



# National Healthcare Quality Report 2008



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# National Healthcare Quality Report

2008

**U.S. Department of  
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**Primary AHRQ Staff:** Carolyn Clancy, William Munier, Katherine Crosson, Ernest Moy, Karen Ho, and Jeffrey Brady.

**HHS Interagency Workgroup for the NHQR/NHDR:** Roxanne Andrews (AHRQ), Hakan Aykan (ASPE), Rachel Ballard-Barbash (NCI), Douglas Boenning (HHS-ASPE), Jeffrey Brady (AHRQ-CQuIPS), Miriam Campbell (CMS), Cecelia Casale (AHRQ-OEREP), Fran Chevarley (AHRQ-CFACT), Steven Clauser (NCI), Rameicha Cooks (HRSA), Agnes Davidson (OPHS), Denise Dougherty (AHRQ-OEREP), Brenda Evelyn (FDA), Yvette Fryar (HRSA), Edward Garcia (CMS), Olinda Gonzalez (SAMHSA), Tanya Grandison (HRSA), Miryam Granthon (OPHS-OMH), Darryl Gray (AHRQ-CQuIPS), Saadia Greenberg (AoA), Kirk Greenway (IHS), Lein Han (CMS), Linda Harlan (NCI), Debbie Hattery (CMS), Karen Ho (AHRQ-CQuIPS), Deloris Hunter (NIH), Memuna Ifedirah (CMS-OCSQ), Padmini Jagadish (AHRQ-OEREP), Linda Johnston-Lloyd (HRSA), Jackie Shakeh Kaftarian (AHRQ-OEREP), Ruth Katz (ASPE), Sophia Kazakova (CDC-CCID-OD), Richard Klein (CDC-NCHS), Lisa Koonin (CDC-NCHS), Onelio Lopez (OCR), Leopold Luberecki (ASPE), Diane Makuc (CDC-NCHS), Marty McGeein (HHS-ASPE), Richard McNaney (CMS), Nancy Miller (NIH), Carmen Moten (NIH-NIMH), Ernest Moy (AHRQ-CQuIPS), Leo Nolan (IHS), Cynthia Ogden (CDC-NCHS), Anna Maria Padian (HRSA), Judith Peres (ASPE), Susan Polniaszek (ASPE), Susan Queen (HRSA), Michael Rapp (CMS), Georgetta Robinson (CMS), Rochelle Rollins (OMH), Susan Rossi (NIH), Beatrice Rouse (SAMHSA), Asel Ryskulova (CDC-NCHS), Judy Sangl (AHRQ-CQuIPS), Michael Schoenbaum (NIMH), Adelle Simmons (HHS-ASPE), Alan E. Simon (CDC-NCHS), Sunil Sinha (CMS), Jane Sisk (CDC-NCHS), Phillip Smith (IHS), Nancy Sonnenfeld (CDC/NCHS), Caroline Taplin (HHS-ASPE), Emmanuel Taylor (NCI), Wilma Tilson (HHS-ASPE), Benedict Truman (CDC), Joan Van Nostrand (HRSA), Nadarajen A. Vydelingum (NIH), Barbara Wells (NHLBI), Valerie Welsh (OPHS/OMH), Odies Williams (OCR), Lee Wilson (ASPE-OS), and Susan Yanovski (NIH/NIDDK).

**AHRQ NHQR/NHDR Team:** Roxanne Andrews, Jeffrey Brady, Denise Burgess, Fran Chevarley, Cecilia Rivera Casale, Katherine Crosson, Denise Dougherty, Darryl Gray, Karen Ho, Alan Hsu, Jackie Shakeh Kaftarian, Stephanie Klapper, Laura McKenzie Phelps, Oscar Mensah, Ernest Moy, William Munier, Ryan Mutter, Daniel Pak, Judy Sangl, Barbara Slivers, and, Marc Zodet.

**HHS Data Experts:** Barbara Altman (CDC-NCHS), Roxanne Andrews (AHRQ), Frances Chevarley (AHRQ), Steven Cohen (AHRQ), James Colliver (SAMHSA), Paul Eggers (NIH), David Keer (ED-OSERS), William Mosher (CDC-NCHS), Cynthia Ogden (CDC-NCHS), Asel Ryskulova (CDC-NCHS), Alan E. Simon (CDC-NCHS), Jane Sisk (CDC-NCHS), and Marc Zodet (AHRQ) and members of the Interagency Subcommittee on Disability Statistics.

**Other Data Experts:** Stephen Connor (NHCPO), Stephen Edge (Rosewell Park Cancer Institute), Michael Halpern (American Cancer Society), Ronald Kessler (Harvard Medical School), Bryan Palis (NCBD, American College of Surgeons), Florentina R. Salvail (Hawaii Department of Health), Allison Petrilla (NHCPO), Hardy Spoehr (Papa Ola Lokahi), Andrew Stewart (NCBD, American College of Surgeons), and Jo Ann Tsark (Papa Ola Lokahi).

**Other AHRQ Contributors:** Doreen Bonnett, Cindy Brach, Xiuhua Chen, Marybeth Farquhar, Karen Fleming-Michael, William Freeman, Amy Galifianakis, Paul Gorrell, Biff LeVee, Corey Mackison, Gerri Michael-Dyer, Karen Migdail, Laura Nawrocki, Pamela Owens, Mamatha Pancholi, Larry Patton, Wendy Perry, Deborah Queenan, Mary Rolston, Scott Rowe, Bruce Seeman, Randie Siegel, Christine Williams, and Phyllis Zucker.

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## Key Themes and Highlights From the National Healthcare Quality Report

Health care helps people stay healthy, recover from illness, live with chronic disease or disability, and cope with dying. Quality health care delivers these services in a way that is safe, timely, patient centered, efficient, and equitable. Unfortunately, Americans too often do not receive care that they need or they receive care that causes harm. Care can be delivered too late or without full consideration of a patient's preferences and values. Many times, our system of health care distributes services inefficiently and unevenly across populations.

Each year since 2003, the Agency for Healthcare Research and Quality (AHRQ), together with its partners in the Department of Health and Human Services (HHS), has reported on progress and opportunities for improving health care quality, as mandated by the U.S. Congress. The information amassed for the National Healthcare Quality Report (NHQR) since its inception is a growing knowledge base that addresses two critically important questions:

- ◆ What is the status of health care quality in the United States?
- ◆ How is the quality of the health care delivered to Americans changing over time?

The significance of tracking this sector's performance is evident from many vantage points. More than \$2 trillion is spent each year on health care in the United States, and costs are escalating relentlessly, threatening the financial security of families and businesses. Quality and value are increasingly considered in decisions made by patients and payers. To help patients choose doctors and hospitals prudently, tools have been produced that gather information about and rate providers. To motivate providers to deliver high-quality care, purchasers are starting to reward superior performance and refusing to pay for additional care needed to correct medical errors. This is a dynamic area that will likely continue to develop and affect ways in which care is selected, delivered, and paid for. Monitoring the success of these efforts is crucial as stakeholders refine their quality improvement activities and reassure Americans that they are receiving the optimal health care they deserve.

The NHQR is built on 220 measures categorized across four dimensions of quality: effectiveness, patient safety, timeliness, and patient centeredness. Guided by a subcommittee of AHRQ's National Advisory Council and an HHS Interagency Work Group,<sup>i</sup> this year's report focuses on the state of health care quality for a group of 45 core report measures that represent the most important and scientifically credible measures of quality for the Nation. By focusing on 45 core measures, the 2008 report provides a more readily understandable summary and explanation of the key results derived from the data.<sup>ii</sup> While the measures selected for inclusion in the NHQR are derived from the most current scientific knowledge,

<sup>i</sup> The HHS Interagency Work Group, which represents 18 HHS agencies and offices, was formed to provide advice and support to AHRQ and the National Reports team.

<sup>ii</sup> Data on all NHQR measures are available in the Data Tables appendix at [www.ahrq.gov/qual/measurix.htm](http://www.ahrq.gov/qual/measurix.htm).

## Highlights

this knowledge base is not evenly distributed across the dimensions of health care quality. For example, there are many measures on the effectiveness of care for heart attacks, but few measures of medication safety or end-of-life care. The analysis in the following pages centers on measures for which data are available and fit within a framework provided by the Institute of Medicine.

Three themes from the 2008 NHQR emphasize the need to accelerate progress if the Nation is to achieve high-quality health care. These themes also reflect the challenges that still remain:

- ◆ Health care quality is suboptimal and continues to improve at a slow pace.
- ◆ Reporting of hospital quality is leading improvement, but patient safety is lagging.
- ◆ Health care quality measurement is evolving, but much work remains.

### Health Care Quality Is Suboptimal and Continues To Improve at a Slow Pace

For the past 6 years, the NHQR has summarized the state of health care quality. This undertaking is difficult, as no single national health care quality survey collects a standard set of data elements from the same defined population for the same period each year. Rather, data are available from a wide range of sources that focus on different populations and data years.

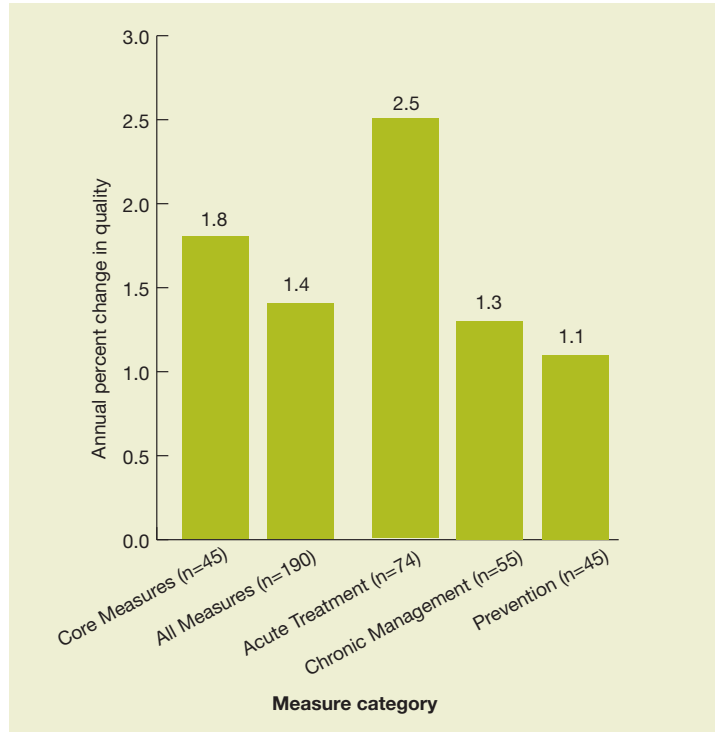
Despite these limitations, we find that health care quality in America is suboptimal. Receipt of needed health care varies widely. While patients hospitalized with a heart attack receive 95% of recommended services, only 15% of patients on dialysis are registered on a kidney transplant waiting list. Across the core report measures tracked in the NHQR, the median level of receipt of needed care was 59%. We can and should do better.

To track the progress of health care quality in this country, the NHQR presents an annual rate of change in quality, which represents how quickly the quality of services delivered by the health care system is improving or declining based on the report's core measures. Another way to describe this is the speed of improvement or decline in the quality of the U.S. health care system. Based on these core report measures, quality of care continues to improve at a slow pace.



## Highlights

**Figure H.1. Median annual rate of change overall and by measure category from baseline to most recent data year**



**Note:** See Chapter 1, Introduction and Methods, for discussion of year intervals used for analysis. Ns indicate number of measures included in each group.

- ◆ The median annual rate of change for the 39 core measures was 1.8% over the measurement period (Figure H.1). Although this rate of change is modest, 87% of the core measures (39 out of 45) showed at least some improvement.
- ◆ The median annual rate of change for all measures was 1.4%. Of these 190 measures, 132 showed at least some improvement (69%).
- ◆ The three measure categories, prevention, acute treatment, and chronic management, reflect different types of care that patients often need. The highest rate of improvement was in measures related to treatment. In this area, 66% of the measures showed some improvement.
- ◆ The median annual rates of change for the management and prevention areas were similar to the overall rate of change. Although these categories had lower rates than the treatment category, 62% of management measures (34/55) and 82% of prevention measures (37/45) showed improvement.

Overall, despite promising improvement in select areas, the health care system is not achieving the more substantial strides needed to close the gap or “quality chasm” that persists. Despite efforts to transform the U.S. health care system to focus on effective preventive and chronic illness care, it continues to perform better when delivering diagnostic, therapeutic, or rehabilitative care in response to acute medical problems. This system achieves higher performance on measures related to acute treatment, such as that for heart attacks, as opposed to prevention and anticipatory management of chronic illnesses, such as cancer screening and diabetes management.

## Highlights

Lessons from quality improvement initiatives in other sectors, such as manufacturing and transportation, are reminders that there is no quick fix or easy overall remedy. Instead, it seems clear that quality improvement in health care, as in other sectors, requires a coordinated, deliberate, consistent, and sustained approach. It is important to recognize that health care quality is improving and this improvement is happening slowly. It is occurring simultaneously with dedicated efforts to improve.

In a general sense, the changes offer some confirmation that work and attention to quality improvement have a positive influence and can translate into results. The country should plan for continuous vigilance focused on the important task of improving health care quality, not only to accelerate progress, but also to sustain the gains in quality that have been achieved and to enhance the return on investment for what we spend on health care.

### Making Patients' and Families' Lives Better

The NHQR concentrates on health care quality at the national level. Measures of health care quality averaged over the U.S. population are not a substitute for the daily reality faced by every health care provider and patient in clinics and hospitals. At the same time, however, the statistics reported in the NHQR and NHDR reflect the aggregated everyday experiences of patients and their doctors and nurses across the Nation. It makes a difference in people's lives when breast cancer is diagnosed early with timely mammography; when a patient suffering from a heart attack is given the correct lifesaving treatment in a timely fashion; when medications are correctly administered; and when doctors listen to their patients and their families, show them respect, and answer their questions.

This 2008 report summarizes the areas where progress in health care quality has excelled and where it has lagged. But reports do not improve quality by themselves. Findings need to be disseminated and awareness raised. Providers need to be trained. Community partnerships that bring together all the stakeholders that can make or break a quality improvement initiative need to be created and maintained. Building on information contained in the NHQR and NHDR, HHS organizations are implementing an exciting range of programs that address health care quality nationwide.

### Disseminate Quality Information

Health care differs from one place to another. Delivering data that can be used for local benchmarking and improvement is a key step in raising awareness and driving quality improvement. AHRQ's "State Snapshots" Web tool was launched in 2005. This tool helps State health leaders, researchers, consumers, and others understand the status of health care quality in individual States. The 51 State Snapshots are based on more than 100 NHQR measures, each of which evaluates a different segment of health care performance and shows each State's strengths and weaknesses. Although the measures are the products of complex statistical formulas, they are expressed on the Web site as simple, five-color graphic "performance meters." The State Snapshots also allow users to compare a State's performance with that of other States in the same region and to see how a State compares with best performing States.

## Highlights

This year's State Snapshots is complemented by an update of NHQRnet and NHDRnet, a pair of interactive Web-based tools for searching AHRQ's storehouse of national health care data. For 2008, NHQRnet and NHDRnet are combined into a single QRDRnet tool to facilitate topic-based table searches across the two reports. This online search engine allows users to create spreadsheets and customize searches of information in the NHQR and NHDR.

The **Health Care Innovations Exchange** is an AHRQ program designed to support health care professionals in sharing and adopting innovations that improve the delivery of care to patients. Providers and policymakers can explore this site to find innovative strategies and quality-related tools, learn how to improve an organization's ability to innovate and adopt new ideas, and interact with innovators and adopters.

### Train Providers

Training is also critical. The Patient Safety Improvement Corps, a partnership program between AHRQ and the Department of Veterans Affairs, provides knowledge and skills to provider teams needed to improve patient safety. The curriculum includes investigation of reports of medical error and the development, implementation, and evaluation of safety interventions. A DVD for self-paced instruction is also available.

The Centers for Disease Control and Prevention's National Methicillin-Resistant *Staphylococcus Aureus* (MRSA) Education Initiative disseminates knowledge about MRSA in community settings. It promotes recognition of signs and symptoms, diagnosis and treatment, and prevention and control measures appropriate for MRSA. Information is available for clinical audiences and the general public, particularly high-risk groups.

The AHRQ-sponsored Keystone ICU Project helped 108 intensive care units reduce rates of blood stream infections associated with central venous catheters. AHRQ is currently working to develop tools to teach additional hospitals how to reduce these types of complications. AHRQ is also supporting training of multidisciplinary hospital teams to address hospital-acquired MRSA and other health care-associated infections.

Improving quality is a "team sport." TeamSTEPPS is an evidence-based teamwork system aimed at optimizing patient outcomes by improving communication and teamwork skills among health professionals. It includes a comprehensive set of ready-to-use materials and a training curriculum to integrate teamwork principles into any health care system. The Department of Defense, in collaboration with AHRQ, developed TeamSTEPPS and has built a national training and support network called the National Implementation of TeamSTEPPS Project. This network is currently conducting training sessions throughout the country.

## Highlights

### Form Partnerships

Partnerships do the actual work of making improvements. In 2008, HHS designated 25 communities as Chartered Value Exchanges (CVEs). These local collaborations of health care providers, employers, insurers, and consumers work jointly to improve care and make quality and price information widely available. CVEs have access to Medicare data on physician quality of care, which they can combine with private-sector data to produce comprehensive community guides to quality. They are also part of a nationwide Learning Network that provides peer-to-peer learning experiences and technical assistance.

In 2008, the Centers for Medicare & Medicaid Services (CMS) awarded contracts to Quality Improvement Organizations (QIOs) for the 9th Scope of Work, which will run through 2011. This collaboration focuses on improving the quality and safety of health care services to Medicare beneficiaries. The work of QIOs contributed substantially to the rapid improvement in the HQA measures they track. New activities include work on projects that span the entire spectrum of the health community, intensive support of providers most in need of QIO assistance, and development of a more robust monitoring framework that will track the impact QIOs are having on the quality of care provided to Medicare beneficiaries.

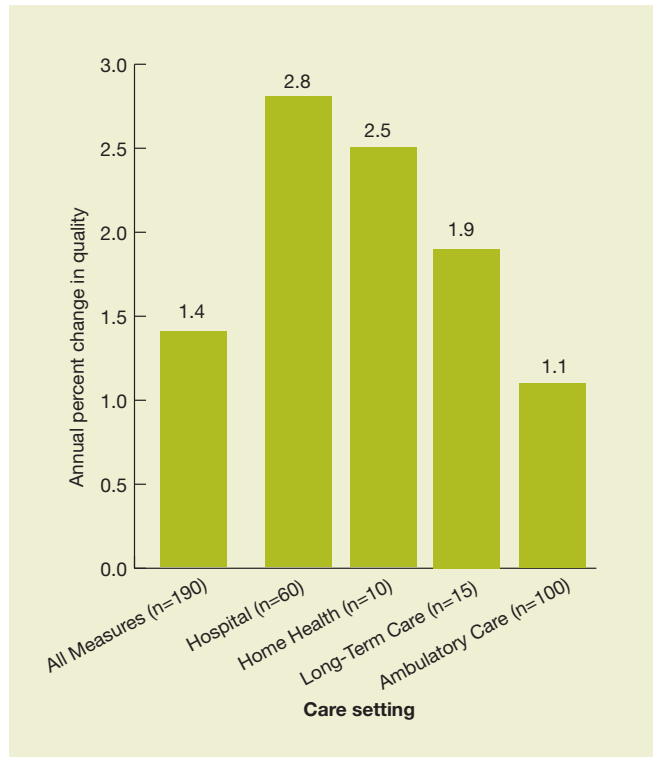
The Health Resources and Services Administration (HRSA) over the last decade has operated quality improvement collaboratives known as the Health Disparities Collaboratives, as well as other collaboratives such as the Organ Transplant Collaborative and the Patient Safety Clinical Pharmacy Collaborative. These adult-learner national learning networks have connected Federal and national partners, State, County, and local partners, and many private organizations such as foundations, professional organizations, and subject matter experts. These collaboratives have shown significant outcomes in improving health care.

### Reporting of Hospital Quality Is Leading Improvement, but Patient Safety Is Lagging

In the analysis of trends for this year's NHQR, it is also clear that quality improvements continue to be unevenly spread across the settings of care examined in the NHQR. Some areas have shown increasing rates of improvement while improvements in other areas have slowed. For example, care delivered in hospitals improved at an annual rate of change of almost 3%, which continues to be the highest rate of quality improvement among the major health care delivery settings. Hospital improvement was led by Hospital Quality Alliance (HQA) measures that are submitted to the Centers for Medicare & Medicaid Services (CMS) for pay-for-reporting and public reporting on the Hospital Compare Web site. The top four core measures that improved the fastest were all composites of HQA measures. In contrast, care in ambulatory settings improved at a rate that only slightly exceeded 1%.

## Highlights

**Figure H.2. Median annual rate of change overall and by health care setting from baseline to most recent data year**



**Note:** Not all measures were included in the “all measures” category. For example, the 13 composite measures were not included because their component measures were included. Also, measures for which there is only one year of data were not included. See Chapter 1, Introduction and Methods, for discussion of year intervals used for analysis. Ns indicate number of measures included in each group.

- ◆ The median annual rate of change for hospital measures is twice the rate for all measures (Figure H.2). In this category, 65% of the measures showed some improvement (39 out of 60).
- ◆ Rates for home health and long-term care measures also improved at a rate greater than the overall rate.
- ◆ Although ambulatory care measures, covering care typically delivered in doctors’ offices and other outpatient settings, had the lowest rate, 75% of these measures showed at least some improvement.

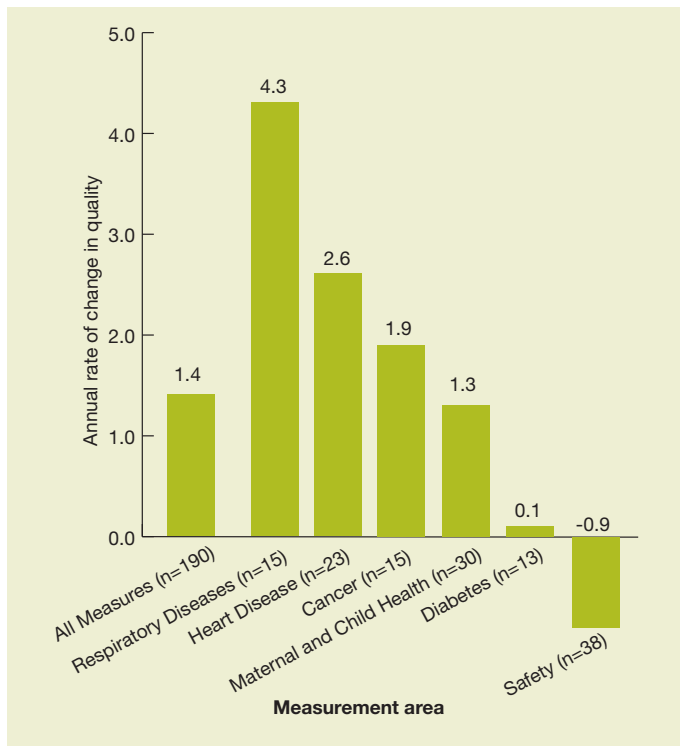
When examining change across multiple diseases and care settings, it is often difficult to determine from the available data why changes in performance occur. Public reporting and strong advocacy from multiple stakeholders in support of quality, as in the case of HQA measures, may influence broad system change and subsequent quality improvements in certain areas. Institutional health care settings, such as hospitals and nursing homes, typically have structured quality improvement programs that help raise performance in these organizations. Usually, ambulatory care settings do not have such programs. The availability of health information technology (HIT) as part of institutional infrastructure may also contribute to improvements in quality.

## Highlights

Improvement is important across all dimensions of health care quality. It is critically important in the area of patient safety. Patients have an expectation that they will not be harmed by the health care they receive. For 6 years, the National Healthcare Quality Report and the National Healthcare Disparities Report (NHDR) have presented a snapshot of the safety of health care provided to the American people. This analysis has been based on a set of databases that were created to respond to the need for information documented in such publications as the Institute of Medicine's landmark 2000 report *To Err Is Human*. Some of our findings are disturbing. For example, approximately one out of seven adult hospitalized Medicare patients experiences one or more adverse events.

Tracking trends in patient safety is complicated by difficulties assessing and ensuring the systematic reporting of medical errors and patient safety events. However, with improvements in data quality, a clearer picture of trends in health care safety is emerging. Distressingly, measures of patient safety in the NHQR indicate not only a lack of improvement but also, in fact, a decline of almost 1 percent in this area.

**Figure H.3. Median annual rate of change by clinical condition and for patient safety from baseline to most recent data year**



**Note:** See Chapter 1, Introduction and Methods, for discussion of year intervals used for analysis. Ns indicate number of measures included in each group.

- ◆ Respiratory disease measures showed the highest median annual rate of change across all measurement areas (Figure H.3).
- ◆ The rate of improvement for heart disease measures is nearly twice that for all measures.

## Highlights

- ◆ Cancer measures, as well as those for maternal and child health, showed modest improvement similar to the overall rate.
- ◆ Diabetes measures showed no improvement.
- ◆ Safety measures were the only area to show an overall decline, with only 45% of the measures showing at least some improvement (17 out of 38).

It is evident that more attention devoted to patient safety is needed to reverse this apparent trend and to help ensure that health care does not result in avoidable patient harm. Systems for identifying and learning from patient safety events need to be improved. Patient safety reporting systems are often laborious and cumbersome, and health care providers express fear that findings may be used against them in court or harm their professional reputations. Many factors, such as concerns about sharing data confidentially across facilities or State lines, limit the ability to aggregate data in sufficient numbers to rapidly identify important risks and hazards in the delivery of patient care. More work is also needed to develop measures that capture the underlying processes and conditions that lead to adverse events and the practices that are most effective in mitigating them.

Fortunately, recent progress has been made in raising awareness, improving event reporting systems, and establishing national standards for data collection. The Patient Safety and Quality Improvement Act of 2005 provides for the voluntary formation of Patient Safety Organizations (PSOs). These entities can receive and analyze patient safety data and work with providers to improve care without fear of legal discovery. PSOs can also report deidentified data to a Network of Patient Safety Databases, and findings from this resource will be published in future NHQRs and NHDRs.

## Health Care Quality Measurement Is Evolving, but Much Work Remains

Just as the Nation works to understand and better define quality in health care consistent with current science, AHRQ and its report partners grapple with the challenge of applying uniform definitions of health care quality and measuring it in ways that provide the most meaningful information possible for policymakers and other users of the reports.

### Improve Quality Measures

Although health care quality measurement is clearly evolving, much work remains. The complex nature of health care makes measuring the quality of health care services particularly difficult. As scientific evidence evolves, we must not only ensure revision and coordination of extant quality measures, but also develop new quality measures to address emerging issues. For example, it is increasingly recognized that some aspects of quality can best be assessed through a patient's eyes. Patients see problems from a personal perspective and may observe deficiencies that busy providers do not notice. They may be uniquely situated to detect flaws during transitions of care and experience the effects of inadequate care coordination.

## Highlights

Patient centeredness, the aspect of quality related to patient self-management and engagement in medical decisionmaking, can only be defined from a patient's perspective. Measures from the Consumer Assessment of Healthcare Providers and Systems (CAHPS®) surveys capture some aspects of patient experience, but more work is urgently needed to expand patient-focused measures of health care quality.

### Coordinate Measure Development

Another challenge is the often opportunistic, incremental, and fragmented development of quality measures without detailed consideration of data sources, analysis and maintenance requirements, and user needs. Uncoordinated and isolated measure development can lead different groups to create and advocate competing and sometimes conflicting measures of the same process or outcome. At best, this is duplicative; at worst, it can create confusion and unnecessary labor for providers trying to supply quality information to multiple stakeholders. Calls for new measures may also be hampered by resource constraints.

A related issue is whether and when to retire measures that indicate high performance levels. The benefits of continuing to monitor measures with high performance may be outweighed by the costs of data collection. On the other hand, continued but less frequent reporting of some measures may be needed to maintain vigilance, reduce disparities, and ensure continued high performance, as we have seen in areas of improved hospital treatment for heart attack and heart failure. The efficiency of measure development and retirement could be enhanced by more explicit coordination and support of this activity.

The work of the National Quality Forum (NQF) helps to enhance measure harmonization and reduce measure clutter. Its mission is to coordinate and promote the consensus development process for health care quality measurement among its organizational members. NQF has endorsed more than 500 measures, and this library represents the best means currently available to track quality of care. What is needed now is consensus on a single set of core measures that will be used by all payers and stakeholders to monitor quality improvement. Such a set would facilitate benchmarking and reduce the measurement burden on providers. Along with achieving consensus on a core measure set, systems for maintaining and revising this set are required. HHS recently released an inventory of quality measures used by the Department for reporting, payment, and quality improvement. This inventory is designed to help synchronize measurement and advance collaboration within the quality improvement community towards a uniform set of performance measures.

Also critical to development of health care quality measures is evidence-based medicine. Measures can only be developed where there is a firm understanding of the natural course of disease and the comparative effectiveness of diagnostic and therapeutic strategies. Rigorous, comprehensive syntheses of research studies need to be conducted using objective criteria and transparent processes. Research syntheses need to be translated into products usable by measure developers. Coordination of the measure development enterprise will require close and ongoing collaboration between the generators and synthesizers of scientific evidence.



## Highlights

### Enable Health Information Technology to Support Quality Improvement

The unavailability of data is another obstacle. Realistically, HIT infrastructure is needed to ensure that relevant data are collected regularly, systematically, and unobtrusively. However, the high implementation costs of HIT to health care organizations often delay the quality measurement contributions that HIT would otherwise offer. In addition, information systems are necessary but insufficient for ensuring high-quality health care. Systems need to generate performance information that can be understood by end users and that are interoperable across different institutions' data platforms, policies, and procedures.

Quality improvement typically requires examining patterns of care across panels of patients rather than one patient at a time. Unfortunately, information systems often are not designed to collect data to support quality improvement as the primary purpose. Retrofitting legacy health information systems to capture data on quality measures is often labor intensive. Also, many benefits of improved information technologies require systems that go beyond simple automated record keeping. Ideally, performance measures should be calculated automatically from health records in a format that can be easily shared across all providers involved with a patient's care.

### Promote Data Standardization

Another issue that has plagued data collection, especially related to patient safety, is the lack of standardized vocabularies that ensure a common definition of specific terms. Implementation of the Patient Safety and Quality Improvement Act of 2005 should help. AHRQ coordinated the development of common definitions and reporting formats for patient safety events. These Common Formats were released in 2008 and support data aggregation, analysis, and learning throughout the quality improvement cycle. AHRQ has contracted with NQF to assist in gathering and analyzing feedback on the Common Formats, and plans to issue updates and revisions based on user input.

Finally, pertinent to this report is the manner in which a large amount of complex information is condensed to create a meaningful summary for decisionmaking. In this 2008 NHQR, AHRQ has refined the criteria for selecting the data used to analyze trends and calculate summary estimates of changes in quality. This analysis is described in more detail in Chapter 1, Introduction and Methods.

### Conclusions

With the publication of this sixth NHQR, AHRQ stands ready to contribute to efforts that encourage and support the development of national, State, tribal, and "neighborhood" solutions using national data and benchmarks in quality. This report documents some areas where important progress has been achieved in improving patients' quality of life as well as many areas where much more should be done. We need to accelerate the pace of quality improvement, especially related to patient safety. The success of CMS reporting initiative may serve as a guide, but more work is needed to improve, standardize, and coordinate quality measurement. Information of quality then needs to be shared with partners with the skills and commitment to change health care. Building on data in the NHQR and NHDR and the State Snapshots, we believe that policymakers can design and target strategies and clinical interventions to ensure that patients receive the high-quality care that makes their lives better.

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## Introduction and Methods

# Chapter 1. Introduction and Methods

In 1999, Congress directed the Agency for Healthcare Research and Quality (AHRQ) to produce an annual report, starting in 2003, on health care quality in the United States (42 U.S.C. 299b-2(b)(2)). AHRQ, with support from Department of Health and Human Services and private sector partners, designed and produced the National Healthcare Quality Report (NHQR) to respond to this legislative mandate.

This is the sixth annual report on the state of health care quality nationally. Similar to the previous five reports, it is designed to summarize data across a wide range of patient needs, including staying healthy, getting better, living with chronic illness and disability, and coping with the end of life. The report tracks quality across nine condition areas and tells the reader how effective, safe, timely, patient-centered, and efficient care is in the United States today.

The National Healthcare Quality Report presents data at the national and State levels, where State-level data are available. This sixth report seeks to balance the goal of presenting a consistent overview of the annual state of health care quality in the United States with the need to reflect changes in particular health care measures. In addition, the report incorporates methodological improvements in quantifying trends in health care quality.

The first NHQR, released in 2003, was a comprehensive national overview of the quality of health care the general U.S. population received. The 2004 NHQR initiated a second critical goal of the report series: tracking the Nation's quality improvement progress. The 2005 NHQR introduced a set of core measures and a variety of new composite measures. The 2006 NHQR continued to improve data, measures, and methods, adding new databases and measures and refining methods for quantifying and tracking changes in health care. The 2007 report, in addition to including new measures and data sources, presented an informed look at directions in health care quality based on data presented in the first five reports.

This 2008 NHQR continues to focus on a consistent subset of measures (the "core" measures), which includes the most important and scientifically supported measures in the full NHQR measure set. In addition, other measures (either new to the measure set or included in past years as part of the Data Tables appendix) are included to complement core measures in key areas. For example, five additional patient safety measures are discussed for the first time in the report (see Chapter 5). These additional measures reflect increased awareness of the importance of health care quality as it relates to patient safety, following the passage of the Patient Safety and Quality Improvement Act of 2005.

## Introduction and Methods

Finally, to provide context for discussion and evaluation of the measures and data presented in the report, references have been systematically updated. Annual reports and other regularly released publications have been updated as appropriate. In addition, a wide range of peer-reviewed journals and electronically published articles have been searched for inclusion as references.

This chapter summarizes the methodological approaches AHRQ has taken in producing the 2008 NHQR. This year's report includes fewer changes to the measure sets and data sources than the past few years. Therefore, unlike past years, this chapter does not include separate sections listing changes to the measure set or new data sources. Changes in measures, data sources, and other modifications are summarized below. Material that is new in this year's report includes:

- ◆ A new core measure for daily preventive asthma medication use.
- ◆ New noncore measures for:
  - State variation in influenza immunization.
  - Receipt of minimally adequate treatment by adults with mental disorders.
  - Patient safety:
    - Surgical discharges with catheter-associated urinary tract infection.
    - Accidental puncture or laceration.
    - Postoperative wound separation.
    - Iatrogenic pneumothorax.
    - Deaths in low-mortality diagnosis-related groups.
  - Referral to hospice at the right time.
- ◆ A discussion in Chapter 6, Efficiency, of a new approach to examining potentially avoidable rehospitalizations.

The new mental health measure for receipt of minimally adequate treatment by adults with mental disorders uses data from a new data source Substance Abuse and in more detail in the Measures Specifications appendix. By including the specification for “minimally adequate treatment,” this measure improves on the measure in previous reports, which did not include criteria for the type or frequency of treatment.

As in previous years, the 2008 NHQR was written by AHRQ staff, with the support and guidance of AHRQ's National Advisory Council and the Interagency Work Group for the NHQR.

## How This Report Is Organized

The basic structure of the report consists of the following:

- ◆ **Highlights** summarizes key themes and highlights from the 2008 report.
- ◆ **Chapter 1:** Introduction and Methods documents the organization, data sources, and methods used in the 2008 report and describes major changes from previous reports.
- ◆ **Chapter 2:** Effectiveness examines the quality of health care in the general U.S. population, focusing on nine clinical conditions or care settings based largely on Healthy People 2010 condition areas. Measures of the quality of health care used in this chapter are identical to measures used in the National Healthcare Disparities Report (NHDR) except when data to examine disparities are unavailable for inclusion in the NHDR.
- ◆ **Chapter 3:** Patient Safety tracks measures of patient safety, including postoperative complications, other complications of hospital care, and complications of medications.
- ◆ **Chapter 4:** Timeliness examines the delivery of time-sensitive clinical care and patient perceptions of the timeliness and accessibility of their care.
- ◆ **Chapter 5:** Patient Centeredness tracks patients' experiences with care in an office or clinic and satisfaction with communication during a hospital stay in order to incorporate the patient's experience and perspective into the report.
- ◆ **Chapter 6:** Efficiency presents a conceptual view and exploratory analyses of this dimension of health care performance that has been missing from previous releases of the NHQR.

Appendixes are available online ([www.ahrq.gov](http://www.ahrq.gov)) and include the following:

- ◆ **Appendix A:** Data Sources provides information about each database analyzed for the NHQR, including data type, sample design, and primary content.
- ◆ **Appendix B:** Measure Specifications provides information about how to generate each measure analyzed for the NHQR. Measures highlighted in the report are described, as well as other measures that were examined but not included in the text of the report.
- ◆ **Appendix C:** Data Tables provides detailed tables for most measures analyzed for the NHQR, including measures highlighted in the report text and measures examined but not included in the text. A few measures cannot support detailed tables and are not included in the appendix.<sup>i</sup>

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<sup>i</sup> NHQR data can now be accessed through NHQRnet, an online tool that provides Internet users with an opportunity to specify dimensions of analysis and produce data tables. NHQRnet is available through the AHRQ Web site at <http://nhqrnet.ahrq.gov/nhqr/jsp/nhqr.jsp>.

## Introduction and Methods

### Measure Set for the NHQR and NHDR

As in previous years, the 2008 reports focus on a subset of core report measures. In addition, composite measures are included to provide readers with a summarized picture of some aspect of health care by combining information from multiple component measures.

#### Core Measures

Core measures were first introduced in the 2005 reports. The Interagency Work Group selected a group of core measures from the full measure sets on which the reports would present findings each year. In 2006, the work group made additional changes to the core measure set. For some topics, the NHQR uses alternating sets of core measures. These measures, which relate to cancer prevention and childhood preventive services, are listed in Table 1.1.

*Table 1.1. Alternating core measures*

| Reported in 2007 NHQR and NHDR*                   | Reported in 2008 NHQR and NHDR                       |
|---|--|
| Breast cancer screening (mammography)             | Colorectal cancer screening                          |
| Breast cancer mortality                           | Colorectal cancer mortality                          |
| Late-stage breast cancer diagnosis                | Advanced stage colorectal cancer diagnosis           |
| Children who received advice about healthy eating | Children who received advice about physical activity |
| Children who had dental care                      | Children who had a vision check                      |

\* The measures listed in this column will be reported again in the 2009 reports.

All core measures fall into two categories: process measures, which track receipt of medical services, and outcome measures, which in part reflect the results of medical care. Both types of measures are not reported for all conditions due to data limitations. For example, data on HIV care are suboptimal; hence, no HIV process measures are included as core measures. In addition, not all core measures are included in trending analysis, because 2 or more years of data were not always available. A complete list of the 2008 NHQR core measure set is presented in Table 1.2.

## Introduction and Methods

**Table 1.2. Core process and outcome measures**

| Section                                  | Process measures   | Outcome measures  |
|--|--|---|
| Effectiveness: Cancer                    | <ul style="list-style-type: none"> <li>Adults age 50 and over who received colorectal cancer screening</li> </ul>  | <ul style="list-style-type: none"> <li>Colorectal cancer diagnosed at advanced stage</li> <li>Colorectal cancer deaths</li> </ul>                       |
| Effectiveness: Diabetes                  | <ul style="list-style-type: none"> <li>Composite: Adults age 40 and over with diagnosed diabetes who received all three recommended services for diabetes in the calendar year (hemoglobin A1c measurement, dilated eye examination, and foot examination)<sup>a</sup></li> </ul>  | <ul style="list-style-type: none"> <li>Hospital admissions for lower extremity amputation per 1,000 population age 18 and over with diabetes</li> </ul> |
| Effectiveness: End Stage Renal Disease   | <ul style="list-style-type: none"> <li>Dialysis patients who were registered on a waiting list for transplantation</li> </ul>  | <ul style="list-style-type: none"> <li>Adult hemodialysis patients with adequate dialysis (urea reduction ratio 65% or greater)</li> </ul>              |
| Effectiveness: Heart Disease             | <ul style="list-style-type: none"> <li>Adult current smokers with a checkup in the last 12 months who received advice to quit smoking</li> <li>Adults with obesity who ever received advice from a health provider to exercise more</li> <li>Composite: Hospital patients with heart attack who received recommended hospital care (aspirin and beta blocker within 24 hours of admission, aspirin and beta blocker prescriptions at discharge, and smoking cessation counseling while hospitalized)<sup>b</sup></li> <li>Composite: Hospital patients with heart failure who received recommended hospital care (evaluation of left ventricular ejection fraction and ACE inhibitor or ARB prescription at discharge, if indicated, for left ventricular systolic dysfunction)<sup>b</sup></li> </ul> | <ul style="list-style-type: none"> <li>Deaths per 1,000 adult hospital admissions with acute myocardial infarction (AMI)</li> </ul>                     |
| Effectiveness: HIV and AIDS              |  | <ul style="list-style-type: none"> <li>New AIDS cases per 100,000 population age 13 and over</li> </ul>   |
| Effectiveness: Maternal and Child Health | <ul style="list-style-type: none"> <li>Women who completed a pregnancy in the last 12 months who first received prenatal care in the first trimester</li> <li>Composite: Children ages 19-35 months who received all recommended vaccines</li> </ul>   | <ul style="list-style-type: none"> <li>Infant deaths per 1,000 live births, birth weight &lt;1,500 grams (No new data this year)</li> </ul>             |

## Introduction and Methods

**Table 1.2. Core process and outcome measures**

| Section  | Process measures  | Outcome measures   |
|--|---|--|
|  | <ul style="list-style-type: none"> <li>• Children ages 3-6 who ever had their vision checked by a health provider</li> <li>• Children ages 2-17 for whom a health provider ever gave advice about the amount and kind of exercise, sports, or physically active hobbies they should have</li> <li>• Children ages 2-17 for whom a health provider ever gave advice about healthy eating</li> </ul>  |  |
| Effectiveness: Mental Health and Substance Abuse           | <ul style="list-style-type: none"> <li>• Adults with major depressive episode in the last 12 months who received treatment for depression in the last 12 months</li> <li>• People age 12 and over who needed treatment for illicit drug use and who received such treatment at a specialty facility in the last 12 months</li> </ul>  | <ul style="list-style-type: none"> <li>• Suicide deaths per 100,000 population</li> </ul>  |
| Effectiveness: Respiratory Diseases                        | <ul style="list-style-type: none"> <li>• Adults age 65 and over who ever received pneumococcal vaccination</li> <li>• Composite: Hospital patients with pneumonia who received recommended hospital care (blood cultures collected before antibiotics are administered, initial antibiotic dose within 4 hours of hospital arrival and consistent with current recommendations, and influenza and pneumococcal screening or vaccination)<sup>c</sup></li> <li>• Visits with antibiotics prescribed for a diagnosis of common cold per 10,000 population</li> <li>• People with current asthma who are now taking preventive medicine daily or almost daily</li> </ul> | <ul style="list-style-type: none"> <li>• Patients with tuberculosis who completed a curative course of treatment within 1 year of initiation of treatment</li> </ul>   |
| Effectiveness: Nursing Home, Home Health, and Hospice Care | <ul style="list-style-type: none"> <li>• Long-stay nursing home residents with physical restraints</li> </ul>   | <ul style="list-style-type: none"> <li>• High-risk, long-stay nursing home residents with pressure sores</li> <li>• Short-stay nursing home residents with pressure sores</li> <li>• Adult home health care patients whose ability to walk or move around improved</li> <li>• Adult home health care patients who were admitted to the hospital</li> </ul> |



## Introduction and Methods

**Table 1.2. Core process and outcome measures**

| Section              | Process measures   | Outcome measures   |
|----------------------|--|--|
| Patient Safety       | <ul style="list-style-type: none"> <li>• Composite: Adult surgery patients who received appropriate timing of antibiotics</li> <li>• Adults age 65 and over who received potentially inappropriate prescription medications</li> </ul>                               | <ul style="list-style-type: none"> <li>• Composite: Adult surgery patients with postoperative complications (postoperative pneumonia or venous thromboembolic event)<sup>d</sup></li> <li>• Composite: Bloodstream infections or mechanical adverse events per 1,000 central venous catheter placements</li> </ul> |
| Timeliness           |  | <ul style="list-style-type: none"> <li>• Adults who needed care right away for an illness, injury, or condition in the last 12 months who did not get care as soon as wanted</li> <li>• Emergency department visits in which patients left without being seen</li> </ul>   |
| Patient Centeredness | <ul style="list-style-type: none"> <li>• Composite: Adult ambulatory patients who reported poor communication with health providers</li> <li>• Composite: Children with ambulatory visits whose parents reported poor communication with health providers</li> </ul> |  |

<sup>a</sup> The specification for the time period for the eye examination measure was changed to include only the calendar year. For previous reports the early part of the subsequent year was also included.

