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Trends in Hospital Emergency Department Utilization: United States, 1992–99

Vital and Health Statistics

Series 13, Number 150

September 2001

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention • National Center for Health Statistics

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Data From the National Health Care Survey

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Health Statistics

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Abstract

Objectives

This report describes trends in hospital emergency department (ED) visits in the United States. Statistics are presented for overall utilization, case mix of patients, services provided, and outcome measures.

Methods

The data presented in this report were collected from the National Hospital Ambulatory Medical Care Survey (NHAMCS) from 1992 through 1999. To make the data points more reliable for trend analysis, the data were combined to provide 2-year annual averages for 1993–94, 1995–96, and 1997–98. The survey in 1992 was especially large so it was used alone. The 1999 data are the most recent year available and are presented separately.

Results

The volume of ED visits in the United States increased by 14% from 1992 through 1999, from 89.8 million to 102.8 million annually. This increase is mainly due to an increase in visits for illness-related as opposed to injury-related conditions. Although the population rate for ED visits did not significantly increase over this time period (rates between 35.7 and 37.9 visits per 100 persons), the rate for illness-related visits rose from 21.0 to 24.0 visits per 100 persons ($p<0.01$). The most dramatic increases were observed in the overall visit rate for black persons 65 years of age and over, which rose by 59% from 45.4 visits per 100 persons in 1992 to 72.2 in 1999. For black seniors, both illness and injury-related visit rates increased at a much higher rate compared with trends for white seniors.

Conclusion

Increased volume of ED encounters for persons 45 years of age and over was associated with a greater proportion of illness conditions presenting to the ED and the use of more services, medications, and mid-level providers.

Keywords: *NHAMCS • emergency department visits • diagnoses • trends • health policy*

Trends in Hospital Emergency Department Utilization: United States, 1992–99

by Catharine W. Burt, Ed.D., and Linda F. McCaig, M.P.H., Division of Health Care Statistics

Introduction

Hospital emergency departments (EDs) account for about 10 percent of all ambulatory medical care in the United States. In 1999, there were over 102 million visits to the EDs of non-Federal, short-stay and general hospitals, an increase of 13 million visits since 1992 (1). From 1997 through 1999, there was an increase of 7.8 million visits, which accounts for well over half of the observed increases since 1992. EDs offer a wide variety of medical care including providing stabilization for critically ill patients in their catchment area, rapid processing and treatment for injuries from trauma incidents, and medical treatment for less urgent conditions including chronic and acute illnesses and minor injuries.

In 1998, the rate of visits to the ED was 37.3 visits per 100 persons (2); however there is evidence to suggest that some persons use the ED on multiple occasions within a year. According to data from the 1998 National Health Interview Survey (NHIS), 20 percent of noninstitutionalized adults living in the United States made at least one visit to an ED to seek medical care, and approximately one-third made multiple visits (3). The choice of seeking care at an ED is related to several factors including possession of health insurance, access to health care providers, and perceived seriousness of condition (4–6). In addition to the ED being frequently used to evaluate and treat patients for acute medical problems and severe injuries, it is also a safety net for patients who lack access to primary health care. According to a Government Accounting Office study in 1993, over 40 percent of patients treated in the ED lacked a usual source of care (7). Others, especially Medicaid patients, have difficulty obtaining an appointment in a primary health care setting (5). Because many people rely on the ED for emergency and nonemergency care, the ED visit rate (number of ED visits divided by the population) can serve as an indicator of the health of our Nation's population and health care system. If patients have access to primary care providers and appropriate medical specialists for good preventive care and disease management, they may be less likely to make an ED visit (or multiple visits) for illness-related conditions. Similarly, national and local focus on safety and injury prevention strategies should reduce both the number and severity of injuries treated in the ED.

Emergency department use is also related to a hospital's ability to provide emergency services. U.S. legislation has had major effects on ED utilization over the last 15 years. In response to allegations of hospital EDs refusing to treat patients who were not fully insured, Congress passed the Consolidated Omnibus Budget Reconciliation Act (COBRA) of 1985 (P.L. 99–292) the Emergency Medical Treatment and Active Labor Act (EMTALA). It requires hospitals that accept Medicare funding to screen all patients presenting to the ED for care and to provide treatment to stabilize emergency medical conditions before transferring or discharging patients from the ED. This "antidumping" legislation

holds hospitals liable for paying the bill for patients who are not able to pay for the cost of care. Because of the increased demand of ED care without corresponding revenues, many hospitals closed their EDs by 1991 (8). About this time, the penetration of managed care into health insurance started to increase. Both public and private managed care plans aimed to expand primary care for their beneficiaries, which should have reduced the need for emergency care. Managed care also controlled the ever-expanding health care expenditures by limiting access to expensive emergency care for their enrollees. Most plans required prior authorization before seeking emergency care unless it is a life-threatening condition. The result was that even if the patient had health insurance, the hospital may not have been reimbursed for the care that EMTALA required them to provide. Under the Balanced Budget Act (BBA) of 1997, Medicaid and Medicare programs are required to reimburse hospitals for emergency care that a reasonable person would consider necessary. Several States also passed legislation that enacted the "prudent layperson" standard. Studies have shown that between 10 and 40 percent of nonurgent ED claims were denied by insurance companies, of which over half would have met a "prudent layperson" standard (9). Since 1997, hospitals received more reimbursement for emergency care provided to insured patients, and there was a commensurate rise in the use of both urgent and nonurgent services.

Despite the increased volume of ED visits in the United States over the last decade, there has been no similar rise in the number of hospital EDs to accommodate the demand. Therefore, on average, most EDs are serving more patients on a daily basis now than they did in 1992. In addition, a shortage of nurses has made staffing problematic, which may mean longer waiting times and overcrowding (10). But what effect does this overcrowding have on how patient care is delivered? What population subgroups are driving the increase in utilization? What differences in outcome measures are observed for patients treated in EDs? ED encounter data from the National Hospital Ambulatory Medical Care Survey (NHAMCS) can reveal these changing patterns of emergency health care.

The NHAMCS was inaugurated in 1992 to gather and disseminate information about the health care provided by hospital EDs and outpatient departments (OPDs) to the population of the United States. The NHAMCS is part of the ambulatory care component of the National Health Care Survey that measures health care utilization across various types of providers including physicians, hospitals, home health agencies, and nursing homes. This report presents national annual estimates of hospital emergency department visits from 1992 through 1999. Highlights of the trends are shown on the adjacent page. Trends in overall utilization, case mix of patients, services provided, and outcome measures are described. Another *Advance Data* report highlights ED visits in 1999 (1). For more information on the NHAMCS, visit our Website: www.cdc.gov/nchs/about/major/ahcd/ahcd1.htm

Methods

The data presented in this report are from the NHAMCS, a national probability sample survey conducted annually since 1992 by the Division of Health Care Statistics of the National Center for Health Statistics, Centers for Disease Control and Prevention. The data from 1992 through 1999 were analyzed for trends in ED utilization.

The target universe of the NHAMCS is in-person visits made in the United States to EDs and OPDs of non-Federal, short-stay hospitals (hospitals with an average stay of less than 30 days) or those whose specialty is general (medical or surgical) or children's general. The sampling frame consisted of hospitals listed in the April 1991 SMG Hospital Database. The data presented in this report are representative of utilization statistics for hospitals existent in 1991.

A four-stage probability sample design is used in the NHAMCS (11). The design involves samples of primary sampling units (PSUs), hospitals within PSUs, EDs within hospitals and/or clinics within outpatient departments, and patient visits within EDs and/or clinics. The PSU sample consists of 112 PSUs that comprise a probability subsample of the PSUs used in the 1985-94 National Health Interview Survey. The sample consists of 600 hospitals divided into 16 panels. In any one year, only 13 panels are used to reduce response burden on the hospitals. ED participation rates ranged between 94 percent and 97 percent. Hospital staff were asked to complete Patient Record forms for a systematic random sample of patient visits occurring during a randomly assigned 4-week reporting period. The Patient Record form was fairly constant from 1992 through 1999, but there were some changes in items. Only those variables that were constant across the years were analyzed. The number of Patient Record forms completed in any given year ranged between 21,103 and 26,706. Because the estimates presented in this report are based on a sample rather than on the entire universe of ED visits, they are subject to sampling variability. Appendix I includes an explanation of sampling errors with guidelines for judging the precision of the estimates. The standard errors reported here are calculated using Taylor approximations in SUDAAN, which take into account the complex sample design of the NHAMCS (12). A weighted least-squares analysis was used to determine significance of trends at the .01 level. Percent increases or decreases are mentioned only if the linear trend was significant. The % symbol is used to indicate percent changes between 1999 and 1992 (base year) so as not to be confused with the referent statistic, which may be a percent of ED visits.

The U.S. Bureau of the Census was responsible for data collection. Data processing operations and medical coding were performed by Analytical Sciences Inc., Durham, North Carolina. As part of the quality assurance procedure, a 10-percent quality control sample of survey records was independently keyed and coded. Coding error rates ranged between 0.1 and

What's increased since 1992?

Utilization:

- ED visits overall (up by 14%)
- Overall population-based visit rates for persons 45–64 years of age (up by 18%) and 65 years of age and over (up by 17%)
- Overall visit rates for black persons 65 years of age and over (up by 59%)

Case mix:

- Percent of visits paid by private HMO insurance (up by 117%), patient-paid (up by 20%), and Medicare (up by 14%)
- Visit rates for illness conditions (up by 14%); driven by increased visit rates for persons 25 years of age and over
- Visit rates for injuries caused by adverse effects of medical treatments (up by 67% for all ages, 103% for persons 45–64 years of age, and 110% for seniors)
- Diagnosis rates for symptoms, signs and ill-defined conditions (up by 45%), diseases of the musculoskeletal system and connective tissue (up by 35%), endocrine and metabolic disorders (up by 51%), and medical complications (up by 92%)
- Specific diagnosis visit rates for chest pain (up by 50%), abdominal pain (up by 39%), spinal disorders (up by 43%), drug dependence (up by 84%), psychoses excluding depression (up by 51%), cerebrovascular disease (up by 53%), and asthma (up by 26%)
- Visit rates for self-inflicted injuries (up by 147%)

Services provided:

- Number of medications mentioned at ED visits (mentions up by 34% and drug mention rate up by 20%)
- Percent of visits with mention of cardiovascular-renal drugs (up by 30%), drugs for the relief of pain (up by 17%), and central nervous system drugs (up by 32%)
- Use of CAT scans/MRIs (up by 103%), mental status exams (up by 121%), and EKGs (up by 12%)
- Administration of intravenous fluids (up by 27%)
- Use of midlevel providers (up by 56%)
- Percent of visits where no physician was seen (up by 68%)

Outcomes:

- Percent released without any planned followup (up by 51%)
- Percent transferred to another facility (up by 43%)
- Percent referred to other clinics (up by 28%)

What's decreased since 1992?

Utilization:

- Visit rates for injuries for children under 15 years of age (down by 17%) and for persons 15–24 years of age (down by 15%)

Case mix:

- Percent of visits paid by Medicaid (down by 23%), percent paid by non-HMO private insurance (down by 19%)
- Overall visit rates for a primary diagnosis of open wounds (down by 19%), intracranial injuries (down by 67%), otitis media (down by 24%), noninfectious enteritis and colitis (down by 17%)
- Visit rates for open wounds among children under 15 years of age (down by 32%)
- Visit rates for injuries due to falls (down by 9%)

Services provided:

- Percent of visits treated with respiratory drugs (down by 16%)
- Use of bladder catheters (down by 25%), nasogastric tubes (down by 50%), and endotracheal intubation (down by 47%)
- Use of extremity x rays (down by 29%)
- Use of residents/interns (down by 49%)

1.7 percent for various survey items over the study period.

Several of the tables in this report present data on rates of ED visits. The population figures used in calculating these rates are U.S. Bureau of the Census estimates of the civilian noninstitutionalized population of the United States as of July 1 in any given year, and have been adjusted for net underenumeration using the 1990 National Population Adjustment Matrix. Because there were no observed significant differences in the crude and age-adjusted utilization rates, only the crude rates are presented.

Except for 1992 and 1999, 2 years of data were combined to make point estimates more reliable (1993-94, 1995-96, 1997-98). For details on the surveys conducted in each year, refer to the annual reports (1,2,13-18). Appendix II provides information on how the drug mentions, race, payment source, and injury-related items were modified because they varied slightly during the study period.

The visit rates for diagnoses presented in this report are based on the first-listed or primary diagnosis, which was coded according to the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM) (19). Therapeutic class for drug mentions was assigned using the *National Drug Code Directory* (20). Injury visits were defined as a visit that had any of the following indications that the visit may be related to an injury: a reason for visit assigned to the injury module, a cause of injury assigned to an E-code from the ICD-9-CM Supplementary Classification of External Causes of Injury and Poisoning, or a diagnosis assigned to an ICD-9-CM code in chapter 17, Injury and Poisoning. If the visit was not identified as an injury visit, it was defined as an illness visit. Patient case mix is defined as composition of ED visits in any given time period based on patient age, type of condition (injury or illness), diagnosis, payment source, etc. The outcome measures used in this report included several disposition options: admit to hospital, transfer to other facility, refer to other physician/clinic, and no followup planned. Admit to hospital includes any visits resulting in a hospital or critical care unit admission.

Results

Trends in Overall Utilization

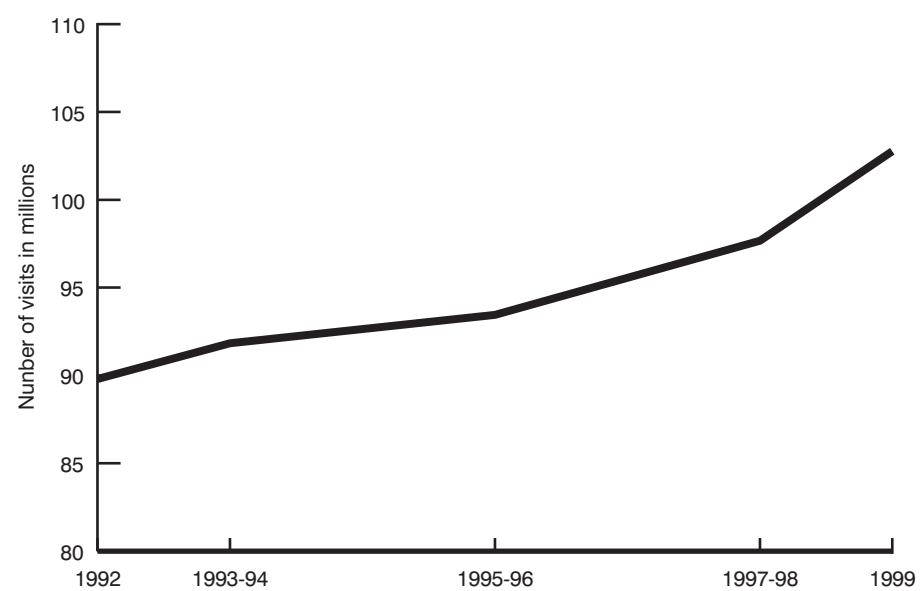
Utilization

Between 1992 and 1999, the amount of ED utilization increased by 14 percent, from 89.8 million to 102.8 million visits annually (figure 1). Although the overall population visit rate did not change (between 35.7 and 37.9 visits per 100 persons, p = .33), increases in visit rates were observed for persons 45-64 years of age (from 25.8 to 30.5 visits per 100 persons) and for persons 65 years of age and over (from 41.2 to 48.2 visits per 100 persons) (table 1). These increases were primarily driven by increases in visit rates for black persons as no trends were observed for white persons in these age groups (figure 2). Dramatic increases were observed for black seniors from 45.4 to 72.2 visits per 100 persons. Increases were observed in visit rates for females in the age groups 25 years and over and for males in the age groups 45 years and over. No trends were observed in overall visit rates by geographic region or location of hospital (metropolitan statistical area (MSA) or non-MSA).

Case Mix

In addition to the increase in visits experienced by EDs in the United States, other factors affecting the changes in case load of the ED included an increase in the average patient age from 33.0 to 35.7 years. Older patients are more likely to have multiple diagnoses and require more medications than younger patients. An analysis of the case mix found that although visits for injuries declined slightly, the amount and rate of ED visits for illness increased (figure 3). The visit rate for illness-related conditions increased from 21.0 to 24.0 visits per 100 persons. The illness visit rate increase was driven by increases in the rates for persons 25 years of age and over (table 2). The injury visit rate declined by 17% for persons under 25 years of age (table 3).

The change in case mix of patients from younger to older also changed the relative distribution of those who paid the bills. There were significant linear



NOTES: Figures are based on 2-year averages except 1992 and 1999. Trend in volume of visits is significant ($p < .01$).

Figure 1. Annual volume of emergency department visits: United States, 1992-99

trends for all sources except the "other" category. Medicare, self-pay, and private HMO insurance increased, while Medicaid and other private insurance decreased from 1992 through 1999 (table 4). The shift in relative proportion of the various payment mechanisms has the effect of equalizing expenditures for emergency services across payers (figure 4).

