ACCESS TO ORAL HEALTH SERVICES IN THE U.S.  
1997 AND BEYOND

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December 1997
Access is a term used to describe a broad set of concerns that center on the degree to which individuals and groups are able to obtain needed services from the health care system. A key test of access is equity and whether differences in the use and outcomes of health services result from financial or other barriers to care. Access has many definitions that typically deal with characteristics of the population, utilization, the process of care, and outcomes, including satisfaction. Because of data limitations, this paper focuses on the proportion of persons with a dental visit in the past year, and number of dental visits, as the primary indicators of access to oral health services.

Access to dental care in the U.S. appears to have increased for many populations during the last decade, with increases in utilization for every age group, both sexes, all income levels, all levels of education, and the major racial/ethnic groups. Blacks have gained relative to Whites, and inequities attributable to income appear to be lessening. While these trends are encouraging, they are no cause for complacency, as the overall trends tend to mask more subtle, but important, differences between populations that continue to exist. Special needs populations, including the elderly, homeless, homebound, migrant and seasonal workers, disabled populations, persons with HIV, the incarcerated, and very young children all have unique problems that act to further limit their access to oral health services.

Access to oral health services is limited by such factors as the availability of providers, state dental practice acts that limit who can provide oral health services, a plethora of federal programs intended to increase access but that are not held accountable for doing so, a limited number of school-based health centers that provide dental services, not having a regular source of care, and not having health or dental insurance. Persons without health insurance are not only less likely to receive health coverage; they are also less likely to get needed dental care. About 55 percent of the population does not have private dental insurance. Those without dental insurance are less likely to have seen a dentist recently, less likely to be using preventive dental services and having all their dental needs addressed, and more likely to be making episodic use of the dental care delivery system. By all accounts, Medicaid has failed to live up to its potential and mandate to make dental services available to the poor.

Solutions lie in using known effective preventive interventions, increasing the use of school-based dental programs, supporting expansions of community clinics, better integrating oral health with primary care, instituting Medicaid reforms, increasing the productivity of the dental workforce and using nontraditional providers, strengthening the dental public health infrastructure, and using multiple public and private partners. Policy change will require creativity, experimentation, and resources. These in turn will require political will.
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Access is used as a shorthand term for a broad set of concerns that center on the degree to which individuals and groups are able to obtain needed services from the health care system. Many definitions of access have been offered. The Institute of Medicine (IOM) defined it as "the timely use of personal health services to achieve the best possible health outcomes." The IOM selected this definition in part because it relies on both the use of health services and health outcomes as yardsticks for judging whether access has been achieved. For the IOM, though, and for the purposes of this paper, the test of equity of access is the more important issue, and involves determining whether there are systematic differences in use and outcomes among groups in U.S. society, and whether these differences result from financial or other barriers to care.

Measures of access

A variety of groups of measures have been used to define access, including 1) characteristics of the population and health care providers in a geographic area, e.g., family income, health insurance coverage, and the number and distribution of health manpower and facilities in an area; 2) health services utilization in the aggregate and/or for certain population subgroups, or utilization relative to an empirical indicator of need, e.g., restricted activity days or bed disability days; 3) process indicators--descriptions of qualitative aspects of an individual's contact with the health care system, e.g., whether there is a usual source of care, travel time to the health care provider, waiting time in the provider's office, delays to an appointment, time spent with the individual during a visit, and availability of the provider at night and on weekends; and 4) satisfaction with the health care received.

While utilization rates are important and useful indicators of access, they fail to reveal all the dimensions of access if used alone to gauge equity of access. In particular, they do not reveal whether people receive the services they need. For this reason, looking at health care outcomes is a complementary approach to measuring access, although access is only one of several mediating factors that stand between the use of health care services and desired health outcomes. Perhaps the most important access consideration is whether people have the opportunity for a good outcome--especially in those instances in which health care can make a difference. When those opportunities are systematically denied to groups in society because they face barriers to care, there is an access problem that needs to be addressed.

The issues and difficulties in defining and measuring access to health care are no
different than those applying to access to oral health services in the U.S. today. The most commonly used indicators of access to oral health services are the proportion of the population with a dental visit in the past year, and the number of visits per person in the past year. These are the only national indicators of access to oral health care that continue to be monitored over time, and even the method by which these indicators are assessed has changed between national surveys, further clouding analysis of trends. As a consequence, while cognizant of the shortcomings of these indicators, this paper will use these indicators as the primary indicators of access to oral health services.

Utilization of dental services in the U.S.

General trends

Overall, if measured using the traditional indicators noted above, access to dental care in the U.S. appears to have increased for many populations between 1983 and the most current national surveys in 1988-94. In fact, among the non-institutionalized population, there have been increases in utilization for every age group, both sexes, all income levels, all levels of education, and the major racial/ethnic groups. In some cases, these increases have been dramatic, as with those for persons aged 75 years and over.

There are also encouraging trends among use of dental services by some racial/ethnic groups, e.g., gains among Blacks relative to Whites. It is also encouraging that inequities attributable to income appear to be lessening. These trends suggest that differences in "access" (utilization) attributable to race and income are becoming less important, and that we are moving towards a more equitable distribution of services. As encouraging as these trends are, they are no cause for complacency, as the overall trends tend to mask the more subtle, but important, differences between populations that continue to exist. These differences illustrate why just looking at overall utilization rates gives an incomplete, and in many ways inadequate, picture of access.

Another persistent and troubling racial difference is in the use of preventive services, in particular the use of sealants. For example, among 5-17 year-olds, the percentage of White children who have had one or more sealants applied to their permanent teeth is three times that of Black and Mexican-American children.

One of the lowest rates of dental service use in the past year is among the edentulous population aged 65 years and over; only 10-11 percent of this group had a dental visit in the past year, which is less than one-fourth that of the entire population in this age group. However, because rates of edentulism are continuing to decline, the steady increase in use of dental services by the elderly population should also continue.

Special needs populations
Elderly
The elderly comprise a population group of such variability in physical, mental and medical health status that using only age categories to define their dental needs and access issues is not appropriate. Access to dental care for the elderly is affected by the many changes in society that have occurred during the past decade, as well as factors such as the unpredictability of some illnesses; reduced energy reserves; time needed and dependence on others for transportation; need to spend income on medical copayments, pharmacy bills, or assistive care services; safety issues when going out, etc. Age cohort also affects elders' attitudes toward dental health and use of dental services, with the greatest difference between cohorts being that the "new elderly" tend to be dentate and use dental services similarly to adults who are still in the workforce.

Homeless persons
Homelessness is becoming increasingly prevalent as individuals lose their jobs and families separate or slip into poverty because of the high cost of medical bills, housing or other reasons. No national studies have been conducted on the dental health needs or care patterns of homeless persons. Local studies are consistent in finding high proportions of the homeless who have not visited the dentist for prolonged periods of time; high prevalence of unmet dental need; and high proportions who use dental services only irregularly.

Migrant and seasonal workers
Major national studies have not been helpful in enumerating migrant families, and in fact there is no agreed upon definition of migrants. The majority of migrants seek health care for acute problems rather than preventive visits since most are not eligible for health benefits and most employers do not provide health insurance to seasonal workers. Dental health is cited in numerous studies as one of the top ten health problems of migrant children.

Disabled populations
The proportion of the U.S. population found to have disabilities has risen in the past 25 years, with greater numbers of children and young adults now reporting disabilities. Due to the wide variability in the medical and educational diagnoses that fall under the term "disabilities" or even "developmental disabilities," national studies of disabled populations have not been attempted. Most studies indicate higher rates of dental disease in some "disabled" populations, not necessarily as a direct result of the disabling condition, but due to personal and professional dental neglect. Performance of oral hygiene and treatment in light of the complex medical and behavioral problems that sometimes arise is challenging and sometimes creates safety issues for both the individual and the dental practitioners. Behavioral management, therefore, has been deemed a significant barrier to care for some disabled individuals. Lack of training in sophisticated management techniques and complex medical problems also makes dental professionals unwilling to care for this population. Most U.S. studies report access problems related to 1) dentists' unwillingness to treat disabled persons because
of inadequate training, time involvement, rising malpractice liability if they use sedation, etc., 2) lack of general dentists and dental specialists who accept Medicaid reimbursement, 3) child's behavior problems, 4) family's transportation problems, and 5) competing priorities for care.

**Persons with HIV**
The future of dental service use by the HIV-infected population is clouded by conflicting evidence. The largest study conducted on the health services needs of HIV-infected persons after implementation of the Ryan White CARE Act found the utilization of dental services to be similar to that of the general population, but a recent study in San Francisco, also conducted after implementation of the CARE Act, found unmet dental needs that were quite high. If the need for dental services is so acute in San Francisco, the city with perhaps the best reputation in the U.S. for its system of services for HIV-infected persons, then the continuing proportion of this population with high levels of unmet dental need is troubling.

**Incarcerated**
Virtually all that is known about access of incarcerated populations to dental care is limited to the federal prison population, where there appears to be an adequate supply of dental manpower be able to meet the current demand, but the extent to which the demand for services reflects the need is unknown.

**Very young children**
Recent studies revealing relatively high caries rates and low use of dental services among preschool age children--especially among low-income children--indicate that even where policy exists that mandates dental care when necessary, agency funding and/or the availability of sufficient providers still sometimes results in children not being served. Further, part of the explanation for the low use of dental services among preschool children is related to the inability or unwillingness of general dentists to see children in this age group. The problem is compounded by declining numbers of pediatric dentists. Without action to substantially increase the number of general dentists treating this population and to train nondental providers to provide exams, preventive care, and parental counseling/anticipatory guidance for young children, the use of dental services by this group seems unlikely to improve.
Barriers to access

Availability of providers

Among the reasons the poor receive less dental care than others is that the number of dentists in a community affects access. Higher-income areas have two-thirds more dentists per capita than low-income areas, and the supply of dentists per capita actually decreased in low- and medium-income areas during the 1980s, while it increased in high-income areas.