<sup>b</sup> Use of angiotensin-converting enzyme (ACE) inhibitors in patients with left ventricular systolic dysfunction was changed to include angiotensin receptor blockers (ARBs) as an acceptable alternative. This change was also included in the 2007 report.

<sup>c</sup> Appropriate antibiotic selection was changed to exclude patients with health care-associated pneumonia from the denominator used in the calculation. Collection of samples for blood culture within 24 hours of hospital arrival was changed so that only those patients who were admitted to the intensive care unit within 24 hours of hospital arrival are included in the denominator. This change was also included in the 2007 report.

<sup>d</sup> The individual measure for postoperative urinary tract infection was refined to include only patients with catheter-associated urinary tract infections and, beginning this year, is no longer included in this composite measure.

## Introduction and Methods

### Composite Measures

More than one measure can be combined to form a single composite measure of health care quality. A composite measure summarizes care that is represented by individual measures that are often related in some way, such as components of care for a particular disease or illness. Policymakers and others have voiced their support for composite measures because they can be used to facilitate understanding of information from many individual measures. The effort to develop new composites is ongoing and, in 2006, a number of new composite measures were added.<sup>ii</sup> The complete list of composite measures is shown in Table 1.3.

Composite measures in the NHQR are created based on two different models: the appropriateness model or the opportunities model. When possible, an appropriateness model is used to create composite measures. It is sometimes referred to as the “all-or-none” approach, because it is calculated based on the number of patients who received all appropriate care. One example of this model is the diabetes composite, in which a patient who receives only one or two of the three services would not be counted as having received the recommended care.

In other cases an opportunities model may be appropriate. The opportunities model assumes that each patient needs and has the opportunity to receive one or more processes of care, but not all patients need the same care. Composite measures that use this model summarize the proportion of appropriate care that is delivered. The denominator for an opportunities model composite is the sum of opportunities to receive appropriate care across a panel of process measures. The numerator is the sum of the components of appropriate care that are actually delivered. The composite measure of recommended hospital care for heart attack is an example where this model is applied. The total number of patients who actually receive treatments represented by individual components of the composite measure (e.g., aspirin therapy within 24 hours, beta blocker within 24 hours, and smoking cessation counseling) is divided by the sum of all of these opportunities to receive appropriate care.

Measures from the CAHPS® (Consumer Assessment of Healthcare Providers and Systems) surveys have their own method for computing composite measures that has been in use for many years. These composite measures average individual components of patient experiences of care. They are typically presented as the proportion of respondents who reported that providers sometimes or never, usually, or always performed well.

Composite measures that relate to rates of complications of hospital care are postoperative complications and complications of central venous catheters. For these complication rate composites, an additive model is used that sums individual complication rates. Thus, for these composites, the numerator is the sum of individual complications and the denominator is the number of patients at risk for these complications. The composite rates are presented as the overall rate of complications. The postoperative complications composite is a good example of this type of composite measure: If 50 patients had a total of 15 complications among them (regardless of their distribution), the composite score would be 30%.

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<sup>ii</sup> See Chapter 1, Introduction and Methods, in the 2006 NHQR for more detailed information about these and other methods used to calculate composite measures used in the reports.

## Introduction and Methods

Table 1.3. Composite measures in the 2008 NHQR and NHDR (updated measures in italics)

| Composite measure   | Individual measures forming composite   | Model           |
|---|---|-----------------|
| <i>Receipt of three recommended services for diabetes<sup>a</sup></i> | <ul style="list-style-type: none"> <li>• Adults age 40 and over with diagnosed diabetes who had a hemoglobin A1c measurement in the calendar year</li> <li>• Adults age 40 and over with diagnosed diabetes who had a dilated eye examination in the calendar year<sup>a</sup></li> <li>• Adults age 40 and over with diagnosed diabetes who had a foot examination in the calendar year</li> </ul>   | Appropriateness |
| Childhood immunization  | <ul style="list-style-type: none"> <li>• Children ages 19-35 months who received 4 doses of diphtheria-tetanus-pertussis vaccine</li> <li>• Children ages 19-35 months who received 3 doses of polio vaccine</li> <li>• Children ages 19-35 months who received 1 dose of measles-mumps-rubella vaccine</li> <li>• Children ages 19-35 months who received 3 doses of <i>Haemophilus influenzae</i> type B vaccine</li> <li>• Children ages 19-35 months who received 3 doses of hepatitis B vaccine</li> </ul>   | Appropriateness |
| Recommended hospital care for heart attack <sup>b</sup>               | <ul style="list-style-type: none"> <li>• Hospital patients with heart attack who received aspirin within 24 hours of admission</li> <li>• Hospital patients with heart attack who were prescribed aspirin at discharge</li> <li>• Hospital patients with heart attack who received beta blocker within 24 hours of admission</li> <li>• Hospital patients with heart attack who were prescribed beta blocker at discharge</li> <li>• Hospital patients with heart attack and left ventricular systolic dysfunction who were prescribed ACE inhibitor or ARB at discharge</li> <li>• Smokers with heart attack who received smoking cessation counseling while hospitalized</li> </ul> | Opportunities   |
| Recommended hospital care for heart failure <sup>b</sup>              | <ul style="list-style-type: none"> <li>• Hospital patients with heart failure who received an evaluation of left ventricular ejection fraction</li> <li>• Hospital patients with heart failure and left ventricular systolic dysfunction who were prescribed ACE inhibitor or ARB at discharge</li> </ul>   | Opportunities   |

## Introduction and Methods

**Table 1.3. Composite measures in the 2008 NHQR and NHDR (updated measures in italics)**

| Composite measure  | Individual measures forming composite  | Model         |
|--|--|---------------|
| Recommended hospital care for pneumonia <sup>c</sup>           | <ul style="list-style-type: none"> <li>Hospital patients with pneumonia who had blood cultures collected before antibiotics were administered</li> <li>Hospital patients with pneumonia who received the initial antibiotic dose within 4 hours of hospital arrival</li> <li>Hospital patients with pneumonia who received the initial antibiotic consistent with current recommendations</li> <li>Hospital patients with pneumonia who received influenza screening or vaccination</li> <li>Hospital patients with pneumonia who received pneumococcal screening or vaccination</li> </ul>  | Opportunities |
| Timing of antibiotics to prevent postoperative wound infection | <ul style="list-style-type: none"> <li>Adult surgery patients who received prophylactic antibiotics within 1 hour prior to surgical incision</li> <li>Adult surgery patients who had prophylactic antibiotics discontinued within 24 hours after surgery end time</li> </ul>   | Opportunities |
| Patient experience of care                                     | <ul style="list-style-type: none"> <li>Adult ambulatory patients whose providers sometimes or never listened carefully to them</li> <li>Adult ambulatory patients whose providers sometimes or never explained things in a way they could understand</li> <li>Adult ambulatory patients whose providers sometimes or never showed respect for what they had to say</li> <li>Adult ambulatory patients whose providers sometimes or never spent enough time with them</li> <li>Children with ambulatory visits whose parents report that their child's providers sometimes or never listened carefully to them</li> <li>Children with ambulatory visits whose parents report that their child's providers sometimes or never explained things in a way they could understand</li> <li>Children with ambulatory visits whose parents report that their child's providers sometimes or never showed respect for what they had to say</li> <li>Children with ambulatory visits whose parents report that their child's providers sometimes or never spent enough time with them</li> </ul> | CAHPS®        |
| Postoperative complications <sup>d</sup>                       | <ul style="list-style-type: none"> <li>Adult surgery patients with postoperative pneumonia events</li> <li>Adult surgery patients with postoperative venous thromboembolic events</li> </ul>   | Additive      |

## Introduction and Methods

**Table 1.3. Composite measures in the 2008 NHQR and NHDR (updated measures in italics)**

| Composite measure                         | Individual measures forming composite   | Model    |
|---|---|----------|
| Complications of central venous catheters | <ul style="list-style-type: none"> <li>• Bloodstream infections per 1,000 central venous catheter placements</li> <li>• Mechanical adverse events per 1,000 central venous catheter placements</li> </ul> | Additive |

<sup>a</sup> The specification for the time period for the eye examination measure was changed to include only the calendar year. For previous reports the early part of the subsequent year was also included.

<sup>b</sup> Use of angiotensin-converting enzyme (ACE) inhibitors in patients with left ventricular systolic dysfunction was changed to include angiotensin receptor blockers (ARBs) as an acceptable alternative. This change was also included in the 2007 report.

<sup>c</sup> Appropriate antibiotic selection was changed to exclude patients with health care-associated pneumonia from the denominator used in the calculation. Collection of samples for blood culture within 24 hours of hospital arrival was changed so that only those patients who were admitted to the intensive care unit within 24 hours of hospital arrival are included in the denominator. This change was also included in the 2007 report.

<sup>d</sup> The individual measure for postoperative urinary tract infection was refined to include only patients with catheter-associated urinary tract infections and, beginning this year, is no longer included in this composite measure.

### Presentation

As in past reports, the NHQR and its companion NHDR continue to be formatted as chartbooks. Each section in the 2008 report begins with a description of the importance of the section's topic in a standardized format. After introductory text, charts and accompanying findings highlight a small number of measures relevant to the topic. Sometimes these charts show contrasts by age when age data are available and relevant.

Almost all core measures and composite measures have multiple years of data, so figures typically illustrate trends over time. Figures include a notation about the reference population for population-based measures and about the denominator for measures based on services or events from provider- or establishment-based data collection efforts.

To place findings in the context of other Federal reporting initiatives, this report indicates where NHQR measures are also included in Healthy People 2010. Note that the Healthy People 2010 targets represented in the report figures, where applicable, reflect target values that were current when the reports were being prepared. Targets may be revised as new information becomes available. Therefore, the targets shown on the figures may differ from those in past reports or subsequent revisions. Also, Healthy People 2010 targets are only referenced in relation to the total population, not particular age groups. In addition, the data source for estimates reported here must be the same as the Healthy People 2010 data source in order for comparisons to be made.

Measures of effectiveness for each condition or care setting area are organized further into categories that reflect the patient's need for preventive care, treatment of illness, or management of chronic conditions. Further detail on each of these categories and the measures included can be found in Chapter 2, Effectiveness.

## Introduction and Methods

### Databases Used in the 2008 Reports

Table 1.4 lists the databases used in the 2008 reports. This year the CPES is added to the set of databases that were used in the 2007 reports.

*Table 1.4. Databases used in the 2008 reports (new databases in italics)*

#### Survey data collected from populations

- AHRQ, Medical Expenditure Panel Survey (MEPS), 2000-2005
- Centers for Disease Control and Prevention (CDC), Behavioral Risk Factor Surveillance System (BRFSS), 2001-2006
- CDC-National Center for Health Statistics (NCHS), National Health and Nutrition Examination Survey (NHANES), 1999-2006
- CDC-NCHS, National Health Interview Survey (NHIS), 1998-2006
- CDC-NCHS/National Immunization Program, National Immunization Survey (NIS), 1998-2006
- Centers for Medicare & Medicaid Services (CMS), Medicare Current Beneficiary Survey (MCBS), 1998-2004
- National Center for Education Statistics, National Assessment of Adult Literacy, Health Literacy Component, 2003
- National Hospice and Palliative Care Organization, Family Evaluation of Hospice Care, 2005-2007
- *National Institutes of Health (NIH), National Institute of Mental Health (NIMH), Collaborative Psychiatric Epidemiology Surveys (CPES), 2001-2003*
- Substance Abuse and Mental Health Services Administration (SAMHSA), National Survey on Drug Use and Health (NSDUH), 2002-2006
- U.S. Census Bureau, American Community Survey, 2006

#### Data collected from samples of health care facilities and providers

- American Cancer Society and American College of Surgeons, National Cancer Data Base (NCDB), 1999-2005
- CDC-NCHS, National Ambulatory Medical Care Survey (NAMCS), 1997-2006
- CDC-NCHS, National Hospital Ambulatory Medical Care Survey-Emergency Department (NHAMCS-ED), 1997-2006
- CDC-NCHS, National Hospital Ambulatory Medical Care Survey-Outpatient Department (NHAMCS-OPD), 1997-2006
- CDC-NCHS, National Hospital Discharge Survey (NHDS), 1998-2006
- CMS, End Stage Renal Disease Clinical Performance Measures Project (ESRD CPMP), 2001-2006

#### Data extracted from data systems of health care organizations

- AHRQ, Healthcare Cost and Utilization Project (HCUP) Nationwide Inpatient Sample, 1994, 1997, 2000-2005, and State Inpatient Databases,<sup>a</sup> 2001-2005
- CMS, Home Health Outcomes and Assessment Information Set (OASIS), 2002-2006
- CMS, Hospital Compare, 2006

## Introduction and Methods

**Table 1.4. Databases used in the 2008 reports (new databases in italics)**

- CMS, Medicare Patient Safety Monitoring System, 2004-2006
- CMS, Nursing Home Minimum Data Set, 1999-2006
- CMS, Quality Improvement Organization (QIO) program, Hospital Quality Alliance (HQA) measures, 2002-2006
- HIV Research Network (HIVRN) data, 2003-2005
- Indian Health Service, National Patient Information Reporting System (NPIRS), 2002-2005
- National Committee for Quality Assurance, Health Plan Employer Data and Information Set (HEDIS®), 2001-2005
- NIH, United States Renal Data System (USRDS), 1998-2004
- SAMHSA, Treatment Episode Data Set (TEDS), 2002-2005

### Data from surveillance and vital statistics systems

- CDC-National Center for HIV, Viral Hepatitis, STD, and TB Prevention, HIV/AIDS Reporting System, 1998-2006
- CDC-National Center for HIV, STD, and TB Prevention, TB Surveillance System, 1999-2004
- CDC-National Program of Cancer Registries (NPCR), 2000-2004
- CDC-NCHS, National Vital Statistics System (NVSS), 1999-2005
- NIH-National Cancer Institute, Surveillance, Epidemiology, and End Results (SEER) program, 2000-2005

<sup>a</sup> Not all States participate in HCUP. For details, see HCUP entry in Appendix A, Data Sources.

**Note:** Measures from the American Community Survey and the National Assessment of Adult Literacy are used only in the 2008 NHDR. For details on these surveys, see Chapter 1, Introduction and Methods, in the 2008 NHDR.

## Continued Exploration of the Efficiency Dimension

The 2007 NHQR included an initial look at the concept of efficiency in the U.S. health care system. The 2008 NHQR continues this exploratory work by updating the discussion of topics introduced in 2007. Chapter 6, Efficiency, in this year's report also includes a first look at data on rehospitalizations for congestive heart failure for nine States in the United States. These nine States represent more than one-third of all hospitalizations for congestive heart failure.

## Trend Analysis

This section discusses the methodology behind the median rates of change shown in Figures H.1 and H.3 in the Highlights chapter. The methodology differs from that used in previous reports. Readers are cautioned not to draw comparisons between rates of change in this and previous reports.

For each measure within a group (e.g., the group of core measures or the group of diabetes measures), the average annual rate of change was calculated between the earliest and the most recent estimates within a specified date range. Consistent with *Health, United States*, a formula that produces the geometric rate of

## Introduction and Methods

change is used for this calculation for each measure.<sup>iii</sup> This geometric rate of change assumes the same rate of change each year between the two time periods. For each group the median rate of change is determined, based on the rates of change for the measures within that group.

Specifying the optimal time period for analysis without excluding large numbers of measures has been a challenge. Specific issues include:

- ◆ Changes in the measure set over time.
- ◆ Changes in the data source over time.
- ◆ Lack of availability of data for particular data years.
- ◆ Recalculation of prior years' data.

Changes in the measure set may result from the deletion of measures due to a lack of availability of new data or a determination by the NHQR's Interagency Work Group that a measure no longer meets its criteria for inclusion. Changes also result from the addition of a measure. For example, this year's report includes a new core measure for daily use of preventive medicine for current asthma. This measure uses data from AHRQ's Medical Expenditure Panel Survey (MEPS). Data for this measure were first collected in 2003. The latest MEPS data year available at the time this report was submitted for review was 2005. Therefore, for this measure data are only available for 3 years: 2003, 2004, and 2005. A 5-year or longer period might be available for other measures.

For this and other reasons (e.g., variability of collection schedules among the different data sources used by the NHQR), if a strict time-interval criterion for trend analysis were used (e.g., only the 2000 and 2005 data years), a large number of measures would be excluded. The approach taken for this year's report favors inclusion of as many measures as possible over a strict application of a minimum number of data points or time interval.

For the trend analysis, 2 data years for each measure are used. In addition, a more inclusive approach to data availability is taken. A data availability preference hierarchy is applied as follows:

- ◆ Take the latest data year available for a particular measure (e.g., 2006 or 2005).
- ◆ Attempt to find data for a 5-year interval (e.g., if 2006 is the latest data year available, then select 2001 as the early data year).
- ◆ If no valid data are available for that year, then attempt to find data for a 4-year interval.
- ◆ Continue this process of reducing the year interval until valid data are selected.

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<sup>iii</sup> See the entry for Average Annual Rate of Change in Appendix II, Definitions and Methods, *Health, United States, 2007*. Available at: <http://www.cdc.gov/nchs/hus.htm>.



## Introduction and Methods

Starting with the latest data year available ensures that up-to-date information is not excluded from the analysis (e.g., 2006 data from the National Health Interview Survey). For most core measures, the trend analysis will use estimates based on a 5-year interval. But, as shown above for the asthma medication measure, application of the preference hierarchy will result in the selection of estimates from 2003 and 2005 (because data from 2000-2002 are not available). Note also that, for alternating measures, the process described above is applied to each measure so that both are included.

For some data sources, data may be available for a 5-year interval, but changes in data collection or analytic methodology may render comparisons between 2 data years invalid. For example, beginning in 2005, the data collection method for the Medicare Quality Improvement Organization (QIO) Program changed from the abstraction of randomly selected Medicare beneficiary records to the receipt of hospital self-reported data for all payer types. Therefore, only 2005 and 2006 QIO data are included in the trend analysis. Although not optimal, this approach is preferable to comparing data with different denominators and collection methods or to excluding QIO measures from the analysis.

In some cases, it is possible to reanalyze the data from prior data years if a change occurs that might otherwise make a comparison invalid. For example, a number of patient safety measures discussed in Chapter 3, Patient Safety, make use of AHRQ's Patient Safety Indicator software. For this year's report, version 3.1 of the software was used. This version was not available when the data for prior reports were generated. It was possible, however, to reanalyze prior data years using the new version of the software so that a 5-year data interval was available for the trend analysis.

One other methodological issue should be noted. Composite measures are included in the core measure category. To avoid duplication of estimates within the other categories, composite measures are not included in other categories where estimates from their component measures are used. For example, the diabetes composite measure (which includes HbA1c measurement, eye exam, and foot exam) contributes to the overall rate for the core measures group but not to the diabetes group rate, which uses the estimates from the three noncore component measures.

In addition to the trend analysis for groups of measures shown in the Highlights chapter, each section of Chapter 2, as well as the following chapters, details changes over time for individual measures. For each measure discussed in the reports, two criteria are applied to determine whether a significant trend exists:

- ◆ First, the difference between the earliest and most recent estimates shown must be statistically significant at  $p < 0.05$ .
- ◆ Second, the average (mean) annual rate of change must be at least 1%.

Only changes over time that meet these two criteria are discussed in the 2008 reports as indicating a change over time or between population subgroups.

## Introduction and Methods

Various words and phrases might be used to refer to a change, depending on the specific measure being discussed. For example, “more likely to,” “significantly below,” “decreased,” “had the highest rate,” “change,” “improvement,” “statistically higher,” and “less likely to” all refer to changes that meet the two criteria listed above. Although the explicit use of the term “statistically significant” is warranted in some cases, imposing its use in every sentence where a change is discussed would be overly cumbersome. Also, not every significant change among data years or populations is noted. Therefore, no conclusions should be drawn if a numeric difference in a figure is not referenced in the corresponding text or bullet.

Due to the methodological changes discussed here, changes to estimates for data from prior years, and changes to the measure set, it is not appropriate to compare the rates of change for measure groups discussed in this year’s report with those from prior years.

Finally, this report conforms to the Government Printing Office Style Manual. In some cases, terms or spelling may vary to reflect an original data source or an agency or program name. For example, “health care” usually appears as two words but may appear as one word in an agency name, such as the Agency for Healthcare Research and Quality. These minor variations in spelling and usage do not alter the meaning or intent of the data and are purely cosmetic in nature.

## Effectiveness

# Chapter 2. Effectiveness

As noted in Chapter 1, Introduction and Methods, effectiveness of care is presented under nine clinical condition/care setting areas: cancer; diabetes; end stage renal disease (ESRD); heart disease; HIV and AIDS; maternal and child health; mental health and substance abuse; respiratory diseases; and nursing home, home health, and hospice care. The nine individual sections of this chapter highlight a small number of core measures. Results for all core measures are found in the List of Core Report Measures at the end of this report.

In this chapter, measures are organized into several categories related to the patient's need for preventive care, treatment of acute illness, and chronic disease management. These are derived from the original Institute of Medicine categories: staying healthy, getting better, living with illness or disability, and coping with the end of life. There is sizable overlap among these categories, and some measures may be considered to belong in more than one category. Outcome measures are particularly difficult to categorize when prevention, treatment, and management all play important roles. Nevertheless, for the purposes of this report, measures are placed into categories that best fit the general descriptions below.

## Prevention

Caring for healthy people is an important component of health care. Educating people about health and promoting healthy behaviors can help postpone or avoid illness and disease. In addition, detecting health problems at an early stage increases the chances of effectively treating them, often reducing suffering and costs.

## Treatment

Even when preventive care is ideally implemented, it cannot entirely avert the need for acute care. Delivering optimal treatments for acute illness can help reduce the consequences of illness and promote the best recovery possible.

## Management

Some diseases, such as diabetes and ESRD, are chronic, which means they cannot simply be treated once; they must be managed across a lifetime. Management of chronic disease often involves promotion and maintenance of lifestyle changes and regular contact with a provider to monitor the status of the disease. For patients, effective management of chronic diseases can mean the difference between normal, healthy living and frequent medical problems.

## Effectiveness

The measures highlighted on the following pages are categorized as follows:

| Section                           | Measure   |
|-----------------------------------|---|
| <b>Prevention</b>                 |   |
| Cancer                            | Colorectal cancer screening                                   |
| Cancer                            | Advanced stage colorectal cancer                              |
| Cancer                            | Colorectal cancer mortality                                   |
| Heart disease                     | Counseling smokers to quit smoking                            |
| Heart disease                     | Counseling obese adults about overweight*                     |
| Heart disease                     | Counseling obese adults about exercise and diet†              |
| Maternal and child health         | Prenatal care in the first trimester                          |
| Maternal and child health         | Receipt of all recommended immunizations by young children    |
| Maternal and child health         | Vision checks for children                                    |
| Maternal and child health         | Counseling for children about healthy eating                  |
| Maternal and child health         | Counseling for children about physical activity               |
| Maternal and child health         | Weight monitoring of overweight children*                     |
| Respiratory diseases              | Pneumococcal vaccination                                      |
| <b>Treatment</b>                  |   |
| Cancer                            | Receipt of recommended care for breast and colon cancer*      |
| Heart disease                     | Receipt of recommended care for heart attack                  |
| Heart disease                     | Inpatient mortality following heart attack                    |
| Heart disease                     | Receipt of recommended care for heart failure                 |
| Mental health and substance abuse | Suicide deaths  |
| Mental health and substance abuse | Receipt of needed treatment for illicit drug use              |
| Mental health and substance abuse | Receipt of minimally adequate treatment for mental disorders* |
| Respiratory diseases              | Receipt of recommended care for pneumonia                     |
| Respiratory diseases              | Receipt of antibiotics for the common cold                    |
| Respiratory diseases              | Completion of tuberculosis therapy                            |
| <b>Management</b>                 |   |
| Diabetes                          | Receipt of three recommended diabetes services                |
| Diabetes                          | Lower extremity amputations                                   |
| Diabetes                          | Controlled hemoglobin, cholesterol, and blood pressure        |
| Diabetes                          | State variation in influenza immunization*                    |
| End stage renal disease           | Patients with adequate hemodialysis                           |
| End stage renal disease           | Registration for transplantation                              |
| HIV and AIDS                      | New AIDS cases  |

## Effectiveness

| Section                                     | Measure  |
|---|--|
| HIV and AIDS                                | PCP and MAC prophylaxis*   |
| Respiratory diseases                        | Daily asthma medication  |
| Nursing home, home health, and hospice care | Use of restraints on long-stay nursing home residents                |
| Nursing home, home health, and hospice care | Presence of pressure sores in nursing home residents                 |
| Nursing home, home health, and hospice care | Improvement in ambulation in home health care episodes               |
| Nursing home, home health, and hospice care | Acute care hospitalization of home health care patients              |
| Nursing home, home health, and hospice care | Receipt of right amount of pain medicine by hospice patients*        |
| Nursing home, home health, and hospice care | Receipt of care consistent with patient's stated end-of-life wishes* |
| Nursing home, home health, and hospice care | Referral to hospice at the right time*                               |

\* Noncore measure.

† Counseling about diet is a noncore measure.

## Effectiveness

## Cancer

## Importance

## Mortality

|                                   |                      |
|-----------------------------------|----------------------|
| Number of deaths (2008 est.)..... | 565,650 <sup>1</sup> |
| Cause of death rank (2005).....   | 2nd <sup>2</sup>     |

## Prevalence

|   |                         |
|---|-------------------------|
| Number of living Americans who have been diagnosed with cancer (2005 est.)..... | 11,098,450 <sup>3</sup> |
|---|-------------------------|

## Incidence

|   |                        |
|---|------------------------|
| New cases of cancer (2008 est.).....            | 1,437,180 <sup>1</sup> |
| New cases of colorectal cancer (2008 est.)..... | 148,810 <sup>4</sup>   |

## Cost

|   |                                      |
|---|--------------------------------------|
| Total cost <sup>i</sup> (2007).....                                   | \$219.2 billion <sup>5</sup>         |
| Indirect costs (2007).....  | \$130.2 billion <sup>5</sup>         |
| Direct costs <sup>ii</sup> (2007).....                                | \$89.0 billion <sup>5</sup>          |
| Cost-effectiveness <sup>iii</sup> of colorectal cancer screening..... | \$0-\$14,000/QALY <sup>6</sup>       |
| Cost-effectiveness of breast cancer screening.....                    | \$35,000-\$165,000/QALY <sup>6</sup> |

**Note:** Statistics may vary from previous years due to revised and updated source statistics or addition of data sources.

<sup>i</sup> Total cost equals cost of medical care (direct cost) and economic costs of morbidity and mortality (indirect cost).

<sup>ii</sup> Direct costs are defined as “personal health care expenditures for hospital and nursing home care, drugs, home care, and physician and other professional services.”<sup>4</sup>

<sup>iii</sup> Cost-effectiveness is measured here by the average net cost of each quality-adjusted life year (QALY) that is saved by the provision of a particular health intervention. QALYs are a measure of survival adjusted for its value: 1 year in perfect health is equal to 1.0 QALY, while a year in poor health would be something less than 1.0. A lower cost per QALY saved indicates a greater degree of cost-effectiveness. For example, the net cost for colorectal cancer screening ranges from \$0 to \$14,000 for each QALY saved.

## Measures

Evidence-based consensus defining good quality care and how to measure it currently exists for only a few cancers and a few aspects of care. Breast and colorectal cancers have high incidence rates and are highlighted in alternate years of the report. The 2007 NHQR highlighted breast cancer; this year's focus is on colorectal cancer. The core report measures are:

- ◆ Colorectal cancer screening.
- ◆ Advanced stage colorectal cancer.
- ◆ Colorectal cancer mortality.

The 2008 NHQR continues to include three noncore cancer care measures—two for breast cancer and one for colon cancer—from the National Cancer Data Base that have been endorsed by the National Quality Forum.

Recommended care for breast and colon cancer patients:

- ◆ Administration of radiation therapy within 1 year of diagnosis for women under age 70 receiving breast-conserving surgery.
- ◆ Axillary node dissection or sentinel lymph node biopsy at the time of surgery (lumpectomy or mastectomy) for women with Stage I-IIb breast cancer.
- ◆ Surgical resection of colon cancer that includes at least 12 lymph nodes.

## Findings

### Prevention: Colorectal Cancer Screening

Colorectal cancer is the third most common cancer in adults.<sup>1</sup> Prevention of colorectal cancer includes modifying risk factors such as weight, physical activity, smoking, and alcohol use, as well as screening for early disease. Screening is important because early stages of colorectal cancer may not present any

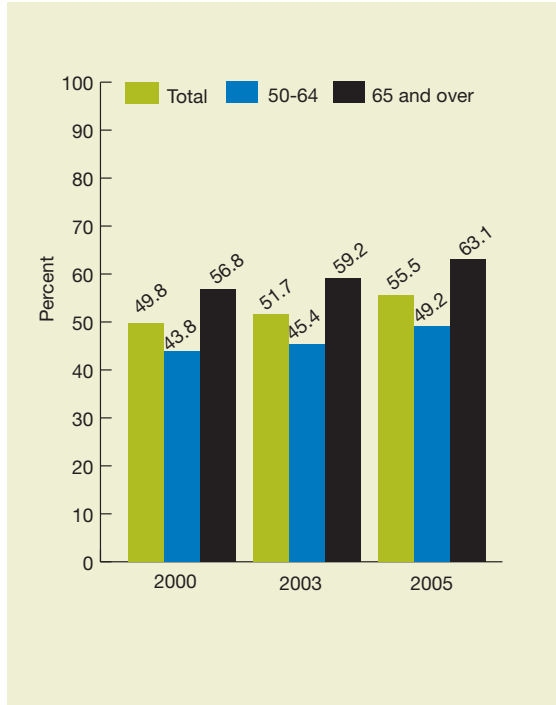
symptoms, and it also can detect abnormal growths before they develop into cancer.<sup>1,7</sup> Early detection increases treatment options and the chances for survival.<sup>8</sup> The U.S. Preventive Services Task Force recommends colorectal cancer screening for men and women age 50 and over.<sup>9</sup> The screening tests include fecal occult blood test (FOBT), flexible sigmoidoscopy, colonoscopy, proctoscopy, and barium enema.

*Colorectal cancer is the third most common cancer in adults.*

## Effectiveness

## Cancer

**Figure 2.1. Adults age 50 and over who ever received colorectal cancer screening (colonoscopy, sigmoidoscopy, proctoscopy, or fecal occult blood test [FOBT]), 2000, 2003, and 2005**



**Source:** Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, 2000, 2003, and 2005.

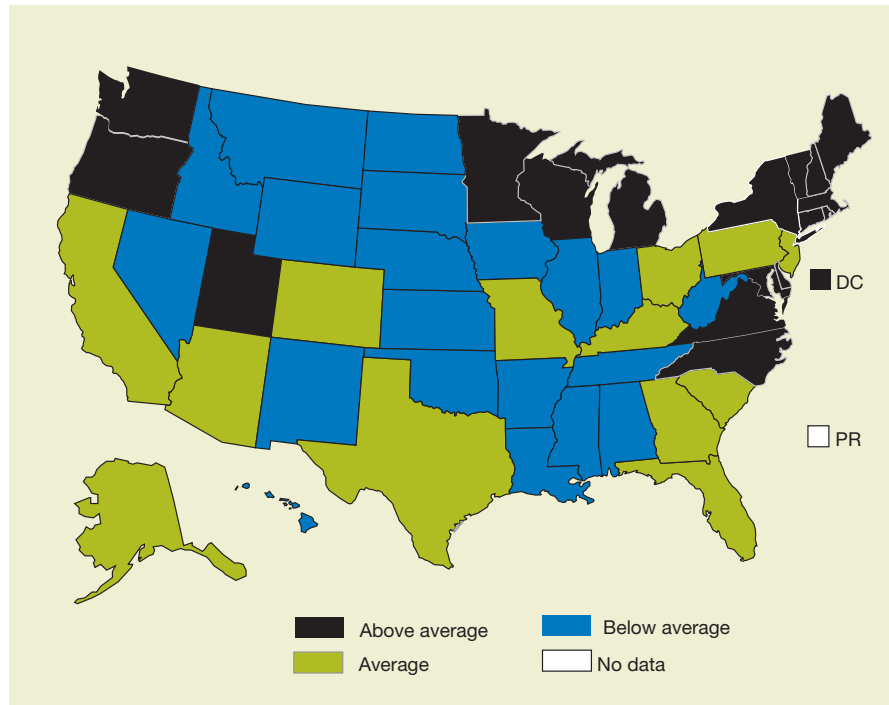
**Reference population:** Civilian noninstitutionalized population age 50 and over.

**Note:** Total rate is adjusted to the 2000 U.S. standard population.

- ◆ The percentage of adults who reported ever having received a sigmoidoscopy, colonoscopy, or proctoscopy or an FOBT increased from 49.8% in 2000 to 55.5% in 2005 (Figure 2.1).
- ◆ From 2000 to 2005, the percentage of adults who report ever receiving a sigmoidoscopy, colonoscopy, or proctoscopy or an FOBT increased from 43.8% to 49.2% for adults ages 50-64 and from 56.8% to 63.1% for adults age 65 and over.
- ◆ In all 3 data years, adults age 65 and over were more likely than adults ages 50-64 to report ever having received a sigmoidoscopy, colonoscopy, or proctoscopy or an FOBT.



**Figure 2.2. State variation: Adults age 50 and over who ever received a colonoscopy or sigmoidoscopy, 2006**



**Key:** Above average = rate is significantly above the reporting States average in 2006. Below average = rate is significantly below the reporting States average in 2006.

**Source:** Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System, 2006.

**Note:** Age adjusted to the 2000 U.S. standard population. The “reporting States average” is the average of all reporting States (51 in this case, including the District of Columbia), which is a separate figure from the national average. Data source differs from national estimates in Figure 2.1. Figure does not include proctoscopy or fecal occult blood test.

- ◆ Variation was seen among States in the rates of receipt of a colonoscopy or sigmoidoscopy. In 2006, the all-States average improved to 59.5%, ranging from 50.7% to 69.4%.
- ◆ Seventeen States<sup>iv</sup> and the District of Columbia were significantly above the reporting States average in 2006, with a combined average rate of 65.8% (Figure 2.2).
- ◆ Twenty States<sup>v</sup> were significantly below the reporting States average in 2006, with a combined average rate of 54.5%.

<sup>iv</sup> The States are Connecticut, Delaware, Maine, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New York, North Carolina, Oregon, Rhode Island, Utah, Vermont, Virginia, Washington, and Wisconsin.

<sup>v</sup> The States are Alabama, Arkansas, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Louisiana, Mississippi, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, South Dakota, Tennessee, West Virginia, and Wyoming.

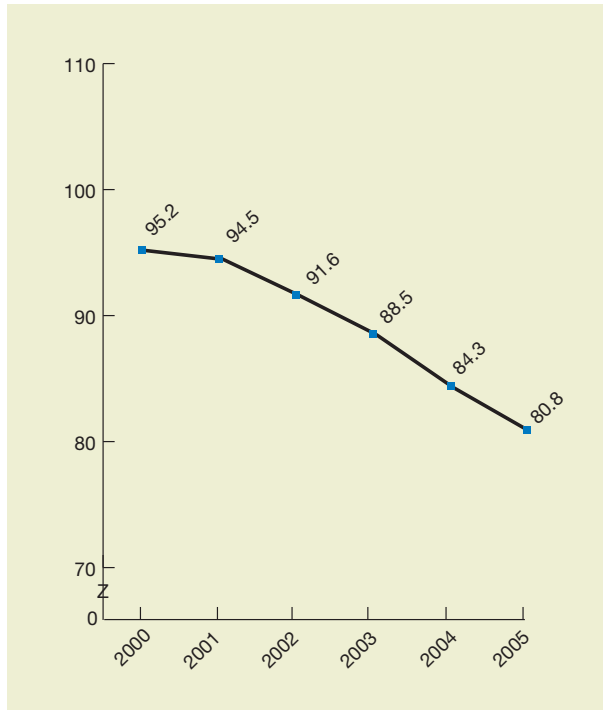
## Effectiveness

### Cancer

#### Prevention: Advanced Stage Colorectal Cancer

Cancers can be diagnosed at different stages of development. Cancers diagnosed early before spread has occurred are generally more amenable to treatment and cure. Cancers diagnosed late with extensive spread often have poor prognoses. The rate of cancer cases that are diagnosed at late or advanced stages is a measure of the effectiveness of cancer screening efforts and of cancer diagnosis following a positive screening test.

**Figure 2.3. Colorectal cancer diagnosed at advanced stage (tumors diagnosed at regional or distant stage) per 100,000 population age 50 and over, 2000-2005**



**Source:** National Cancer Institute, Surveillance, Epidemiology, and End Results Program, 2000-2005.

**Reference population:** U.S. population age 50 and over.

**Note:** Data from the SEER 17 registries are used to expand the sample size. The earliest data year available is 2000.

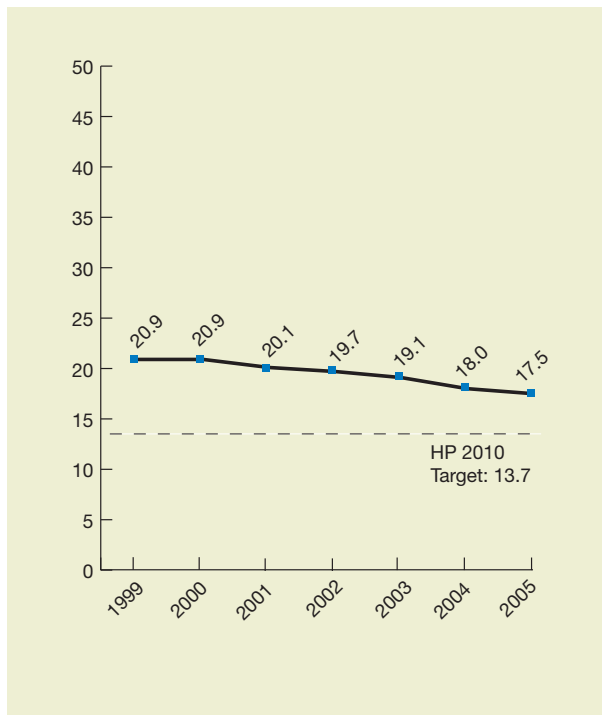
- ◆ Between 2000 and 2005, the rate of colorectal cancer diagnosed at advanced stage decreased from 95.2 to 80.8 per 100,000 population age 50 and over (Figure 2.3).

## Effectiveness

### Prevention: Colorectal Cancer Mortality

The death rate from a disease is a function of many determinants, including causes of the disease, social forces, and health care system quality in providing prevention, treatment, and management of the disease. Colorectal cancer mortality reflects the impact of colorectal cancer screening, diagnosis, and treatment and is measured as the number of deaths per 100,000 population. Declines in colorectal cancer mortality can be attributed, in part, to improvements in early detection and treatment.

**Figure 2.4. Colorectal cancer deaths per 100,000 population per year, United States, 1999-2005**



**Source:** Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System-Mortality, 1999-2005.

**Reference population:** U.S. population.

**Note:** Age adjusted to the 2000 U.S. standard population. Healthy People 2010 target is revised. Please see Chapter 1, Introduction and Methods, for details.

- ◆ Between 1999 and 2005, the age-adjusted rate of colorectal cancer deaths decreased from 20.9 to 17.5 per 100,000 population (Figure 2.4).
- ◆ At 17.5 deaths per 100,000 population, the overall colorectal cancer age-adjusted death rate in 2005 was higher than the Healthy People 2010 target of 13.7. At the present rate of change from 1999 to 2005, this target will not be met by 2010.