Increasing trends were observed for all of the leading diagnoses (i.e., chest pain, abdominal pain, spinal disorders, and asthma) rendered at ED visits (table 5). Visits with a primary diagnosis in the symptoms, signs, and ill-defined category (ICD-9-CM codes 780–799) increased by 45% from a rate of 41.7 to 60.3 visits per 1,000 persons (figure 5). Visits with a diagnosis in the musculoskeletal system and connective tissue category (ICD-9-CM codes 710–739) increased by 35% from 15.2 to 20.5 visits per 1,000 persons (figure 5). Increasing trends were also observed for endocrine and metabolic disorders, although the observed increase for diabetes (the most frequent diagnosis in this category) was not significant. Although the visit rates for mental disorders as a category did not increase significantly, significant increases were observed for psychoses (excluding major depression) and drug dependence and nondependant abuse of drugs (table 5). Decreasing trends were also found for open wounds, intracranial injuries, noninfectious enteritis and colitis, and otitis media. Although the decline in the overall injury visit rate was not significant at the .01 level, there was a significant decrease in the visit rate for injuries due to falls (from 30.5 to 27.7 visits per 1,000 persons), which accounted for the observed declines in open wounds and intracranial injuries (figure 6). Troublesome were the observed increases in the visit rates for self-inflicted injuries (ICD-9-CM codes E950–E959, up by 147% from 0.6 to 1.6 visits per 1,000 persons) and problems caused by adverse effects of medical treatment (ICD-9-CM codes E870–E879 and E930–E949, up by 67% from 3.1 to 5.2 visits per 1,000 persons). These codes include both adverse drug events and complications from medical and surgical care.

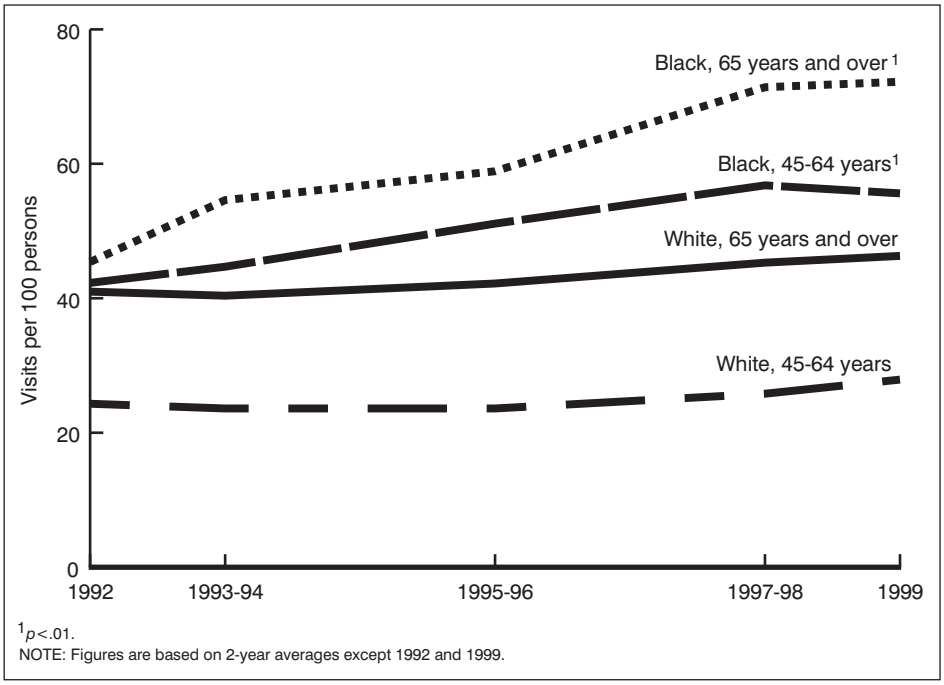


Figure 2. Annual rate of emergency department visits for persons 45 years of age and over by race: United States, 1992–99

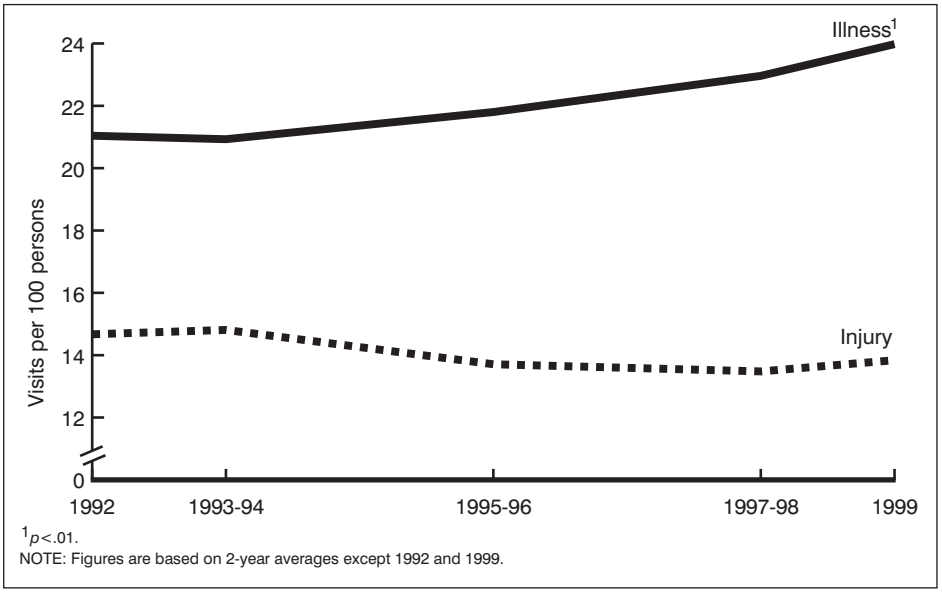


Figure 3. Annual rate of emergency department visits by illness or injury: United States, 1992–99

Services Provided

As expected from both the increase in patient age and increase in illness-related visits, NHAMCS data showed an increase in the number of medications prescribed, provided, or continued at ED visits (figure 7). Limiting the number of medications to five because the maximum number collected varied over the study period, the number of drug mentions increased by 34 percent, from 118.5 million to 158.7 million. Correspondingly, the drug mention rate rose from 130.8 to 157.1 medications per 100 ED visits (table 6). There was no trend observed in the percent of visits where the patient had any mention of medication. However, there were significant upward trends in

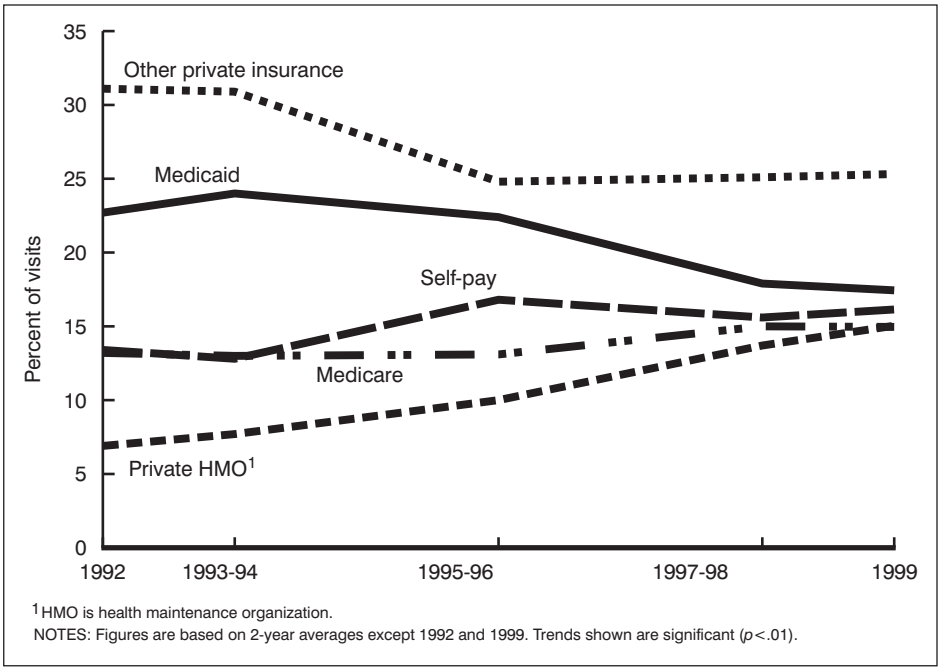


Figure 4. Annual percent of emergency department visits by selected expected source of payment: United States, 1992-99

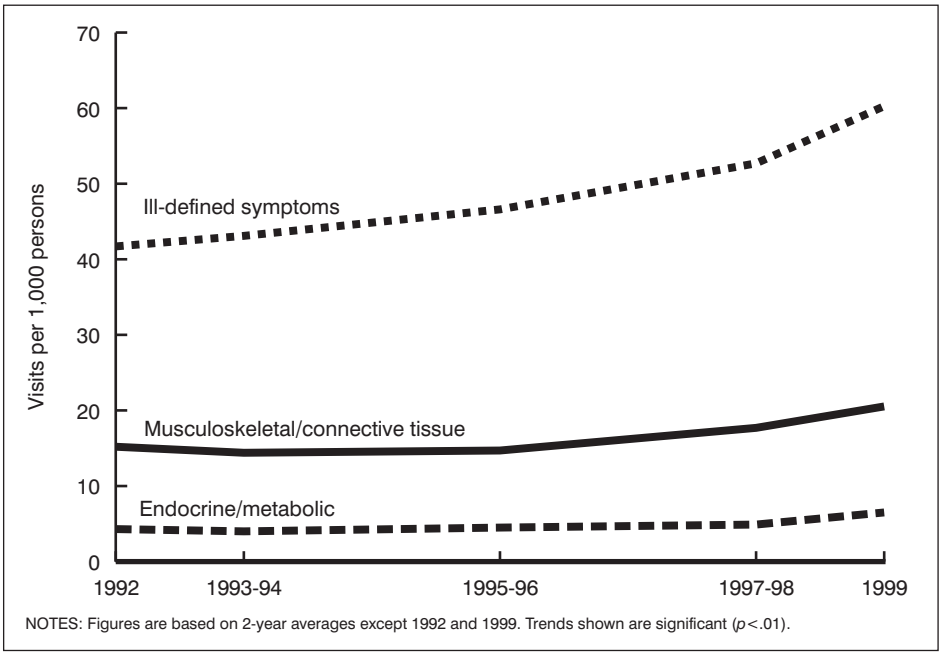


Figure 5. Annual rate of emergency department visits by selected illness diagnosis categories: United States, 1992-99

the percent of visits with 3, 4, or 5 or more drug mentions. Increases were observed for several of the major therapeutic classes used in the treatment of ED patients. The percent of visits with mention of cardiovascular-renal drugs, drugs used for the relief of pain, and central nervous system medications rose from 1992 through 1999.

In addition to increases in medication therapy at ED visits, there were increases in some diagnostic services. Overall, there was no change in the percent of visits with imaging, but the percent of visits where extremity x rays were ordered declined as the use of CAT scans and MRIs rose (up 103 percent from 2.4 percent in 1992 to 4.9 percent in 1999). Performance of mental status exams doubled from 5.9 percent to 13.0 percent. Overall use of procedures did not change; however, the percent of care where intravenous fluids were administered increased by 27% from 14.4 percent to 18.3 percent. Declines were observed in the percent of cases with a bladder catheter, naso-gastric tube/gastric lavage, and endotracheal intubation (table 6).

Type of provider seen in the ED also changed. In 1992, 3.6 percent of patient encounters did not involve a physician; however, this increased to 6.0 percent by 1999 (a rise of 68%). The percent of patient encounters involving a physician assistant (PA) or nurse practitioner (NP) increased by 56% from 3.9 percent to 6.1 percent, but this was primarily driven by an increase in visits where a PA was seen. Among physicians seen at ED visits, use of residents/interns declined from 13.7 percent to 7.1 percent. The use of staff physicians and registered nurses rose slightly.

Outcomes

The percent of patients admitted to the hospital from the ED did not change during the study period. In fact, there was a slight decline in the percent admitted, from 13.5 percent to 12.9 percent, but it was not significant at the .01 level (table 7). However, the percent of visits where the patient was treated and released from the ED without any followup planned increased by 51 percent, from 6.0 percent to 9.0 percent (figure 8). The percent of cases transferred to another facility and referred to other clinics also increased.

Trends for Specific Age Groups

Children

The percent of total ED visits by children under 15 years of age declined by 15% from 1992 through 1999 (table 4). For children under 18 years of age, the percent of visits with a payment source of private HMO insurance

increased by 113%, from 8.5 percent to 18.0 percent. Visits covered by Medicaid declined by 15%, from 38.2 percent to 32.5 percent. The injury visit rate for children under age 15 years of age declined by 17% (table 3). This decline was driven by decreases in the percent of visits for open wounds, excluding the head, which declined by 31%, from 6.1 percent to 4.2 percent. As a cause of injury in children, unintentional falls declined from a rate of 44.5 per 1,000 children to 30.9 from 1992 through 1999. This decline accounted for 50% of the decline in children's injury visit rates. Increases in "struck by/against" causes were offset by slight declines in less common causes of childhood injuries. The percent of visits for otitis media decreased by 21%, from 12.4 percent to 9.8 percent. The asthma ED visit rate, often considered an indicator of poor disease management or compliance, did not change for children under 15 years of age. The percent of visits where an antimicrobial was prescribed declined from 32.9 percent in 1993/94 to 28.2 percent in 1999. Antimicrobials are no longer the most frequent therapeutic class of drugs administered at visits by children under 15 years of age. The percent of visits with prescriptions for pain relief drugs increased by 16%, from 29.4 percent to 34.0 percent making it the most frequent drug class used at ED visits for children in 1999, while prescriptions for respiratory drugs decreased by 16%.

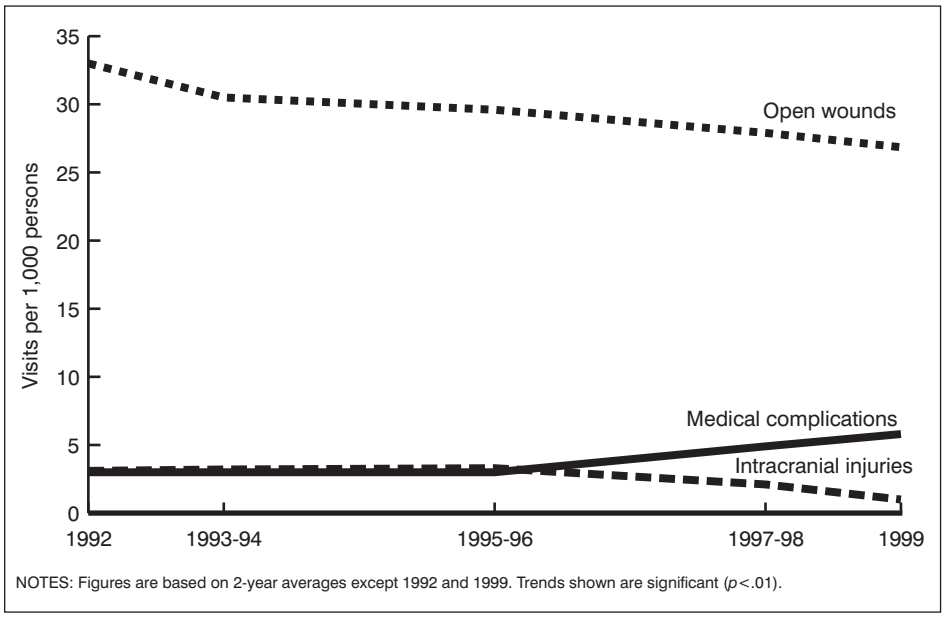


Figure 6. Annual rate of emergency department visits by selected injury diagnosis categories: United States, 1992-99

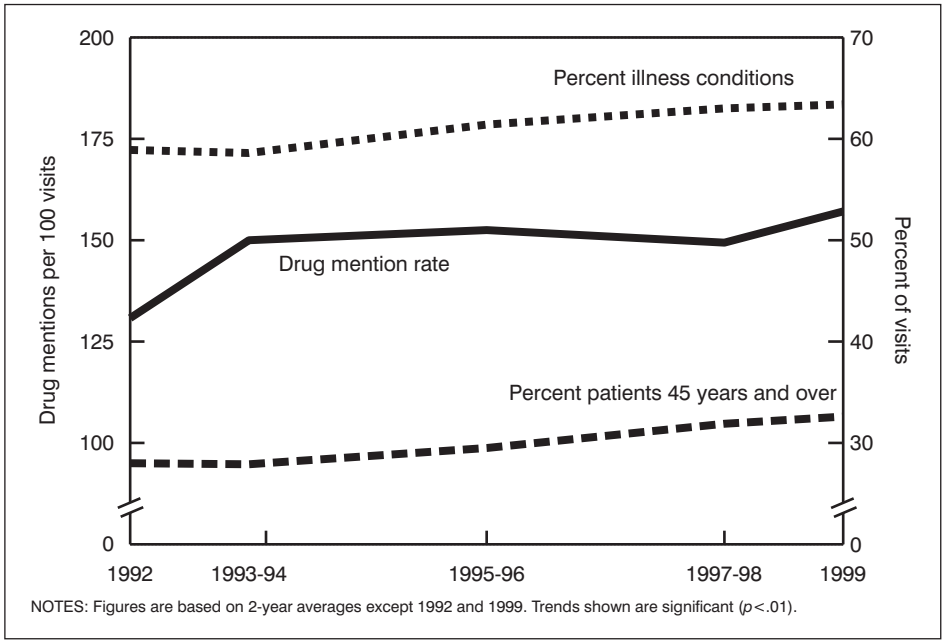


Figure 7. Annual emergency department visits by selected characteristics: United States, 1992-99

Persons 45-64 Years Old

The percent of total ED visits made by persons 45-64 years of age increased from 13.9 percent to 17.4 percent (table 4), and the visit rate for this group increased by 18%, from 25.8 visits per 100 persons to 30.5 (table 1). Most of this increase (85%) was due to increases in illness rather than injury conditions. Increases in diseases classified in the musculoskeletal system and in the symptoms, signs, and ill-defined conditions categories accounted for 62% of the increase in illness conditions. The visit rate for ischemic heart disease declined, whereas the visit rate for chest pain rose. Increases were observed in medication therapy (table 6). Although the overall injury visit rate did not increase for this age group, increases were observed in the rate of ED visits for adverse effects of medical treatment (up over 100%).

