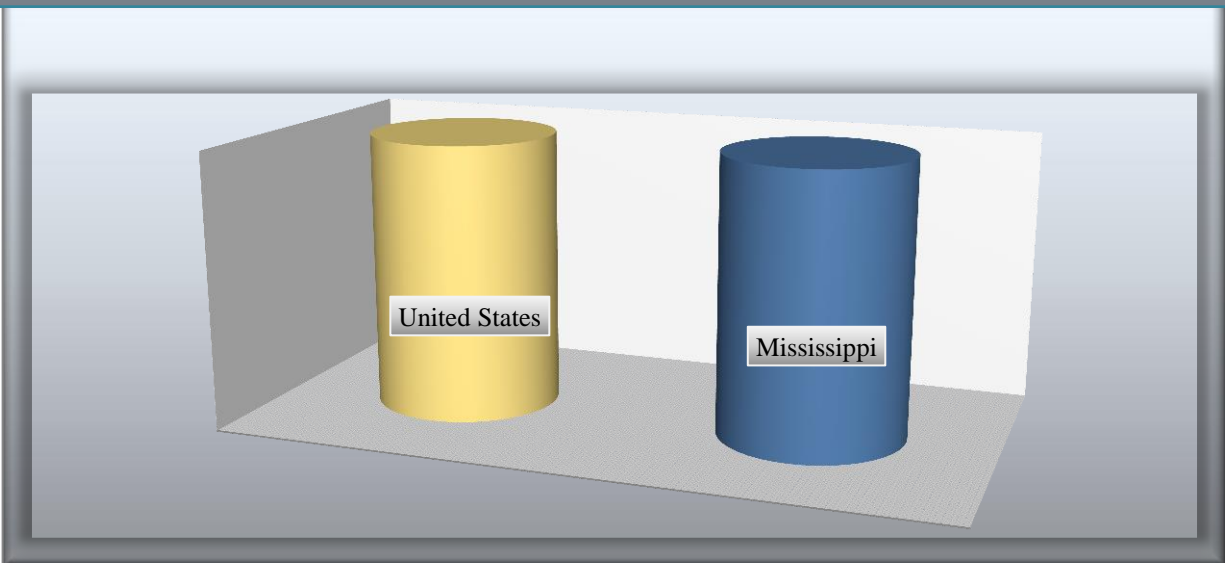


Hospitalizations in Mississippi and United States: A Comparative Analysis, 2010



MISSISSIPPI STATE DEPARTMENT OF HEALTH

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April 2013

INTRODUCTION

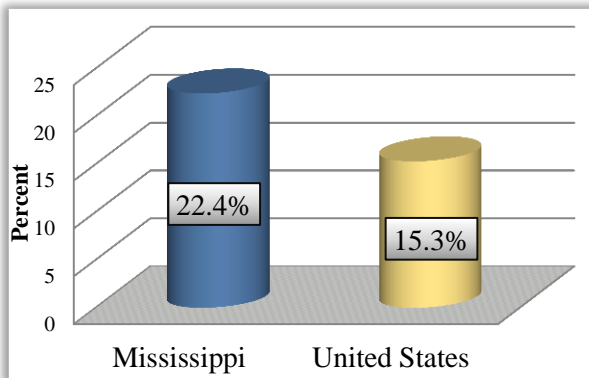
PURPOSE: This report was designed to compare state-wide statistics with national statistics on in-patient hospital stays for 2010. Such an approach aims to highlight major differences and help identify areas that need improvement. Because health care outcomes cannot be evaluated without taking into consideration the socioeconomic environment or access to effective health care, poverty levels and health insurance coverage between Mississippi and United States were also compared.

NATIONAL DATA SOURCE: National summary statistics on inpatient hospital stays were obtained from the Health Care Cost and Utilization Project's (HCUP) publicly available query system. The Health Care Cost and Utilization Project, a part of the Agency for Healthcare Quality and Research, has been designated to collect data from state-level data organizations and to provide national estimates of inpatient hospital care. The collected data from each state are transformed into a common data format and a multi-state database is created. The HCUP's hospital discharge database is the largest national database, containing data from approximately 8 million hospital stays each year. For 2010, the database comprised 1,051 community hospitals located in forty-five states.¹

MISSISSIPPI DATA: Hospital inpatient discharge data were obtained from the Mississippi State Department of Health's database. Included in this report are only records from community hospitals, defined as nonfederal, short-term general and specialty hospitals by the American Hospital Association. To conform to the HCUP's inclusion criterion, records from long-term healthcare facilities were excluded from the data analysis. A total of 11,261 records were excluded from the 377,528 reported hospitalizations for 2010. This exclusion will cause some minor discrepancies between the findings in our hospital discharge data annual report for 2010 and the findings in this report.

POVERTY AND HEALTH INSURANCE COVERAGE

Figure 1: Percent of People Living in Poverty, 2010



The poverty rate measures the percentage of people with income below the poverty threshold. The American Community Survey publishes poverty rates for the nation, each state, and large metropolitan areas.

According to the American Community Survey 22.4% of all residents in the state lived below the poverty level in 2010, while nationwide 15.3% of all Americans lived in poverty (Figure 1).²

Poverty is one of the major societal determinants of health. Paradoxically, poverty in developed countries has been linked to obesity, a leading underlying factor for the increasing chronic morbidity in the United States and Mississippi.³

Table 1: Coverage by Type of Health Insurance for 2010

COVERAGE TYPE*	MISSISSIPPI (%)	UNITED STATES (%)
COVERAGE		
Not covered	21.0	16.3
Covered	79.0	83.7
PRIVATE		
Total	54.1	64.0
Employment-based	45.2	55.3
Direct Purchase	10.2	9.9
GOVERNMENT HEALTH INSURANCE		
Total	35.8	31.2
Medicare	19.9	15.8
Medicaid	15.5	14.6
Military Health Care	4.4	4.2

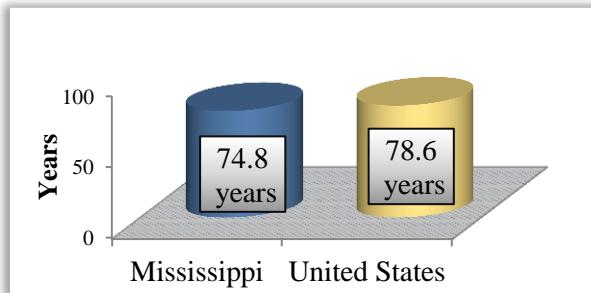
Source: US Census Bureau

*The estimates by type of coverage are not mutually exclusive; people can be covered by more than one type of health insurance during the year.

