

The Changing Practice of Emergency Medicine
An Information Paper
June 2004

Executive Summary

Significant challenges face the practice of emergency medicine. The impact of policy decisions is often more acute for the emergency department (ED). Because emergency medicine is the health care “safety net” our options for response to changes in policy are constrained.

For these reasons, it is imperative that we influence the decisions that are being made by those who create policy. In spite of the fact that the future may be daunting, our ability to project future trends helps us to direct our efforts. This document addresses future trends in several major factors impacting the practice of emergency medicine namely changing demographics, workforce, liability, compensation, and emerging technologies.

Demographics – The trend has been a steadily increasing ED census since the mid 1990s. Projections into the future suggest that this trend will continue and even accelerate. The effect of aging baby boomers likely will contribute to this, with t increasing impact from about 2010 and peaking around 2025. This is related not only to the increased percentage of patients in older age bracket, but also an associated increase in repeat visits by this age group.

Workforce – Many variables could impact the availability of emergency medicine-trained physicians. The best case scenario would suggest that the supply would gradually increase to meet the need for residency-trained physicians. Threats to that balance include the increasing demand for ED services, and the practice patterns of ED physicians who enter the workforce. In addition, the impact will likely be more dramatic in rural environments. Augmenting this physician workforce will be mid-level providers who are graduating in increasing numbers and who present an attractive alternative to more traditional models, financially. Parenthetically, the shortages of other disciplines in the health care workforce will present further challenges to physician efficiency.

Liability – Barriers to meaningful medical liability reform are significant. On a national level, federal reforms look unlikely in the near term. Dedicated efforts at the state level have achieved some successes. Those successes are, in many cases, under continued challenge from the trial lawyers. The irony of reform efforts often is an increase in suits filed prior to implementation that may require years to clear. The financial reward of decreased premiums also is delayed.

Compensation – The aging population will shift a greater proportion of patients to Medicare, while reducing the proportion covered by other payors. This arguably could have a positive impact, if the proposed cuts in funding for Medicare are permanently corrected. At the state level, budget pressures pose a significant challenge to provide improved benefits for the un- and under insured groups of patients. Combined, these factors look to present increasing challenges to maintaining, let alone improving compensation.

Emerging Technologies – The development and inclusion of new technologies will create an ED environment that brings greater diagnostic, treatment, and documentation capabilities to the ED. While this should bring improvements in patient safety and is to be encouraged, the impact on ED efficiency is yet to be defined. These technologies will continue to position the ED as diagnostic centers to patients and their physicians. Also, the financial commitment that these technologies require could become a factor leading to greater differences among EDs in their ability to provide treatment.

Demographic trends and emergency medicine practice

Summary of demographic trend data:

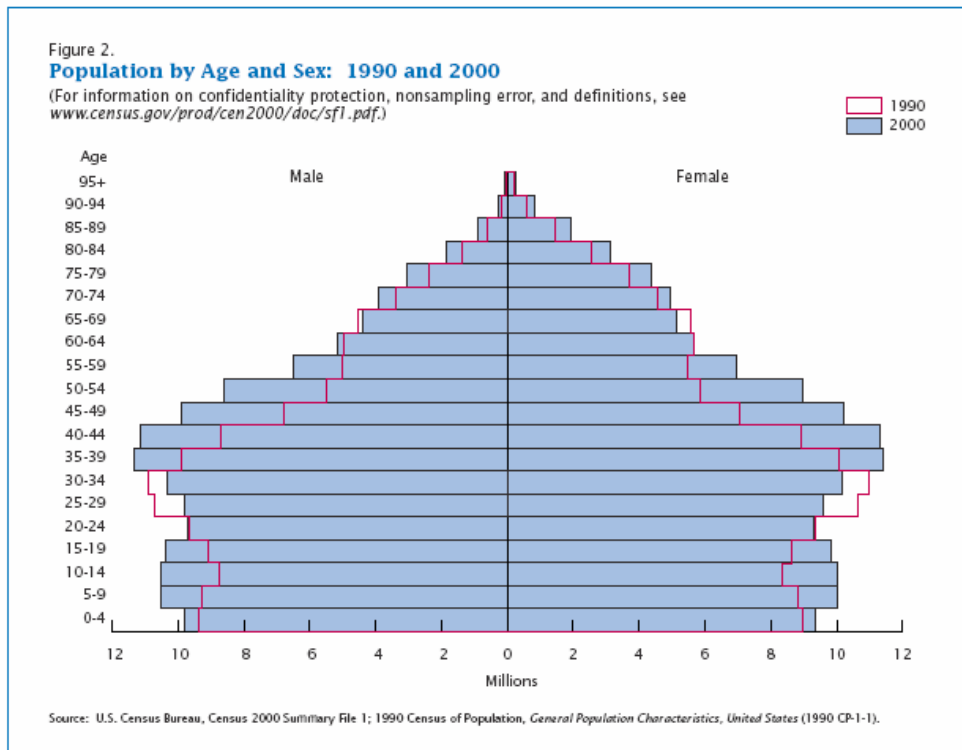
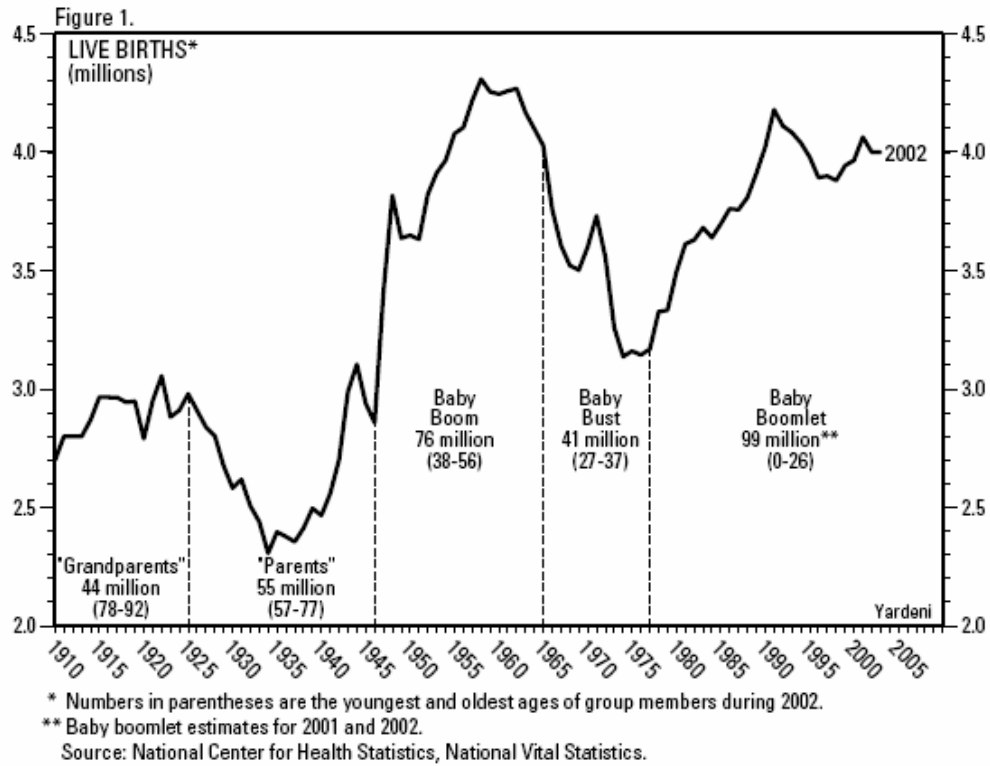
- ED visits have increased by 23% over the 11 year period from 1992-2002 to 110 million/year.¹
- Increased visits are due primarily to growth of the US population, and secondarily, there was also an increase of 9% in visits per capita (from 35.7 to 38.9 visits/100 persons).
- There was a noteworthy change in visit rates for the following population groups between 1992-1999²:
 - 60% increase in non-injury visits among African American persons over 65 years of age
 - 15% decrease in visit rate for injuries among persons less than 25 years of age (all races)