Research and experience show that employing expanded function dental auxiliaries to provide a number of services currently restricted to dentists by state dental practice acts is one way in which the efficiency of the nation’s dental care delivery system could be increased. Nevertheless, most states continue to have laws precluding dentists from employing such persons for this purpose, and even the federal government has not established an overall policy requiring or promoting the use of such auxiliaries in federally supported dental care delivery programs.

Federal programs

A broad range of federal agencies and programs are aimed at alleviating access problems, including Rural Health Clinics, the National Health Service Corps (NHSC) and Title VII and VIII education and training programs. Federal review has found that these programs historically have not been held accountable for showing that access has improved. For example, a review of the Rural Health Clinics program found that the availability of care did not change appreciably for at least 90 percent of Medicare and Medicaid beneficiaries using the clinics; the federal subsidies had not been used to expand access to underserved portions of the populations; and the clinics did not need the federal subsidies to remain financially viable. Studies of the NHSC found that it does not distribute provider resources as effectively as it could to alleviate health care needs in the greatest number of eligible shortage areas. And while almost $2 billion has been spent in the last decade on Title VII and VIII education and training programs, there has been no evaluation of whether these programs had a significant effect on changes that occurred in the national supply, distribution, or minority representation of health professionals or their impact on access to care.

School-based health centers.

Another method that has been proposed to help increase access to dental care for school-aged children is through dental care programs in school-based or school-linked health centers (SBHCs/SLHCs). These centers improve children's access to health care by removing financial and other barriers in the existing health delivery system, and take advantage of the fact that children in or linked to school settings represent a "captive audience" with easy access to services. Although SBHCs/SLHCs offer considerable potential for increasing children's access to dental services, relatively few currently offer dental services.
**Rural residence**

Rural residents face a number of barriers to the receipt of health services. Rates of health insurance in rural areas are lower, reflecting in part the fact that the poverty rate is higher in rural areas than in urban areas, so that rural residents are less able to afford insurance coverage. Rural residents are also more likely to be employed in agriculture and in small businesses, neither of which offer private insurance as extensively as more urbanized industries. Medicaid coverage tends to be less extensive in rural areas due to variations in coverage between states and to the exclusion of coverage for two-parent families in most states. Rural areas also have fewer preventive and health promotion programs than urban areas.

In nonmetropolitan counties, the ratio of both physicians and dentists to population decreases with declines in population size, even after controlling for population density and income. Urban residents are more likely to have dental examinations than rural residents, and 11 percent of rural residents have never visited a dentist. There is a common perception that the rural population is small and decreasing, which to some extent affects the desirability of practicing in rural areas. However, between 1900 and 1991, the number of nonfarm rural residents increased by almost 400 percent, and nonfarm rural residents now constitute one quarter of the population of the nation. These data argue against the prevailing notion that there are limited opportunities for dental practice in rural areas.

**Regular source of care**

Having a gap in health insurance coverage affects access to medical care in two ways: first, it requires families already having financial difficulties to pay out-of-pocket for services; and second, it makes maintaining a continuous relationship with a primary care physician much more difficult. As fewer children have dental insurance than have medical insurance, and as dental care is considered a more discretionary service than medical care, it stands to reason that the factors limiting the regular use of medical care will also limit the regular use of dental care. Among children, the extent to which the last dental visit was for a "checkup" or for preventive care is clearly income-related. Among children from lower-income families without health insurance, approximately 35 percent reported that their previous dental visit was preventive, whereas this figure was over 60 percent among those from the higher-income category.

Having a regular source of care has been found to dramatically increase the likelihood that Medicaid children will use dental services. Those children with a usual source of care were at least 15 times more likely to have had a dental visit in the past 12 months than those without a usual source of care. There is also evidence that children are more likely to use dental services if their parents also do, with one study reporting that children whose parents both saw a dentist in the past year were 13 times more likely to see a dentist themselves than children whose parents did not both see a dentist in the past year.
Health insurance

Persons without health insurance are not only less likely to receive the health coverage afforded by typical health insurance plans; they are also less likely to get needed dental care. Children with no health insurance are three times as likely as privately insured children to be unable to get dental care when they need it. Working-age adults are four times as likely as their privately insured counterparts to be unable to get dental care when they need it. And older adults with no health insurance are twice as likely as privately insured older adults to be unable to get dental care when they need it.

When children from poor families, minority children, and uninsured children were compared with a reference group of children from nonpoor, white, insured families, a higher proportion of children in every group were found unable to get needed dental care than was the case for any of the other health care services. In particular, uninsured children were more than twice as likely as children from poor families, more than three times as likely as children from minority families, and almost four times as likely as children from nonpoor, white, insured families to have reported they were unable to get needed dental care. This study showed that while poverty and minority status posed significant barriers to gaining access to primary care, the most important barrier was lack of insurance coverage.

Dental insurance

Private dental insurance has been a factor of increasing significance in the use of dental services since the 1970s. By 1989, 95 million Americans--about 38 percent of the total U.S. population at that time--had private dental insurance. It has been estimated that approximately 117 million Americans, or 45 percent of the total 1995 U.S. population, had private dental insurance.

Dental benefits are the third most commonly provided of employer-provided health benefits. A 1996 industry survey found that 52 percent of all employers provide a dental benefit. Of large employers (500 or more employees) it was reported that 87 percent provide dental benefits. People between the ages of 35 and 54 were the most likely group to have dental insurance; males were more likely than females (41.4 percent and 39.6 percent, respectively) to have coverage, especially those 45 years of age and older. A larger proportion of white persons (41.8 percent) than black persons (32.4 percent) had coverage, and non-Hispanics were more likely to be covered than Hispanics (41.5 percent and 29.7 percent, respectively).

Not surprisingly, persons with higher levels of education and income were more likely to have dental insurance, as health insurance is typically provided as an employee benefit, and persons with higher income and education are more likely to be employed in jobs that provide dental coverage. Persons with private dental insurance were significantly more likely to have had a recent dental visit than were those without such coverage. Overall, 71.4 percent of those with coverage had had a dental visit in the past year, compared with 50.0 percent of those without coverage. Among those with coverage, children 5-11 and 12-17 years of age had the greatest likelihood of a recent visit (81.3
and 82.1 percent, respectively), and persons aged 75 years and over had the least likelihood (36.0 percent).

Persons with private dental insurance had a higher number of dental visits per person per year (2.7) than did persons with no coverage (1.7). These differences existed in most age, sex, and race groups; however, there were still disparities between those with and without private dental insurance by age, sex, and race. The expected pattern of increased use of dental services associated with higher income was not as clear in the two lower-income categories for those with private dental insurance coverage. Insured persons with a family income less than $10,000 used dental services more often than those with an income of $10,000-$19,999.

Out of all the sociodemographic characteristics reported in the 1989 NHIS, lack of private dental insurance coverage had the most disparate effect on Blacks who made three or more visits in the previous year, with the insured group having almost twice the proportion with three or more visits as the uninsured group. These disparities in number of visits between insured and uninsured persons suggest that the uninsured are not only less likely to have seen a dentist recently, but also less likely to be using preventive dental services and having all their dental needs addressed, and more likely to be making episodic use of the dental care delivery system.

**Medicaid coverage**

By all reasonable measures, Medicaid has failed to live up to its potential and mandate to make dental services available to the poor. In a nation that spends approximately 5 percent of personal health care expenditures on dental services, less than 1 percent of Medicaid expenditures go toward this purpose, although the Medicaid population is clearly one with greater dental needs than the general population. It is estimated that less than one-half of 1 percent of Medicaid expenditures are for children’s dental services, the target of Medicaid’s Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) Program, which is considerably less than Medicaid spending for laundry services in nursing homes. Fewer than one in five Medicaid children receive any preventive dental services each year. Because Medicaid dental services for adults are optional, many states provide coverage only for emergency dental treatment.

Although in theory dental managed care would appear to offer some potential for increasing access to dental care under Medicaid, there is little evidence to support that perspective, and some evidence to support the opposite: that utilization of dental services, including preventive services, is lower under dental managed care programs than under fee-for-service arrangements. Because of this potential for the underprovision of services, managed care plans will need to be carefully monitored for both the quality and quantity of services they provide and should be held financially accountable for predetermined utilization rates.

**Conclusions and recommendations**
An ounce of prevention

Prevention, in particular community-based prevention programs, remains the cornerstone of any effort to make dental care available to more people. A greater emphasis on making preventive services available to more people will, in turn, allow more efficient use of the dental workforce and ultimately free up more resources to provide more extensive dental care for more people. Together, the use of fluorides and sealants continues to be our best means of controlling caries at the community level. The combination has been likened to childhood immunizations, i.e., the extent to which they can prevent caries is roughly comparable to the extent to which immunizations can prevent vaccine-preventable disease. Without a concerted effort to redirect public monies into fluoridation to serve the entire community, and sealant programs to serve underserved children, there will be little progress in fluoridating more communities and sealants will likely remain a privilege of the "haves" in American society.