An estimated 21% of all Mississippi residents were uninsured in 2010, compared to 16.3% of all persons nationally. In 2010, approximately 54% of all Mississippi residents had private insurance coverage and 36% had a government type of health insurance. In comparison, nationally 64% of all Americans had a private health insurance and 31.2% had publically funded coverage (Table 1).⁴

LIFE EXPECTANCY

Figure 2: Life Expectancy, 2007



Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of his/her birth were to stay the same throughout his/her life.

In 2007, life expectancy in Mississippi was 3.8 years less than life expectancy in the country as whole (Figure 2).⁵

Life expectancy, education, and economic indices are the three composites of the human development index. This index has become an important alternative to traditional measures of development such as gross domestic product. The human development index has been computed for each country since 1990 and published by the United Nations Development Program in their annual Human Development Report.

African-Americans and Caucasians who were born in Mississippi during 2007 were expected to live approximately two years less than their national counterparts (Figure 3). In general, African-Americans, especially men, have shorter life expectancy across the country.

The life expectancy for Mississippi men was 71.3 years versus 76 years nationwide, and for Mississippi's women was 78.3 years versus 81.2 years nationally (Figure 4).

Mississippi men are expected to live 4.7 years less than men nationwide.

Figure 3: Life Expectancy by Race, 2007

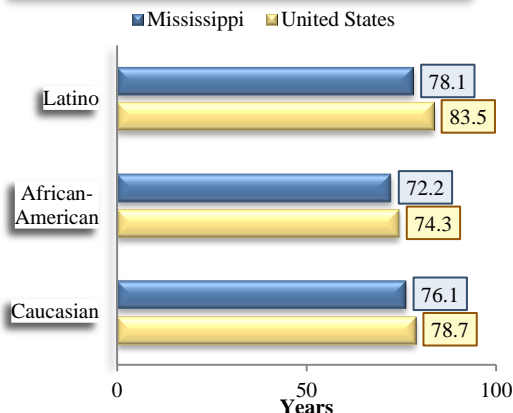
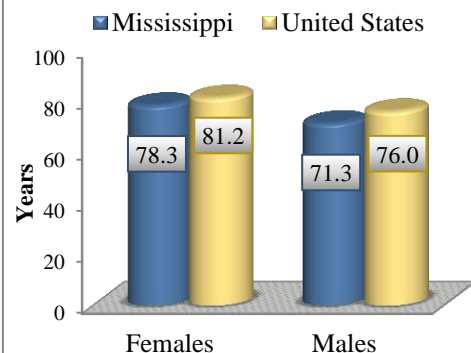


Figure 4: Life Expectancy by Gender, 2007



INPATIENT-LEVEL HOSPITAL CARE: OUTCOMES OF INTEREST

HOSPITALIZATIONS BY DEMOGRAPHICS

LENGTH OF STAY AND CHARGES

DISCHARGE STATUS

PRIMARY EXPECTED PAYER

THE TOP 10 PRIMARY DIAGNOSES

THE TOP 10 PRIMARY PROCEDURES

IN-HOSPITAL DEATHS: PRIMARY DIAGNOSES

IN-HOSPITAL MORTALITY RATES: PRIMARY DIAGNOSES

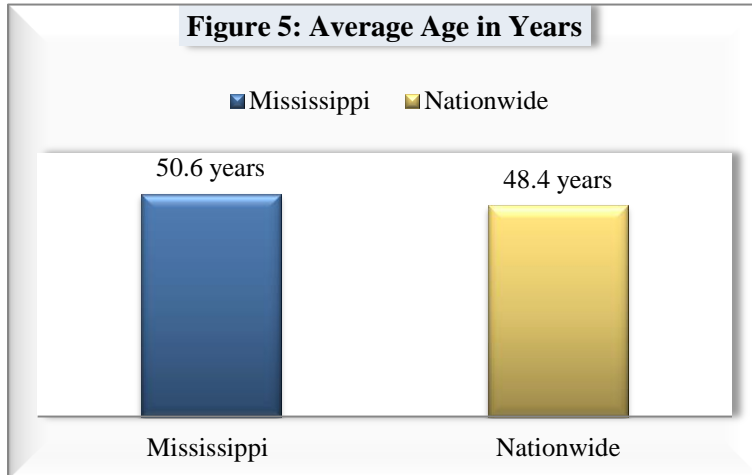
*IN-HOSPITAL MORTALITY RATES: PRIMARY
PROCEDURES*

KEY FINDINGS

- On average, patients in Mississippi were slightly older than patients nationwide (50.6 years versus 48.4 years). The proportion of female patients was slightly greater in Mississippi than in national estimates (60.2% versus 57.7%), while the proportion of male patients was slightly smaller (39.8% versus 42.3%).
- Average hospital charges in Mississippi were considerably less than average hospital charges for the country as a whole, respectively \$24,751 and \$33,079.
- Whereas Medicaid and Medicare were the primary payers for 64.2% of all hospitalizations in Mississippi, they were the primary payers for 58.5% of all hospitalizations across the nation. This difference was especially notable for Medicare, the insurer of the elderly.
- The major difference between the country and the state was in private insurance coverage – only 22.8% of all charges were directed toward private insurers in Mississippi, while the private insurance sector received the charges for 31.9% of all hospitalizations nationwide.
- The top 10 primary diagnoses were similar for the state and the country, except for the slightly higher prevalence of urinary tract infections, diabetes mellitus, and coronary atherosclerosis and various forms of ischemic heart disease in Mississippi.
- The top 10 primary procedures also followed similar frequency patterns, except for the higher prevalence of two cardiac procedures in Mississippi: diagnostic cardiac catheterization/coronary arteriography and percutaneous coronary angioplasty.
- Mississippi's in-hospital mortality rate was slightly higher than the national averages. The percent of in-hospital deaths associated with septicemia, a potentially preventable infection, was four points higher in the state compared to the nationwide rate.
- The top five diagnoses listed for in-hospital deaths had considerably higher in-hospital mortality rates in Mississippi than nationwide.