Seniors

From 1992 through 1999, the relative percent of the civilian noninstitutionalized population that was 65 years of age or over remained the same at about 12 percent. However, the percent of ED visits made by patients 65 years of age and over increased by 8%, from 14.1 percent to 15.2 percent. For seniors 65 years of age and over, the percent of visits with a payment source of private HMO insurance increased over 200%, from 2.6 percent to 8.1 percent. The percent covered by

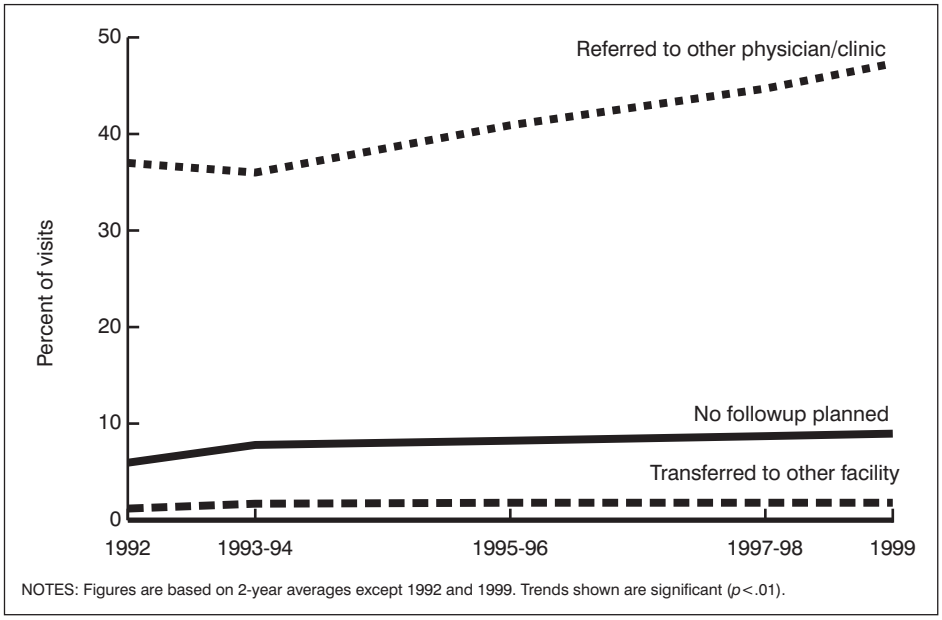


Figure 8. Annual percent of emergency department visits by visit disposition: United States, 1992-99

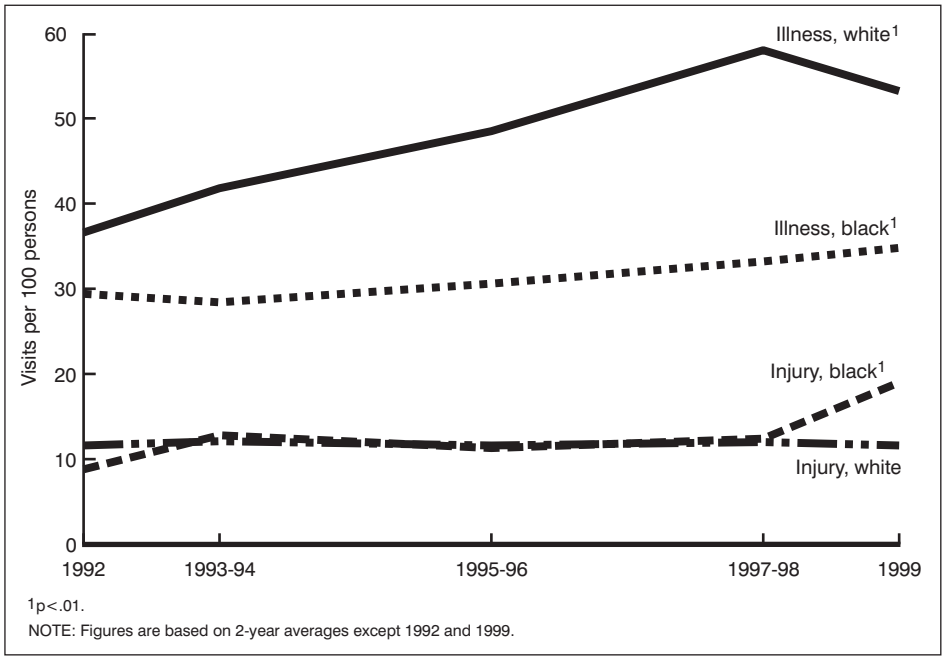


Figure 9. Annual rates of illness and injury emergency department visits for persons 65 years of age and over by race: United States, 1992-99

Medicaid decreased by 47%, from 11.3 percent to 6.0 percent.

The case mix in terms of percent of visits for illness conditions for senior black ED patients appeared similar for senior white patients. However, from 1992 through 1999, the illness-visit rates for all persons 65 years of age and over increased by 21% (table 2) and the increase was greater for black than white seniors (53% compared with 30%) (figure 9). The rate of ED visits for black seniors for injuries increased dramatically, from 14.0 to 31.9 visits per 100 persons, an increase of 127% (table 3). Although there were no observed increases in injury visits overall by seniors, the rate of injury visits due to adverse effects of medical treatment increased by 110 percent, from 4.8 to 10.2 visits per 1,000 persons (figure 10). Visits with a diagnosis of chest pain rose from 4.5 percent to 5.9 percent (up 33%). In addition to the increases observed in visits with a primary diagnosis of chest pain, the visit rates for all seniors increased by 99% for a primary diagnosis of other ill-defined symptoms and 72% for cerebrovascular diseases. With the observed increase in visits without a specific diagnosis, increases were observed in the use of imaging (up 14%), especially CAT scans/MRIs (up 102%). The percent of visits by seniors with five or more drug mentions increased by 59%, from 7.8 percent to 12.4 percent (figure 10). Much of the increase in both of the trends shown in figure 10 may be related because sicker patients are more likely to receive more procedures and more drugs, and adverse effects of this care are more likely to occur.

There was a significant increase in the rates of black seniors admitted to inpatient status from the ED (from 14.8 visits per 100 persons in 1992 to 25.6 visits per 100 persons in 1999) (figure 11), but no such trend was found for white seniors. However, there was no trend in the percent of visits resulting in hospital admission for either black or white seniors (stable at about 40 percent of visits). The visit rate for black seniors treated and released from the ED (i.e., not admitted to the hospital) increased by 53%, whereas the increase for white seniors was 19% (figure 12).

Discussion

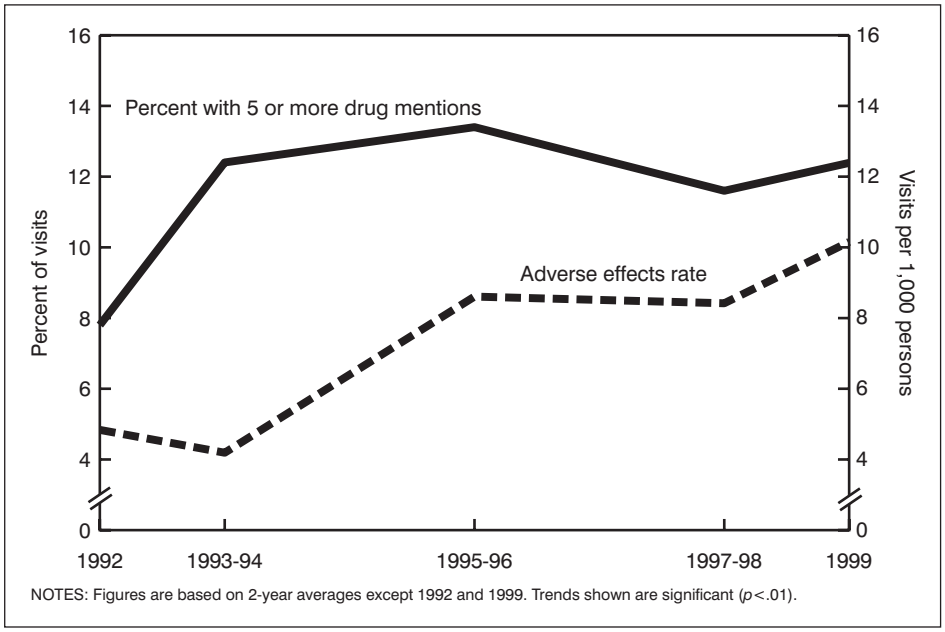
Overall Utilization

The cumulative effect of the increasing volume of ED encounters from 1992 through 1999 without a corresponding increase in the number of hospitals operating EDs has resulted in an "overcrowding" effect (10). In 1992, the average ED treated 42.8 patients per day, but by 1999 the average ED treated 47.9 patients per day. Compared with hospital EDs in 1992, EDs in 1999 were collectively accommodating an additional 35,000 patients each day (1). Increase in volume by seniors was also observed after the 1997 BBA legislated

a "prudent layperson" standard for Medicaid and Medicare programs. In addition to trends in the volume of ED patient encounters, this study examined trends in population-based utilization rates, case mix of conditions, payers, services provided, types of providers seen, and outcome measures.

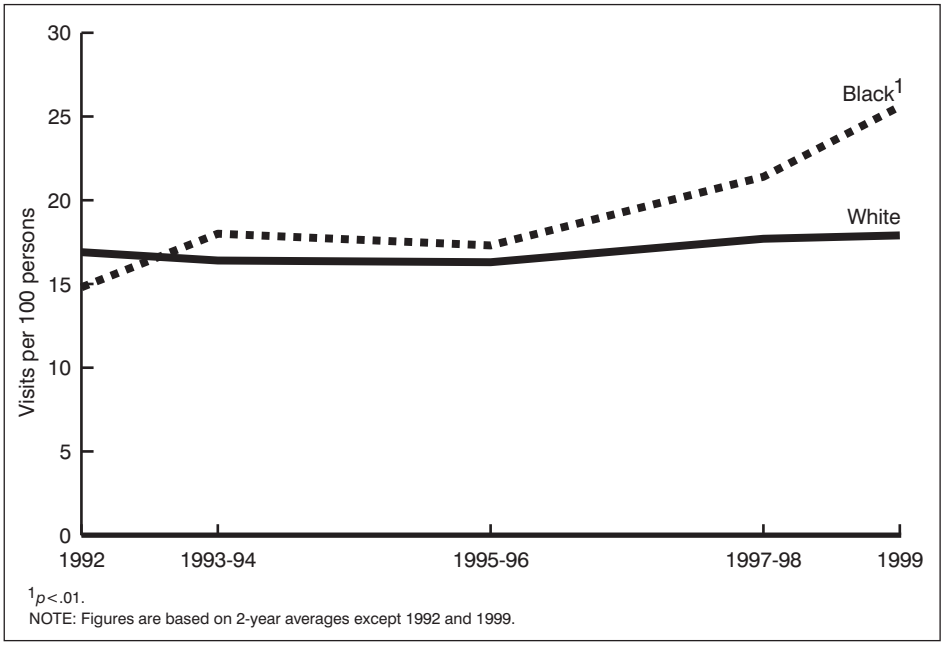
Although overall population-based ED utilization rates did not rise, visit rates for persons 45-64 years of age and 65 years of age and over increased. Among seniors, visits by black persons increased substantially. The case mix of patients presenting to the ED shifted with a greater percent of visits for illness as opposed to injury conditions. The percent of visits for illness conditions increased as did the population-based visit rate. The visit rate for injury declined for persons under 25 years of age. The decline in injury visits was driven by a decrease in open wounds and contusions. An exception was an increase in visit rates for medical complications. The rise in illness visit rates was driven by an increase in cases with symptoms that could not be completely diagnosed in the ED. This included chest pain and other miscellaneous ill-defined symptoms and cases with a diagnosis in the musculoskeletal area such as spinal column disorders like slipped and ruptured discs. These two categories account for one-quarter of the observed increase in illness visit rates. Overall, visit rates also increased for diagnoses associated with aging such as cerebrovascular disease.

With an increase in cases that could not be clearly diagnosed, increases in diagnostic services such as CAT scans/MRIs and mental status exams were observed. Medication therapy increased as evidenced by a 19% rise in the drug mention rate (number of prescribed medications per visit) and a 27% rise in the administration of intravenous fluids. Increases in visits with the mention of drugs for pain relief correspond with clinical practice guidelines that recommend treating patient pain more aggressively (21). An increase in visits with cardiovascular drug mentions is indicative of the increasing visits by seniors. But the increase in drug mentions is greater than that expected just by the rise in the senior visit rate.



NOTES: Figures are based on 2-year averages except 1992 and 1999. Trends shown are significant ($p<.01$).

Figure 10. Annual percent of emergency department visits with five or more drug mentions and rate of emergency department visits for adverse effects of medical treatment by persons 65 years of age and over: United States, 1992-99



[1]$p<.01$.
NOTE: Figures are based on 2-year averages except 1992 and 1999.

Figure 11. Annual rate of hospital admission from the emergency department for persons 65 years of age and over by race: United States, 1992-99

The last 8 years have seen an increase in the utilization of midlevel health care providers, perhaps substituting for residents/interns or staff physicians in an attempt to reduce costs. This may be the result of initiatives to reduce the number of international medical graduates in residency training (22). The outcome measures of "admit to hospital" and "released with no planned followup" cover the extremes in the spectrum of the types of case disposition. There was no observed trend in the percent of ED cases admitted to inpatient status despite the increase in illness to injury case mix. Illness visits are twice as likely as injury visits to result in hospitalization. More

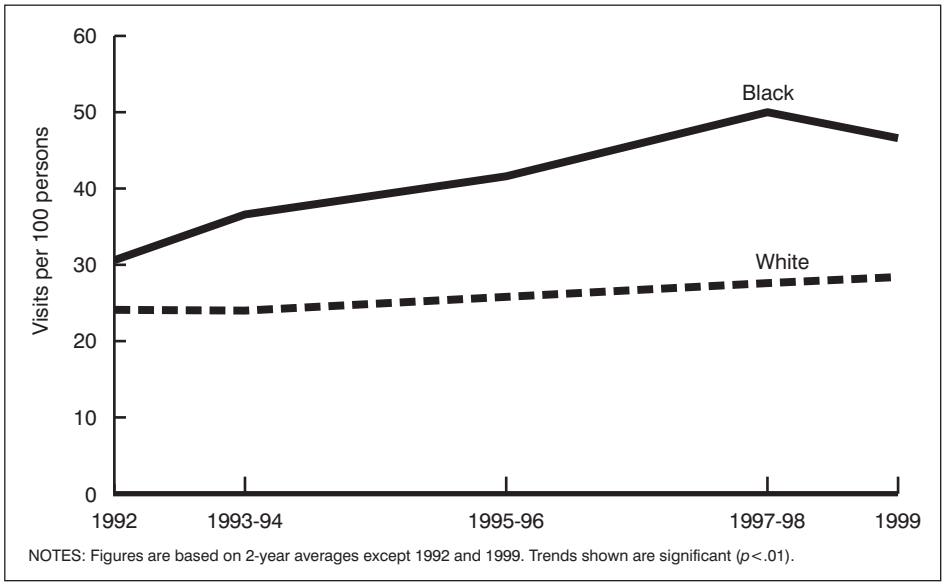


Figure 12. Annual rate of emergency department visits with a disposition of treated and released for persons 65 years of age and over by race: United States, 1992–99

troubling is the percent of cases that were treated and released with no planned followup. Protocol suggests that continuity of care is best served if there is some measure of followup on released patients. It may be that the overcrowding effect has led to less individual attention. Also worrisome is the increase in the rate of ED visits for adverse effects of medical treatment. This includes both complications from medical procedures and devices such as catheters and infected shunts as well as adverse drug events from prescribed medication such as allergic reactions and inappropriate dosage. The original treatment could have occurred in any of a variety of health care settings, which includes hospital inpatient and outpatient settings, physician offices, home health care, or nursing homes that include skilled nursing facilities.

Children

The decline in injury visits by children 15 years of age and under is encouraging. NHAMCS data found that this trend was driven by declines in visits for open wounds and their leading cause, falls. Preventive efforts to reduce injuries from falls in sport-related activities by wearing appropriate safety gear may be having an effect. Unpublished data from the NAMCS and OPD component of the NHAMCS show no rise in visits for falls in other ambulatory settings, which would support a conclusion that the incidence of injuries from falls in children has declined as well as the rate of ED visits for falls.

Surprising is the decline in percent of children's visits with an expected pay source of Medicaid. Unpublished data from the NHAMCS OPD and NAMCS data files also show declines in the percent of visits by children under 18 years of age that have an expected source of payment of Medicaid (down by 37 percent and 27 percent, respectively, since 1992). Therefore, it appears that children are not going to hospital OPDs or physician offices in lieu of EDs. The State Children's Health Insurance Program (SCHIP) was initiated in 1997. In the NHAMCS, SCHIP visits are coded as Medicaid; therefore, a rise in the percent of children's Medicaid visits was expected. Additionally, if patients were enrolled in a Medicaid-managed care plan, they may be counted in the HMO numbers rather than Medicaid for this report.