Increased use of technologies, 1992-2002^{1,2}

- Although the overall percent of visits with imaging remained level (40.7%), the modality used shifted from plain film x-rays to newer technologies such as CT, MRI and ultrasound. For example, use of CT/MRI increased from 2.4% in 1992 to 7.1% in 2002. Data on ultrasound use was not reported in 1992.
- However, it is not clear that increased patient age and use of technology corresponded with an increased disease severity. For example, visits with a final diagnosis in the “symptoms, signs, and ill-defined conditions” group increased by 45%.² This could be interpreted as suggesting a decrease rather than an increase in the average severity of illness or injury although it also could be interpreted as reflective of an increase in the use of EDs as a diagnostic and consultative resource by primary care physicians.

It is important to understand that National Hospital Ambulatory Medical Care Survey (NHAMCS) data does not account for multiple visits by same individual. One urban ED survey found that frequent ED visitors were more likely to be African-American, and more likely to have Medicare or Medicaid as payer, and more likely to be admitted, potentially accounting for part of the trend in ED visits noted in this subgroup. The National Health Interview Survey (NHIS) demonstrates that for persons over 65, fewer than half of visits represent first visits in a given year. The same is true for visits by African Americans over 45. African Americans are more likely to have Medicare alone (ie, no drug coverage), to reside in a nursing home, and they may be more likely than whites to use an ED for routine care. Also, interpretation of the data may be clouded by the exclusion of homeless and nursing home patients from the NHIS data, but the inclusion of those same populations in the NHAMCS data.

The Baby Boom



Data from the National Hospital Ambulatory Care Survey (NHAMCS): Emergency Department Summary, 2000

Current				Projections			
2000 NHAMCS Survey				2010		2020	
Age Group	Visits	US Population ³	Rate	Visits	US Population	Visits	US Population
0-4	12,453	19,218	64.8%	13,884	21,426	14,859	22,932
5-19	19,098	61,331	31.1%	19,247	61,810	20,538	65,955
20-44	41,895	104,075	43.3%	42,044	104,444	43,730	108,632
45-64	18,339	62,440	29.4%	23,793	81,012	24,569	83,653
65-84	13,013	30,794	42.3%	14,418	34,120	20,014	47,363
85+	3,219	4,267	95.4%	4,620	6,123	5,484	7,269
Total	108,017	282,125	37.9%	118,006	308,935	129,195	335,804

117,168

127,359

(all estimates are in thousands)

Projected by Census Bureau

Calculated from the 2000 age-specific visit rates

Projection based on age-specific ED visits rates and census projection for each age group

Projection based on crude visit rate and census projection of future total population.

NOTE: The rates in pink are “adjusted” for the census bureau’s projected age distributions, but NOT for other determinants of ED visit rates such as race, chronic illness, injury vs. illness, payer type, etc. Of course it also assumes that visit rates will remain constant within an age group, though we know that rates are increasing especially in elderly population. Therefore these are UNDERestimates of future ED volumes.

Workforce Issues

The topic of emergency medicine workforce (the supply of emergency physicians relative to the demand for them) will be an important influence with respect to many aspects of emergency medicine practice in the next decade. The balance between workforce supply and demand for emergency physicians influences: physician salary; the availability and geographic distribution of jobs; the importance of residency training as well as board certification in emergency medicine; and the potential desirability of clinical or administrative fellowship training.

In recent years, ACEP has conducted the two largest and most definitive studies of the emergency medicine workforce in the US.^{4,5} The study methodology in both investigations sampled emergency medicine staffing at approximately 10% of all US hospitals. The investigators found approximately 5 emergency physician full time equivalents (FTE) staffing on average at study hospitals, provided by 7.5 emergency physicians (1.5 physicians on-staff to provide 1 FTE of service). From American Hospital Association (AHA) data, there are 4945 hospitals in the US, yielding an estimate for emergency physician demand nationally of 24,548 FTEs and 32,036 physicians.^{4,5} Review of US General Accounting Office (GAO) statistics for ED visits over the past several years yields an estimate of a 3% increase in ED visits per year for the past several years, with 108 million ED visits in 2001. Projecting this growth rate into the future, ED visits nationally may be estimated to increase by 3 million visits annually.