Because the caries process can begin at a very early age, its prevention must likewise begin early--even before the first tooth erupts in children identified as high risk. Unfortunately, there are still few dentists--both general dentists and pediatric dentists--who are willing to see children this early. Further, few health professionals have been trained to provide adequate levels of oral health supervision to children prior to their first dental visit. Some ways of addressing this issue include: 1) increase training of primary care providers to provide exams, preventive care, and parental counseling/anticipatory guidance for young children; 2) provide reimbursement for preventive dental counseling and exams for young children; 3) provide on-site day care for families during their appointments, and incorporate a health education/wellness focus into the day care activities; 4) involve parents and members of underserved groups in planning programs for their care; 5) incorporate more preventive dental services into medical HMOs; 6) develop certification programs for dental professionals who wish to improve their skills in working with young children, individuals with chronic medical problems, or other types of special needs; and 7) teach child care providers to assess oral health needs and arrange for palliative care for oral symptoms.
School-based dental services

Although relatively few SBHCs currently offer dental services, the overall number of SBHCs has increased substantially in recent years, and there is no reason that dentistry should be excluded from the services offered by these centers. The availability of such centers with dental components would offer tremendous potential for improving children's access to dental care, especially to preventive services. In fact, the vast majority of existing community-based sealant programs are located in schools.

Community/rural/migrant health centers and other federal programs

While only 60 percent of community and migrant health centers provided dental services in 1996, they served more than 1 million people. They represent an established and successful model for serving hard-to-reach populations that often will not seek care from private dental providers in a community, even if they are available. In some rural counties in California, clinics have quadrupled Medicaid dental utilization rates. At the same time, federal programs aimed at increasing access to care must improve their focus on access, including developing better ways of measuring need and evaluating the success of individual programs in meeting this need.

Integration of oral health with primary care

Serious consideration must be given to investigating how to better integrate oral health with primary care. The lack of such integration has given us a health care system that routinely excludes the mouth in discussions of so-called "comprehensive" health care, but would never consider excluding other body parts from coverage. Until policymakers recognize the mouth as part of the body, dentistry seems destined to play a minimal role during negotiation of health benefits.

Medicaid and health insurance reform efforts

Medicaid dental performance falls far short of its promise. By law and regulation, Medicaid entitles one-quarter of all American children to comprehensive dental care, but by administration and implementation, it substantially fails these children. If the nation is going to continue to rely on the Medicaid program to serve the poorest Americans, some major reforming of that program will be necessary if services are to be provided through the existing workforce. Some potentially positive changes, such as allowing states to determine eligibility only once a year, were enacted as part of the recent balanced budget negotiations. Other changes that would help increase access include incentives for states to provide dental exams at an earlier age, financial incentives for providing preventive services, adequate reimbursement levels, and broader coverage for adults than many states currently allow. Some evidence already exists that changes such as these can increase access to dental services for Medicaid enrolled children, such as Washington’s Access to Baby and Child Dentistry (ABCD)
program.

**Workforce issues**

A variety of ways of addressing dental workforce issues need to be examined. In particular, attention needs to be directed at the already small yet decreasing number of practitioners willing and able to see young children. There appears to be a growing consensus that the way to do this is not by training more pediatric dentists, but by training more general dentists in how to handle children, and by making more efficient use of auxiliary personnel. To the extent that the provisions of state dental practice acts represent barriers to access, restrictions that limit who can provide services must be reexamined. There is ample evidence that expanded function dental auxiliaries could increase the efficiency of the dental workforce and assure the provision of needed services to more people at lower cost. In addition, the role of non-traditional providers needs further exploration.

**Strengthening the infrastructure**

Substantially more oral health-related assessment, policy development and assurance activities occur in states with full-time dental directors, and such leadership has been identified as essential to ensure that individuals at greatest risk for oral diseases are effectively targeted for preventive intervention. Consequently, all public and private dental organizations should be encouraged to develop, update, and/or strengthen current policy that advocates for dental public health programs and representation within state and local health departments.

There is also a diminished oral health presence in many federal agencies. There needs to be a dental presence within federal government agencies by securing dental leadership involvement on advisory groups, task forces, committees, and panels addressing issues of relevance to oral health.

**Need for multiple partners**

The continuing inability of large segments of our population to realize adequate access to dental services remains a large and complex problem. Some barriers to the utilization of dental services will require long-term social, political, and economic changes. Other barriers are likely to only be adequately addressed through collaborative efforts of the public and private sectors. Among the recommendations addressing this issue are:
• Form a "National Working Group on Access to Oral Health for Vulnerable U.S. Populations" to include non-dental business, labor, advocacy, and other groups interested in access to oral health.

• Promote public/private forums at state and local levels to foster collaboration on access issues of mutual interest that strive to improve access to care for vulnerable populations and to assure a dental presence on state and local advisory groups, task forces, committees, and panels addressing issues of relevance to oral health.

• Assure public and private leadership participation in dental organization leadership training, management conferences, and policy forums.

• Expand and enhance support for dental student loan repayment programs for practice in underserved areas and develop new approaches for increasing the number of dental professionals working in underserved areas.

In summary, despite gradual improvements in access to dental care for some populations, and despite the presence of a number of programs that have sought to increase access, one cannot help but assess the net effect of past and current efforts to improve access to dental care, especially for traditionally underserved populations, as falling far short of their potential. Change will require policies that: are based on scientific evidence; reflect differential risk; cast access to dental care as a community health problem, rather than a dental problem; recognize access, at least in part, as behaviorally determined; require that programs to improve access be community-based, with performance measured at the community level; and address the need for properly trained personnel, including not only traditional dental providers, but also non-dental personnel who can help assure access and address prevention and behavioral issues affecting access before dental professional help is typically sought.

These policy determinants require creativity and experimentation, which in turn require political will. With political will comes resource allocation. As a nation, we have the knowledge and resources to improve access to dental care for our underserved populations. What we have lacked is the political will to do so.
Introduction

"You don't have the money to keep your teeth," his voice, like his face was flat like the top of a table - round and flat and shiny and his eyes darted urgently from scalpel to drill arranging and re-arranging his tools as though he was preparing to solve my dental emergency.

"Ms. Gray I can't help you," this time the words were louder, a slight edge around 'can't'. "I'm afraid saving your teeth would require a root canal and you stated on your intake form that you don't have the financial resources to afford that kind of procedure."

"What can I do?"

"You have no choice but to have these teeth pulled, and I would suggest that if you are in pain, you have the extractions done immediately."

"But you said these teeth are restorable - and if they are missing it would be rather obvious..."

"That's all you can do." Suddenly he stopped arranging tools, snapped off his gloves and threw them in the trash with a pointed thump. Before that time I'd never heard rubber gloves make a thumping noise.

"Well, our time's up." He made a complete military pivot and left. The whack of the door-slam vibrated the steel clamp that had seized my skull since these two teeth had become inflamed. He left me in that room in the overly reclined dental chair. What could I do now? What did I do wrong?

Working or unemployed, dental work was a luxury. Ongoing dental insurance an impossibility. Now I was being encouraged to pull two teeth that were very near the front of my mouth." (Gray-Garcia, 1997)

In its exploration of access to health care in Access to Health Care in America (Institute of Medicine, 1993), the Institute of Medicine (IOM) noted that:

"Access is a shorthand term for a broad set of concerns that center on the degree to which individuals and groups are able to obtain needed services from the medical care system. Often because of difficulties in defining and measuring the concept, people equate access with insurance coverage or with having enough doctors and hospitals in the geographic area in which they live. But having insurance or nearby health care providers is no guarantee that people who need services will get them. Conversely, many who lack coverage or live in areas that appear to have
shortages of health care resources do, indeed, receive services.

For its purposes, the IOM defined access as "the timely use of personal health services to achieve the best possible health outcomes." The IOM selected this definition in part because it relies on both the use of health services and health outcomes as yardsticks for judging whether access has been achieved. In applying this definition, the IOM sought to occupy a middle ground between all care that people might want or need, and the belief that medical care can make an important difference in people's lives. The IOM believed that using this definition "forces us to identify those areas of medical care in which services can be shown to influence health status and then to ask whether the relatively poorer outcomes of some population groups can be explained by problems related to access." In other words, the IOM wanted to move beyond traditional approaches to access that have relied on enumerating health care providers, the uninsured, or encounters with health care providers to detect access problems. For the IOM, the test of equity of access is the more important issue, and involves determining whether there are systematic differences in use and outcomes among groups in U.S. society, and whether these differences result from financial or other barriers to care.

Measures of access

"The United States has a dental care system that does not provide equitable access to care, even though it has ample resources to do so. As a result, the dental health of the population varies widely by socioeconomic status" (Schoen, 1992).

A variety of groups of measures have been used to define access (Sloan & Bentkover, 1979). One such group refers to characteristics of the population and health care providers in a geographic area, which include family income, health insurance coverage, and the number and distribution of health manpower and facilities in an area. A second type of access measure relates to health services utilization in the aggregate and/or for certain population subgroups. A more refined but related measure is utilization relative to an empirical indicator of need, e.g., restricted activity days or bed disability days. For example, according to Andersen:

"Equitable distribution' does not imply that everyone should receive the same amount of health services. Instead...an "equitable distribution" of health services is one in which illness (as defined by the patient and his family or by health care professionals) is the major determinant of the distribution...Perceived need and evaluated need are the major determinants of health services use in such a system...On the other hand, social structure, health beliefs, family resources, and community resources should have less impact on utilization. Inequity is suggested, for example, if the distribution of services is determined by race, income or availability of facilities. Empirically, a distribution of services may be defined as more equitable, the stronger the association between utilization, perceived and evaluated need and demographic variables on
the one hand, and the weaker the association between utilization and social structure, health benefits, family resources and community resources on the other hand" (Andersen, Kravits, Anderson, 1975).

A third class of access measures encompasses process indicators, which are descriptions of qualitative aspects of an individual's contact with the health care system, e.g., whether there is a usual source of care, travel time to the health care provider, waiting time in the provider's office, delays to an appointment, time spent with the individual during a visit, and availability of the provider at night and on weekends. Finally, a fourth type of access measure involves attitudinal indicators of satisfaction with the health care received.

