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# Preventable Hospitalizations: A Window Into Primary and Preventive Care, 2000




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# Preventable Hospitalizations: A Window Into Primary and Preventive Care, 2000



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## FACTS ON:

- TRENDS OVER TIME
- VARIATIONS ACROSS U.S. REGIONS
- PRIORITY POPULATIONS
- CHRONIC CONDITIONS
- ACUTE CONDITIONS
- BIRTH OUTCOMES

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# HCUP Fact Book Series

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3. **Care of Women in U.S. Hospitals, 2000**  
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# Executive Summary

This Fact Book examines one critical area of health care quality: **potentially preventable hospitalizations**, or hospitalizations that may be preventable with high quality primary and preventive care. These hospitalizations may be avoided if clinicians effectively diagnose, treat, and educate patients, and if patients actively participate in their care and adopt healthy lifestyle behaviors. Thus, higher rates of “preventable hospitalizations” may pinpoint areas in which potential improvements can be made in the quality of the U.S. health care system.

This report presents information on preventable hospitalizations for select chronic and acute conditions, as well as for one birth outcome. The Fact Book first addresses these conditions in a broad, national-level context. It evaluates time trends between 1994 and 2000; variations across regions of the United States; and hospitalizations among priority populations, including children, older Americans, women, low-income, and rural residents. The report then provides detailed statistics for each health condition. Results are based on the Healthcare Cost and Utilization Project (HCUP) Nationwide Inpatient Sample (NIS) database and the Agency for Healthcare Research and Quality’s (AHRQ) Prevention Quality Indicators (PQIs). All statistics presented in this report are adjusted for the age and sex distribution of the population.

Decisionmakers at national, State, and local levels may use this Fact Book to establish national benchmarks and to identify target areas for quality improvement. For example, a community or State could apply the PQIs to hospital discharge data to identify regions with high numbers of preventable admissions for particular conditions.

## HAVE ADMISSION RATES FOR PREVENTABLE HOSPITALIZATIONS CHANGED OVER TIME?

Between 1994 and 2000, rates of preventable hospitalizations improved for certain health conditions. The most striking improvements were:

- Hospital admission rates for treatment of angina without a procedure dropped 71 percent.
- Hospitalizations for uncontrolled diabetes without complications declined nearly 30 percent.
- Rates of hospitalization for adult asthma and pediatric gastroenteritis each decreased 20 percent.

In contrast, admission rates rose among other conditions as follows:

- Chronic obstructive pulmonary disease increased by 20 percent.
- Hypertension rose by 13 percent.
- Bacterial pneumonia increased by 9 percent.

## DO PREVENTABLE HOSPITALIZATION RATES VARY ACROSS THE U.S.?

Variations in hospitalization rates exist across the 4 U.S. Census regions: Northeast, South, West, and Midwest. Admissions for preventable hospitalizations are most encouraging in the West, where rates are the lowest in the Nation for 15 of the 16 PQIs. The Northeast has the lowest rate of hospitalizations for perforated appendix.

Conversely, the South has the highest rates of hospitalization for most indicators, including:

- Uncontrolled diabetes without complications and short-term diabetes complications
- Congestive heart failure and hypertension
- Chronic obstructive pulmonary disease

## Summary

- Four acute conditions: bacterial pneumonia, dehydration, urinary tract infection, and pediatric gastroenteritis
- Low-weight births

### ARE PARTICULAR AGE GROUPS MORE LIKELY TO BE ADMITTED TO PREVENTABLE HOSPITALIZATIONS?

Populations most vulnerable to illness, such as older Americans and very young children, experience the highest rates of preventable admission.

Older Americans are more likely than any other age group to be hospitalized for:

- Congestive heart failure
- Chronic obstructive pulmonary disease
- Bacterial pneumonia

Compared with children 5–17 years of age, young children under the age of 5 experience significantly higher rates of preventable hospitalization. The differences are most striking for:

- Pediatric gastroenteritis
- Bacterial pneumonia
- Dehydration

Also, young children under the age of 5 are much more likely to be hospitalized for pediatric asthma, the most common chronic disease among children.

These results indicate that specific age groups are more susceptible than others to certain conditions. Conditions such as congestive heart failure

and chronic obstructive pulmonary disease are particularly relevant to older adults. Therefore, it may be appropriate to apply these prevention quality indicators to those who are 65 years of age and older. In contrast, PQIs for pediatric gastroenteritis, pediatric asthma, and dehydration are particularly useful for children, and can be used to examine the substantially higher risks observed for those who are 0–4 years of age.

### ARE PREVENTABLE HOSPITALIZATION RATES DIFFERENT FOR MEN AND WOMEN?

The greatest difference occurs for treatment of adult asthma; for this condition, women are more than 2.5 times more likely than men to be admitted to the hospital. A contrast emerges for younger populations: girls are approximately 30 percent less likely than boys to be hospitalized for pediatric asthma.

Women also have higher rates of admission for:

- Hypertension
- Dehydration
- Urinary tract infections

On the other hand, women are less likely to be hospitalized for:

- Long-term diabetes complications, including diabetes-related lower extremity amputations
- Congestive heart failure
- Angina without a procedure
- Bacterial pneumonia
- Perforated appendix

## IS COMMUNITY INCOME RELATED TO PREVENTABLE HOSPITALIZATION RATES?

Residents from areas with the lowest median incomes (less than \$25,000) have the highest rates of admission for all preventable hospitalizations. The greatest amount of variation occurs for:

- Uncontrolled diabetes without complications and short-term diabetes complications
- Hypertension
- Adult asthma

Disparities based on community incomes are more pronounced for chronic conditions than for acute conditions. Among the 10 chronic conditions, differences in admission rates between the lowest and highest income communities range from 76 to 278 percent. In contrast, for the 5 acute conditions, differences in admission rates range from 6 to 78 percent.

## DO ADMISSION RATES FOR PREVENTABLE HOSPITALIZATIONS DIFFER BETWEEN URBAN AND RURAL RESIDENTS?

In many cases, preventable admission rates are comparable for urban and rural residents. However, rural residents experience higher hospitalization rates for several conditions, including:

- Uncontrolled diabetes without complications
- Hypertension
- Angina without a procedure
- Chronic obstructive pulmonary disease

- Bacterial pneumonia
- Dehydration
- Urinary tract infections
- Pediatric gastroenteritis

## WHAT ARE THE PATTERNS OF PREVENTABLE HOSPITALIZATIONS BY HEALTH CONDITION?

The following tables summarize the patterns of avoidable hospitalizations by types of conditions. The tables identify whether admission rates increased, decreased, or remained unchanged between 1994 and 2000, and also indicate the U.S. regions with the highest and lowest rates of hospitalization. In addition, the summary compares hospitalization rates for the following priority and reference populations:

- Children: Very young children 0–4 years of age are compared with children 15–17 years.
- Elderly: Individuals 65 years of age and older are compared with adults 18–44 years.
- Women: Women are compared with men.
- Low-income residents: Individuals from communities with the lowest median household incomes (<\$25,000) are compared with residents from communities with median household incomes of \$45,000 and above.
- Rural residents: Individuals from rural areas are compared with urban dwellers.

## Summary

### Patterns of Preventable Hospitalizations by Types of Conditions

CONDITION†	CHANGES OVER TIME (1994–2000)	REGIONAL VARIATION		VARIATION BY PRIORITY POPULATION				
		Region with Highest Rates	Region with Lowest Rates	Children (0–4 years)	Elderly (≥65 years)	Women	Low-Income Residents (<\$25,000)	Rural Residents
<b>Diabetes</b>								
Uncontrolled diabetes without complications	Decreased	South	West	n/a	+	No difference	+	+
Short-term diabetes complications	Increased	South	West	n/a	-	No difference	+	No difference
Long-term diabetes complications	No change	Northeast	West	n/a	+	No difference	+	No difference
Diabetes-related lower extremity amputations	No change	Northeast	West	n/a	+	-	+	No difference
<b>Circulatory diseases</b>								
Congestive heart failure	No change	South	West	n/a	+	-	+	No difference
Hypertension	Increased	South	West	n/a	+	+	+	+
Angina without a procedure	Decreased	Northeast	West	n/a	+	-	+	+
<b>Respiratory diseases</b>								
Adult asthma	Decreased	Northeast	West	n/a	+	+	+	No difference
Pediatric asthma	No change	Northeast	West	+	n/a	-	+	No difference
Chronic obstructive pulmonary disease	Increased	South	West	n/a	+	No difference	+	+

#### Reference Groups:

- Children: Very young children 0–4 years of age are compared with children 15–17 years.
- Elderly: Individuals 65 years of age and older are compared with adults 18–44 years.
- Women: Women are compared with men.
- Low-income residents: Individuals from communities with the lowest median household incomes (<\$25,000) are compared with residents from communities with median household incomes of \$45,000 and above.
- Rural residents: Individuals from rural areas are compared with urban dwellers.

“+” indicates hospitalization rates are higher for the priority population compared with the reference group (significant at  $p \leq 0.05$ ).

“-” indicates hospitalization rates are lower for the priority population compared with the reference group (significant at  $p \leq 0.05$ ).

“Increased” indicates hospitalization rates increased over time (significant at  $p \leq 0.05$ ).

“Decreased” indicates hospitalization rates decreased over time (significant at  $p \leq 0.05$ ).

“No difference” indicates hospitalization rates are comparable between the priority population and the reference group.

† Full definitions for each Prevention Quality Indicator are provided in the Glossary section of this report.



### Patterns of Preventable Hospitalizations by Types of Conditions

CONDITION†	CHANGES OVER TIME (1994–2000)	REGIONAL VARIATION		VARIATION BY PRIORITY POPULATION				
		Region with Highest Rates	Region with Lowest Rates	Children (0–4 Years)	Elderly (≥65 years)	Women	Low-Income Residents (<\$25,000)	Rural Residents
<b>Acute Conditions</b>								
Bacterial pneumonia	Increased	South	West	n/a	+	-	+	+
Dehydration	No change	South	West	n/a	+	+	+	+
Urinary tract infection	No change	South	West	n/a	+	+	+	+
Perforated appendix	Decreased	Midwest	Northeast	n/a	+	-	+	No difference
Pediatric gastroenteritis	Decreased	South	West	+	n/a	No difference	+	+
<b>Birth Outcomes</b>								
Low-weight births	No change	South	West	n/a	n/a	No difference	+	No difference

Reference Groups:

- Children: Very young children 0–4 years of age are compared with children 15–17 years.
- Elderly: Individuals 65 years of age and older are compared with adults 18–44 years.
- Women: Women are compared with men.
- Low-income residents: Individuals from communities with the lowest median household incomes (<\$25,000) are compared with residents from communities with median household incomes of \$45,000 and above.
- Rural residents: Individuals from rural areas are compared with urban dwellers.

“+” indicates hospitalization rates are higher for the priority population compared with the reference group (significant at  $p \leq 0.05$ ).

“-” indicates hospitalization rates are lower for the priority population compared with the reference group (significant at  $p \leq 0.05$ ).

“Increased” indicates hospitalization rates increased over time (significant at  $p \leq 0.05$ ).

“Decreased” indicates hospitalization rates decreased over time (significant at  $p \leq 0.05$ ).

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\*The Healthcare Research and Quality Act of 1999, the re-authorizing legislation for AHRQ, identifies priority populations to be included in research, evaluations, and demonstration projects (Healthcare Research and Quality Act of 1999, Public Law 106-129, § 901, 113 Stat. 1654).

\*\*These conditions are related to the priority areas identified by the Institute of Medicine for improving the health of the U.S. population (Institute of Medicine. 2003. *Priority Areas for National Action: Transforming Health Care Quality*. Washington, DC: National Academies Press).

# Foreword

The mission of the Agency for Healthcare Research and Quality (AHRQ) is to improve the quality, safety, efficiency, and effectiveness of health care for all Americans. To help fulfill this mission, AHRQ develops a number of databases, including those of the powerful Healthcare Cost and Utilization Project (HCUP). HCUP is a Federal-State-Industry partnership to build a standardized, multi-State health data system; HCUP features databases, software tools, and statistical reports to inform policymakers, health system leaders, researchers, and clinicians.

For data to be useful, they must be disseminated in a timely, accessible way. To meet this objective, AHRQ launched HCUPnet, an interactive, Internet-based tool for identifying, tracking, analyzing, and comparing statistics on hospital utilization, outcomes, and charges (<http://hcup.ahrq.gov/HCUPnet.asp>). Menu-driven HCUPnet guides users in tailoring specific queries about hospital care online; with a click of a button, users receive answers within seconds.

In addition, AHRQ produces the HCUP Fact Books to provide statistics about hospital care in the United States in an easy-to-use, readily accessible format. Each Fact Book presents information about specific aspects of hospital care — the single largest component of our health care dollar. The national estimates are benchmarks against which States can compare their own data. Previous Fact Books provided overviews on hospital stays in the U.S.; procedures performed in U.S. hospitals; and care for women, children, and adolescents.

This Fact Book addresses hospital admissions that may have been prevented through high quality primary and preventive care. The Nationwide Inpatient Sample (NIS) and the AHRQ Prevention Quality Indicators (PQIs) are used to evaluate trends over time, variations by U.S. geographic region, and differences among priority populations. The report also offers detailed statistics by specific health conditions.



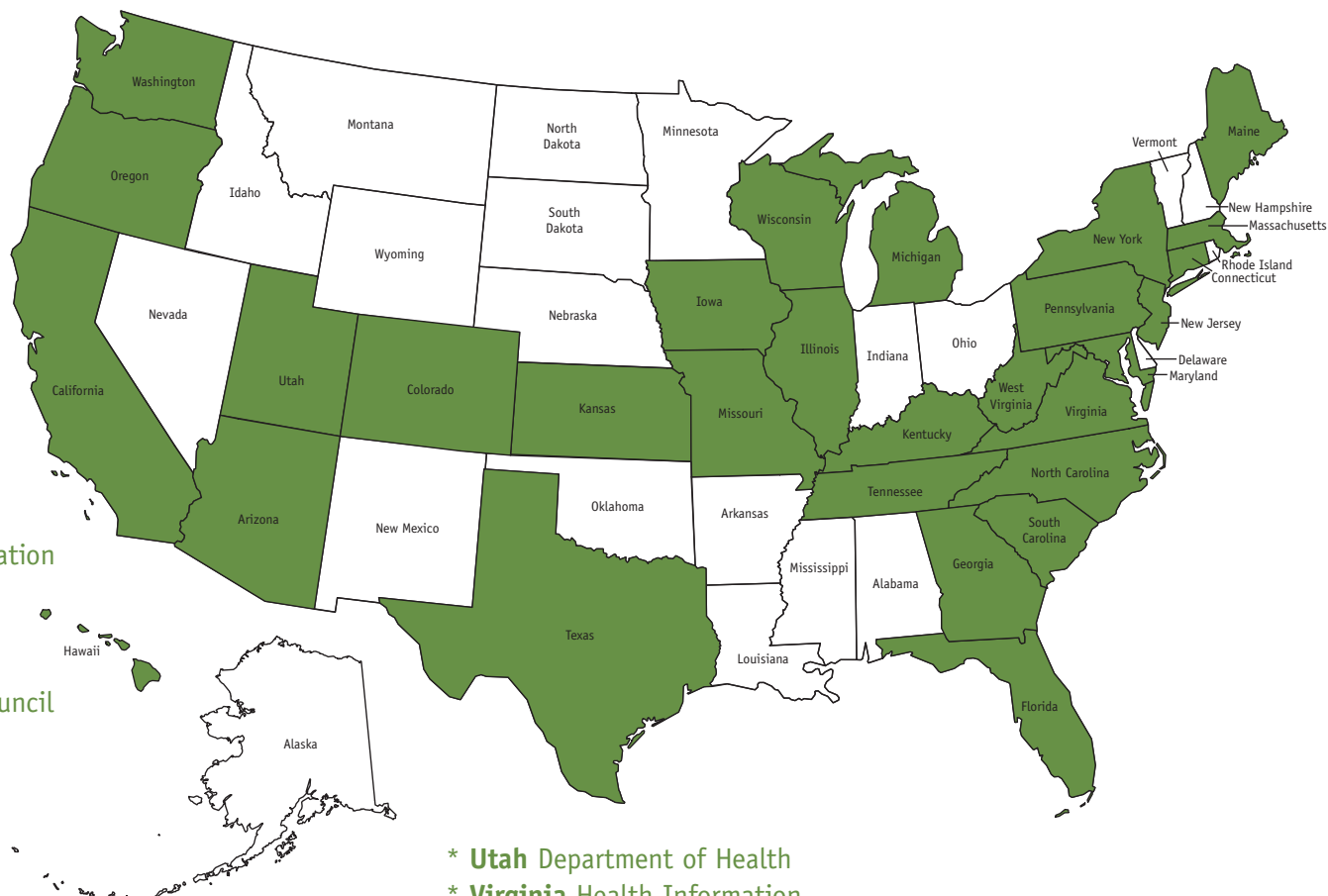
We invite you to tell us how you are using this Fact Book and other HCUP data and tools, and to share suggestions on how HCUP products might be enhanced to further meet your needs. Please e-mail us at [hcup@ahrq.gov](mailto:hcup@ahrq.gov) or send a letter to the address below.