United States emergency medicine residencies currently graduate approximately 1,300 new emergency physicians per year,⁶ with this output increasing by about 3-4% per year. A linear mathematical model of the emergency medicine workforce by Holliman^{7,8} has been used to analyze the US emergency medicine workforce at varying levels of emergency physician demand, residency output, and emergency physician workforce attrition. Using workforce assumptions considered to be most likely (32,000 total emergency physician demand, 1,300 resident graduates per year, 3% workforce attrition rate, and 3% annual increase in US ED visits), the supply of emergency physicians would increase gradually to meet demand in 20 to 25 years. However, Haase,⁹ in a study of emergency physician demand and supply in Missouri, demonstrated that formulaic estimates of ED workforce requirements (5 FTEs per ED and # of ED visits divided by 4700 visits per year per emergency physicians) may significantly underestimate the true demand for emergency physician services (as measured by direct tabulation of the number of emergency physicians on duty in all hospitals).

There are several demographic trends within US society that likely will impact both the number of ED visits and the mix of complaints evaluated in EDs. First is the increasing US population (2-3% per year), resulting in additional citizens seeking emergency care. The US population also is aging, resulting in the probability of an increased representation of disease presentations commonly seen in geriatric patients, particularly cardiac, respiratory, neurologic, and infectious disorders,^{1,2} as well as more ED visits per capita with increased disease severity per patient. Other population trends, such as increasing illicit drug use, excessive alcohol use, acts of violence, smoking, obesity, HIV infection, and others, harbor the likelihood of increasing the demand for ED services, further increasing the number of ED visits nationwide.

A number of additional practice considerations may impact emergency medicine workforce needs. First among these is the trend for an increasing number of emergency physicians to select a career in emergency medicine not solely devoted to clinical care. This may involve a variety of career tracks including emergency physicians who elect to work: in health care administration, either as ED directors, hospital medical directors, government officials, EMS administrators; medical research industry (eg, pharmaceuticals, insurance or information systems); specialized clinical practice related to emergency medicine (eg, toxicology or sports medicine), or academic practice with protected time for teaching as well as administrative pursuits. For personal reasons, a number of emergency physicians choose to work less than full-time, even if on a solely clinical career track.

Second is the potential impact of managed care on the utilization of emergency services. At one time, increased managed care enrollment was believed to impact ED volumes by shifting ambulatory acute cases from the ED to the clinic environment, as well as by reducing hospital excess capacity of “unused” beds, and closure of inefficient hospitals. Despite the presence and growth of managed care in the US health marketplace for over a decade, these changes have not had the predicted impact upon the marketplace. In theory, managed care would impact the mix of patients and service demanded of the ED, including fewer primary and urgent care cases, and increasing demand for intermediate clinical decision making, observation services, and specialized emergency services. This impact on the demand for emergency services has been less than originally predicted, and likely will not impact much further over the next 5-10 years.

Third is the impact of providers of emergency care other than American Board of Emergency Medicine (ABEM)-certified emergency physicians. These include not only moonlighting physicians, but also non-emergency medicine residency trained physicians who are not board certified by ABEM (who may or may not be certified by other certifying boards). The total number and FTE of these physicians practicing in US EDs is unknown. In the ACEP workforce studies, it was estimated that 40-50% of physicians practicing in EDs in 1997 and 1999 were non-ABEM certified, accounting for 11,047-12,274 FTEs and 16,570-18,142 physicians overall.^{4,5} It is anticipated that, as the supply of ABEM certified emergency physicians grows and as hospitals increasingly require ABEM certification as a credentialing standard, that the supply of moonlighters and non-ABEM certified physicians will decline. However, many of these individuals have careers in emergency medicine practice and they will continue to have a presence, albeit a diminishing one, in the emergency medicine workforce into the near future. Factors that may tend to support a continuing emergency medicine career track for these individuals include increasing aggregate demand for emergency services as well as continuing difficulties in staffing rural, low volume, and “undesirable” EDs with ABEM-certified emergency physicians.