**Utilization indicators**

Utilization, sometimes referred to as "demand," has been measured in a variety of ways, one of the most common being the number or frequency of visits to a health care provider. Surveys exploring the nature of access have investigated various properties of utilization: who provided the care (e.g., physician or dentist); the care setting (e.g., private office, outpatient clinic, hospital); the purpose of the visit (e.g., preventive, episodic); and the frequency and continuity of use. However, this measure is not entirely appropriate since it does not distinguish between patient- and dentist-initiated visits, and takes no account of the amount or type of treatment performed (Yule and Parkin, 1985).

Studies of health services utilization frequently employ a medical care utilization model described by Andersen and Newman (Andersen and Newman, 1973). According to this model, there are three determinants of health services use: individual determinants, characteristics of the health services system, and societal determinants.

Individual determinants, of which there are three components, are expected to directly affect the use of health services. The three components are: characteristics that predispose one toward utilization ("predisposing factors"); enabling factors; and need factors. Predisposing characteristics reflect the fact that some individuals have a greater propensity to use services than others, and that these propensities can be predicted by various individual characteristics occurring prior to a specific episode of illness. Thus, predisposing factors can include sociodemographic factors, e.g., race, gender, education, and occupation, as well as attitudes and beliefs about health services, e.g., the belief that medical care can be helpful in treating illness.

Enabling factors reflect the fact that while one may be predisposed to use health services, one does not use them unless able to use them. Thus, enabling factors are the means through which an individual is able to access health services, and include one's family resources, e.g., level of income and health insurance, as well as community resources, e.g., availability of health facilities and personnel.

Finally, given appropriate levels of predisposing and enabling characteristics, the individual must perceive some need for using health services, which is represented by the type and level of illness, or the perceived threat of illness.
Characteristics of the health services system include its organization and the resources available to the system, such as the distribution and volume of resources within the health care system, the means through which an individual gains entry to or accesses the health care system, and barriers inhibiting entry to the system. Societal determinants include social norms and technological developments that lead to changes in the level of health services use, such as immunization programs and new antibiotics.

In its selection of access indicators, the IOM sought to capture indicators of utilization that would encompass the services of various types of providers in different settings, including primary care and specialty physicians and dentists. At the same time, the IOM was quick to point out the limitations of using utilization of health care services as an indicator of access. They noted that some people are prone to overuse medical care, whereas others may underutilize it for reasons that have little to do with access. Others use more services because they need more. For example, the poor may use a greater amount of care because they are more likely to have health problems than those with higher income levels. For these reasons, the unambiguous interpretation of utilization indicators requires that efforts also be made to account for need and appropriateness of services.

**Outcome Indicators**

While utilization rates are important and useful indicators of access, they fail to reveal all the dimensions of access if used alone to gauge equity of access. For example, a poor mother who brings her child for a visit to the clinic for treatment of a dental abscess but cannot afford to purchase the prescribed antibiotic may have a visit recorded, but few would consider that she had adequate access to care. A dentist may be reluctant to perform a root canal treatment for an uninsured patient, while readily providing such a service for someone whose insurance coverage will pay for the procedure. Thus, the poor and uninsured may enter the health care system, but it is difficult to tell whether they receive the services they need. Another limitation of using utilization of health care services as a way to measure access is that it is frequently impossible to track all of the services people need when they need them, especially for complex chronic diseases.

Looking at health care outcomes, therefore, is a complementary approach to measuring access. Outcomes can be measured in terms of survival (e.g., tooth survival in dentistry); states of physiological, physical, and emotional health; and satisfaction.

The IOM notes that access is only one of several mediating factors that stand between the use of health care services and desired health outcomes, and that these factors must be taken into account when selecting indicators and drawing conclusions about equity of access (Institute of Medicine, 1993). In any interaction between a health care provider and a patient, a given health service may not have a positive outcome because (1) it is inappropriate for that patient, (2) some percentage of all disease processes may not respond to the appropriate treatment, (3) the treatment is of questionable efficacy, (4) the disease defeats the best that health care can offer, (5) the diagnostic and
treatment skills of the provider are below acceptable standards, or (6) the patient does not follow the treatment regimen.

In summary, according to the IOM, "no matter how generally efficacious a particular health service may be, a good health outcome cannot always be guaranteed. The most important consideration is whether people have the opportunity for a good outcome--especially in those instances in which medical care can make a difference. When those opportunities are systematically denied to groups in society because they face barriers to care, there is an access problem that needs to be addressed" (Institute of Medicine, 1993).

**Dental access indicators**

The issues and difficulties expressed by the IOM and others in defining and measuring access to health care are no different than those applying to access to oral health services in the U.S. today. The most commonly used indicators of access to dental care are the proportion of the population with a dental visit in the past year, and the number of visits per person in the past year.
<table>
<thead>
<tr>
<th>Objective/Indicator</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Promoting successful birth outcomes</td>
<td>Percentage of pregnant women obtaining adequate care</td>
</tr>
<tr>
<td>Adequacy of prenatal care (u)</td>
<td>Children who die before first birthday (per 1,000 live births)</td>
</tr>
<tr>
<td>Infant mortality (o)</td>
<td>Percentage of infants born weighing less than 2,500 grams</td>
</tr>
<tr>
<td>Low birthweight (o)</td>
<td>Cases per 100,000 population</td>
</tr>
<tr>
<td>Congenital syphilis (o)</td>
<td></td>
</tr>
<tr>
<td>2. Reducing the incidence of vaccine-preventable</td>
<td>Percentage of preschool children vaccinated</td>
</tr>
<tr>
<td>childhood diseases</td>
<td>Cases per 100,000 population</td>
</tr>
<tr>
<td>Immunization rates (u)</td>
<td></td>
</tr>
<tr>
<td>Incidence of preventable childhood communicable</td>
<td></td>
</tr>
<tr>
<td>diseases (diphtheria, measles, mumps, pertussis,</td>
<td></td>
</tr>
<tr>
<td>polio, rubella, and tetanus) (o)</td>
<td></td>
</tr>
<tr>
<td>3. Early detection and diagnosis of treatable diseases</td>
<td>Percentage of women undergoing procedure in given period</td>
</tr>
<tr>
<td>Breast and cervical cancer screening (u)</td>
<td>Clinical breast exam</td>
</tr>
<tr>
<td>Incidence of late-stage breast and cervical cancers (o)</td>
<td>Mammogram</td>
</tr>
<tr>
<td></td>
<td>Pap test</td>
</tr>
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<td></td>
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<tr>
<td></td>
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</tr>
<tr>
<td>4. Reducing the effects of chronic diseases and</td>
<td>Average number of physician contacts annually those in</td>
</tr>
<tr>
<td>prolonging life</td>
<td>fair to poor health; proportion with no physician contacts in</td>
</tr>
<tr>
<td>Chronic disease follow-up care (u)</td>
<td>previous year</td>
</tr>
<tr>
<td>Use of high-cost discretionary care (u)</td>
<td>Admissions for referral-sensitive surgeries</td>
</tr>
<tr>
<td>Avoidable hospitalization for chronic diseases (o)</td>
<td>Admissions for ambulatory-care-sensitive chronic conditions</td>
</tr>
<tr>
<td>Access-related excess mortality (o)</td>
<td>Number of deaths per 100,000 population estimated to be</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Reducing morbidity and pain through timely and</td>
<td>Percentage of individuals with acute illness who have no</td>
</tr>
<tr>
<td>appropriate treatment</td>
<td>physician contact</td>
</tr>
<tr>
<td>Acute medical care (u)</td>
<td>Average number of dental visits per year</td>
</tr>
<tr>
<td>Dental services (u)</td>
<td>Admissions for ambulatory-care-sensitive conditions</td>
</tr>
<tr>
<td>Avoidable hospitalizations for acute conditions (o)</td>
<td></td>
</tr>
</tbody>
</table>

u: utilization; o: outcome


Table 1 displays the utilization and outcome access indicators and measures developed by the IOM. Interestingly, a dental services utilization indicator--average number of dental visits per year--is included as one of the overall indicators of access to health care, but no dental outcome indicator is included.

Annual dental visits include all visits made to a dentist, or to a technician or hygienist usually under a dentist’s supervision, for regular, specialized, or emergency dental care. People visit the dentist for many reasons: to have a regular oral examination and checkup; to receive preventive services such as sealants, topical fluoride applications, and prophylaxes; to obtain emergency treatment for pain or infection; to have decayed teeth restored; to have teeth extracted; to have periodontal disease treated; and to have missing teeth replaced. Dental care can help resolve oral disease problems and improve functioning, such as the ability to eat or speak; it can also improve appearance. To the extent that dental care can prevent the loss of teeth and help individuals maintain a healthy and attractive dentition, it plays an important social role in communication, employment, and job performance (Douglass, 1979).
One reason the IOM believed it was important to track access to dental services was because the use of dental services is quite sensitive to income. About 40 percent of Americans were covered by dental insurance in 1989 (Bloom, Gift, Jack, 1992), and those in higher-income brackets are more likely to visit a dentist than those less financially well off, regardless of broader health insurance coverage. Dentistry represents a health service that nearly everybody needs, but that is frequently overlooked as a component of the personal health care system.

Using the IOM work as the basis for its approach, The Robert Wood Johnson Foundation (RWJF) expanded upon the IOM's list of access indicators in its report, *Access to Health Care: Key Indicators for Policy* (Center for Health Economics Research, 1993). In this report, both utilization and outcome indicators were used as indicators of access. In addition, selected measures of the *health care resources available* were used, which for dentists was represented by the number of dentists per 100,000 people (see Table 2). Because of the difficulty faced by many Medicaid beneficiaries in obtaining access to health services, the report also used indicators of participation in Medicaid for some physician specialties (e.g., obstetrics), although this was not done for dentists, presumably because no data were available.