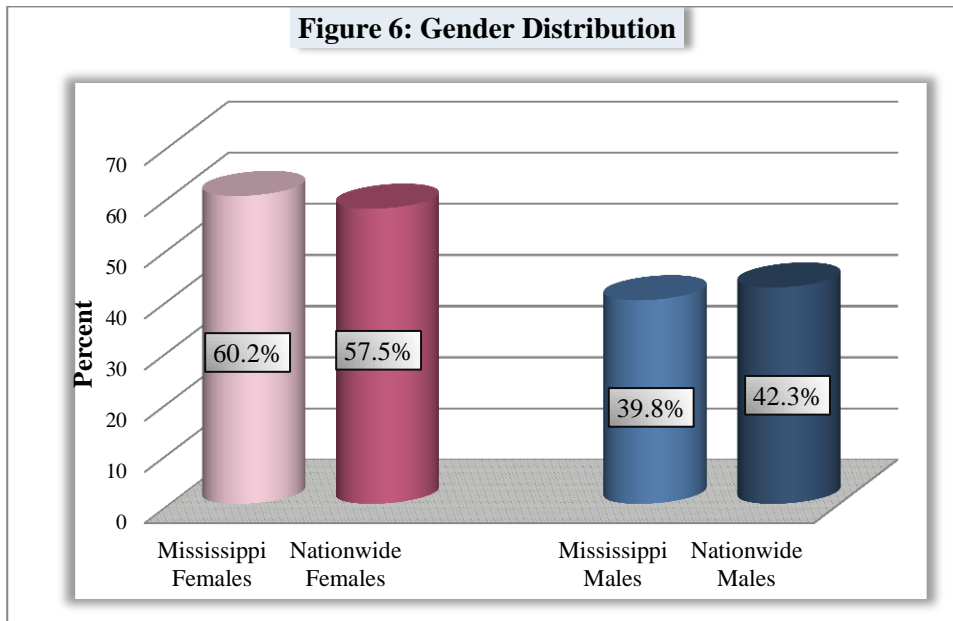
DEMOGRAPHICS

Figure 5: Average Age in Years



The average age of hospitalized patients in Mississippi was 50.6 years. In comparison, the average age of hospitalized patients nationwide was 48.4 years (Figure 5).

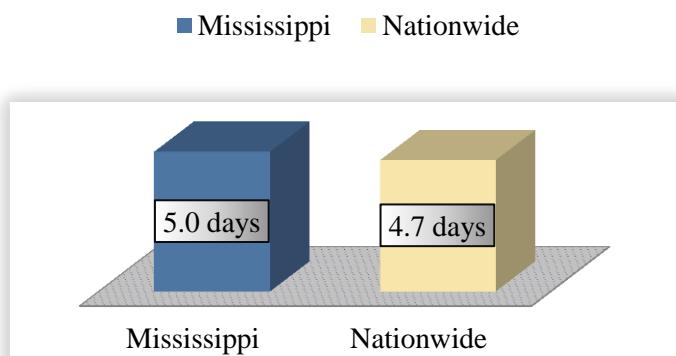
Figure 6: Gender Distribution



The difference in the gender distribution, depicted in Figure 6, demonstrated that there were more females hospitalized in Mississippi (60.2%) than nationwide (57.5%), while the proportion of hospitalized men was smaller in the state (39.8% versus 42.3%).

LENGTH OF STAY AND CHARGES

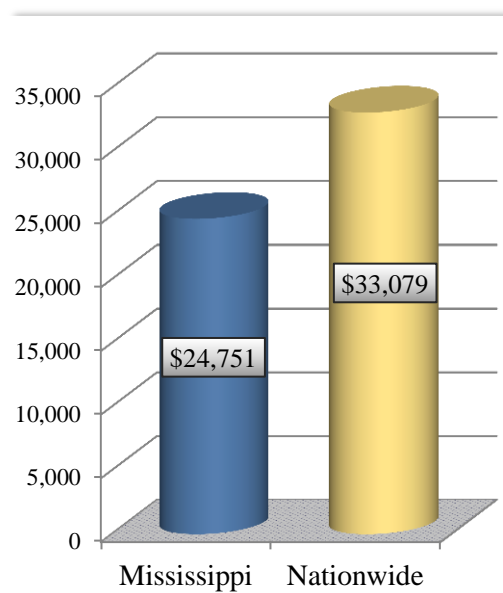
Figure 7: Average Length of Stay



The average length of stay was 5.0 days, which was slightly higher than the average length of state of 4.7 days for the United States (Figure 7).

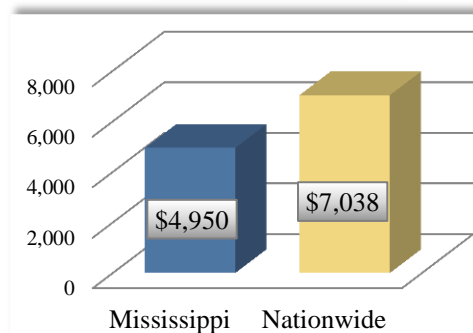
Nationwide, the average charges per hospital stay were \$11,300 in 1997; \$30,700 in 2009; and \$33,079 in 2010. Mississippi's average charges of \$24,751 for 2010, the first year of such an estimate in the state, were lower than the national average of \$33,079.

Figure 8: Average Charges per Stay



The average charges per stay of \$24,751 were over \$8,000 less than the average charges for the country (Figure 8). The average charges per day of \$4,950 were over \$2,000 less than the average charges of \$7,038 for the country as a whole (Figure 9).