The decline in visits with antimicrobials prescribed since 1993–94 coincides with the decline in visits for otitis media. NAMCS data indicate that pediatric antimicrobial prescribing decreased from 1989–90 through 1997–98 and corresponds with increased media attention and provider and patient education on the inappropriate use of antimicrobials and its effect on the development of antibiotic resistence (23).

Racial Disparity Among Seniors

Why has the ED visit rate increased so much more for black seniors than for white seniors? Examining trend data from other health care surveys and data sources helps to put this increase in perspective. Combining data from the NHAMCS and the NAMCS show that the racial disparity found in the visit rate trends for ambulatory care varies by setting (figure 13). The increase in rates for black seniors in the ED is consistent with increases in their visit rates to physician offices. However, the opposite is true in hospital outpatient departments (OPDs) where visit rates for black persons have traditionally been higher than visit rates for white persons. Since 1992, the visit rate for white seniors to the OPD increased dramatically whereas the black visit rate did not change significantly (24). By 1999, black seniors 75 years of age and over were 2.3 times as likely as white seniors to make a visit to the OPD, whereas in 1992, they were 2.7 times as likely.

The relationship between health insurance and ED usage trends is complex. The increase in visit rates for black seniors does not appear to be related to trends in having any health insurance coverage, but it may be related to what kind of coverage the patient has. Data from the National Health Interview Survey (NHIS) indicate that the percent of persons with private health insurance declined by 8% between 1994 and 1998 (from 43.6 percent to 40.3 percent) for black seniors and by 13% (from 80.9 percent to 70.3 percent) for white seniors (3). The percent of persons 65 years of age and over with Medicare as their only source of health insurance increased by 83% for white seniors and by 30% for black seniors. The percent of seniors with Medicaid

remained fairly constant from 1994 through 1998 for white seniors, but declined by 28% for black seniors. Black seniors were still more likely than white seniors to have Medicare only (38.1 percent versus 21.8 percent, respectively, in 1998). This means that they were more likely not to have drug coverage (3). Without drug coverage, black seniors may be less likely to fill the prescriptions they have been given (25), which could result in a poorer outcome and thus more trips to the ED. Black seniors were also more likely than white seniors to have Medicaid (18.0 percent versus 6.4 percent, respectively, in 1998) (3), which may be related to ED use. There may have been changes in the percent of physicians who accept Medicaid patients over the last 8 years. In 1999, almost one-quarter of office-based physicians did not accept new Medicaid-only patients (26). Because black seniors were 3 times as likely to have Medicaid coverage compared with white seniors, they may have had more difficulty finding new physicians. This may have led to more frequent use of the ED for primary care.

Although increases were observed for ED utilization and hospital admission from the ED for black seniors, no similar increase was observed in hospital discharge data (27), which includes all admissions and not just those admitted through the ED. Likewise, no increases were observed in avoidable hospitalizations for black or white seniors over a similar time period (1990–98) (28). Avoidable hospitalizations can be a keen indicator of gaps in access to primary care. Trend data from nursing home and hospital discharge data sets show decreases in length of stay over this time period (29). It may be that care is shifting from more costly inpatient settings to less costly outpatient settings, thus driving the increase in ED utilization rates by seniors. The early discharge of older persons from hospital stays and nursing homes may result in more ED visits.

There is evidence that home health care for this age group also increased by 126% from 1990 through 1998 (28). The 1997 BBA limited Medicare

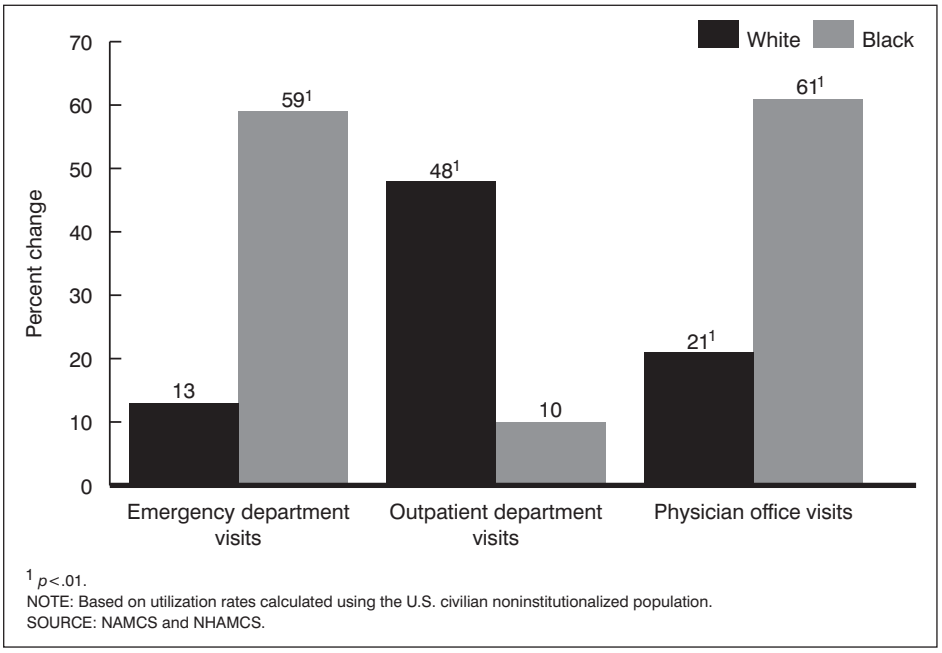


Figure 13. Percent growth in ambulatory medical care utilization for persons 65 years of age and over by race: United States, 1992–99

payments for home health services after the explosion of services per home health patient in the early 1990s (30). It is possible that beginning in 1998, seniors who were denied home health services made more frequent trips to the ED. Data from the National Home and Hospice Care Survey (NHHCS) show that the use of home health care from 1992 through 1998 increased by 28% for white seniors (23.0 to 29.0 per 1,000 seniors) and 43% for black seniors (40.8 to 58.3 per 1,000 persons) (figure 14). In 1998, black seniors were nearly twice as likely as white seniors to use home health services (29).

The method by which visit rates for the NHAMCS are calculated may affect the racial disparities in the observed trends. The NHAMCS traditionally uses the civilian noninstitutionalized population (CNP) estimates whereas the other component surveys of the National Health Care Survey use the total civilian population (CP) estimates. Data from the National Nursing Home Survey (NNHS) showed that there was an increase in the rate of black seniors using nursing homes and a decrease in the use rate by white seniors. Thus there is now parity between the two races in nursing home utilization (29). But because nursing home residents are not included in the CNP, a disproportionately greater number of black seniors may be excluded from the ED visit rate denominator and included in the numerator, thus artificially increasing the ED rates. Unfortunately, the NHAMCS did not start collecting information on whether the patient resides in a nursing home until 2001. The CNP for both black and white seniors increased by about 4.5% between 1992 and 1999. However, the CP increased by 11% for black seniors and 6% for white seniors. The differential increase in the use of nursing homes made the ED visit rate for black seniors grow more steeply than that for white seniors. However, if the CP is used as the ED visit rate denominator, then the increase is 49% for black seniors compared with 12% for white seniors, as opposed to 59% and 13%, respectively, using the CNP as the denominator. Therefore, using the CNP rather then the CP only accounts for 17% of the observed increase in the ED visit rates for black seniors.

Because almost 80% of care in the ED for persons 65 years of age and over is paid by Medicare, examining data for Medicare beneficiaries is helpful in corroborating trends observed from the NHAMCS. Data from the Health Care Financing Agency (HCFA) indicate that the per capita expenditures for outpatient

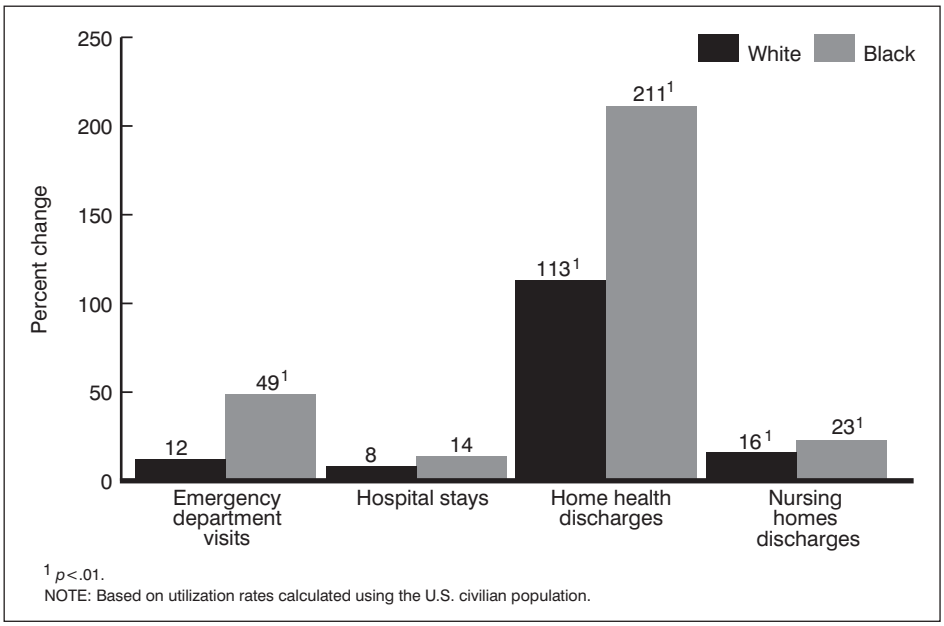


Figure 14. Percent growth in health care services for persons 65 years of age and over by race: United States, 1992–98

services (which include both ED and OPD settings) between 1992 and 1998 increased by 49% for black enrollees compared with 34% for white enrollees (31). This differential increase is consistent with most other covered services (figure 15). By 1998, the per capita expenditures for outpatient services were $760.27 for black seniors compared with $452.64 for white seniors.

Nature of Racial Disparities

Given that several broad measures point to disparate increases in health care utilization for black persons, other research can show the nature of racial disparity in the health of seniors. Recent research looking at 1997 and 1998 Medicare data has found that senior black beneficiaries were more likely than white beneficiaries to be in poorer health, have disabling chronic diseases such as diabetes and hypertension, and have limitations in their activities of daily living (ADLs) (32,33). Research also shows that race differences persist despite differences in income. Medicare beneficiaries with lower patient income make fewer ambulatory physician visits, more ED visits, less use of MRIs, less use of mammography, and have more amputations (most frequently a complication of diabetes). The income-adjusted black:white ratios for these services were 0.93 for ambulatory physician visits, 1.37 for ED visits, 0.95 for MRIs, 0.75 for mammography, and 3.30 for lower limb amputation (32). Mortality data from 1997 show that black persons 65 years of age and over are more likely than white persons to die from diseases of the heart and cerebrovascular diseases. However, Medicare data show that rates of common procedures for treating these diseases are higher among white beneficiaries than among black beneficiaries (e.g., coronary artery

Racial disparities for seniors (black vs. white) in percentage growth in other health care measures, 1992–1999

- ED utilization growth (59% vs. 13%)
- Physician office utilization growth (61%vs. 21%)
- Home health discharges (43% vs. 28%)
- Nursing home discharges (21% vs. 15%)
- Civilian population increase for seniors (11% vs. 6%)
- Medicare expenditures for outpatient services (49% vs. 34%)

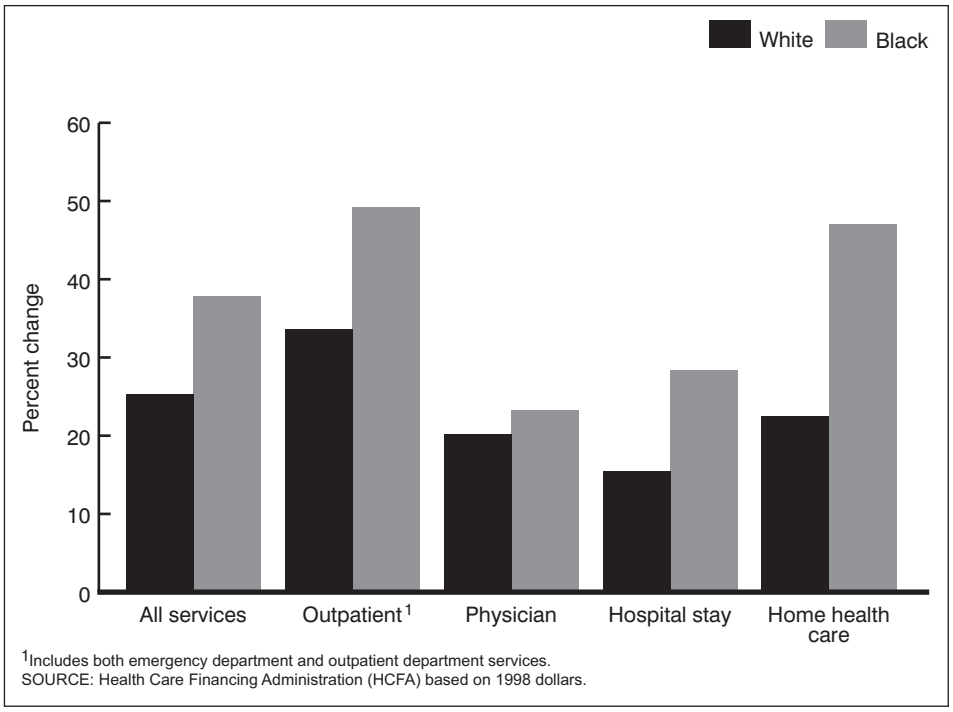


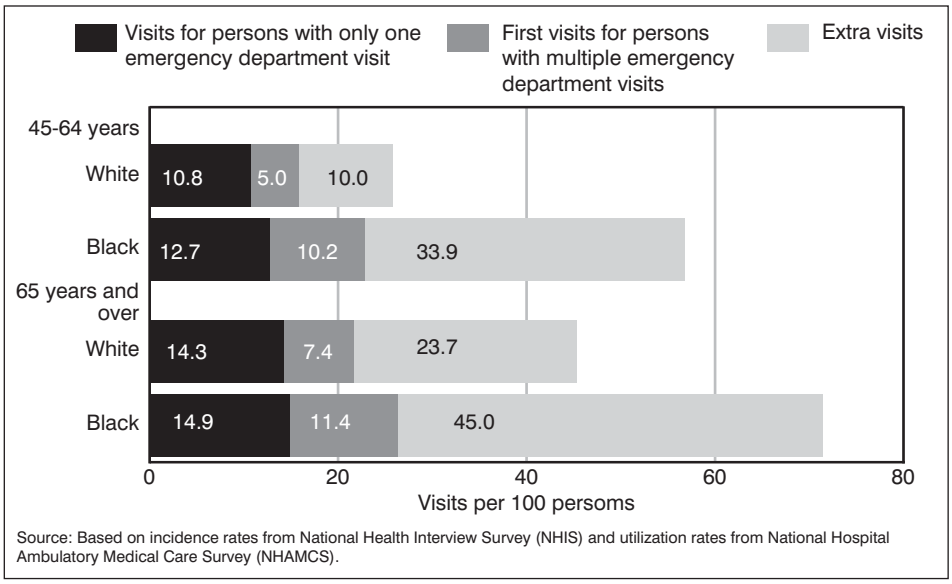
Figure 15. Growth in Medicare per capita expenditures between 1992 and 1998 on selected medical services for persons 65 years of age and over by race: United States, 1992 and 1998

bypass graft, coronary angioplasty, sonography of the carotid artery, and thromboendarterectomy). Gornik (32) concludes that there are barriers other than insurance coverage that influence racial disparities in the use of specific types of services. Elderly black persons as well as the least affluent Medicare beneficiaries have lower rates of preventive services and higher rates of procedures associated with poor outcomes in chronic disease management (e.g., lower limb amputation).

In examining racial disparities, it is important to know if much of the utilization is from the same set of people or the usage is spread across many persons. Because the NHAMCS is a record-based survey that does not collect patient identifiers, it is impossible to determine which visits are made by the same patients. Data from the 1992 NHAMCS (which had an item on initial or follow-up visit) found that about 7 percent of ED visits were follow-up visits from a previous ED encounter (13). However, there could also be other visits from frequent users of the ED that are not necessarily follow-up visits. One study from an urban university hospital that excluded scheduled return visits found that frequent ED users (four or more visits within 1 year) were more likely to be black and more likely to have Medicare or Medicaid as payment sources (34). Over one-quarter of their frequent users indicated that they had difficulty seeing a primary care physician. Frequent users were more likely than the general ED population at that hospital to be admitted to the hospital on the date of their participation in the study (28 percent versus 16 percent). In a study of early returns (unscheduled return visits within 3 days of the initial visit) to another university ED, researchers found that patients with an initial diagnosis of dehydration are at higher risk for an early return and an ultimate admission compared with patients with other initial diagnoses (35). Other frequent diagnoses in the early return group included septicemia, pneumonia, and asthma. These studies were not limited to seniors, but the nature of the diagnoses indicate that seniors are more likely to make multiple unscheduled visits.