**Utilization of dental services in the U.S.**

Both the IOM and RWJF reports rely on data from the 1983, 1986, and 1989 National Health Interview Surveys (NHIS) to report on persons with a dental visit. Table 3 displays NHIS data on the percentage of persons 2 years of age and over with dental visits in the past year, and number of dental visits per person per year for 1983, 1986, and 1989, by age, sex, race, and family income. In addition, Table 3 displays unpublished data from the 1988-94 Third National Health and Nutrition Examination Survey (NHANES III)--Phases 1 and 2 for comparable population characteristics, where they are available.

<table>
<thead>
<tr>
<th>Utilization Measures</th>
<th>Outcome Measures</th>
<th>Resource Availability Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of children ages 2-4 with a dental visit in the past year</td>
<td>Percent of decayed teeth that were filled, children ages 5-17</td>
<td>Dentists per 100,000 people</td>
</tr>
<tr>
<td>Percent of children ages 5-17 with a dental visit in the past year</td>
<td>Percent of adults with no teeth</td>
<td></td>
</tr>
<tr>
<td>Percent of adults with a dental visit in the past year</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Center for Health Economics Research, 1993.

<table>
<thead>
<tr>
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<td></td>
<td></td>
<td></td>
<td>Percent</td>
<td></td>
<td></td>
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<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Number</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All ages</td>
<td>55.0</td>
<td>57.1</td>
<td>57.2</td>
<td>64.6</td>
<td>1.9</td>
<td>2.0</td>
<td>2.1</td>
</tr>
<tr>
<td>2-4 years</td>
<td>28.4</td>
<td>31.3</td>
<td>32.1</td>
<td>35.8</td>
<td>0.7</td>
<td>0.7</td>
<td>0.9</td>
</tr>
<tr>
<td>5-17 years</td>
<td>67.0</td>
<td>70.3</td>
<td>69.0</td>
<td>76.0</td>
<td>2.5</td>
<td>2.4</td>
<td>2.4</td>
</tr>
<tr>
<td>18-34 years</td>
<td>57.0</td>
<td>58.0</td>
<td>56.9</td>
<td>63.5</td>
<td>1.7</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>35-54 years</td>
<td>57.4</td>
<td>60.5</td>
<td>61.4</td>
<td>68.7</td>
<td>2.1</td>
<td>2.1</td>
<td>2.3</td>
</tr>
<tr>
<td>55-64 years</td>
<td>51.3</td>
<td>51.2</td>
<td>54.0</td>
<td>61.8</td>
<td>2.1</td>
<td>2.5</td>
<td>2.4</td>
</tr>
<tr>
<td>65 years and over</td>
<td>38.6</td>
<td>41.7</td>
<td>43.2</td>
<td>53.1</td>
<td>1.5</td>
<td>2.1</td>
<td>2.0</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>53.0</td>
<td>54.9</td>
<td>54.9</td>
<td>61.5</td>
<td>1.7</td>
<td>1.9</td>
<td>1.9</td>
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<tr>
<td>Female</td>
<td>56.9</td>
<td>59.2</td>
<td>59.4</td>
<td>67.5</td>
<td>2.1</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>57.0</td>
<td>59.2</td>
<td>59.3</td>
<td>66.1</td>
<td>2.0</td>
<td>2.1</td>
<td>2.2</td>
</tr>
<tr>
<td>Black</td>
<td>41.8</td>
<td>43.6</td>
<td>44.5</td>
<td>56.8</td>
<td>1.2</td>
<td>1.4</td>
<td>1.2</td>
</tr>
<tr>
<td>Family Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than $10,000</td>
<td>38.8</td>
<td>40.9</td>
<td>40.9</td>
<td>48.3</td>
<td>1.2</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td>$10,000-$19,999</td>
<td>47.5</td>
<td>47.5</td>
<td>43.4</td>
<td>52.3</td>
<td>1.5</td>
<td>1.6</td>
<td>1.5</td>
</tr>
<tr>
<td>$20,000-$34,999</td>
<td>61.4</td>
<td>61.0</td>
<td>58.3</td>
<td>63.0</td>
<td>2.3</td>
<td>2.3</td>
<td>2.0</td>
</tr>
<tr>
<td>$35,000 and over</td>
<td>74.0</td>
<td>73.5</td>
<td>73.0</td>
<td>77.3</td>
<td>2.7</td>
<td>2.7</td>
<td>2.8</td>
</tr>
</tbody>
</table>

3. For NHIS, ages 2 years and older; for NHANES, ages 2 months and older.

Although both the NHIS and NHANES surveys are of nationally representative samples, data from the two surveys are not strictly comparable. The NHIS is a cross-sectional household interview survey of the civilian noninstitutionalized population of the United States. The 1989 NHIS was conducted on a sample of 45,711 households containing 116,929 persons. Most of the reported data from the NHIS is limited to persons aged 2 years and older, because "younger children rarely, if ever, visit a dentist" (Bloom, Gift, Jack, 1992).

The NHANES III is a survey based on oral examinations of a representative sample (N = 33,994) of the U.S. population two months of age and older. However, data on utilization of dental services are reported for persons age 2 and older, as the dental part of the household questionnaire was not asked for children under 2 years of age (Vargas, 1997). NHANES III was conducted in two three-year phases over a six-year period. Phase 1 took place from October 18, 1988 through October 24, 1991, and Phase 2 took place from September 20, 1991 through October 15, 1994. Both phases were of equal length, the samples were of equal size, and both were nationally representative of the target population (Drury et al., 1996).
The question about dental visits in the 1986 and 1989 NHIS was, "How long has it been since (subject) last went to a dentist?" The question in the 1990 and 1993 NHIS was, "During the past 12 months...about how many visits did you make to a dentist?" The question in NHANES III was, "How long ago was your last visit to a dentist or dental hygienist?"

The sample size for the 1989 NHIS was considerably larger than that of NHANES III. Another difference between the two surveys was that there was oversampling of young children 2 months to 5 years of age, older persons 60 years and over, African-Americans, and Mexican-Americans in NHANES III. Also, Mexican-Americans were the only Hispanic population included in NHANES III (Drury et al., 1996).

Other recent data from the NHIS have been published on the percentage of persons 25 years of age and over who had a dental visit in the past year, by age group, sex, poverty status, race and Hispanic origin, and education, for 1983, 1989, 1990, 1991, and 1993 (see Table 4).

**Age**

The overall pattern of utilization displayed in Table 3 is very consistent, although there are a few minor variations, even after controlling for sex, race, income, education (adults 22 years of age and over), place of residence, and geographic region. When the utilization data are age-adjusted, the characteristics associated with a relatively high proportion of persons with a recent dental visit were non-Hispanic, suburban, college educated, income over $35,000, covered by private dental insurance, and in excellent or very good health. The NHANES III data displayed in Table 3 appear to continue the trend of an increasing percentage of the population with a dental visit in the past year for every population characteristic in common with the NHIS. Similarly, the data presented in Table 4 show substantial increases in utilization between 1983 and 1993 for all persons aged 35 years and over. Therefore, it appears to still be the case that, just as Douglass noted in 1979 when looking at 1963-64 and 1971-73 NHIS data, "age is an independent factor in determining utilization of dental services" (Douglass, 1979).

**Children**

Dental care received in childhood is a major factor in preventing poor oral health in later years (Bloom, Gift, Jack, 1992). Historically, utilization rates for the preschool segment of the population have been lower than for any other age group in the United States (Crall, 1995). Nevertheless, there has been a progressive increase in the use of dental services by preschool children. By 1989, about one-third of all children 2-4 years of age had visited a dentist in the past year, and this trend appears to be continuing: By 1988-94, nearly 36 percent of 2-4-year-olds had visited a dentist in the past year.

In addition, there has been a progressive decrease in the percent of preschool children who have never visited a dentist, from 64.2 percent in 1983 to 55.0 percent in 1989. Visits to a dentist in the previous year were reported more often for preschool children who are white, non-Hispanic, noncentral city metropolitan residents, residents of the Midwest region, live in families with higher incomes, and are covered by private dental
insurance plans than by their respective counterparts. Never having visited a dentist was reported more often for preschool children who are male, black, Hispanic (particularly Mexican), nonmetropolitan area residents, residents of the South region, and those who live in families with low incomes and are not covered by private dental insurance plans than for their respective counterparts (Waldman, 1995). In looking at progress toward the Healthy People 2000 objectives related to dental visits (Objective 13.12: Increase to at least 90 percent the proportion of all children entering school programs for the first time who have received an oral health screening, referral, and follow-up for necessary diagnostic, preventive, and treatment services. Objective 13.14: Increase to at least 70 percent the proportion of people aged 35 and older using the oral health care system during each year) it was noted that although among adults 35 and over, a slightly higher percentage are seeking dental care, in contrast, the proportion of 5-year-old children visiting a dentist in the past year actually declined from 66 percent in 1986 to 63 percent in 1991 (National Center for Health Statistics, 1996; National Center for Health Statistics, 1997b).

Children 5-17 years of age were more likely to have visited a dentist in the past year than persons of any other age. The proportion with a dental visit in the past year was more than twice that of 2-4-year-olds. Among these children, the proportion with a dental visit ranged from 72.3 percent (9-11 years of age) to 66.9 percent (5-8 years of age) in 1989. Data from the 1988-1994 NHANES III survey indicate that these rates increased slightly for 5-17-year-olds, although the relative proportion remained about the same.