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# Contributors

Without the following State Partners, the Healthcare Cost and Utilization Project and the 2000 Nationwide Inpatient Sample would not be possible:

- \* **Arizona** Department of Health Services
- \* **California** Office of Statewide Health Planning & Development
- \* **Colorado** Health & Hospital Association
- \* **Connecticut** Chime, Inc.
- \* **Florida** Agency for Health Care Administration
- \* **Georgia** GHA: An Association of Hospitals & Health Systems
- \* **Hawaii** Health Information Corporation
- \* **Illinois** Health Care Cost Containment Council
- \* **Iowa** Hospital Association
- \* **Kansas** Hospital Association
- \* **Kentucky** Department for Public Health
- \* **Maine** Health Data Organization
- \* **Maryland** Health Services Cost Review Commission
- \* **Massachusetts** Division of Health Care Finance and Policy
- \* **Michigan** Health & Hospital Association<sup>1</sup>
- \* **Missouri** Hospital Industry Data Institute
- \* **New Jersey** Department of Health and Senior Services
- \* **New York** State Department of Health
- \* **North Carolina** Department of Health and Human Services
- \* **Oregon** Association of Hospitals and Health Systems
- \* **Pennsylvania** Health Care Cost Containment Council
- \* **South Carolina** State Budget & Control Board
- \* **Tennessee** Hospital Association
- \* **Texas** Health Care Information Council



- \* **Utah** Department of Health
- \* **Virginia** Health Information
- \* **Washington** State Department of Health
- \* **West Virginia** Health Care Authority
- \* **Wisconsin** Department of Health and Family Services

In May 2000, HCUP State Partners and AHRQ received the Secretary of Health and Human Services' Award for Distinguished Service for "leadership, teamwork, and creative thinking in increasing availability, utility, and value of data for policy makers and researchers concerned with hospital quality, utilization and cost."

<sup>1</sup>While this State Partner participated in HCUP during 2000, Michigan data were not included in the 2000 NIS. Thus, analyses conducted for this Fact Book are based on 2000 NIS data sampled from the other 28 State Partner databases.

# Introduction

Quality of care continues to be a focal point in current U.S. health care policy, as decision makers strive to improve the way the health care system meets the needs of the residents of the United States. This Fact Book offers insight into one critical area of health care quality — hospitalizations that may be preventable with high quality primary and preventive care. Such hospital admissions are commonly referred to as preventable hospitalizations.

Hospitalizations may be prevented when clinicians diagnose, educate, and treat patients in a timely and effective manner in outpatient settings, and when patients actively participate in their care and engage in healthy lifestyle behaviors. Thus, higher rates of “preventable hospitalizations” identify areas where potential improvements can be made in the quality of the U.S. health care system.

This Fact Book focuses on potentially preventable hospitalizations for select chronic and acute conditions, as well as one birth outcome. The chronic conditions are diabetes, including uncontrolled diabetes without complications, short-term and long-term diabetes complications, and diabetes-related lower-extremity amputations; circulatory diseases, such as congestive heart failure, hypertension, and angina without a procedure; and respiratory diseases, such as adult and pediatric asthma and chronic obstructive pulmonary disease. Acute conditions include pediatric gastroenteritis, bacterial pneumonia, dehydration, urinary tract infection, and perforated appendix. In addition, this Fact Book offers statistics on low-weight births.

Potentially preventable hospitalizations are a significant issue with regard to both quality and cost. During the year 2000, nearly 5 million admissions to U.S. hospitals involved treatment for 1 or more of these conditions; the resulting cost was more than \$26.5 billion.<sup>1</sup> While some hospitalizations were likely inevitable, many might have been prevented if individuals had received high quality primary and preventive care. Identifying and reducing such avoidable hospitalizations could help alleviate the economic burden placed on the U.S. health care system.

Assuming an average cost of \$5,300 per admission,<sup>1</sup> even a 5 percent decrease in the rate of potentially avoidable hospitalizations could result in a cost savings of more than \$1.3 billion.

The report first addresses these preventable hospitalizations in a broad, national context and examines 3 key issues: time trends between 1994 and 2000, variations among regions of the U.S., and hospitalizations among select priority populations.<sup>ii</sup> The report then presents detailed statistics for each health condition.

National policymakers may use the information in this Fact Book to evaluate priority areas and to identify targets for health care system improvement. State and local decisionmakers can use the national and regional trends as guides when planning quality improvement programs. Further, health care institutions, practitioners, and researchers may examine the national and regional benchmarks to establish health care evaluation standards and to determine areas that require more extensive study.

<sup>ii</sup> The Healthcare Research and Quality Act of 1999, the authorizing legislation for AHRQ, defines priority populations for AHRQ and includes children, elderly, women, minority, low-income, inner city, and rural residents, as well as individuals with special health care needs, including persons with disabilities or those requiring chronic or end-of-life care. Healthcare Research and Quality Act of 1999, Public Law 106-129, § 901, 113 Stat. 1654. This Fact Book does not include statistics based on minority status because national estimates for racial/ethnic subpopulations were not available. However, statistics by racial/ethnic subpopulations based on 16 States' data are available in the *National Healthcare Disparities Report*, developed by the Agency for Healthcare Research and Quality, U.S. Department of Health and Human Services (available online at [http://www.qualitytools.ahrq.gov/disparitiesreport/download\\_report.aspx](http://www.qualitytools.ahrq.gov/disparitiesreport/download_report.aspx)).

## HOW ARE POTENTIALLY PREVENTABLE HOSPITALIZATIONS IDENTIFIED AND HOW DO THEY RELATE TO QUALITY?

This report examines potentially preventable hospitalizations by using the AHRQ Prevention Quality Indicators. The AHRQ PQIs examine quality by focusing on hospital admissions for ambulatory care sensitive conditions. These 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. Even though these indicators are based on hospital inpatient data, they provide insight into the quality of the health care system beyond the

hospital setting. For example, individuals 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. The PQIs are not definitive measures of quality; rather, they serve as screens for evaluating quality and for identifying areas that require more intensive study.

The table below lists the 16 AHRQ PQIs discussed in this Fact Book and identifies the age groups to which each PQI pertains. In addition, the Appendix offers information on how to obtain the PQI documentation and software.

PREVENTION QUALITY INDICATOR†	AGE GROUPS			
	0–17 years	18–44 years	45–64 years	65 years and older
Uncontrolled diabetes without complications		X	X	X
Short-term diabetes complications		X	X	X
Long-term diabetes complications		X	X	X
Diabetes-related lower extremity amputations		X	X	X
Congestive heart failure		X	X	X
Hypertension		X	X	X
Angina without a procedure		X	X	X
Chronic obstructive pulmonary disease		X	X	X
Adult asthma		X	X	X
Pediatric asthma	X			
Pediatric gastroenteritis	X			
Bacterial pneumonia	X	X	X	X
Dehydration	X	X	X	X
Urinary tract infection	X	X	X	X
Perforated appendix	X	X	X	X
Low-weight births	neonates			

†Definitions for each Prevention Quality Indicator are provided in the Glossary section of this report.

## Introduction





# PART I: Overview

# Have admission rates for preventable hospitalizations changed over time?

Between 1994 and 2000, rates of hospital admission improved for particular health conditions. Some of the most striking improvements were:

- Hospital admission rates for treatment of angina without a procedure dropped 71 percent during the 6-year period.
- Admission rates for uncontrolled diabetes without complications declined nearly 30 percent.
- Rates of hospitalization for adult asthma and pediatric gastroenteritis decreased 20 percent.

These reductions may be attributed to a number of factors, including increased patient education, enhanced awareness and access to health care hotlines, better environmental settings, and changes in medical technologies. In addition, lower admission rates may indicate that the quality of primary and preventive care improved for these conditions during this time period.

At the same time, opportunities for improvement exist. Special attention should be directed to conditions for which admission rates increased over time. For example, between 1994 and 2000, rates of hospitalization increased as follows:

- Chronic obstructive pulmonary disease rose by 20 percent.
- Hypertension increased by 13 percent.
- Bacterial pneumonia rose by 9 percent.

Older Americans are at highest risk of hospitalization for these 3 conditions. More needs to be learned about the reasons for the observed increases so that decisionmakers can work toward eliminating unnecessary hospitalizations.



There are some health conditions for which hospitalization rates did not vary substantially over time. Although it is encouraging that the rates did not rise, the goal is to reduce the need for hospitalization for all conditions that can be effectively managed outside the hospital. Therefore, efforts should be applied to prevent unnecessary admissions for the following conditions: long-term diabetes complications, diabetes-related lower extremity amputations, congestive heart failure, dehydration, urinary tract infection, and low-weight births.



### Time Trends in Admission Rates for Preventable Conditions

PREVENTION QUALITY INDICATOR†	ADMISSION RATE TREND BETWEEN 1994 AND 2000		
	DECREASE*	NO CHANGE	INCREASE*
Uncontrolled diabetes without complications	X		
Short-term diabetes complications			X
Long-term diabetes complications		X	
Diabetes-related lower extremity amputations		X	
Congestive heart failure		X	
Hypertension			X
Angina without a procedure	X		
Adult asthma	X		

PREVENTION QUALITY INDICATOR†	ADMISSION RATE TREND BETWEEN 1994 AND 2000		
	DECREASE*	NO CHANGE	INCREASE*
Pediatric asthma		X	
Chronic obstructive pulmonary disease			X
Pediatric gastroenteritis	X		
Bacterial pneumonia			X
Dehydration		X	
Urinary tract infection		X	
Perforated appendix	X		
Low-weight births		X	

†Full definitions for each Prevention Quality Indicator are provided in the Glossary section of this report.  
 \*Significant decreases and increases are defined at  $p \leq 0.05$ .

# Do preventable hospitalization rates vary across the U.S.?

## HOW DO I READ THESE GRAPHS?

These graphs compare the preventable hospitalization rates of 3 regions (the South, West, and Midwest) to the rates of 1 common region, the Northeast. To create the graphs, each PQI admission rate for the South, West, and Midwest is divided by the PQI admission rate in the Northeast. As noted, the Northeast admission rate compared to itself equals 1.00. Regions with rates higher than those in the Northeast have bars that cross the reference point, 1.00, while regions with lower rates have bars that do not reach the 1.00 line. The graphs also display the magnitude of the difference in hospitalization rates between each region relative to the Northeast. For example, compared with the Northeast, admission rates for uncontrolled diabetes without complications are 18 percent higher in the South and 48 percent lower in the West ( $[1.18-1.00] \times 100 = 18\%$ ;  $[1.00-0.52] \times 100 = 48\%$ ). All rates are adjusted by age and sex, using year 2000 as the standard population.

Variations in hospitalization rates exist across the 4 U.S. Census regions: Northeast, South, West, and Midwest. The greatest amount of variation occurs for 3 chronic conditions — uncontrolled diabetes without complications, hypertension, and chronic obstructive pulmonary disease.

Admissions for preventable hospitalizations are most encouraging in the West, where rates are the lowest in the nation for 15 of the 16 PQIs. Conversely, the South has the highest rates of hospitalization for most indicators, including:

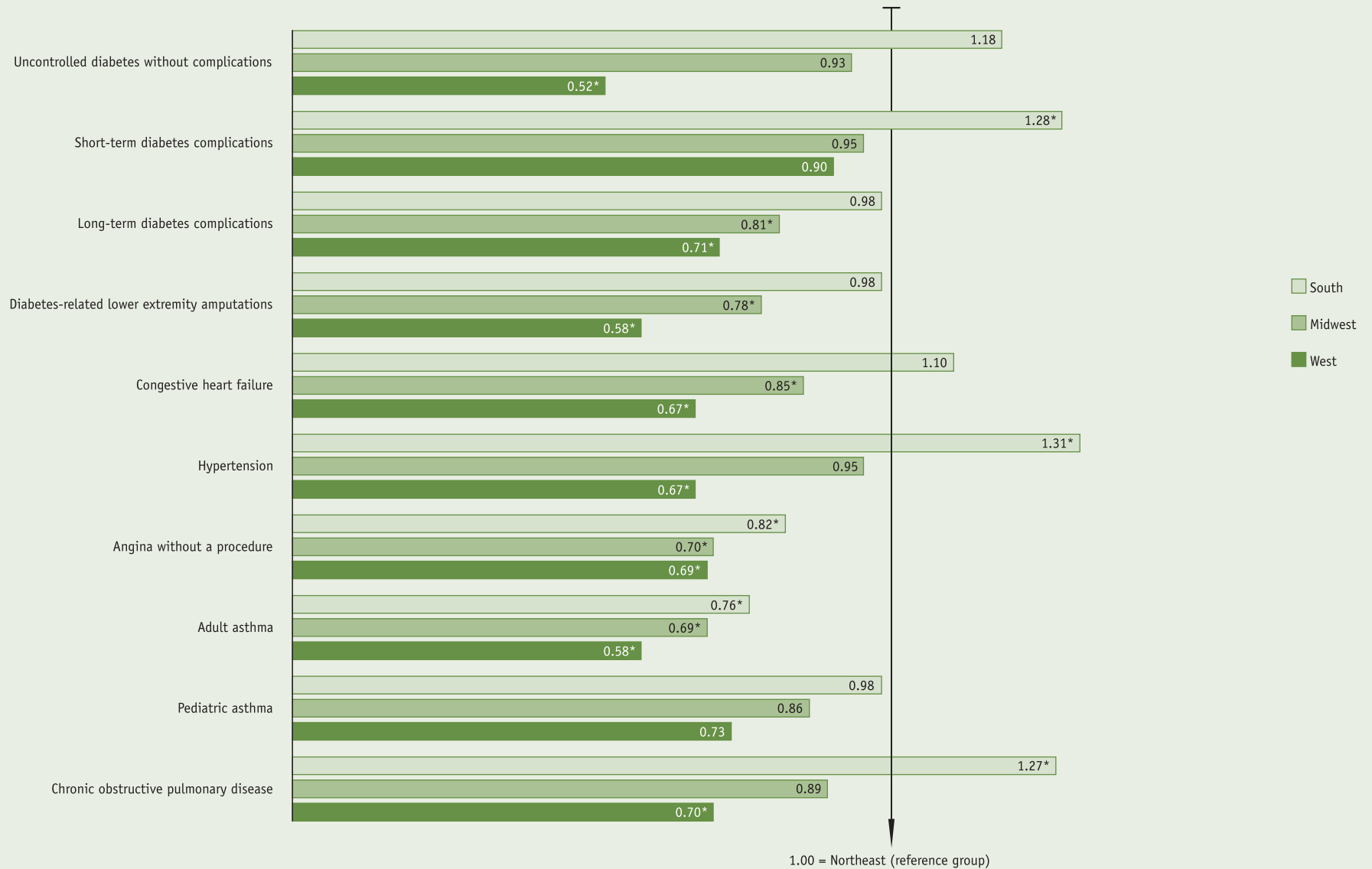
- Uncontrolled diabetes without complications
- Short-term diabetes complications
- Congestive heart failure
- Hypertension
- Chronic obstructive pulmonary disease
- Four acute conditions: bacterial pneumonia, dehydration, urinary tract infections, and pediatric gastroenteritis
- Low-weight births

For these conditions, the differences in admission rates between the South and the Northeast (the common reference group used in the graph) range from 10 percent for congestive heart failure and low-weight births to 36 percent for urinary tract infections.

The low rates of admission observed in some areas of the country indicate the potential for improvement for other regions, and more research is needed to identify how the health care system can effectively reduce unnecessary hospitalizations.

### Geographic Variations in Preventable Hospitalizations for Chronic Conditions

HOSPITALIZATION RATES PER 100,000 POPULATION,<sup>a</sup> 2000  
SOUTH, MIDWEST, AND WEST RELATIVE TO NORTHEAST



\* = statistically different at  $p \leq 0.05$  relative to the Northeast. Rates are adjusted by age and sex, using year 2000 as the standard population.

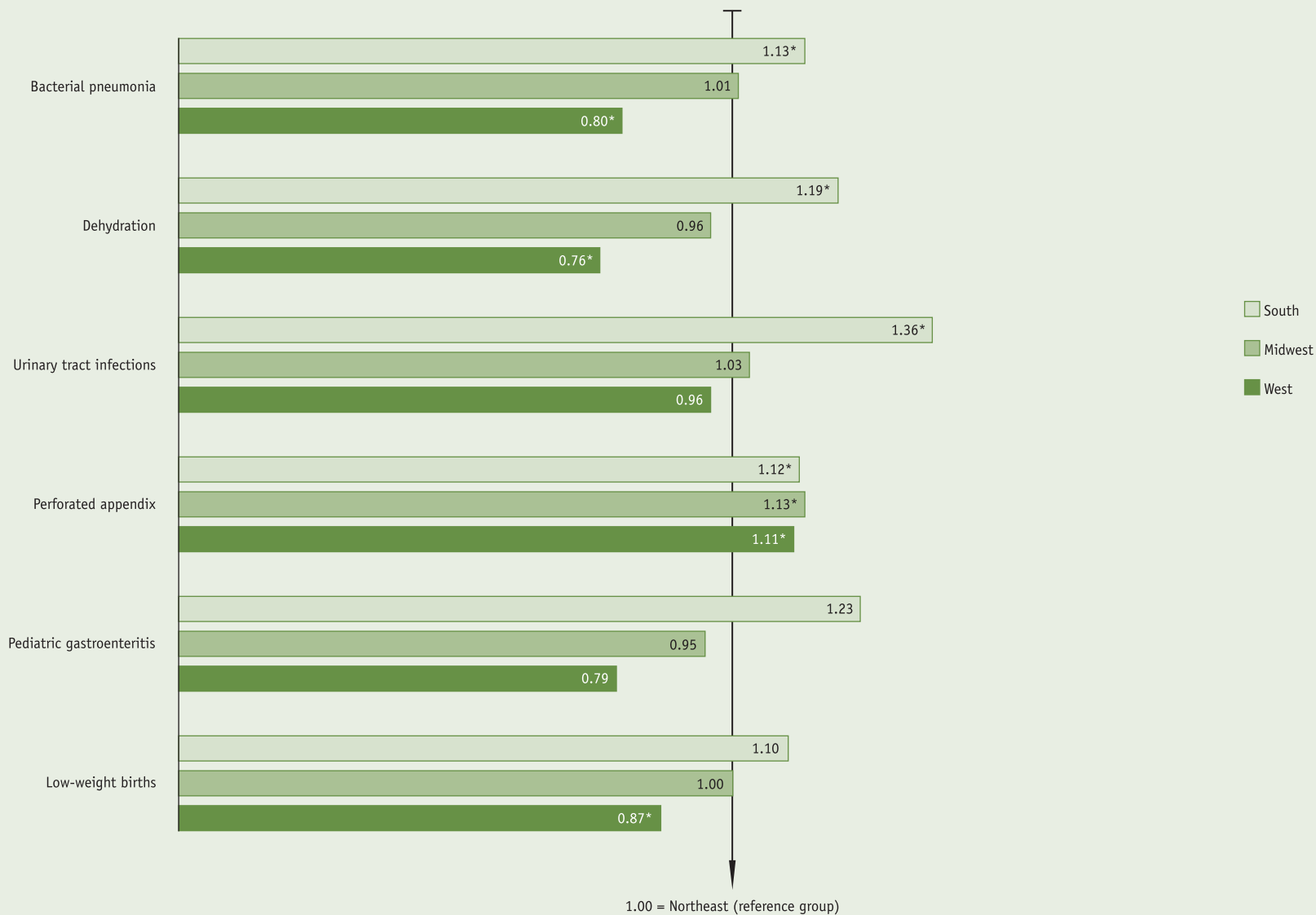
<sup>a</sup> Admission rate populations vary by type of condition. Diabetes, circulatory diseases, adult asthma, and chronic obstructive pulmonary disease include individuals 18 years and older; pediatric asthma includes children less than 18 years of age.