Incidence data on ED usage from the NHIS, a population-based survey, can shed light on persons who use the ED multiple times within a year and disparity in ED utilization at a national level. Analyzing combined data from the 1997 and 1998 NHIS sample adult files revealed that there were no racial differences in the percent of people who made only one ED visit during the year, but there was a disparity in the percent who made multiple (two or more) visits. Multiple ED visits were made by 7.4±.28 percent of white seniors and 11.4±.97 percent of black seniors. Black seniors were 50 percent more likely than white seniors to make multiple ED visits. Using the NHIS data to help indicate the volume of visits attributable to single or multiple ED users, figure 16 compares the ED utilization rates for persons 45-64 years of age and persons 65 years of age and over. It demonstrates that the bulk of ED utilization is attributable to a relatively small percent of persons.

The first segment in the bars shown in figure 16 shows that part of the ED visit rate attributable to persons who made only one ED visit (the NHIS incidence rate for single ED visits); the second segment shows the first visit for persons who made multiple visits (the NHIS incidence rate for multiple users). The total length of the bar represents the NHAMCS ED utilization rate. Subtraction provides the third and last segment of the bar, which represents the "extra" ED visits made by persons who made multiple visits (i.e., those visits beyond their first visit). But not all of these "extra" visits are actually made by the kinds of persons who are surveyed by the NHIS. The extra visits would also include visits by persons living in institutional settings like nursing homes, international visitors who may require medical care while in the United States, and the homeless. As shown before, persons residing in nursing homes make visits to the ED, and there are proportionately greater numbers of black persons living in nursing homes compared with white persons. Unpublished logistic regression analysis from the 1997/98 NHIS modeling frequent ED users (persons with more than one ED visit within the last 12 months) versus one-time users (persons with only one ED visit within the last 12 months) for adults over age 18 years, found that patient age was unrelated to frequent ED use after entering other variables into the model such as race, sex, having diabetes, and having hypertension. After adjusting for all these factors, black patients were more likely than white patients to make multiple visits (OR=1.44:95% CI;1.29,1.61), as were females



Source: Based on incidence rates from National Health Interview Survey (NHIS) and utilization rates from National Hospital Ambulatory Medical Care Survey (NHAMCS).

Figure 16. Combining emergency department visit incidence and utilization rates for persons 45 years of age and over by race: United States, 1997-98

(OR=1.28:95% CI;1.17,1.40). Patients with diabetes and hypertension were also more likely to make multiple ED visits. When only persons 65 years of age and over were included in the full model, black seniors were 38% more likely than white seniors to make multiple visits (OR=1.38:95% CI;1.09,1.74). The theory that many of the "extra" visits for older black patients are from people who are not captured in the NHIS is supported by the fact that age was not a significant predictor of making multiple ED visits. Future NHAMCS data containing estimates of ED visits by nursing home residents should help explain some of the observed disparities.

Evidence of racial disparity in health of persons 65 years of age and over

- Black seniors were 50% more likely than white seniors to make multiple ED visits within a 12-month period.
- After adjusting for age, sex, and history of chronic conditions, black persons were 38% more likely than white persons to make multiple ED visits.
- Income-adjusted utilization of health services indicate poorer disease management among black persons compared to white persons.

Limitations of Data

Limitations of the current study include possible nonsampling error related to data abstraction. Because the data are abstracted from medical records, abstractors may not be able to differentiate between whether an HMO member's health plan was a Medicare, Medicaid, or private insurance plan. Therefore, the drop in Medicaid visits in each age group studied may be an artifact of miscoding. However, the number of Medicaid recipients has declined slightly between 1992 and 1999. Using Current Population Survey (CPS) estimates of Medicaid enrollees in the denominator (36) and ED visits with an expected source of payment of Medicaid in the numerator reveals that there was no net per capita decline in ED use for Medicaid enrollees. The rate was 61.2 ED visits per 100 enrollees in 1992, 69.5 in 1993–94, and 61.3 in 1999.

Another limitation of NHAMCS data for examining ED utilization trends is that the data only capture visits made to the ED, not the number of times ambulance patients are diverted away from one hospital and sent to another. At approximately 14 percent of ED visits in 1999, the patient arrived by ambulance (1). However, trends cannot be analyzed for this because the NHAMCS did not publish mode of patient arrival data prior to 1999. Data from other sources show that although increased volume is one factor in ambulance diversions, more urban EDs cite full critical care beds as the main reason for the increased number of diversions (37). The ability of EDs to accept ambulance cases depends on the availability of acute and critical care beds. The number of staffed critical care beds in community hospitals declined by 17% since 1992 (37). Reductions in inpatient bed capacity, more tightly managed staffing levels, on-call physician availability, and nursing shortages have resulted in inpatient beds not always being available for ED patients. An insufficient number of inpatient beds for critical care ED patients causes a gridlock and results in ambulance diversions. The NHAMCS plans to collect ambulance diversion information in future surveys.

Conclusion

In summary, an increase in the U.S. population with no increase in the number of EDs led to an increased volume in non-Federal, general, and short-stay hospitals EDs. More than half of the increased volume in ED use occurred since the 1997 Balanced Budget Act was enacted requiring public health insurance to cover ED visits that meet the "prudent layperson" standard. From 1992 through 1999, persons 45 years of age and over increased their use of EDs annually. The increase was driven by illness as opposed to injury conditions, especially an increase in visits for ill-defined symptoms and musculoskeletal diseases. Increases in diagnostic services and medication therapy accompanied the increase in volume of older patients. The increased ED visit volume was also accompanied by an increase in the use of midlevel providers.

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Table 1. Annual rates of emergency department visits with corresponding standard errors by selected patient and hospital characteristics: United States, 1992–99

Selected patient and hospital characteristics	1992	1993–94	1995–96	1997–98	1999	Percent change since 1992
	Number of visits per 100 persons per year[1,2]					
All visits	35.7	35.7	35.5	36.4	37.9	6
Patient characteristics						
Age:						
Under 15 years	39.9	39.9	36.6	36.0	36.7	–8
15–24 years	43.1	43.4	41.4	41.0	40.9	–5
25–44 years	33.5	33.7	34.9	35.8	38.5	15
45–64 years	25.8	25.4	26.4	28.7	30.5	@18
65 years and over	41.2	41.3	43.3	47.0	48.2	@17
Sex and age:						
Female	36.1	36.7	36.4	37.8	38.9	8
Under 15 years	37.0	37.3	34.6	33.9	34.6	–7
15–24 years	46.6	47.7	45.3	45.7	44.9	–4
25–44 years	34.0	34.4	35.9	37.1	39.6	@17
45–64 years	26.3	26.4	27.5	29.2	31.7	@20
65 years and over	43.0	42.7	44.0	48.9	50.0	@16
Male	35.3	35.5	34.9	35.4	36.6	4
Under 15 years	42.7	42.5	38.6	38.0	38.0	–11
15–24 years	39.8	39.0	37.6	36.3	37.1	–7
25–44 years	33.0	33.0	33.8	34.5	37.4	13
45–64 years	25.2	24.4	25.3	28.2	29.2	@16
65 years and over	38.7	39.3	42.3	44.4	45.9	@19
Race and age:						
White	33.6	33.4	32.9	33.7	35.2	5
Under 15 years	37.5	37.5	34.1	33.4	34.3	–9
15–24 years	42.2	41.6	39.0	38.5	38.5	–9
25–44 years	30.4	30.7	31.7	32.4	35.2	16
45–64 years	24.3	23.6	23.9	25.8	27.9	15
65 years and over	41.0	40.4	42.2	45.3	46.3	13
Black	54.5	56.7	57.8	61.0	60.4	11
Under 15 years	57.3	56.6	56.9	54.6	51.8	–10
15–24 years	56.4	62.9	61.3	62.7	60.9	8
25–44 years	59.6	60.1	62.8	65.4	67.8	14
45–64 years	42.3	44.7	51.1	56.8	55.6	@31
65 years and over	45.4	54.6	58.9	71.4	72.2	@59
Other race	20.6	18.9	19.7	17.9	22.3	8
Hospital characteristics						
Geographic region:						
Northeast	33.9	37.0	37.1	37.4	37.0	9
Midwest	42.0	40.2	39.7	38.6	40.1	–5
South	35.0	35.4	35.2	37.0	40.4	15
West	31.5	30.3	30.2	32.1	31.5	0
Hospital location:						
MSA area[3]	36.1	25.5	24.5	35.0	36.1	0
Non-MSA area[3]	34.3	36.8	39.9	42.0	44.5	30

Table 1. Annual rates of emergency department visits with corresponding standard errors by selected patient and hospital characteristics: United States, 1992–99–Con.

Selected patient and hospital characteristics	1992	1993–94	1995–96	1997–98	1999	Percent change since 1992
			Standard error of rates			
All visits	1.32	1.30	1.07	1.10	1.65	. . .
Patient characteristics						
Age:						
Under 15 years	2.54	1.88	1.43	1.51	2.18	. . .
15–24 years	2.11	1.70	1.60	1.65	2.21	. . .
25–44 years	1.50	1.27	1.10	1.17	1.69	. . .
45–64 years	1.11	0.96	0.87	1.00	1.54	. . .
65 years and over	1.72	1.68	1.67	1.63	2.59	. . .
Sex and age:						
Female	1.38	1.38	1.11	1.12	1.72	. . .
Under 15 years	2.27	1.80	1.37	1.55	1.90	. . .
15–24 years	2.57	2.11	1.83	1.85	3.09	. . .
25–44 years	1.58	1.33	1.18	1.24	1.97	. . .
45–64 years	1.31	1.16	0.99	1.04	2.13	. . .
65 years and over	1.91	1.83	1.80	1.81	4.17	. . .
Male	1.34	1.29	1.09	1.12	1.67	. . .
Under 15 years	2.91	2.06	1.62	1.59	2.47	. . .
15–24 years	1.98	1.55	1.63	1.61	2.12	. . .
25–44 years	1.61	1.36	1.13	1.21	1.83	. . .
45–64 years	1.16	0.88	0.94	1.14	1.52	. . .
65 years and over	1.76	1.75	1.91	1.63	2.73	. . .
Race and age:						
White	1.43	1.39	1.23	1.25	1.79	. . .
Under 15 years	2.29	1.89	1.55	1.51	2.23	. . .
15–24 years	2.24	1.91	1.85	1.94	2.37	. . .
25–44 years	1.43	1.32	1.20	1.32	1.78	. . .
45–64 years	1.11	1.01	0.95	1.07	1.64	. . .
65 years and over	1.82	1.85	1.79	1.78	2.61	. . .
Black	3.84	2.83	2.70	2.59	3.39	. . .
Under 15 years	7.82	4.04	3.64	3.75	4.97	. . .
15–24 years	5.05	3.38	3.24	3.28	3.98	. . .
25–44 years	5.51	3.35	3.36	2.94	4.09	. . .
45–64 years	4.34	2.70	3.03	3.24	3.62	. . .
65 years and over	5.08	3.86	4.44	4.85	7.53	. . .
Other race	3.94	3.47	3.35	2.21	3.05	. . .
Hospital characteristics						
Geographic region:						
Northeast	2.22	2.73	2.10	2.18	3.19	. . .
Midwest	3.49	2.84	2.34	2.28	3.58	. . .
South	2.10	2.27	2.07	1.99	3.16	. . .
West	2.97	2.56	1.73	2.39	3.32	. . .
Hospital location:	. . .					
MSA area[3]	1.55	1.56	1.15	1.24	1.75	. . .
Non-MSA area[3]	3.32	3.28	3.77	3.31	4.64	. . .

@ Trend is significant (p<.01).

. . . Category not applicable.

[1]Based on U.S. Bureau of the Census monthly postcensal estimates of the civilian noninstitutionalized population of the United States as of July 1 of each year. Figures are consistent with the downloadable series, "U.S. Population Estimates by Age, Sex, Race, and Hispanic Origin: 1980 to 1999" available at the Census Internet site: http://ftp.census.gov/population/www/estimates/nat_90s_4.html. Figures have been adjusted for net underenumeration using the 1990 National Population Adjustment Matrix.

[2]Regional estimates were provided by the Division of Health Interview Statistics. (DHIS), National Center for Health Statistics, and are also based on U.S. census estimates of the civilian noninstitutionalized population as of July 1 each year. DHIS estimates differ slightly from monthly postcensal estimates because of differences in the adjustment process.

[3]MSA is metropolitan statistical area.

Table 2. Annual rates of emergency department visits for illness conditions with corresponding standard errors by selected patient and hospital characteristics: United States, 1992–99

Selected patient and hospital characteristics	1992	1993–94	1995–96	1997–98	1999	Percent change since 1992
	Number of visits per 100 persons per year[1,2]					
All illness visits	21.0	20.9	21.8	23.0	24.0	@14
Patient characteristics						
Age:						
Under 15 years	23.6	23.9	22.4	22.4	22.8	–4
15–24 years	21.6	22.1	22.1	22.4	22.6	5
25–44 years	18.3	18.3	20.1	21.6	23.1	@26
45–64 years	16.6	15.9	17.6	19.0	20.6	@24
65 years and over	29.9	29.3	31.8	35.0	36.0	@21
Sex and age:						
Female	23.3	23.4	24.4	25.7	26.6	@14
Under 15 years	23.1	23.5	22.4	22.7	22.4	–3
15–24 years	29.5	30.3	30.2	30.3	30.1	2
25–44 years	21.2	21.6	23.9	25.2	26.6	@25
45–64 years	18.0	17.1	18.8	20.0	21.8	@21
65 years and over	52.9	52.3	57.2	67.2	72.1	@36
Male	18.6	18.4	19.1	20.1	21.2	14
Under 15 years	24.2	24.2	22.3	22.1	23.2	–4
15–24 years	13.6	13.9	14.1	14.7	15.2	12
25–44 years	15.4	14.9	16.2	17.9	19.6	@27
45–64 years	15.1	14.5	16.4	18.0	19.3	@28
65 years and over	46.0	46.2	52.5	56.7	58.0	@26
Race and age:						
White	19.1	19.0	19.5	20.7	21.9	15
Under 15 years	20.7	21.4	19.6	19.7	20.6	0
15–24 years	19.5	20.4	19.3	20.1	20.3	4
25–44 years	15.9	15.9	17.5	19.0	20.5	@29
45–64 years	15.3	14.3	15.5	16.7	18.6	@21
65 years and over	49.5	48.3	53.5	60.1	64.2	@30
Black	37.0	36.9	40.2	42.2	41.1	11
Under 15 years	41.3	38.3	38.9	39.2	36.3	–12
15–24 years	35.7	36.3	40.3	39.7	39.1	10
25–44 years	37.3	37.3	40.7	42.9	44.1	18
45–64 years	30.0	31.4	37.8	41.1	39.8	@32
65 years and over	58.4	67.4	78.3	96.6	89.1	@53
Other race	12.3	11.7	12.2	10.7	13.5	10
Hospital characteristics						
Geographic region:						
Northeast	19.1	21.0	22.8	23.4	23.1	21
Midwest	24.5	23.1	23.9	24.1	25.4	4
South	21.6	21.4	22.3	24.1	26.0	20
West	18.1	17.7	17.8	19.3	19.7	9
Hospital location:						
MSA[3]	21.2	20.7	21.1	22.1	23.1	9
Non-MSA[3]	20.4	21.7	24.6	26.4	27.4	34

Table 2. Annual rates of emergency department visits for illness conditions with corresponding standard errors by selected patient and hospital characteristics: United States, 1992–99–Con.

Selected patient and hospital characteristics	1992	1993–94	1995–96	1997–98	1999	Percent change since 1992
			Standard error of rates			
All illness visits	0.85	0.83	0.69	0.73	1.10	. . .
Patient characteristics						
Age:						
Under 15 years	1.91	1.29	9.19	0.81	1.30	. . .
15–24 years	1.24	1.04	0.76	0.70	1.27	. . .
25–44 years	1.00	0.92	0.69	0.65	1.27	. . .
45–64 years	1.11	1.00	0.75	0.71	1.31	. . .
65 years and over	1.57	1.29	1.10	1.54	1.92	. . .
Sex and age:						
Female	0.96	0.97	0.77	0.82	1.20	. . .
Under 15 years	1.77	1.29	1.02	1.23	1.55	. . .
15–24 years	1.88	1.58	1.36	1.36	1.81	. . .
25–44 years	1.08	0.92	0.84	0.91	1.25	. . .
45–64 years	1.06	0.88	0.78	0.80	1.40	. . .
65 years and over	2.53	2.47	2.43	2.72	4.06	. . .
Male	0.81	0.72	0.64	0.66	1.08	. . .
Under 15 years	2.13	1.30	1.09	1.08	1.82	. . .
15–24 years	0.91	0.68	0.78	0.81	1.07	. . .
25–44 years	0.92	0.72	0.63	0.69	1.04	. . .
45–64 years	0.75	0.61	0.67	0.77	1.17	. . .
65 years and over	2.36	2.21	2.42	2.22	3.52	. . .
Race and age:						
White	0.88	0.87	0.76	0.83	1.17	. . .
Under 15 years	1.59	1.20	1.01	1.07	1.59	. . .
15–24 years	1.25	1.14	1.02	1.16	1.34	. . .
25–44 years	0.84	0.76	0.74	0.83	1.09	. . .
45–64 years	0.76	0.70	0.68	0.77	1.21	. . .
65 years and over	2.32	2.37	2.34	2.58	3.59	. . .
Black	2.78	2.01	2.04	1.86	2.46	. . .
Under 15 years	6.39	2.89	2.88	3.07	3.68	. . .
15–24 years	3.99	2.43	2.37	2.21	2.94	. . .
25–44 years	3.37	2.27	2.31	1.91	2.93	. . .
45–64 years	3.45	2.29	2.67	2.43	2.95	. . .
65 years and over	6.85	5.06	6.33	6.84	8.96	. . .
Other race	2.48	2.42	2.07	1.32	1.93	. . .
Hospital characteristics						
Geographic region:						
Northeast	1.38	1.60	1.39	1.47	2.03	. . .
Midwest	2.42	1.74	1.46	1.43	2.38	. . .
South	1.27	1.55	1.38	1.40	2.16	. . .
West	1.78	1.65	1.02	1.44	2.05	. . .
Hospital location:						
MSA[3]	0.98	0.98	0.72	0.81	1.15	. . .
Non-MSA[3]	2.14	1.94	2.31	2.18	3.12	. . .