Fourth is the staffing pattern in rural EDs. Both the ACEP workforce studies^{4,5} as well as studies by McGirr, Williams, and Haskins^{10,11,12} have shown that coverage by residency trained and board certified emergency physicians is lower in rural EDs than found in urban and suburban EDs. Haskins found that 80% of emergency care in Kansas was provided by rural family physicians. McGirr’s data regarding care in 20 rural West Virginia EDs showed an average of 2 ± 2 full time physicians per ED, with staffing of these 20 hospitals by 40 full-time and 90 part-time emergency physicians. Of the 40 full-time emergency physicians, only 3 (7.5%) were residency trained, and 5 (12.5%) were ABEM-certified; 20 of 40 (50%) full-time emergency physicians were board certified in primary care, 13 (33%) were not board certified in any specialty, and 13 of 40 (33%) were foreign medical graduates. The part-time physicians typically were moonlighting residents, foreign medical graduates, or physicians without board certification. Significant challenges to recruiting trained and certified emergency physicians to rural environments include professional factors (access to consultants, inadequate resources and equipment, access to continuing medical education) and personal factors (lifestyle, leisure pursuits, childrens’ education, and salary). It is unlikely that these recruitment challenges will change without intervention. Common solutions to address staffing deficiencies include the use of physician contracting groups, locum tenens staffing, and mid-level providers (nurse practitioner and physician assistants). Nearly half of all rural EDs use mid-level providers, one third of mid-level providers practice in rural environments, and 10% practice in EDs. However, exact numbers are not known. This situation is unlikely to change in the short term.

A final consideration impacting the emergency medicine workforce is the availability and role of non-physician ED providers, such as nurse practitioners (NPs) and physician assistants (PAs). The national shortage of nurses has been well-documented.¹³ It is a workforce issue that affects ED function, both in terms of its negative impact on operational capacity, as well as staffed bed capacity. Beyond the ED, such capacity constraints impact both floors and intensive care units throughout the hospital, and contribute to overcrowding.¹⁴ The total number of NPs and PAs, the number of new individuals entering and leaving the emergency medicine workforce each year, and the roles of such individuals within emergency

medicine practice groups are largely unknown. A yardstick that has been used in primary care is that one NP or PA can increase the efficiency of one primary care physician by approximately 50%, but it is unclear if this is also true in emergency medicine practice as well. The attractiveness of NPs and PAs to emergency medicine groups and to hospitals are readily apparent – their salary cost is a fraction of a physician's, and they can manage a significant portion of practice encounters, creating value in comparison to a physician hire. They are also plentiful – the output of NP and PA schools are rapidly growing, by as much as 50-100% over the last 6 years, turning out 10,000 PAs and 33,000 NPs annually (collectively, almost triple the output of US medical schools annually). Estimates are that there may be as many as 300,000 NPs by 2012, which would constitute nearly half of the physician workforce. Given the plentiful supply, their value, their ability to process routine encounters, the increasing cost consciousness of hospitals, and their willingness to serve in rural, low volume, and “undesirable” EDs, these individuals likely will have an increasingly significant role in the emergency medicine workforce.

Liability Issues

The US Department of Health and Human Services (HHS) released a report in July of 2002 stating that “curbing excessive litigation” is a critical element of reform that will help Americans obtain better and more affordable health care.

From 1975-1985 the frequency of malpractice claims per hundred physicians increased at roughly 10 percent a year. The claim severity (average amount per paid claim, including jury verdicts and out-of-court settlements) rose twice as fast as the consumer price index. Malpractice premiums increased sharply.¹⁵ By the mid-1980s, one estimate placed the overall claims rate at 16.3 per 100 physicians, with geographic and inter-specialty variation.¹⁶ The median size of awards was estimated to be \$400,000.¹⁷ According to the June 2003 ACEP fact sheet, medical liability insurance premiums have risen more than 500 percent nationally between 1996 and 1999.¹⁸ In 2001, 12 malpractice verdicts exceeded \$20 million, and the costs of America's tort system are predicted to go from \$200 billion in 2002 to \$300 billion by 2005. According to National Practitioner Data Bank statistics, there was a 30% increase in the amount paid out in awards in physician liability cases from 1999-2003. Fifty-seven percent of medical malpractice premiums go toward attorneys' fees, and more than 50% of awards go to attorneys, as well.