**Adults**

In every NHIS study from 1983 to 1989, as well as in the 1988-94 NHANES III study, persons aged 35-54 years were the second most likely age group to have had a dental visit in the past year, followed by those aged 18-34 years, 55-64 years, and 65 years and over. At age 45 years and over, the proportion with a recent dental visit decreased with age, mostly due to increased edentulism in this age group (Bloom, Gift, Jack, 1992). For adults 22 years of age and over, the higher the educational level, the greater the proportion with a recent dental visit.

**Elderly**

Although only 2-4-year-olds had a lower proportion of persons with a dental visit in the past year than those age 65 years and over, the largest age group-specific increase between 1983 and 1989 was among those age 65 years and older (from 38.6 percent in 1983 to 43.2 percent in 1989). Similarly, the average number of dental visits per person per year was 1.9 in 1983, 2.0 in 1986, and 2.1 in 1989, with the largest increase again among those age 65 years and older (from 1.5 visits/person in 1983 to 2.0 in 1989). Table 4 shows that between 1983 and 1993, the most dramatic increase in persons with a dental visit in the past year--more than 13 percentage points--occurred
Table 4. Persons with a dental visit within the past year among persons 25 years of age and over, according to selected patient characteristics: United States, selected years 1983-93

<table>
<thead>
<tr>
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<td>Total</td>
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<td>58.9</td>
<td>62.3</td>
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<td>60.8</td>
</tr>
<tr>
<td>Age</td>
<td></td>
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<tr>
<td>25-34 years</td>
<td>59.0</td>
<td>60.9</td>
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<td>59.1</td>
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<tr>
<td>35-44 years</td>
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<td>69.1</td>
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<td>59.9</td>
<td>62.8</td>
<td>59.2</td>
<td>62.0</td>
</tr>
<tr>
<td>65 years and over</td>
<td>39.3</td>
<td>45.8</td>
<td>49.6</td>
<td>47.2</td>
<td>51.7</td>
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<tr>
<td>65-74 years</td>
<td>43.8</td>
<td>50.0</td>
<td>53.5</td>
<td>51.1</td>
<td>56.3</td>
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<td>75 years and over</td>
<td>31.8</td>
<td>39.0</td>
<td>43.4</td>
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<td>61.4</td>
<td>65.6</td>
<td>60.8</td>
<td>63.4</td>
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<td>Poverty status</td>
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<td>Below poverty</td>
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<td>38.2</td>
<td>33.0</td>
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</tr>
<tr>
<td>At or above poverty</td>
<td>55.8</td>
<td>62.1</td>
<td>65.4</td>
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<td>64.3</td>
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<td>Race and Hispanic origin</td>
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<tr>
<td>White, non-Hispanic</td>
<td>56.6</td>
<td>61.8</td>
<td>64.9</td>
<td>61.5</td>
<td>64.0</td>
</tr>
<tr>
<td>Black, non-Hispanic</td>
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<td>49.1</td>
<td>44.3</td>
<td>47.3</td>
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<td>Less than 12 years</td>
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<td>36.9</td>
<td>41.2</td>
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<td>38.0</td>
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<tr>
<td>12 years</td>
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<td></td>
</tr>
<tr>
<td>White, non-Hispanic</td>
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<td>39.1</td>
<td>41.8</td>
<td>38.1</td>
<td>41.2</td>
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<td>37.9</td>
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<tr>
<td>Hispanic</td>
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<td>36.5</td>
<td>42.7</td>
<td>28.9</td>
<td>33.0</td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>White, non-Hispanic</td>
<td>56.6</td>
<td>59.8</td>
<td>62.8</td>
<td>58.8</td>
<td>60.4</td>
</tr>
<tr>
<td>Black, non-Hispanic</td>
<td>40.5</td>
<td>44.8</td>
<td>51.1</td>
<td>43.1</td>
<td>48.2</td>
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<tr>
<td>Hispanic</td>
<td>48.7</td>
<td>56.5</td>
<td>59.9</td>
<td>49.5</td>
<td>54.6</td>
</tr>
<tr>
<td>13 years or more</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White, non-Hispanic</td>
<td>72.6</td>
<td>75.8</td>
<td>77.3</td>
<td>74.2</td>
<td>75.8</td>
</tr>
<tr>
<td>Black, non-Hispanic</td>
<td>54.4</td>
<td>57.2</td>
<td>64.4</td>
<td>61.7</td>
<td>61.3</td>
</tr>
<tr>
<td>Hispanic</td>
<td>58.4</td>
<td>66.2</td>
<td>67.9</td>
<td>61.2</td>
<td>61.8</td>
</tr>
</tbody>
</table>

1Data for 1983 and 1989 are not strictly comparable with data for later years. Data for 1983 and 1989 are based on responses to the question, “About how long has it been since you last went to a dentist?” Starting in 1990, data are based on the question, “During the past 12 months, how many visits did you make to a dentist?”
2Includes all other races not shown separately and unknown poverty status and education level.
3Age adjusted.
4Poverty status is based on family income and family size using Bureau of the Census poverty thresholds.
Source: National Center for Health Statistics, 1997a
Sex

The 1983, 1986, and 1989 NHIS surveys, as well as the 1988-1994 NHANES III survey, all confirm what many previous studies (Newman and Anderson, 1972; Suchman and Rothman, 1965; Avnet and Nikias, 1967; Salber, Greene, Feldman, Hunter, 1976; US Department of Health, Education, and Welfare, 1968; US Department of Health, Education, and Welfare, 1972) have shown: females tend to use dental services more than males. A higher proportion of females than males made dental visits in each of the periods reported, with females making more of an improvement than males over the six years represented in the NHIS surveys, although the number of visits per person changed very little over that period for either sex. In 1989, a higher proportion of females than males made dental visits for every age group, although differences were quite small among 2-4-year-olds and 5-11-year-olds, and were stated to be insignificant by 55 years of age and over (Bloom, Gift, Jack, 1992). White women had a higher dental visit rate (2.4) than white males (2.1), but white males had a significantly higher visit rate than either black females (1.4) or black males (1.0). For persons 25 years of age and over, females continued to make more of an improvement in utilization than males between 1983 and 1993 (NHIS data), and for persons of all ages, females made more of an improvement than males between 1989 (NHIS data and 1988-94 (NHANES III data).

Race/ethnicity

In 1983, 1986, and 1989, the rate of dental visits was lower for black persons than white persons, with black persons having a slightly higher rate of improvement than white persons over the six years (Table 3). During this period, the disparity between black and white persons became more pronounced with increasing age: By 65 years of age, black persons were half as likely as white persons to have had a recent dental visit. The discrepancy in visits per person also was dramatic, with white persons having almost twice the number of visits per person as black persons (2.2 and 1.2 visits per person, respectively). Table 5 displays the 1989 racial distribution of persons with a dental visit in the past year, and the number of visits per person, adjusted for age. For persons 25 years of age and over, the higher rate of improvement in black persons continued between 1983 and 1993 (Table 4).

In the 1985-86 National Survey of Oral Health of United States Adults, several major differences between Blacks and Whites were found. Differences relating to the lack of care were: 1) reasons for going to the dentist, and 2) perceived need for dental treatment. Nineteen percent of Blacks and 44 percent of Whites stated that their most frequent reason for going to the dentist was for a regular check-up. Preventive care, defined as regular check-ups and prophylaxis was reported by 58 percent of the population; preventive visits in Whites constituted 60 percent of the dental visits, compared with 40 percent in Blacks (Cherry-Peppers et al., 1995).
Wolinsky found there were significant differences between Blacks and Whites in terms of how predisposing, enabling, and need characteristics affected their use of dental services. He found that both education and need characteristics have different effects for Blacks than they do for Whites. In particular, while education has significant positive effects on the use of dental services among Whites, it has no significant effect among Blacks, whereas need characteristics have significant positive effects on the use of dental services among Blacks, but have no significant effects among Whites. In other words, “Blacks appear to be responding to need when they use dental services, while Whites appear to be responding to fundamental predispositions related to their middle class value structure” (Wolinsky, 1982). Wolinsky interpreted these differences to mean that improvements in such conditions as socioeconomic inequality may be necessary for equity in the delivery of health care, but they are not sufficient conditions to meet the health care problems of Black populations.

In 1989, Hispanic persons were less likely than non-Hispanic persons to have visited a dentist in the past year, primarily due to the significantly lower usage rates of Mexican-Americans. Just over one-fifth of children 2-4 years of age had had a dental visit in the year prior to the interview, compared with almost one-third of all non-Hispanic children in the same age group. By 65 years of age, however, there was no statistical difference between the Hispanic and non-Hispanic usage rates (40.2 and 43.3 percent, respectively). For persons 25 years of age and over, black persons were less likely than Hispanic persons to have seen a dentist in 1983 and 1989. However, by 1993, the percent of black persons with a dental visit in the past year exceeded that for Hispanic persons, although only by about one percentage point.

Among children 2-17 years of age, racial and ethnic differences were striking. The proportion of white children with a dental visit in the past year was about 25 percent greater than the proportion of black children (64.8 and 50.8 percent, respectively), and the proportion of non-Hispanic children with a dental visit in the past year was about 33 percent greater than the proportion of Hispanic children (63.7 and 47.9 percent, respectively).