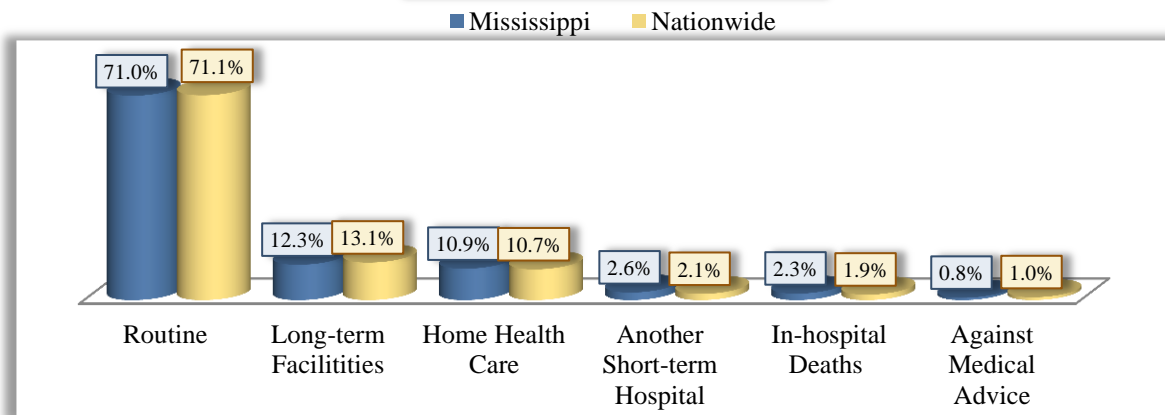
Figure 9: Average Charges per Day



DISCHARGE STATUS

Discharge status indicates the disposition of the patient at the end of his or her care. In terms of discharge status, there were no considerable differences between the Mississippi data and the available nation-wide data, except for slightly higher in-hospital mortality rates in the state (Figure 10).

Figure 10: Discharge Disposition

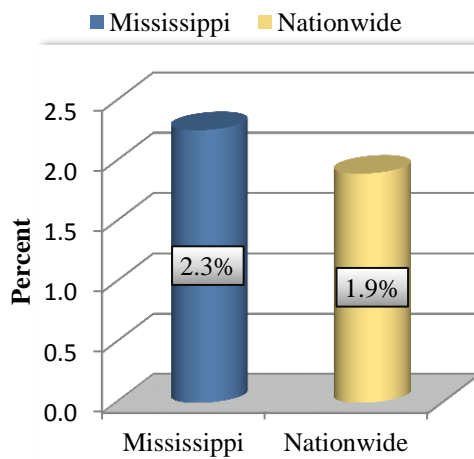


One of the major outcomes of in-hospital level care is in-hospital mortality.

The in-hospital mortality rate is the percent of patients who died among all patients hospitalized for a given year.

Nationwide, the in-hospital mortality rate for 2010 was 1.9%. In Mississippi, the in-hospital mortality rate was 2.3% (Figure 11).

Figure 11: In-hospital Deaths

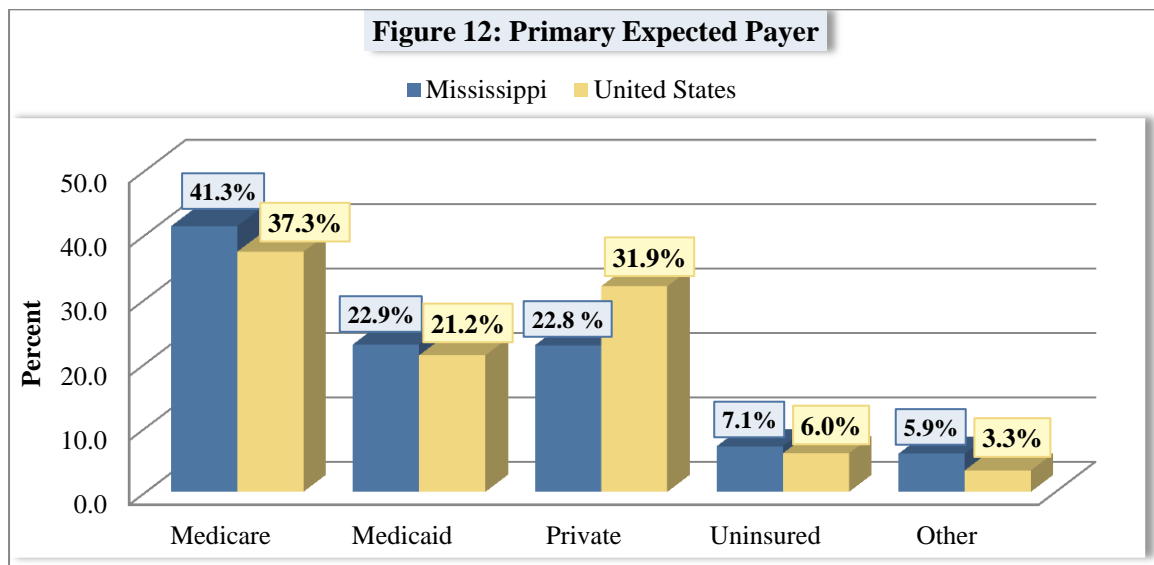


PRIMARY EXPECTED PAYER

In Mississippi, each of the two major publicly funded payers, Medicare and Medicaid, was responsible for a higher percent of hospital charges than national averages (Figure 12). Medicare received the charges for 41.3% of all hospitalizations in the state, which was four points higher than the nationwide average. Medicaid, the program covering the low-income population, received the charges for 22.9% of all hospitalizations in the state and for 21.2% of all hospitalizations in the country. Cumulatively, Medicare and Medicaid were charged for 64.2% of all hospital admissions during 2010 in Mississippi. This percent was 58.5% nationwide. The proportion of uninsured hospitalized patients was slightly higher in Mississippi than the proportion in the national estimate, respectively 7.1% versus 6%.

However, the greatest difference in payment patterns was observed for private insurance – Mississippi’s private insurers were responsible for 22.8% of all charges, while this percent was 31.9% nationwide. Interestingly, Mississippi private insurers and Medicaid received an almost identical percent of all hospital charges, respectively 22.9% and 22.8%. Note that when evaluating Medicaid charges one should bear in mind that different states have different enrollment policies and criteria.