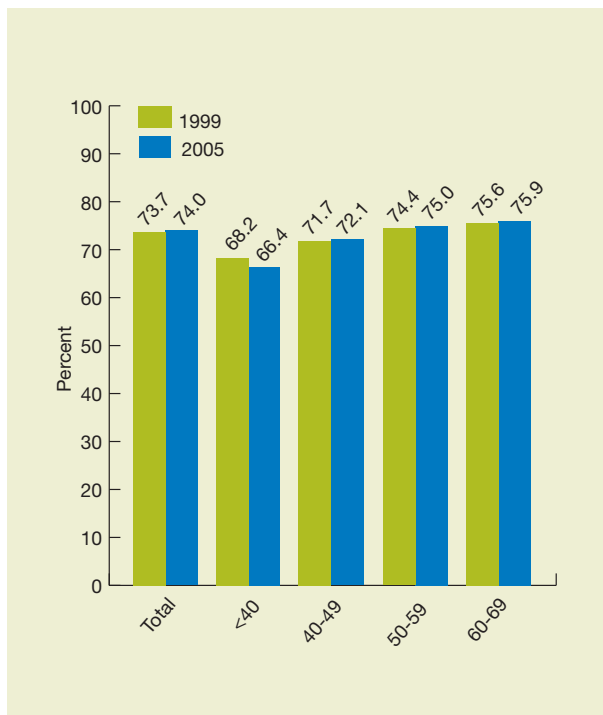
## Effectiveness

## Cancer

**Treatment: Receipt of Recommended Care for Breast and Colon Cancer**

Different diagnostic and treatment options exist for various types of cancer. Some aspects of cancer care are well established as beneficial and are commonly recommended. The appropriateness of recommended care depends on different factors, such as the stage or the extent of the cancer within the body (especially whether the disease has spread from the original site to other parts of the body). Other types of care are important for accurate diagnosis, such as ensuring the adequate examination of lymph nodes when surgery is performed (e.g., to remove colon cancer).

**Figure 2.5. Women under age 70 treated for breast cancer<sup>a</sup> with breast-conserving surgery who received radiation therapy to the breast within 1 year of diagnosis, 1999 and 2005**



<sup>a</sup> American Joint Committee on Cancer Stage I, II, or III, primary invasive epithelial breast cancer.

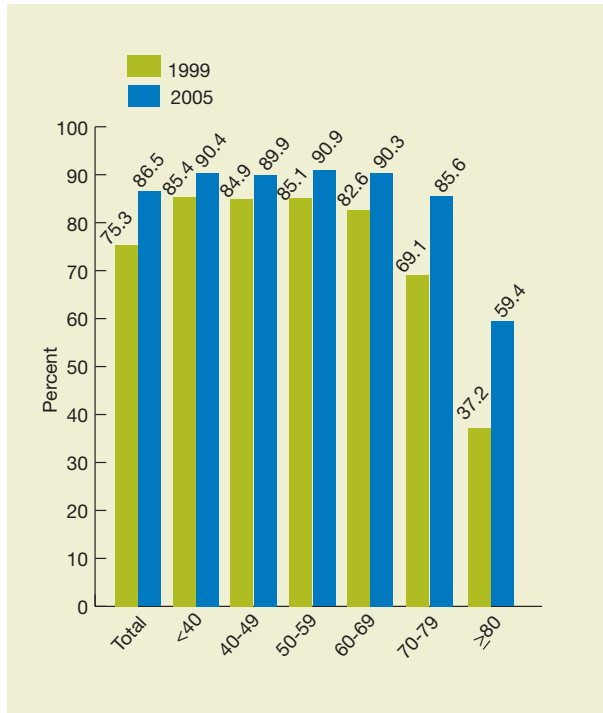
**Source:** Commission on Cancer, American College of Surgeons and American Cancer Society, National Cancer Data Base, 1999 and 2005.

**Reference population:** U.S. population, women.

- ◆ Between 1999 and 2005, the rates of women under age 70 treated for breast cancer with breast-conserving surgery who received the recommended treatment of radiation therapy to the breast within 1 year of diagnosis remained stable overall at 74.0% with no significant changes (Figure 2.5).
- ◆ In both 1999 and 2005, the rates of radiation therapy were highest for women ages 60-69 (75.6% and 75.9%) and lowest for women under age 40 (68.2% and 66.4%).

## Effectiveness

**Figure 2.6. Women with Stage I-IIb breast cancer who received axillary node dissection or sentinel lymph node biopsy (SLNB) at the time of surgery (lumpectomy or mastectomy), 1999 and 2005**



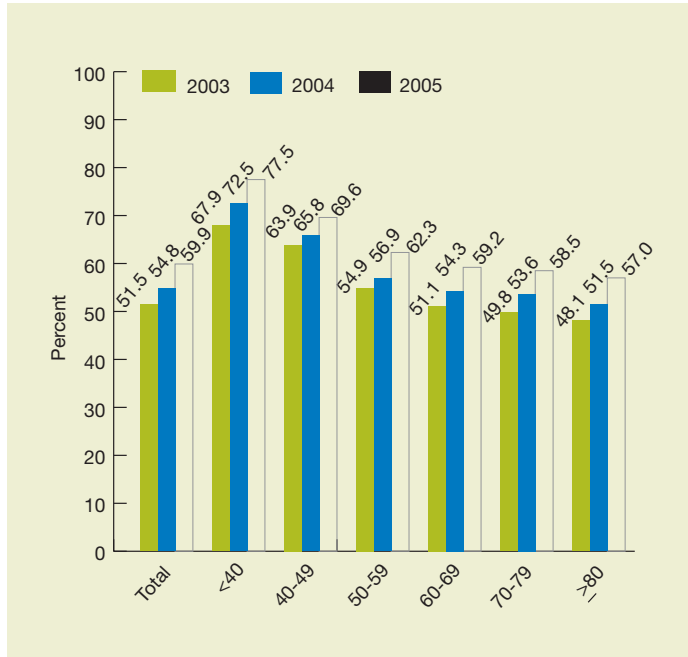
**Source:** Commission on Cancer, American College of Surgeons and American Cancer Society, National Cancer Data Base, 1999-2005.

**Reference population:** U.S. population, women.

- ◆ Between 1999 and 2005, rates of patients with breast cancer who received recommended care of axillary node dissection or sentinel lymph node biopsy at the time of surgery (lumpectomy or mastectomy) for women with Stage I-IIb breast cancer increased overall (75.3% in 1999 to 86.5% in 2005) (Figure 2.6).
- ◆ In 2005, women ages 50-59 had the highest rate of receipt of this care for breast cancer (90.9%). Women age 80 years and over had the lowest rates in both data years but also showed the highest relative increase from 1999 to 2005 (37.2% to 59.4%).

## Effectiveness

**Figure 2.7. Patients with colon cancer who received surgical resection of colon cancer that included at least 12 lymph nodes pathologically examined, 2003-2005**



**Source:** Commission on Cancer, American College of Surgeons and American Cancer Society, National Cancer Data Base, 2003-2005.

**Reference population:** U.S. population.

- ◆ Between 2003 and 2005, rates of patients with colon cancer who received the recommended care, in which the surgical resection of colon cancer included at least 12 lymph nodes, increased overall (from 51.5% in 2003 to 59.9% in 2005), as well as for each age group (Figure 2.7).
- ◆ In all 3 data years, patients under age 40 had the highest rates of receipt of this care, and patients age 80 and over had the lowest rates.
- ◆ For patients with colon cancer, the median number of regional lymph nodes examined in resected colon specimens in 2005 was 13 overall. Patients under age 40 had the highest (19) and patients age 60 and over had the lowest (13) median number of regional lymph nodes examined (data not shown).

## Diabetes

### Importance

#### Mortality

|                                  |                     |
|----------------------------------|---------------------|
| Number of deaths (2005).....     | 75,119 <sup>2</sup> |
| Cause of death rank (2005) ..... | 6th <sup>2</sup>    |

#### Prevalence

|  |                            |
|--|----------------------------|
| Total number of Americans with diabetes (2007).....        | 23.6 million <sup>10</sup> |
| Number of Americans diagnosed with diabetes (2007) .....   | 17.9 million <sup>10</sup> |
| Number of Americans with undiagnosed diabetes (2007) ..... | 5.7 million <sup>10</sup>  |

#### Incidence

|   |                           |
|---|---------------------------|
| New cases (age 20 and over, 2007) ..... | 1.6 million <sup>10</sup> |
|---|---------------------------|

#### Cost

|                                   |                             |
|-----------------------------------|-----------------------------|
| Total cost (2007).....            | \$174 billion <sup>11</sup> |
| Direct medical costs (2007) ..... | \$116 billion <sup>11</sup> |

**Note:** Statistics may vary from previous years due to revised and updated source statistics or addition of data sources.

### Measures

Effective management of diabetes includes appropriate receipt of recommended processes, such as hemoglobin A1c (HbA1c) tests, eye examinations, and foot examinations. Effective management also promotes outcomes expected to correlate positively with these processes, such as control of cholesterol, blood pressure, and HbA1c<sup>vi</sup> levels. In addition, hospital admission rates among patients with diabetes for amputations of a leg or foot can be an indicator of appropriate care for this condition.

The two core report measures highlighted in this section are:

- ◆ Receipt of three recommended diabetes services.
- ◆ Lower extremity amputations.

<sup>vi</sup> HbA1c is glycosylated hemoglobin—the higher the level of glucose in the blood, the higher the HbA1c level.

## Effectiveness

### Diabetes

In addition, two noncore measures are presented:

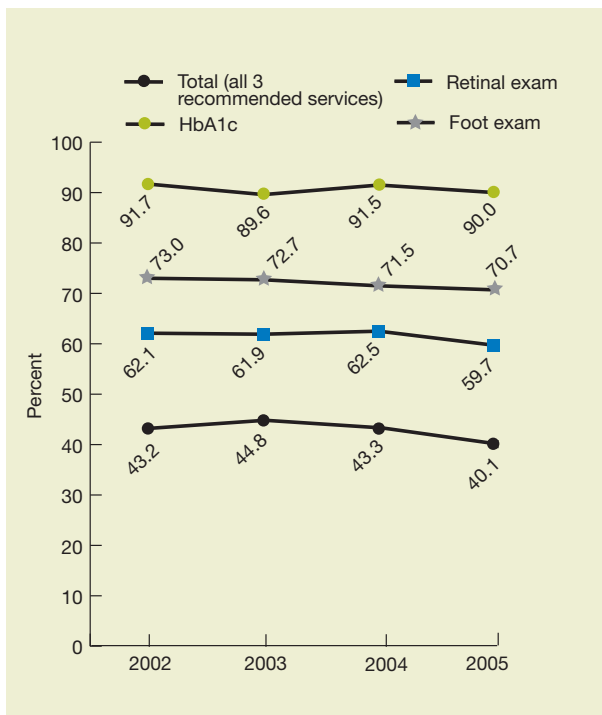
- ◆ Controlled HbA1c, cholesterol, and blood pressure.
- ◆ State variation in influenza immunization for adults with diabetes.

## Findings

### Management: Receipt of Three Recommended Diabetes Services

The NHQR uses a composite measure to track the national rate of the receipt of all three recommended annual diabetes interventions: a hemoglobin A1c test, an eye examination, and a foot examination. These provide an assessment of the management of diabetes and the presence of possible complications that can occur. They are basic process measures for the quality of care for diabetes. They do not include outcomes, such as the hemoglobin A1c value, an indicator of whether diabetes is adequately controlled.

**Figure 2.8. Composite measure: Adults age 40 and over with diagnosed diabetes who received all three recommended services for diabetes in the calendar year (hemoglobin A1c measurement, dilated eye examination, and foot examination), 2002-2005**



**Source:** Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2002-2005.

**Reference population:** Civilian noninstitutionalized population with diagnosed diabetes, age 40 and over.

**Note:** Rates are age adjusted. Data include people with both type 1 and type 2 diabetes. For this report, the time period for the retinal eye examination measure was changed to include only the calendar year. For previous reports, in addition to the calendar year, the early part of the subsequent year was included in the data collection period. This change also affects the composite measure. All data years shown in Figure 2.8 were calculated according to this revised specification.



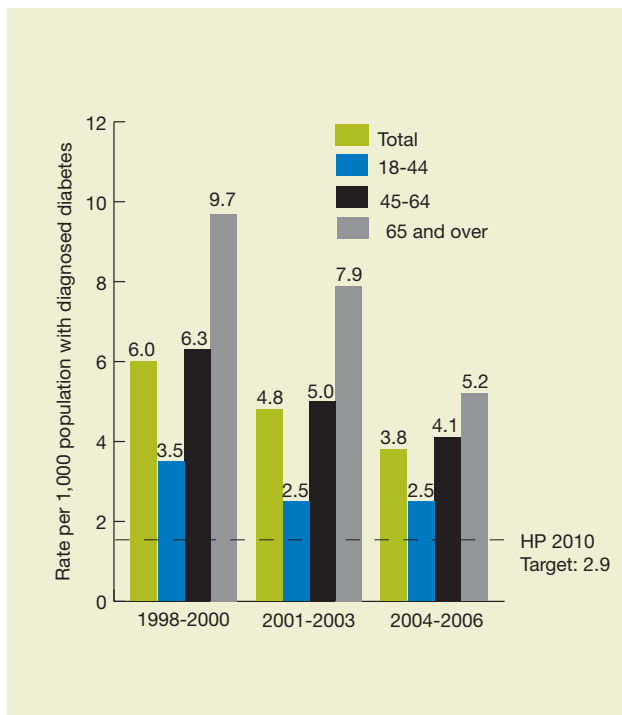
## Effectiveness

- ◆ In 2005, of adults age 40 and over with diagnosed diabetes, 40.1% received all three recommended services for diabetes, including an HbA1c measurement, a dilated eye examination, and a foot examination, compared with 43.2% in 2002. There was no significant change in rate between 2002 and 2005 (Figure 2.8).
- ◆ From 2002 to 2005, the rate of receipt of HbA1c tests, dilated eye examinations, and foot examinations remained stable.

### Management: Lower Extremity Amputations

Although diabetes is the leading cause of lower extremity amputations, amputations can be avoided through proper care on the part of patients and providers. Hospital admissions for lower extremity amputations for patients with diagnosed diabetes reflect poorly controlled diabetes. Better management of diabetes would prevent the need for many lower extremity amputations.

**Figure 2.9. Hospital admissions for lower extremity amputations per 1,000 population age 18 and over with diabetes, 1998-2000, 2001-2003, and 2004-2006**



**Source:** Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey, 1998-2000, 2001-2003, and 2004-2006.

**Reference population:** Civilian noninstitutionalized adults age 18 and over with diagnosed diabetes, from the National Health Interview Survey, 1998-2000, 2001-2003, and 2004-2006.

**Note:** Total rate is age adjusted to the 2000 U.S. standard population. Healthy People 2010 target is revised. Please see Chapter 1, Introduction and Methods, for details.

## Effectiveness

### Diabetes

- ◆ The overall rate of lower extremity amputations in adults with diagnosed diabetes fell from 6.0 per 1,000 population in 1998-2000 to 3.8 per 1,000 population in 2004-2006 (Figure 2.9).
- ◆ During the same period, lower extremity amputation rates fell from 6.3 to 4.1 per 1,000 population for adults ages 45-64 and from 9.7 to 5.2 per 1,000 population for adults age 65 and over.
- ◆ The Healthy People 2010 target rate of 2.9 lower extremity amputations in adults with diagnosed diabetes per 1,000 population has not been met by the total population age 18 and over. If current trends continue, the target will not be met by 2010.

#### Management: Controlled Hemoglobin, Cholesterol, and Blood Pressure

People diagnosed with diabetes<sup>vii</sup> are often at higher risk for other cardiovascular risk factors, such as high blood pressure and high cholesterol. Having these conditions in combination with diagnosed diabetes increases the likelihood of complications, such as heart and kidney diseases, blindness, nerve damage, and stroke. Patients who manage their diagnosed diabetes and maintain an HbA1c level of <7%, total cholesterol of <200 mg/dL, and blood pressure of <140/80 mm Hg<sup>viii</sup> can decrease these risks.

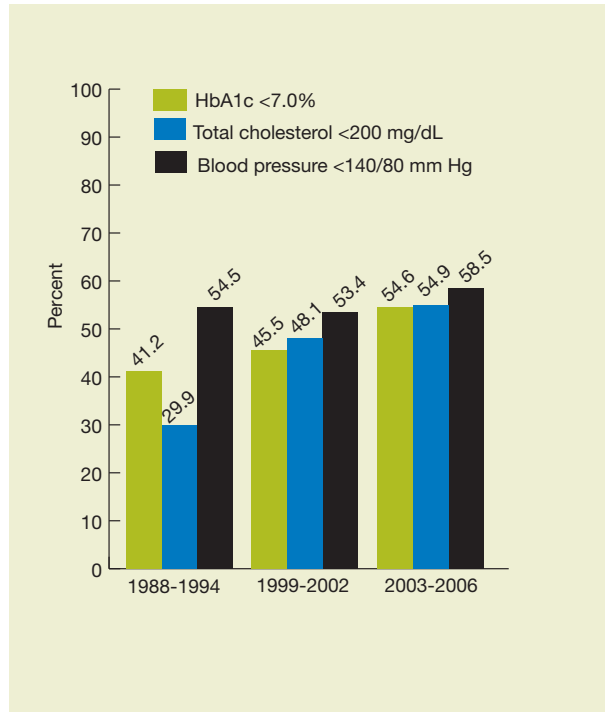
*Better management of diabetes would prevent the need for many lower extremity amputations.*

<sup>vii</sup> In 1997, the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus issued revised guidelines for the diagnosis of diabetes. Included among these was a change of the threshold for fasting plasma glucose level for the diagnosis of diabetes, which was lowered from 140 mg/dL to 126 mg/dL.

<sup>viii</sup> Blood pressure control guidelines were updated in 2005. Previously, having a blood pressure reading of <140/90 mm Hg was considered under control. For this measure, the new threshold of <140/80 mm Hg has been applied to historical data for the sake of consistency and comparability.

## Effectiveness

**Figure 2.10. Adults age 40 and over with diagnosed diabetes with HbA1c, total cholesterol, and blood pressure under control, 1988-1994, 1999-2002, and 2003-2006**



**Source:** Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey, 1988-1994, 1999-2002, and 2003-2006.

**Reference population:** Civilian noninstitutionalized population with diagnosed diabetes, age 40 and over.

**Note:** Age adjusted to the 2000 U.S. standard population. Survey respondents were classified as having diabetes only if they had a previous diagnosis of diabetes from a doctor other than during a period of pregnancy (i.e., gestational diabetes was excluded). This is determined by a “Yes” response to the question: “Other than during pregnancy, have you ever been told by a doctor or health professional that you have diabetes or sugar diabetes?”

- ◆ In 2003-2006, 54.6% of adults age 40 and over diagnosed with diabetes had their HbA1c level under optimal control (<7%) (Figure 2.10). This percentage is significantly higher than the 41.2% reported for the 1988-1994 period.
- ◆ In 2003-2006, 54.9% of those age 40 and over diagnosed with diabetes had their total cholesterol under control (<200 mg/dL). This is an improvement over the 1988-1994 rate of 29.9% for this measure.
- ◆ In 2003-2006, 58.5% of this population had their blood pressure under control (<140/80 mm Hg), which is not significantly different from the 1988-1994 period.
- ◆ Despite significant progress seen with the HbA1c and cholesterol control, fewer than 60% of all adults age 40 and over with diagnosed diabetes have their blood sugar, cholesterol, or blood pressure under optimal control.

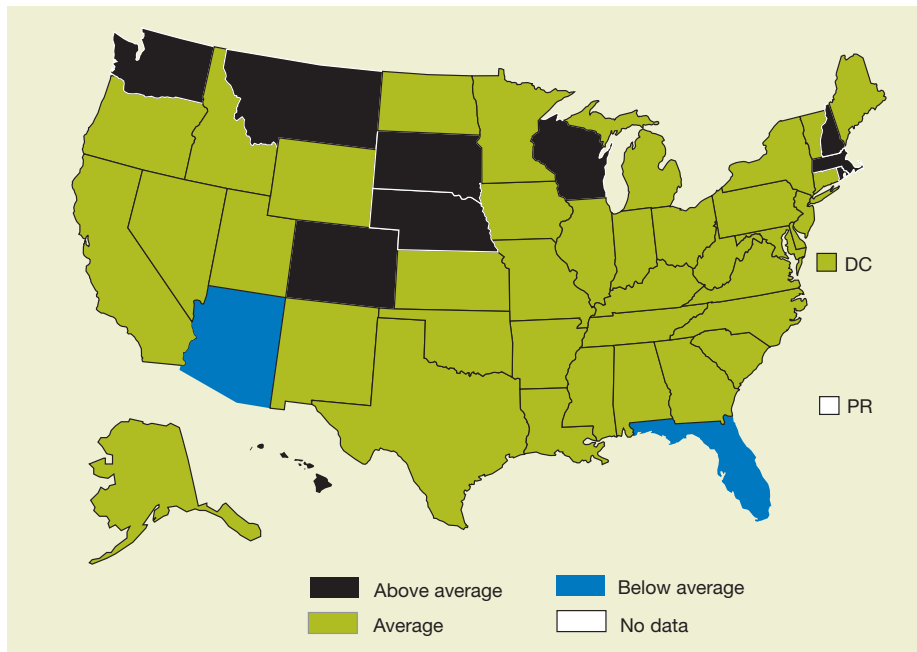
## Effectiveness

## Diabetes

**Management: State Variation in Influenza Immunization**

People with diagnosed diabetes are six times more likely to be hospitalized with flu complications. During flu epidemics, deaths among people with diabetes increase 5 to 15%.<sup>12</sup> Therefore, influenza immunization is an important aspect of diabetes management.

**Figure 2.11. State variation: High-risk adults ages 18-64 with diagnosed diabetes who received an influenza vaccine in the last 12 months, by State, 2006**



**Key:** Above average = rate is significantly above the reporting States average in 2006. Below average = rate is significantly below the reporting States average in 2006.

**Source:** Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System, 2006.

**Reference population:** Civilian noninstitutionalized population ages 18-64.

**Note:** Age adjusted to the 2000 U.S. standard population. The “reporting States average” is the average of all reporting States (51 in this case, including the District of Columbia), which is a separate figure from the national average.

- ◆ In 2006, State rates of receipt of influenza immunization by noninstitutionalized high-risk adults ages 18-64 with diabetes ranged from 23.9% to 66.4%, with a reporting States average of 40.0%. This is a significant improvement over the 33.7% reported for 2005 (data not shown).
- ◆ Ten States<sup>ix</sup> were significantly above the reporting States average in 2006 (Figure 2.11), with a combined average rate of 56.0% in 2006.
- ◆ Only eight of these States have influenza immunization above 50% for noninstitutionalized high-risk adults with diabetes.
- ◆ Two States<sup>x</sup> were significantly below the reporting States average in 2006, each with rates under 25%.

<sup>ix</sup> The States are Colorado, Hawaii, Massachusetts, Montana, Nebraska, New Hampshire, Rhode Island, South Dakota, Washington, and Wisconsin.

<sup>x</sup> The States are Arizona and Florida.

## End Stage Renal Disease

### Importance

#### Mortality

Total ESRD deaths (2005) .....85,790<sup>13</sup>

#### Prevalence

Total cases (2005).....485,012<sup>13</sup>

#### Incidence

Number of new cases (2005) .....106,912<sup>13</sup>

#### Cost

Total ESRD Medicare program expenditures (2005) .....\$19.3 billion<sup>13</sup>

Note: Statistics may vary from previous years due to revised and updated source statistics or addition of data sources.

### Measures

The NHQR includes six measures of ESRD management to assess the quality of care provided to renal dialysis patients. The two core report measures highlighted here are:

- ◆ Adequacy of hemodialysis.
- ◆ Registration for transplantation.

### Findings

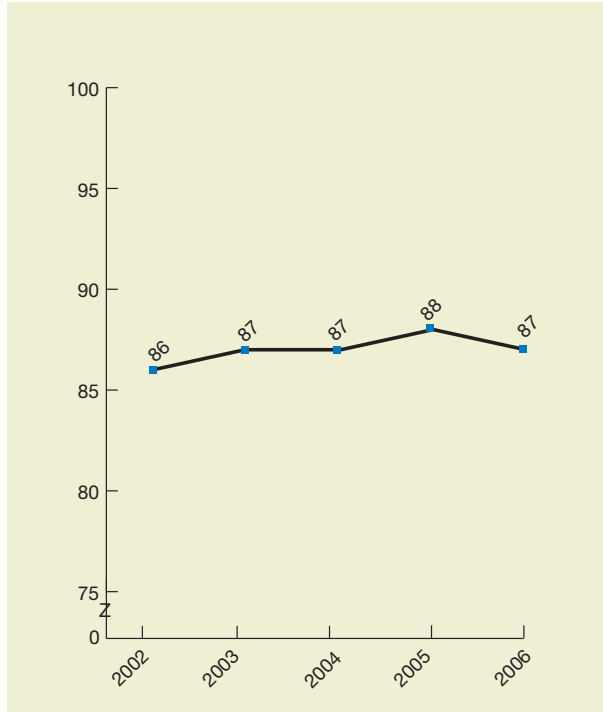
#### Management: Patients With Adequate Hemodialysis

Dialysis removes harmful waste and excess fluid buildup in the blood that occurs when kidneys fail to function. Hemodialysis is the most common method used to treat advanced and permanent kidney failure. The adequacy of dialysis is measured by the percentage of hemodialysis patients with a urea reduction ratio equal to or greater than 65%; this measure indicates how well urea, a waste product, is eliminated by the dialysis machine.

## Effectiveness

## End Stage Renal Disease

Figure 2.12. Adult hemodialysis patients with adequate dialysis (urea reduction ratio 65% or greater), 2002-2006

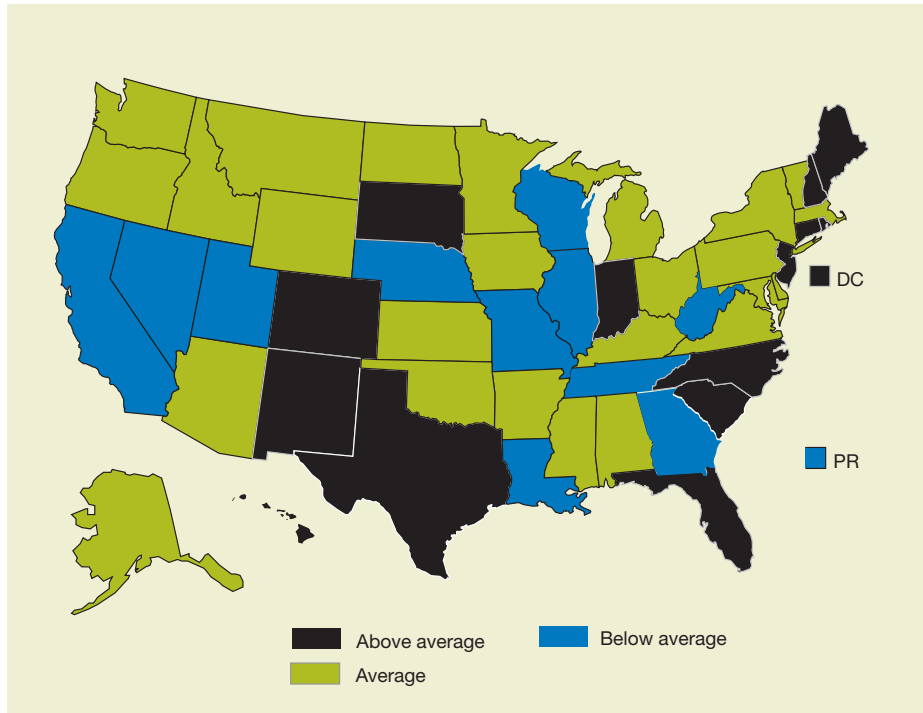


**Source:** Centers for Medicare & Medicaid Services, ESRD Clinical Performance Measures Project, 2002-2006.

**Reference population:** ESRD hemodialysis patients age 18 and over.

- ◆ There is no significant difference between the 2002 percentage of all hemodialysis patients with adequate dialysis (86%) and the 2006 percentage (87%) (Figure 2.12). The rates for each age group have remained stable during this period (data not shown).

**Figure 2.13. State variation: Adult hemodialysis patients with adequate dialysis (urea reduction ratio 65% or greater), 2006**



**Key:** Above average = rate is significantly above the reporting States average in 2006. Below average = rate is significantly below the reporting States average in 2006.

**Source:** Centers for Medicare & Medicaid Services, University of Michigan Kidney Epidemiology and Cost Center, 2006.

**Reference population:** ESRD hemodialysis patients and peritoneal dialysis patients.

**Note:** The “reporting States average” is the average of all reporting States (52 in this case, including the District of Columbia and Puerto Rico), which is a separate figure from the national average.

- ◆ In 2006, the reporting States average for adult patients with adequate dialysis was 94.6%, with all States 90% or above.
- ◆ Fourteen States<sup>xi</sup> and the District of Columbia were significantly above the reporting States average in 2006 (Figure 2.13), with a combined average rate of 96.4%.
- ◆ Eleven States and Puerto Rico<sup>xii</sup> were significantly below the reporting States average in 2006, with a combined average rate of 92.3%.
- ◆ Thirty-two States showed improvement on this measure from 2005 to 2006, with no States reporting a decline (data not shown).

<sup>xi</sup> The States are Colorado, Connecticut, Florida, Hawaii, Indiana, Maine, New Hampshire, New Jersey, New Mexico, North Carolina, Rhode Island, South Carolina, South Dakota, and Texas.

<sup>xii</sup> The States are California, Georgia, Illinois, Louisiana, Missouri, Nebraska, Nevada, Tennessee, Utah, West Virginia, and Wisconsin.

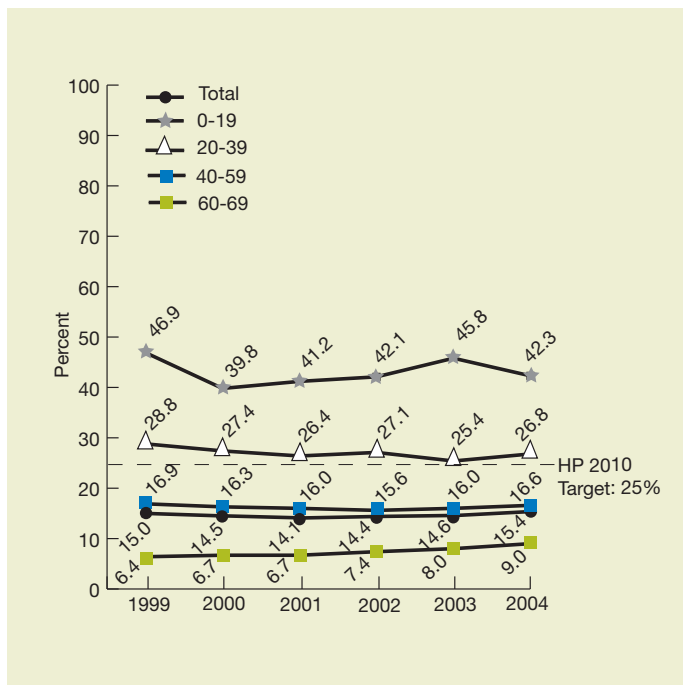
## Effectiveness

**Management: Registration for Transplantation**

Kidney transplantation is a procedure that replaces a failing kidney with a healthy kidney. If a patient is deemed a good candidate for transplant, he or she is placed on the transplant program's waiting list. Dialysis patients wait for transplant centers to match them with the most suitable donor. Registration for transplantation is an initial step toward patients receiving the option of kidney transplantation. Patients who receive transplants from living donors, about 36% of kidney transplants, do not need to register on a waiting list.

Early transplantation that decreases or eliminates the need for dialysis can also lessen the occurrence of acute rejection and patient mortality. In 2006, 70,778 patients were on the Organ Procurement and Transplantation Network deceased donor kidney transplant waiting list in the United States. Only 10,212 deceased donor kidney transplants were performed.\*

**Figure 2.14. Dialysis patients under age 70 who were registered on a waiting list for transplantation, by age group, 1999-2004**



**Source:** Centers for Medicare & Medicaid Services, U.S. Renal Data System, 1999-2004.

**Reference population:** ESRD hemodialysis patients and peritoneal dialysis patients under age 70.

**Note:** The estimates in this chart differ from those reported in the 2007 NHQR. The 2007 NHQR estimates have been updated.

\*See Health Resources and Services Administration. 2007 annual report of the U.S. Organ Procurement and Transplantation Network and Scientific Registry of Transplant Recipients: transplant data 1997-2006. Available at: <http://www.optn.org/AR2007/chapter-index.htm>.



- ◆ In 2004, 15.4% of dialysis patients were registered on a waiting list for transplantation. This rate did not improve from 1999 for the total population or for almost any age group (Figure 2.14).
- ◆ From 1999 to 2004, the likelihood of being on a transplant waiting list did increase significantly for adults ages 60-69 (6.4% to 9.0%).
- ◆ During the same period, the likelihood of being on a transplant waiting list decreased significantly for the 20-39 age group.
- ◆ From 1999 to 2004, the likelihood of being on a transplant waiting list stayed the same for patients under age 20 and ages 40-59.

## Effectiveness

### Heart Disease

#### Importance

##### Mortality

|                                 |                      |
|---------------------------------|----------------------|
| Number of deaths (2005).....    | 652,091 <sup>2</sup> |
| Cause of death rank (2005)..... | 1st <sup>2</sup>     |

##### Prevalence

|  |                              |
|--|------------------------------|
| Number of cases of coronary heart disease (2005) ..... | 16.0 million <sup>5,14</sup> |
| Number of cases of heart failure (2005).....           | 5.3 million <sup>14</sup>    |
| Number of cases of high blood pressure (2005) .....    | 73.0 million <sup>14</sup>   |
| Number of heart attacks (2005) .....                   | 8.1 million <sup>14</sup>    |

##### Incidence

|   |                       |
|---|-----------------------|
| Number of new cases of congestive heart failure (2005)..... | 366,815 <sup>14</sup> |
|---|-----------------------|

##### Cost

|   |                                     |
|---|-------------------------------------|
| Total cost of cardiovascular disease (2008 est.) .....          | \$448.5 billion <sup>14</sup>       |
| Total cost of congestive heart failure (2008 est.) .....        | \$34.8 billion <sup>14</sup>        |
| Direct medical costs of cardiovascular disease (2008 est.)..... | \$296.4 billion <sup>14</sup>       |
| Cost-effectiveness of hypertension screening .....              | \$14,000-\$35,000/QALY <sup>6</sup> |

**Note:** Statistics may vary from previous years due to revised and updated source statistics or addition of data sources.

#### Measures

The NHQR tracks several quality measures for preventing and treating heart disease, including the following five core report measures:

- ◆ Counseling smokers to quit smoking.
- ◆ Counseling obese adults about exercise.
- ◆ Receipt of recommended care for heart attack.
- ◆ Inpatient mortality following heart attack.
- ◆ Receipt of recommended care for heart failure.

## Effectiveness

In addition, two noncore measures are presented:

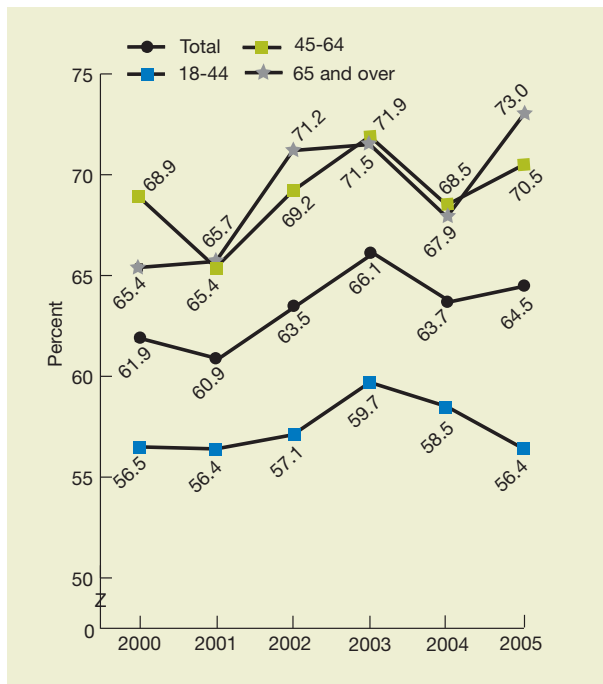
- ◆ Counseling obese adults about overweight.
- ◆ Counseling obese adults about healthy eating.

## Findings

### Prevention: Counseling Smokers To Quit Smoking

Heart disease is the leading cause of death in the United States for both men and women,<sup>2</sup> with approximately 135,000 deaths due to smoking.<sup>15</sup> Cigarette smoking increases the risk of dying from coronary heart disease (CHD) two- to threefold.<sup>15</sup> The risk of developing CHD attributed to smoking can be decreased by 50% after one year of cessation.<sup>16</sup> Smoking is a modifiable risk factor, and health care providers can help encourage patients to change their behavior and quit smoking.

**Figure 2.15. Adult current smokers with a checkup in the last 12 months who received advice to quit smoking, 2000-2005**



**Source:** Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2000-2005.

**Reference population:** Civilian noninstitutionalized population age 18 and over.

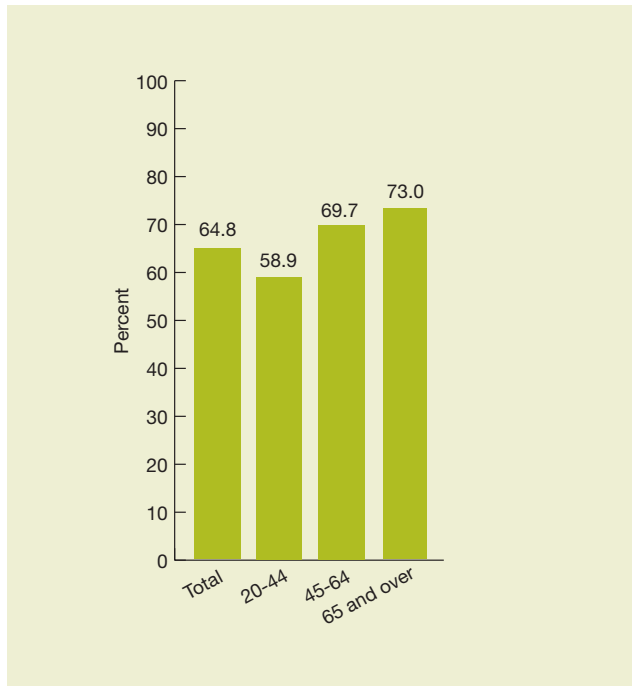
- ◆ In 2005, 64.5% of adult smokers with a doctor visit in the last 12 months reported that their providers had advised them to quit. There was no significant difference between 2000 and 2005 in the percentage of adult smokers during the preceding year who reported that their providers had advised them to quit (Figure 2.15).
- ◆ In all 6 data years, adult smokers ages 18-44 were less likely than the other age groups to receive advice to quit smoking.

## Effectiveness

**Prevention: Counseling Obese Adults About Overweight**

More than 34% of adults age 20 and over in the United States are obese (defined as having a body mass index of 30 or higher),<sup>17</sup> putting them at increased risk for many chronic, often deadly conditions, such as hypertension, cancer, diabetes, and CHD.<sup>18</sup> Although physician guidelines recommend that health care providers screen all adult patients for obesity,<sup>19</sup> obesity remains underdiagnosed among U.S. adults.<sup>20</sup>

**Figure 2.16. Adults with obesity who were told by a doctor they were overweight, 2003-2006**



**Source:** Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey, 2003-2006.

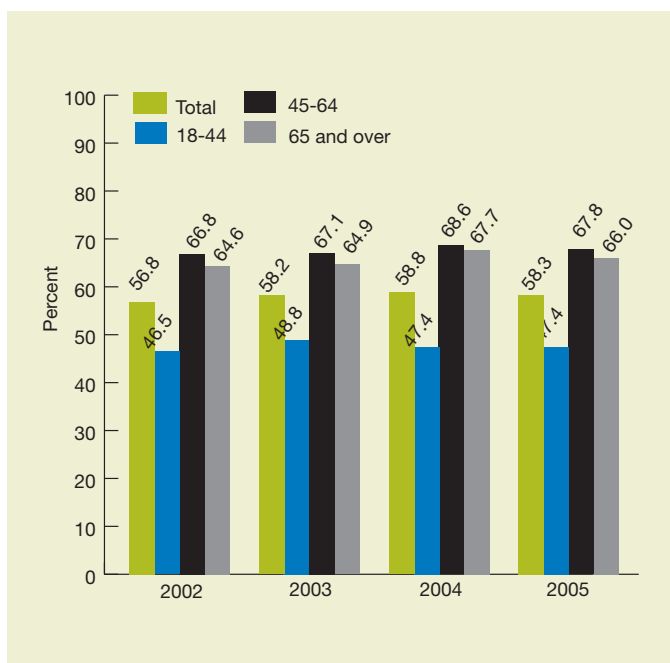
**Reference population:** Civilian noninstitutionalized adults age 20 and over.

- ◆ In 2003-2006, 64.8% of obese adults were told they were overweight by a doctor or health professional (Figure 2.16).
- ◆ In 2003-2006, obese adults ages 20-44 (58.9%) were less likely than those ages 45-64 (69.7%) and 65 and over (73.0%) to be told by a doctor or health professional they were overweight.

### Prevention: Counseling Obese Adults About Exercise and Diet

Physician-based exercise and diet counseling is an important component of effective weight loss interventions,<sup>19</sup> and it has been shown to produce increased levels of physical activity among sedentary patients.<sup>21</sup> While not every obese person needs counseling about exercise and diet, many would likely benefit from improvements in these activities. Regular exercise and a healthy diet aid in maintaining normal blood cholesterol levels, weight loss, and blood pressure control efforts, reducing the risk of heart disease, stroke, diabetes, and other comorbidities of obesity.

**Figure 2.17. Adults with obesity who ever received advice from a health provider to exercise more, 2002-2005**



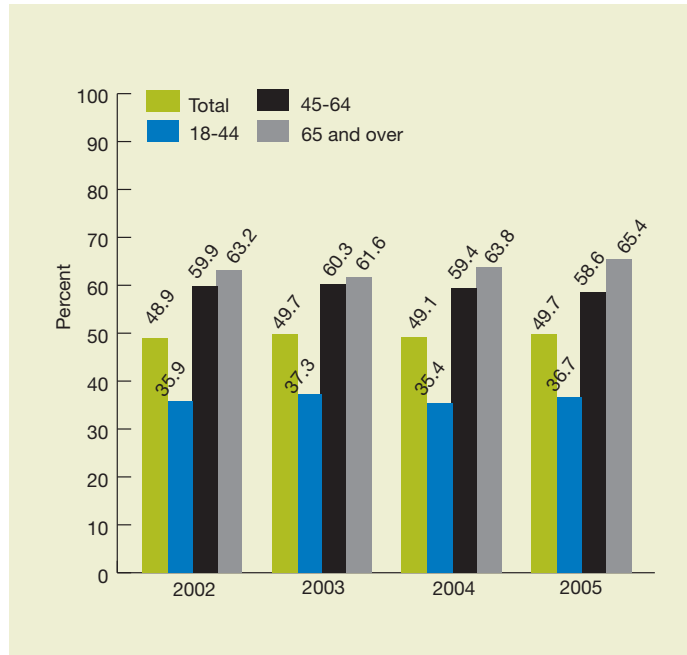
**Source:** Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2002-2005.