Variations Across U.S. Regions



### Geographic Variations in Preventable Hospitalizations for Acute Conditions and Birth Outcomes

HOSPITALIZATION RATES PER 100,000 POPULATION,<sup>a</sup> 2000  
SOUTH, MIDWEST, AND WEST RELATIVE TO NORTHEAST



\* = statistically different at  $p \leq 0.05$  relative to the Northeast. Rates are adjusted by age and sex, using year 2000 as the standard population.  
<sup>a</sup> Admission rate populations vary by type of condition. Bacterial pneumonia, dehydration, urinary tract infections, and perforated appendix include individuals of all ages; pediatric gastroenteritis includes children less than 18 years of age; low-weight births include neonates only.

# Are particular age groups more likely to be admitted for preventable hospitalizations?

Populations most vulnerable to illness, such as older Americans and very young children, experience the highest rates of admission. Older Americans are more likely than any other age group to be hospitalized, particularly for:

- Congestive heart failure
- Chronic obstructive pulmonary disease
- Bacterial pneumonia

Many hospitalizations among this population may be appropriate because older Americans tend to be more frail and suffer from more illnesses than younger Americans. On the other hand, some admissions may be preventable through better management of chronic conditions throughout the course of the disease and more effective treatment upon onset of acute conditions.

The PQIs for congestive heart failure and chronic obstructive pulmonary disease are particularly relevant to older Americans, as this population is at substantially higher risk of hospitalization for these conditions. As a result, it may be appropriate to apply these prevention quality indicators specifically to individuals 65 years of age and older.

Certain pediatric groups are also more likely to be admitted to U.S. hospitals. In fact, very young children under the age of 5 years have dramatically higher rates of hospitalization than older children. The differences between pediatric groups are most striking in relation to the treatment of:

- Pediatric gastroenteritis
- Bacterial pneumonia
- Dehydration

For these 3 conditions, admission rates for children 0–4 years of age are up to 13 times higher than the admission rates for older children.

In addition, children 0–4 years of age are much more likely than their older counterparts to be hospitalized for asthma, the most common chronic disease among children. Clinicians may be more cautious when treating this age group, which could result in a lower threshold for hospitalization. While such preferences may be appropriate given the increased vulnerability of this patient population, many admissions may be preventable. More work needs to be done to ensure that very young children obtain high quality primary and preventive care and are hospitalized only when necessary.

The underlying causes of disease and reasons for hospitalization likely vary between age groups. For example, gastroenteritis and dehydration among children may be related to environmental and living conditions, whereas these same conditions among older populations may be attributed to other factors. Therefore, it is important to consider such differences when examining the prevention quality indicators across age groups.

<sup>iii</sup> The Healthcare Research and Quality Act of 1999, the re-authorizing legislation for AHRQ, identifies priority populations to be included in research, evaluations, and demonstration projects (Healthcare Research and Quality Act of 1999, Public Law 106-129, § 901, 113 Stat. 1654).



**Admission Rates for Preventable Conditions per 100,000 Population 18 Years and Older, 2000**

PREVENTION QUALITY INDICATOR†	AGE GROUP			PREVENTION QUALITY INDICATOR†	AGE GROUP		
	18–44 (a) YEARS	45–64 YEARS	65 YEARS		18–44 (a) YEARS	45–64 YEARS	65 YEARS
Uncontrolled diabetes without complications	15	36*	59*	Adult asthma	89	131*	158*
Short-term diabetes complications	54	49*	45*	Chronic obstructive pulmonary disease	20	272*	1,138*
Long-term diabetes complications	33	158*	339*	Bacterial pneumonia	92	323*	1,815*
Diabetes-related lower extremity amputations	5	55*	140*	Dehydration	32	90*	568*
Congestive heart failure	35	355*	2,321*	Urinary tract infections	64	97*	647*
Hypertension	15	57*	116*	Perforated appendix	230	443*	579*
Angina without a procedure	12	90*	197*				

†Full definitions for each Prevention Quality Indicator are provided in the Glossary section of this report.  
 \* = statistically different from group (a) at  $p \leq 0.05$ . Rates are adjusted by age and sex, using year 2000 as the standard population.

**Admission Rates for Preventable Conditions per 100,000 Population Less than 18 Years, 2000**

PREVENTION QUALITY INDICATOR†	AGE GROUP			
	0–4 (a) YEARS	5–9 YEARS	10–14 YEARS	15–17 YEARS
Pediatric asthma	400	179*	113*	70*
Bacterial pneumonia	465	104*	42*	35*
Dehydration	333	62*	24*	27*
Urinary tract infections	148	39*	20*	51*
Perforated appendix	598	356*	285*	233*
Pediatric gastroenteritis	302	54*	30*	27*

†Full definitions for each Prevention Quality Indicator are provided in the Glossary section of this report.  
 \* = statistically different from group (a) at  $p \leq 0.05$ . Rates are adjusted by age and sex, using year 2000 as the standard population.

# Are preventable hospitalization rates different for men and women?

Rates of admission for select conditions vary by patient gender. Women are at increased risk of admission for 4 conditions:

- Hypertension
- Adult asthma
- Dehydration
- Urinary tract infections

The most striking difference occurs for treatment of adult asthma; for this condition, women are more than 2.5 times more likely than men to be admitted to the hospital. This relationship presents a sharp contrast to that observed for pediatric asthma. Among children, girls are approximately 30 percent less likely than boys to be hospitalized for asthma.

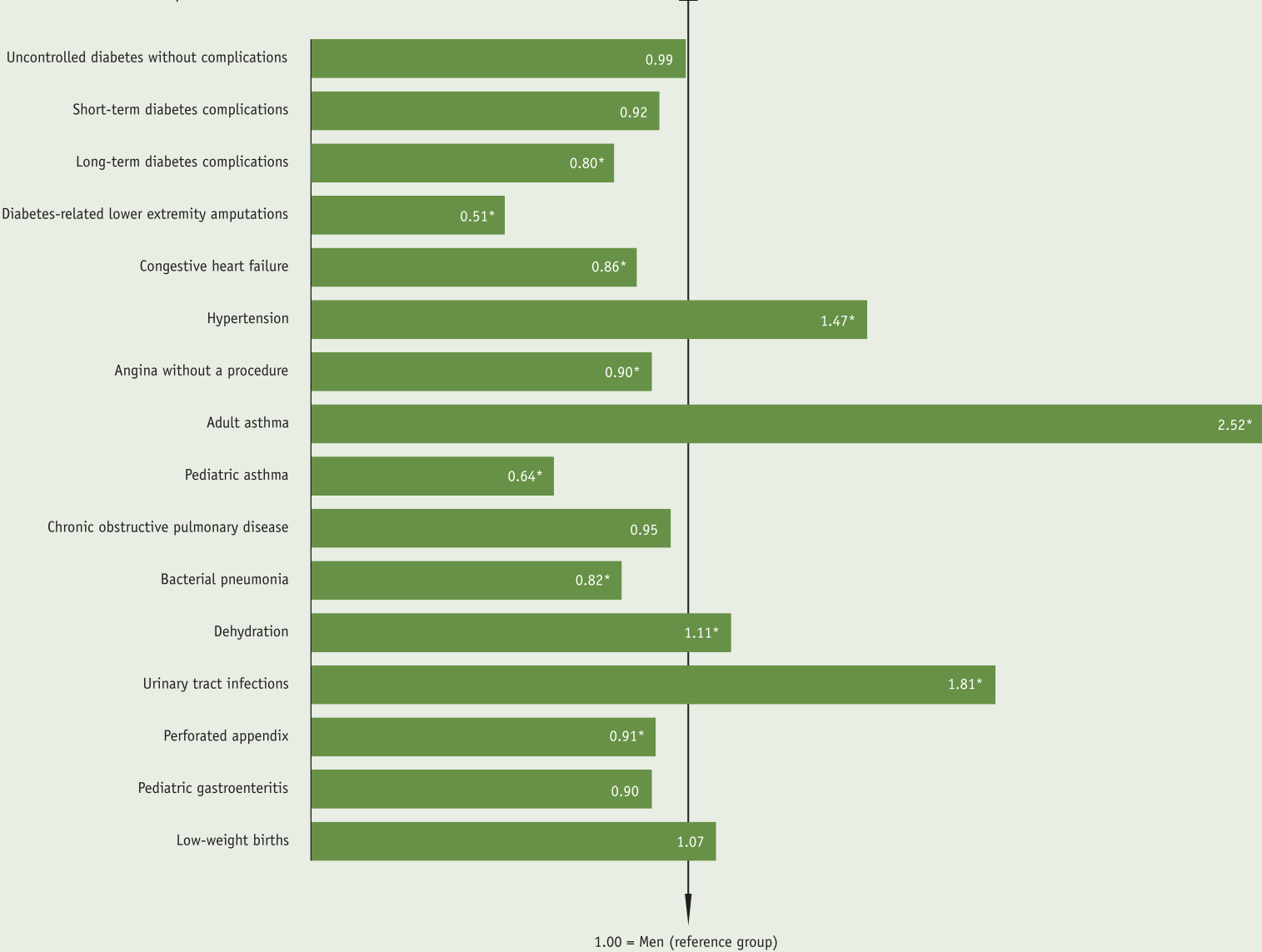
On the other hand, women are less likely to be hospitalized for a number of other conditions, including:

- Long-term diabetes complications
- Diabetes-related lower extremity amputations
- Congestive heart failure
- Angina without a procedure
- Bacterial pneumonia
- Perforated appendix

Of these conditions, the gender difference is most dramatic for diabetes-related lower extremity amputations. Hospitalizations involving treatment for this condition are approximately 50 percent lower for women than for men. Again, the causes for this difference are uncertain and more research is needed to better understand why men may be at higher risk for hospital admission.

**Preventable Hospitalization Rates per 100,000 Population\***

WOMEN RELATIVE TO MEN, 2000



\* = statistically different at  $p \leq 0.05$  relative to men. Rates are adjusted by age and sex, using year 2000 as the standard population.  
<sup>a</sup> Admission rate populations vary by type of condition. Diabetes, circulatory diseases, adult asthma, and chronic obstructive pulmonary disease include individuals 18 years and older; pediatric asthma and pediatric gastroenteritis include children less than 18 years of age; bacterial pneumonia, dehydration, urinary tract infections, and perforated appendix include individuals of all ages; low-weight births include neonates only.

# Is community income related to preventable hospitalization rates?

The likelihood of hospitalization increases dramatically as median community income decreases. Residents from areas with the lowest median incomes (<\$25,000) have the highest rates of admission for every preventable hospitalization indicator. When comparing communities with the lowest incomes to those with the highest incomes, differences in admission rates range from 5 to 74 percent. The greatest amount of variation between the lowest and highest income areas occurs for treatment of:

- Uncontrolled diabetes without complications
- Hypertension
- Short-term diabetes complications
- Adult asthma

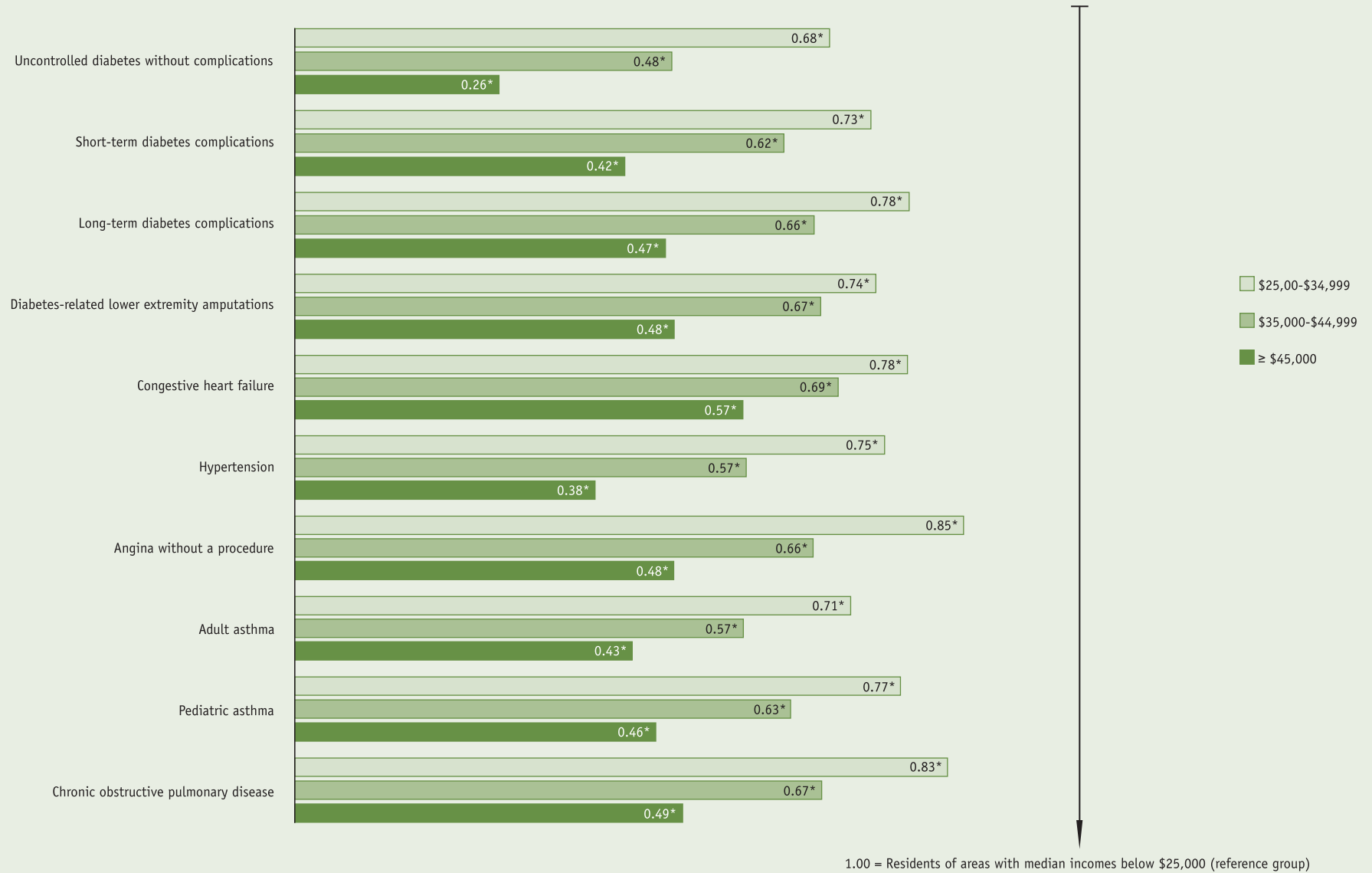
Community income disparities are less pronounced for treatment of acute conditions than for chronic conditions. For the 5 acute conditions, admission rates are 6 to 78 percent higher among individuals from the lowest income communities, as compared with residents from areas with median incomes of \$45,000 or more.

In contrast, rates of hospitalization vary considerably for treatment of the 10 chronic conditions. Among these conditions, differences in admission rates range from 76 to 278 percent between the lowest and highest income communities. For 9 of these conditions, admission rates are at least 2 times higher among lowest income residents, as compared with residents of the highest income areas.