In Mississippi and in the country, the majority of hospital charges were borne by the publicly funded programs, Medicare and Medicaid. Less than one-quarter of all charges in Mississippi were directed toward private insurance companies.



THE TOP 10 PRIMARY DIAGNOSES

Table 2 and Table 3 present the top 10 most frequent diagnoses for Mississippi and the United States. For the purpose of this analysis, diagnoses related to pregnancy, childbirth, and newborn infant hospitalizations were excluded. If included, newborn would be the most frequent primary diagnosis in the country and the state. In 2010, pneumonia topped the rankings both for Mississippi and the USA as the leading cause of hospitalization. Three clinical conditions, urinary tract infections, coronary atherosclerosis and other heart disease, and diabetes mellitus with complications, were among the top 10 diagnoses for Mississippi, but not for the United States as a whole. Note that the group of “other heart disease” includes ischemic heart disease, except for acute myocardial infarction.

Table 2: The Top 10 Primary Diagnoses for Mississippi

Rank	The Top 10 Primary Diagnoses for Mississippi
1	Pneumonia (except that caused by tuberculosis and sexually transmitted diseases)
2	Congestive heart failure
3	Chronic obstructive pulmonary disease
4	Mood disorders
5	Urinary tract infections
6	Skin and subcutaneous tissue infections
7	Septicemia (except in labor)
8	Coronary atherosclerosis and other heart disease
9	Diabetes mellitus with complications
10	Cardiac dysrhythmias

Table 3: The Top 10 Diagnoses for the United States

Rank	The Top 10 Diagnoses for the United States
1	Pneumonia (except that caused by tuberculosis and sexually transmitted diseases)
2	Osteoarthritis
3	Congestive heart failure
4	Septicemia (except in labor)
5	Mood disorders
6	Cardiac dysrhythmias
7	Chronic obstructive pulmonary disease
8	Complication of device, implant or graft
9	Spondylosis, intervertebral disc disorders, other back problems
10	Skin and subcutaneous tissue infections

THE TOP 10 PRIMARY PROCEDURES

Presented in Tables 4 and 5 are the top 10 procedures in the state and nationwide, respectively. The most frequently performed procedures in Mississippi and the United States were delivery- or newborn-related, including vaccinations and circumcision. Among the top 10, there were 8 procedures that were common between Mississippi and the United States.

Table 4: The top 10 Primary Procedures in Mississippi

Rank	The top 15 Primary Procedures in Mississippi
1	Other procedures to assist delivery
2	Cesarean section
3	Blood transfusion
4	Respiratory intubation and mechanical ventilation
5	Prophylactic vaccinations and inoculations
6	Upper gastrointestinal endoscopy, biopsy
7	Diagnostic cardiac catheterization; coronary arteriography
8	Non-cardiac vascular catheterization
9	Percutaneous coronary angioplasty (PTCA)
10	Circumcision

Diagnostic cardiac catheterization/coronary arteriography and percutaneous coronary angioplasty, two groups of cardiac treatment and surgical procedures with increasing importance for the state, were among the top 10 most frequently performed procedures in Mississippi. These two groups of procedures were ranked in the top 15, but not in the top 10 nationwide (data not shown).

Table 5: The Top 10 Primary Procedures in the United States

Rank	The Top 10 Primary Procedures in the United States
1	Other procedures to assist delivery
2	Cesarean section
3	Prophylactic vaccinations and inoculations
4	Circumcision
5	Respiratory intubation and mechanical ventilation
6	Blood transfusion
7	Arthroplasty knee
8	Upper gastrointestinal endoscopy, biopsy
9	Non-cardiac vascular catheterization
10	Repair of current obstetric laceration

Arthroplasty knee and repair of current obstetric laceration were among the top 10 in the country, but not in Mississippi. Arthroplasty knee, a group of procedures related to knee surgeries, was ranked as the eleventh most frequently performed procedure in Mississippi. Hip replacement, another important surgical procedure, was ranked as number 15 nationwide and as number 19 in Mississippi (data not shown).

IN-HOSPITAL DEATHS: PRIMARY DIAGNOSES

Septicemia was the leading primary diagnosis associated with in-hospital death both in Mississippi and in the nationwide sample. Lung cancer and chronic obstructive pulmonary disease (COPD) were among the top 10 primary diagnoses in Mississippi, but ranked eleventh and sixteenth nationwide. Two conditions, intracranial injuries and secondary malignancy were in the top ten for the nationwide sample, but ranked as the thirteenth and the eleventh primary diagnosis associated with in-hospital death in Mississippi (Figure 13 and Figure 14).

Figure 13: Top 10 Primary Diagnoses Associated with In-hospital Death, Mississippi