**Reference population:** Civilian noninstitutionalized adults age 18 and over.

- ◆ In 2005, 58.3% of obese adults were ever given advice from a health provider to exercise more. This figure did not improve from 2002, nor did it improve for any age group (Figure 2.17).
- ◆ In all 4 data years, obese adults ages 45 and over were more likely than those ages 18-44 to ever receive advice from a health provider about exercising more.

## Effectiveness

**Figure 2.18. Adults with obesity who ever received advice from a health provider about eating fewer high-fat or high-cholesterol foods, 2002-2005**



**Source:** Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2002-2005.

**Reference population:** Civilian noninstitutionalized adults age 18 and over.

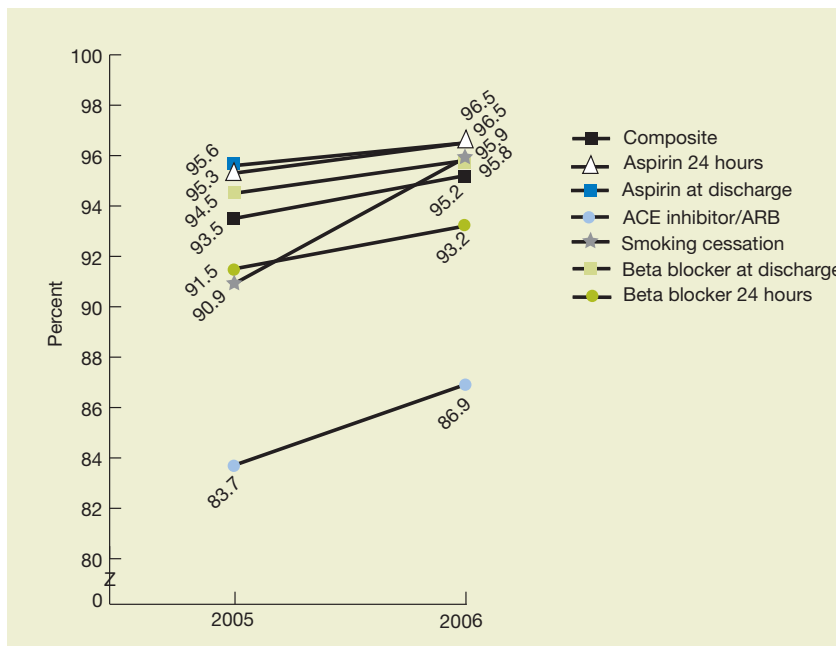
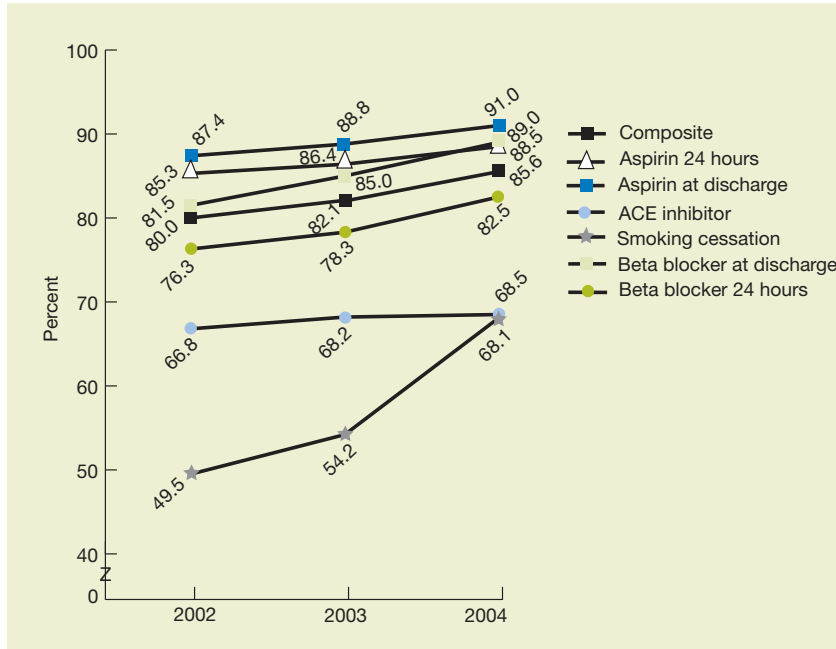
- ◆ In 2005, 49.7% of obese adults were ever given advice from a health provider about eating fewer high-fat or high-cholesterol foods. This figure did not significantly improve from 2002, nor did it improve for any age group (Figure 2.18).
- ◆ In all 4 years, obese adults ages 45-64 and 65 and over were more likely than those ages 18-44 to ever receive advice about eating fewer high-fat or high-cholesterol foods.

### Treatment: Receipt of Recommended Care for Heart Attack

There is consensus that recommended care for patients with a heart attack includes administration of aspirin within 24 hours of heart attack and at discharge, administration of beta blocker within 24 hours of attack and at discharge, angiotensin-converting enzyme (ACE) inhibitor or angiotensin receptor blocker (ARB) treatment among patients with left ventricular systolic dysfunction, and, among smokers, counseling to quit smoking. The NHQR reports on these measures, as well as a composite of these measures that addresses the proportion of all opportunities in which heart attack patients receive recommended care.

# Effectiveness

**Figure 2.19. Hospital patients with heart attack who received recommended hospital care: Overall composite and six components, 2002-2004 (Medicare) and 2005-2006 (all payers)**



**Key:** ACE = angiotensin-converting enzyme; ARB = angiotensin receptor blocker.

**Source:** Centers for Medicare & Medicaid Services, Medicare Quality Improvement Organization Program, 2002-2006.

**Denominator:** Patients hospitalized with a principal diagnosis of acute myocardial infarction.

**Note:** Beginning in 2005, the data collection method changed from the abstraction of randomly selected medical records for Medicare beneficiaries to the receipt of hospital self-reported data for all payer types. The ACE inhibitor measure was changed in 2005 to include angiotensin receptor blockers as an acceptable alternative to ACE inhibitors.

## Effectiveness

### Heart Disease

- ◆ From 2002 to 2004, the overall heart attack composite shows significant improvement in the provision of recommended care for Medicare patients with heart attacks.
- ◆ From 2005 to 2006, among all payers, there was no significant improvement in the provision of recommended care for heart attacks (Figure 2.19).
- ◆ From 2002 to 2004, five of the six individual component measures of recommended care for heart attack significantly increased (aspirin within 24 hours of admission, from 85.3% to 88.5%; aspirin prescribed at discharge, from 87.4% to 91.0%; beta blocker administered within 24 hours, from 76.3% to 82.5%; beta blocker prescribed at discharge, from 81.5% to 89.0%; and smoking cessation counseling, from 49.5% to 68.1%).
- ◆ From 2005 to 2006, four of the six individual component measures for recommended care for heart attack significantly increased (aspirin within 24 hours of admission, from 95.3% to 96.5%; ACE inhibitor or ARB prescribed at discharge, from 83.7% to 86.9%; beta blocker administered within 24 hours, from 91.5% to 93.2%; and smoking cessation counseling, from 90.9% to 95.9%).

#### **Treatment: Inpatient Mortality Following Heart Attack**

Acute myocardial infarction (AMI) is a common, life-threatening condition that requires rapid recognition and efficient treatment in a hospital to reduce the risk of serious damage to the heart and death.

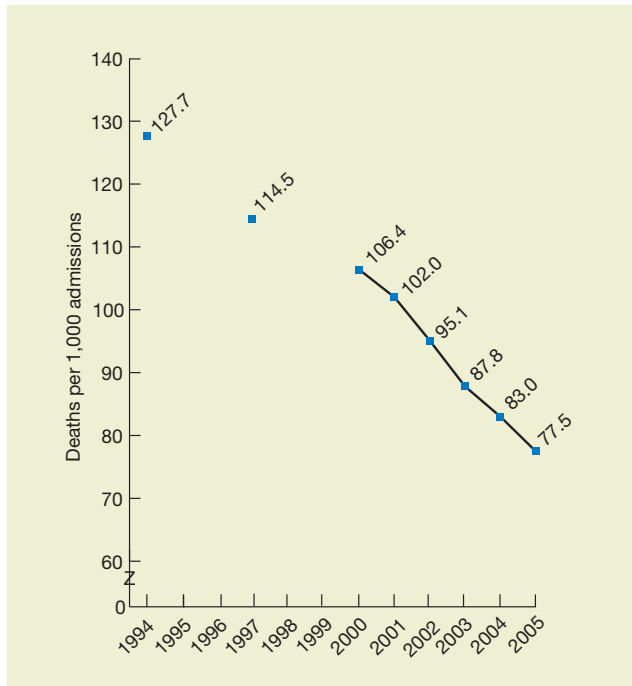
Measuring processes of AMI care can provide information about whether a patient received specific needed services, but these processes make up a very small proportion of all the care that an AMI patient needs. Measuring outcomes of AMI care, such as mortality, can provide a more global assessment of all the care a patient receives and usually is the aspect of quality that matters most to patients.

Survival following admission for AMI reflects multiple patient factors, such as a patient's comorbidities, as well as health care system factors, such as the possible need to transfer hospitals in order to receive services. Also, it may partly reflect receipt of appropriate health services.

*Heart disease is the leading cause of death in the United States.*



**Figure 2.20. Deaths per 1,000 adult hospital admissions with acute myocardial infarction (AMI), 1994, 1997, and 2000-2005**



**Source:** Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project Nationwide Inpatient Sample, 1994, 1997, 2000-2005.

**Denominator:** Any person age 18 and over, U.S. citizen or foreign, using non-Federal, community hospitals in the United States, with a heart attack as principal discharge diagnosis.

**Note:** Rates are adjusted by age, gender, age-gender interactions, and all-payer refined diagnosis-related group scoring of risk of mortality. Data were analyzed for two selected historic years (1994 and 1997) and annually with each NHQR (2000-2005).

- ◆ Between 1994 and 2005, the overall inpatient mortality rate declined from 127.7 to 77.5 deaths per 1,000 admissions with heart attack (Figure 2.20).
- ◆ The rate of overall inpatient mortality for admissions with heart attack as the principal discharge diagnosis decreased significantly from 2000 to 2005 (106.4 to 77.5 deaths per 1,000 admissions with heart attack) (Figure 2.20).

### Treatment: Receipt of Recommended Care for Heart Failure

The NHQR tracks the national rates of receipt of the following services:

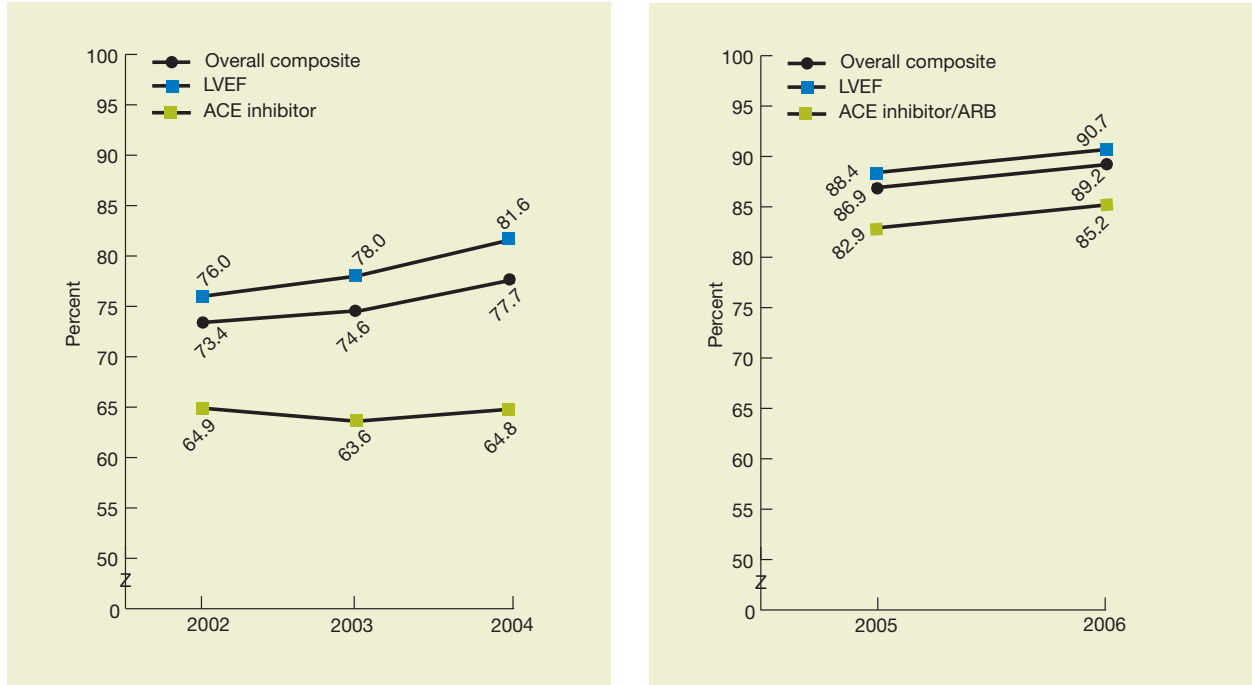
- ◆ Recommended test for heart functioning (heart failure patients having evaluation of left ventricular ejection fraction [LVEF]).
- ◆ Recommended medication treatment (patients with left ventricular systolic dysfunction prescribed ACE inhibitor or ARB at discharge).

In addition, an overall composite measure describes the proportion of all episodes in which heart failure patients receive recommended care.

## Effectiveness

## Heart Disease

**Figure 2.21. Hospital patients with heart failure who received recommended hospital care: Overall composite and two components, 2002-2004 (Medicare) and 2005-2006 (all payers)**



**Key:** LVEF = left ventricular ejection fraction; ACE = angiotensin-converting enzyme; ARB = angiotensin receptor blocker.

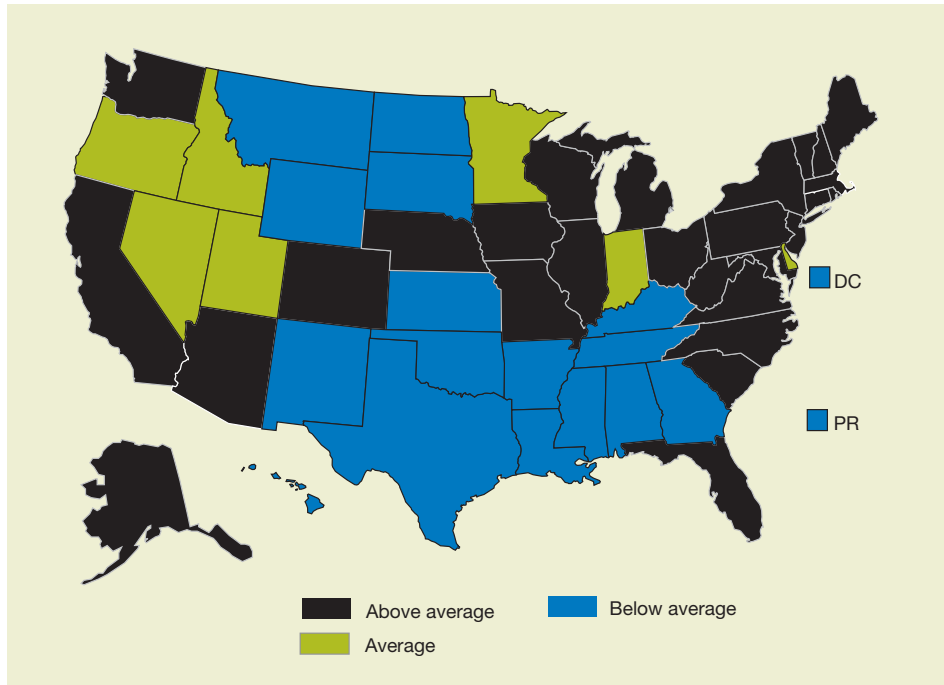
**Source:** Centers for Medicare & Medicaid Services, Medicare Quality Improvement Organization Program, 2002-2006.

**Denominator:** Patients hospitalized with a principal diagnosis of acute heart failure.

**Note:** Beginning in 2005, the data collection method changed from the abstraction of randomly selected medical records for Medicare beneficiaries to the receipt of hospital self-reported data for all payer types. The ACE inhibitor measure was changed in 2005 to include ARBs as an acceptable alternative to ACE inhibitors.

- ◆ From 2002 to 2004, the overall composite showed improvement in the provision of recommended care for Medicare patients with heart failure, from 73.4% of the opportunities to provide recommended care in 2002 to 77.7% in 2004 (Figure 2.21).
- ◆ For all payers from 2005 to 2006, the LVEF measure and ACE inhibitors for treatment of acute heart failure showed improvement, from 88.4% to 90.7% and from 82.9% to 85.2%, respectively.

**Figure 2.22. State variation: Hospital patients with heart failure who received recommended hospital care, 2006**



**Key:** Above average = rate is significantly above the reporting States average in 2006. Below average = rate is significantly below the reporting States average in 2006.

**Source:** Centers for Medicare & Medicaid Services, Medicare Quality Improvement Organization Program, 2006.

**Denominator:** Patients hospitalized with a principal diagnosis of acute heart failure.

**Note:** The “reporting States average” is the average of all reporting States (52 in this case, including the District of Columbia and Puerto Rico), which is a separate figure from the national average.

- ◆ In 2006, the reporting States average for receipt of recommended hospital care for acute heart failure was 89.2%, with States ranging from a low of 74.3% to a high of 94.5%.
- ◆ Twenty-seven States<sup>xiii</sup> were significantly above the reporting States average in 2006 (Figure 2.22), with a combined average rate of 91.7%.
- ◆ Sixteen States,<sup>xiv</sup> the District of Columbia, and Puerto Rico were significantly below the reporting States average in 2006, with a combined average rate of 85.4%.

<sup>xiii</sup> The States are Alaska, Arizona, California, Colorado, Connecticut, Florida, Illinois, Iowa, Maine, Maryland, Massachusetts, Michigan, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Vermont, Virginia, Washington, West Virginia, and Wisconsin.

<sup>xiv</sup> The States are Alabama, Arkansas, Georgia, Hawaii, Kansas, Kentucky, Louisiana, Mississippi, Montana, New Mexico, North Dakota, Oklahoma, South Dakota, Tennessee, Texas, and Wyoming.

## HIV and AIDS

### Importance

#### Mortality

Number of deaths among people with AIDS (2006) .....14,627<sup>22</sup>

#### Prevalence

Number of people in the United States living with HIV (2006) .....226,477<sup>22</sup>

Number of people in the United States living with AIDS (2006) .....436,693<sup>22</sup>

#### Incidence

New AIDS cases (2006) .....37,852<sup>22</sup>

New HIV infection (2006) .....56,300<sup>23</sup>

#### Cost

Federal spending on domestic HIV/AIDS care, cash and housing assistance, and prevention and research (FY 2008 est.) .....\$18.2 billion<sup>24</sup>

**Note:** Statistics may vary from previous years due to revised and updated source statistics or addition of data sources.

### Measures

This section highlights one core report measure focusing on quality of preventive care for HIV-infected individuals:

- ◆ New AIDS cases.

In addition, a noncore measure from the HIV Research Network is presented on the prevention of opportunistic infections in HIV patients:

- ◆ Eligible AIDS patients receiving prophylaxis for *Pneumocystis pneumonia* (PCP) and *Mycobacterium avium* complex (MAC).

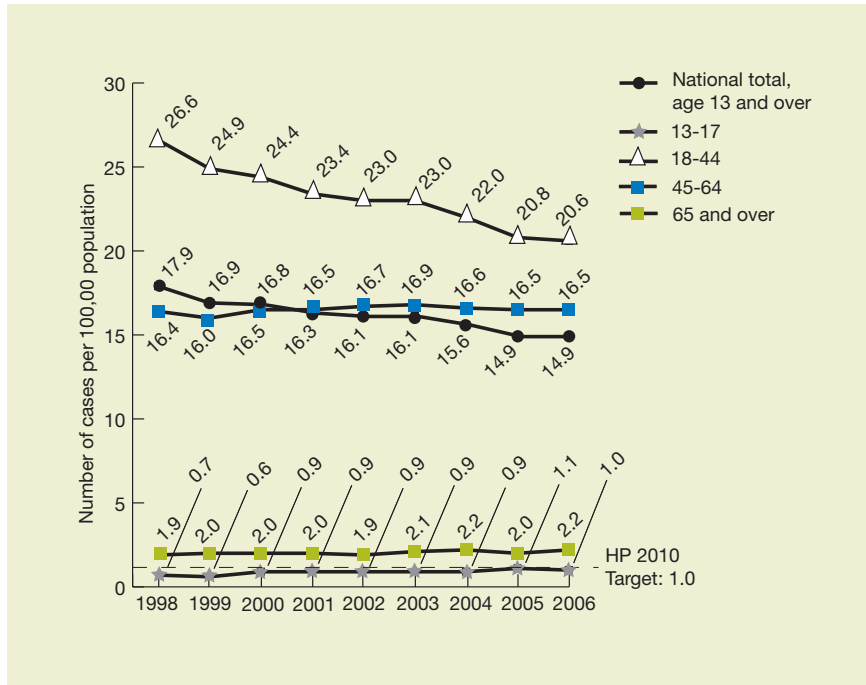
### Findings

#### Management: New AIDS Cases

Changes in HIV infection rates reflect changes in behavior by at-risk individuals that may only partly be influenced by the health care system. However, individual and community programs have shown

progress in influencing behavior change. Changes in the incidence of new AIDS cases are affected by changes in HIV infection rates and by the availability of appropriate treatments for HIV-infected individuals. Improved treatments that extend life for those with the disease are reflected in the fact that the number of deaths due to AIDS fell from about 18,000 to 14,600 between 2003 and 2006, after showing no change for the previous 3 years.<sup>22</sup>

**Figure 2.23. New AIDS cases per 100,000 population age 13 and over, 1998-2006**



**Source:** Centers for Disease Control and Prevention, National Center for HIV, Viral Hepatitis, STD, and TB Prevention, HIV/AIDS Surveillance System, 1998-2006.

**Reference population:** U.S. population age 13 and over.

- ◆ The overall rate of new AIDS cases per 100,000 decreased significantly between 1998 and 2006 (17.9% to 14.9%; Figure 2.23).
- ◆ From 1998 to 2006, the rate of new AIDS cases also significantly decreased for people ages 18-44 (26.6% to 20.6%).
- ◆ The 2006 national rate of 14.9 new AIDS cases per 100,000 population age 13 and over is well above the Healthy People 2010 target of 1.0 new case per 100,000 population age 13 and over. If current trends continue, this target will not be met.

### Management: PCP and MAC Prophylaxis

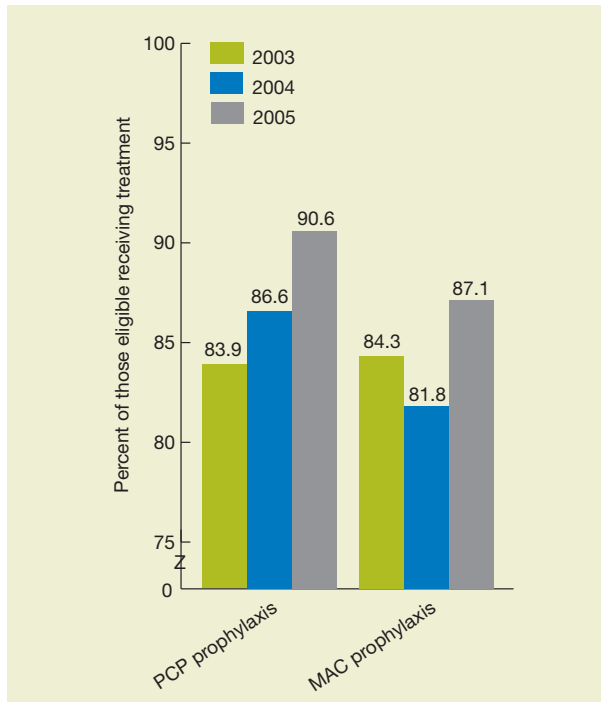
Management of chronic HIV disease includes outpatient and inpatient services. Without adequate treatment, as HIV disease progresses, CD4 cell counts fall and patients become increasingly susceptible to opportunistic infections. When CD4 cell counts fall below 200, medicine to prevent development of

## Effectiveness

## HIV and AIDS

PCP is routinely recommended. When CD4 cell counts fall below 50, medicine to prevent development of disseminated MAC infection is routinely recommended.<sup>25</sup> Because national data on HIV care are not routinely collected, HIV measures tracked in the NHQR come from the HIV Research Network, which consists of 18 medical practices across the United States that treat large numbers of HIV patients.<sup>xv</sup>

**Figure 2.24. Eligible AIDS patients age 18 and over receiving PCP and MAC prophylaxis in the calendar year, 2003-2005**



**Key:** PCP = *Pneumocystis pneumonia*; MAC = *Mycobacterium avium complex*.

**Source:** Agency for Healthcare Research and Quality, Center for Delivery, Organization, and Markets, HIV Research Network, 2003-2005.

**Reference population:** Adult patients with AIDS with CD4 cell counts below 200 (PCP) or CD4 cell counts below 50 (MAC).

**Note:** Data from the HIV Research Network are not nationally representative of the level of care received by all Americans living with HIV. Participation in this network is voluntary, and network data represent only patients who are actually receiving care. Furthermore, data shown above are not representative of the HIV Research Network as a whole because they represent only a subset of network sites that have the best quality data. (For more information on the HIV Research Network, go to [www.ahrq.gov/data/hivnet.htm](http://www.ahrq.gov/data/hivnet.htm).)

- ◆ Of eligible patients (3,080 AIDS patients with at least two CD4 cell counts below 200), 90.6% received PCP prophylaxis in 2005 (Figure 2.24), which is a significant increase compared with 2003 and 2004.
- ◆ Of eligible patients (915 AIDS patients with at least two CD4 cell counts below 50), 87.1% received MAC prophylaxis in 2005, which is not significantly different from 2003 but is a significant increase from 2004.

<sup>xv</sup> Although program data are collected from all Ryan White HIV/AIDS Program grantees, the aggregate nature of the data makes it difficult to assess the quality of care provided by Ryan White HIV/AIDS Program providers.

## Maternal and Child Health

### Importance

#### Mortality

|                                       |                     |
|---------------------------------------|---------------------|
| Number of maternal deaths (2005)..... | 623 <sup>2</sup>    |
| Number of infant deaths (2005).....   | 28,440 <sup>2</sup> |

#### Demographics

|  |                          |
|--|--------------------------|
| Number of children under age 18 (2006).....        | 73,460,567 <sup>26</sup> |
| Number of babies born in United States (2005)..... | 4,138,349 <sup>27</sup>  |

#### Cost

|  |                            |
|--|----------------------------|
| Total cost of health care for children (2002).....                       | \$79 billion <sup>28</sup> |
| Cost-effectiveness of vision screening for children.....                 | \$0-\$14,000 <sup>6</sup>  |
| Cost-effectiveness of childhood immunization series <sup>xvi</sup> ..... | cost saving <sup>6</sup>   |

**Note:** Statistics may vary from previous years due to revised and updated source statistics or addition of data sources.

### Measures

The NHQR tracks several prevention and treatment measures related to maternal and child health care throughout the report. The core report measures highlighted in this section are:

- ◆ Prenatal care in the first trimester.
- ◆ Receipt of all recommended immunizations by young children.
- ◆ Vision checks for children.
- ◆ Counseling for children about physical activity.
- ◆ Counseling for children about healthy eating.

In addition, one noncore measure is presented:

- ◆ Weight monitoring of overweight<sup>xvii</sup> children.

<sup>xvi</sup> The childhood immunization series includes vaccinations for diphtheria-tetanus-pertussis, measles-mumps-rubella, inactivated polio virus, *Haemophilus influenzae* type B, hepatitis B, and varicella.

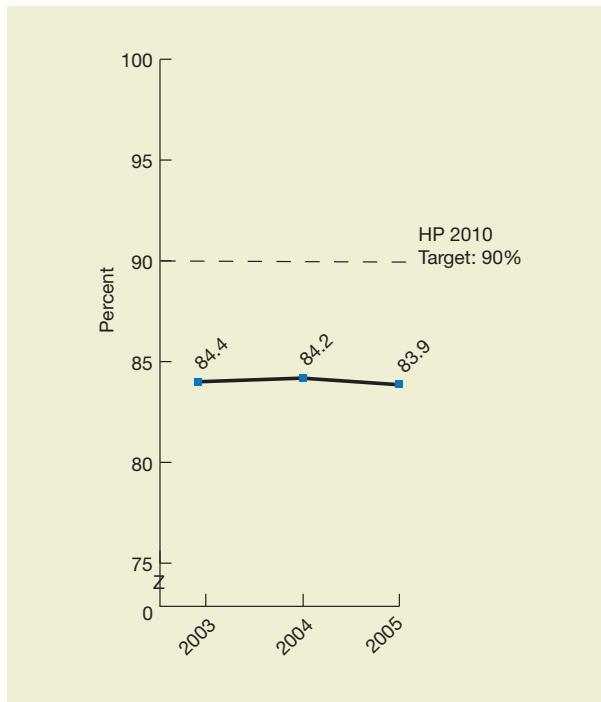
<sup>xvii</sup> Children and youth can be categorized as acceptable, underweight, at risk of overweight, or overweight. Children with body mass index values at or above the 95th percentile of the sex-specific body mass index growth charts are categorized as overweight.

## Findings

### Prevention: Prenatal Care in the First Trimester

Pregnant women are at risk for high blood pressure, gestational diabetes, and other disorders. Prenatal care is a preventive service intended to identify and manage risk factors in pregnant women and their unborn children to improve the chances of a healthy mother and child during pregnancy, birth, and early childhood. Prenatal care is recommended during the first trimester and throughout pregnancy.

*Figure 2.25. Women who completed a pregnancy in the last 12 months who first received prenatal care in the first trimester, 37 reporting States, the District of Columbia, and New York City, 2003-2005*



**Source:** Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System-Nativity, 2003-2005.

**Reference population:** Women with live births.

**Note:** Excludes data from the following States that implemented the 2003 revisions to the U.S. Standard Birth Certificate: FL, ID, KS, KY, NE, NH, NY (not including New York City), PA, SC, TN, TX, and WA. Please see the Measure Specifications appendix for details.

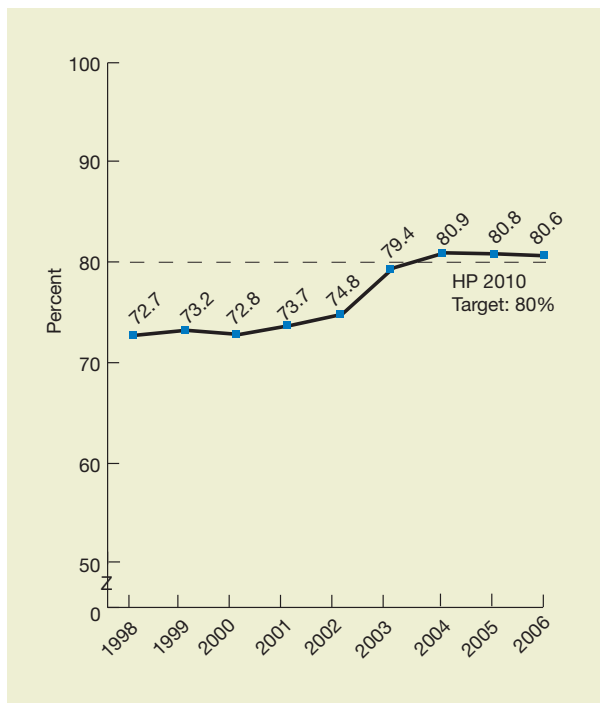
- ◆ There is no significant difference between 2003 and 2005 in the percentage of women who received prenatal care in the first trimester of pregnancy (Figure 2.25).
- ◆ As of 2005, the percentage of women who received prenatal care in the first trimester of pregnancy had not yet achieved the Healthy People 2010 target of 90%. At the current average annual rate of change, this target is not projected to be met.



### Prevention: Receipt of All Recommended Immunizations by Young Children

Immunizations are important for reducing mortality and morbidity. They protect recipients from illness and disability, as well as others in the community who cannot be vaccinated. In 2006, recommended vaccines for children that should have been completed by ages 19-35 months included four doses of diphtheria-tetanus-pertussis vaccine, three doses of polio vaccine, one dose of measles-mumps-rubella vaccine, three doses of *Haemophilus influenzae* type B vaccine, and three doses of hepatitis B vaccine.

**Figure 2.26. Composite measure: Children ages 19-35 months who received all recommended vaccines, 1998-2006**



**Source:** Centers for Disease Control and Prevention, National Center for Health Statistics, National Immunization Survey, 1998-2006.

**Reference population:** U.S. civilian noninstitutionalized population ages 19-35 months.

**Note:** The vaccines included in this measure are based on the corresponding Healthy People 2010 objective, which does not include varicella vaccine or vaccines added to the recommended schedule after 1998 for children up to 35 months of age. More information can be found in the Measure Specifications appendix.

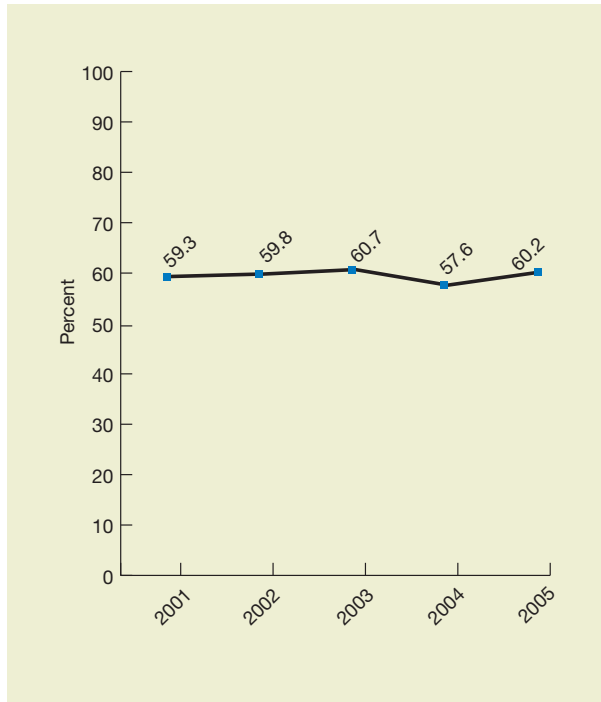
- ◆ From 1998 to 2006, the percentage of children ages 19-35 months who received all recommended vaccines increased from 72.7% to 80.6% (Figure 2.26).

## Effectiveness

**Prevention: Vision Checks for Children**

Vision checks for children may detect problems of which children and their parents were previously unaware. Early detection also improves the chances that corrective treatments will be successful.

*Figure 2.27. Children ages 3-6 who ever had their vision checked by a health provider, 2001-2005*



**Source:** Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2001-2005.

**Reference population:** U.S. civilian noninstitutionalized population ages 3-6.

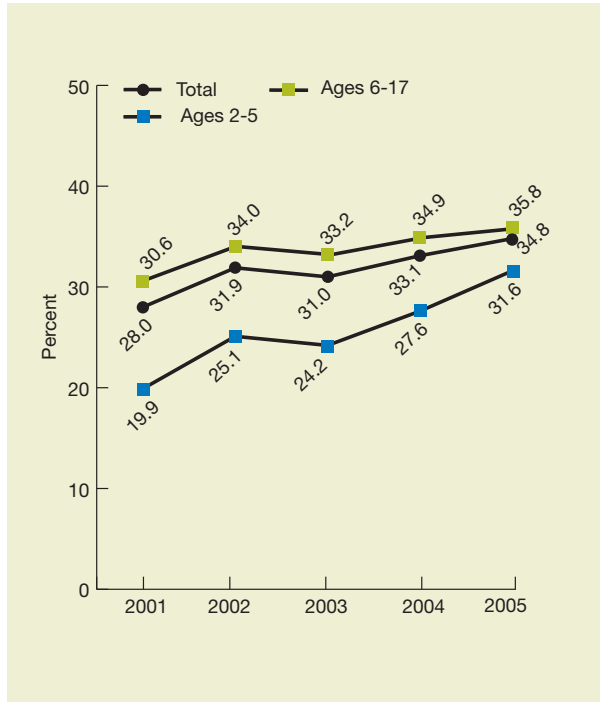
- ◆ There is no significant difference from 2001 to 2005 in the percentage of children ages 3-6 who ever received a vision check (Figure 2.27).

*Overweight and obesity among children under age 18 has risen dramatically in the past two decades.*

### Prevention: Counseling for Children About Physical Activity

Childhood represents a period when healthy, lifelong habits such as exercise can be formed, and physicians play an important role in encouraging these healthy behaviors in children.

**Figure 2.28. Children ages 2-17 for whom a health provider ever gave advice about the amount and kind of exercise, sports, or physically active hobbies they should have, by age group, 2001-2005**



**Source:** Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2001-2005.

**Reference population:** U.S. civilian noninstitutionalized population ages 2-17.

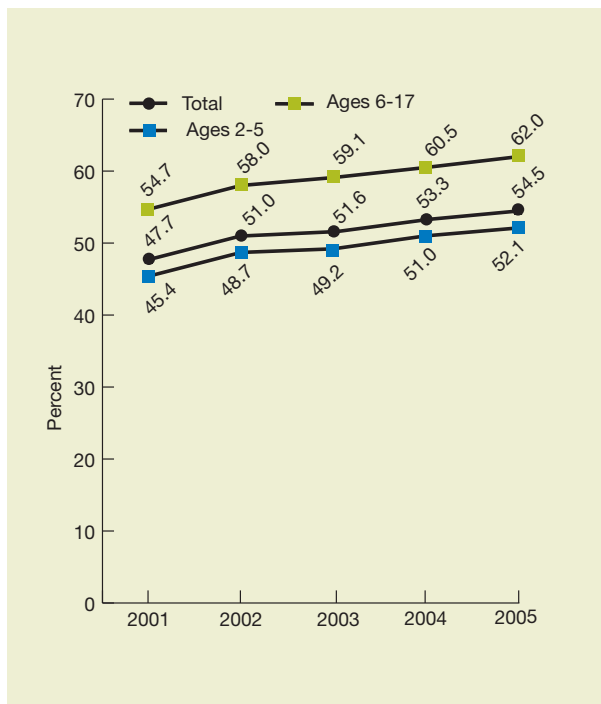
- ◆ From 2001 to 2005, the percentage of children for whom a health provider ever gave advice about the amount and kind of exercise, sports, or physically active hobbies they should have improved from 28.0% to 34.8% (Figure 2.28).
- ◆ The percentage of children for whom a health provider ever gave advice about the amount and kind of exercise, sports, or physically active hobbies they should have increased from 2001 to 2005 for both age groups—children ages 2-5 (from 19.9% to 31.6%) and children ages 6-17 (from 30.6% to 35.8%).
- ◆ In all 5 data years, advice from a health provider about the amount and kind of exercise, sports, or physically active hobbies they should have was more likely for children ages 6-17 than for children ages 2-5.

## Effectiveness

**Prevention: Counseling for Children About Healthy Eating**

Physicians play an important role in encouraging children's healthy eating. Overweight and obesity during childhood often persist into adulthood, with consequences that are numerous and costly. Unfortunately, overweight and obesity among children under age 18 has risen dramatically in the past two decades.<sup>29</sup> The American Academy of Pediatrics recommends that pediatricians discuss and promote healthy diets with their patients.<sup>29</sup>

**Figure 2.29. Children ages 2-17 for whom a health provider ever gave advice about healthy eating, by age group, 2001-2005**



**Source:** Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2001-2005.

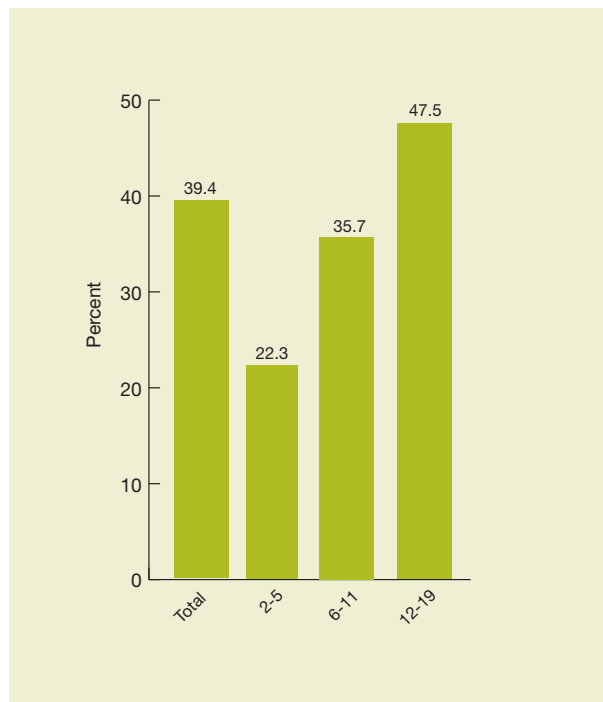
**Reference population:** U.S. civilian noninstitutionalized population ages 2-17.

- ◆ In 2005, the percentage of all children ages 2-17 for whom a health provider ever gave advice about healthy eating was just over half. From 2001 to 2005, the percentage of children for whom a health provider ever gave advice about eating healthy improved from 47.7% to 54.5% (Figure 2.29).
- ◆ The percentage of children for whom a health provider ever gave advice about healthy eating rose from 2001 to 2005 for both age groups—children ages 2-5 (from 54.7% to 62.0%) and children ages 6-17 (from 45.4% to 52.1%).
- ◆ In all 5 data years, advice from a health provider about healthy eating was less likely for children ages 6-17 than for children ages 2-5.

### Prevention: Weight Monitoring of Overweight Children

Pediatricians are advised to monitor body mass index and excessive weight gain in children in order to recognize and address cases of overweight and obesity.<sup>29</sup> When health care providers alert young patients and their parents about their overweight status, a new opportunity is created to develop healthy diet and exercise habits that may be carried into adulthood.<sup>30</sup>

**Figure 2.30. People ages 2-19 who were overweight who were told by a health provider they were overweight, by age group, 2003-2006**



**Source:** Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey, 2003-2006.

**Reference population:** U.S. civilian noninstitutionalized population ages 2-19.

**Note:** Overweight children are identified using age- and sex-specific reference data from the 2000 Centers for Disease Control and Prevention body mass index (BMI) for age growth charts. Children and youth can be categorized as acceptable, underweight, at risk of overweight, or overweight. Children with BMI values at or above the 95th percentile of the sex-specific BMI growth charts are categorized as overweight.

- ◆ In 2003-2006, 39.4% of overweight children and teens ages 2-19 were told by a health provider that they were overweight (Figure 2.30).
- ◆ In 2003-2006, overweight children ages 2-5 (22.3%) and 6-11 (35.7%) were less likely than overweight children and teens ages 12-19 (47.5%) to be told by a health provider that they were overweight.