### Income Disparities in Preventable Hospitalizations for Chronic Conditions

HOSPITALIZATION RATES PER 100,000 POPULATION,<sup>a</sup> 2000  
RESIDENTS OF HIGHER INCOME AREAS RELATIVE TO RESIDENTS OF AREAS WITH INCOMES BELOW \$25,000

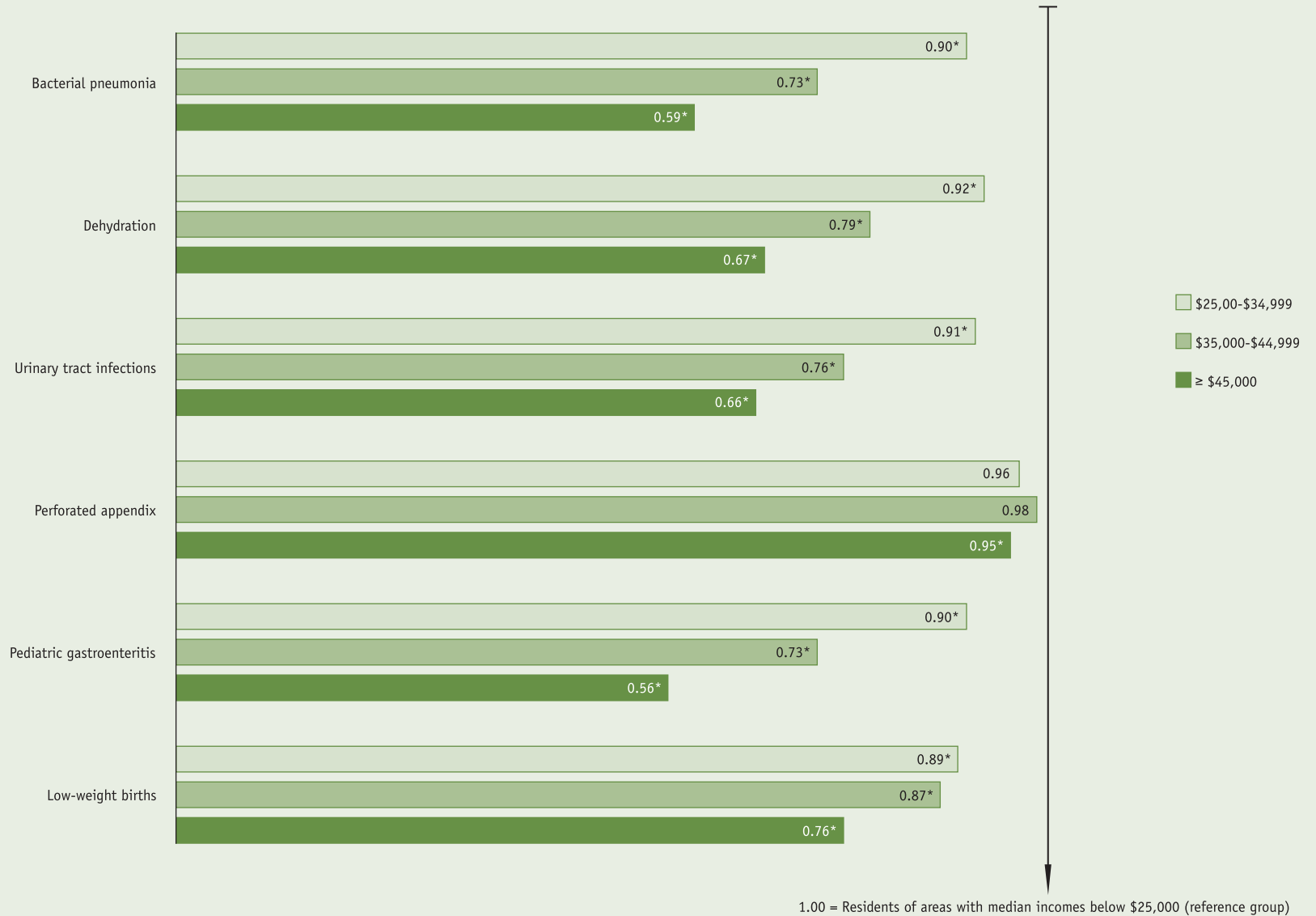


\* = statistically different at  $p \leq 0.05$  relative to residents of low-income areas ( $< \$25,000$ ). Rates are adjusted by age and sex, using year 2000 as the standard population.  
<sup>a</sup> Admission rate populations vary by type of condition. Diabetes, circulatory diseases, adult asthma, and chronic obstructive pulmonary disease include individuals 18 years and older; pediatric asthma includes children less than 18 years of age.

## Differences Among Priority Populations

### Income Disparities in Preventable Hospitalizations for Acute Conditions and Birth Outcomes

HOSPITALIZATION RATES PER 100,000 POPULATION,<sup>a</sup> 2000  
RESIDENTS OF HIGHER INCOME AREAS RELATIVE TO RESIDENTS OF AREAS WITH INCOMES BELOW \$25,000



\* = statistically different at  $p \leq 0.05$  relative to residents of low-income areas ( $< \$25,000$ ). Rates are adjusted by age and sex, using year 2000 as the standard population.  
<sup>a</sup> Admission rate populations vary by type of condition. Bacterial pneumonia, dehydration, urinary tract infections, and perforated appendix include individuals of all ages; pediatric gastroenteritis includes children less than 18 years of age; low-weight births include neonates only.

# Do admission rates for preventable conditions differ between urban and rural residents?

Hospitalization rates for certain conditions vary by location of patient residence; when differences occur, rural residents are consistently at higher risk for being admitted to the hospital.

Hospitalization rates are comparable between urban and rural residents for 6 of the 10 chronic conditions. However, rural residents are more likely to be admitted to the hospital for:

- Uncontrolled diabetes without complications
- Hypertension
- Angina without a procedure
- Chronic obstructive pulmonary disease

More room for improvement exists among the acute conditions. Rural residents have higher rates of admission for almost every acute condition, including:

- Bacterial pneumonia
- Dehydration
- Urinary tract infections
- Pediatric gastroenteritis

The sole exception among acute conditions is perforated appendix, where the likelihood of admission is similar for urban and rural dwellers.

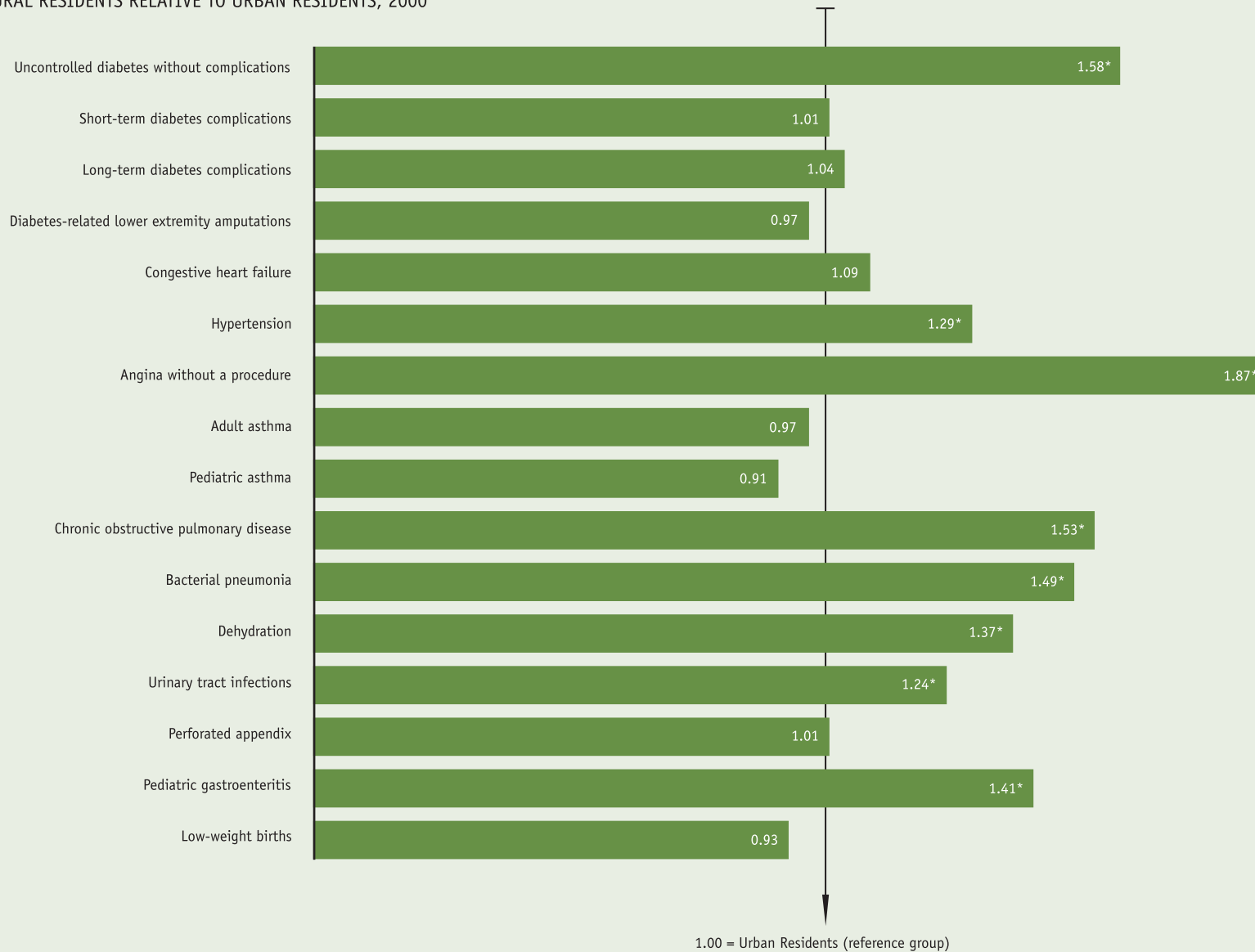
Rural residents may consistently have higher rates of hospitalization for acute conditions because of difficulty in accessing care. For example, compared with urban residents, rural residents may have fewer alternatives to hospital treatment. It is also possible that individual care-seeking behaviors and admission thresholds may differ between urban and rural populations. In addition, environmental factors that increase an individual's susceptibility to particular conditions may vary between urban and rural areas.

In recent years, decisionmakers and researchers have placed increased attention on the health and availability of high quality care for rural Americans. As more information becomes available, health care leaders may be able to identify and address the potential disparities experienced by this population.

## Differences Among Priority Populations

### Preventable Hospitalization Rates per 100,000 Population<sup>a</sup>

RURAL RESIDENTS RELATIVE TO URBAN RESIDENTS, 2000



\* = statistically different at  $p \leq 0.05$  relative to urban residents. Rates are adjusted by age and sex, using year 2000 as the standard population.

<sup>a</sup> Admission rate populations vary by type of condition. Diabetes, circulatory diseases, adult asthma, and chronic obstructive pulmonary disease include individuals 18 years and older; pediatric asthma and pediatric gastroenteritis include children less than 18 years of age; bacterial pneumonia, dehydration, urinary tract infections, and perforated appendix include individuals of all ages; low-weight births include neonates only.



**PART II:**  
**Detailed Statistics by**  
**Health Condition**

# DIABETES:

*Uncontrolled Diabetes  
Without Complications,  
Short-Term Complications,  
Long-Term Complications, and  
Diabetes-Related Lower Extremity  
Amputations*



## BACKGROUND:

More than 18 million Americans (6 percent of the population) have diabetes, though experts estimate that nearly 30 percent of this population remains undiagnosed. The number of people diagnosed with this condition is expected to increase 44 percent by 2020. Among those at highest risk are older Americans: the number of diagnosed patients among this population is expected to increase 56 percent within this same time period.<sup>2</sup> The increase in diabetes has been linked to a number of other factors, including the rise in obesity in the United States observed within the last 2 decades.<sup>3, 4, 5</sup>

The costs of treating this chronic disease are tremendous. The American Diabetes Association estimates that the total national cost of diabetes was \$132 billion in 2002; of this figure, nearly \$92 billion was spent on direct medical costs, and \$40 billion went toward indirect costs related to disability, work loss, and premature mortality.<sup>6</sup>

The Institute of Medicine has identified this disease as a priority area for improvement of health care quality.<sup>7</sup> Providing high quality care for diabetes management and treatment engages the health care system at all levels. Providers need to ensure that patients are properly diagnosed, educated, and treated. Furthermore, individuals with diabetes need to proactively manage their disease and work toward preventing secondary complications.

Timely diagnosis, effective ambulatory care, and appropriate disease management may reduce the need for hospital admissions for diabetes. *Healthy People 2010*, a report issued by the U.S. Department of Health and Human Services, established a target hospitalization rate of 54 per 100,000 population for persons 18–64 years of age with uncontrolled diabetes.<sup>8</sup> This goal applies to individuals treated for uncontrolled diabetes with and without short-term complications.

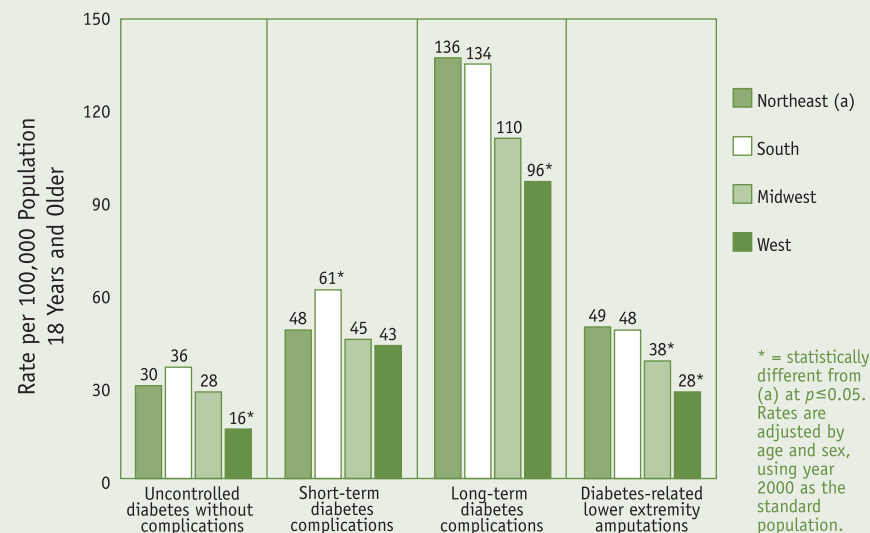
### Adult Admissions for Diabetes-Related Conditions

U.S. TRENDS, 1994–2000



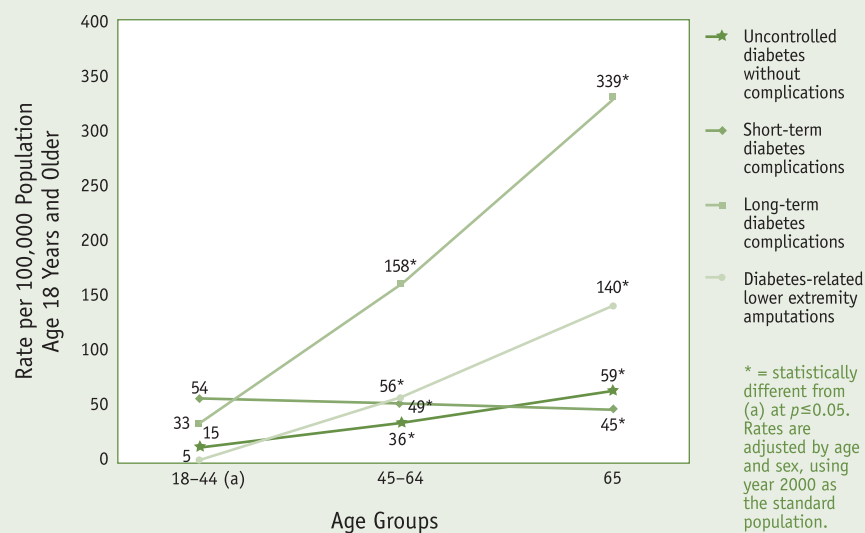
### Adult Admissions for Diabetes-Related Conditions

REGION, 2000



### Adult Admissions for Diabetes-Related Conditions

AGE, 2000

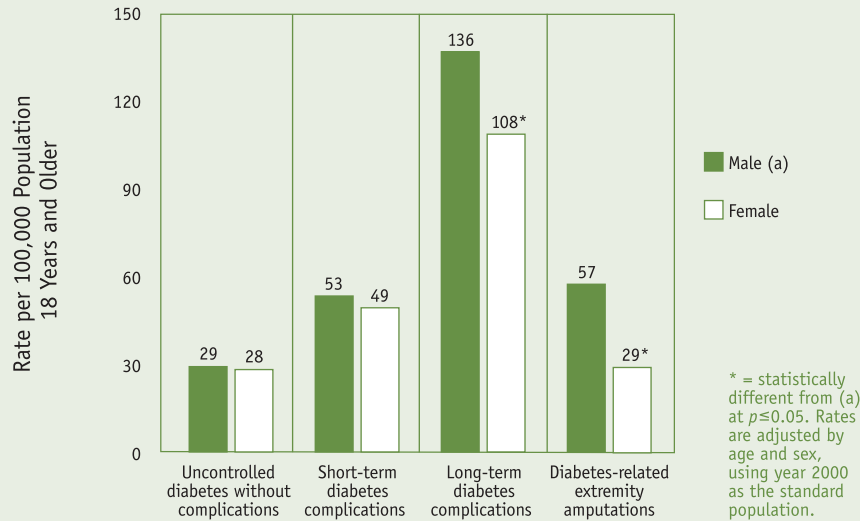


- Hospitalization rates for uncontrolled diabetes without complications dropped by nearly 30 percent between 1994 and 2000, while rates for short-term complications increased by 9 percent.
- The West has the lowest rates of hospitalization across all 4 diabetes-related indicators. Geographic variation is greatest for treatment of uncontrolled diabetes without complications; for this condition, admissions vary by more than 100 percent between the regions with the highest and lowest rates.
- Compared with adults 18–44 years of age, the elderly are more likely to be hospitalized for the long-term complications of diabetes but less likely for short-term complications.