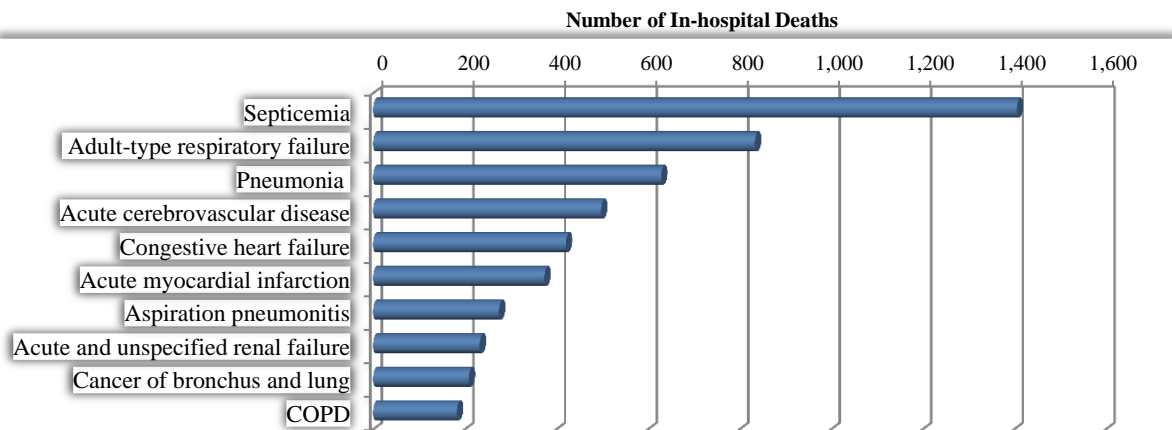
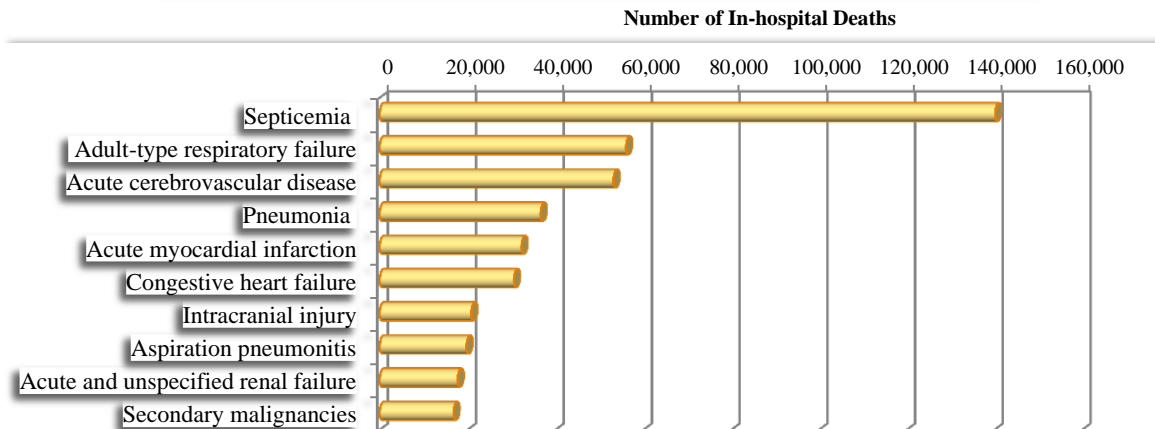


Figure 14: Top 10 Primary Diagnoses Associated with In-hospital Death, Nationwide

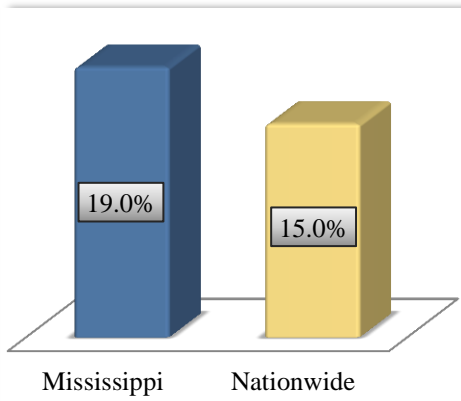


IN-HOSPITAL MORTALITY RATES: PRIMARY DIAGNOSES

In-hospital mortality rates for selected primary diagnoses and primary procedures were calculated and compared with nationwide averages. These conditions were selected because they were associated with high numbers of hospital admissions and/or high numbers of in-hospital deaths.

Figure 15: In-hospital Mortality Rates for Septicemia

■ Mississippi ■ Nationwide

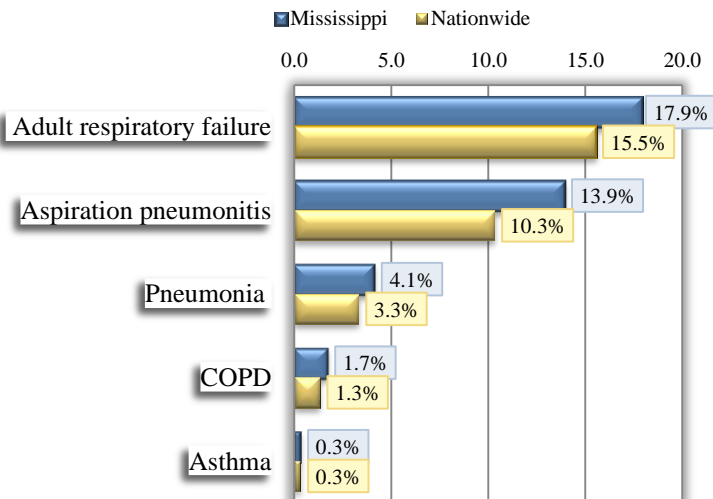


The in-hospital mortality rate for septicemia was 19.0%, four points higher in the state's community hospitals in comparisons to the national estimates of 15% (Figure 15). Hospitals can reduce the in-hospital mortality rate due to septicemia with improvements in the hand hygiene of hospital personnel. This is an important avenue for the prevention of all hospital-acquired infections.

Washing hands saves lives! With simple hand hygiene programs, the state can improve hospital-level care, reduce healthcare costs, and prevent unnecessary deaths.⁶

Pneumonia and chronic obstructive pulmonary disease are among the leading causes for hospital admissions and together they accounted for 6.4% of all hospital discharges in Mississippi. Adult respiratory failure and aspiration pneumonitis were associated with less frequent hospitalizations, but with higher mortality rates. All of the above-mentioned conditions had higher mortality rates in the state than nationwide, while asthma mortality rates were identical (Figure 16).

Figure 16: In-hospital Mortality for Selected Respiratory Conditions



IN-HOSPITAL DEATHS: PRIMARY DIAGNOSES (CONTINUED)

Cardiac arrest and ventricular fibrillation are high-mortality risk cardiac conditions and they had almost five point higher mortality rates in the state. Cerebrovascular disease (stroke), another high-mortality risk condition, had a lower in-hospital mortality rate in the state. The rest of the selected circulatory diseases had only slightly higher in-hospital mortality rates in Mississippi than in comparison to nationwide figures (Figure 17).