## Mental Health and Substance Abuse

### Importance

#### Mortality

|   |                      |
|---|----------------------|
| Number of deaths due to suicide (2005).....                         | 32,637 <sup>2</sup>  |
| Rank among causes of death in the United States—suicide (2005)..... | 11th <sup>2</sup>    |
| Alcohol-related motor vehicle deaths (2006).....                    | 17,602 <sup>31</sup> |

#### Prevalence

|   |                                    |
|---|------------------------------------|
| Adults age 18 and over with any mental disorder or substance abuse disorder in the past year (2007) ..... | 32.4% <sup>32</sup>                |
| People age 12 and over with alcohol and/or illicit drug dependence or abuse in the past year (2006).....  | 22.6 million (9.2%) <sup>33</sup>  |
| Adults age 18 and over with serious psychological distress in the past year (2006) .....                  | 24.9 million (11.3%) <sup>33</sup> |
| Adults age 18 and over with a major depressive episode during the past year (2006) .....                  | 15.8 million (7.2%) <sup>33</sup>  |
| Lifetime prevalence of major depressive disorder (2006).....  | 30.4 million (13.9%) <sup>33</sup> |

#### Cost

|   |                                     |
|---|-------------------------------------|
| National expenditures for the treatment of mental health services and substance abuse disorders (2003)..... | \$121 billion <sup>34</sup>         |
| Cost-effectiveness of problem drinking screening and brief counseling.....                                  | \$14,000-\$35,000/QALY <sup>6</sup> |

**Note:** Statistics may vary from previous years due to revised and updated source statistics or addition of data sources.

### Measures

The NHQR tracks measures for the treatment of diagnosable mental disorders in general, substance abuse, and major depression. Mental health treatment is defined as counseling, inpatient care, outpatient care, or prescription medications for problems with emotions or anxiety and does not include alcohol or drug treatment. Because improved outcomes are correlated with treatment completion and length of stay in substance abuse treatment, the measure of the quality of substance abuse treatment presented in this

report is the rate of people who complete all parts of their treatment plan. This section highlights two core measures of mental health and substance abuse treatment:

- ◆ Suicide deaths.
- ◆ Receipt of needed treatment for illicit drug use.

In addition, a noncore measure is presented:

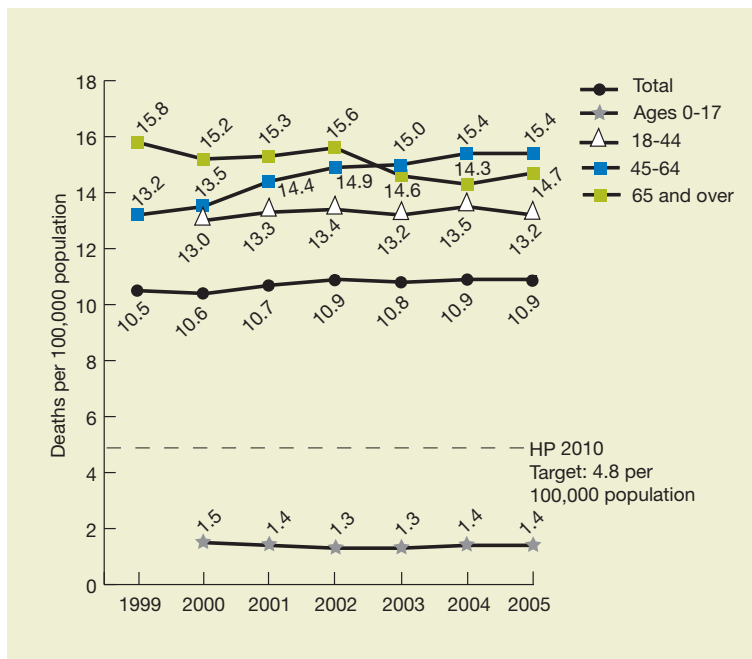
- ◆ Receipt of minimally adequate treatment for mental disorders.

## Findings

### Treatment: Suicide Deaths

Suicide is often the result of untreated depression and may be prevented when its warning signs are detected and treated.

**Figure 2.31. Suicide deaths per 100,000 population, 1999-2005**



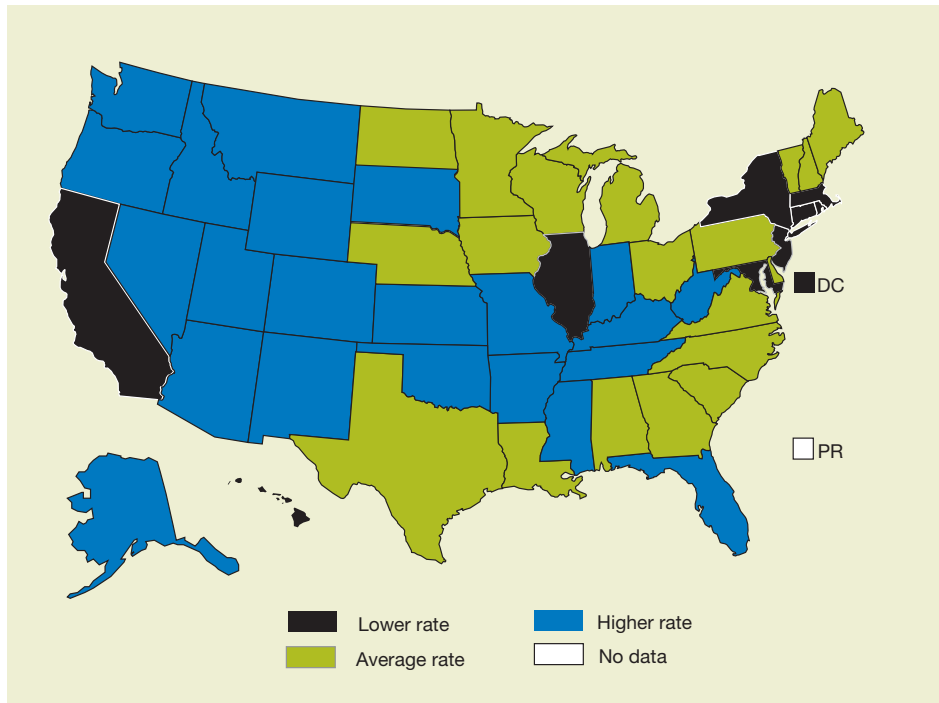
**Source:** Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System-Mortality, 1999-2005.

**Note:** Total rate is age adjusted to the 2000 U.S. standard population. Healthy People 2010 target is revised. Please see Chapter 1, Introduction and Methods, for details. The 1999 data for ages 0-17 and 18-44 are not available.

- ◆ From 1999 to 2005, the age-adjusted suicide death rate increased for the population as a whole (from 10.5 to 10.9 deaths per 100,000 population), moving farther away from the Healthy People 2010 target of 4.8 suicide deaths per 100,000 population (Figure 2.31).
- ◆ From 1999 to 2005, the age-adjusted rate of suicide deaths per 100,000 population for adults ages 45-64 increased from 13.2 to 15.4. During the same period, the rate decreased for adults age 65 and over (from 15.8 to 14.7).

## Effectiveness

Figure 2.32. State variation: Suicide deaths per 100,000 population, 2005



**Key:** Higher rate = rate is significantly above the reporting States average in 2005. Lower rate = rate is significantly below the reporting States average in 2005.

**Source:** Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System-Mortality, 2005.

Reference population: U.S. population.

**Note:** Rates are age adjusted to the 2000 standard population. The “reporting States average” is the average of all reporting States (51 in this case, including the District of Columbia), which is a separate figure from the national average.

- ◆ The State rates of suicide deaths per 100,000 population ranged from a low of 5.5 to a high of 21.5.
- ◆ In 2005, 9 States<sup>xviii</sup> and the District of Columbia had rates of suicide deaths that were lower than the reporting States average of 10.9 per 100,000 population (Figure 2.32), with a combined average rate of 7.3 per 100,000 population. No State has yet reached the Healthy People 2010 goal of 4.8 per 100,000 population.
- ◆ In 2005, 22 States<sup>xix</sup> had rates of suicide deaths that were higher than the reporting States average, with a combined average rate of 15.3 per 100,000 population.
- ◆ Ten States showed a significant change in the rate of suicide deaths from 1999 to 2005, with 7 States reporting an increase and 3 States a decrease in suicide death rates (data not shown).

<sup>xviii</sup> The States are California, Connecticut, Hawaii, Illinois, Maryland, Massachusetts, New Jersey, New York, and Rhode Island.

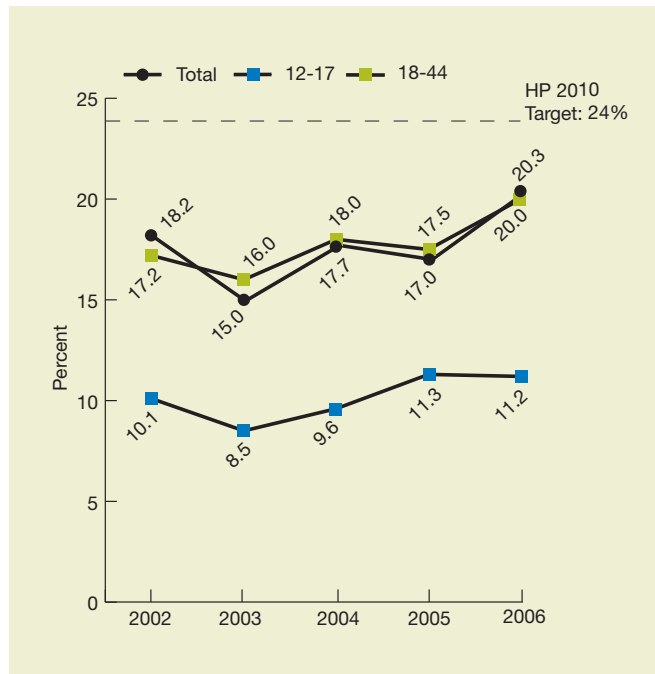
<sup>xix</sup> The States are Alaska, Arizona, Arkansas, Colorado, Florida, Idaho, Indiana, Kansas, Kentucky, Mississippi, Missouri, Montana, Nevada, New Mexico, Oklahoma, Oregon, South Dakota, Tennessee, Utah, Washington, West Virginia, and Wyoming.



### Treatment: Receipt of Needed Treatment for Illicit Drug Use

Substance abuse is a medical problem that requires timely treatment, not only because of its health effects but also because drug use is associated with other adverse effects, such as violent behavior. In addition, because overall health care costs may be reduced by effective substance abuse and mental health treatment,<sup>35,36</sup> appropriate receipt and completion of treatment have both clinical and economic implications.

**Figure 2.33.** People age 12 and over who needed treatment for illicit drug use and who received such treatment at a specialty facility in the last 12 months, 2002-2006



**Source:** Substance Abuse and Mental Health Services Administration, National Survey on Drug Use and Health, 2002-2006.

**Reference population:** Civilian noninstitutionalized population age 12 and over who needed treatment for any illicit drug use.

**Note:** Treatment refers to treatment at a specialty facility, such as a drug and alcohol inpatient and/or outpatient rehabilitation facility, inpatient hospital care, or a mental health center.

- ◆ Overall, 20.3% of persons age 12 and over who met criteria for needing treatment for illicit drug use actually received it in 2006. This rate has not changed significantly since 2002 (Figure 2.33).
- ◆ Of people who needed treatment for illicit drug use in 2006, only 20.0% of adults ages 18-44 and 11.2% of children ages 12-17 received it. These rates remain significantly unchanged from 2002.
- ◆ In all 5 data years, children ages 12-17 who needed treatment for illicit drug use were less likely than adults ages 18-44 to receive such treatment.
- ◆ As of 2006, the percentage of people age 12 and over who met criteria for needing treatment for illicit drug use who actually received it had not yet achieved the Healthy People 2010 target of 24%. At the current average annual rate of change, this target is projected to be met.

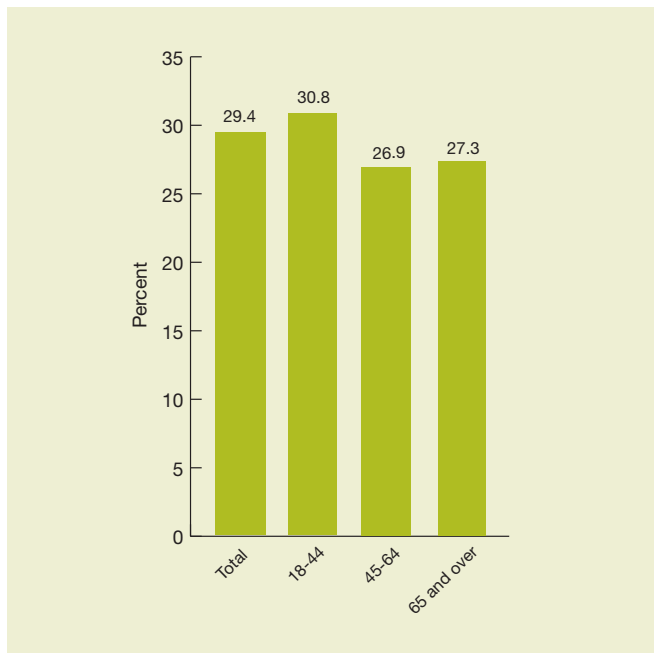
## Effectiveness

**Treatment: Receipt of Minimally Adequate Treatment for Mental Disorders**

Receipt of any treatment for a major depressive episode is a relatively low standard against which to assess quality of mental health care. The Collaborative Psychiatric Epidemiology Surveys (CPES) allow more detailed examination of mental health care. The CPES join together three nationally representative surveys, the National Comorbidity Survey Replication (NCS-R), the National Survey of American Life (NSAL), and the National Latino and Asian American Study (NLAAS). Together, these surveys can provide national estimates of mental disorders and mental health care for majority and minority populations in the United States in much greater detail than other data sources.

To better assess quality of mental health care, a higher standard of care, minimally adequate treatment, has been specified using the CPES. This measure defines minimally adequate treatment as pharmacotherapy, including at least 60 days of an appropriate medication and 4 visits to a physician, or psychotherapy, including at least 8 visits to a health care or human services professional lasting an average of 30 minutes or more.<sup>37</sup>

**Figure 2.34. Adults with a mood, anxiety, or impulse control disorder in the last 12 months who received minimally adequate treatment, 2001-2003**



*Nearly 30% of adults with mood, anxiety, or impulse control disorders received minimally adequate treatment.*

**Source:** National Institutes of Health, National Institute of Mental Health, Collaborative Psychiatric Epidemiology Surveys, 2001-2003.

**Reference population:** U.S. population age 18 and over who had a mood, anxiety, or impulse control disorder in the last year.

**Note:** The Composite International Diagnostic Interview (CIDI) was used to make psychiatric diagnoses consistent with the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV). “Minimally adequate treatment” is defined as at least 60 days of an appropriate medication and 4 visits to a physician OR at least 8 visits to a health care or human services professional lasting an average of 30 minutes or more in the last year.

- ◆ In 2001-2003, nearly 30% of adults with mood, anxiety, or impulse control disorders in the last 12 months received minimally adequate treatment (Figure 2.34).
- ◆ There were no significant differences by age for adults with mood, anxiety, or impulse control disorders in the last 12 months who received minimally adequate treatment.

## Respiratory Diseases

### Importance

#### Mortality

|   |                       |
|---|-----------------------|
| Number of deaths due to lung diseases (2004) .....                | 226,379 <sup>38</sup> |
| Number of deaths, influenza and pneumonia combined (2005).....    | 63,001 <sup>2</sup>   |
| Cause of death rank, influenza and pneumonia combined (2005)..... | 8th <sup>2</sup>      |

#### Prevalence

|   |                          |
|---|--------------------------|
| Adults age 18 and over who have asthma (2006) ..... | 16,057,000 <sup>39</sup> |
| Children under age 18 who have asthma (2006) .....  | 6,819,000 <sup>39</sup>  |

#### Incidence

|   |                          |
|---|--------------------------|
| Annual number of cases of the common cold (est.) .....                        | >1 billion <sup>40</sup> |
| Annual number of pneumonia cases due to <i>Streptococcus pneumoniae</i> ..... | 500,000 <sup>41</sup>    |
| New cases of tuberculosis (2007) .....  | 13,293 <sup>42</sup>     |

#### Cost

|   |                                |
|---|--------------------------------|
| Total cost of lung diseases (2007 est.).....                          | \$153.6 billion <sup>5</sup>   |
| Direct medical costs of lung diseases (2007 est.) .....               | \$94.8 billion <sup>5</sup>    |
| Total approximate cost of upper respiratory infections (annual) ..... | \$40 billion <sup>43</sup>     |
| Total cost of asthma (2007 est.) .....                                | \$19.7 billion <sup>38</sup>   |
| Direct medical costs of asthma (2007 est.).....                       | \$14.7 billion <sup>38</sup>   |
| Cost-effectiveness of influenza immunization .....                    | \$0-\$14,000/QALY <sup>6</sup> |

**Note:** Statistics may vary from previous years due to revised and updated source statistics or addition of data sources.

## Effectiveness

### Respiratory Diseases

## Measures

The NHQR tracks several quality measures for prevention and treatment of this broad category of illnesses that includes influenza, pneumonia, asthma, upper respiratory infection, and tuberculosis. The five core report measures highlighted in this section are:

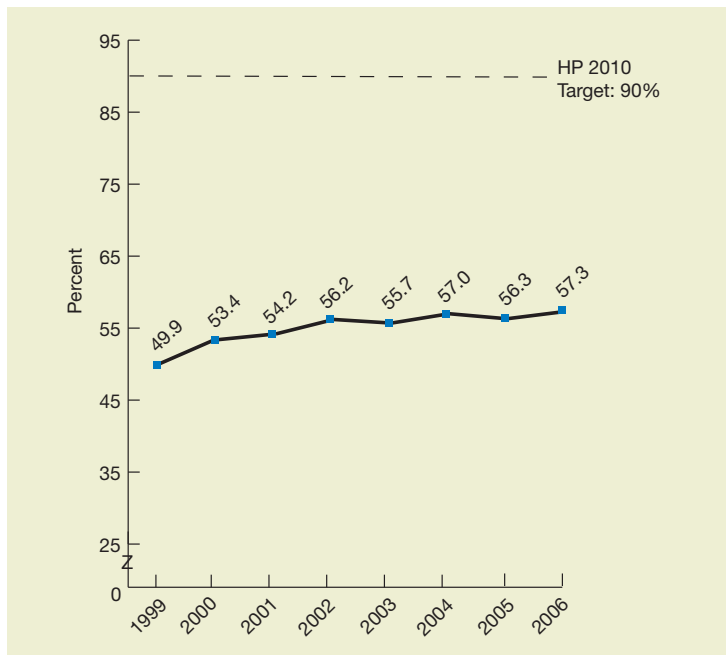
- ◆ Pneumococcal vaccination.
- ◆ Receipt of recommended care for pneumonia.
- ◆ Receipt of antibiotics for the common cold.
- ◆ Completion of tuberculosis therapy.
- ◆ Daily asthma medication.

## Findings

### Prevention: Pneumococcal Vaccination

Vaccination is a cost-effective strategy for reducing illness and death associated with pneumococcal disease of the lungs (pneumonia) and influenza.

**Figure 2.35. Adults age 65 and over who ever received pneumococcal vaccination, 1999-2006**



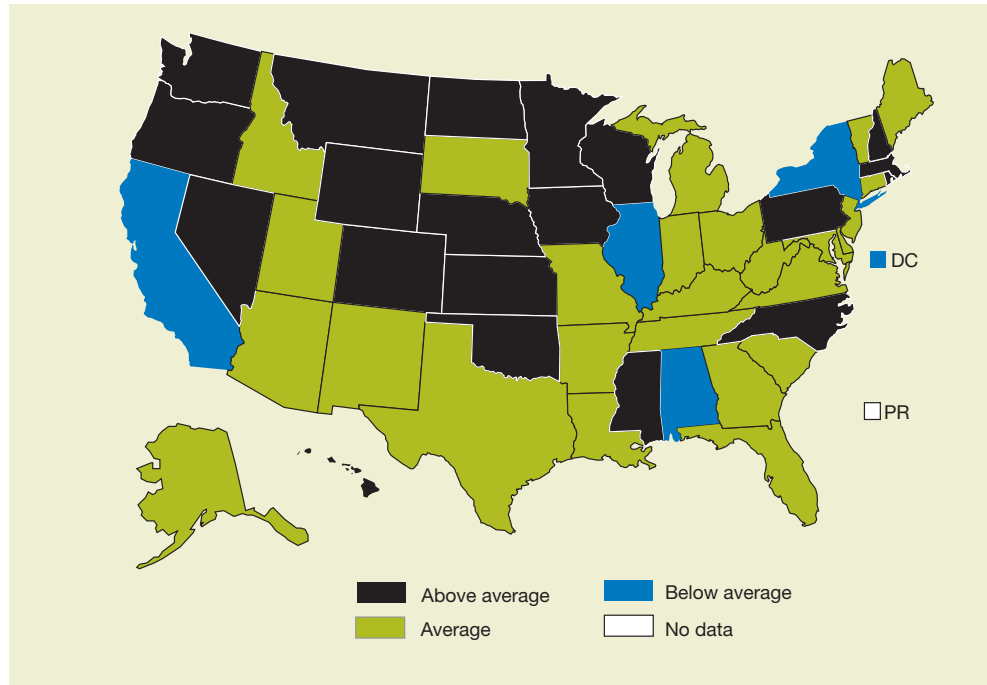
**Source:** Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey, 1999-2006.

**Reference population:** Civilian noninstitutionalized population age 65 and over.

**Note:** Age adjusted to the 2000 U.S. standard population.

- ◆ The percentage of adults age 65 and over who ever received a pneumococcal vaccination increased from 49.9% in 1999 to 57.3% in 2006 (Figure 2.35). The Healthy People 2010 target of 90% is unlikely to be met until after 2020 at this rate of change.

**Figure 2.36. State variation: Adults age 65 and over who ever received pneumococcal vaccination, 2006**



**Key:** Above average = rate is significantly above the reporting States average in 2006. Below average = rate is significantly below the reporting States average in 2006.

**Source:** Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System, 2006.

**Reference population:** Civilian noninstitutionalized population age 65 and over.

**Note:** Age adjusted to the 2000 U.S. standard population. "Reporting States average" is the average of all reporting States (51 in this case, including the District of Columbia), which is a separate figure from the national average.

- ◆ In 2006, the reporting States average of adults age 65 and over who had ever received a pneumococcal vaccination was 64.9%, with a range from 52.0% to 74.3%.
- ◆ Twenty States<sup>xx</sup> were significantly above the reporting States average in 2006 (Figure 2.36), with a combined average rate of 70.1%.
- ◆ Four States<sup>xxi</sup> and the District of Columbia were significantly below the reporting States average in 2006, with a combined average rate of 58.5%.
- ◆ Seventeen States showed improvement between 2001 and 2006 in the number of adults age 65 and over who ever received a pneumococcal vaccination.<sup>xxii</sup> No State showed a significant decrease on this measure during this period (data not shown).

<sup>xx</sup> The States are Colorado, Hawaii, Iowa, Kansas, Massachusetts, Minnesota, Mississippi, Montana, Nebraska, Nevada, New Hampshire, North Carolina, North Dakota, Oklahoma, Oregon, Pennsylvania, Rhode Island, Washington, Wisconsin, and Wyoming.

<sup>xxi</sup> The States are Alabama, California, Illinois and New York.

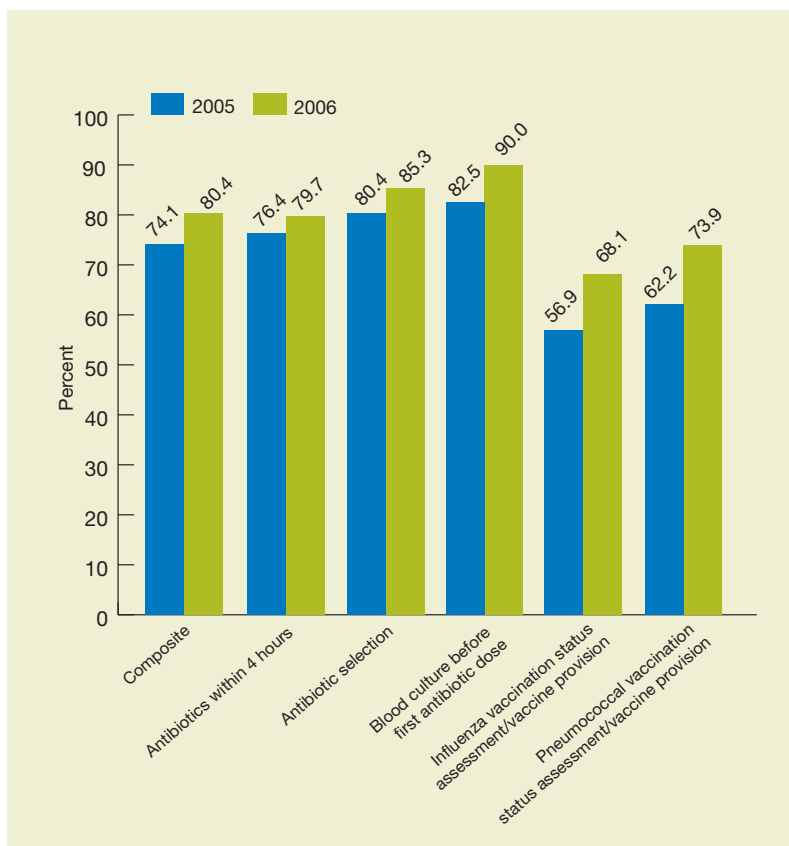
<sup>xxii</sup> The States are Florida, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, New Jersey, Ohio, Pennsylvania, South Dakota, and Tennessee.

## Effectiveness

**Treatment: Receipt of Recommended Care for Pneumonia**

Recommended care for patients with pneumonia includes receipt of: (1) initial antibiotics within 4 hours of hospital arrival; (2) antibiotics consistent with current recommendations; (3) blood culture before antibiotics are administered; (4) influenza vaccination status assessment/vaccine provision; and (5) pneumococcal vaccination status assessment/vaccine provision. The NHQR tracks receipt of this care for each measure and as an overall composite.

**Figure 2.37. Hospital patients with pneumonia who received recommended hospital care: Overall composite and five components, 2005 and 2006**



**Source:** Centers for Medicare & Medicaid Services, Medicare Quality Improvement Organization Program, 2005 and 2006.

**Denominator:** Patients hospitalized with a principal diagnosis of pneumonia or a principal diagnosis of either septicemia or respiratory failure and secondary diagnosis of pneumonia.

**Note:** Beginning in 2005, the data collection method changed from the abstraction of randomly selected medical records for Medicare beneficiaries to the receipt of hospital self-reported data for all payer types.

- ◆ In 2006, 80.4% of adult patients with pneumonia received the recommended care included in the overall pneumonia treatment composite measure (Figure 2.37). This is a significant increase from 2005 (74.1%). For each of the five component measures in 2006, recommended care was received by significantly more patients than in 2005.

- ◆ Among the five components of the composite measure, patients were most likely to receive blood cultures when clinically appropriate (90.0%) and least likely to have their influenza vaccination status assessed and receive the vaccine if indicated (68.1%).
- ◆ Revisions to two component measures applied to data for 2005 that are related to recommended care for pneumonia should be noted:
  - The individual measure of appropriate antibiotic selection for community-acquired pneumonia was changed to exclude patients with health care-associated pneumonia from the denominator used in the calculation.
  - The individual measure for the collection of samples for blood culture within 24 hours of hospital arrival was changed so that only those patients who were admitted to the intensive care unit within 24 hours of hospital arrival are included in the denominator.

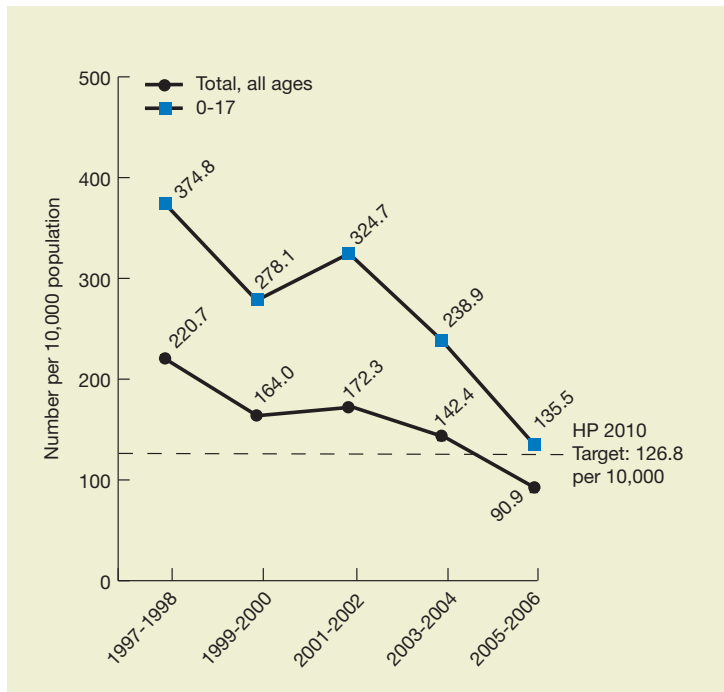
## Effectiveness

## Respiratory Diseases

**Treatment: Receipt of Antibiotics for the Common Cold**

Taking antibiotics does not treat or relieve symptoms of the common cold and may lead to the development of antibiotic-resistant bacteria. Although antibiotic prescribing patterns are slowly improving, overuse of antibiotics is still a concern.<sup>44</sup> Children have the highest rates of antibiotic use and the highest rates of infection with antibiotic-resistant bacterial pathogens.<sup>45</sup>

**Figure 2.38. Visits with antibiotics prescribed for a diagnosis of common cold per 10,000 population, overall and for children under age 18, 1997-2006**



**Source:** Centers for Disease Control and Prevention, National Center for Health Statistics, National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey, 1997-1998, 1999-2000, 2001-2002, 2003-2004, and 2005-2006.

**Denominator:** U.S. noninstitutionalized population.

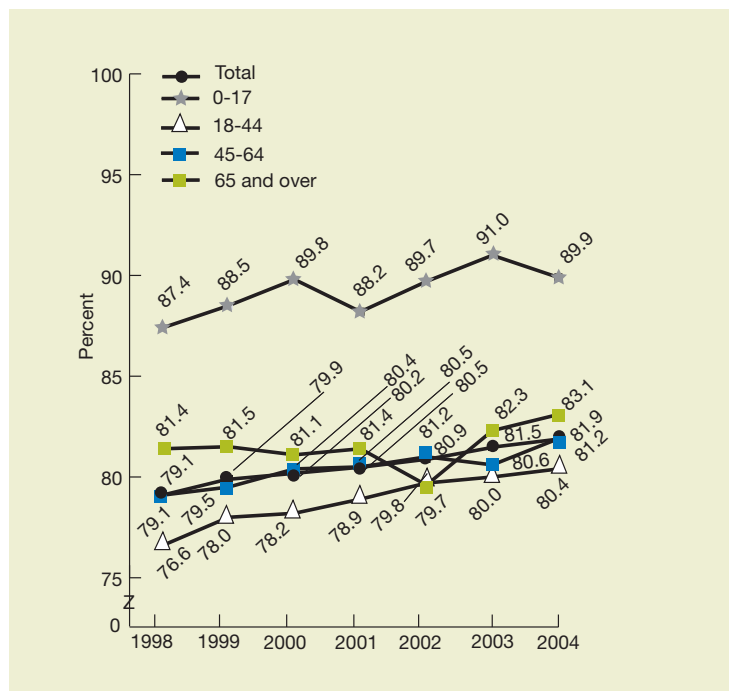
- ◆ In 2005-2006, the overall rate of antibiotics prescribed at visits with a diagnosis of the common cold stood at 90.9 per 10,000, which is below the Healthy People 2010 target of 126.8 per 10,000 (Figure 2.38).
- ◆ From 1997-1998 to 2005-2006, the rate of antibiotic prescription at visits with a diagnosis of common cold decreased overall for people of all ages and for children under age 18.



### Treatment: Completion of Tuberculosis Therapy

In order to be effective for individuals as well as the public, tuberculosis therapy must be taken to its completion. Failure to complete tuberculosis therapy puts patients at increased risk for treatment failure and for spreading the disease to others. Even worse, it may result in the development of drug-resistant strains of the disease.<sup>46</sup>

**Figure 2.39. Patients with tuberculosis who completed a curative course of treatment within 1 year of initiation of treatment, by age group, 1998-2004**



**Source:** Centers for Disease Control and Prevention, National Tuberculosis Surveillance System, 1998-2004.

**Reference population:** U.S. civilian noninstitutionalized population.

- ◆ From 1998 to 2004, the rate of completion of tuberculosis therapy within one year did not change significantly for both the total population and all age groups (Figure 2.39).
- ◆ In 2004, children ages 0-17 with tuberculosis were more likely to complete a curative course of treatment within one year of treatment than adults age 18 and over.

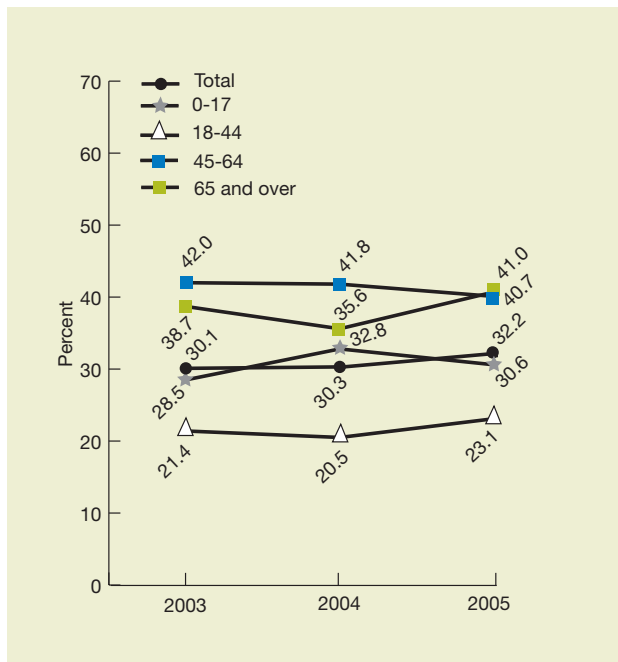
## Effectiveness

**Management: Daily Asthma Medication**

Improving quality of care for people with asthma can reduce the occurrence of asthma attacks and avoidable hospitalizations. The National Asthma Education and Prevention Program (NAEPP), coordinated by the National Heart, Lung, and Blood Institute, develops and disseminates science-based guidelines for the diagnosis and management of asthma.<sup>47</sup> These recommendations are built around four essential components of asthma management critical for effective long-term control of asthma: assessment and monitoring, control of factors contributing to symptom exacerbation, pharmacotherapy, and education for partnership in care.<sup>48</sup>

Asthma can be effectively controlled over the long term with recommended medications (depending on the severity of the disease), routine checkups, education of patients, and use of asthma management plans.

**Figure 2.40. People with current asthma who are now taking preventive medicine daily or almost daily (either oral or inhaler), 2003-2005**



**Source:** Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2003-2005.

**Denominator:** Civilian noninstitutionalized population who reported current asthma or an asthma attack within the last 12 months.

- ◆ In 2005, 6.9% of the population had current asthma (reported to still have asthma or have had an episode or attack in the last 12 months; data not shown).
- ◆ Of those with current asthma in 2005, 32.2% reported now taking preventive medicine daily or almost daily (Figure 2.40).
- ◆ People ages 18-44 are less likely than those age 17 and under and age 45 and over to report use of daily preventive medicine for asthma.

## Nursing Home, Home Health, and Hospice Care

### Importance

#### Demographics

|   |                               |
|---|-------------------------------|
| Number of nursing home residents ever admitted during the calendar year (2006)..... | 3,176,119 <sup>49</sup>       |
| Medicare fee-for-service (FFS) admissions for skilled nursing facility (2005).....  | 2,543,133 <sup>50</sup>       |
| Number of Medicare FFS home health patients (2006) .....                            | 3,031,814 <sup>51,xxiii</sup> |
| Number of Medicare FFS beneficiaries using Medicare hospice services (2006).....    | 935,565 <sup>52</sup>         |

#### Cost

|   |                               |
|---|-------------------------------|
| Total costs of nursing home care (2006) .....           | \$124.9 billion <sup>53</sup> |
| Medicare expenditures for nursing home care (2006)..... | \$20.8 billion <sup>53</sup>  |
| Total costs of home health care (2006) .....            | \$52.7 billion <sup>53</sup>  |
| Medicare expenditures for home health care (2006) ..... | \$19.8 billion <sup>53</sup>  |
| Medicare FFS payments for hospice services (2006).....  | \$9.2 billion <sup>54</sup>   |

**Note:** Statistics may vary from previous years due to revised and updated source statistics or addition of data sources. Cost estimates for nursing home and home health services include only costs for freestanding skilled nursing facilities, nursing homes, and home health agencies and not those that are hospital based.

### Measures

The NHQR tracks 14 measures of nursing home care. Care is tracked among both short-stay and long-stay residents. Short-stay residents commonly have a brief stay in a nursing home after a hospitalization, which is usually followed by return to their home. Care for short-stay residents is often funded by the Medicare Skilled Nursing Facility benefit. Long-stay residents, in contrast, are expected to stay in the nursing home either permanently or for an extended time. The NHQR also tracks 12 measures for home health care that reflect improvement or deterioration during the course of care. Two core report measures on nursing home care and two core report measures on home health care are highlighted in this section:

- ◆ Use of restraints on long-stay nursing home residents.
- ◆ Presence of pressure sores in short-stay and long-stay nursing home residents.
- ◆ Improvement in ambulation in home health care episodes.
- ◆ Acute care hospitalization of home health care patients.

<sup>xxiii</sup> Medicare FFS patients only represent a portion of all home health patients.

## Effectiveness

The NHQR also includes measures of the quality of care provided by hospice organizations. Hospice care is delivered at the end of life to patients with a terminal illness or condition requiring comprehensive medical care as well as psychosocial and spiritual support for the patient and family. The goal of end-of-life care is to achieve a “good death,” defined by the Institute of Medicine as one that is “free from avoidable distress and suffering for patients, families, and caregivers; in general accord with the patients’ and families’ wishes; and reasonably consistent with clinical, cultural, and ethical standards.”<sup>55</sup>

The National Hospice and Palliative Care Organization’s Family Evaluation of Hospice Care survey examines the quality of hospice care for dying patients and their family members. Family respondents report how well hospices respect patient wishes, communicate about illness, control symptoms, support dying on one’s own terms, and provide family emotional support.<sup>56,xxiv</sup>

The three noncore measures presented here from the National Hospice and Palliative Care Organization’s Family Evaluation of Hospice Care survey are:

- ◆ Receipt of right amount of pain medicine by hospice patients.
- ◆ Receipt of care consistent with patient’s stated end-of-life wishes.
- ◆ Referral to hospice at the right time.

*Use of physical restraints on patients declines in nursing homes—Associated Press, March 2008*

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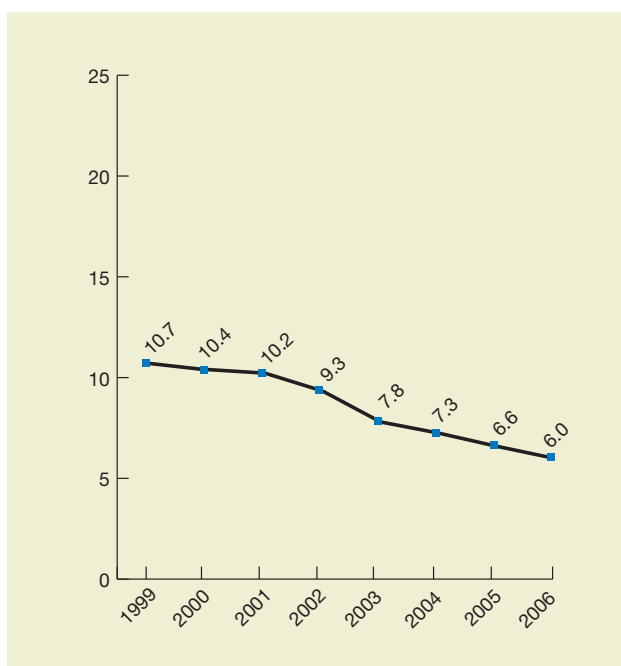
<sup>xxiv</sup> This survey provides unique insight into end-of-life care and captures information about a large percentage of hospice patients but is limited by nonrandom data collection and a response rate of about 40%. Survey questions were answered by family members of patients, who might not be fully aware of the patients’ wishes and concerns. These limitations should be considered when interpreting these findings.

## Findings

### Management: Use of Restraints on Long-Stay Nursing Home Residents

A physical restraint is any device, material, or equipment that keeps a resident from moving freely. A resident who is restrained daily can become weak and develop other medical complications. The use of physical and pharmacological restraints can result in a variety of emotional, mental, and physical problems. According to regulations for the nursing home industry, restraints should be used only when medically necessary. Bedrails are not included in this measure because they may be appropriate at night for some patients to prevent falls.

**Figure 2.41.** Long-stay nursing home residents with physical restraints, 1999-2006



**Source:** Centers for Medicare & Medicaid Services, Minimum Data Set, 1999-2006. Data are from the third quarter of each calendar year.

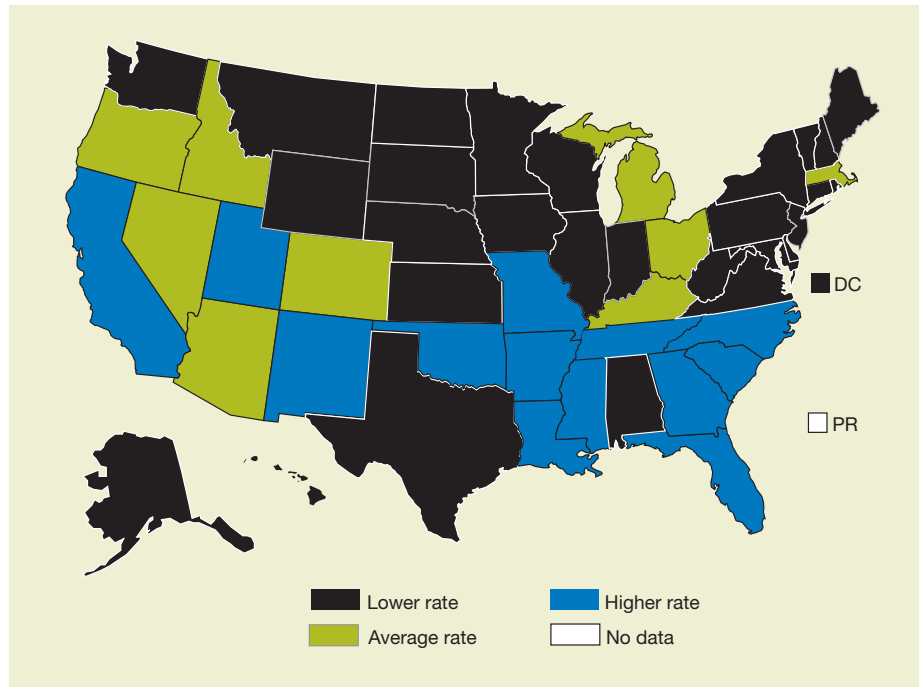
**Denominator:** All long-stay residents in Medicare or Medicaid certified nursing home facilities.