Many people in the US believe that health care is a right and that malpractice litigation is a natural extension of that right if they are dissatisfied in the quality or outcome of their health care. Malpractice cases likely will continue into the future, although the rate of increase in awards may be slowed as more states grant legislative caps on pain and suffering. In the July of 2002 report from the HHS, it was noted that there is a substantial difference in malpractice premiums in states with meaningful caps, such as California, Wisconsin, Utah, and Hawaii, as compared to states without such caps. A nationwide poll of 1000 people that was conducted in March 2004 for the Health Coalition on Liability and Access showed that 72% of those polled believed that the rising cost of health care is due to the increasing costs of medical liability suits. The majority (55%) said that the number of lawsuits is not justified. Of those polled, 75% wanted Congress to fix the medical liability crisis. The American Medical Association (AMA), ACEP, and many other groups are supporting the passage of a federal cap of \$250,000 on non-economic damages. In the 2002 AMA House of Delegates stated that liability reform is its highest legislative priority.

In the HHS report mentioned above, it was noted that the federal government pays an additional \$28 - \$47.5 billion per year through its Medicare, Medicaid and other health care programs due to medical liability costs and defensive testing of patients.

As discussed in the 2003 Community in Crisis ACEP information paper by Dr. Gardner and Dr. Schmitt, legislative reform does not come easily.¹⁹ In the states, the legislation may pass, but the legislation is subject to the interpretation by the courts, which may not be in agreement. Federal legislation likely will

be even harder to pass. According to the Texas Medical Liability Trust (TMLT), the number of liability suits filed in courts against physicians increased multi-fold in the month before the tort reform legislation took effect in 2003. Conversely, the number of liability suits filed dropped dramatically after the legislation took effect. With the passage of a \$250,000 cap on noneconomic damages in Texas, the TMLT, the largest liability insurer of Texas physicians, decreased its premiums twelve percent, in anticipation of reductions in jury awards and settlements.²⁰

The public wants to stem the rising cost of health care, which the public realizes is due at least in part, to increasing medical liability costs. With increasing support from the public, and with liability reform being the top legislative issue of the AMA and other medical organizations, it is likely that more state legislatures will pass caps on noneconomic damages, that liability award amounts will decrease, and ultimately the cost of liability premiums will decrease in the future.

Compensation Issues

When looking into the future of medical reimbursement, reading the crystal ball is complex. Trying to predict the winds of political change is risky. Irrespective of ones opinion regarding universal health care coverage, financing remains elusive in any event. The Medicare system will be stressed increasingly by an increase in Medicare beneficiaries and a decrease in the tax base. The remainder of this discussion assumes that the current health care financing system remains unchanged.

The costs for health care are borne in a variety of ways in the US. Major sources of reimbursement include private insurance, government insurance, and self-pay. In 2002, these funding sources provide the following coverage (percentages not equal to 100 because of coverage overlaps):²¹

- Private insurance – 69.6%
 - Employment – 61.3%
 - Direct purchase – 9.3%
- Medicare – 13.4%
- Medicaid – 11.6%
- Military health care – 3.5%
- Self pay (uninsured) – 15.2%

These are national percentages. Large variations exist at the regional, state and local levels. An example would be the regional breakdown of the percentage of people without health insurance for more than one year:

- Northeast – 13.0
- Midwest – 11.7
- South – 17.5
- West – 17.1

When considering the effects of the aging population over the next 10-20 years, it is instructive to look at the 45-54 and 55-64 age groups:

Age group 45-54 years:

- Private insurance – 78.8%
 - Employment – 73.6%
 - Direct purchase – 7.7%
- Medicare – 3.4%
- Medicaid – 5.5%
- Military health care – 3.4%
- Self pay (uninsured) – 13.9%

Age group 55-64 years:

- Private insurance – 75.9 %
 - Employment – 67.5%
 - Direct purchase – 11.2%
- Medicare – 8.7%
- Medicaid – 6.5%
- Military health care – 5.4%
- Self pay (uninsured) – 12.8%

