005** (see Figure 4)

Figure 4: HCUP/AHRQ Prevention Quality Indicators (PQIs) for Hospitalization

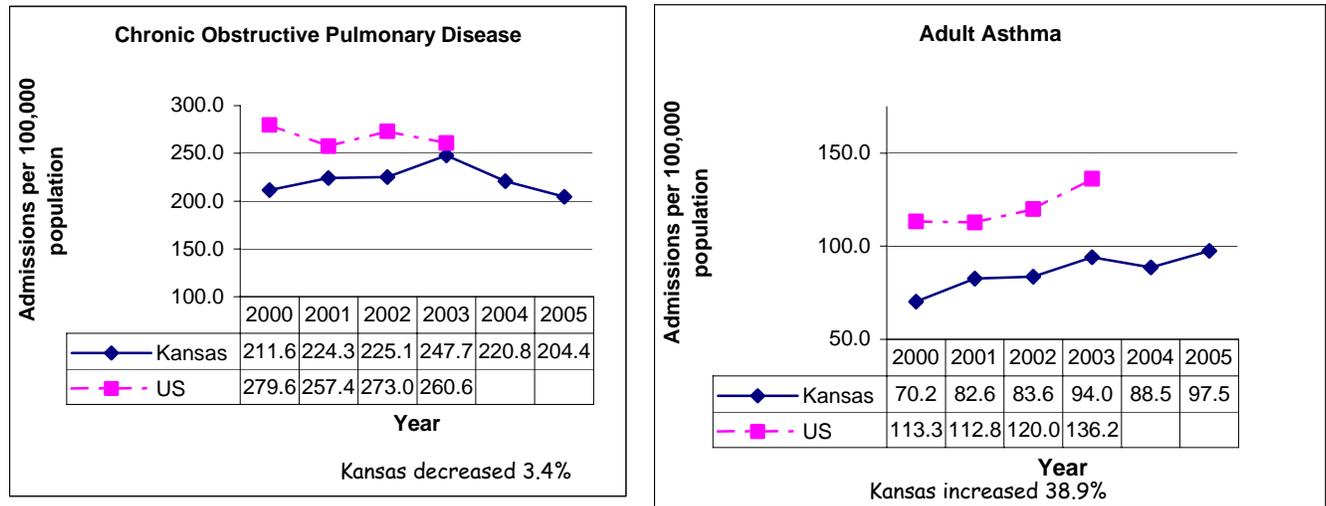
Infectious Conditions and Perforated Appendix, Risk Adjusted by Age and Sex; Kansas 2000-2005



Respiratory conditions: While both rates fall below the national average, Kansans experienced a decrease in the admission rate for chronic obstructive pulmonary disease during 2000-2005, but **hospitalizations for adult asthma increased 38.9% in Kansas for the same time period** (see Figure 5).

Figure 5: HCUP/AHRQ Prevention Quality Indicators (PQIs) for Hospitalization

Respiratory Conditions, Risk Adjusted by Age and Sex; Kansas 2000-2005



What is the Financial Burden of Preventable Hospitalizations?

Understanding costs and financial liabilities of disease conditions and the services needed to treat them can be complex. Billing and payment information maintained in the form of health insurance claims data is used by actuaries and health services managers to evaluate the cost of providing care. For the purposes of this report, information has been acquired from the Kansas Health Insurance Information System (KHIIS)³, to ascertain estimates about the financial burden of preventable hospitalizations for individuals with private health insurance (not Medicare or Medicaid) in Kansas. Typically, data such as total billed charges, allowed charges and paid charges are referenced. To simplify terms, total charges are those billed by service providers to health plans and are best interpreted as the retail cost to the uninsured consumer. Allowed charge is the price in the health plan contract and is often a negotiated discount⁴. Based on data from KHIIS, a summary of financial liability for preventable hospitalizations is presented in Table 2.