**Note:** Restraint use was determined based on a 7-day assessment period.

- ◆ The overall percentage of long-stay nursing home residents who are physically restrained decreased from 10.7% in 1999 to 6.0% in 2006 (Figure 2.41).
- ◆ The decrease from 6.6 to 6.0 between 2005 and 2006 is also statistically significant.
- ◆ Decreases in the use of physical restraints were observed for all age groups (data not shown) between 1999 and 2006.

## Effectiveness

Figure 2.42. State variation: Long-stay nursing home residents with physical restraints, 2007



**Key:** Higher rate = State has rate in use of restraints higher than the reporting States average in 2007. Lower rate = State has rate in use of restraints lower than the reporting States average in 2007.

**Source:** Centers for Medicare & Medicaid Services, Minimum Data Set, Nursing Home Compare, 2007.

**Denominator:** All long-stay residents in Medicare or Medicaid certified nursing and long-term care facilities.

**Note:** The “reporting States average” is the average of all reporting States (51 in this case, including the District of Columbia), which is a separate figure from the national average.

- ◆ The reporting States average of use of physical restraints for long-stay residents improved between 2002 and 2007, dropping from 9.7% to 5.1% during this period. There was considerable variation in this measure among States in 2007. States ranged from a low of 1.5% to a high of 11.0% in 2007.
- ◆ Twenty-eight States<sup>xxv</sup> and the District of Columbia outperformed the reporting States average (i.e., less use of physical restraints on long-stay nursing home residents) (Figure 2.42), with a combined average rate of 2.6% in 2007.
- ◆ Thirteen States<sup>xxvi</sup> had rates higher than the reporting States average (i.e., greater use of restraints), with a combined average rate of 8.0% in 2007.
- ◆ In only two States (New Mexico and Utah) did the rate of long-stay nursing home residents with physical restraints not improve from 2002 to 2007 (data not shown). In these States, there was no significant change.

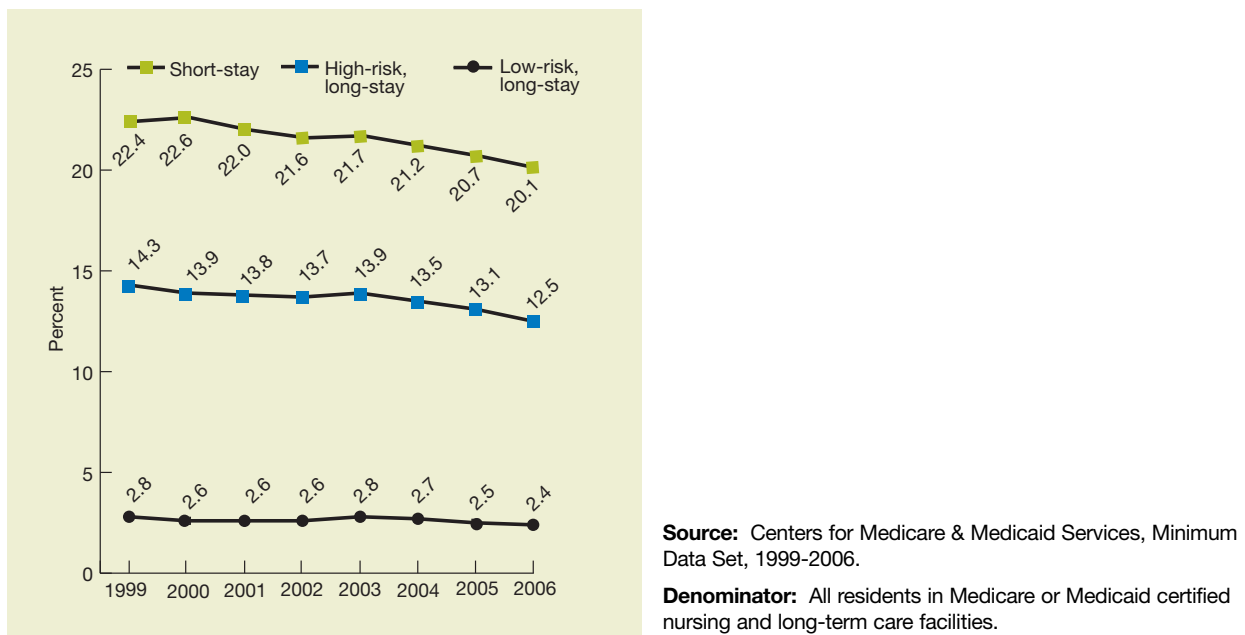
<sup>xxv</sup> The States are Alabama, Alaska, Connecticut, Delaware, Hawaii, Illinois, Indiana, Iowa, Kansas, Maine, Maryland, Minnesota, Montana, Nebraska, New Hampshire, New Jersey, New York, North Dakota, Pennsylvania, Rhode Island, South Dakota, Texas, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.

<sup>xxvi</sup> The States are Arkansas, California, Florida, Georgia, Louisiana, Mississippi, Missouri, New Mexico, North Carolina, Oklahoma, South Carolina, Tennessee, and Utah.

### Management: Presence of Pressure Sores in Nursing Home Residents

A pressure ulcer, or pressure sore, is an area of broken-down skin caused by sitting or lying in one position for an extended time. Pressure sores can be painful, take a long time to heal, and cause other complications such as skin or bone infections. Pressure sores are classified into four stages (stages 1 through 4, with stage 4 being the most severe) according to the depth or type of tissue damage. The measures presented here include all four stages.

**Figure 2.43. Short-stay and long-stay nursing home residents with pressure sores, by type of resident, 1999-2006**



- ◆ There were only minor improvements in pressure sore measures for all three types of nursing home residents between 1999 and 2006.
- ◆ From 1999 to 2006, the rate of short-stay residents with pressure sores fell from 22.4% to 20.1% (Figure 2.43).<sup>xxvii</sup> For high-risk, long-stay residents, the rate fell from 14.3% to 12.5%, and for low-risk, long-stay residents, the rate fell from 2.8% to 2.4%.<sup>xxviii</sup>
- ◆ For high-risk, long-stay nursing home residents, the decrease from 13.1% in 2005 to 12.5% in 2006 is statistically significant.
- ◆ High-risk, long-stay residents have a fivefold greater risk of having pressure sores than low-risk, long-stay residents.

<sup>xxvii</sup> “Short stay” refers to residents who are admitted to a facility and stay fewer than 30 days; these admissions, also referred to as “postacute,” typically follow an acute care hospitalization and may involve high-intensity rehabilitation or clinically complex care.

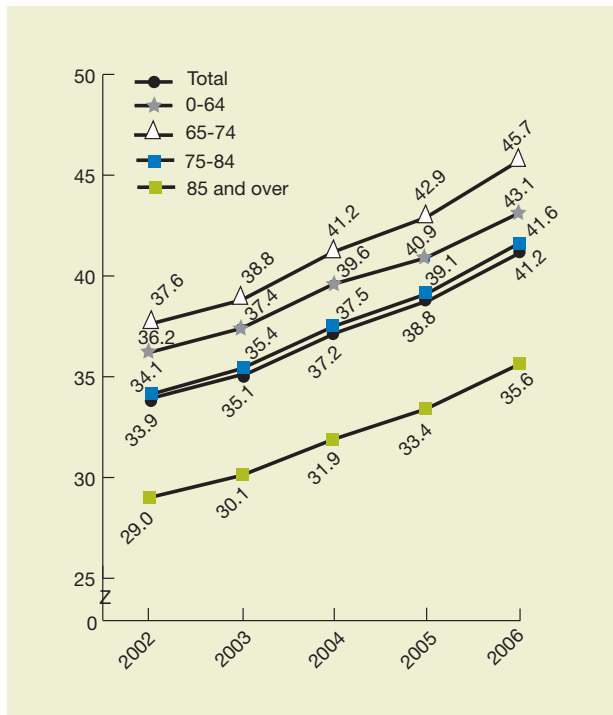
<sup>xxviii</sup> “Long stay” (also known as “chronic care”) refers to residents who enter a nursing facility typically because they are no longer able to care for themselves at home; they tend to remain in the facility from several months to several years. High-risk residents are those who are in a coma, who do not get or absorb the nutrients they need, or who cannot move or change position on their own. Conversely, low-risk residents can be active, can change positions, and are getting and absorbing the nutrients they need.

## Effectiveness

**Management: Improvement in Ambulation in Home Health Care Episodes**

Improvement in ambulation/locomotion is demonstrated by an increase in the percentage of patients who improve walking or mobility with a wheelchair. Many patients receiving home health care may need help to walk safely. This assistance can come from another person or from equipment, such as a cane. Patients who use a wheelchair may have difficulty moving around safely, but if they can perform this activity with little assistance, they are more independent, self-confident, and active. In cases of patients with some neurologic conditions, such as progressive multiple sclerosis or Parkinson's disease, ambulation may not improve even when the home health agency provides good care.

**Figure 2.44. Adult home health care patients whose ability to walk or move around improved, by age group, 2002-2006**



**Source:** Centers for Medicare & Medicaid Services, Outcome and Assessment Information Set (OASIS), 2002-2006.

**Denominator:** Episodes for adult nonmaternity patients receiving at least some skilled home health care and not already performing at the highest level according to the OASIS question on ambulation.

- ◆ From 2002 to 2006, the percentage of home health care episodes<sup>xxix</sup> showing improvement in ambulation/locomotion increased from 33.9% to 41.2% (Figure 2.44).
- ◆ The percentage of home health care episodes showing ambulation/locomotion improvement also increased for every age group.

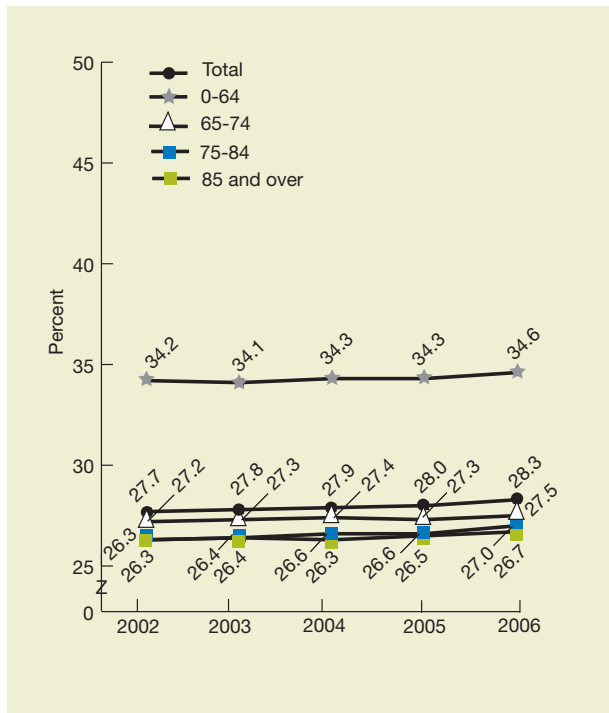
<sup>xxix</sup> An “episode” is the time during which a patient is under the direct care of a home health agency. It starts with the beginning/resumption of care and finishes when the patient is discharged or transferred to an inpatient facility. The same patient may be involved in multiple episodes. An episode is a 60-day time period.



### Management: Acute Care Hospitalization of Home Health Care Patients

Improvement in acute care hospitalization of home health patients is demonstrated by a decrease in the percentage of patients who had to be admitted to the hospital. Patients may need to go into the hospital while they are getting home health care. Depending on the severity of the patient's condition, this may not be avoidable even with good home health care.

**Figure 2.45. Adult home health care patients who were admitted to the hospital, by age group, 2002-2006**



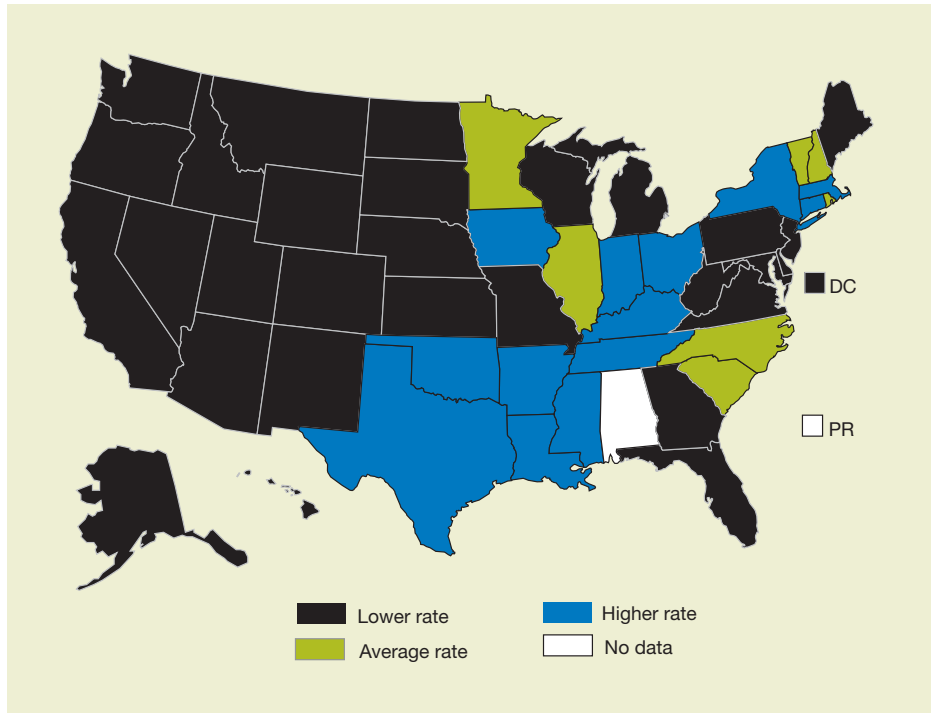
**Source:** Centers for Medicare & Medicaid Services, Outcome and Assessment Information Set (OASIS), 2002-2006.

**Denominator:** Episodes for adult nonmaternity patients receiving at least some skilled home health care.

- ◆ In 2006, 28.3% of home health care episodes ended in hospitalization (Figure 2.45).
- ◆ Between 2002 and 2006, the rate did not improve for the entire population or for any age group.
- ◆ In all 5 data years, home health care patients under age 65 years were more likely than patients ages 65-74 to require hospitalization. This may be because home health care patients under age 65 in Medicare tend to have different characteristics, such as greater degrees of disability and illness.

## Effectiveness

Figure 2.46. State variation: Adult home health care patients who were admitted to the hospital, 2007



**Key:** Higher rate = State has rate of hospitalizations higher than the reporting States average in 2007. Lower rate = State has rate of hospitalizations lower than the reporting States average in 2007.

**Source:** Centers for Medicare & Medicaid Services, Outcome and Assessment Information Set (OASIS), 2007.

**Denominator:** Episodes for adult nonmaternity patients receiving at least some skilled home health care.

**Note:** The “reporting States average” is the average of all reporting States (51 in this case, including the District of Columbia), which is a separate figure from the national average.

- ◆ In 2007, the reporting States average for home health care patients who were admitted to the hospital was 31.9%.
- ◆ Thirteen States<sup>xxx</sup> were significantly above the reporting States average in 2007 (Figure 2.46), with a combined average rate of 37.0%.
- ◆ Twenty-nine States<sup>xxxi</sup> and the District of Columbia were significantly below the reporting States average in 2007, with a combined average rate of 25.9%.

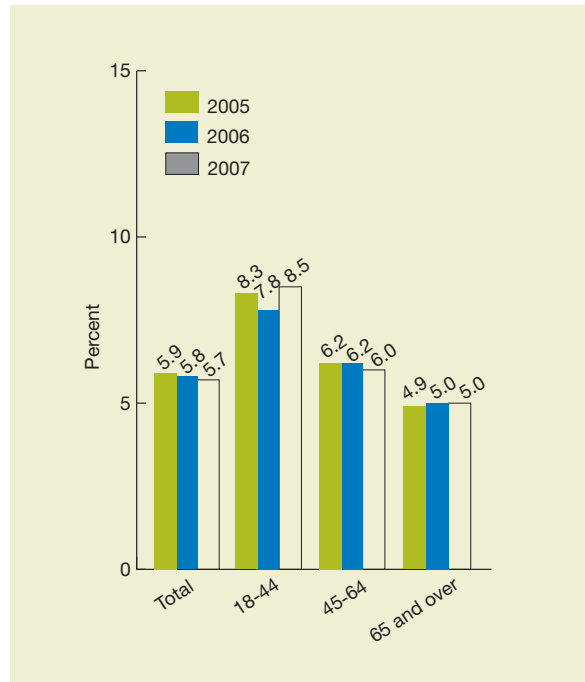
<sup>xxx</sup> The States are Arkansas, Connecticut, Indiana, Iowa, Kentucky, Louisiana, Massachusetts, Mississippi, New York, Ohio, Oklahoma, Tennessee, and Texas.

<sup>xxxi</sup> The States are Alaska, Arizona, California, Colorado, Delaware, Florida, Georgia, Hawaii, Idaho, Kansas, Maine, Maryland, Michigan, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, North Dakota, Oregon, Pennsylvania, South Dakota, Utah, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.

### Management: Receipt of Right Amount of Pain Medicine by Hospice Patients

Addressing the comfort aspects of care, such as relief from pain, fatigue, and nausea, is an important component of hospice care.<sup>xxxii</sup>

**Figure 2.47. Hospice patients who did NOT receive the right amount of medicine for pain, by age group, 2005-2007**



**Source:** National Hospice and Palliative Care Organization, Family Evaluation of Hospice Care, 2005-2007.

**Denominator:** Adult hospice patients.

- ◆ The percentage of hospice patients whose families reported that they did not receive the right amount of medicine for pain was 5.7% in 2007 (Figure 2.47).
- ◆ Families of hospice patients ages 18-44 and ages 45-64 were more likely to report that the patient did not receive the right amount of pain medicine (8.5% and 6.0%, respectively) in 2007 compared with families of patients age 65 and over (5.0%).
- ◆ Between 2005 and 2007, the percentage of hospice patients whose families reported that they did not receive the right amount of medicine for pain did not change significantly overall or for any adult age group (18-44, 45-64, 65 and over).

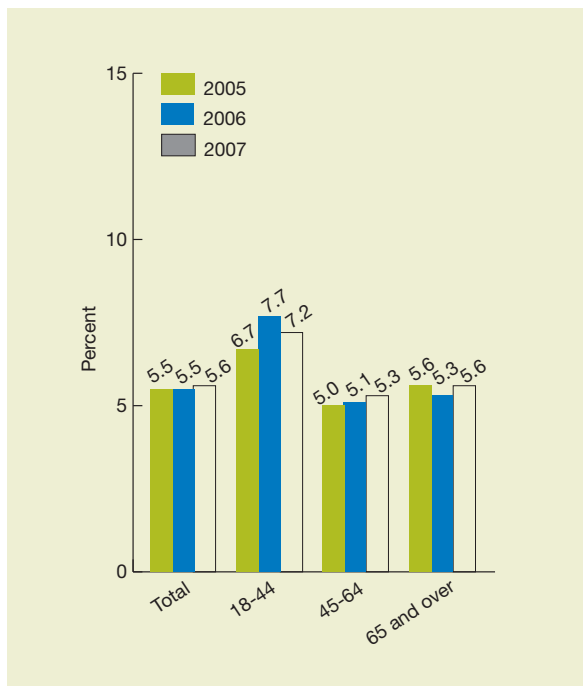
<sup>xxxii</sup> This measure is based on responses from a family member of the deceased. In interpreting it, it should be noted that family members may or may not be able to determine whether the right amount of medicine for pain was administered.

## Effectiveness

**Management: Receipt of Care Consistent With Patient's Stated End-of-Life Wishes**

End-of-life care should respect a patient's stated end-of-life wishes. This includes shared communication and decisionmaking between providers and hospice patients and their family members and respect for cultural beliefs.

*Figure 2.48. Hospice patients age 18 and over who did NOT receive care consistent with their stated end-of-life wishes, by age group, 2005-2007*



**Source:** National Hospice and Palliative Care Organization, Family Evaluation of Hospice Care, 2005-2007.

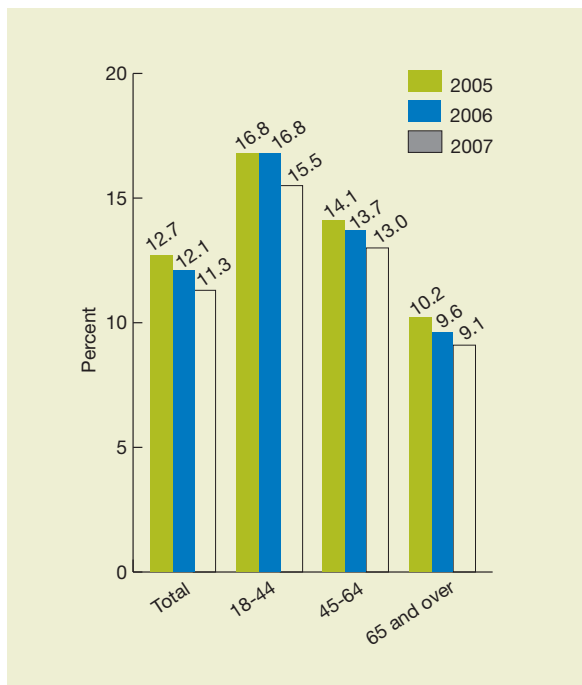
**Denominator:** Adult hospice patients.

- ◆ The percentage of hospice patients whose families reported that they did not receive end-of-life care consistent with their stated wishes was 5.6% in 2007 (Figure 2.48).
- ◆ In 2007, hospice patients ages 18-44 were less likely than patients ages 45 and over to receive end-of-life care consistent with their wishes.
- ◆ Between 2005 and 2007, the percentage of hospice patients whose families reported that they did not receive end-of-life care consistent with their stated wishes did not change significantly overall or for any adult age group (18-44, 45-64, 65 and over).

### Management: Referral to Hospice at the Right Time

Caregivers' perception of the timing of the referral to hospice is often associated with increased reports of unmet needs and lower satisfaction with hospice care. The perception of referral timing may be an indicator of adequacy of access to hospice care.

**Figure 2.49. Hospice patient caregivers who perceived patient was NOT referred to hospice at the right time, by age group, 2005-2007**



**Source:** National Hospice and Palliative Care Organization, Family Evaluation of Hospice Care, 2005-2007.

**Denominator:** Adult hospice patients.

**Note:** Caregivers were family members who interacted with hospice providers.

- ◆ The percentage of hospice patient caregivers who perceived that the patient was not referred to hospice at the right time was 11.3% in 2007 (Figure 2.49).
- ◆ In 2007, overall, and for all three patient age groups, caregivers' perception of referral to hospice at the right time improved from 2005.
- ◆ In 2007, caregivers for the 65 and over age group were less likely to report a perception that the patient was not referred at the right time than caregivers for either the 18-44 or 45-64 age group.
- ◆ Caregivers for the 45-64 age group were less likely than caregivers for the 18-44 age group to report a perception that the patient was not referred at the right time.

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## Chapter 3.

# Patient Safety

The Institute of Medicine (IOM) defines patient safety as freedom from accidental injury due to medical care or medical errors.<sup>1</sup> In 1999, the IOM published *To Err Is Human: Building a Safer Health System*, which called for a national effort to reduce medical errors and improve patient safety. Central to this effort is the ability to measure and track patient safety events.

Measuring patient safety is complicated by difficulties assessing and ensuring the systematic reporting of medical errors and patient safety events. All too often, patient safety event reporting systems are laborious and cumbersome. Health care providers may also fear that if they participate in the analysis of medical errors or patient care processes, the findings may be used against them in court or harm their professional reputations. Many factors limit the ability to aggregate data in sufficient numbers to rapidly identify prevalent risks and hazards in the delivery of patient care, their underlying causes, and practices that are most effective in mitigating them. These include difficulties aggregating and sharing data confidentially across facilities or State lines.

Despite these limitations, a clear picture of patient safety is emerging. Progress has been made in recent years in raising awareness, developing event reporting systems, and establishing national data collection standards. Examining patient safety using a combination of administrative data, chart abstraction, and patient surveys allows a more robust understanding of what is improving and what is not. Still, data remain incomplete for a comprehensive national assessment of patient safety.<sup>2</sup>

## Importance

### Mortality

Number of Americans who die each year from medical errors (1999 est.).....44,000-98,000<sup>1</sup>

Number of Americans who die in the hospital each year due to 18 types  
of medical injuries (2000 est.).....at least 32,000<sup>3</sup>

### Cost

Cost attributable to medical errors (lost income, disability,  
and health care costs) (1999 est.) .....\$17 billion-\$29 billion<sup>1</sup>

Annual cost attributable to surgical errors (2008 est.)..... \$1.47 billion<sup>4</sup>

## Patient Safety

### Measures

This year's chapter highlights three core measures and nine additional measures related to surgical complications, other complications of hospital care, and complications of medications:

Core measures are:

- ◆ Postoperative care composite: pneumonia or venous thromboembolic event.
- ◆ Appropriate timing of antibiotics among surgical patients.
- ◆ Adverse events associated with central venous catheters (CVCs).
- ◆ Potentially inappropriate prescription medications for adults age 65 and over.

Additional noncore measures include:

- ◆ Catheter-associated urinary tract infections (UTIs).
- ◆ Accidental puncture or laceration.
- ◆ Postoperative wound separation in abdominopelvic-surgery patients (reclosure).
- ◆ Iatrogenic pneumothorax.
- ◆ Deaths following complications of care.
- ◆ Deaths in low-mortality diagnosis-related groups (DRGs).
- ◆ Adverse drug events in the hospital.
- ◆ Any hospital complication.

*Approximately 40% of all health care-associated infections are attributed to catheter-associated urinary tract infections.*

# Patient Safety

## Findings

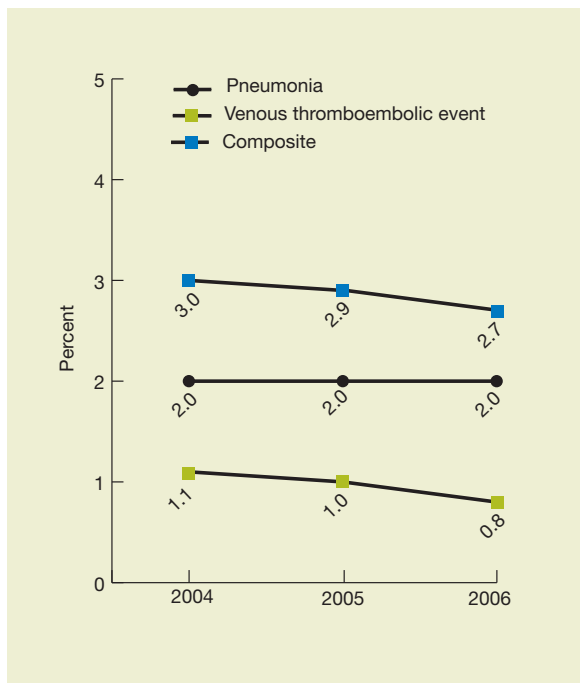
### Surgical Care

Adverse health events can occur during episodes of care, especially during and soon after surgery. Although some events may be related to a patient's underlying condition, many can be avoided if appropriate care is provided.

#### Postoperative Care Composite: Pneumonia or Venous Thromboembolic Event

Complications after surgery may include, but are not limited to, pneumonia and blood clots.

**Figure 3.1. Composite measure: Adult surgery patients with postoperative complications (postoperative pneumonia or venous thromboembolic event), 2004-2006**



**Source:** Centers for Medicare & Medicaid Services, Medicare Patient Safety Monitoring System, 2004-2006.

**Denominator:** Adult hospitalized Medicare patients having major surgery and meeting specific criteria for each measure.

**Note:** Postoperative care complications included in this composite are postoperative pneumonia and venous thromboembolic event (blood clot). Note that this composite changed from 2004 to 2005 with the alteration of the complications of UTIs being changed to catheter-associated UTIs. Catheter-associated UTIs was removed from this composite for 2006 data. Sensitivity analysis carried out on the composite shows that this change does not significantly alter the composite estimate.

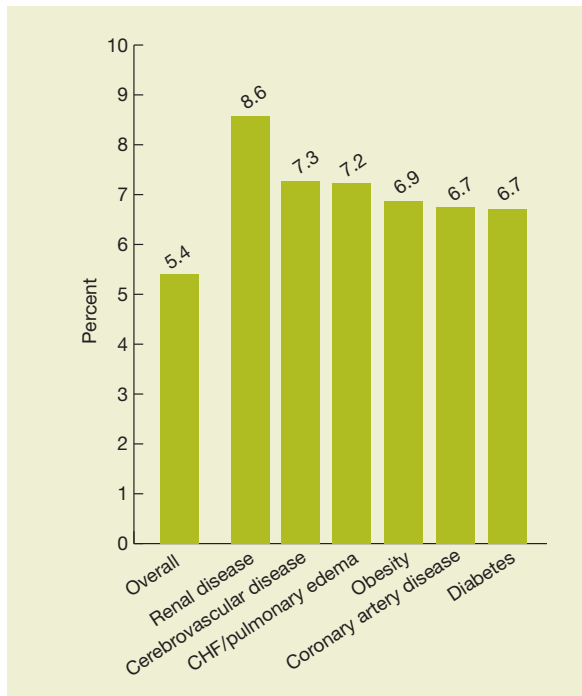
- ◆ In 2006, 2.7% of Medicare surgical patients had postoperative pneumonia or a thromboembolic event. The change from the 2004 figure (3.0%) was not statistically significant (Figure 3.1).

## Patient Safety

### Catheter-Associated Urinary Tract Infections

The urinary tract is a common site of health care-associated infection. Catheter use and specific comorbid conditions can increase the risk of developing a UTI. Approximately 40% of all health care-associated infections are attributed to catheter-associated UTIs.<sup>5</sup>

**Figure 3.2. Adult surgery patients with postoperative catheter-associated urinary tract infection, overall\* and by selected comorbid conditions, 2006**



\* The overall rate uses a different denominator from the condition-specific rate denominators that are based on the numbers of patients who have a specific condition.

**Key:** CHF = congestive heart failure.

**Source:** Centers for Medicare & Medicaid Services, Medicare Patient Safety Monitoring System, 2006.

**Denominator:** Adult hospitalized Medicare patients having major surgery and meeting specific criteria for each measure.

**Note:** The overall rate also includes health conditions in condition categories not shown in the figure (e.g., chronic obstructive pulmonary disease, smoking, and corticosteroids). Patients may be counted as having one or more conditions concurrent with a UTI.

- ◆ In 2006, the total percentage of surgical patients with catheter-associated UTIs was 5.4% (Figure 3.2).
- ◆ In 2006, patients with renal disease, cerebrovascular disease, and congestive heart failure or pulmonary edema had the highest rates of catheter-associated UTIs among the conditions analyzed (Figure 3.2).

### Appropriate Timing of Antibiotics Among Surgical Patients

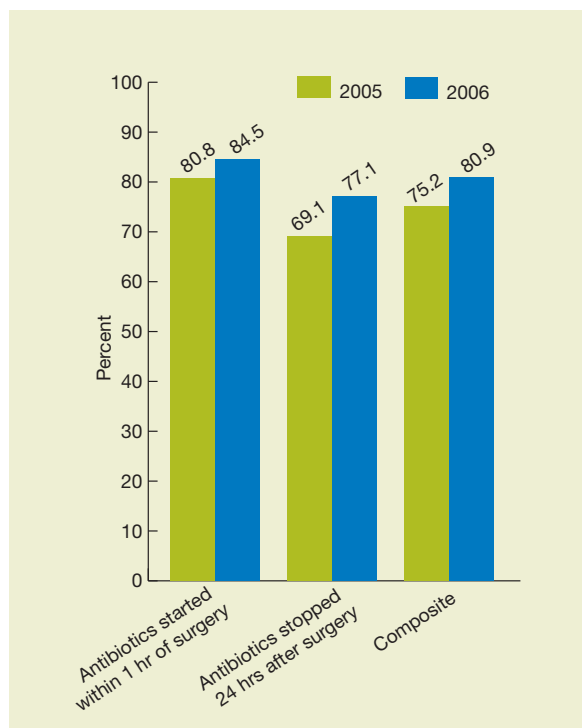
Infections acquired during hospital care (nosocomial infections) are one of the most serious safety concerns. A common health care-associated infection is a wound infection following surgery. Hospitals

## Patient Safety

can reduce the risk of wound infection after surgery by making sure patients get the right antibiotics at the right time on the day of their surgery.

Research shows that surgery patients who get antibiotics within the hour before their operation are less likely to get wound infections. Getting an antibiotic earlier or after surgery begins is not as effective. However, taking these antibiotics for more than 24 hours after routine surgery is usually not necessary and can increase the risk of side effects, such as stomachaches, serious types of diarrhea, and antibiotic resistance. Among adult Medicare patients having surgery, the National Healthcare Quality Report tracks receipt of antibiotics within 1 hour prior to surgical incision, discontinuation of antibiotics within 24 hours after end of surgery, and a composite of these two measures.

**Figure 3.3. Adult surgery patients who received appropriate timing of antibiotics: Overall composite and two components, 2005 and 2006**



**Source:** Centers for Medicare & Medicaid Services, Medicare Quality Improvement Organization Program, 2005 and 2006.

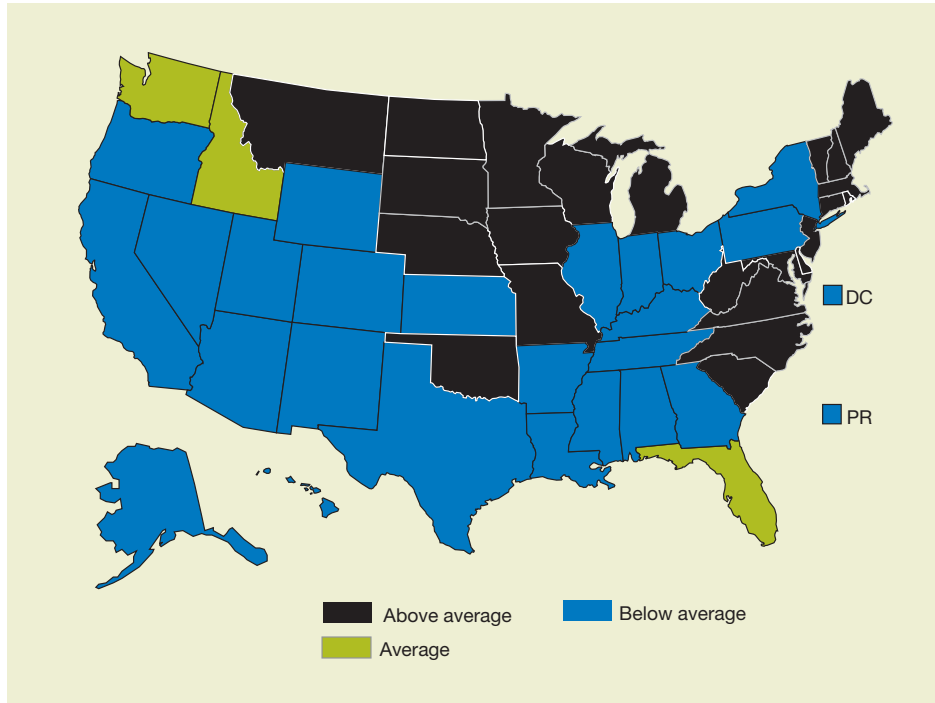
**Denominator:** Hospitalized patients having surgery.

**Note:** Beginning in 2005, the data collection method changed from the abstraction of randomly selected medical records for Medicare beneficiaries to the receipt of hospital self-reported data for all payer types.

- ◆ In 2006, 84.5% of adult patients having surgery received antibiotics within 1 hour of surgery, and 77.1% had their antibiotics stopped within 24 hours after end of surgery (Figure 3.3).
- ◆ Appropriate timing of antibiotics received by adult patients having surgery improved significantly between 2005 (75.2%) and 2006 (80.9%), both overall and for the two components of the composite measure.

## Patient Safety

**Figure 3.4. State variation: Adult surgery patients who received appropriate timing of antibiotics, 2006**



**Key:** Above average = appropriate timing of prophylactic antibiotics is significantly above the all States average in 2006. Below average = appropriate timing of prophylactic antibiotics is significantly below the all States average in 2006.

**Source:** Centers for Medicare & Medicaid Services, Medicare Quality Improvement Organization Program, 2006.

**Denominator:** Hospitalized patients having surgery.

**Note:** “All States average” is the average of all responding States (52 in this case, including the District of Columbia and Puerto Rico), which is a separate figure from the national average.

- ◆ Variation was seen among States in the overall timing of prophylactic antibiotics (Figure 3.4). In 2006, the all States average was 80.9% and ranged from 65.1% to 91.6%.
- ◆ Twenty-three States<sup>i</sup> were significantly above the all States average in 2006, with a combined average rate of 85.5%.
- ◆ Twenty-four States,<sup>ii</sup> the District of Columbia, and Puerto Rico were significantly below the all States average in 2006, with a combined average rate of 76.8%.

<sup>i</sup> The States were Connecticut, Delaware, Iowa, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, New Hampshire, New Jersey, North Carolina, North Dakota, Oklahoma, Rhode Island, South Carolina, South Dakota, Vermont, Virginia, West Virginia, and Wisconsin.

<sup>ii</sup> The States were Alabama, Alaska, Arizona, Arkansas, California, Colorado, Georgia, Hawaii, Illinois, Indiana, Kansas, Kentucky, Louisiana, Mississippi, Nevada, New Mexico, New York, Ohio, Oregon, Pennsylvania, Tennessee, Texas, Utah, and Wyoming.

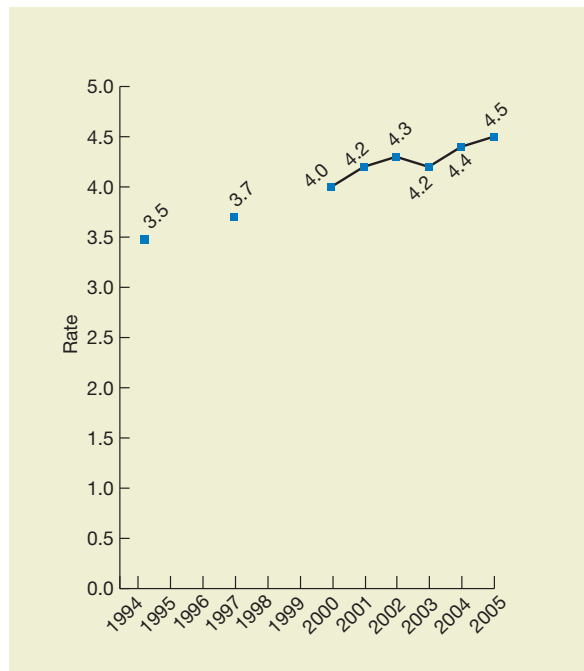


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### Accidental Puncture or Laceration

Adverse events, including the nicking or cutting of bodily organs and blood vessels, are possible during any operation or procedure. This may be especially true in emergent situations, when, according to an expert panel review,<sup>6</sup> some of these occurrences are not preventable. Puncture or laceration can lead to serious complications.<sup>6</sup>

**Figure 3.5. Accidental puncture or laceration during procedure per 1,000 discharges, adults age 18 and over, 1994, 1997, and 2000-2005**



**Source:** Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 1994, 1997, and 2000-2005.

**Note:** Rates are adjusted by age, gender, age-gender interactions, comorbidities, and DRG clusters.

- ◆ From 1994 to 2005, the rate of accidental puncture or laceration during procedure increased from 3.5 to 4.5 per 1,000 hospital discharges of adults age 18 and over (Figure 3.5).
- ◆ From 2000 to 2005, the rate of accidental puncture or laceration during procedure increased significantly from 4.0 to 4.5 per 1,000 hospital discharges of adults age 18 and over.

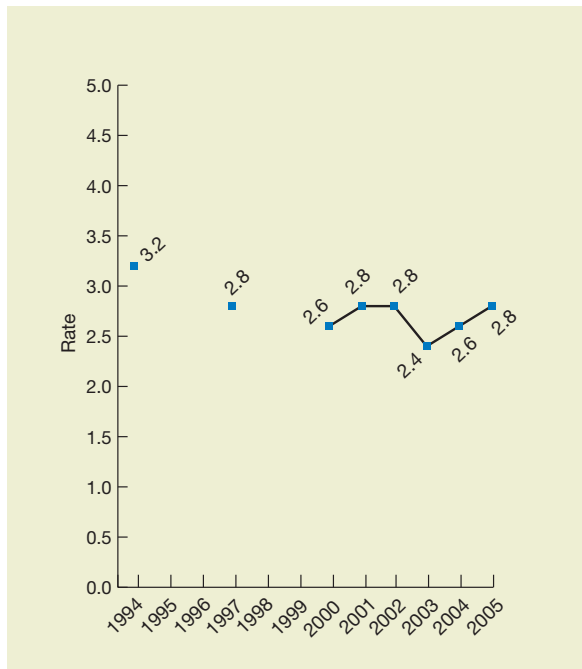
*Safety improving but gains hard to measure—Modern Healthcare Daily Dose, March 3, 2008*

## Patient Safety

### Postoperative Wound Separation in Abdominopelvic-Surgery Patients (Reclosure)

Possible complications of abdominal and pelvic surgery include wound separation or rupture, which involves all layers of the abdominal wall and requires surgical reclosure. This can occur within 30 days of the procedure, typically between days 5 and 8. Separation is more likely to occur if wound infection is present and can lead to prolonged hospitalization and death.<sup>6</sup>

**Figure 3.6. Reclosure of postoperative abdominal wound separation per 1,000 abdominopelvic-surgery hospital discharges, adults age 18 and over, 1994, 1997, and 2000-2005**



**Source:** Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 1994, 1997, and 2000-2005.

**Note:** Rates are adjusted by age, gender, age-gender interactions, comorbidities, and DRG clusters.

- ◆ From 1994 to 2005, the rate of postoperative abdominal wound separation decreased from 3.2 to 2.8 per 1,000 abdominopelvic surgery discharges in adults age 18 and over (Figure 3.6).