While these two age groups have a lower percentage of uninsured persons than the national average, a significant portion of these populations still do not have coverage. These patients will become eligible for Medicare. The effects of this will depend on local circumstances. It could be beneficial to an ED with a large percent of uninsured patients and poor capture of associated charges. Conversely, an ED with a low percentage of un-insured patients may not realize the same benefit. There also will be a marginal increase in reimbursement, as Medicaid patients shift onto the Medicare rolls. Overall, expect reduced reimbursement as well as downward pressure on revenues, as the large number of privately insured patients shift onto the Medicare rolls.

In summary, the aging population will shift more patients to Medicare coverage. The increasing numbers of Medicare recipients will put increasing pressure on the Medicare system. Future attempts at cost containment – such as increasing the age of eligibility and reducing Medicare reimbursement – are predictable.

Emerging Technology: Affecting Productivity, Outcomes and Scope of Practice

Technology is having, and will continue to have profound effects on the clinical practice of emergency medicine. Our medical system has a history of research and innovation in diagnostic tools and treatments. Despite the strength of our medical system, problems remain. Unlike other major industries, medicine has yet to fully adopt and benefit from the advances in information technology and still operates largely, with paper-based records. Concerns about medical errors, poor communication, administrative inefficiency, and uneven quality have attracted national attention. Medical records are frequently handwritten, fragmented and unavailable at the point of care. Physicians keep drug dosages, interactions and clinical guidelines in memory, a difficult task given the overwhelming amount of data and advances in medicine. Handwritten orders can lead to confusion and errors. Government agencies and consumer groups are advocating for the adoption of new technologies to reduce errors and increase efficiency. The US spends more than a trillion dollars per year on health care, but spent just \$23.6 billion on health care information technology last year.²² Information technology remains a small, but growing fraction of total spending on health care.

The ED has emerged as a diagnostic center. Physicians refer patients when symptoms require emergent workup, at any hour of the day. Better diagnostic tools will increase productivity and improve outcomes. Emergency physicians can extend their market and services beyond their physical workplace using telemedicine.

Electronic Medical Records

President Bush recently outlined an initiative for the widespread adoption of electronic medical records within 10 years.²³ A functional system would have a remarkable effect on medicine. A complete medical record including diagnostic images would be available at the point of care regardless of where it originated. Electronic records also will facilitate surveillance for outbreaks of infectious diseases.

Obviously, challenges remain in the adoption of electronic medical records. Currently, only 20% of hospitals and 5% of doctors utilize electronic medical records.²² Much of the spending on information technology currently comes from relatively deep-pocketed hospital centers and academic groups. Consumer and government groups may advise their clients to visit “best practice” facilities which offer improved information technology. Smaller facilities and individual practitioners face hard choices about funding costly information technology products. Increased investment in information technology may become part of the cost of doing business in medicine. President Bush has earmarked \$100 million in 2004 for demonstration projects in information technology; however, it remains unclear how funding will be obtained for widespread adoption of the new technology.

Currently, multiple systems exist for medical records. Integration of these systems remains an issue.²⁴ President Bush has created a new sub-cabinet position to help coordinate the adoption of a uniform standard to permit the sharing of electronic medical records between providers. Industry groups have attempted but failed, thus far, to reach a consensus.

The importance of a patient’s privacy is instilled early in medical training. The Health Insurance Portability and Accountability Act (HIPAA) outlines privacy standards pertaining to electronic medical records. However, the adoption of electronic medical records could enable greater or more frequent abuses to occur than in the past.

Computerized Order Entry

Computerized physician order entry (CPOE) is a computer function that replaces hand written orders and offers decision support to physicians. Though controversial, recent research concluding that medical errors may account for 50,000 to 100,000 deaths per year has created great public interest.²⁵ The Harvard Medical Practice Study concluded that adverse drug events accounted for 19% of all adverse events.²⁶ Consumer groups, notably the Leapfrog Group, are urging adoption of CPOE to reduce medication errors, reduce variability in care, and improve efficiency.²⁷ Medication errors cost an average of \$2000 and add to patient length of stay and patient mortality.²⁸

Medication safety could be improved with CPOE - by notifying a physician of drug allergies, dosages and potential interactions.²⁹ Decision support tools help to standardize care.³⁰ For example, a diagnosis of pneumonia could lead to the institution’s care plan for that diagnosis. Efficiency could be improved by increased communication between departments. However, increased physician time may be needed for order entry.