Figure 17: In-hospital Mortality for Selected Circulatory Conditions

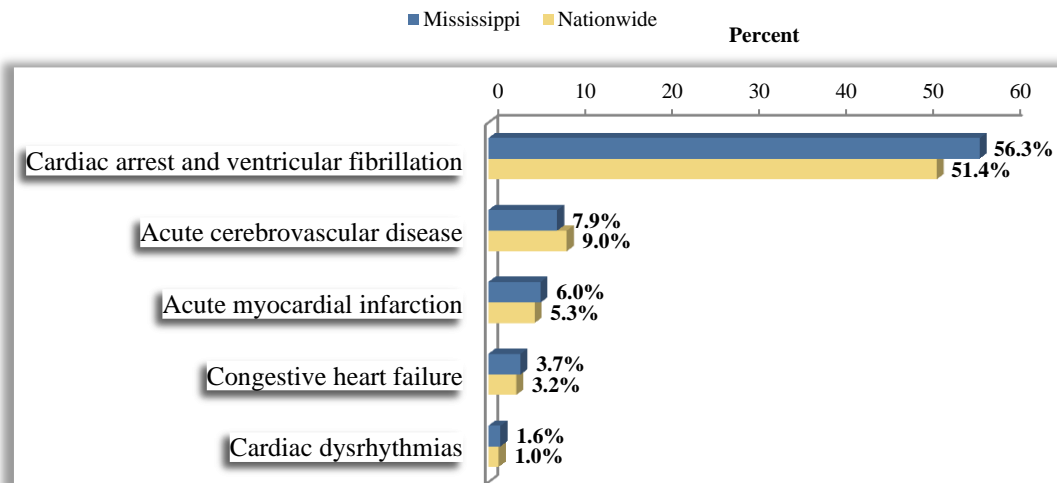
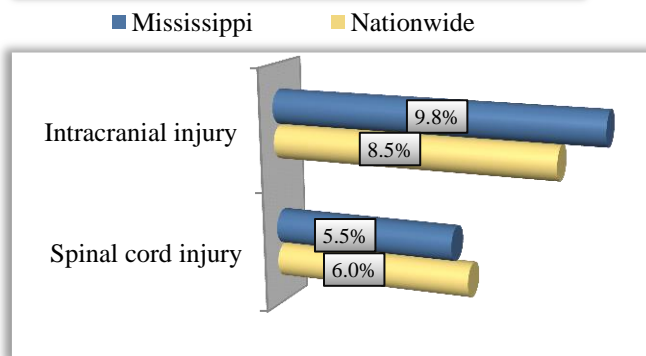


Figure 18: In-hospital Mortality for Selected Injuries

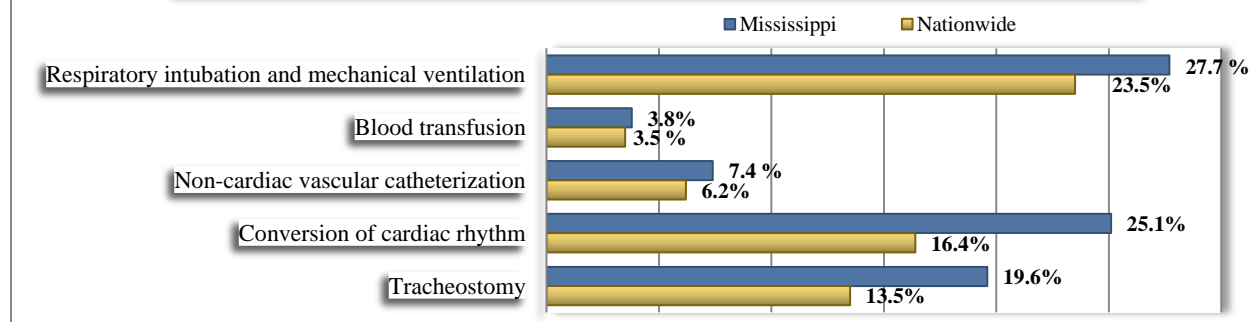


Among the two selected injuries that occurred with high frequency, intracranial injury had a higher and spinal cord injury had a lower in-hospital mortality rate in Mississippi than nationwide (Figure 18).

IN-HOSPITAL MORTALITY RATES: PRIMARY PROCEDURES

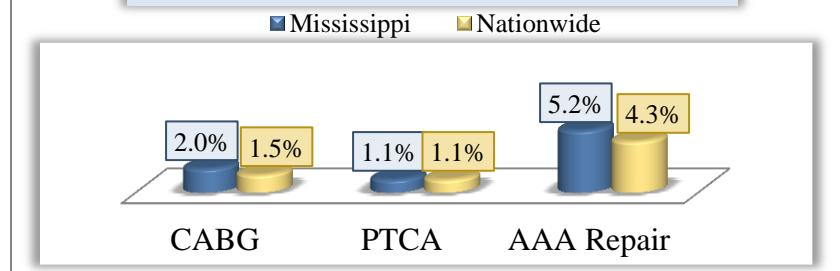
The top five procedures listed for discharges recorded as in-hospital deaths in Mississippi and their mortality rates (the percent of patients who died among all patients who underwent such procedure) are presented in Figure 19. Over a quarter (27.7%) of patients who underwent respiratory intubation / mechanical ventilation, listed as a primary procedure, died during their hospitalization, while the national estimate was 23.5%. The mortality rate for conversion of cardiac rhythm was 25.1%, which was almost 9 points higher than the nationwide rate. Tracheostomy listed as a primary procedure was also associated with a higher mortality rate in Mississippi than the national estimate, respectively 19.6% and 13.5%. Note that these procedures were performed as a treatment or as diagnostic and exploratory tools. They were performed on seriously ill or critically-injured patients and the in-hospital deaths indicate the seriousness of the underlying condition and not necessarily the impact of the procedure.

Figure 19: In-hospital Mortality Rates for the Top 5 Procedures Associated with In-hospital Deaths



Major cardiac procedures are of increasing importance to the state as a result of the ongoing obesity epidemic and the high rates of cardiovascular disease that it causes. Therefore, this report examines three major high-risk surgical procedures, namely percutaneous transluminal coronary angioplasty (PTCA), coronary artery bypass graft (CABG), and abdominal aortic aneurysm (AAA) repair.

Figure 20: In-hospital Moratlity Rate for Selected Cardiac Procedures



The findings displayed in Figure 20 demonstrated that Mississippi and the United States had the same mortality rate for PTCA. Mississippi had slightly higher mortality rate for the other two procedures.