## Patient Safety

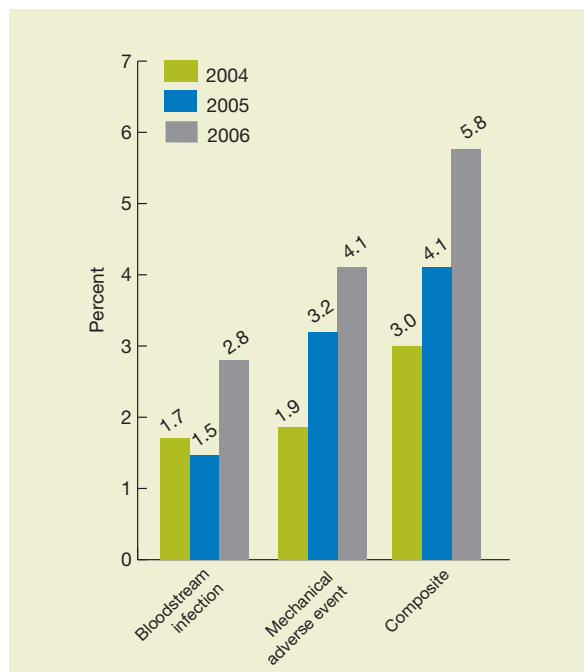
### Other Complications of Hospital Care

Besides surgery, other types of care delivered in hospitals can place patients at risk for injury or death.

#### Adverse Events Associated With Central Venous Catheters

Patients who require a CVC to be inserted into the great vessels leading to the heart tend to be severely ill. However, the placement and use of these catheters can result in infections and other complications.

**Figure 3.7. Bloodstream infections or mechanical adverse events per 1,000 central venous catheter placements: Overall composite and two components, 2004-2006**



**Source:** Centers for Medicare & Medicaid Services, Medicare Patient Safety Monitoring System, 2004-2006.

**Denominator:** Adult hospitalized Medicare patients with CVC placement.

**Note:** Mechanical adverse events include allergic reaction, tamponade, perforation, pneumothorax, hematoma, shearing off of the catheter, air embolism, misplaced catheter, thrombosis or embolism, knotting of the pulmonary artery catheter, and certain other events.

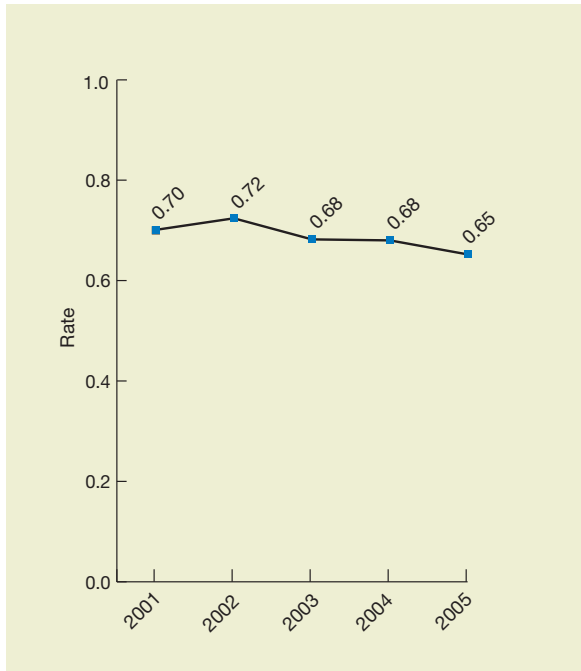
- ◆ From 2004 to 2006, there were significant increases overall in the percentage of CVC placements with associated complications (Figure 3.7).
- ◆ The percentage of CVC placements with associated bloodstream infection and mechanical adverse events increased significantly between 2004 and 2006.

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### Iatrogenic Pneumothorax

Iatrogenic pneumothorax is a partial or complete collapse of a lung due to an accumulation of air in the pleural space (between the lungs and the chest wall) and is caused by medical care. This condition can be life threatening.<sup>6,7</sup>

**Figure 3.8. Iatrogenic pneumothorax per 1,000 hospital discharges, adults age 18 and over, 2001-2005**



**Source:** Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, State Inpatient Databases, 2001-2005.

**Note:** Rates are adjusted by age, gender, age-gender interactions, comorbidities, and DRG clusters.

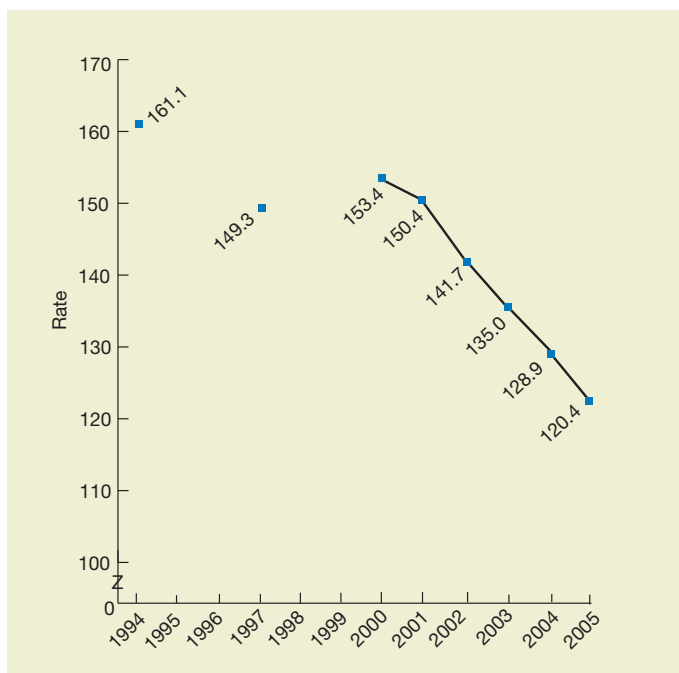
- ◆ From 2001 to 2005, the rate of iatrogenic pneumothorax decreased from 0.70 to 0.65 per 1,000 hospital discharges of adults age 18 and over (Figure 3.8).

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### Deaths Following Complications of Care

Many complications that arise during hospital stays cannot be prevented. However, rapid identification and aggressive treatment of complications may prevent these complications from leading to death. Deaths following complications of care, also called “failure to rescue,” is an indicator that tracks deaths among patients whose hospitalizations are complicated by pneumonia, thromboembolic events, sepsis, acute renal failure, gastrointestinal bleeding or acute ulcers, shock, or cardiac arrest.<sup>6</sup>

**Figure 3.9. Deaths per 1,000 discharges with complications potentially resulting from care (failure to rescue), adults ages 18-74, 1994, 1997, and 2000-2005**



**Source:** Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 1994, 1997, and 2000-2005.

**Denominator:** Patients ages 18-74 years from U.S. community hospitals whose hospitalizations are complicated by pneumonia, thromboembolic events, sepsis, acute renal failure, gastrointestinal bleeding or acute ulcer, shock, or cardiac arrest.

**Note:** Rates are adjusted for age, gender, comorbidities, and DRGs.

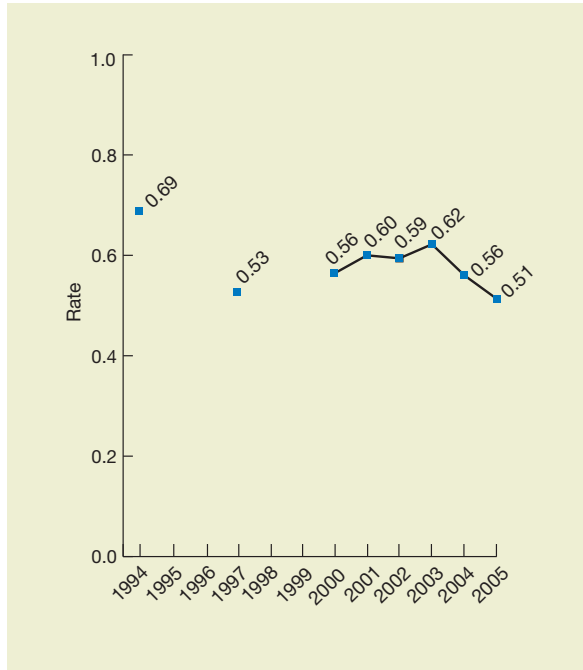
- ◆ From 1994 to 2005, the rate of deaths following complications of care declined from 161.1 to 120.4 per 1,000 admissions of adults ages 18-74 (Figure 3.9).
- ◆ The rate of deaths following complications of care decreased significantly from 2000 to 2005 (153.4 to 120.4 per 1,000 admissions).

## Patient Safety

### Deaths in Low-Mortality Diagnosis-Related Groups

When in-hospital deaths of patients admitted for low-risk illnesses or procedures occur, health care errors are more likely responsible than in deaths of patients with high-risk illnesses.<sup>6,7</sup>

**Figure 3.10.** Deaths per 1,000 admissions in low-mortality diagnosis-related groups, adults age 18 and over, 1994, 1997, and 2000-2005



**Source:** Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 1994, 1997, and 2000-2005.

**Note:** All estimates shown in Figure 3.10 used version 3.1 of the AHRQ Patient Safety Indicators software (see the Measure Specifications appendix for details). Rates not risk adjusted.

- ◆ From 1994 to 2005, the rate of deaths in low-mortality DRGs decreased from 0.69 to 0.51 per 1,000 admissions of adults age 18 and over (Figure 3.10).
- ◆ Between 2000 and 2005, there was no significant change in the rate of deaths in low-mortality DRGs per 1,000 admissions of adults age 18 and over.

## Patient Safety

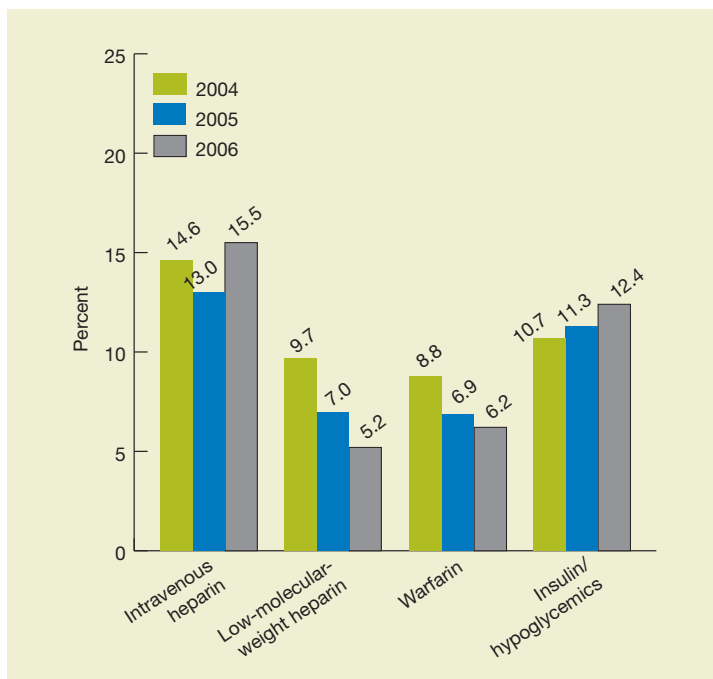
### Complications of Medications

Complications of medications are common safety problems. Some, but not all, adverse drug events may be related to misuse of medication. However, prescribing medications that are inappropriate for a specific population may increase the risk of adverse drug events.

#### Adverse Drug Events in the Hospital

Some medications used in hospitals can cause serious complications. The Medicare Patient Safety Monitoring System tracks a number of adverse drug events, including serious bleeding associated with intravenous heparin, low-molecular-weight heparin, or warfarin and hypoglycemia associated with insulin or oral hypoglycemics.

**Figure 3.11. Hospital patients with adverse drug events, 2004-2006**



**Source:** Centers for Medicare & Medicaid Services, Medicare Patient Safety Monitoring System, 2004-2006.

**Denominator:** Adult hospitalized Medicare patients receiving specified medication.

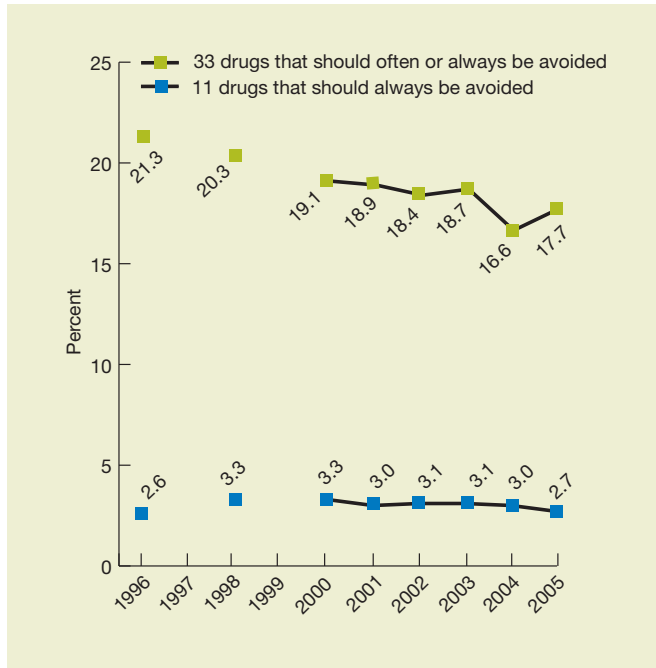
- ◆ In 2006, adverse drug events in the hospital related to some frequently used medications ranged from 5.2% of Medicare patients who received low-molecular-weight heparin to 15.5% of Medicare patients who received intravenous heparin (Figure 3.11).
- ◆ The rates of adverse events associated with low-molecular-weight heparin and warfarin decreased significantly between 2004 and 2006.
- ◆ The rates of adverse events associated with insulin and other hypoglycemics increased significantly between 2004 and 2006.

## Patient Safety

### Potentially Inappropriate Prescription Medications for Adults Age 65 and Over

Some drugs are considered potentially harmful for older patients but nevertheless were prescribed to them.<sup>8,3</sup>

**Figure 3.12. Adults age 65 and over who received potentially inappropriate prescription medications in the calendar year, 1996, 1998, and 2000-2005**



**Source:** Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 1996, 1998, and 2000-2005.

**Reference population:** Civilian noninstitutionalized population age 65 and over.

**Note:** Prescription medications received include all prescribed medications initially purchased or otherwise obtained, as well as any refills.

- ◆ From 1996 to 2005, the percentage of older patients who reported purchasing at least 1 of 33 potentially inappropriate drugs decreased significantly, from 21.3% to 17.7% (Figure 3.12).
- ◆ There was no significant difference between 2000 and 2005 in the receipt of potentially inappropriate drugs by older patients for both the 33 drugs that should often or always be avoided and the 11 drugs that should always be avoided.
- ◆ The receipt of the 11 drugs that should always be avoided remained relatively stable over the 1996-2005 period at about 3%.

*Quarter of disabled seniors use risky medications—HealthDay, May 7, 2008*



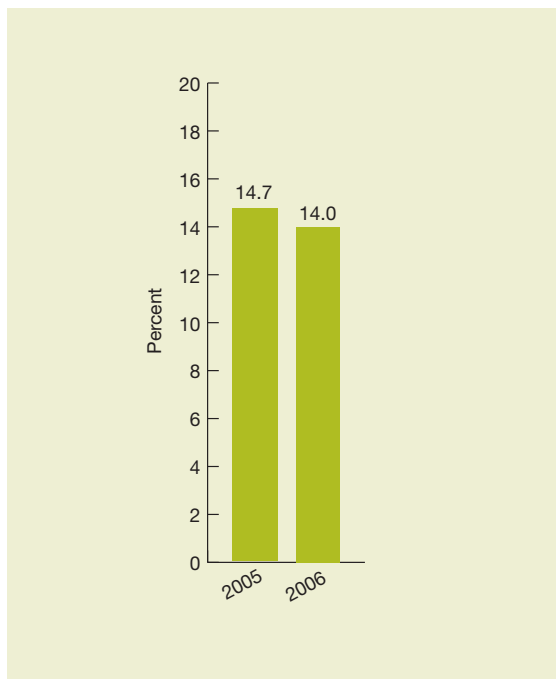
## Patient Safety

### Any Hospital Complication

Examining specific adverse events is helpful for targeting quality improvement activities. A complementary approach is to study a broad panel of patient safety events. Such an approach provides a better understanding of the overall prevalence of adverse events.

The Medicare Patient Safety Monitoring System affords an opportunity to examine hospital adverse events in aggregate. Not all adverse events are captured by the system, but a large number can be. These include adverse events associated with CVCs, femoral artery puncture for angiographic procedures, and hip- and knee-joint replacements; postoperative pneumonia, venous thromboembolic, and cardiac events; infections with methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococcus*; adverse drug events; hospital-acquired pressure ulcers; catheter-associated UTIs; in-hospital patient falls; and contrast nephropathies associated with catheter angiography.

**Figure 3.13.** Adult hospitalized Medicare patients with one or more adverse events, 2005 and 2006



**Source:** Centers for Medicare & Medicaid Services, Medicare Patient Safety Monitoring System, 2005 and 2006.

- ◆ In 2005 and 2006, approximately one out of seven adult hospitalized Medicare patients experienced one or more of the adverse events tracked by the Medicare Patient Safety Monitoring System (Figure 3.13).

## Patient Safety

### Future Directions

In response to the IOM's report on patient safety, the President signed the Patient Safety and Quality Improvement Act of 2005 (Patient Safety Act) to spur the development of voluntary, provider-driven initiatives to improve the quality, safety, and outcomes of patient care. The act addresses many of the current barriers to improving patient care.

The Patient Safety Act provides for voluntary formation of Patient Safety Organizations (PSOs), which can be public or private organizations. PSOs will collect, aggregate, and analyze information regarding the quality and safety of care delivered in any health care setting. To allow standardized data collection, the Secretary of Health and Human Services (HHS) requested that the Agency for Healthcare Research and Quality (AHRQ) coordinate the development of common definitions and reporting formats (Common Formats) for patient safety events. These Common Formats support data aggregation, analysis, and learning throughout the improvement cycle.

AHRQ issued Common Formats in August 2008 as Version 0.1 Beta. AHRQ's initial Common Formats address patient safety event reporting (the first stage in the improvement cycle) in the hospital inpatient setting. In the future, AHRQ will develop Common Formats to address the remaining three phases of the improvement cycle (root cause analysis, implementation of improvement action, and evaluation of effectiveness). AHRQ has contracted with the National Quality Forum, a nonprofit organization focused on health care quality, to assist in gathering and analyzing feedback on the Common Formats. AHRQ plans to issue updates and revisions based on user input and, over time, to release Common Formats that address patient safety in other settings.

AHRQ is also working with patients to improve reporting of patient safety events, because patients see problems that busy providers may not notice. Measures from Hospital CAHPS® (Consumer Assessment of Healthcare Providers and Systems) are beginning to capture patient perceptions of problems with medications and transitions of care, but more work is critically needed.

Health care-associated infections (HAIs) are the most common complication of hospital care, and preventing them requires a multipronged approach. HHS supports a number of initiatives to reduce HAIs. AHRQ is summarizing effective quality improvement strategies for preventing HAIs, training patient safety officers to implement these strategies, and partnering with hospitals to improve infection safety. The Centers for Disease Control and Prevention's National Healthcare Safety Network (NHSN) collects surveillance information on the rate of HAIs and information on health care practices from nearly 2,000 hospitals in 49 States. Hospitals using NHSN for data collection and prevention efforts decreased their rates of central line-associated bloodstream infections by 40 to 50% during the last decade among patients in intensive care units. In most intensive care units, rates also decreased 50% for the subset of central line-associated bloodstream infections associated with methicillin-resistant *Staphylococcus aureus*. HHS is working to establish national targets for HAI reduction and helping to coordinate HHS-supported efforts to achieve these goals.

## Patient Safety

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## Timeliness

# Chapter 4. Timeliness

Timeliness is the health care system's capacity to provide health care quickly after a need is recognized. Timeliness is one of the six dimensions of quality the Institute of Medicine established as a priority for improvement in the health care system.<sup>1</sup> Measures of timeliness include time spent waiting in doctors' offices and emergency departments (EDs) and the interval between identifying a need for specific tests and treatments and actually receiving those services.

## Importance

### Morbidity and Mortality

- ◆ Lack of timeliness can result in emotional distress, physical harm, and higher treatment costs for patients.<sup>2,3</sup>
- ◆ Stroke patients' mortality and long-term disability are largely influenced by the timeliness of therapy.<sup>4,5</sup>
- ◆ Timely delivery of appropriate care can help reduce mortality and morbidity for chronic conditions such as kidney disease.<sup>6</sup>
- ◆ Timeliness in childhood immunizations helps maximize the protection from vaccine-preventable diseases while minimizing risks to the child and reducing the chance of disease outbreaks.<sup>7</sup>
- ◆ Timely antibiotic treatments are associated with improved clinical outcomes.<sup>8</sup>

### Cost

- ◆ Early care for comorbid conditions has been shown to reduce hospitalization rates and costs for Medicare beneficiaries.<sup>9</sup>
- ◆ Some research suggests that, over the course of 30 years, the costs of treating diabetic complications can approach \$50,000 per patient.<sup>10</sup> Early care for complications in patients with diabetes can reduce overall costs of the disease.<sup>11</sup>
- ◆ Timely outpatient care can reduce admissions for pediatric asthma, which in 2003 accounted for more than \$1.25 billion in hospitalization charges.<sup>12,13</sup>

## Timeliness

### Measures

This report focuses on two core report measures related to timeliness of primary, emergency, and hospital care:

- ◆ Getting care for illness or injury as soon as wanted.
- ◆ Emergency department visits in which patients left without being seen.

In addition, one noncore measure is presented:

- ◆ Time to initiation of thrombolytic therapy for heart attack patients.

*Emergency room waiting times  
36% longer than in 1997—  
Medical News Today*

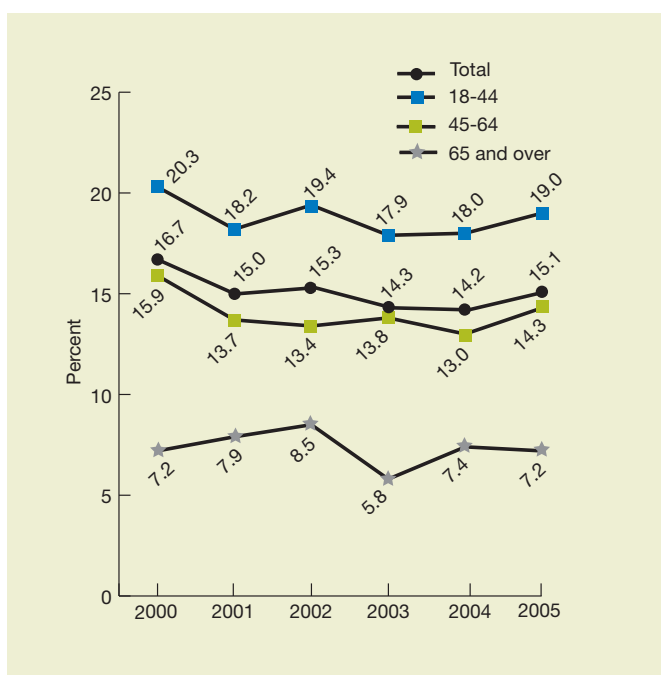
# Timeliness

## Findings

### Getting Care for Illness or Injury As Soon As Wanted

A patient's primary care provider should be the first point of contact for most illnesses and injuries. A patient's ability to receive timely treatment for illness and injury is a key element in a patient-centered health care system.

**Figure 4.1. Adults who needed care right away for an illness, injury, or condition in the last 12 months who sometimes or never got care as soon as wanted, by age group, 2000-2005**

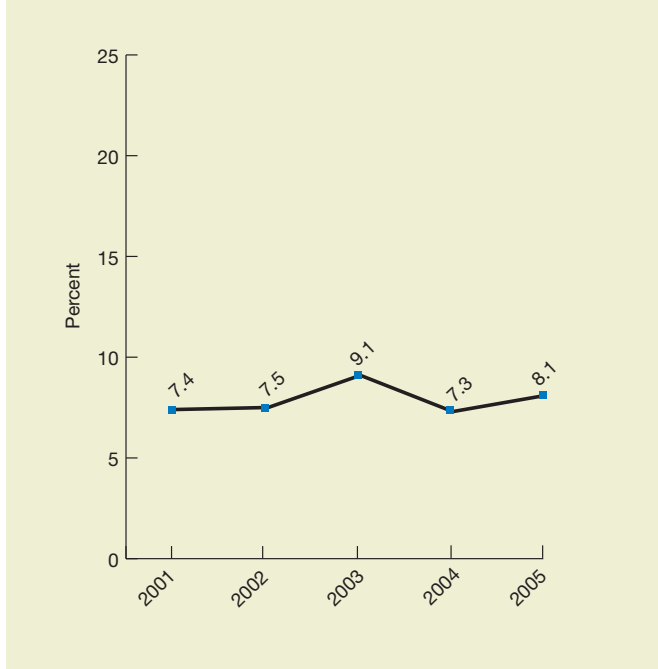


**Source:** Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2000-2005.

**Reference population:** Civilian noninstitutionalized population age 18 and over.

## Timeliness

**Figure 4.2. Children who needed care right away for an illness, injury, or condition in the last 12 months who sometimes or never got care as soon as wanted, 2001-2005**



**Source:** Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2001-2005.

**Reference population:** Civilian noninstitutionalized population under age 18.

- ◆ From 2000 to 2005, the percentage of adults who needed care right away for an illness, injury, or condition in the last 12 months who sometimes or never got care as soon as wanted did not significantly change (Figure 4.1). This was true for all age groups.
- ◆ In all 6 data years, the percentage of adults who needed care right away for an illness, injury, or condition in the last 12 months who sometimes or never got care as soon as wanted was lower among those ages 45-64 and age 65 and over than among those ages 18-44.
- ◆ In 2005, among children who needed care right away for an illness, injury, or condition in the last 12 months, 8.1% sometimes or never got care as soon as wanted (Figure 4.2). This rate did not change significantly between 2001 and 2005.
- ◆ In all 5 data years, there was no significant difference on this measure between children under age 6 and children ages 6-17 (data not shown).

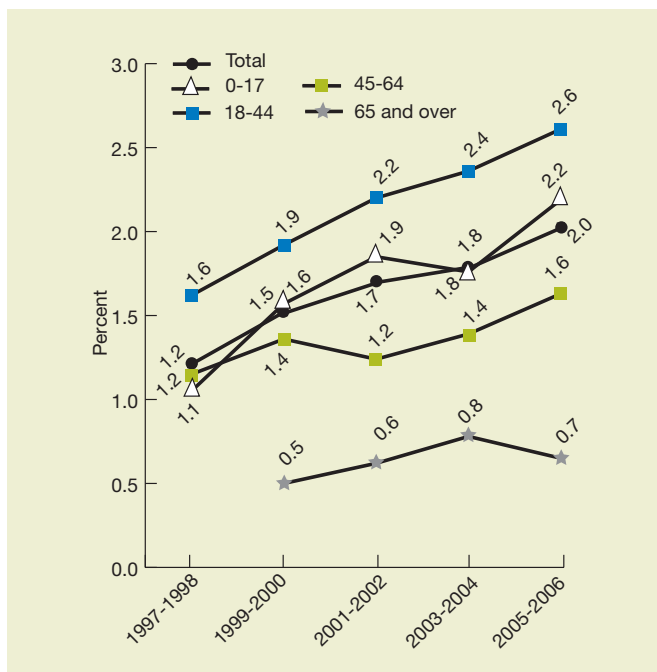


# Timeliness

## Emergency Department Visits in Which Patients Left Without Being Seen

In 2006, the median waiting time for patients to be seen by a physician during an emergency department (ED) visit in the United States was 31 minutes.<sup>14</sup> In 2006, an estimated 119.2 million visits were made to hospital EDs (compared with 110.2 million in 2004).<sup>14,15</sup> Between 1996 and 2006, the number of hospital EDs decreased from 4,019 to 3,833.<sup>14</sup> Although many factors may lead a patient seeking care in a hospital ED to leave without being seen, long waits tend to exacerbate the problem.

**Figure 4.3. Emergency department visits in which patients left without being seen, 1997-1998, 1999-2000, 2001-2002, 2003-2004, and 2005-2006**



**Source:** Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Ambulatory Medical Care Survey, 1997-1998, 1999-2000, 2001-2002, 2003-2004, and 2005-2006.

**Denominator:** Visits to EDs of general and short-stay hospitals.

**Note:** The 1997-1998 data for those age 65 and over are not shown because data did not meet tests for statistical reliability.

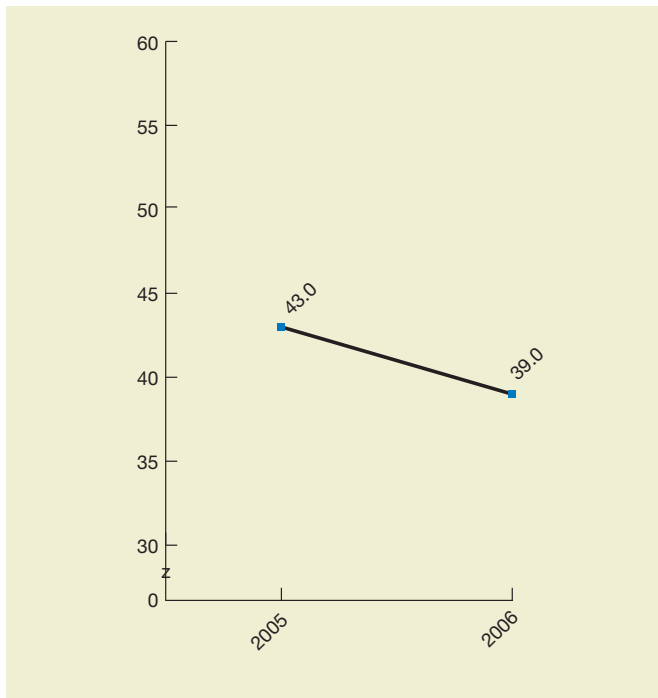
- ◆ From 1997-1998 to 2005-2006, the overall percentage of ED visits in which the patient left without being seen increased from 1.2% to 2.0% (Figure 4.3).
- ◆ In 2005-2006, patients ages 18-44 were more likely than those in other age groups to have an ED visit in which they left without being seen.
- ◆ During this period, patients age 65 and over were less likely than those in other age groups to have an ED visit in which they left without being seen.

## Timeliness

### Time to Initiation of Thrombolytic Therapy for Heart Attack Patients

The capacity to treat hospital patients in a timely fashion is especially important for emergency situations such as heart attacks. For patients suffering from a heart attack, early interventions—such as percutaneous coronary stenting and thrombolytic therapy—may reduce heart muscle damage and save lives.<sup>16</sup>

**Figure 4.4. Median time in minutes from arrival of heart attack patients to initiation of thrombolytic therapy, 2005-2006**



**Source:** Centers for Medicare & Medicaid Services, Medicare Quality Improvement Organization Program, 2005 and 2006.

**Denominator:** Adult patients meeting all of the following criteria: (1) principal diagnosis of acute myocardial infarction; (2) ST segment elevation or left bundle branch block on the electrocardiogram performed closest to hospital arrival time; and (3) thrombolytic therapy during the hospital stay.

**Note:** Beginning in 2005, the data collection method changed from the abstraction of randomly selected medical records for Medicare beneficiaries to the receipt of hospital self-reported data for all payer types.

- ◆ Among heart attack patients, the median time from hospital arrival to the initiation of thrombolytic therapy was 39 minutes in 2006. This is an apparent decrease in waiting time from 2005 (Figure 4.4).<sup>i</sup>
- ◆ The median time to the initiation of therapy with thrombolytic agents remains above the national target of 30 minutes set by the American College of Cardiology and the American Heart Association.<sup>17</sup>

<sup>i</sup> Statistical significance could not be determined because standard errors were not available for these estimates.

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## Chapter 5.

# Patient Centeredness

Patient centeredness is defined as:

[H]ealth care that establishes a partnership among practitioners, patients, and their families (when appropriate) to ensure that decisions respect patients' wants, needs, and preferences and that patients have the education and support they need to make decisions and participate in their own care.<sup>1</sup>

An important dimension of quality, patient centeredness “encompasses qualities of compassion, empathy, and responsiveness to the needs, values, and expressed preferences of the individual patient.”<sup>2</sup>

## Importance

### Morbidity and Mortality

- ◆ Patient-centered approaches to care have been shown to improve patients' health status. These approaches rely on building a provider-patient relationship, improving communication, fostering a positive atmosphere, and encouraging patients to actively participate in patient-provider interactions.<sup>3,4</sup>
- ◆ A patient-centered approach has been shown to lessen patients' symptom burden.<sup>5</sup>
- ◆ Patient-centered care encourages patients to comply with treatment regimens.<sup>6</sup>

Patient-centered care can reduce the chance of misdiagnosis due to poor communication<sup>7</sup>

### Cost

- ◆ Patient centeredness has been shown to reduce underuse and overuse of medical services.<sup>8</sup>
- ◆ Patient centeredness can reduce the strain on system resources and save money by reducing the number of diagnostic tests and referrals.<sup>5</sup>
- ◆ Although some studies have shown that being patient centered reduces costs and use of health service resources, others have shown that patient centeredness increases providers' costs, especially in the short run.<sup>9</sup>

# Patient Centeredness

## Measures

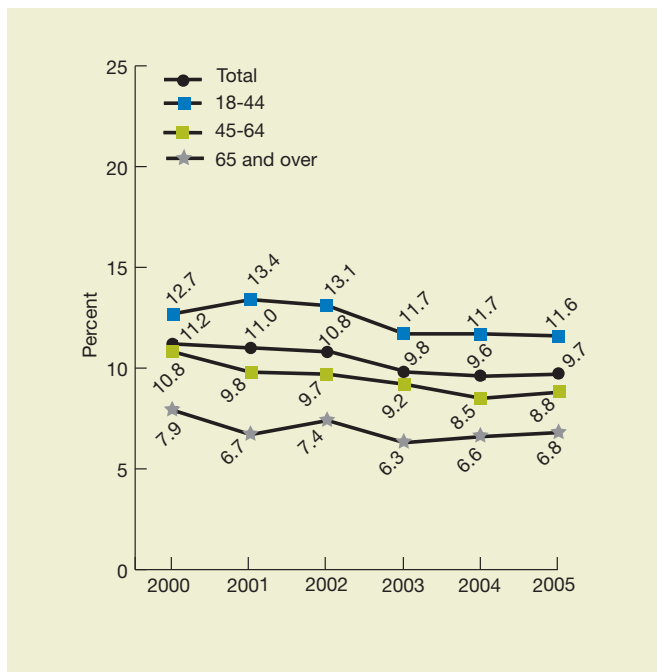
The National Healthcare Quality Report tracks four measures of patients' experience of care. The core report measure is a composite of these measures—patients' assessments of how often their provider listened carefully to them, explained things clearly, respected what they had to say, and spent enough time with them.

## Findings

### Patients' Experience of Care—Adults

Optimal health care requires good communication between patients and providers, yet barriers to patient-provider communication are common. To provide all patients with the best possible care, providers must be able to understand patients' diverse health care needs and preferences and communicate clearly with patients about their care.

**Figure 5.1. Composite measure: Adult ambulatory patients who reported poor communication with health providers,\* by age group, 2000-2005**



\* Average percentage of adults who had a doctor's office or clinic visit in the last 12 months and reported poor communication with health providers (i.e., that their health providers *sometimes* or *never* listened carefully, explained things clearly, showed respect for what they had to say, and spent enough time with them).

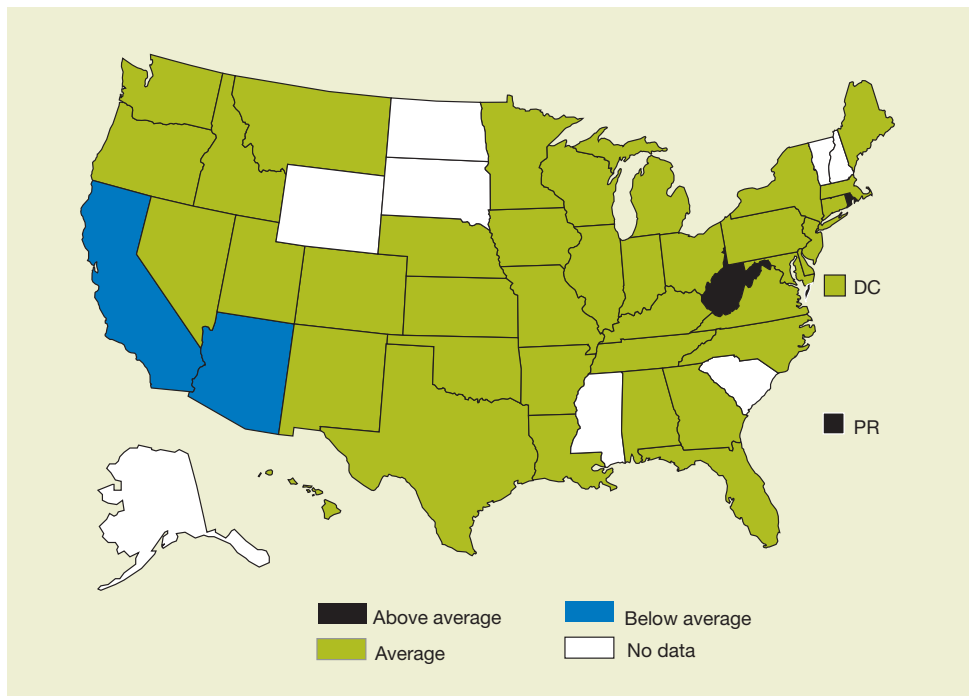
**Source:** Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2000-2005.

**Denominator:** Civilian noninstitutionalized population age 18 and over who visited a doctor's office or clinic to get health care in the last 12 months.

## Patient Centeredness

- ◆ In 2005, 9.7% of adults who had a doctor's office or clinic visit in the last 12 months reported poor communication (Figure 5.1).
- ◆ Between 2000 and 2005, the average percentage of adults with a doctor's office or clinic visit who reported poor communication decreased for the total population from 11.2% to 9.7%. Most of this improvement occurred between 2002 and 2003.
- ◆ Improvements were also seen from 2000 to 2005 for adults ages 45-64. There was no significant change in the percentages for adults ages 18-44 or 65 and over.
- ◆ In all 6 data years, the average percentage of adults with doctor's office or clinic visits who reported poor communication was lowest among adults age 65 and over.

**Figure 5.2. State variation: Adult ambulatory patients who reported good communication with health providers,\* 2007**



\* Average percentage of adults who had a doctor's office or clinic visit in the last 12 months and reported good communication with health providers (i.e., that their health providers *always* listened carefully, explained things clearly, showed respect for what they had to say, and spent enough time with them).

**Key:** Higher rate = rate is significantly above the all States average in 2007. Lower rate = rate is significantly below the all States average in 2007.

**Source:** Agency for Healthcare Research and Quality, National CAHPS® Benchmarking Database, 2007.

**Denominator:** Adults with Medicare fee-for-service benefits who visited a doctor's office or clinic in the past 12 months.

**Note:** "All States average" is the average of all responding States (44 in this case, including the District of Columbia and Puerto Rico), which is a separate figure from the national average.

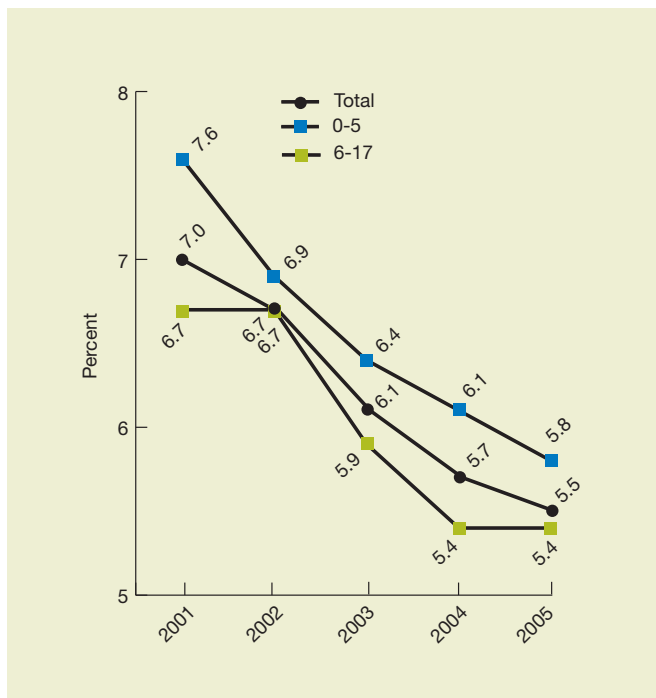
## Patient Centeredness

- ◆ In 2007, individual State scores for this composite measure<sup>i</sup> of communication with health providers ranged from a low (i.e., worse communication) of 70.6% to a high of 81.7%.
- ◆ In 2007, two States<sup>ii</sup> and Puerto Rico were above (i.e., better communication) the all States average of 70.6% for this composite measure of communication with health providers (Figure 5.2).
- ◆ Two States<sup>iii</sup> were below (i.e., worse communication) the all States average for this measure in 2007.

### Patients' Experience of Care—Children

Communication in children's health care can pose a particular challenge as children are often less able to express their health care needs and preferences, and a third party (e.g., a parent or guardian) is involved in communication and decisionmaking. Optimal communication in children's health care can therefore have a significant impact on receipt of high-quality care and subsequent health status.

**Figure 5.3. Composite measure: Children with ambulatory visits whose parents reported poor communication with health providers,\* 2001-2005**



**Source:** Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey, 2001-2005.

**Denominator:** Civilian noninstitutionalized population under age 18 who visited a doctor's office or clinic to get health care in the last 12 months.

**Note:** Additional age subgroups of 0-1, 2-5, 6-11, and 12-17 were reviewed but did not have any statistically significant differences.

\* Average percentage of children who had a doctor's office or clinic visit in the last 12 months and were reported to have had poor communication with health providers (i.e., that their health providers *sometimes* or *never* listened carefully, explained things clearly, showed respect for what they had to say, and spent enough time with them).

<sup>i</sup> Note that respondents were asked to choose "sometimes," "never," "usually," or "always." In contrast to Figure 5.1, the map shown in Figure 5.2 displays results for respondents answering "always."

<sup>ii</sup> The States were Rhode Island and West Virginia

<sup>iii</sup> The States were Arizona and California.



## Patient Centeredness

- ◆ In 2005, 5.5% of parents of children who had a doctor's office or clinic visit in the last 12 months reported poor communication with health providers. This rate is a significant improvement over the 2001 rate of 7.0% (Figure 5.3).
- ◆ This improvement since 2001 was true for children under age 6, as well as those ages 6-17.

*Between 2000 and 2005, the average percentage of adults with a doctor's office or clinic visit who reported poor communication decreased.*

## Patient Centeredness

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## Chapter 6.