## Chronic Conditions

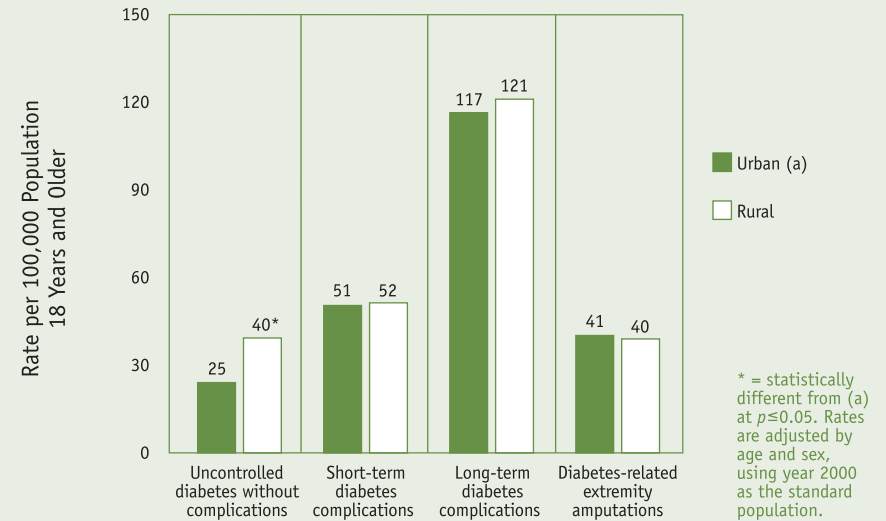
### Adult Admissions for Diabetes-Related Conditions

GENDER, 2000



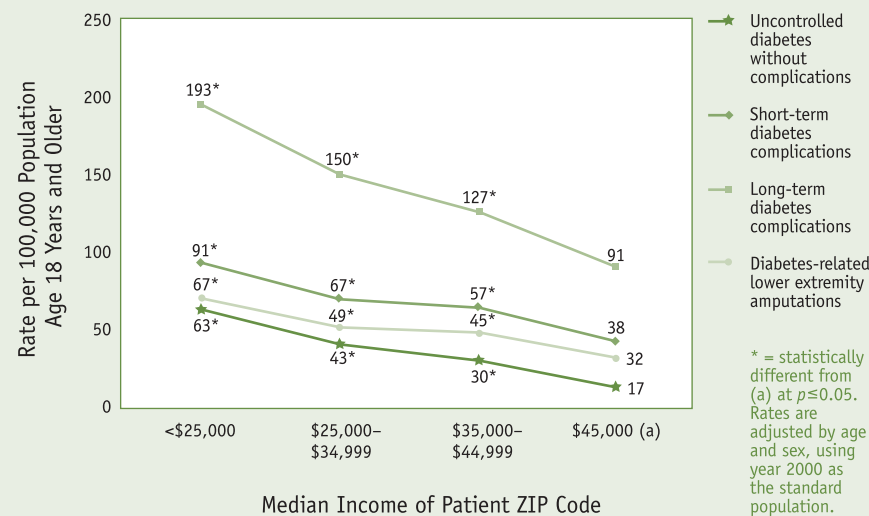
### Adult Admissions for Diabetes-Related Conditions

PATIENT RESIDENCE, 2000



### Adult Admissions for Diabetes-Related Conditions

MEDIAN INCOME OF PATIENT ZIP CODE, 2000



- Women are 50 percent less likely than men to experience diabetes-related lower extremity amputations during hospitalization.
- Dramatic differences exist across community income groups; residents from the lowest income areas have the highest rates of hospitalization for all diabetes-related conditions.
- Although admission rates for most diabetes-related indicators do not vary by patient residence, rural residents are more likely than urban dwellers to be admitted to the hospital for uncontrolled diabetes without complications.

# CIRCULATORY DISEASES:

## *Congestive Heart Failure, Hypertension, and Angina Without a Procedure*

### BACKGROUND:

Congestive heart failure, hypertension, and angina without a procedure are related to the priority areas identified by the Institute of Medicine for improving the health of the U.S. population.<sup>9</sup>

People suffering from congestive heart failure (CHF) typically have high rates of hospitalization. The elderly are at especially high risk for this condition. In fact, CHF is the most frequent discharge diagnosis among Medicare beneficiaries. In 1999, Medicare paid \$3.6 billion for treatment of this disease. Furthermore, approximately 5 million Americans of all ages have been diagnosed with CHF; the associated costs amount to nearly \$29 billion.<sup>10</sup>

Hypertension has also sparked great concern within the U.S. This condition now affects more than 50 million Americans, representing roughly 25 percent of the adult population.<sup>11</sup> According to the American

Heart Association, the lifetime risk of developing hypertension is approximately 90 percent for adults between ages 55 and 65; one-third of those affected are not even aware they have this condition.<sup>12, 13</sup> In 2004, the total cost of treating hypertensive patients was estimated to be \$55.5 billion, and 75 percent of these expenses were allocated for direct medical costs.<sup>14</sup>

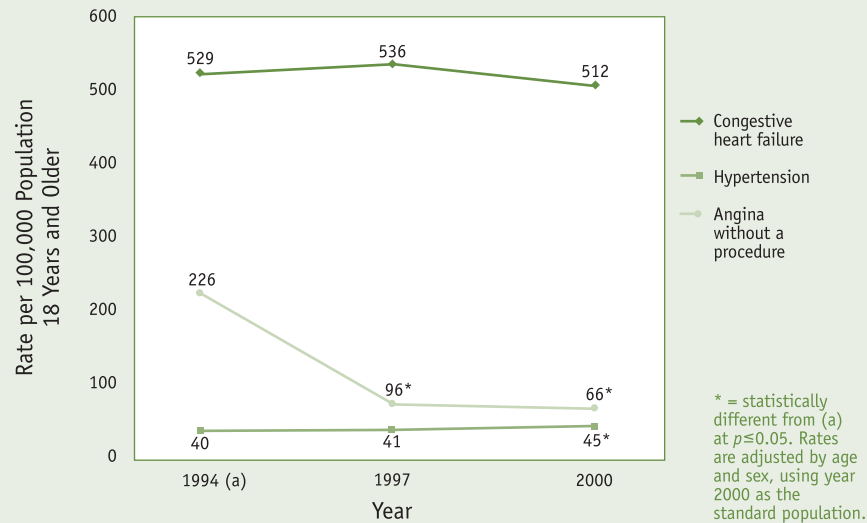
While less widespread, angina without a procedure persists as a significant health condition in the U.S. In 2001, approximately 7 million people were diagnosed with angina.<sup>15</sup> The American Heart Association estimates that 27 percent of men and 14 percent of women will develop this condition within 6 years of experiencing a heart attack.<sup>16</sup> While not all angina admissions are preventable, it may be possible to effectively manage this condition on an outpatient basis if diagnostic procedures and/or surgical interventions are not required.

Although occasional hospitalization may be necessary, each of these conditions can usually be controlled in outpatient settings. Patient compliance with treatment and appropriate lifestyle behaviors may lower the likelihood of hospitalization, and admission rates may be further reduced by ensuring access to high quality outpatient care.

## Chronic Conditions

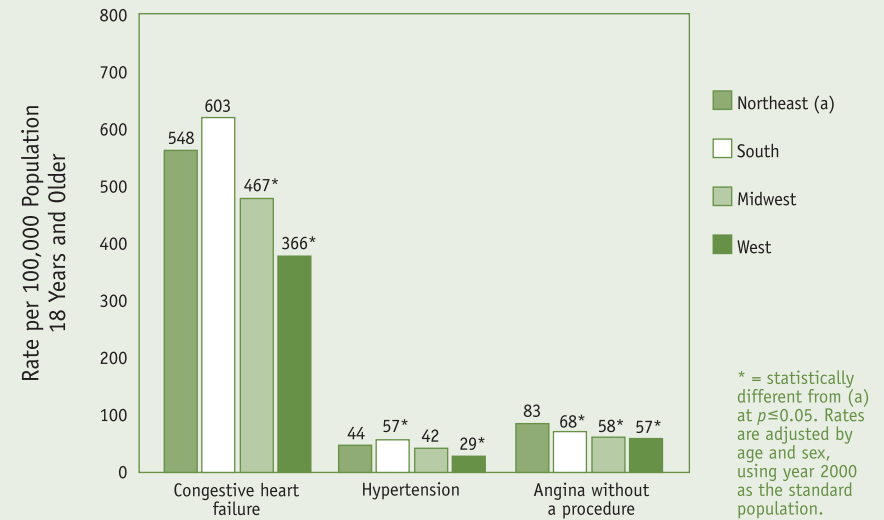
### Adult Admissions for Circulatory Diseases

U.S. TRENDS, 1994–2000



### Adult Admissions for Circulatory Diseases

REGION, 2000

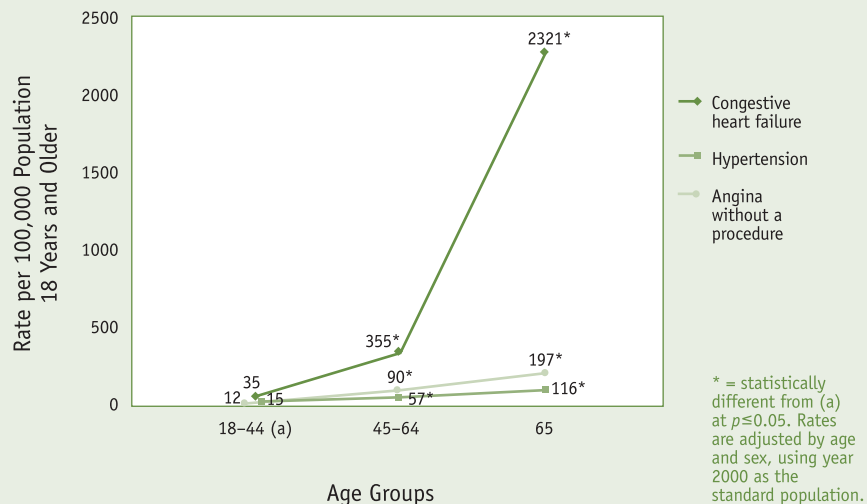


- Admission rates for angina without a procedure decreased markedly between 1994 and 2000, dropping by 71 percent (to 66 admissions per 100,000 population).<sup>iv</sup>
- Regional variation is greatest among hypertension admissions; hospitalization rates in the South are nearly twice as high as rates in the West, the region characterized by the lowest admission rates.
- The likelihood of hospitalization increases as community income decreases; this inverse relationship is most apparent for treatment of CHF.
- Rural residents are 87 percent more likely than urban residents to be admitted for treatment of angina without a procedure.

<sup>iv</sup>This decline in admissions may be related to several factors, including increased use of procedures; shifting care from inpatient to outpatient settings; improved clinical training, technology, and patient ability to recognize symptoms; and more effective drugs.

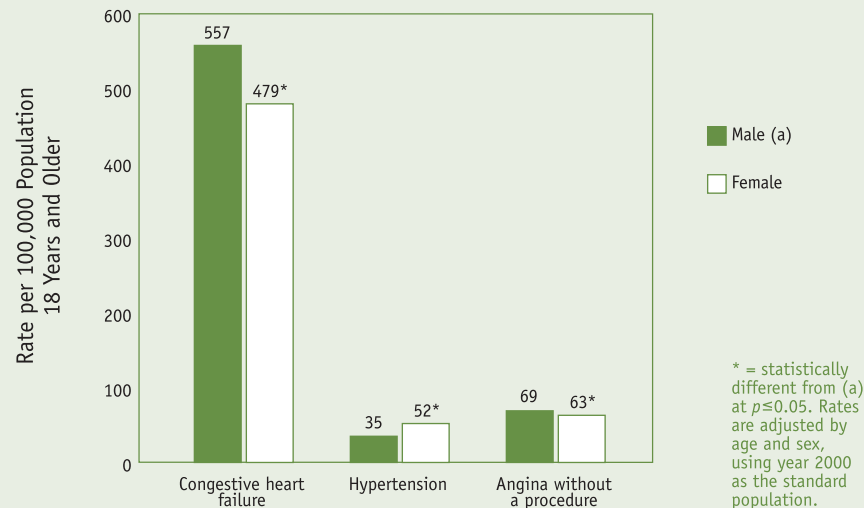
### Adult Admissions for Circulatory Diseases

AGE, 2000



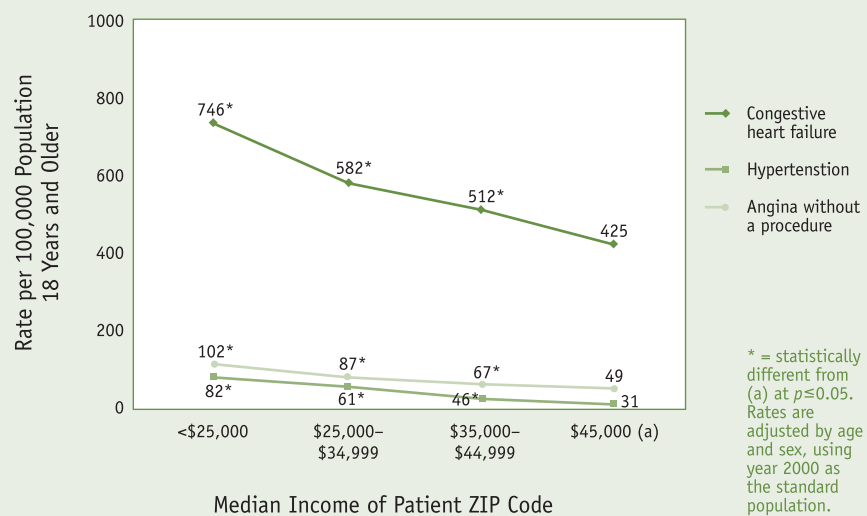
### Adult Admissions for Circulatory Diseases

GENDER, 2000



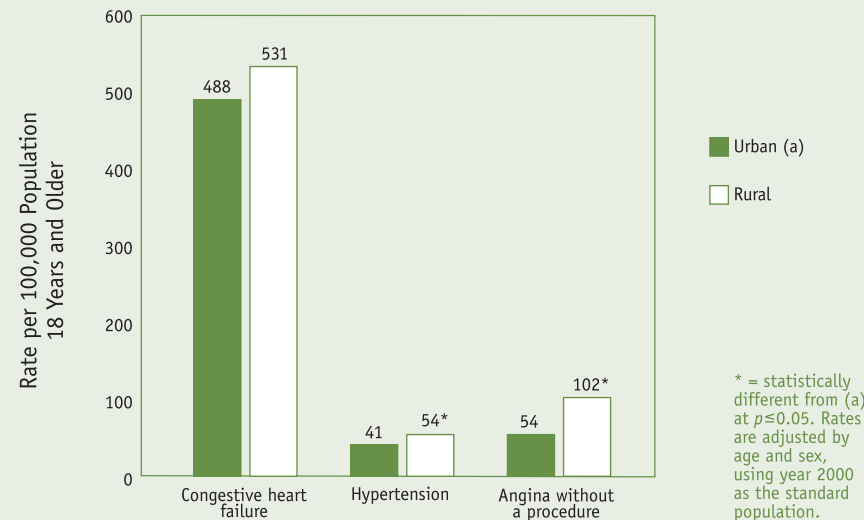
### Adult Admissions for Circulatory Diseases

MEDIAN INCOME OF PATIENT ZIP CODE, 2000



### Adult Admissions for Circulatory Diseases

PATIENT RESIDENCE, 2000



# RESPIRATORY DISEASES:

## *Adult Asthma, Pediatric Asthma, and Chronic Obstructive Pulmonary Disease*

### BACKGROUND:

The number of Americans diagnosed with asthma has more than doubled since 1985; by 2000, more than 25 million Americans had been diagnosed with this chronic condition.<sup>17, 18</sup> Vulnerable populations at highest risk of acquiring asthma include children and low-income persons.<sup>19</sup> The American Lung Association reports that total national direct costs amount to more than \$9 billion annually, while indirect costs arising from lost productivity equal approximately \$4.5 billion.<sup>20</sup> Despite the vast resources spent on treating this disease, asthmatic patients continue to experience serious consequences. Each year, asthma results in nearly 2 million visits to the emergency room and roughly 5,000 deaths.<sup>21</sup> Death from asthma sparks particular concern because this outcome is almost always avoidable with timely and effective care.

While asthma prevalence has increased over time, hospitalizations for this condition improved between 1994 and 2000. However, current admission rates still fall short of the objectives set forth by the U.S. Department of Health and Human Services. In its report, *Healthy People 2010*, the Department establishes target hospitalization rates of 77 per 100,000 population for people ages 5–65 years, and 25 per 100,000 population for children under the age of 5 years.<sup>22</sup> Although the PQIs focus on different age groups, the results presented in the following pages illustrate that more work is needed to attain these goals. In 2000, admission rates were 201 per 100,000 children 0–17 years of age, and 113 per 100,000 adults 18 years and older.

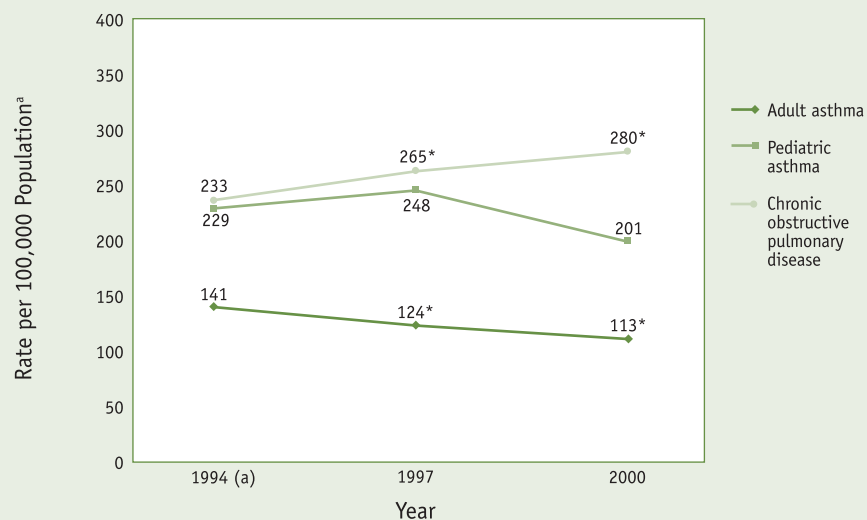
Chronic obstructive pulmonary disease (COPD) also warrants attention, particularly because of the large number of cases that are not diagnosed. In 2001, when more than 12 million adults were diagnosed with COPD, experts estimate that an additional 16 million remained undiagnosed and, therefore, untreated.<sup>23, 24</sup> Failure to treat patients with COPD is a significant problem because this disease can be fatal. In fact, COPD is the fourth leading cause of death in the United States.<sup>25</sup> Furthermore, COPD is a costly disease. In 2000, national COPD costs totaled more than \$32 billion; this amount was split nearly evenly between direct and indirect costs.<sup>26</sup>

For most populations, asthma and COPD can often be managed with proper outpatient therapy, patient compliance with treatment, and abstinence from smoking. These factors, combined with access to high quality primary and preventive care, can reduce the severity of these conditions and the need for hospitalization.