FROM ANALYSIS TO PREVENTION: THE EVIDENCE-BASED WAY

THE MISSISSIPPI OBESITY EPIDEMIC: This report demonstrates that the reasons for hospitalization and the procedures performed in both Mississippi and the United States followed similar patterns. One noticeable difference, however, was the higher prevalence of hospitalizations due to coronary atherosclerosis, various forms of ischemic heart disease and diabetes mellitus as well as the higher frequency of diagnostic and treatment cardiac procedures. These findings reflect, at least partly, the higher obesity rates in our state than in the nation and underscore the need for finding the most effective ways to combat obesity among the state's population.

SEPTICEMIA: The in-hospital mortality rate for septicemia was higher in Mississippi than nationwide, underlining the importance of introducing preventive measures designed to decrease the number of hospitalizations due to septicemia and the number of deaths caused by this serious, but often preventable, infection in our state.

***SEPTICEMIA AND HOSPITAL-ACQUIRED INFECTIONS PREVENTION:** Findings from the National Hospital Discharge Survey in 2008 revealed that the number and rate of hospitalizations for septicemia and sepsis more than doubled from 2000 to 2008 in the United States. Patients suffering from septicemia and sepsis were also approximately eight times more likely to die during their hospitalization.⁷ Many of these deaths are preventable and can be reduced in a relatively easy and cost-effective manner. For instance, studies have shown that simple hand hygiene remains the single most important measure to prevent hospital-acquired or nosocomial infections.⁸ Listed here are some initiatives targeting nosocomial infections:*

THE JOHNS HOPKINS INITIATIVE: Experts at the Johns Hopkins Center for Innovation are helping hospitals to improve in areas such as central line-associated blood stream infections and surgical-site infections and have built up an in-hospital hand-hygiene program that has already led to reduced transmission of two drug-resistant pathogens.⁹

THE MARYLAND HOSPITAL HAND HYGIENE COLLABORATIVE: A statewide initiative to enhance the prevention of healthcare-associated infections in Maryland hospitals.¹⁰

“SURVIVING SEPSIS CAMPAIGN”: The “Surviving Sepsis Campaign” is a collaborative, international effort by physicians to develop and promote evidence-based guidelines for the diagnosis, treatment, and prevention of septicemia and sepsis. Tested by a number of hospitals these measures have shown a potential to decrease septicemia-related deaths.¹¹

PRINCIPAL PROCEDURES AND IN-HOSPITAL DEATHS: Finally, this report demonstrates that the in-hospital mortality rates listed for several principal procedures such as respiratory intubation/mechanical ventilation, conversion of cardiac rhythm, and tracheostomy are higher in Mississippi than in the United States as a whole. While further analysis is needed to determine the reasons for this, one possible explanation may be the increased severity of the underlying conditions affecting our state's patients. In a state with a higher poverty level, a higher percent of the population lacking health insurance, and lower overall access to health care than the nationwide norm, it may not be unusual for patients to seek medical care when it is already too late.

TERMS AND DEFINITIONS

Diagnoses: Diagnosis denotes a clinical condition and all diagnoses (conditions) are assigned ICD-9-CM codes. Each hospital stay has one primary and up to ten secondary diagnoses.

Primary: The primary diagnosis is the clinical condition established to be chiefly responsible for the admission.

Secondary: Secondary diagnoses are all coexisting clinical conditions at the time of admission or any condition that develops during hospitalization.

Hospital Charges: Hospital charges are the amount of money that the hospital bills for the entire hospital stay and for all the services and interventions performed during that stay. They may not represent the actual amount that the hospital collects or the actual cost of the services provided.

Hospital Discharge: Hospital discharge is a hospital stay that ends with the patient's release from the hospital (or with the patient's in-hospital death). A patient might have multiple discharges within a year.

Primary Payer: Primary payer is the expected source of payment. A hospital stay might have additional sources of payment (secondary payers).

Procedure: A surgical or non-surgical medical intervention. Each hospital stay can have multiple procedures. Discharge data has one primary and up to five secondary procedures.

NOTES AND REFERENCES

¹For further information please refer to the Agency for Healthcare Quality and Research's website at www.hcup-us.ahrq.gov.

²U. S. Census Bureau. Poverty: 2010 and 2011. American Community Survey Briefs. Available at <http://www.census.gov/hhes/www/poverty/>.

³Dinour L. , Bergen D., Yeh M. The Food Insecurity – Obesity Paradox: A Review of the Literature and the Role Food Stamps May Play. *Journal of the American Dietetic Association*. 2007; 107 (11): 1952-1960.

⁴U.S. Census Bureau, Health Insurance Coverage Status and Type of Coverage by State and Age: 2010. Available at: http://www.census.gov/hhes/www/hlthins/data/historical/HIB_tables.html.

⁵Data from The Centers for Disease Control and Prevention, National Center for Health Statistics mortality data and US Census Bureau population data, 2007; calculations from the American Human Development Index. Available at <http://www.measureofamerica.org/maps/>.

⁶For more information refer to the Center for Disease Control and Prevention at <http://www.cdc.gov/handwashing/>.

⁷Hall M., Williams S. Inpatient Care for Septicemia or Sepsis: A Challenge for Patients and Hospitals. NCHS data brief, no 62. Hyattsville, MD: National Center for Health Statistics. 2011.

⁸Pittet D., Hugonnet S., Harbarth S., Mourouga P., Sauvan V., Touveneau S., Perneger T. Effectiveness of a Hospital-wide Program to Improve Compliance with Hand Hygiene. *The Lancet*.2000; 356: 1307-1312.

⁹For more information refer to Johns Hopkins 's website at: http://www.hopkinsmedicine.org/innovation_quality_patient_care/areas_expertise/infections_complications/

¹⁰For more information refer to the Maryland Patient Safety Center at: <http://www.marylandpatientsafety.org/HandHyginecollaborative.aspx#>

¹¹Levy M., Dellinger R., Townsend S., Linde-Zwirble W., Marshall J., Bion J., et al. The Surviving Sepsis Campaign: Results of an International Guideline-based Performance Improvement Program Targeting Severe Sepsis. *Intensive Care Medicine*. 2010; 36:222-231.