For example, there were 721 adult asthma hospitalizations indicating private pay as the pay source, for Kansans in 2005. Average charged amounts for asthma hospitalization are \$10,180, while average allowed amounts are \$3,134. If one considers the allowed amount to be a more representative indicator of the financial liability of a condition, preventable hospitalizations for asthma in adults cost the Kansas private health care system over \$2.5 million. Similarly, there were 1,821 hospitalizations, with private pay source indicated, for preventable bacterial pneumonia in Kansas in 2005 with an estimated financial liability of over \$3.7 million. The greatest financial liability of preventable hospitalizations is low birth weight infant care which cost private pay sources over \$41.5 million. In total, preventable hospitalizations cost the private Kansas health care system an estimated \$63 million in 2005. These

estimates will become important to determine resource needs as Kansas seeks ways to assure that all its citizens have adequate health insurance.

Table 2-Average Charged, Allowed Amounts, Number and Total Amounts of Private Pay Hospitalizations for Prevention Quality Indicators (PQIs) Kansas residents, 2005

Description	Average Charged Amounts	Average Allowed amounts	Number of Hospitalizations*	Total Amount
Diabetes, Short Term Complications	\$14,563	\$5,427	371	\$2,013,417
Perforated Appendix	\$24,490	\$9,583	307	\$2,941,981
Diabetes, Long Term Complications	\$13,598	\$3,653	530	\$1,936,090
Chronic Obstructive Pulmonary Disease	\$11,012	\$1,854	117	\$216,918
Hypertension	\$5,546	\$1,457	305	\$444,385
Congestive Heart Failure	\$13,267	\$1,931	989	\$1,909,759
Low Birth Weight	\$70,901	\$37,576	1107	\$41,596,632
Dehydration	\$7,375	\$2,109	765	\$1,613,385
Bacterial Pneumonia	\$11,430	\$2,043	1821	\$3,720,303
Urinary Tract Infection	\$8,251	\$1,802	765	\$1,378,530
Angina Without Procedure	\$5,917	\$1,992	194	\$386,448
Uncontrolled Diabetes, Without Complications	\$5,620	\$2,440	173	\$422,120
Adult Asthma	\$10,180	\$3,134	721	\$2,259,614
Lower Extremity Amputation/ Diabetes Patients	\$40,758	\$15,770	141	\$2,223,570
Estimated Total				\$63,063,152

Hospital inpatient claims only. Outliers removed
 *Hospital discharge data, Kansas Hospital Association
 Data Source: Kansas Health Insurance Information System,
 Kansas Insurance Department

The financial information presented above exemplifies the liability for preventable hospitalizations for private health insurance. Similar analyses should be conducted for the Medicaid and Medicare programs (when data becomes available) to determine the financial burden of these preventable hospitalizations on public insurance programs. Future plans must be developed to minimize the occurrence of preventable inpatient hospitalizations.

Recommendations

Prevention Quality Indicators (PQIs) are measures of the effectiveness of outpatient and other health care rather than a measure of hospital quality. PQIs assess the quality of the health care system as a whole in preventing medical complications that require hospitalization. Since hospitalizations are the most expensive portion of health care treatment, one goal of health care cost containment efforts must be to avoid preventable hospitalization where possible. Kansas health care program managers should routinely evaluate prevention quality indicators, consider where targeted interventions can minimize the risk of costly treatments and devise programs to assist patients in treatment regimen compliance. Key priorities for Kansas with regard to preventable hospitalizations and effective ambulatory care delivery include strategies to address:

- Low birth weight infant care;
- Infectious conditions such as bacterial pneumonia, urinary tract infections, and perforated appendix;
- Short term complications with diabetes and uncontrolled diabetes without complications;

- Hypertension and
- Adult asthma.

Bibliography:

¹ **HCUP Factbook No. 5, Preventable Hospitalizations: Window Into Primary and Preventive Care, 2000** Agency for Healthcare Research and Quality, www.ahrq.gov

²(Utah Department of Health, *Important Facts for Ambulatory Care Sensitive Conditions: Diabetes Hospitalization Among Adults, 2006*).

³Kansas Health Insurance Information System, Kansas Insurance Department, Topeka, Kansas

⁴Pharmaceutical Cost Report, Kansas Department of Health and Environment, Center for Health and Environmental Statistics, September, 2000, Topeka, Kansas

Guide to Prevention Quality Indicators, March, 2007, www.ahrq.gov

Acknowledgements

Questions about this report can be directed to Lou Saadi, Ph.D., Director, Office of Health Assessment. Many thanks go to Joy Crevoiserat and Rachel Lindbloom of the Office of Health Assessment, CHES for their assistance in the preparation of this report.