@ Trend is significant (p<.01).

. . . Category not applicable.

[1]Based on U.S. Bureau of the Census monthly postcensal estimates of the civilian noninstitutionalized population of the United States as of July 1 of each year. Figures are consistent with the downloadable series, "U.S. Population Estimates by Age, Sex, Race, and Hispanic Origin: 1980 to 1999" available at the Census Internet site: http://ftp.census.gov/population/www/estimates/nat_90s_4.html. Figures have been adjusted for net underenumeration using the 1990 National Population Adjustment Matrix.

[2]Regional estimates were provided by the Division of Health Interview Statistics (DHIS), National Center for Health Statistics, and are also based on U.S. census estimates of the civilian noninstitutionalized population as of July 1 each year. DHIS estimates differ slightly from monthly postcensal estimates because of differences in the adjustment process.

[3]MSA is metropolitan statistical area.

Table 3. Annual visit rates for emergency department utilization for injury conditions by selected patient and hospital characteristics: United States, 1992–99

Selected patient and hospital characteristics	1992	1993–94	1995–96	1997–98	1999	Percent change since 1992
	Number of visits per 100 persons per year[1,2]					
All injury visits	14.7	14.8	13.7	13.5	13.8	–6
Patient characteristics						
Age:						
Under 15 years	16.3	16.1	14.3	13.6	13.6	@–17
15–24 years	21.6	21.3	19.3	18.5	18.3	@–15
25–44 years	15.2	15.4	14.8	14.2	15.4	2
45–64 years	9.2	9.6	8.8	9.7	9.9	8
65 years and over	11.3	12.0	11.5	12.1	12.2	8
Sex and age:						
Female	12.75	12.98	11.9	11.85	12.33	–3
Under 15 years	14.0	13.7	12.2	11.2	12.2	@–12
15–24 years	17.1	17.5	15.1	15.5	14.8	–14
25–44 years	12.8	12.8	12.1	11.9	13.1	2
45–64 years	8.3	9.2	8.7	9.2	9.9	19
65 years and over	22.5	23.6	22.9	24.7	23.7	5
Male	16.7	16.7	15.6	15.2	15.4	–8
Under 15 years	18.5	18.3	16.2	15.8	14.8	@–20
15–24 years	26.2	25.2	23.5	21.5	21.9	@–16
25–44 years	17.6	18.2	17.7	16.6	17.9	1
45–64 years	10.1	9.9	8.8	10.2	9.9	–2
65 years and over	14.2	16.0	16.3	17.7	20.5	@44
Race and age:						
White	14.56	14.46	13.44	13.02	13.29	–9
Under 15 years	16.8	16.1	14.5	13.7	13.6	@–19
15–24 years	22.7	21.3	19.7	18.5	18.1	@–20
25–44 years	14.5	14.8	14.2	13.4	14.6	1
45–64 years	9.0	9.2	8.4	9.0	9.3	3
65 years and over	19.4	20.5	20.2	21.7	21.5	11
Black	17.54	19.83	17.63	18.74	19.31	10
Under 15 years	16.0	18.4	15.0	15.5	15.6	–2
15–24 years	20.7	26.6	21.0	22.9	21.7	5
25–44 years	22.3	22.7	22.1	22.5	23.5	5
45–64 years	12.3	13.3	13.3	15.8	15.7	@28
65 years and over	14.0	20.6	18.7	22.3	31.9	@127
Other race	8.3	7.2	7.5	7.2	8.8	5
Hospital characteristics						
Geographic region:						
Northeast	14.8	16.0	14.3	14.0	13.9	–6
Midwest	17.5	17.1	15.8	14.5	14.7	–16
South	13.4	13.9	12.8	12.9	14.4	7
West	13.4	12.5	12.4	12.8	11.9	–12
Hospital location:						
MSA[3]	14.9	14.7	13.4	12.9	13.0	@–13
Non-MSA[3]	13.9	15.1	15.2	15.6	17.1	23

Table 3. Annual visit rates for emergency department utilization for injury conditions by selected patient and hospital characteristics: United States, 1992–99—Con.

Selected patient and hospital characteristics	1992	1993–94	1995–96	1997–98	1999	Percent change since 1992
			Standard error of rates			
All injury visits	0.57	0.53	0.47	0.42	0.61	. . .
Patient characteristics						
Age:						
Under 15 years	0.84	1.03	0.70	0.49	0.64	. . .
15–24 years	0.79	0.83	0.57	0.35	0.57	. . .
25–44 years	0.58	0.86	0.51	0.34	0.55	. . .
45–64 years	0.54	0.79	0.51	0.37	0.50	. . .
65 years and over	0.79	1.09	0.77	0.51	0.81	. . .
Sex and age:						
Female	0.51	0.48	0.42	0.36	0.60	. . .
Under 15 years	0.73	0.71	0.54	0.52	0.83	. . .
15–24 years	1.01	0.76	0.81	0.73	1.12	. . .
25–44 years	0.71	0.54	0.48	0.46	0.75	. . .
45–64 years	0.49	0.44	0.41	0.40	0.64	. . .
65 years and over	1.28	1.25	1.29	1.14	1.80	. . .
Male	0.68	0.62	0.53	0.51	0.69	. . .
Under 15 years	1.05	0.94	0.75	0.73	0.91	. . .
15–24 years	1.33	1.06	1.12	1.06	1.34	. . .
25–44 years	0.86	0.73	0.65	0.64	0.99	. . .
45–64 years	0.68	0.41	0.42	0.50	0.59	. . .
65 years and over	1.30	0.95	1.08	0.92	1.79	. . .
Race and age:						
White	0.64	0.58	0.53	0.47	0.67	. . .
Under 15 years	0.92	0.84	0.69	0.62	0.85	. . .
15–24 years	1.19	0.96	1.04	0.96	1.21	. . .
25–44 years	0.72	0.62	0.57	0.56	0.82	. . .
45–64 years	0.54	0.38	0.39	0.40	0.55	. . .
65 years and over	1.15	1.05	1.06	0.98	1.59	. . .
Black	1.26	1.10	0.82	0.89	1.15	. . .
Under 15 years	1.73	1.50	1.04	0.95	1.77	. . .
15–24 years	1.93	1.68	1.29	1.44	1.78	. . .
25–44 years	2.36	1.44	1.35	1.36	1.63	. . .
45–64 years	1.46	0.99	0.89	1.24	1.25	. . .
65 years and over	2.19	2.27	2.26	2.49	4.94	. . .
Other race	1.60	1.19	1.34	1.04	1.32	. . .
Hospital characteristics						
Geographic region:						
Northeast	1.05	1.23	0.82	0.84	1.30	. . .
Midwest	1.27	1.23	0.99	0.90	1.31	. . .
South	0.97	0.83	0.80	0.68	1.10	. . .
West	1.39	1.01	0.95	1.03	1.36	. . .
Hospital location:	. . .					
MSA[3]	0.68	0.64	0.51	0.48	0.67	. . .
Non-MSA[3]	1.37	1.49	1.59	1.24	1.66	. . .

@ Trend is significant (p<.01).

. . . Category not applicable.

[1]Based on U.S. Bureau of the Census monthly postcensal estimates of the civilian noninstitutionalized population of the United States as of July 1 of each year. Figures are consistent with the downloadable series, "U.S. Population Estimates by Age, Sex, Race, and Hispanic Origin: 1980 to 1999" available at the Census Internet site: http://ftp.census.gov/population/www/estimates/nat_90s_4.html. Figures have been adjusted for net underenumeration using the 1990 National Population Adjustment Matrix.

[2]Regional estimates were provided by the Division of Health Interview Statistics (DHIS), National Center for Health Statistics, and are also based on U.S. census estimates of the civilian noninstitutionalized population as of July 1 each year. DHIS estimates differ slightly from monthly postcensal estimates because of differences in the adjustment process.

[3]MSA is metropolitan statistical area.

Table 4. Mean age and percent distribution of emergency department visits with corresponding standard errors by selected patient and visit characteristics: United States, 1992-99

Selected patient and visit characteristics	1992	1993–94	1995–96	1997–98	1999	Percent change since 1992
			Mean age in years			
Patient characteristics						
Mean age	33.0	32.8	34.1	35.3	35.7	@8
			Percent distribution of emergency department visits			
All visits	100.0	100.0	100.0	100.0	100.0	. . .
Age:						
Under 15 years	25.1	25.3	23.3	22.0	21.3	@–15
15–24 years	16.5	16.7	16.1	15.6	15.1	@–8
25–44 years	30.3	30.2	31.1	30.5	31.0	2
45–64 years	13.9	13.9	14.8	16.4	17.4	@25
65 years and over	14.1	14.0	14.7	15.5	15.2	@8
75 years and over	7.7	7.9	8.3	9.1	9.0	@17
Sex:						
Female	51.9	52.2	52.4	52.8	52.8	2
Male	48.1	47.8	47.6	47.2	47.2	–2
Race:						
White	78.5	77.6	76.7	76.2	76.5	–3
Black	19.1	20.1	20.8	21.5	20.6	8
Other	2.4	2.4	2.5	2.3	2.9	20
Visit characteristics						
Expected source of payment:						
Self pay	13.4	12.8	16.8	15.6	16.1	@20
Private HMO insurance[1]	6.9	7.7	10.0	13.7	15.0	@117
Other private insurance	31.1	30.9	24.8	25.1	25.3	@–19
Medicaid	22.7	24.0	22.4	17.9	17.4	@–23
Medicare	13.2	13.0	13.1	15.0	15.0	@14
Other	12.7	11.6	12.9	12.8	11.1	–13
Type of condition:						
Illness	58.9	58.6	61.4	63.0	63.4	@8
Injury	41.1	41.5	38.6	37.0	36.6	@–11
			Standard error of mean			
Patient characteristics						
Mean age	0.56	0.32	0.30	0.34	0.44	. . .
			Standard error of percent			
All visits	. . .	. . .	. . .	. . .	. . .	. . .
Age:						
Under 15 years	1.27	0.62	0.58	0.63	0.84	. . .
15–24 years	0.40	0.23	0.29	0.32	0.41	. . .
25–44 years	0.69	0.39	0.39	0.39	0.53	. . .
45–64 years	0.41	0.20	0.23	0.28	0.40	. . .
65 years and over	0.44	0.37	0.37	0.38	0.46	. . .
75 years and over	0.30	0.25	0.25	0.27	0.30	. . .
Sex:						
Female	0.43	0.35	0.33	0.30	0.48	. . .
Male	0.43	0.35	0.33	0.30	0.48	. . .
Race:						
White	1.30	1.01	1.07	0.97	1.15	. . .
Black	1.23	0.90	0.95	0.91	1.08	. . .
Other	0.46	0.44	0.44	0.30	0.39	. . .

Table 4. Mean age and percent distribution of emergency department visits with corresponding standard errors by selected patient and visit characteristics: United States, 1992–99—Con.

Selected patient and visit characteristics	1992	1993–94	1995–96	1997–98	1999	Percent change since 1992
			Standard error of percent			
Visit characteristics						
Expected source of payment:						
Self pay	0.72	0.52	0.42	0.49	0.64	. . .
Private HMO insurance[1]	0.84	0.49	0.57	0.66	0.84	. . .
Other private insurance	1.12	0.69	0.61	0.66	0.81	. . .
Medicaid	1.03	0.67	0.69	0.51	0.67	. . .
Medicare	0.49	0.38	0.34	0.40	0.51	. . .
Other	0.83	0.67	0.61	0.75	0.75	. . .
Type of condition:						
Illness	0.72	0.56	0.54	0.43	0.57	. . .
Injury	0.72	0.56	0.54	0.43	0.57	. . .

@ Trend is significant (p<.01).

. . .Category not applicable.

[1]HMO is health maintenance organization.

Table 5. Annual rates of emergency department visits with correspondng standard errors by selected illness and injury conditions: United States, 1992–99

Selected condition	1992	1993–94	1995–96	1997–98	1999	Percent change since 1992
			Number of visits per 1,000 persons per year[1]			
Illness condition						
Infectious and parasitic diseases	12.4	12.8	11.8	11.6	10.6	–15
Endocrine and metabolic disorders	4.3	4.0	4.5	4.9	6.5	@51
Diabetes	1.1	1.1	1.3	1.3	2.2	101
Mental disorders	9.5	9.6	10.2	11.7	10.7	13
Psychoses, excluding major depression	1.6	1.8	2.1	2.5	2.4	@46
Drug dependence and nondependent drug abuse	1.5	1.3	2.2	2.5	2.7	@84
Nervous system and sense organ diseases	24.0	23.3	20.7	20.7	21.6	–10
Otitis media	12.9	12.7	10.9	9.8	9.7	@–24
Migraine	3.0	3.1	2.7	3.3	3.2	9
Circulatory system diseases	15.4	14.1	15.8	16.2	16.2	5
Ischemic heart disease	4.6	3.6	3.6	3.9	3.5	–25
Non-ischemic heart disease	5.5	4.7	5.8	6.0	5.6	2
Hypertension	1.4	1.8	1.9	1.7	2.2	56
Cerebrovascular disease	2.1	2.4	2.7	2.5	3.2	@53
Respiratory system diseases	43.4	46.5	46.2	45.7	47.8	10
Acute URI[2], excluding pharyngitis	14.1	15.0	14.3	14.3	14.0	–1
Acute pharyngitis	5.0	6.3	6.3	5.4	5.9	17
Asthma	5.8	6.4	7.2	7.4	7.4	@26
Pneumonia	4.9	4.8	4.7	4.7	5.5	12
Digestive system diseases	21.8	20.6	20.3	21.2	21.9	1
Noninfectious enteritis and colitis	7.3	6.7	6.0	5.3	6.1	@–17
Genitourinary system diseases	15.2	15.4	15.1	15.1	16.1	6
Urinary tract infection	4.7	5.3	5.5	4.7	5.5	17
Skin and subcutaneous tissue diseases	10.6	9.9	9.3	9.7	10.4	–2
Musculoskeletal system & connective tissue diseases	15.2	14.4	14.7	17.7	20.5	@35
Arthropathies	3.4	3.3	3.1	3.7	4.5	32
Spinal disorders (dorsopathies)	5.7	5.4	5.7	7.6	8.6	@51
Ill-defined symptoms	41.7	43.1	46.6	52.7	60.3	@45
Chest pain	8.4	8.8	9.9	10.8	12.6	@50
Abdominal pain	9.1	8.8	10.0	11.3	12.6	@39
Headache	3.7	3.7	3.6	4.5	4.6	25
Other ill-defined symptoms	5.1	7.0	6.7	8.3	9.1	@79
Supplementary classification	11.9	12.9	12.3	10.9	10.1	@–15
Injury condition						
External cause:						
Unintentional	107.8	130.2	111.6	105.6	110.0	2
Falls	30.5	31.2	28.2	26.3	27.7	@–9
MVTC[3]	15.7	14.9	16.2	15.9	15.0	–5
Struck-by/against	14.5	14.7	13.2	17.8	15.6	@8
Cut/pierce	12.2	11.3	10.8	11.1	11.6	–4
Overexertion	6.3	3.3	5.8	5.3	6.7	6
Natural/environmental	5.6	6.0	5.3	4.6	6.2	12
Intentional	7.0	6.5	9.3	8.1	7.4	5
Self-inflicted	0.6	0.9	1.0	1.6	1.6	@147
Assault	6.2	5.6	8.1	6.2	5.7	–8
Adverse effects	3.1	2.1	4.5	4.4	5.2	@67
Nature of injury:						
Open wounds	33.0	30.5	29.6	27.9	26.9	@–19
Fractures	15.4	14.9	14.3	13.6	13.5	–12
Sprains and strains	22.0	22.4	22.1	22.2	23.2	5
Superficial	24.6	25.6	24.2	23.0	22.3	–9
Intracranial	3.1	3.2	3.3	2.1	1.0	@–67
Burns	2.7	2.4	2.5	2.5	2.1	–22
Poisoning	3.9	4.1	3.5	3.0	3.5	–11
Medical complications	3.0	3.0	3.1	4.9	5.8	@92
Illness condition			Standard error of rates			
Infectious and parasitic diseases	0.85	0.68	0.61	0.62	0.71	. . .
Endocrine and metabolic disorders	0.33	0.27	0.29	0.27	0.51	. . .
Diabetes	0.16	0.14	0.14	0.11	0.34	. . .

Table 5. Annual rates of emergency department visits with correspondng standard errors by selected illness and injury conditions: United States, 1992–99—Con.