Obstacles remain to the adoption of this technology. Despite potential savings by reducing errors, purchase and implementation of CPOE requires a large initial investment. In emergency medicine, orders are frequently given verbally for critically ill patients. It is unclear what role CPOE would play in this situation. Also, effective and accepted decision support requires the adoption by system designers of the specific language as well as clinical logic of emergency medicine. The implementation costs of a functional system can be significant, although reduction in adverse drug events, increased efficiency and decreased duplicate testing may offer even greater value. Another concern is that improper data entry could cause an acceleration of errors.

Adoption and use of CPOE has become a focus of both government and private groups, both of which are large health care consumers. Savings generated by a CPOE may benefit a payer when payment is linked to actual charges or length of stay. Therefore, in the future employers and payers may contribute to the cost of CPOE to realize an overall cost savings.²⁷ Undoubtedly, CPOE will have an expanding role in operational systems of the future.

Telemedicine and Broadband Communication

Broadband technology combined with exponential growth in computing power has decreased the cost of communication. Voice, data and images can be transmitted using broadband technology. Technology allows the remote consultation and monitoring of patients.

Real-time availability of emergency physicians may allow the use of information systems for remote consultation in nursing homes, rehabilitation centers, dialysis centers and airplanes. Widespread adoption of this possibility may require payer acceptance.³¹

Emergency medical services (EMS) communication systems are improving with new technologies. Development of automatic automobile crash notification systems can reduce scene response times. Improved communications can improve resource utilization and reduce response times in mass casualty events. Wireless carriers are required by Federal Communications Commission (FCC) rules to provide location information for all wireless 911 calls by 2005. However, progress toward that goal may be delayed. Investments in broadband technology will allow emergency physicians to view images and data in real time from EMS crews, with obvious implications for improved quality of care.³²

Diagnostic Technology

Diagnostic bedside ultrasound is gaining rapid acceptance into clinical practice and has been included as a necessary procedural skill in ACEPs policy statement, "Model of the Clinical Practice of Emergency Medicine."³³ Bedside ultrasound allows the rapid and non-invasive detection of life threatening disorders, and improves outcomes and productivity. For instance, a bedside focused abdominal sonography for trauma (FAST) exam to reliably detect intra-abdominal injury can be completed in minutes, in lieu of a diagnostic peritoneal lavage (DPL), which may require laboratory evaluation and can result in morbidity.³⁴ Bedside ultrasound increases physician productivity. For example, a recent study showed that pelvic ultrasound performed by emergency physicians can decrease length of stay in the ED.³⁵ The use of ultrasound in the ED can be expected to increase as greater numbers of residency-trained physicians join the workforce.

The technology and resolution of diagnostic imaging available to emergency physicians is continuing to improve. For example, a spiral CT allows more rapid imaging than a conventional CT. Introduction and use of multi-detector CT increases imaging speed 3-6 times versus single detector machines. Faster scanners increase performance, resolution and anatomic detail.³⁶ For instance, increased anatomic detail improves sensitivity for a diagnosis such as pulmonary embolism, while the superior speed permits simultaneous scanning of the peripheral vasculature to detect deep vein thrombosis.

Summary

The fundamental skill of emergency medicine remains bedside clinical diagnosis, which requires high-touch, low-tech skills. However, exponential and accelerating changes in technology are having profound effects on documentation, communication, productivity and outcomes. The competitive marketplace, as defined by government, consumer groups, hospitals and physicians, is encouraging the adoption of new technologies. The long-term solution is widespread adoption of improved information and diagnostic technology. However, implementation costs may cause a short-term gap between well-funded centers that can afford to invest in new technology and less advantaged organizations, which cannot.

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