Using data from the 1986 NHIS, Aday and Forthofer (1992) used a logistic regression procedure to examine the linkage between whether there had been a dental visit in the past year and predisposing, enabling, and need predictor variables, while controlling for racial/ethnic group membership and its interactions with age, education, and poverty level. They found that for adults 18 years of age and older, persons with the following characteristics were least likely to have been to a dentist: males, members of larger families, those who were unemployed or in blue-collar jobs, persons residing in southern states or nonmetropolitan areas, those with no private dental insurance, and people who felt that they had fair to poor health. Mexican-Americans were least likely to have been seen by a dentist, regardless of their education and income.
TABLE 5. Age-adjusted percent of persons 2 years of age and over with dental visits in past year and number of visits per person per year, by selected characteristics: United States, 1989.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Persons with visit</th>
<th>Visits per person per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>All ages</td>
<td>57.3</td>
<td>2.1</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>59.5</td>
<td>2.2</td>
</tr>
<tr>
<td>Black</td>
<td>43.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Other</td>
<td>51.6</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>Hispanic origin</strong></td>
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<td></td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>58.5</td>
<td>2.2</td>
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<tr>
<td>Hispanic</td>
<td>46.0</td>
<td>1.6</td>
</tr>
<tr>
<td>Hispanic-American</td>
<td>40.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Other Hispanic</td>
<td>53.2</td>
<td>1.7</td>
</tr>
<tr>
<td><strong>Place of Residence</strong></td>
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<td></td>
</tr>
<tr>
<td>MSA, total</td>
<td>58.4</td>
<td>2.2</td>
</tr>
<tr>
<td>Central city</td>
<td>54.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Not central city</td>
<td>60.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Not MSA</td>
<td>53.6</td>
<td>1.7</td>
</tr>
<tr>
<td><strong>Geographic Region</strong></td>
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<tr>
<td>Northeast</td>
<td>60.7</td>
<td>2.2</td>
</tr>
<tr>
<td>Midwest</td>
<td>61.5</td>
<td>2.1</td>
</tr>
<tr>
<td>South</td>
<td>52.2</td>
<td>1.8</td>
</tr>
<tr>
<td>West</td>
<td>57.8</td>
<td>2.4</td>
</tr>
</tbody>
</table>


Among children ages 2-17, the findings were similar to those for adults: those who were least likely to have been to a dentist included boys; those in larger families, or ones in which the head of the family had no post-high school education, or was unemployed or worked in a blue-collar job; children from southern states or nonmetropolitan areas; and those who were poor or had no private dental insurance. As with adults, Mexican-American children were least likely to have seen a dentist.

Between 1991 and 1993, NHIS data on the proportion of persons 35 years and over with regular dental visits show gains for whites, blacks, and Mexican-Americans. Puerto Ricans were the only race/ethnic group reported in this age group to have lost ground over this period, declining from 51 percent in 1991 to 37 percent in 1993 (National Center for Health Statistics, 1996). No explanation was provided for this dramatic decrease.

The NHANES III data suggest an encouraging development: there was a substantially greater increase in the percent of persons with a dental visit in the past year for black persons than for white persons between the 1989 NHIS and the 1988-1994 NHANES III survey (a gain of 12.3 percentage points for blacks, vs. 6.8 percentage points for whites). Comparable data between the two surveys are not available for Hispanics, as
the only Hispanics recorded as such in NHANES III were Mexican-Americans. For this group, 50 percent had a dental visit in the past year, compared with 66.1 percent for whites and 56.8 percent for blacks.

Approximately 1.4 million American Indians and Alaska Natives living on or near reservations receive clinical dental services at over 430 locations from programs operated by the Indian Health Service (IHS). When compared to the nation as a whole, access to dental care by American Indians and Alaska Natives (AI/AN) is limited. While in 1993, approximately 61 percent of the U.S. population received some form of dental care during the past year, in Fiscal Year (FY) 1996, less than 25 percent of American Indians living on or near AI/AN reservations received care, a decrease from about 34 percent of the eligible population as recently as FY 1994. This disparity in access to care is consistent with the dentist-to-population ratio in Indian country and the U.S. at large, with the ratio for American Indians living on reservations at 1:2700 vs. 1:1,500 for the U.S. as a whole. In addition, the AI/AN population has approximately twice the oral disease rate of the rest of the nation across all age groups.

During the 1950s the federal government had an aggressive policy to terminate American Indian treaties and eliminate reservations. During this time many American Indians moved to major cities throughout the U.S. Since that time, many other AI/AN have moved off the reservations, seeking employment in cities. Today it is estimated that over 1,000,000 AI/AN live in cities across the U.S. Three thousand of these live in cities that are in states where there is no access to IHS or Tribal managed facilities. Only 11 of the 34 Urban Indian clinics funded by the IHS elected to or had the funds to provide dental care. Most of these clinics receive other federal and state funds to provide services, but it is not nearly enough to treat all of the AI/AN people living in urban locations.

In recognition of the persistently high level of oral disease in the AI/AN population, the IHS has made significant and increasing efforts over the years to implement and extend oral disease prevention programs that have been demonstrated by the research community to be effective in reducing oral disease. The basic thrust of these programs is to ensure that community-based programs such as community water fluoridation are in place. Community-based programs aimed at preventing early childhood caries and the use of tobacco products have also been implemented. Clinically, the IHS has made the placement of pit and fissure sealants to prevent dental caries a priority, and as of FY 1996, the IHS had met its Year 2000 objective of placing sealants in the teeth of more than 50 percent of 6-8- and 15-year-olds.

The ratio of operating funds to inflation has reduced the ability of the IHS to provide needed services. In the past three years the impact of absorbing inflationary costs coupled with the transferring of administrative funds to Tribes has led to the reduction of 56 percent of headquarters administrative positions and 56 percent of Area administrative dental positions, with more positions anticipated to be lost in FY 1997. These losses are beginning to have significant adverse effects on the ability of the IHS to monitor program effectiveness, recruit dentists, orient new dental staff, train and retain high quality clinical dental staff, and support health promotion and disease prevention through training and technical assistance. For example, due to the lack of
ability to monitor 400 water fluoridation systems serving reservations, the IHS will most likely have to recommend that up 50 percent of them be taken off line (Martin, 1997).

Dental services utilization in the past 12 months was compared across population-based samples of African-American, Navajo, Lakota, Hispanic, and White adults participating in the World Health Organization International Collaborative Study of Oral Health Outcomes (ICS-II) at U.S. research locations (Davidson, Andersen, 1997). Bivariate results revealed that ethnic minority groups in both age cohorts reported significantly fewer dental visits in the past 12 months compared with White adults. When dentate status was controlled for, age cohort differences were not significant in Baltimore (African-American and White) and San Antonio (Hispanic and White) research locations. In contrast, older Native Americans (65-74 years) reported visiting the dentist significantly less often compared with their middle-aged (35-44 years) counterparts.

One of the most serious shortcomings of all the national surveys of utilization of dental services, as well as many more localized surveys, is their failure to report on racial and ethnic groups other than white, African-American, and Hispanic. In particular, data are lacking for Asians. Even when data are reported for this population, they are rarely categorized into the many Asian subpopulations; also, there are no oral health sub-objectives for Asians among the Year 2000 health objectives for the nation. Yet, in a recent oral health needs assessment of California children, Asians were found to have a higher prevalence of decayed primary or permanent teeth among 6-8-year-old children than any other racial/ethnic group, the lowest percentage of preschool children who had ever had a dental visit, and the lowest percentage of 15-year-olds with sealants (Pollick et al., 1997).

Income and education

As expected, both the proportion of persons with a dental visit in the past year and the number of dental visits per person varied directly with family income for each NHIS year reported, as well as in NHANES III. In 1989, for example, 40.9 percent of those with a family income less than $10,000 had a dental visit within the year prior to the interview (48.3 percent in NHANES III) compared with 73.5 percent of those with a family income of $35,000 or more (77.3 percent in NHANES III). In the two lower income groups, however, the differences are only apparent among those over the age of 35. For those with a family income of $10,000 and over, the proportion of persons with a dental visit in the past year actually declined between 1983 and 1989, but apparently increased again from 1988-94.

In most income and age groups, the proportion with a visit in the past year increased with higher educational attainment. Among those with a family income less than $15,000, about one-fourth of those who had less than 12 years of education, compared with about one-half of those who had attended college, visited the dentist in the past year. Similarly, among those with a family income of $35,000 or more, nearly half of those who had not completed high school had visited the dentist in the past year, compared with more than three-fourths of those who had attended college. The effects
of income and education can also be seen in the number of dental visits per person per year. In 1989, the higher the educational attainment, the greater the rate of dental visits reported in most age groups.

For persons 25 years of age and over, modest gains in the percentage of persons with a dental visit in the past year were made between 1983 and 1993 for both those with income below poverty level, and those at or above poverty level, although the increase was somewhat greater for the latter group. Still, in 1993, those at or above poverty level were 179 percent more likely than those below poverty to have made a dental visit within the past year, which represented only slightly less of a disparity than existed ten years earlier. For this age group, education level also remained as a key factor associated with utilization of dental services. As with income, there were modest gains in utilization for all categories of education level between 1983 and 1993, but in 1993, those with 13 years or more of education were almost twice as likely as those with less than 12 years of education to have made a dental visit within the past year.

Despite the nearly universal availability of Medicare among the elderly, discrepancies persist in the ability of different subpopulations to access health services. These include the elderly living in poverty and those living in nonmetropolitan areas. These discrepancies persist for several reasons. First, a small percentage of elderly persons are ineligible for coverage under Medicare Part A (hospital insurance program) (US General Accounting Office, 1992). Even among elders with Medicare coverage, however, discrepancies in access to health services persist. While persons 65 years and older who are eligible for Social Security or railroad retirement cash benefits are automatically insured through Medicare Part A, enrollment in Part B (supplemental medical insurance program) is voluntary and costs $43.80 per month in 1997 (Health Care Financing Administration, 1997d). Among those elders electing to subscribe to Part B, Medicare pays 80 percent of the fee schedule for physician and certain other medical services after the $100 deductible. Neither Medicare Part A or Part B cover long-term custodial care, outpatient prescription drugs, or dental services. To alleviate some of these gaps and costs, persons may purchase Medigap insurance or participate in another private insurance plan, such as one offered through an employer-sponsored retirement health plan. More than 85 percent of elderly Medicare beneficiaries had at least one additional form of health insurance coverage in 1991 (US General Accounting Office, 1994b).