Selected condition	1992	1993–94	1995–96	1997–98	1999	Percent change since 1992
Illness condition—Continued			Standard error of rates			
Mental disorders	0.94	0.51	0.51	0.64	0.79	. . .
Psychoses, excluding major depression	0.29	0.18	0.23	0.26	0.28	. . .
Drug dependence and nondependent drug abuse	0.19	0.12	0.19	0.22	0.29	. . .
Nervous system and sense organ diseases	1.43	1.16	0.88	0.95	1.43	. . .
Otitis media	1.17	0.75	0.57	0.65	0.93	. . .
Migraine	0.28	0.25	0.19	0.25	0.36	. . .
Circulatory system diseases	0.79	0.68	0.78	0.68	1.00	. . .
Ischemic heart disease	0.37	0.26	0.25	0.24	0.37	. . .
Non-ischemic heart disease	0.42	0.26	0.39	0.32	0.51	. . .
Hypertension	0.18	0.21	0.16	0.17	0.31	. . .
Cerebrovascular disease	0.19	0.19	0.21	0.20	0.32	. . .
Respiratory system diseases	2.33	2.26	1.71	1.89	2.82	. . .
Acute URI[2], excluding pharyngitis	1.12	0.88	0.61	0.76	1.02	. . .
Acute pharyngitis	0.40	0.40	0.42	0.34	0.73	. . .
Asthma	0.45	0.40	0.40	0.42	0.48	. . .
Pneumonia	0.43	0.36	0.30	0.32	0.54	. . .
Digestive system diseases	1.14	0.89	0.79	0.79	1.35	. . .
Noninfectious enteritis and colitis	0.63	0.41	0.34	0.32	0.59	. . .
Genitourinary system diseases	0.88	0.71	0.68	0.73	0.91	. . .
Urinary tract infection	0.35	0.29	0.32	0.30	0.40	. . .
Skin and subcutaneous tissue diseases	0.78	0.58	0.54	0.53	0.81	. . .
Musculoskeletal system & connective tissue diseases	0.79	0.72	0.60	0.79	1.32	. . .
Arthropathies	0.29	0.24	0.23	0.28	0.44	. . .
Spinal disorders (dorsopathies)	0.45	0.33	0.30	0.48	0.66	. . .
Ill-defined symptoms	2.00	1.83	1.91	2.03	3.27	. . .
Chest pain	0.54	0.45	0.56	0.57	0.79	. . .
Abdominal pain	0.64	0.45	0.47	0.55	0.84	. . .
Headache	0.33	0.30	0.22	0.39	0.46	. . .
Other ill-defined symptoms	0.36	0.41	0.41	0.40	0.67	. . .
Supplementary classification	0.73	0.68	0.77	0.58	0.71	. . .
Injury Condition						
External cause:						
Unintentional	4.41	4.68	3.81	3.42	4.90	. . .
Falls	1.39	1.20	1.16	1.02	1.51	. . .
MVTC[3]	0.80	0.67	0.62	0.69	0.90	. . .
Struck-by/against	0.80	0.71	0.65	0.70	1.06	. . .
Cut/pierce	0.69	0.61	0.52	0.52	0.80	. . .
Overexertion	0.48	0.39	0.42	0.32	0.49	. . .
Natural/environmental	0.45	0.44	0.32	0.28	0.55	. . .
Intentional	0.63	0.35	0.45	0.40	0.55	. . .
Self-inflicted	0.16	0.10	0.11	0.15	0.26	. . .
Assault	0.60	0.31	0.42	0.33	0.44	. . .
Adverse effects	0.33	0.18	0.30	0.27	0.43	. . .
Nature of injury:						
Open wounds	1.66	1.27	1.01	0.99	1.49	. . .
Fractures	0.82	0.70	0.68	0.54	0.79	. . .
Sprains and strains	1.10	0.98	0.94	0.98	1.30	. . .
Superficial	1.22	1.08	1.03	0.83	1.12	. . .
Intracranial	0.31	0.23	0.22	0.18	0.17	. . .
Burns	0.24	0.18	0.20	0.21	0.28	. . .
Poisoning	0.79	0.41	0.28	0.22	0.38	. . .
Medical complications	0.30	0.28	0.24	0.34	0.49	. . .

@ Trend is significant (p<.01).

. . . Category not applicable.

[1]Based on U.S. Bureau of the Census monthly postcensal estimates of the civilian noninstitutionalized population of the United States as of July 1 of each year. Figures are consistent with the downloadable series, "U.S. Population Estimates by Age, Sex, Race, and Hispanic Origin: 1980 to 1999" available at the Census Internet site: http://ftp.census.gov/population/www/estimates/nat_90s_4.html. Figures have been adjusted for net underenumeration using the 1990 National Population Adjustment Matrix.

[2]URI is upper respiratory infection.

[3]MVTC is motor vehicle traffic crash.

Table 6. Annual rates of emergency department visits with corresponding standard errors by selected services ordered or provided: United States, 1992–99

Selected service	1992	1993–94	1995–96	1997–98	1999	Percent change since 1992
			Number per 100 visits per year			
Drug mentions						
All ages:	130.8	150.0	152.5	149.4	157.1	@20
Under 15 years	113.0	126.0	121.6	121.8	120.5	@7
15–24 years	113.8	130.5	126.9	126.2	131.9	@16
25–44 years	132.9	154.0	155.5	149.4	160.5	@21
45–64 years	158.1	176.1	182.5	177.9	186.5	@18
65 years and over	150.8	182.1	193.1	181.9	192.4	@28
Number of medications mentioned						
0	30.9	25.6	27.5	28.6	27.5	–11
1	32.6	32.5	30.9	30.3	29.0	@–11
2	21.0	22.1	21.3	21.2	21.6	3
3	9.0	10.4	10.3	10.5	11.2	@25
4	3.6	4.6	4.8	4.6	5.2	@44
5 or more	3.0	4.7	5.3	4.9	5.6	@88
Drug visits by therapeutic drug class						
Antimicrobial agents	19.6	23.0	21.8	20.4	20.5	5
Cardiovascular-renal drugs	5.7	6.8	7.5	7.3	7.4	@30
Drugs used for pain relief	32.5	35.2	36.2	37.3	38.1	@17
Respiratory drugs	12.5	14.0	14.5	13.4	10.5	@–16
Central nervous system drugs	6.1	6.5	6.5	6.9	8.0	@32
Hormones/hormonal agents	3.7	5.0	6.1	6.1	6.8	@87
Gastrointestinal agents	4.8	5.2	5.7	5.5	5.8	@21
Metabolic/nutrient agents	2.3	2.5	4.0	4.4	4.4	@88
Immunologics	4.0	4.2	3.9	3.3	3.4	@–16
Hematologic agents	1.3	1.6	1.9	2.1	2.2	@75
Diagnostic services						
Blood pressure	73.7	73.6	73.6	72.7	74.4	1
EKG[1]	13.2	12.0	13.5	14.7	14.8	@12
Mental status examination	5.9	. . .	13.4	13.5	13.0	@121
Urinalysis	15.2	15.9	15.1	15.7	16.2	6
Any imaging	38.7	38.0	38.7	38.7	39.6	2
CAT scan/MRI[2,3]	2.4	. . .	3.2	4.0	4.9	@103
Extremity x ray	15.1	14.0	11.9	11.2	10.7	@–29
Chest x ray	16.8	16.2	16.2	16.6	16.7	–1
None	12.1	13.8	13.1	12.7	11.0	–9
Therapeutic procedures						
Intravenous fluids	14.4	14.0	15.9	16.7	18.3	@27
Wound care	12.9	12.6	12.3	12.1	12.2	–5
Orthopedic care	7.9	9.0	8.2	7.5	8.1	3
Eye, ear, nose, and throat care	2.8	3.1	3.1	3.0	3.1	13
Bladder catheter	2.6	2.4	2.1	2.1	1.9	@–25
Nasogastric tube/gastric lavage	1.0	0.8	0.7	0.6	0.5	@–50
Endotracheal intubation	0.5	0.4	0.5	0.4	0.2	@–47
CPR[4]	0.3	0.3	0.4	0.3	0.2	–20
None	57.7	57.7	57.9	58.4	57.5	0
			Standard error of rates			
Drug mentions						
All ages:	2.57	2.20	2.89	2.81	4.15	. . .
Under 15 years	2.73	2.63	2.36	2.81	3.75	. . .
15–24 years	3.07	1.97	2.67	2.55	3.76	. . .
25–44 years	2.64	2.23	2.92	3.02	4.27	. . .
45–64 years	4.49	3.91	4.99	4.26	6.40	. . .
65 years and over	5.81	4.78	6.26	5.70	8.97	. . .

Table 6. Annual rates of emergency department visits with corresponding standard errors by selected services ordered or provided: United States, 1992–99–Con.

Selected service	1992	1993–94	1995–96	1997–98	1999	Percent change since 1992
			Standard error of rates			
Number of medications mentioned						
0	0.78	0.61	0.74	0.82	1.13	. . .
1	0.51	0.42	0.47	0.42	0.62	. . .
2	0.44	0.33	0.32	0.38	0.50	. . .
3	0.31	0.24	0.25	0.31	0.43	. . .
4	0.20	0.18	0.19	0.19	0.28	. . .
5 or more	0.25	0.25	0.32	0.28	0.48	. . .
Drug visits by therapeutic drug class						
Antimicrobial agents	0.54	0.45	0.44	0.53	0.68	. . .
Cardiovascular-renal drugs	0.28	0.27	0.29	0.61	0.41	. . .
Drugs used for pain relief	0.71	0.56	0.65	0.56	0.83	. . .
Respiratory drugs	0.46	0.36	0.36	0.38	0.39	. . .
Central nervous system drugs	0.23	0.22	0.22	0.22	0.36	. . .
Hormones/hormonal agents	0.21	0.21	0.21	0.26	0.36	. . .
Gastrointestinal agents	0.21	0.16	0.20	0.17	0.27	. . .
Metabolic/nutrient agents	0.17	0.13	0.19	0.23	0.30	. . .
Immunologics	0.08	0.15	0.16	0.13	0.15	. . .
Hematologic agents	0.09	0.09	0.11	0.10	0.18	. . .
Diagnostic services						
Blood pressure	1.31	1.21	0.96	1.36	1.76	. . .
EKG[1]	0.44	0.31	0.32	0.39	0.54	. . .
Mental status examination	0.90	. . .	1.02	1.03	1.61	. . .
Urinalysis	0.44	0.32	0.37	0.43	0.43	. . .
Any imaging	0.65	0.55	0.59	0.61	0.76	. . .
CAT scan/MRI[2,3]	0.18	. . .	0.14	0.16	0.23	. . .
Extremity x ray	0.41	0.27	0.30	0.29	0.36	. . .
Chest x ray	0.41	0.36	0.41	0.41	0.53	. . .
None	0.70	0.69	0.67	0.76	0.83	. . .
Therapeutic procedures						
Intravenous fluids	0.48	0.44	0.40	0.48	0.68	. . .
Wound care	0.40	0.32	0.34	0.32	0.40	. . .
Orthopedic care	0.30	0.29	0.30	0.28	0.34	. . .
Eye, ear, nose, and throat care	0.23	0.17	0.18	0.15	0.42	. . .
Bladder catheter	0.15	0.11	0.12	0.12	0.14	. . .
Nasogastric tube/gastric lavage	0.08	0.05	0.06	0.05	0.07	. . .
Endotracheal intubation	0.05	0.04	0.05	0.04	0.04	. . .
CPR[4]	0.04	0.03	0.04	0.03	0.06	. . .
None	0.80	0.85	0.68	0.66	0.94	. . .

@ Trend is significant ($p<.01$).

. . . Category not applicable or data item not on the form during that period.

[1]EKG is electrocardiogram.

[2]CAT is computerized axial tomography.

[3]MRI is magnetic resonance imaging.

[4]CPR is cardiopulmonary resuscitation.

Table 7. Annual percent of emergency department visits with corresponding standard errors by selected providers seen and disposition of visit: United States, 1992–99

Selected service	1992	1993–94	1995–96	1997–98	1999	Percent change since 1992
			Percent of visits			
Providers seen						
Staff physician	82.5	84.4	81.8	86.5	88.4	@7
Resident/intern	13.7	12.6	12.7	9.8	7.1	@–49
Other physician	11.7	9.8	12.7	8.1	8.5	–27
No physician seen	3.6	4.0	3.9	5.9	6.0	@68
Midlevel provider	3.9	3.5	4.6	5.2	6.1	@56
Registered nurse	83.1	83.5	85.0	88.1	87.7	@5
Licensed practical nurse	6.5	6.1	4.7	5.2	5.5	–15
Disposition						
Admitted to hospital	13.5	12.7	12.6	13.2	12.9	–5
Transferred to other facility	1.2	1.7	1.8	1.8	1.8	@43
DOA/died in ED[1,2]	0.3	0.3	0.3	0.3	0.3	–19
Referred to other physician/clinic	37.0	36.0	40.9	44.7	47.3	@28
No followup planned	6.0	7.8	8.2	8.7	9.0	@51
			Standard error of percent			
Providers seen						
Staff physician	1.54	1.18	1.57	0.99	1.30	. . .
Resident/intern	1.67	1.20	1.09	0.83	0.85	. . .
Other physician	1.28	0.92	1.24	0.93	0.11	. . .
No physician seen	0.41	0.44	0.35	0.63	0.66	. . .
Midlevel provider	0.60	0.54	0.50	0.74	0.86	. . .
Registered nurse	1.43	1.41	1.34	1.27	1.53	. . .
Licensed practical nurse	1.13	0.75	0.55	0.69	0.92	. . .
Disposition						
Admitted to hospital	0.46	0.36	0.40	0.42	0.50	. . .
Transferred to other facility	0.10	0.10	0.09	0.10	0.16	. . .
DOA/died in ED[1,2]	0.04	0.03	0.04	0.04	0.05	. . .
Referred to other physician/clinic	1.45	1.08	1.04	1.33	1.55	. . .
No followup planned	0.56	0.72	0.71	0.57	0.72	. . .

@Trend is significant ($p<.01$).

Category not applicable.

[1]DOA is dead on arrival.

[2]ED is emergency department.

Appendix I

Technical Notes

Data Collection

The emergency encounter data for the NHAMCS are collected annually from about 486 responding hospitals with EDs. ED participation rates varied slightly between 1992 and 1999, between 94–97%. The Census Bureau, acting as the data collection agent for the survey, provided training to field representatives (FRs) throughout the nation. FRs contacted the hospitals for induction into the survey after an advance letter was mailed from NCHS notifying the hospitals of selection for the survey. In most cases, hospital staff completed the information requested on the Patient Record forms. However, in about one-third of the hospitals, FRs abstracted the data from medical records or computer printouts. No personally identifying information such as patient name or address is collected. Confidentiality of the data collected in the survey is protected under the Privacy Act, Public Health Service Act, and Title 42 of the United States Code, Section 242m (d).

Estimation

Statistics from the NHAMCS are derived by multistage estimation procedures that produce essentially unbiased estimates. The estimation procedure has three basic components: a) inflation by reciprocals of the sampling selection probabilities; b) adjustment for nonresponse; and c) a population weighting ratio adjustment. The full NHAMCS hospital sample is partitioned into 16 panels that are rotated into the sample over 16 periods of 4 weeks each so that only 13 panels are used in any one year. The number of patient records collected in the time period studied are 1992: 36,271; 1993–94: 55,664; 1995–96: 43,788; 1997–98: 46,387, and 1999: 21,103.

Sampling Errors

The standard error is primarily a measure of the sampling variability that occurs by chance when only a sample, rather than an entire universe, is surveyed. The standard error also reflects part of the measurement error, but does not measure any systematic biases in the data. The chances are 95 in 100 that an estimate from the sample differs from the value that would be obtained from a complete census by less than twice the standard error.

The standard errors used in tests of significance for this report were estimated using SUDAAN software. SUDAAN computes standard errors by using a first-order Taylor approximation of the deviation of estimates from their expected values. A description of the software and the approach it uses has been published (12). The relative standard error (RSE) of an estimate is obtained by dividing the standard error by the estimate itself. The result is then expressed as a percent of the estimate.

Nonsampling Errors

As in any survey, results are subject to both sampling and nonsampling errors. Nonsampling errors include reporting and processing errors as well as biases due to nonresponse and incomplete response. The magnitude of the nonsampling errors cannot be computed. However, these errors were kept to a minimum by procedures built into the operation of the survey. To eliminate ambiguities and to encourage uniform reporting, attention was given to the phrasing of questions, terms, and definitions. Also, pretesting of most data items and survey procedures was performed. Quality control procedures and consistency and edit checks reduced errors in data coding and processing. The error rate (which includes coding and keying errors) ranged from 0.0 to 1.7 over the study period.

Adjustments for survey nonresponse—NHAMCS data were adjusted to account for nonresponse at the hospital level and at the ED level. The response rates varied over the years, but they are very high (94–97% of eligible hospital EDs). The weights of visits from hospitals similar to the nonrespondent hospitals were inflated to account for visits represented by the nonrespondent hospitals, where hospitals were judged to be similar if they were in the same region and ownership control group and had the same metropolitan statistical area (MSA) status (in an MSA versus not in an MSA). The weights of visits from responding EDs were inflated to account for visits to similar nonrespondent EDs where EDs were judged to be similar if they were in the same region and size. Hospitals were judged similar if they were in the same region, ownership control group, and metropolitan statistical area control group.

Adjustments for item nonresponse—Weighted item nonresponse rates were 5 percent or less for most data items included in this report. For some items, missing values were imputed by randomly assigning a value from Patient Record forms with similar characteristics. These items included patient's birth year (used to determine age), sex, and race. Imputations were based on ED volume, geographic region, immediacy with which patient should be seen, and 3-digit ICD-9-CM (19) code for primary diagnosis.