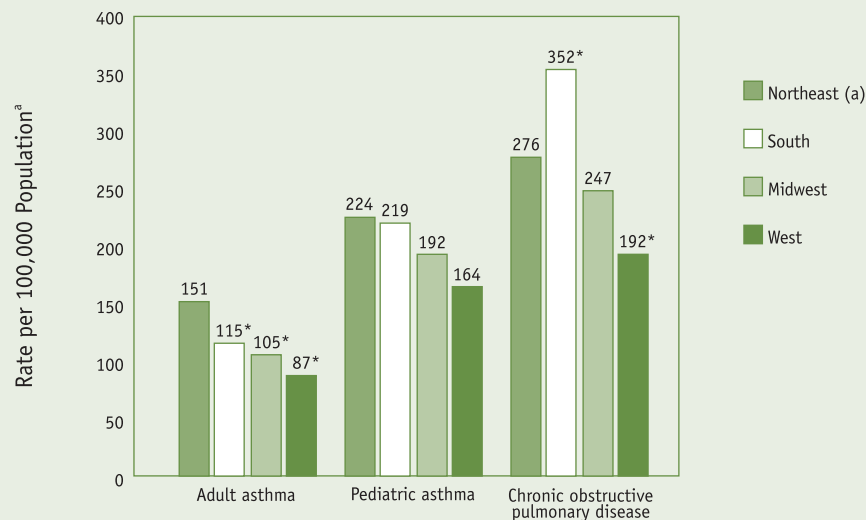
### Admissions for Respiratory Diseases

U.S. TRENDS, 1994–2000



### Admissions for Respiratory Diseases

REGION, 2000



- Admission rates for asthma improved over time: adults experienced a steady decline in admissions between 1994 and 2000, and children were much less likely to be hospitalized in 2000 than in 1997.
- COPD admissions rose substantially during the 6-year study period; hospitalization rates increased by 20 percent.
- Variation in hospitalizations is most dramatic for treatment of COPD; hospitalization rates in the West are nearly half the rates observed in the South, the region with the highest admission rates.

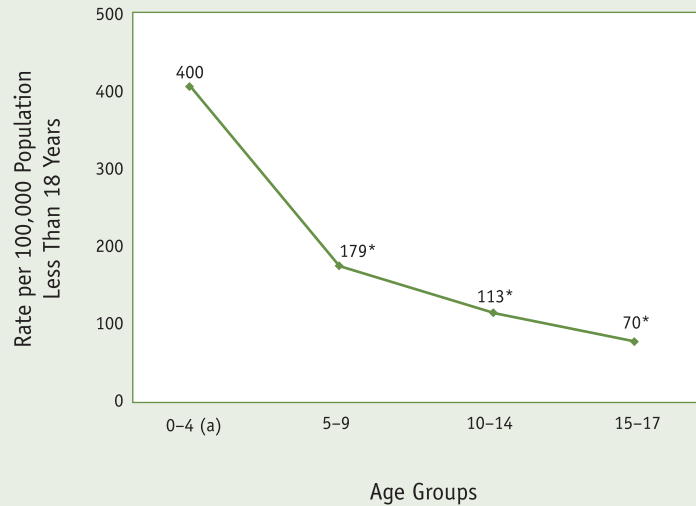
\* = statistically different from (a) at  $p \leq 0.05$ . Rates are adjusted by age and sex, using year 2000 as the standard population.

<sup>a</sup> Admission rate populations vary by type of condition. Adult asthma and chronic obstructive pulmonary disease include individuals 18 years and older, and pediatric asthma includes children less than 18 years of age.

## Chronic Conditions

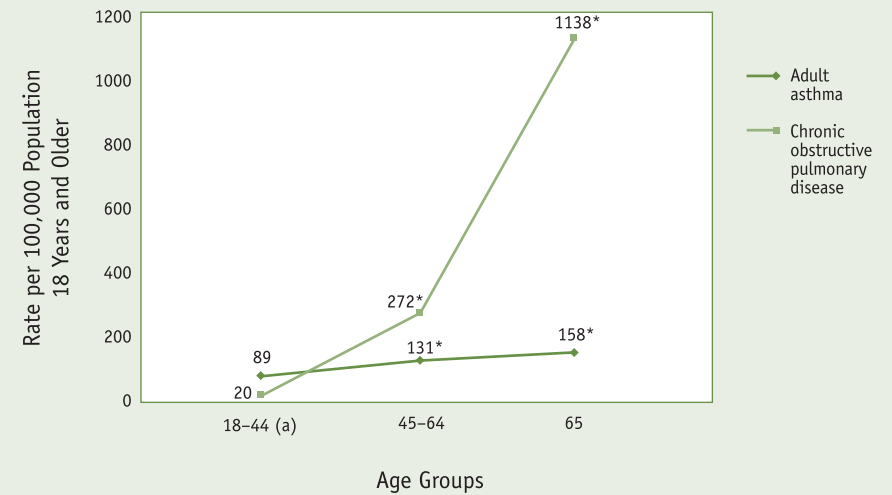
### Admissions for Respiratory Diseases

PEDIATRIC ASTHMA; AGE, 2000



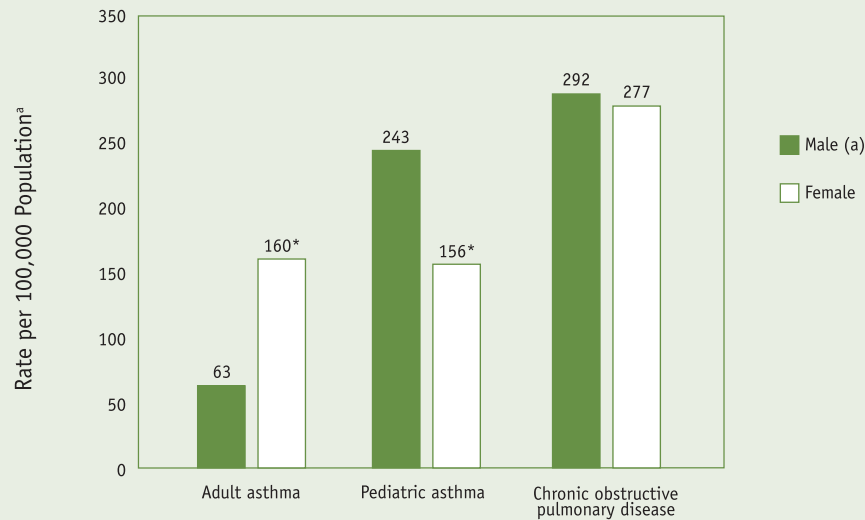
### Admissions for Respiratory Diseases

ADULT ASTHMA AND COPD; AGE, 2000



### Admissions for Respiratory Diseases

GENDER, 2000



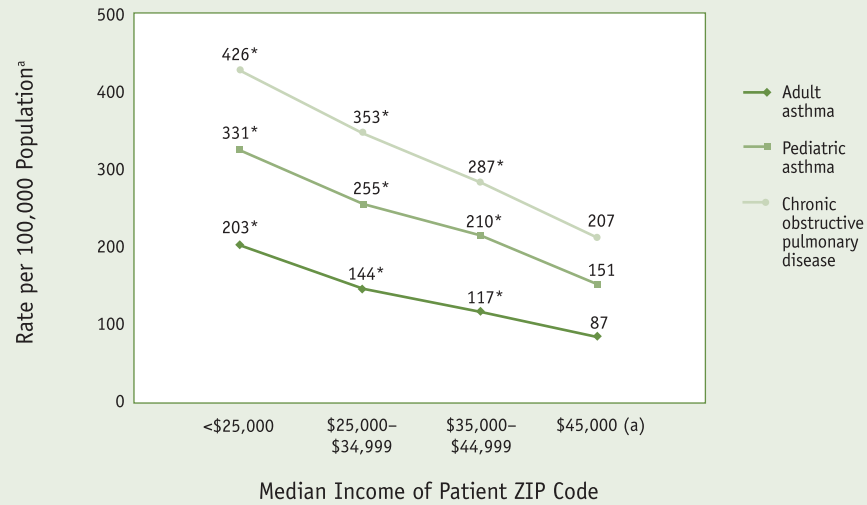
- Likelihood of admission is related to patient age: children below the age of 5 are 2 to 6 times more likely to be hospitalized for asthma than are older children, and adults 65 and above are more than 4 times more likely to be admitted for COPD than adults 45-64 years of age.
- Adult asthma admission rates are 2.5 times higher for women than for men, whereas pediatric asthma admission rates are nearly one-third lower for girls than for boys.
- For each of the 3 respiratory diseases, hospital admission rates decline as community income rises; rates are more than 2 times higher for residents of low-income areas than for residents of the highest income areas.

\* = statistically different from (a) at  $p \leq 0.05$ . Rates are adjusted by age and sex, using year 2000 as the standard population.

<sup>a</sup> Admission rate populations vary by type of condition. Adult asthma and chronic obstructive pulmonary disease include individuals 18 years and older, while pediatric asthma includes children less than 18 years of age.

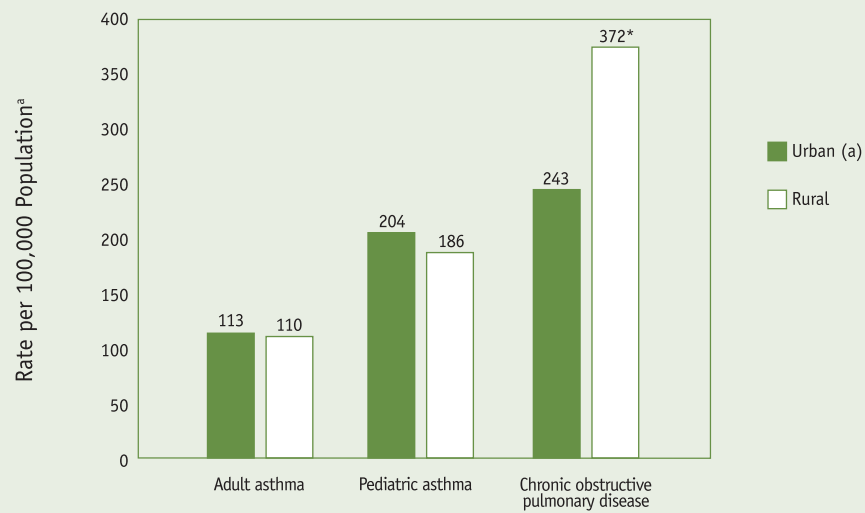
### Admissions for Respiratory Diseases

MEDIAN INCOME OF PATIENT ZIP CODE, 2000



### Admissions for Respiratory Diseases

PATIENT RESIDENCE, 2000



# ACUTE CONDITIONS:

*Bacterial Pneumonia,  
Dehydration,  
Urinary Tract Infections,  
Perforated Appendix, and  
Pediatric Gastroenteritis*



## BACKGROUND:

Several acute conditions pose significant challenges for the U.S. health care system. Many of these, such as bacterial pneumonia, dehydration, urinary tract infections, and perforated appendix, impact people of all ages. Each of these conditions may pose greater risks for specific subgroups, and others may target limited populations. For example, gastroenteritis is considered a potentially serious health problem among children.

The most common form of bacterial pneumonia is pneumococcal pneumonia, which accounts for 9 out of 10 disease cases. This condition results in as many as 800,000 hospitalizations each year.<sup>27</sup> Older Americans are particularly susceptible, although research indicates that vaccines can be 45 percent effective in preventing the need for hospitalization among this population during peak seasons.<sup>28</sup> Furthermore, this condition can often be treated with antibiotics, and prompt, effective outpatient treatment can help prevent unnecessary hospital admissions.

Certain populations are especially vulnerable to dehydration, including older Americans and very young children. This condition can often be treated in outpatient settings and, in many cases, hospital treatment may be unnecessary. However, inadequate treatment can result in serious complications, including mortality.<sup>29</sup>

Urinary tract infections (UTIs) are most common among women, although some men may also experience these types of infections. Estimates indicate that 50 to 80 percent of women develop at least 1 UTI during their lifetime, compared with 12 percent of men.<sup>30,31</sup> Approximately 20 to 50 percent of all women experience recurrent infections and each year 11 percent of American women report suffering from UTIs.<sup>32,33</sup> These infections are treated most frequently with antibiotics; the annual national cost of UTI prescriptions was estimated at more than \$1.5 billion in 1995.<sup>34</sup>

Perforated appendix occurs when appropriate treatment for acute appendicitis is delayed. Delays may arise from providers' misdiagnosis, a patient's failure to interpret symptoms as important, or system factors preventing timely access to surgery (e.g., hospital surgical rooms are occupied when needed). On the other hand, prompt diagnosis and treatment generally prevent the progression of acute appendicitis to rupture and, thus, reduce the incidence of perforated appendix. Consequently, hospitalizations involving treatment for this condition suggest difficulties in 1 or more of the previously described areas.

Pediatric gastroenteritis is the irritation and inflammation of a child's digestive tract and can be the result of a number of factors, including food poisoning, viral infection, and intestinal parasites. This condition is often treatable in primary care settings with proper hydration and high quality care. Yet, it remains one of the most common reasons for hospitalization among children. Each year, pediatric gastroenteritis accounts for approximately 10 percent of all hospitalizations for children under 5 years of age.<sup>35</sup>

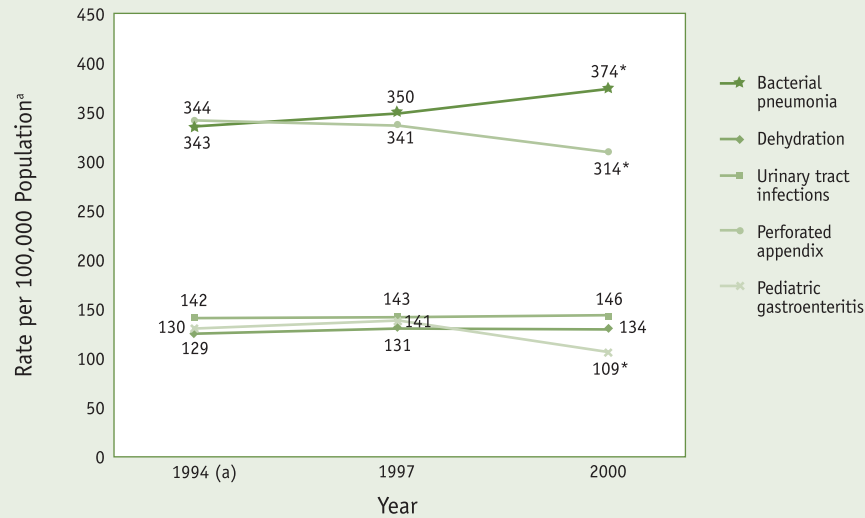
Several factors can reduce the likelihood of contracting these conditions. Safe environmental surroundings and proper hygiene can help prevent exposure to many of these illnesses. In addition, if patients seek treatment soon after experiencing symptoms, and if physicians provide high quality treatment in outpatient settings, the need for hospitalization can be decreased significantly. Therefore, rates of hospital admission may be used to evaluate the quality of primary and preventive care, and lower admission rates may reflect better overall access and quality of care provided in outpatient settings.



## Acute Conditions

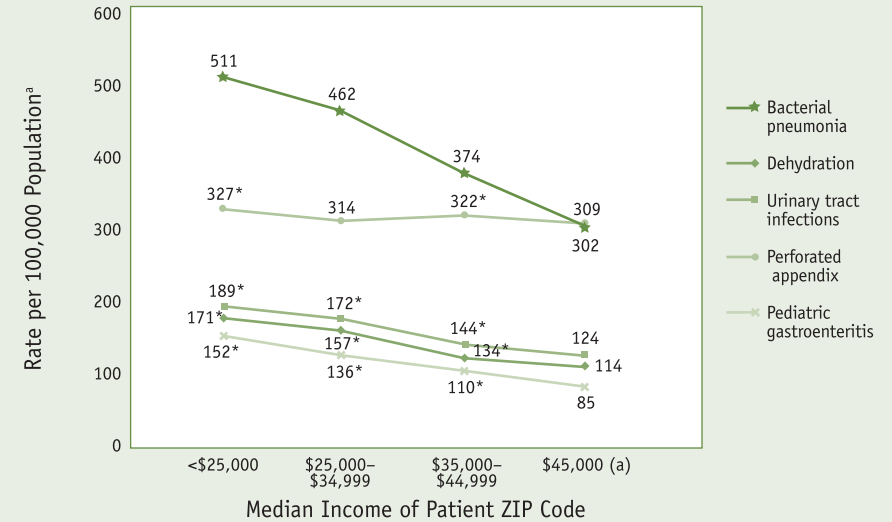
### Admissions for Acute Conditions

U.S. TRENDS, 1994–2000



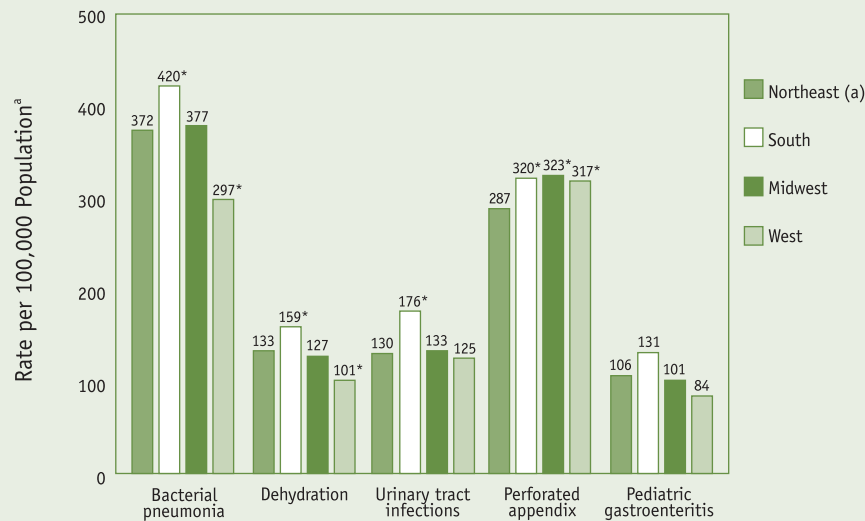
### Admissions for Acute Conditions

Median Income of Patient ZIP Code, 2000



### Admissions for Acute Conditions

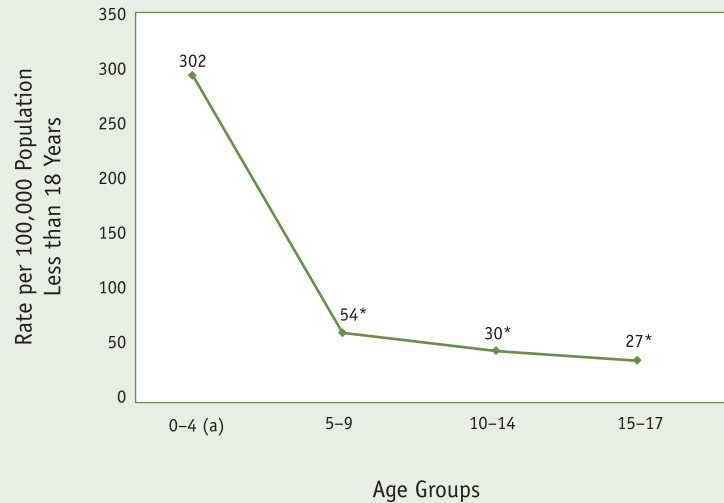
REGION, 2000



- Between 1994 and 2000, hospitalization rates for perforated appendix decreased 9 percent, rates for dehydration and urinary tract infection did not change substantially, and rates for bacterial pneumonia increased by 9 percent.
- The South has the highest admission rates and the West has the lowest admission rates for 4 of 5 acute conditions.
- Among hospitalizations involving treatment for perforated appendix, the Northeast has the lowest rate, while the 3 other Census regions have comparable rates of roughly 320 admissions per 100,000 population.
- The likelihood of hospital admission is inversely related to community income: residents from the lowest income areas are more likely than residents of higher income areas to be hospitalized for each of the acute conditions.