# Efficiency

Few issues within American health care policy today are as extensively debated as how to obtain better value for money. The debate about how to improve efficiency is equally matched by the debate about how best to measure it. Varying perspectives and definitions of “efficiency” in the health care marketplace and the lack of consensus on what constitutes appropriate measurement of efficiency have stymied efforts to report on this area. For example, efficiency can be viewed from different perspectives, including individual patients, providers, and society as a whole.

The issue of how to improve efficiency in the Nation’s health care system is at the heart of the Department of Health and Human Services’ (HHS) mission to increase transparency in health care through better information on quality and cost. In support of this mission, this year’s National Healthcare Quality Report (NHQR) continues to look at potential information sources and findings on efficiency in the U.S. health care system.

This year’s NHQR outlines the varying perspectives of efficiency and offers potential methods for measuring efficiency at the national level that respond to the NHQR’s mandate to provide lawmakers in Congress with information on health care performance. This chapter does not attempt to provide a definitive framework for efficiency, nor does it provide an exhaustive list of potential measures of efficiency. The examples follow the initial effort to report on efficiency in the 2007 NHQR and should still be viewed as preliminary.

No conclusions about efficiency in the U.S. health care system should be drawn. Rather, the Agency for Healthcare Research and Quality (AHRQ) hopes that this chapter will stimulate further productive discussions on health care efficiency. AHRQ intends this chapter to be part of an evolving national discussion on measuring efficiency in the U.S. health care system that will be reviewed, revised, and presented in future reports.

## Background and Measures

In its landmark report, *Crossing the Quality Chasm: A New Health System for the 21st Century*,<sup>1</sup> the Institute of Medicine (IOM) presented six “aims” for the health care system: effectiveness, safety, timeliness, patient centeredness, equity, and efficiency. AHRQ, in its 2001 reauthorization legislation, was given the task of developing two national health care reports that would track quality and prevailing disparities in the Nation’s health care system.

## Efficiency

IOM provided guidance<sup>2,3</sup> on the development of these two national health care reports and suggested that the reports' framework be linked to the six aims presented in *Crossing the Quality Chasm*. At the same time, however, IOM stated that AHRQ should not try to address the issue of efficiency in the first national reports but should examine its inclusion in future reports or in a separate report.

With guidance from an HHS Interagency Work Group brought together to advise on the reports' development, AHRQ developed the first NHQR and National Healthcare Disparities Report (NHDR) in 2003 without addressing efficiency. In 2004, the Interagency Work Group encouraged AHRQ to examine possible approaches to including efficiency in future reports. This followed advice from AHRQ's National Advisory Committee (NAC) of external experts from the private sector, academia, and the Federal sector. The NAC had, at AHRQ's request, formed a subcommittee, led by Dr. Don Berwick, that provided advice on the NHQR and NHDR. That subcommittee recommended that AHRQ develop a chapter on efficiency for the reports.

To respond to the NAC and Interagency Work Group requests, AHRQ formed a subgroup of its Interagency Work Group in 2004 to address efficiency. In 2005, this subgroup held two meetings, during which it reviewed documents from previous reports and discussed possible ways to further this effort. The subgroup concluded that there was insufficient consensus to conceptualize and measure efficiency.

AHRQ had previously commissioned the RAND Corporation to systematically review measures of efficiency and their potential to be tracked and reported at various levels. The efficiency subgroup therefore decided to wait until RAND submitted its report to AHRQ before developing any further plans. The final version of the RAND report summarizes the knowledge base on efficiency measures as follows:

- ◆ Few analyses of the reliability and validity (“scientific soundness”) of published and unpublished measures have been conducted.
- ◆ Both the published literature measures and the vendor measures focus on intermediate outcomes (e.g., inpatient stays), not final outcomes (e.g., functional status or measures of health).
- ◆ Consensus has yet to emerge on which approaches constitute acceptable measures of efficiency.<sup>4</sup>

The RAND report provides a typology of efficiency measures that emphasizes the multiple perspectives on efficiency and points out that measures must be considered from the standpoint of what the measuring organization is and what its goal is in assessing efficiency. The typology distinguishes between:

- ◆ Society as a whole (i.e., the “population” level).
- ◆ Health care firms (i.e., hospitals and other providers).
- ◆ Individuals.

## Efficiency

Another report in 2006 examined the question of efficiency from the cost of waste point of view. In that report, the authors outline another common typology for efficiency measurement: the tracking of overuse, underuse, and misuse in the health care system.<sup>5</sup>

This chapter first presents a general set of trends on costs and quality levels in the U.S. health care system. Additional measures summarize information at the population and provider level. The measures used are presented to provide some insight on health care efficiency. They are:

- ◆ Change in expenditures and quality of care for cancer, diabetes, and heart disease (overview).
- ◆ Trends in avoidable hospitalizations and costs (population perspective).
- ◆ Rehospitalization for congestive heart failure (CHF) for selected States (population perspective).
- ◆ Trends in hospital efficiency (provider perspective).

Because consensus has yet to emerge about the appropriate framework and acceptable measures of efficiency, the examples provided should be viewed as preliminary and designed to stimulate productive ongoing discussions about health care efficiency.

## Findings

### Change in Expenditures and Quality of Care for Cancer, Diabetes, and Heart Disease

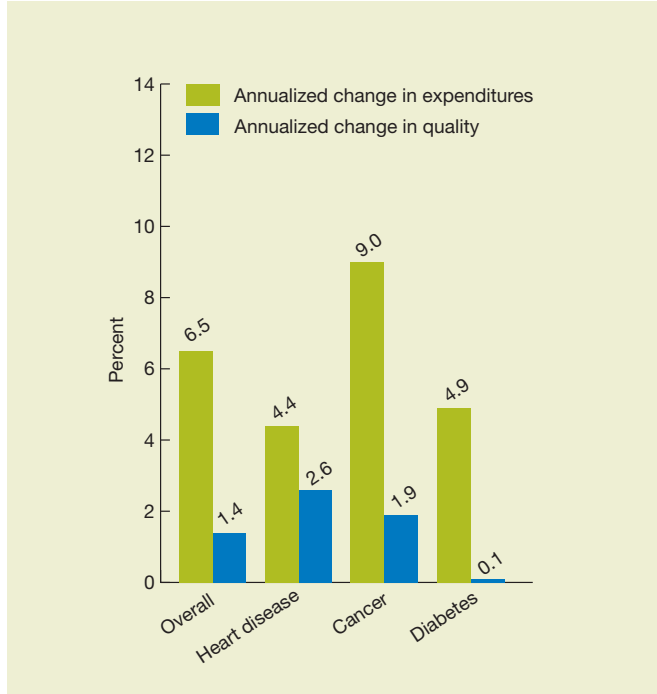
Data from AHRQ's Medical Expenditure Panel Survey (MEPS) are used to provide a preliminary overview and to suggest possible national trends in health care cost and quality. MEPS collects health care expenditures by all payers for nearly all types of health care utilization, including outpatient visits, hospital inpatient stays, emergency department visits, prescribed medicines, dental visits, and home health care. Data are collected for the civilian noninstitutionalized population.

Summary data are presented here on the average annual rate of change from 2001 to 2005 in total annual expenditures for the general population and for people with three high-priority conditions: cancer, diabetes, and heart disease. In addition, quality data are summarized in terms of the median rate of change in the NHQR measures from 2001 to 2005 for the entire measure set and for each condition area.<sup>i</sup>

<sup>i</sup> This median rate of change is the same metric used in the Highlights section of this report and is explained in detail in Chapter 1, Introduction and Methods. A list of the measures used for these calculations is available in the NHQR Measure Specifications appendix.

## Efficiency

**Figure 6.1. Average annualized percentage changes in national health care expenditures and quality for general population and people with selected conditions,\* 2001-2005**



\* See Chapter 1, Introduction and Methods, for a discussion of how data years were selected for determining the percentage change in health care quality.

**Source:** Agency for Healthcare Research and Quality, Medical Expenditure Panel Survey (MEPS), 2001 and 2005. See the Measure Specifications appendix for list of measures included in each category.

**Reference population:** Civilian noninstitutionalized population.

**Note:** Expenditures are payments from all sources for hospital inpatient care, ambulatory care provided in offices and hospital outpatient departments, care provided in emergency departments, and prescribed medicine purchases reported by respondents in the MEPS-Household Component. Sources include direct payments from individuals, private insurance, Medicare, Medicaid, Workers' Compensation, and other miscellaneous sources. Expenditures for 2001 are adjusted to 2005 dollars using the gross domestic product implicit price deflator (Bureau of Economic Analysis).

- ◆ From 2001 to 2005, total annual health care expenditures increased at a rate 4.6 times the rate of the increase in the summary measure of quality of care. Annual total health care expenditures rose 6.5% (in 2005 dollars). During this same period, quality increased at a rate of 1.4% (Figure 6.1).
- ◆ For heart disease, cancer, and diabetes individually, quality increased at a rate of 2.6%, 1.9%, and 0.1% annually, respectively. Expenditures increased at an annual rate of 4.4%, 9.0%, and 4.9%, respectively.

Figure 6.1 may seem to suggest that improvements in overall quality are outpaced by increases in expenditures. However, such a conclusion cannot be drawn, and the statistics should be viewed with caution because these are comparisons of percentage changes in two very different measures. First, expenditures are comprehensively measured, but quality is not. Figure 6.1 presents a summary of all available quality measures in this report rather than a catalog of all clinical care for all conditions and patients. The quality measures track both processes of care and outcomes of care.

## Efficiency

The indicators selected for inclusion in the NHQR and NHDR measure set are considered the most scientifically sound and clinically important markers of whether we are achieving appropriate performance in health care. However, many aspects of care are not captured in these quality indicators. A comprehensive assessment may never be feasible, as technical aspects of care are changing more rapidly than can be captured through broad, consensus-based quality measurement vehicles, such as the NHQR. Moreover, it would be difficult to collect measures of quality for rare conditions. In addition, the summary measure of quality is composed of measures calculated on a per person basis, but total annual expenditures increase in part due to population growth. Finally, these statistics are provided without estimates of variability (i.e., without confidence intervals). Statistical testing for these sorts of comparisons is complex, and future versions of the NHQR will examine more refinements to such statistical testing.<sup>ii</sup>

The statistics illustrated above suggest many questions about efficiency. They are not provided to suggest causation between costs and quality. Providing higher quality care may cost more than providing lower quality care, and achieving increasingly higher quality goals may require even higher expenditures to reach an additional person. Some types of quality care might reduce expenditures, particularly by reducing hospitalizations. Furthermore, the factors that cause changes in expenditures may be different from the factors that cause improvements in quality. More research is needed to investigate these issues.

### Trends in Avoidable Hospitalizations and Costs

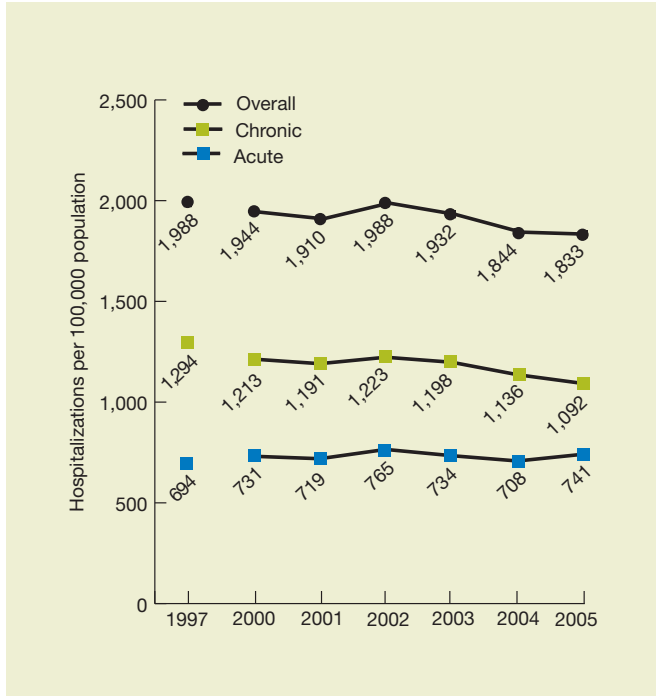
To address the population perspective of potentially avoidable hospitalizations and costs, data on ambulatory-care-sensitive conditions are summarized here using the AHRQ Prevention Quality Indicators (PQIs). Not all hospitalizations that the AHRQ PQIs track are preventable, but ambulatory-care-sensitive conditions are those for which good outpatient care can prevent the need for hospitalization or for which early intervention can prevent complications or more severe disease.<sup>6</sup> The AHRQ PQIs track these conditions using hospital discharge data. For this analysis, total hospital charges were converted to costs using Healthcare Cost and Utilization Project (HCUP) cost-to-charge ratios based on hospital accounting reports from the Centers for Medicare & Medicaid Services. Therefore, cost estimates in this section refer to hospital costs.

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<sup>ii</sup> The creation of confidence intervals for expenditures using MEPS data is possible and was conducted for this analysis. The estimates with their confidence intervals are: (1) heart disease, 4.4% (-2.1–10.9); (2) cancer 9.0%, (0.3–17.6); and (3) diabetes, 4.9% (-1.4–11.2).

## Efficiency

**Figure 6.2. National trends in potentially avoidable hospitalization rates, by type of hospitalization, 1997 and 2000-2005**



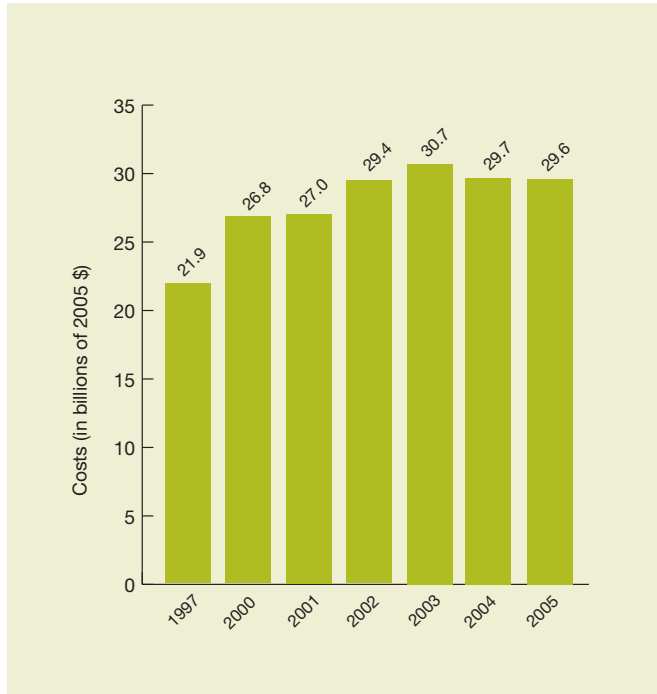
**Source:** Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 1997 and 2000-2005.

**Note:** Data are for adults age 18 and over. Annual rates are adjusted for age and gender.



## Efficiency

**Figure 6.3. Total national costs associated with potentially avoidable hospitalizations, 1997 and 2000-2005**



**Source:** Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 1997 and 2000-2005.

**Note:** Data are for adults age 18 and over.

- ◆ From 1997 to 2005, avoidable hospitalizations for chronic conditions decreased significantly, from 1,294 per 100,000 to 1,092 per 100,000 (Figure 6.2). The rate also decreased significantly from 2000 to 2005 (1,213 per 100,000 to 1,092 per 100,000).
- ◆ Avoidable hospitalizations for acute conditions did not significantly change from 1997 to 2005 or from 2000 to 2005.
- ◆ Although avoidable hospitalization rates have decreased overall since 2000, total national costs associated with potentially avoidable hospitalizations have increased since 2000 (Figure 6.3). Hospital costs due to avoidable hospitalizations exceeded \$29 billion in 2005, which was 35% greater than what these costs were in 1997 when adjusted for inflation (\$21.9 billion).<sup>iii</sup>

These figures provide some preliminary measures of the potential for improvement in one dimension of efficiency.

<sup>iii</sup> The inflation adjustment was done using the gross domestic product implicit price deflator.

## Efficiency

### Rehospitalization for Congestive Heart Failure

To gain further insight into the population perspective of avoiding potentially avoidable hospitalizations and costs, data on rehospitalization rates for CHF for nine States in 2004 and 2005 are summarized here (Table 6.1). Rehospitalization for CHF signals a worsened state of illness for patients and is more resource intensive than treatment as an outpatient in the community. Although not every rehospitalization for CHF is preventable, CHF is a condition for which good outpatient care and early intervention can help prevent rehospitalization.

The estimates below are derived from data for nine States participating in the HCUP State Inpatient Databases. They are based on all CHF admissions from January to September of each year and allow for a 3-month timeframe for rehospitalization.<sup>iv</sup> Rehospitalizations have a principal diagnosis of CHF.

*Health care quality gains  
outpaced by spending—South  
Florida Sun Sentinel, March 11, 2008*

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<sup>iv</sup> A 3-month period (or longer) for readmissions has been used in studies of the effective management of chronic illness.<sup>7</sup> Two-thirds of the readmissions reported above occurred within 1 month.

## Efficiency

**Table 6.1. Rehospitalizations for congestive heart failure, per 1,000 initial admissions for CHF, 9 States, 2004 and 2005**

| Age category   | State   | 2004 |      | 2005 |      |
|----------------|---------|------|------|------|------|
|                |         | Rate | SE   | Rate | SE   |
| Ages 18-64     | State A | 140  | 1.00 | 140  | 1.00 |
|                | State B | 190  | 1.00 | 230  | 1.00 |
|                | State C | 180  | 1.00 | 190  | 1.00 |
|                | State D | 260  | 0.00 | 270  | 0.00 |
|                | State E | 230  | 1.00 | 220  | 1.00 |
|                | State F | 220  | 1.00 | 240  | 1.00 |
|                | State G | 230  | 1.00 | 230  | 1.00 |
|                | State H | 240  | 0.00 | 250  | 0.00 |
|                | State I | 240  | 1.00 | 250  | 1.00 |
| Age 65+        | State A | 110  | 1.00 | 110  | 1.00 |
|                | State B | 170  | 0.00 | 160  | 0.00 |
|                | State C | 180  | 0.00 | 170  | 0.00 |
|                | State D | 190  | 0.00 | 190  | 0.00 |
|                | State E | 210  | 0.00 | 200  | 0.00 |
|                | State F | 210  | 0.00 | 200  | 0.00 |
|                | State G | 200  | 1.00 | 200  | 0.00 |
|                | State H | 210  | 0.00 | 210  | 0.00 |
|                | State I | 220  | 0.00 | 210  | 0.00 |
| All ages (18+) | State A | 120  | 1.00 | 120  | 1.00 |
|                | State B | 170  | 0.00 | 180  | 0.00 |
|                | State C | 180  | 0.00 | 180  | 0.00 |
|                | State D | 210  | 0.00 | 210  | 0.00 |
|                | State E | 210  | 0.00 | 200  | 0.00 |
|                | State F | 210  | 0.00 | 210  | 0.00 |
|                | State G | 210  | 0.00 | 210  | 0.00 |
|                | State H | 220  | 0.00 | 220  | 0.00 |
|                | State I | 220  | 0.00 | 220  | 0.00 |

**Key:** SE = standard error.

**Source:** Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, State Inpatient Databases, 2004 and 2005.

**Note:** Data are for adults age 18 and over.

## Efficiency

- ◆ The mean CHF rehospitalization rate for all adult patients previously admitted for CHF in the 9-State sample was 210 per 1,000 in both 2004 and 2005.
- ◆ The rate of State-level CHF rehospitalizations for adult patients of all ages previously admitted for CHF ranged from a low of 120 to a high of 220 per 1,000 for rehospitalizations for CHF. State A had a rehospitalization rate that was consistently lower than the other rates across both years and all reported age categories.
- ◆ The CHF rehospitalization rates for patients previously admitted for CHF were generally lower in the Medicare-eligible population than in those ages 18-64.

It is important to note that the figures reported above are not national estimates and that no conclusions about national trends should be inferred. The States in the analysis account for about 36% of all adult discharges for CHF and provide an indication of the general trend that readmissions for CHF may be following.

### Trends in Hospital Efficiency

Significant attention has been paid to cost variations across providers and across the country. Yet it is often difficult to separate out costs due to differences among providers in outputs, patient burden of illness,<sup>5</sup> or care quality. To address the provider perspective, hospital cost efficiency is examined using a technique from the field of econometrics that can account for such differences.<sup>v</sup> This analysis uses data from the American Hospital Association Annual Survey, Medicare Cost Reports, and HCUP State Inpatient Databases.

Here, hospital efficiency is defined as the ratio of best practice costs to total observed costs. For example, given the types and quantities of outputs a hospital produces, the input prices it pays, its case mix, its quality, and its market characteristics, a theoretical best practice hospital might incur expenses amounting to \$90 million. A comparison hospital in an identical situation with total expenses of \$100 million would have an estimated cost efficiency of 90%.

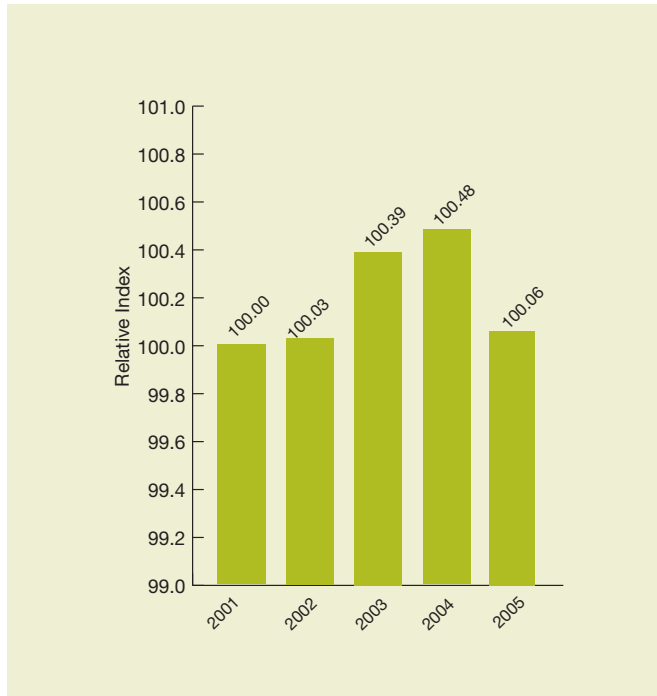
Cost-efficiency estimates have been converted to index numbers with a base of 100 for the year 2001 as a way to place less emphasis on the specific magnitude of estimated cost efficiency than on its general trend.

This analysis controls for the following components that Elixhauser, et al. (1998) contend are part of patient burden of illness: (1) primary reason for admission to the hospital, (2) severity of the principal diagnosis, (3) iatrogenic complications, and (4) comorbidities that are unrelated to the primary diagnosis but have a substantial impact on both the resources used to treat the patient and the outcomes of the care provided.<sup>8</sup>

<sup>v</sup> Stochastic frontier analysis (SFA) is the technique used in this analysis. SFA can estimate best practice costs as the value total costs would be if full efficiency were attained. The hospital-level “cost efficiency” estimates SFA produces measure whether output is obtained using the fewest inputs (i.e., technical efficiency), as well as whether output is produced using the optimal mix of inputs, given prices (i.e., allocative efficiency), the size of a hospital’s operations (i.e., scale efficiency), and the range of a hospital’s operations (i.e., scope efficiency), including possible overspecialization or overdiversification.<sup>9</sup>

## Efficiency

**Figure 6.4.** Average estimated relative hospital cost efficiency index for a selected sample of urban general community hospitals, 2001-2005



**Source:** Agency for Healthcare Research and Quality. Analysis based on 1,368 urban general community hospitals with data in the Healthcare Cost and Utilization Project, State Inpatient Databases. See Chapter 1, Introduction and Methods, for further details.

- ◆ Estimated urban hospital cost efficiency increased slightly from 2001 to 2004 but decreased slightly in 2005 for a selected sample of urban general community hospitals (Figure 6.4)
- ◆ The most cost-efficient hospitals (i.e., hospitals in the highest quartile of estimated cost efficiency) compared favorably with the least cost-efficient hospitals (i.e., hospitals in the lowest quartile of estimated cost efficiency) on a number of important variables. The most cost-efficient hospitals had lower costs and fewer full-time-equivalent employees per case-mix-adjusted admission, as well as a shorter average length of stay, compared with the least cost-efficient hospitals (Table 6.2).
- ◆ The most cost-efficient hospitals had a higher operating margin than the least cost-efficient hospitals (Table 6.2).

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**Table 6.2. Correlates of hospital cost efficiency**

| Measure  | Estimate | Standard deviation |
|--|----------|--------------------|
| <b>Cost per case-mix-adjusted admission:</b>                           |          |                    |
| Top quartile of hospital cost efficiency                               | \$4,340  | \$1,087            |
| Bottom quartile of hospital cost efficiency                            | \$6,241  | \$2,350            |
| <b>Full-time equivalent employees per case-mix-adjusted admission:</b> |          |                    |
| Top quartile of hospital cost efficiency                               | .040     | 0.01               |
| Bottom quartile of hospital cost efficiency                            | .055     | 0.02               |
| <b>Average length of stay (days):</b>                                  |          |                    |
| Top quartile of hospital cost efficiency                               | 4.88     | 1.33               |
| Bottom quartile of hospital cost efficiency                            | 5.22     | 1.80               |
| <b>Operating margin:</b>   |          |                    |
| Top quartile of hospital cost efficiency                               | .033     | 0.13               |
| Bottom quartile of hospital cost efficiency                            | -.066    | 0.17               |

**Sources:** American Hospital Association Annual Survey of Hospitals and Medicare Cost Reports, 2001-2005.

It is important to note that the figures reported above are not national estimates and that no conclusions about national trends should be inferred. However, the hospitals in the analysis represent about 53% of all urban general community hospitals and therefore provide an indication of the general trend that cost efficiency may be following.

### Next Steps in Efficiency Reporting

A significant amount of information about the study of health care efficiency and its measurement is not fully developed. In addition, the relationship between health care quality and efficiency is complex and not well understood. Recent work examining variations in Medicare spending and quality shows that higher cost providers do not necessarily provide higher quality care, illustrating the potential for improvement.<sup>10</sup> The preliminary examination of efficiency in this chapter is only an early step. Tracking efficiency in the health care system over the long term, understanding its relationship with quality, and finding ways to improve quality and efficiency will require future research commitment in these areas.

The AHRQ-sponsored commissioned report prepared by RAND, *Identifying, Categorizing, and Measuring Health Care Efficiency Measures*, released in April 2008, identifies several gaps in efficiency measurement.<sup>4</sup> A number of efforts are now underway to advance our knowledge of efficiency. On May 20, 2008, AHRQ hosted the “Physician Performance Measurement and Reporting Conference,” cosponsored by the Wisconsin Collaborative for Healthcare Quality. This conference included more than 40 technical experts on physician performance measurement and stakeholders representing consumers, purchasers, employers, and providers. The goal of the meeting was to identify areas of agreement across

the groups and to suggest topics where future research might lead to further consensus. Topics identified as promising areas for future research include:

- ◆ Can standards be developed that can be applied to the diverse physician practices seen across the United States?
- ◆ Can a bridge between claims and clinical data be created?
- ◆ Will the implementation of initiatives designed to improve health care efficiency have an impact on health care quality?
- ◆ How can the regional variations in coding practices be addressed?
- ◆ How does the size of a physician practice affect the measurement of performance?

The RAND report notes that efficiency measurement techniques developed in the academic literature, namely “frontier techniques,” have not been applied to the policy setting. The RAND report identified these techniques, including stochastic frontier analysis, which is used to provide the population perspective in this chapter, as among the most promising approaches for measuring provider efficiency. These approaches also may inform strategies for improving the delivery of health care services. Therefore, AHRQ hosted an invitational meeting, “Translating Frontiers Into Practice: Taking the Next Steps Toward Improving Efficiency,” on August 27-28, 2008. This meeting brought together policymakers, stakeholders, and leading technical experts to discuss how frontier techniques can be used most effectively to address the problems confronting the health care system and to identify how the needs of end users should shape the research community’s agenda.

Moreover, AHRQ sponsored the first in what will be a series of theme issues of the journal *Health Services Research*. This first issue, which appeared in October 2008, is called “Improving Efficiency and Value in Health Care.” It provides insight into recent initiatives in health care that require efficiency measurement. These efforts range from internal quality improvement exercises to innovations in payment and public reporting. The theme issue also emphasizes the importance of organizational structures and market forces to efforts aimed at improving efficiency and increasing value.

One of the primary areas on which AHRQ and its HHS partners are concentrating on improving efficiency measurement is the Secretary’s Value-Driven Health Care Initiative. This initiative is an effort by Secretary Leavitt and HHS to provide public information about the quality and cost of services health care providers deliver. Such information is not widely available today; thus, there is little information to help consumers compare doctors and hospitals based on measures of quality and cost. Providers themselves have limited information for comparing their performance based on accepted standards of care. Yet such information may be crucial for delivering the best treatment and the best value in health care.

As part of the Value-Driven Health Care Initiative, volunteer participants in AHRQ Chartered Value Exchanges ([www.hhs.gov/valuedriven/communities/exchanges.html](http://www.hhs.gov/valuedriven/communities/exchanges.html)) commit to four objectives, called the “cornerstones” of value-driven health care. One cornerstone is “Measure and Publish Quality

## Efficiency

Information,” whereby participants commit to public reporting on the performance of doctors, hospitals, and other providers. The other cornerstones are “Interoperable Health Information Technology,” “Measure and Publish Price Information,” and “Promote Quality and Efficiency of Care.” For more information about the Value-Driven Health Care Initiative, visit [www.hhs.gov/valuedriven/](http://www.hhs.gov/valuedriven/).

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## Efficiency

## List of Core Measures and Measure Numbers

| MEASURE   | 2008 Measure Number | Year of Most Recent Data | National Estimate | National Database | State Database |
|---|---------------------|--------------------------|-------------------|-------------------|----------------|
| <b>EFFECTIVENESS OF CARE</b>  |                     |                          |                   |                   |                |
| <b>CANCER</b>   |                     |                          |                   |                   |                |
| <b>Screening for colorectal cancer:</b>   |                     |                          |                   |                   |                |
| Composite measure: Adults age 50 and over who received colorectal cancer screening (colonoscopy, sigmoidoscopy, proctoscopy, or (in the last 2 years) fecal occult blood test [FOBT])                                       | 1_3_1               | 2005                     | 55.5              | NHIS              | BRFSS          |
| Colorectal cancer diagnosed at advanced stage (tumors diagnosed at regional or distant stage) per 100,000 population age 50 and over  | 1_3_4               | 2005                     | 80.8              | SEER              | NPCR           |
| <b>Cancer treatment:</b>  |                     |                          |                   |                   |                |
| Colorectal cancer deaths per 100,000 population per year  | 1_3_6               | 2005                     | 17.5              | NVSS-M            | NVSS-M         |
| <b>DIABETES</b>   |                     |                          |                   |                   |                |
| <b>Management of diabetes:</b>  |                     |                          |                   |                   |                |
| Composite measure: Adults age 40 and over with diagnosed diabetes who received all three recommended services for diabetes in the calendar year (hemoglobin A1c measurement, dilated eye examination, and foot examination) | 2_1_1               | 2005                     | 40.1              | MEPS              | n.a.           |
| Hospital admissions for lower extremity amputations per 1,000 population age 18 and over with diabetes  | 2_3_4               | 2004-2006                | 3.8               | NHDS              | n.a.           |

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| MEASURE   | 2008 Measure Number | Year of Most Recent Data | National Estimate | National Database                          | State Database |
|---|---------------------|--------------------------|-------------------|--|----------------|
| <b>END STAGE RENAL DISEASE</b>  |                     |                          |                   |  |                |
| <b>Management of end stage renal Disease:</b>   |                     |                          |                   |  |                |
| Dialysis patients under age 70 who were registered on a waiting list for transplantation  | 3_1_1               | 2004                     | 15.4              | USRDS                                      | USRDS          |
| Adult hemodialysis patients with adequate dialysis (urea reduction ratio 65% or greater)  | 3_1_3               | 2006                     | 87.0              | ESRD Clinical Performance Measures Project | U Michigan     |
| <b>HEART DISEASE</b>  |                     |                          |                   |  |                |
| <b>Counseling on risk factors:</b>  |                     |                          |                   |  |                |
| Adult current smokers with a checkup in the last 12 months who received advice to quit smoking  | 4_1_4               | 2005                     | 64.5              | MEPS                                       | BRFSS          |
| Adults with obesity who ever received advice from a health provider to exercise more  | 4_1_6               | 2005                     | 58.3              | MEPS                                       | n.a.           |
| <b>Treatment of acute myocardial infarction(AMI):</b>   |                     |                          |                   |  |                |
| Composite measure: Hospital patients with heart attack who received recommended hospital care (aspirin and beta blocker within 24 hours of admission, aspirin and beta blocker prescriptions at discharge, and smoking cessation counseling while hospitalized) | 4_2_1               | 2006                     | 95.2              | QIO  | QIO+HC         |
| <b>Treatment of acute heart failure:</b>  |                     |                          |                   |  |                |
| Composite measure: Hospital patients with heart failure who received recommended hospital care (evaluation of left ventricular ejection fraction and ACE inhibitor or ARB prescription at discharge, if indicated, for left ventricular systolic dysfunction)   | 4_3_1               | 2006                     | 89.2              | QIO  | QIO+HC         |

## Efficiency

| MEASURE   | 2008 Measure Number | Year of Most Recent Data | National Estimate | National Database | State Database |
|---|---------------------|--------------------------|-------------------|-------------------|----------------|
| <b>Heart disease treatment:</b>   |                     |                          |                   |                   |                |
| Deaths per 1,000 adult hospital admissions with acute myocardial infarction (AMI)   | 4_2_8               | 2005                     | 77.5              | HCUP NIS          | n.a.           |
| <b>HIV and AIDS</b>   |                     |                          |                   |                   |                |
| <b>AIDS prevention:</b>   |                     |                          |                   |                   |                |
| New AIDS cases per 100,000 population age 13 and over   | 5_2_1               | 2006                     | 14.9              | CDC AIDS          | n.a.           |
| <b>MATERNAL AND CHILD HEALTH</b>  |                     |                          |                   |                   |                |
| <b>Maternity care:</b>  |                     |                          |                   |                   |                |
| Women who completed a pregnancy in the last 12 months who first received prenatal care in the first trimester   | 6_1_1               | 2005                     | 83.9              | NVSS-N            | NVSS-N         |
| Infant deaths per 1000 live births, birth weight <1,500 g   | 6_1_3               | 2004                     | 6.8               | NVSS              | NVSS           |
| <b>Childhood immunization:</b>  |                     |                          |                   |                   |                |
| Composite measure: Children ages 19-35 months who received all recommended vaccines   | 6_2_1               | 2006                     | 80.6              | NIS               | NIS            |
| <b>Childhood preventive care:</b>   |                     |                          |                   |                   |                |
| Children ages 2-17 for whom a health provider ever gave advice about the amount and kind of exercise, sports, or physically active hobbies they should have | 6_3_2               | 2005                     | 34.8              | MEPS              | n.a.           |
| Children ages 2-17 for whom a health provider ever gave advice about healthy eating   | 6_3_3               | 2005                     | 54.5              | MEPS              | n.a.           |
| Children ages 3-6 who ever had their vision checked by a health provider  | 6_3_4               | 2005                     | 60.2              | MEPS              | n.a.           |

## Efficiency

| MEASURE  | 2008 Measure Number | Year of Most Recent Data | National Estimate | National Database | State Database |
|--|---------------------|--------------------------|-------------------|-------------------|----------------|
| <b>MENTAL HEALTH AND SUBSTANCE ABUSE</b>   |                     |                          |                   |                   |                |
| <b>Treatment of depression:</b>  |                     |                          |                   |                   |                |
| Suicide deaths per 100,000 population  | 7_1_1               | 2005                     | 10.9              | NVSS-M            | NVSS-M         |
| Adults with major depressive episode in the last 12 months who received treatment  | 7_1_5               | 2006                     | 69.1              | SAMHSA-NSDUH      | n.a.           |
| <b>Treatment of substance abuse:</b>   |                     |                          |                   |                   |                |
| People age 12 and over who needed treatment for illicit drug use and who received such treatment at a specialty facility in the last 12 months   | 7_2_1               | 2006                     | 20.3              | SAMHSA-NSDUH      | n.a.           |
| <b>RESPIRATORY DISEASES</b>  |                     |                          |                   |                   |                |
| <b>Pneumococcal vaccination:</b>   |                     |                          |                   |                   |                |
| Adults age 65 and over who ever received pneumococcal vaccination  | 8_1_5               | 2006                     | 57.3              | NHIS              | BRFSS          |
| <b>Treatment of pneumonia:</b>   |                     |                          |                   |                   |                |
| Composite measure: Hospital patients with pneumonia who received recommended hospital care (blood cultures collected before antibiotics are administered, initial antibiotic dose within 4 hours of hospital arrival and consistent with current recommendations, and influenza and pneumococcal screening or vaccination) | 8_2_1               | 2006                     | 80.4              | QIO               | QIO            |
| <b>Treatment of upper respiratory infection:</b>   |                     |                          |                   |                   |                |
| Visits with antibiotics prescribed for a diagnosis of common cold per 10,000 population  | 8_2_8               | 2005-2006                | 90.9              | NAMCS-NHAMCS      | n.a.           |
| <b>Treatment of tuberculosis:</b>  |                     |                          |                   |                   |                |
| Patients with tuberculosis who completed a curative course of treatment within 1 year of initiation of treatment   | 8_2_9               | 2004                     | 81.9              | CDC TB            | n.a.           |
| <b>Management of asthma:</b>   |                     |                          |                   |                   |                |
| People with current asthma who are now taking preventive medicine daily or almost daily (either oral or inhaler)   | 8_3_1               | 2005                     | 32.2              | MEPS              | n.a.           |

## Efficiency

| MEASURE   | 2008 Measure Number | Year of Most Recent Data | National Estimate | National Database | State Database |
|---|---------------------|--------------------------|-------------------|-------------------|----------------|
| <b>NURSING HOME AND HOME HEALTH CARE</b>  |                     |                          |                   |                   |                |
| <b>Nursing facility care:</b>   |                     |                          |                   |                   |                |
| Long-stay nursing home residents with physical restraints   | 9_1_2               | 2006                     | 6.0               | MDS               | MDS            |
| High-risk, long-stay nursing home residents with pressure sores   | 9_1_8               | 2006                     | 12.5              | MDS               | MDS            |
| Short-stay nursing home residents with pressure sores   | 9_1_15              | 2006                     | 2.4               | MDS               | MDS            |
| <b>Home health care:</b>  |                     |                          |                   |                   |                |
| Adult home health care patients whose ability to walk or move around improved   | 9_2_4               | 2006                     | 41.2              | OASIS             | OASIS          |
| Adult home health care patients who were admitted to the hospital   | 9_2_8               | 2006                     | 28.3              | OASIS             | OASIS          |
| <b>PATIENT SAFETY</b>   |                     |                          |                   |                   |                |
| <b>Postoperative complications:</b>   |                     |                          |                   |                   |                |
| Composite measure: Adult surgery patients with postoperative complications (postoperative pneumonia or venous thromboembolic event)                                     | 10_1_1              | 2006                     | 2.7               | MPSMS             | n.a.           |
| Composite measure: Adult surgery patients who received appropriate timing of antibiotics (prophylactic antibiotics begun at the right time and ended at the right time) | 10_1_5              | 2006                     | 80.9              | QIO               | QIO            |
| Composite measure: Bloodstream infections or mechanical adverse events per 1,000 central venous catheter placements   | 10_2_1              | 2006                     | 5.8               | MPSMS             | n.a.           |
| <b>Complications of medication:</b>   |                     |                          |                   |                   |                |
| Adults age 65 and over who received potentially inappropriate prescription medications in the calendar year   | 10_3_1              | 2005                     | 17.1              | MEPS              | n.a.           |

## Efficiency

| MEASURE  | 2008 Measure Number | Year of Most Recent Data | National Estimate | National Database | State Database |
|--|---------------------|--------------------------|-------------------|-------------------|----------------|
| <b>TIMELINESS</b>  |                     |                          |                   |                   |                |
| <b>Getting appointments for care:</b>  |                     |                          |                   |                   |                |
| Adults who sometimes or never got care right away for an illness, injury or condition in the last 12 months        | 11_1_3              | 2005                     | 15.1              | MEPS              | NCBD           |
| <b>Waiting time:</b>   |                     |                          |                   |                   |                |
| Emergency department visits in which patients left without being seen  | 11_2_2              | 2005-2006                | 2.0               | NHAMCS            | n.a.           |
| <b>PATIENT CENTEREDNESS</b>  |                     |                          |                   |                   |                |
| <b>Patient experience of care:</b>   |                     |                          |                   |                   |                |
| Composite measure: Adult ambulatory patients who reported poor communication with health providers                 | 12_1_1              | 2005                     | 9.7               | MEPS              | NCBD           |
| Composite measure: Children with ambulatory visits whose parents reported poor communication with health providers | 12_1_2              | 2005                     | 5.5               | MEPS              | NCBD           |

**Key to Database Abbreviations**

BRFSS = Behavioral Risk Factor Surveillance System

CDC AIDS = Centers for Disease Control and Prevention HIV/AIDS Surveillance System

CDC TB = Centers for Disease Control and Prevention National Tuberculosis Surveillance System

ESRD = End Stage Renal Disease

HCUP NIS = Healthcare Cost and Utilization Project Nationwide Inpatient Sample

MDS = Medicare Minimum Data Set

MEPS = Medical Expenditure Panel Survey

MPSMS = Medicare Patient Safety Monitoring System

n.a. = not applicable

NAMCS-NHAMCS = National Ambulatory Medical Care Survey-National Hospital Ambulatory Medical Care Survey

NCBD = National CAHPS® Benchmarking Database

NHDS = National Hospital Discharge Survey

NHIS = National Health Interview Survey

NIS = National Immunization Survey

NPCR = National Program of Cancer Registries

NVSS-M = National Vital Statistics System—Mortality

NVSS-N = National Vital Statistics System—Natality

OASIS = Centers for Medicare & Medicaid Services Outcome and Assessment Information Set

QIO = Quality Improvement Organization Program

QIO + HC = Quality Improvement Organization Program and Hospital Compare

SAMSHA-NSDUH = Substance Abuse and Mental Health Services Administration National Survey on Drug Use and Health

SEER = Surveillance, Epidemiology, and End Results Program

USRDS = United States Renal Data System

U.Michigan = University of Michigan Kidney Epidemiology and Cost Center











**U.S. Department of  
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Agency for Healthcare Research and Quality  
540 Gaither Road  
Rockville, MD 20850



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