Published and Flagged Estimates

Estimates are not presented unless a reasonable assumption regarding their probability distributions is possible on the basis of the Central Limit Theorem. The Central Limit Theorem states that given a sufficiently large sample size, the sample estimate approximates the population estimate and, upon repeated sampling, its distribution would be approximately normal.

In this report, estimates are not presented if they are based on fewer than 30 cases in the sample data; only an asterisk (*) appears in the tables. Estimates based on 30 cases or more are preceded by an asterisk if the relative standard error of the estimate exceeds 30 percent.

Tests of Significance and Rounding

In this report, the determination of statistical inference of trend is based on the two-tailed weighted least-squares *Z*-test where the weight is based on the relative size of the standard error of the estimates involved. The critical value of 2.56 was used to judge statistical significance at the .01 level of significance. Terms relating to trends such as "increased" or "decreased" indicate that the linear trend is statistically significant.

In the tables, estimates of visits have been rounded to the nearest thousand. Consequently, estimates will not always add to totals. Rates and percents were calculated from original unrounded figures and do not necessarily agree with percents calculated from rounded data.

Diagnosis and Injury Groupings

Physicians' primary diagnoses, shown in table 5 of this report, are grouped according to a classification system developed for use with NHAMCS data. This grouping is based on the ICD-9-CM, but also reflects the frequency of particular diagnoses occurring in the NAMCS and NHAMCS data. It is meant to provide additional detail on the diagnostic content of ambulatory care as characterized by the surveys. Table I shows the groupings used to categorize data in table 5.

Table 5 also presents data on the intent and mechanism producing the injuries that resulted in an ED visit. Cause of injury is collected for each sampled visit in the NHAMCS and is coded according to the ICD-9-CM's Supplementary Classification of External Causes of Injury and Poisoning. For table 5, however, the first-listed cause of injury data were regrouped to highlight the interaction between intentionality of the injury and the mechanism that actually produced the injury. Table I displays the groupings used in table 5.

Table I. Codes used for defining diagnoses and causes of injury

Selected condition	ICD–9–CM code[1]
Illness condition	
Infectious and parasitic diseases	001–139
Endocrine and metabolic disorders	240–279
Diabetes	250
Mental disorders	290–319
Psychoses, excluding major depression	290–296
Drug dependence and nondependent drug abuse	304–305
Nervous system and sense organ diseases	320–389
Otitis media	381–382
Migraine	346
Circulatory system diseases	390–459
Ischemic heart disease	410–414
Nonischemic heart disease	391–392.0, 393–398, 402, 404, 415–416, 420–429
Hypertension	401
Cerebrovascular disease	430–438
Respiratory system diseases	460–519
Acute URI, excluding pharyngitis[1]	460–461, 463–466
Acute pharyngitis	462
Asthma	493
Pneumonia	480–486
Digestive system diseases	520–579
Noninfectious enteritis and colitis	555–558
Genitourinary system diseases	580–629
Urinary tract infection	599.0
Skin and subcutaneous tissue diseases	680–709
Musculoskeletal system & connective tissue diseases	710–739
Arthropathies	710–716
Spinal disorders (dorsopathies)	720–724
Ill-defined symptoms	780–799
Chest pain	786.5
Abdominal pain	789.0
Headache	784.0
Other ill-defined symptoms	780.0–780.1, 780.5, 780.7–780.9, 781, 783, 784.1–784.6, 784.8–784.9, 785.4–785.9, 786.1, 786.3–786.4, 786.6–787, 789.1–799.9
Supplementary classification	V01–V82
Injury condition	
External cause:	E800–E999
Unintentional	E800–E869, E880–E929
Falls	E888.0–E886.9, E888
MVTC[2]	E810–E819
Struck-by/against	E916–E917
Cut/pierce	E920
Overexertion	E927
Natural/environmental	E900–E909, E928.0–E928.2
Intentional	E950–E959, E960–E969, E970–E978, E990–E999
Self-inflicted	E950–E959
Assault	E960–E969
Adverse effects	E870–E879, E930–E949
Nature of injury:	800–999
Open wounds	870–899
Fractures	800–829
Sprains and strains	840–848
Superficial	910–924
Intracranial	850–854
Burns	940–949
Poisoning	960–989
Medical complications	996–999

[1]ICD–9–CM is the *International Classification of Diseases, 9th Revision, Clinical Modification* (19).
[2]MVTC is motor vehicle traffic crash.

Population Figures and Rate Calculation

The population figures used in computing annual visit rates by age, sex, and race for this report are shown in table II. The figures represent U.S. Bureau of the Census estimates of the civilian noninstitutionalized population as of July 1,1992, through July 1, 1999. Figures are based on monthly postcensal estimates and are consistent with the downloadable series, *U.S. Population Estimates by Age, Sex, Race and Hispanic Origin: 1980–1999* . It is available at the U.S. Bureau of the Census Internet site: http://ftp.census.gov/population/www/estimates/nat_90s_4.html. Figures have been adjusted for net underenumeration using the 1990 National Population Adjustment Matrix. Regional estimates were obtained from the Division of Health Interview Statistics (DHIS), NCHS, and are based on U.S. Bureau of the Census estimates of the civilian noninstitutionalized population as of July 1, 1992, through July 1, 1999. DHIS estimates may differ slightly from monthly postcensal estimates because of differences in the adjustment process.

Table II. Annual civilian noninstitutionalized population estimates for the United States, 1992-99

Selected characteristic	1992	1993–94	1995–96	1997–98	1999
Total	251,448,459	256,957,372	263,164,954	268,069,746	271,749,305
Age					
Under 15 years	56,442,611	58,193,452	59,476,892	59,785,248	60,193,165
15–24 years	34,384,602	35,260,085	36,277,705	37,083,542	37,945,857
25–44 years	81,327,380	82,259,538	83,277,174	83,167,253	82,507,114
46–64 years	48,501,115	50,096,374	52,462,324	55,822,124	58,641,514
65 years and over	30,791,751	31,147,924	31,670,860	32,211,580	32,461,655
Sex					
Female	129,260,980	131,857,399	134,861,603	137,334,766	139,275,461
Under 15 years	27,550,869	28,411,627	29,040,427	29,198,529	29,408,836
15–24 years	17,286,835	17,628,737	18,017,003	18,385,873	18,849,063
25–44 years	41,328,729	41,751,174	42,282,966	42,284,807	42,029,126
46–64 years	25,195,150	25,948,877	27,110,617	28,827,579	30,287,263
65 years and over	17,899,397	18,116,984	18,410,592	18,637,979	18,701,173
Male	122,187,479	125,099,973	128,303,352	130,734,980	132,473,844
Under 15 years	28,891,742	29,781,825	30,436,465	30,586,719	30,784,329
15–24 years	17,097,767	17,631,348	18,260,703	18,697,669	19,096,794
25–44 years	39,999,651	40,508,364	40,996,209	40,882,446	40,477,988
46–64 years	23,305,965	24,147,497	25,351,707	26,994,545	28,354,251
65 years and over	12,892,354	13,030,941	13,260,269	13,573,602	13,760,482
Race					
White	209,464,504	212,915,572	217,575,584	220,842,178	223,263,366
Under 15 years	44,985,523	46,045,168	46,763,886	46,924,118	47,171,646
15–24 years	27,479,788	28,013,928	28,893,536	29,495,444	30,154,665
25–44 years	67,716,634	68,002,017	68,631,785	68,112,901	67,229,552
46–64 years	41,743,184	43,137,752	44,982,046	47,649,273	49,910,737
65 years and over	27,539,375	27,850,208	28,304,333	28,660,443	28,796,766
Black	31,461,180	32,532,632	33,638,928	34,455,861	35,114,071
Under 15 years	8,954,786	9,350,925	9,594,974	9,602,725	9,647,649
15–24 years	5,100,047	5,274,339	5,475,175	5,591,796	5,714,083
25–44 years	9,795,335	10,176,637	10,548,881	10,725,451	10,804,292
46–64 years	4,989,293	5,132,605	5,421,594	5,852,183	6,215,500
65 years and over	2,621,722	2,598,128	2,598,305	2,683,708	2,732,547
Other	10,522,775	11,509,168	11,950,443	12,771,707	13,371,868
Under 15 years	2,502,302	2,797,359	6,236,064	3,258,406	3,373,870
15–24 years	1,804,767	1,971,819	1,908,994	1,996,302	2,077,109
25–44 years	3,816,414	4,080,884	8,193,018	4,328,901	4,473,270
46–64 years	1,768,638	1,959,517	2,058,684	2,320,669	2,515,277
65 years and over	630,654	699,590	768,224	867,430	932,342
Geographic region					
Northeast	50,000,327	50,326,711	52,938,232	52,173,508	52,541,088
Midwest	61,472,387	62,639,234	61,581,369	66,228,955	66,830,045
South	84,419,002	86,811,641	91,793,259	95,365,391	96,499,838
West	55,556,743	57,270,786	56,600,508	54,050,321	55,820,082
MSA status[1]					
MSA[1]	196,606,190	201,270,278	210,671,956	212,600,052	215,622,467
Non-MSA[1]	54,842,269	55,687,094	52,241,411	55,218,124	56,068,586

[1]MSA is metropolitan statistical area.

SOURCE: Based on U.S. Bureau of the Census monthly postcensal estimates of the civilian noninstitutionalized population of the United States as of July 1 of each year. Figures are consistent with the downloadable series, "U.S. Population Estimates by Age, Sex, Race, and Hispanic Origin: 1980 to 1999" available at the Census Internet site: http://ftp.census.gov/population/www/estimates/nat_90s_4.html. Figures have been adjusted for net underenumeration using the 1990 National Population Adjustment Matrix.

Regional estimates were provided by the Division of Healh Interview Statistics (DHIS), National Center for Health Statistics, and are also based on U.S. census estimates of the civilian noninstitutionalized population as of July 1 each year. DHIS estimates differ slighlty from monthly postcensal estimates because of differences in the adjustment process.

Appendix II

Definitions of Terms

Terms Relating to the Survey

Emergency department—An emergency department (ED) is a hospital facility for the provision of unscheduled outpatient services to patients whose conditions require immediate care and is staffed 24 hours a day. If an ED provided emergency services in different areas of the hospital, then all of these emergency service areas are selected with certainty into the sample. Off-site EDs that are open less than 24 hours are included if staffed by the hospital's ED.

Geographic region of hospital—The four geographic regions that correspond to those used by the Bureau of the Census:

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

Hospital—To be in scope for the NHAMCS, a hospital must have an average length of stay for all patients of less than 30 days (short-stay) or hospitals whose specialty is general (medical or surgical) or children's general, except Federal hospitals, hospital units of institutions, and hospitals with less than six beds staffed for patient use.

Outpatient department—An outpatient department is a hospital facility where nonurgent ambulatory medical care is provided under the supervision of a physician.

Ownership—Hospitals are designated according to the primary owner of the hospital based on the SMG Hospital Database.

Voluntary nonprofit: Hospitals that are church-related or are a nonprofit corporation or have other nonprofit ownership.

Government, non-Federal: Hospitals that are operated by State, county, city, city-county, or hospital district or authority.

Proprietary: Hospitals that are individually or privately owned or are partnerships or corporations.

Patient—A patient is an individual seeking personal health services who is not currently admitted to any health care institution on the premises. Excluded are patients who contact and receive advice from the emergency physician via telephone or patients who come to the emergency department only for administrative purposes (e.g., to pick up insurance forms or to pay a bill).

Visit—A visit is a direct, personal exchange between an ambulatory patient seeking care and a physician or other hospital staff member working under the physician's supervision for the purpose of rendering emergency health services.

Terms Relating to the Patient Record Form

Age—The age calculated from date of birth was the age at last birthday on the date of visit.

Race—Hospital staff were instructed to check the category they judged to be the most appropriate for each patient based on observation or prior knowledge. Starting in 1999, hospital staff were asked to record all races that apply. For trend purposes, the 1999 data were recorded to make a separate category called "multiracial," but there were too few cases to provide a reliable estimate. Other race selections were recoded to be consistent with previous categories. The following definitions were provided to the hospital staff from 1992–98:

- *White*—A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.
- *Black*—A person having origins in any of the black racial groups of Africa.
- *Asian/Pacific Islander*—A person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands.
- *American Indian/Eskimo/Aleut*—A person having origins in any of the original peoples of North, South, or Central America and who maintains cultural identification through tribal affiliation or community attachment.

Expected source(s) of payment—The source(s) that to the best of the hospital staff's knowledge describes how charges incurred this visit will be paid:

- *Patient-paid*—Charges billed directly to the patient that will not be reimbursed by a third party. Does not include prepaid plans for which copayment is charged.
- *Medicare*—Charges paid in part or in full by a Medicare plan, including payments made directly to the hospital as well as payments to the patient.
- *Medicaid*—Charges paid in part or in full by a Medicaid plan, including payments made directly to the hospital as well as payment to the patient.
- *Private/commercial insurance*—Charges paid in part or in full by a private insurance company, including payments reimbursed to the patient. If charges are covered under a Blue Cross/Blue Shield-sponsored prepaid plan, the physician is requested to check both the private/commercial insurance and the "HMO/other prepaid" category.

- *HMO/other prepaid*—Charges included under a health maintenance organization (HMO) plan or other prepayment plan, including independent practice associations (IPAs) and preferred provider organizations (PPOs). Starting in 1997, there was a separate item on HMO status.
- *No charge*—Visits for which no fee is charged (not including visits paid for as part of a total care package, e.g., post-operative visits included in a surgical fee, pregnancy visits for which a flat fee was charged, and HMO and prepaid systems).
- *Other and unknown*—All other sources of payment not in the preceding categories (e.g., private charitable institutions). Charges paid under any other local, State, or Federal health care program such as worker's compensation programs and CHAMPUS. This category also includes a small percent of cases where none of the previous source of payment categories was checked.

The expected source of payment item varied over the study period. From 1992–94, the item was a multiple selection item allowing the respondent to check as many sources that might apply. In 1995 and 1996, the item was split into two sections allowing multiple selection for type of insurance (e.g., Medicaid, Medicare, private, worker's compensation), but single selection for other sources (e.g., fee-for-service insurance, HMO, self-pay, charity). From 1997–99, the items were again rewritten to make two different items, a single selection for source of payment and a separate item for HMO status of the patient (e.g., Is patient a member of an HMO?). Because the payment item varied over the years from multiple to single selection, an algorithm was used to arrive at a primary payer whereby Medicaid and Medicare (regardless of HMO status) were assigned a higher priority than private insurance or self-pay when more than one category was indicated. The "Other and unknown payer source" category had the lowest priority. It included worker's compensation, charity, and other sources. With private insurance, HMO status was assigned a higher priority than private insurance without any mention of HMO membership.

Illness-related visit—A visit is considered illness-related if it was not an injury visit as defined below.

Injury-related visit—A visit is injury-related if "yes" was checked in response to "Is visit related to injury or poisoning?" if a cause of injury or a nature of injury diagnosis was provided, or if an injury-related reason for visit was reported. After 1992, this definition was built into the survey edits. For this report, the 1992 data were recoded using this definition.

Physician's diagnosis—Hospital staff were instructed to record the physician or other health care provider's best assessment of diagnosis of the patient's most important problem, complaint, or symptom. In the event of multiple diagnoses, the physician was instructed to list them in order of decreasing importance. The term "primary" refers to the first-listed diagnosis. The diagnosis represents the provider's best judgment at the time of the visit and may be tentative, provisional, or definitive.

Medication—Hospital staff were instructed to record all new or continued medications ordered, supplied, or administered at the visit. This included prescription and nonprescription preparations, immunizations, and desensitizing agents and anesthetics. Providers were requested to record the same specific medication name (brand or generic) that was used on any prescription listed in the hospital medical record. Also included are medications ordered or provided prior to the visit that the hospital staff instructed or expected the patient to continue taking. From 1992 through 1994, up to five medications were collected. Starting in 1995, up to six medications were recorded. For this study, only the first five mentions were analyzed.

Drug mention—A drug mention is the health care provider's entry on the Patient Record form of a pharmaceutical agent ordered or provided by any route of administration for prevention, diagnosis, or treatment. Generic as well as brand name medications are included as are nonprescription and prescription drugs. Along with all new drugs, hospital staff also record continued medications if the patient was specifically instructed during the visit to continue the medication.

Disposition this visit—Categories varied by survey year, but the consistent categories are listed below. The provider was instructed to check as many of the following categories as apply:

- *No followup planned*—No return visit or telephone contact was scheduled or planned for the patient's problem.
- *Referred to other physician/clinic*—Patient was screened, evaluated, stabilized, and then referred to another physician or clinic for followup.
- *Admitted to hospital*—Patient was instructed that further care or treatment would be provided as an inpatient in the hospital. For this report, it includes admission to critical and intensive care units in the hospital. This is a separate disposition item. Starting in 1997, survey edits automatically indicated hospital admission if the critical care unit was so marked.
- *Transferred to other facility*—Patient was transferred to another facility other than a facility operated under the auspices of the hospital (e.g., another acute care hospital, nursing home, jail, drug or alcohol detoxification, or mental institution).
- *DOA/died in ED*—Patient arrived at the ED dead on arrival (DOA) or died in the ED.

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For answers to questions about this report or for a list of reports published in these series, contact:

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