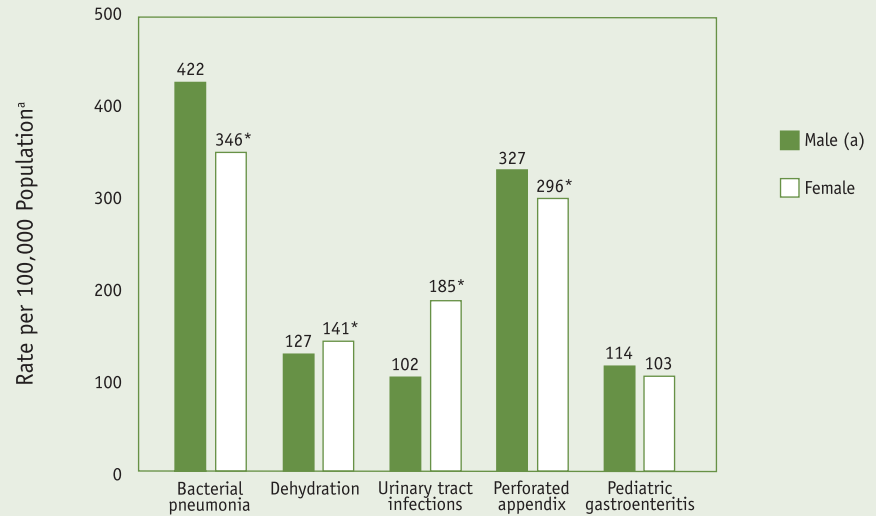
### Admissions for Acute Conditions

PEDIATRIC GASTROENTERITIS ADMISSIONS; AGE, 2000



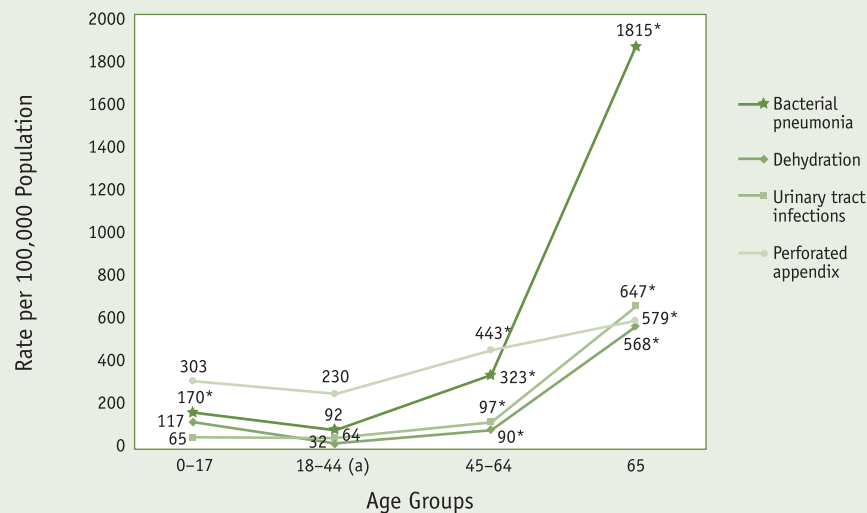
### Admissions for Acute Conditions

GENDER, 2000



### Admissions for Acute Conditions

AGE, 2000



- Young children age 0–4 years are 6 to 11 times more likely to be hospitalized for pediatric gastroenteritis than older children.
- Among adults, preventable hospitalization rates for acute conditions increase substantially with age. The elderly are 5 to 6 times more likely to be admitted for bacterial pneumonia, dehydration, and urinary tract infections than adults 45–64 years of age.
- Compared with men, women have higher admission rates for dehydration and urinary tract infections but lower rates for bacterial pneumonia and perforated appendix.

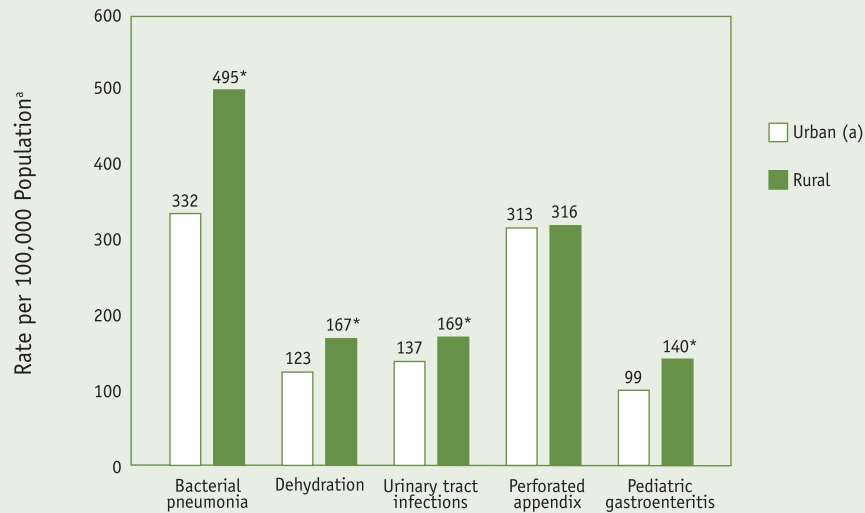
\* = statistically different from (a) at  $p \leq 0.05$ . Rates are adjusted by age and sex, using year 2000 as the standard population.

^ Admission rate populations vary by type of condition. Bacterial pneumonia, dehydration, urinary tract infections, and perforated appendix include individuals of all ages; pediatric gastroenteritis includes children less than 18 years of age.

## Acute Conditions

### Admissions for Acute Conditions

PATIENT RESIDENCE, 2000



- Admission rates are higher among rural residents for 4 of 5 acute conditions: bacterial pneumonia, dehydration, urinary tract infection, and pediatric gastroenteritis.

\* = statistically different from (a) at  $p \leq 0.05$ . Rates are adjusted by age and sex, using year 2000 as the standard population.

<sup>a</sup> Admission rate populations vary by type of condition. Bacterial pneumonia, dehydration, urinary tract infections, and perforated appendix include individuals of all ages; pediatric gastroenteritis includes children less than 18 years of age.





# BIRTH OUTCOMES:

## *Low-Weight Births*



### BACKGROUND:

The proportion of newborns weighing less than 2,500 grams has increased steadily since the mid-1980s. By 2002, the rate of low-weight births reached the highest level observed over the past 3 decades. This trend may be partially explained by the increased use of assisted reproductive technologies, which often results in multiple births.<sup>36</sup>

At the same time, other factors influence the likelihood of low-weight birth, such as prenatal care. Because prenatal care is delivered in primary care settings, data on these services are not widely available. As a result, it is difficult to define and evaluate the effectiveness of adequate prenatal care. However, some studies have found that mothers who obtain prenatal care have fewer low-weight newborns than women who do not receive such preventive care.<sup>37</sup> Research also suggests that the following factors may be particularly effective in preventing low-weight births: smoking cessation, proper maternal nutrition, and adequate treatment of maternal comorbidities.<sup>38</sup>

The Institute of Medicine classified pregnancy and childbirth as a priority area, and the U.S. Department of Health and Human Services' report, *Healthy People 2010*, established a goal of reducing the proportion of low birthweight infants to 50 per 1,000 of all newborns.<sup>39, 40</sup>

## Birth Outcomes

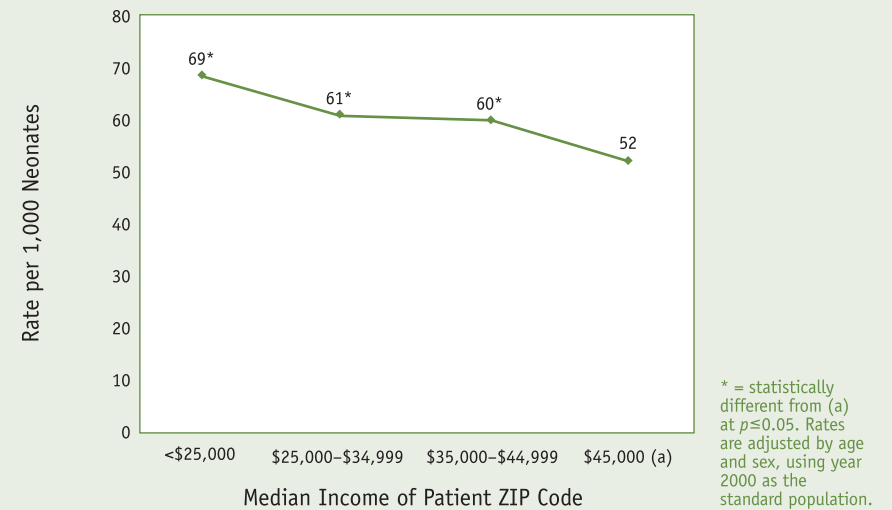
### Low-Weight Births

U.S. TRENDS, 1994–2000



### Low-Weight Births

MEDIAN INCOME OF PATIENT ZIP CODE, 2000



### Low-Weight Births

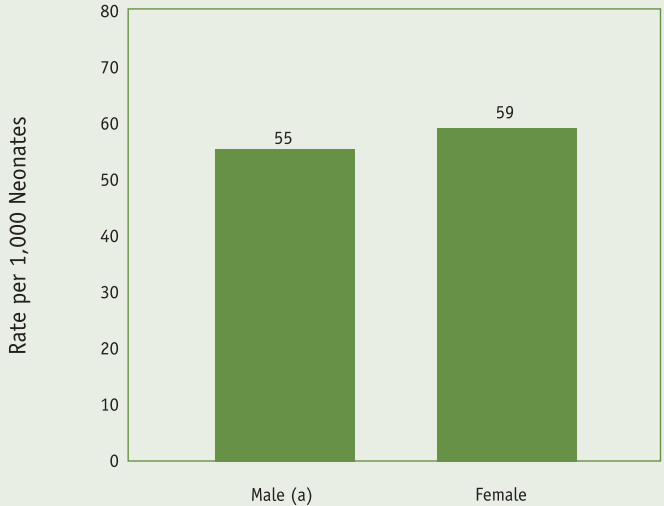
REGION, 2000



- The South has the greatest number of low-weight births per 100,000 neonates, while the West has the fewest; the West's low-weight birth rate is 15 percent below the average of the 3 other regions.
- Low-weight birth rates decline with increasing community income; rates vary by one-third between residents of the highest and lowest income areas.

### Low-Weight Births

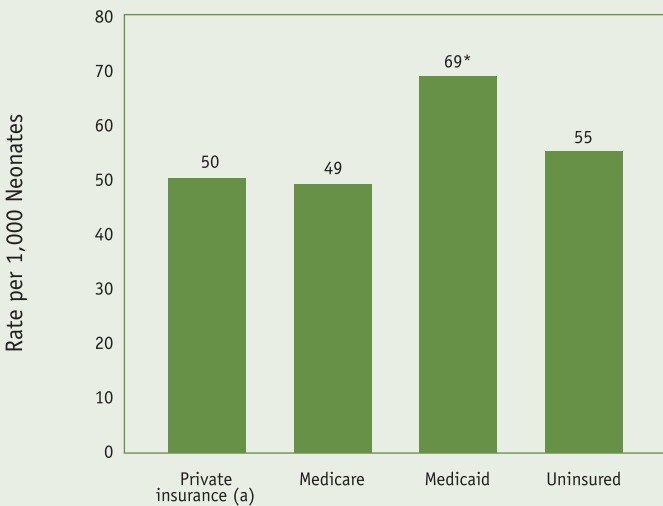
GENDER, 2000



\* = statistically different from (a) at  $p \leq 0.05$ . Rates are adjusted by age and sex, using year 2000 as the standard population.

### Low-Weight Births

EXPECTED PRIMARY PAYER, 2000



\* = statistically different from (a) at  $p \leq 0.05$ . Rates are adjusted by age and sex, using year 2000 as the standard population.

### Low-Weight Births

PATIENT RESIDENCE, 2000



\* = statistically different from (a) at  $p \leq 0.05$ . Rates are adjusted by age and sex, using year 2000 as the standard population.

- Rates of low-weight births are comparable between newborns with private insurance and those who are uninsured.<sup>v</sup>
- Medicaid enrollees have higher low-weight birth rates than any other payer group; rates are 38 percent higher for newborns covered by Medicaid than for newborns with private insurance.

<sup>v</sup>When calculating admission rates, the Low-Weight Birth PQI uses the number of neonates in the denominator. Because HCUP databases provide the number of births, it is possible to calculate rates for each payer group and make comparisons. All other PQIs use population-based denominators, which are available through the U.S. Census, Current Population Survey, and Claritas Census projections. These data sources define payer groups differently than the HCUP databases; therefore, it is not possible to calculate admission rates by payer categories for all other PQIs.

## Birth Outcomes





# AHRQ Prevention Quality Indicators

The Prevention Quality Indicators (PQIs) are a set of measures that can be used with hospital inpatient discharge data to identify “ambulatory care sensitive conditions.” These are 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.<sup>41,42</sup>

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, individuals 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.

The PQIs consist of the 16 ambulatory care sensitive conditions listed on this page.

For more information on the Prevention Quality Indicators, download the documentation and software available at <http://www.qualityindicators.ahrq.gov/data/hcup/prevqi.htm>.

For questions regarding the AHRQ Quality Indicators, e-mail the AHRQ Quality Indicator Support Team at [support@qualityindicators.ahrq.gov](mailto:support@qualityindicators.ahrq.gov).

## CHRONIC CONDITIONS

### Diabetes

- Uncontrolled diabetes without complications
- Short-term diabetes complications
- Long-term diabetes complications
- Lower-extremity amputation among patients with diabetes

### Circulatory Diseases

- Congestive heart failure
- Hypertension
- Angina without a procedure

### Respiratory Diseases

- Adult asthma
- Pediatric asthma
- Chronic obstructive pulmonary disease

## ACUTE CONDITIONS

- Bacterial pneumonia
- Dehydration
- Urinary tract infection
- Perforated appendix
- Pediatric gastroenteritis

## BIRTH OUTCOMES

- Low-weight birth

# Source of Data for This Report

The results presented in this report are drawn from the Healthcare Cost and Utilization Project (HCUP), a Federal-State-Industry partnership to build a multi-State health care data system. This partnership is sponsored by the Agency for Healthcare Research and Quality (AHRQ) and is managed by staff in AHRQ's Center for Delivery, Organization, and Markets. HCUP is based on data collected by individual State Partner organizations (including State departments of health, hospital associations, and private agencies), which then provide the data to AHRQ. HCUP would not be possible without statewide data collection projects and their partnership with AHRQ.

For the year 2000, 29 State Partner organizations contributed data to AHRQ, where all files were validated and converted into a uniform format. The uniform HCUP databases enable comparative studies of health care services and the use and cost of hospital care, including:

- The effects of market forces on hospitals and the care they provide
- Variations in medical practice
- The effectiveness of medical technology and treatments
- Use of services by special populations.

HCUP includes short-term, non-Federal, community hospitals as defined by the American Hospital Association. This definition includes general hospitals and specialty facilities, such as pediatric, obstetrics-gynecology, and oncology hospitals. The HCUP State Inpatient Databases (SID) also include short-term rehabilitation facilities. Long-term care and psychiatric hospitals are excluded, as are substance abuse treatment facilities.



HCUP includes several sets of inpatient databases for health services research. This report is based on Nationwide Inpatient Sample (NIS) data for years 1994, 1997, and 2000.<sup>vi</sup> The NIS is the largest all-payer inpatient care database that is publicly available in the United States. The database contains data for 5 to 8 million hospital stays from roughly 1,000 hospitals sampled to approximate a 20 percent stratified sample of U.S. community hospitals.<sup>vii</sup> The data are weighted to obtain estimates representing the total number of inpatient hospital discharges in the U.S.; in the year 2000, this figure was approximately 36.4 million.

<sup>vi</sup>By 1994, 17 State Partners participated in HCUP (AZ, CA, CO, CT, FL, IL, IA, KS, MD, MA, NJ, NY, OR, PA, SC, WA and WI). By 1997, 5 additional State Partners (GA, HI, MO, TN and UT) participated. By 2000, 7 additional states (KT, ME, MI, NC, TX, VA, and WV) participated in HCUP. While Michigan participated in HCUP during 2000, Michigan data were not included in the 2000 NIS. Thus, analyses conducted for the Fact Book are based on 2000 NIS data sampled from 28 State Partner databases.

<sup>vii</sup>Starting in the year 2000, short-term rehabilitation hospitals are not included in the HCUP Nationwide Inpatient Sample (NIS).

# Methods

For this report, the AHRQ Prevention Quality Indicators are applied to the HCUP Nationwide Inpatient Sample hospital discharge databases.

The AHRQ Prevention Quality Indicators identify hospital admissions that could have been avoided, at least in part, through high quality outpatient care. These PQIs are based on existing measures that have been evaluated by health researchers and used in analytic studies.<sup>43</sup>

The AHRQ PQIs rely solely on hospital inpatient administrative data and, for this reason, serve as screens to examine quality and identify the need for more in-depth studies. The PQIs were originally developed by AHRQ staff and were recently revised and improved under contract with AHRQ by the University of California, San Francisco–Stanford University (UCSF-Stanford) Evidence-Based Practice Center.

Several steps are taken to apply the AHRQ Prevention Quality Indicators to HCUP hospital discharge data for this study:

1. QI software was reviewed and modified to allow for the generation of national estimates using a weighted NIS.
2. National, population-based data were acquired for the reporting categories in the study.
3. HCUP data were prepared for consistency over time and data sets to account for longitudinal changes in ICD-9 codes.
4. Statistical methods were developed for hypothesis testing.

The report, *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the National Healthcare Quality Report*,<sup>44</sup> available from AHRQ upon request, describes these steps in detail.



The Prevention Quality Indicators develop admission rates using HCUP inpatient hospitalization data and population data from the 2000 Census and Claritas.<sup>45</sup> Admission rates are based on principal diagnosis for all measures except diabetes-related lower extremity amputations, perforated appendix, and low-weight births. For these three PQIs, counts are included in the numerators if the condition of interest is indicated in any diagnosis field. The PQIs for perforated appendix and low-weight births use hospital discharges in the denominators, rather than general population groups. Diagnoses are identified using codes of the *International Classification of Diseases, 9<sup>th</sup> Revision, Clinical Modification* (ICD-9-CM). Risk adjustments are made for age and gender differences based on methods of direct standardization.<sup>46</sup>



# References

- <sup>1</sup>Source: Unpublished tables produced by AHRQ staff using the 2000 HCUP Nationwide Inpatient Sample. Costs are based on charges included in accounting data reported by hospitals to the Center for Medicare and Medicaid Services.
- <sup>2</sup>Centers for Disease Control and Prevention. 2002. *National Diabetes Fact Sheet*. <http://www.cdc.gov/diabetes/pubs/factsheet.htm>. Accessed December 10, 2003.
- <sup>3</sup>Mokdad A, Ford E, Bowman B, Dietz W. 2003. Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. *Journal of the American Medical Association*, 289(1):76–79.
- <sup>4</sup>Diabetes Prevention Program Research Group. 2002. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. *New England Journal of Medicine*, 346(6):393–403.
- <sup>5</sup>Centers for Disease Control and Prevention. *U.S. Obesity Trends 1985 to 2002*. <http://www.cdc.gov/nccdphp/dnpa/obesity/trend/maps/index.htm>. Accessed January 14, 2004.
- <sup>6</sup>American Diabetes Association. Costs of Diabetes in U.S., 2002. *Diabetes Care*, 26(3):917–933.
- <sup>7</sup>Institute of Medicine. 2003. *Priority Areas for National Action: Transforming Health Care Quality*. Washington, DC: National Academies Press.
- <sup>8</sup>U.S. Department of Health and Human Services. November 2000. *Healthy People 2010: Understanding and Improving Health*. 2nd ed. Washington, DC: U.S. Government Printing Office.
- <sup>9</sup>Institute of Medicine. 2003. *Priority Areas for National Action: Transforming Health Care Quality*. Washington, DC: National Academies Press.
- <sup>10</sup>American Heart Association. 2003. *Heart Disease and Stroke Statistics — 2004 Update*. Dallas, TX: American Heart Association.
- <sup>11</sup>National Institutes of Health. *High Blood Pressure*. [http://123819272.net/Diseases/Hbp/HBP\\_WholsAtRisk.html](http://123819272.net/Diseases/Hbp/HBP_WholsAtRisk.html). Accessed January 14, 2004.
- <sup>12</sup>American Heart Association. 2002. *Heart Disease and Stroke Statistics — 2003 Update*. Dallas, TX: American Heart Association.
- <sup>13</sup>American Heart Association, 2003.
- <sup>14</sup>Ibid.
- <sup>15</sup>Ibid.
- <sup>16</sup>American Heart Association, 2002.
- <sup>17</sup>U.S. Department of Health and Human Services. 2000. *Action Against Asthma: A Strategic Plan for the Department of Health and Human Services*. <http://aspe.hhs.gov/sp/asthma>. Accessed December 15, 2003.
- <sup>18</sup>Krauss, N. March 2003. *Statistical Brief #13: Asthma Treatment: Use of Medications and Devices, 2000*. Rockville, MD: Agency for Healthcare Research and Quality. [http://www.meps.ahrq.gov/PrintProducts/PrintProd\\_Detail.asp?ID=489](http://www.meps.ahrq.gov/PrintProducts/PrintProd_Detail.asp?ID=489). Accessed December 15, 2003.
- <sup>19</sup>Ibid.
- <sup>20</sup>American Lung Association. March 2003. *Trends in Asthma Morbidity and Mortality*. <http://www.lungusa.org/data/asthma/asthma1.pdf>. Accessed December 15, 2003.
- <sup>21</sup>U.S. Department of Health and Human Services, 2000.

## References

- <sup>22</sup> U.S. Department of Health and Human Services. November 2000. *Healthy People 2010: Understanding and Improving Health*. 2nd ed. Washington, DC: U.S. Government Printing Office.
- <sup>23</sup> National Institutes of Health. 2003. *Data Fact Sheet: Chronic Obstructive Pulmonary Disease*. NIH Publication No. 03-5229. Bethesda, MD: National Institutes of Health.
- <sup>24</sup> American Lung Association. 2001. *Breathless in America: COPD at a Glance*. [http://www.lungusa.org/press/lung\\_dis/asn\\_copdglance.html](http://www.lungusa.org/press/lung_dis/asn_copdglance.html). Accessed December 17, 2003.
- <sup>25</sup> National Institutes of Health, 2003.
- <sup>26</sup> Ibid.
- <sup>27</sup> Federson DS. 1993. Pneumococcal vaccination in the prevention of community-acquired pneumonia: An optimistic view of cost-effectiveness. *Seminars in Respiratory Infection*, 8(4):285–293.
- <sup>28</sup> Foster DA, Taslma A, Furumoto-Dawson A, et al. 1992. Influenza vaccine effectiveness in preventing hospitalization for pneumonia in the elderly. *American Journal of Epidemiology*, 136(3):296–307.
- <sup>29</sup> Weinberg AD, Minaker KL. 1995. Dehydration: Evaluation and management in older adults. *Journal of the American Medical Association*, 274(19):1552–1556.
- <sup>30</sup> Gupta K, Rubin R. 1999. Infections in the urinary tract. *Scientific American Medicine*, Volume 2, Part 7:1–9. New York, NY: Scientific American.
- <sup>31</sup> American Urological Association. *Urinary Tract Infections in Adults*. <http://www.urologyhealth.org/print/index.cfm?topic=147>. Accessed December 17, 2003.
- <sup>32</sup> Gupta K, Rubin R. 1999. Infections in the urinary tract. *Scientific American Medicine*, Volume 2, Part 7: 1–9. New York, NY: Scientific American.
- <sup>33</sup> Foxman B, Barlow R, D’Arcy H, et al. 2000. Urinary tract infection: Self-reported incidence and associated costs. *Annals of Epidemiology*, 10(8):509–515.
- <sup>34</sup> Ibid.
- <sup>35</sup> Murkhart DM. 1999. Management of acute gastroenteritis in children. *American Family Physician*, 60(9):2555–2566.
- <sup>36</sup> Martin JA, Hamilton BE, Sutton PD, et al. 2003. Births: Final Data for 2002. *National Vital Statistics Reports*, 52(10):17–18.
- <sup>37</sup> Shiono PH, Behrman RE. 1995. Low Birth Weight: Analysis and Recommendations. *The Future of Children*, 5(1):4–18.
- <sup>38</sup> Alexander GR, Korenbrot CC. 1995. The Role of Prenatal Care in Preventing Low Birth Weight. *The Future of Children*, 5(1):103–120.
- <sup>39</sup> Institute of Medicine. 2003. *Priority Areas for National Action: Transforming Health Care Quality*. Washington, DC: National Academies Press.
- <sup>40</sup> U.S. Department of Health and Human Services. November 2000. *Healthy People 2010: Understanding and Improving Health*. 2nd ed. Washington, DC: U.S. Government Printing Office.
- <sup>41</sup> Agency for Healthcare Research and Quality. 2001. *AHRQ Quality Indicators — Guide to Prevention Quality Indicators: Hospital Admission for Ambulatory Care Sensitive Conditions*, AHRQ Pub. No. 02-R0203. Rockville, MD: Agency for Healthcare Research and Quality.

<sup>42</sup>Davies SM, Geppert J, McClellan M, et al. May 2001. Refinement of the HCUP Quality Indicators. Technical Review Number 4 (prepared by UCSF-Stanford Evidence-Based Practice Center under Contract No. 290-97-0013), AHRQ Pub. No. 01-0035. Rockville, MD: Agency for Healthcare Research and Quality.

<sup>43</sup>Agency for Healthcare Research and Quality. 2001. AHRQ Quality Indicators — Guide to Prevention Quality Indicators: Hospital Admission for Ambulatory Care Sensitive Conditions. Rockville, MD: Agency for Healthcare Research and Quality. AHRQ Pub. No. 0-R0203.

<sup>44</sup>Coffey R, Barrett M, Houchens B, et al. June 2003. *Methods Applying AHRQ Quality Indicators to Healthcare Cost and Utilization Project (HCUP) Data for the National Healthcare Quality Report*. Deliverable 179 (prepared by Medstat under Contract No. 290-00-004).

<sup>45</sup>Claritas, Inc. May 2001. *The Claritas Demographic Update Methodology*.

<sup>46</sup>Fleiss JL. 1973. *Statistical Methods for Rates and Proportions*. New York, NY: John Wiley & Sons, Inc.



# Glossary

**Angina (without a procedure)** — Angina is a severe, often constricting pain, discomfort, tightness, or pressure experienced primarily in the chest. Pain may also be felt in the left shoulder, arms, neck, back, and throat. Angina is often an early sign of coronary artery disease. While not all angina admissions are preventable, it is possible that angina can be effectively managed on an outpatient basis if diagnostic procedures and/or surgical interventions are not required.

**Asthma** — This chronic lung disease is characterized by an inflammation of the lungs and may involve muscle spasms and airway constriction. Common symptoms of asthma include: coughing, wheezing, shortness of breath, and chest tightness. Asthma may be triggered by a host of environmental factors, including pollen, dust, smoke, exercise, illness, weather, and strong emotions.

**Bacterial pneumonia** — Infection of the lungs caused by bacteria that leads to irritation, swelling, and congestion of the lungs.

**Chronic obstructive pulmonary disease (COPD)** — Common name for the frequently coexisting conditions of chronic bronchitis and emphysema. Chronic bronchitis is an inflammation of the lungs that leads to swelling of the lungs and constriction of the airways. Emphysema is also an inflammation of the lungs leading to swelling that stretches and eventually breaks the walls in between the air sacs. These broken walls reduce the elasticity of the lungs and impair the exchange of oxygen and carbon dioxide.

**Congestive heart failure (CHF)** — A weakness in the heart muscle, possibly caused by heart attack, heart disease, high blood pressure, or infection that reduces the ability of the heart to effectively pump blood to the body. This inability to effectively pump and circulate blood throughout the body leads to pooling of blood in the extremities and congestion in the lungs.

**Dehydration** — Excessive loss of water and salt that can lead to dangerous side effects. Dehydration is usually classified as mild, moderate, and severe with symptoms. Mild and moderate dehydration are characterized by symptoms ranging from dry mouth and rapid heart beat to sunken eyes and lethargy. Severe dehydration can lead to shock, seizure, brain damage, and death.

**Diabetes** — The body's inability to produce insulin (type 1 diabetes) or properly use insulin (type 2 diabetes) that has been produced. Complications from diabetes can be categorized as follows:

**Short-term complications** — Conditions include diabetic ketoacidosis, hyperosmolarity, and coma. These life-threatening conditions occur when a patient experiences excess glucose or insulin.

**Long-term complications** — Conditions include renal, visual, neurological, and circulatory disorders.

**Lower extremity amputation** — Long-term circulatory problems caused by diabetes can lead to gangrene and necrosis of the muscle and skin in the legs; often, these complications will lead to the amputation of the feet and/or legs. Lower extremity amputations are often preventable with proper disease management. Hospitalizations involving these procedures signal significant problems in the quality of primary and preventive care that might have been provided earlier in the disease progression.

**Hypertension** — Also known as high blood pressure, hypertension is the elevation of blood pressure to a level sufficient to cause cardiovascular damage. The official criterion for hypertension is a systolic reading of 140 or higher and a diastolic reading of 90 or higher.

**Low-weight birth** — Birth weight less than 2,500 grams.

**Pediatric gastroenteritis** — Irritation and inflammation of the digestive tract in children. Common symptoms include abdominal pain, diarrhea, vomiting, nausea, and dehydration. A variety of environmental factors may be responsible, including food poisoning, viral infection, and intestinal parasites.

**Perforated appendix** — A tear in the appendix usually caused by swelling from appendicitis. This perforation allows the contents of the appendix to be released into the abdominal cavity and can lead to a serious infection (peritonitis).

**Region** — For this report, States are included in the four U.S. Census regions as follows:

- **Northeast** — Connecticut, Massachusetts, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont
- **Midwest** — Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin
- **West** — Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming
- **South** — Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia.



**Urban/rural residence** — This report defines patient residence as urban or rural based on the 1990 definition of the U.S. Office of Management and Budget. Thus, location of patient's residence is defined as:

- **Urban** — Patient's ZIP Code is located in a metropolitan statistical area (MSA)
- **Rural** — Patient's ZIP Code is located outside a MSA.

**Urinary tract infection** — Infection that occurs when bacteria enters the urethra. The infection may spread from the urethra to the rest of the urinary tract, including the bladder, ureters, and kidneys.

Note: Definitions are derived from 3 sources: (1) *AHRQ Quality Indicators — Guide to Prevention Quality Indicators: Hospital Admission for Ambulatory Care Sensitive Conditions*. Rockville, MD: Agency for Healthcare Research and Quality, 2001. AHRQ Pub. No. 0-R0203; (2) *Stedman's Medical Dictionary — 27<sup>th</sup> Edition*. 2000. Baltimore, MD: Lippincott Williams & Wilkins; (3) Agency for Healthcare Research and Quality, 2002. *Description of Data Elements: Nationwide Inpatient Sample (NIS), Hospital Weights File, 2001*. [http://www.hcup-us.ahrq.gov/db/nation/nis/dbdoc/DataElements\\_NIS\\_2001\\_HOSPITAL.pdf](http://www.hcup-us.ahrq.gov/db/nation/nis/dbdoc/DataElements_NIS_2001_HOSPITAL.pdf). Accessed January 23, 2004.

# For More Information

More information regarding HCUP data is available at <http://www.ahrq.gov/data/hcup>, as well as on the HCUP User Support Web site at <http://www.hcup-us.ahrq.gov>. Detailed documentation for the AHRQ Quality Indicators is available at <http://www.qualityindicators.ahrq.gov>.

Additional descriptive statistics can be viewed through HCUPnet (<http://www.ahrq.gov/data/hcup/hcupnet.htm>), a Web-based tool providing easy access to information on hospital stays.

## NIS DATA CURRENTLY AVAILABLE INCLUDE:

2001

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2000

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1999 (PB 2002-500020)

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1998 (PB 2001-500092)

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Release 6, 1997 (PB 2000-500006)

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Release 5, 1996 (PB 99-500480)

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Release 4, 1995 (PB 98-500440)

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Release 3, 1994 (PB 97-500433)

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Release 2, 1993 (PB 96-501325)

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Release 1, 1988–1992 (PB 95-503710)

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NIS data for years 1988 to 2001 can be purchased for research through the HCUP Central Distributor sponsored by AHRQ: Social and Scientific Systems, Inc., telephone: (866) 556-4287 (toll-free), fax: (301) 628-3201, or e-mail: [hcup@s-3.com](mailto:hcup@s-3.com).



Price of the data is \$322 for Release 1; \$160 per year for 1993 to 1999; and \$200 per year for 2000 and 2001. All prices may be higher for customers outside the United States, Canada, and Mexico.

**AHRQ is always looking for ways in which AHRQ-funded research, products, and tools have changed peoples' lives, influenced clinical practice, improved policies, and affected patient outcomes. Impact case studies describe AHRQ research findings in action. These case studies have been used in testimony, budget documents, and speeches. If you are aware of any impact AHRQ-funded research or products, such as HCUP, have had on health care policy, clinical practice, or patient outcomes, please let us know using the contact information below.**

Healthcare Cost and Utilization Project (HCUP)  
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