Paying the Medicare Part B premium can represent a financial hardship for many low-income elders, and the amount of disposable income available to the elder is another economically-based factor influencing access to and use of health care services (US General Accounting Office, 1992). Discrepancies in service use could be expected to be greatest among services not covered through any of the insurance plans and which are more discretionary and perceived as being less critical, such as dental care (Andersen and Newman, 1975; Wolinsky, 1980). In addition, out-of-pocket health care expenditures can consume a substantial share of the elder's income, particularly among those with lower incomes. For example, in 1987 poor elderly persons spent nearly 20 percent of their income on out-of-pocket health care expenses, in contrast to less than 13 percent for nonpoor elderly persons (US General Accounting Office, 1992).

At the same time, financial hardship can impede the use of essential health care
services. A sufficient level of income can reduce barriers to the use of health services by providing both the means for purchasing additional insurance or paying deductibles or copayments, as well as enabling elders to obtain transportation to health care appointments. Among nonmetropolitan elders in particular, a lack of income can aggravate difficulties in obtaining transportation to health care services, since lower income individuals would be less able to own or maintain their own car. Further, some elderly never learned to drive, or are no longer able to because of vision and other impairments. Such a situation is worsened by the relative absence of public transportation. Reliance on private transportation underscores the importance of income for gaining access to the health care system.

Kassab et al. (1996) conducted telephone interview surveys of persons aged 65 and older who were residents of four rural counties in Pennsylvania to determine the influence of insurance coverage and income on health care use. They hypothesized that since most elders have Medicare, private insurance is most likely to have an effect on access to services that are covered by the private plan, but not covered or only partially covered by Medicare. They examined three types of health services: visits to the hospital, physician, and dentist. These three types of health services vary in terms of the discretionary nature of the visit, i.e., whether the visit is initiated by the patient or the provider, with visits to the dentist being perceived as the most discretionary of the three.

The number of visits to the physician, dentist, and hospital during the past year was used to measure use of health services. It should be noted that Pennsylvania's Medicaid program provides coverage for some adult dental services. The multivariate analysis controlled for gender, education, whether the respondent lived alone, and the county of residence (used as a gross measure of available community resources).

Three percent of the sample reported not having any health insurance. More than 60 percent (61.5%) indicated they had private insurance coverage, 7 percent had Medicaid, and 28 percent had Medicare coverage. Results indicated a clear association between income and type of insurance coverage. As income increased, the proportion of respondents with private health insurance also increased. However, there was no association between income and having Medicare coverage.

Forty-nine percent of the respondents indicated they had made no visits to the dentist during the past year. Lower income respondents who specified only Medicare as their health insurance were less likely to visit the dentist than respondents with private health insurance (although the extent to which respondents had private dental insurance was not determined). As income increased, discrepancies between respondents with Medicare and private health insurance steadily decreased to the point that Medicare respondents in the highest income groups were as likely, if not more likely, to visit the dentist than respondents with private health insurance.

Medicare and private health insurance steadily decreased to the point that Medicare respondents in the highest income groups were as likely, if not more likely, to visit the dentist than respondents with private health insurance.

In addition, respondents with no form of health insurance coverage were only 23 percent as likely to visit the dentist as respondents with private health insurance. Moreover, there was a tendency for Medicaid respondents to be less likely to visit the dentist than those with private insurance. Other results indicate that respondents with
higher levels of educational attainment were significantly more likely to visit the dentist. Also, there was a tendency for older respondents to be less likely to visit the dentist.

The results from this study support the hypothesis that different types of health insurance coverage influence the rate at which nonmetropolitan elderly see a dentist, and that these visits are also influenced by an elder's income. Low-income respondents with no insurance, or with coverage through Medicare, which does not cover dental services, were less likely to visit the dentist than those with private insurance. However, the inhibiting effect of Medicare coverage declined as household income increased, suggesting that as disposable income increased, respondents would invest it in obtaining dental services.

The edentulous population

While the 1989 NHIS remains the most current published data set on utilization of dental services for a representative sample of the entire U.S. population age 2 and over, more recent data have been reported for adults ages 18 and over, and for adults ages 65 and over, by income, race, and dentate status, from the 1989, 1990, and 1991 NHIS surveys (Gift, 1995). Table 6 displays this information on the proportion of the population with a dental visit in the past year and the number of visits per person by dentate status.

Although the data presented in Table 6 appear to suggest a substantial increase in utilization of dental services for adults between 1989 and 1990, and then a decrease in 1991, Gift notes several reasons for being cautious in making such an interpretation. First, the 1989 NHIS was a full household survey, whereas the dental portion of the 1990 and 1991 surveys was based just on the persons sampled. Second, the 1989 survey was based on the question, "About how long has it been since you last went to a dentist?" while the other two surveys were based on the question, "During the past 12 months, how many visits did you make to a dentist?" Third, the 1989 survey contained a full list of supplemental dental questions, with lead-in text, whereas the other two surveys had only a few dental questions in the middle of other topics. Finally, the standard errors were not calculated at the time of Gift's analysis (Gift, 1997).

As might be expected, those people who currently had some natural teeth--the dentate population--were more likely to have had dental visits and, specifically, more likely to have had three or more visits, than those who were edentulous at the time of the 1989 NHIS interview (19.2 and 4.6 percent, respectively). Gift's comparison of data from the 1989, 1990, and 1991 surveys makes this case even more dramatically: those persons with some upper and lower teeth were approximately one and one-half times more likely to have seen a dentist in the past year than persons with no upper teeth or no lower teeth, and persons with no upper teeth or no lower teeth were three to four times more likely to have seen a dentist in the past year than persons with no natural teeth (Gift, 1995).

TABLE 6. Percent of persons 18 years of age and over, and 65 years of age and over, with dental visits in past year and number of visits per person per year, by dentate status: United States, 1989, 1990, and 1991.

TABLE 6. Percent of persons 18 years of age and over, and 65 years of age and over, with dental visits in past year and number of visits per person per year, by dentate status: United States, 1989, 1990, and 1991.
An estimated 17.7 million Americans (7.5 percent) were reported to be edentulous in 1989, but this figure underestimates the total number of edentulous persons, since the NHIS does not include persons who are living in nursing homes or other types of institutions where there is likely to be substantial edentulism. Among respondents 45 years of age and over, the percentage reported to be edentulous was far greater and increased with age; 10.0 percent of persons aged 45-54 years were edentulous, compared with 28.4 percent of those aged 65-74 years and 52.5 percent of those aged 85 years and over. Overall, a greater proportion of females than males were edentulous (8.3 and 6.7 percent, respectively). However, there were no significant differences in the proportion of females and males aged 65 and over who were edentulous (Bloom, Gift, Jack, 1992).

Overall, a greater proportion of white than black Americans were edentulous (7.9 and 6.0 percent, respectively). In the 75-years-and-over age group, however, edentulism was 25 percent higher among black persons than among white persons (53.0 and 41.9 percent, respectively). Comparison of Hispanic with non-Hispanic populations aged 65 years and under show significantly less edentulism among Hispanic persons. There was no statistical difference between the percentage of Hispanic and non-Hispanic persons aged 65 years and over who were edentulous.

The proportion of the population that was edentulous in 1989 declined with increased family income. The most dramatic differences were found in the population aged 65-74 years: 46.1 percent of those with an income under $10,000 were edentulous, compared with 28.8 percent of those with an income of $10,000-$34,999 and 12.0 percent of those with an income of $35,000 or more. Nearly three-fourths of edentulous persons aged 35 years and over did not have private dental insurance coverage (72.5 percent) compared with about one-half of dentate persons (52.1 percent).
Among persons aged 35 years and over, those who were edentulous at the time of the interview were more than five times less likely to have been to a dentist in the past year than was the dentate population (12.5 and 65.6 percent, respectively). Edentulous persons also were less likely to have visited a dentist for at least 5 years. Even among the youngest edentulous persons shown, those 35-44 years of age, nearly half (47.6 percent) had not visited a dentist in 5 or more years, compared with 9.8 percent of dentate persons. The lack of dental visits among the edentulous population is of concern because it precludes routine examinations for and early treatment of oral soft-tissue diseases, the most serious of which is oral cancer.

Special needs populations

In recent years, the characterization of "special populations" of persons or those with "special needs" has been applied quite broadly to encompass those who may have serious physical, cognitive, developmental, learning, or emotional problems or disabilities; those who are socially or economically disadvantaged; and those who may be otherwise particularly "vulnerable" populations (National Center for Health Statistics, 1992). Unfortunately, a limitation of NHIS data, and a shortcoming of the access to care literature generally, relates to these populations. Homeless and/or indigent persons; institutionalized and homebound persons; children in foster care; migrant farm workers and other highly mobile populations and their families; undocumented immigrants; non-English-speaking persons; HIV-infected persons; and dysfunctional persons are typically not captured in traditional household surveys, including NHIS, and remain high-risk groups for which little information relating to access to care exists (Caplan and Weintraub, 1993; Newacheck, Stoddard, Hughes, Pearl, 1997). Moreover, children in families with low socioeconomic status are disproportionately represented among children with special health care needs (Newacheck, 1994) although it is unclear which condition is a precursor of the other.
**Elders**

The elderly comprise a population group of such variability in physical, mental and medical health status that using only age categories to define their dental needs and access issues is not appropriate. This review will consider their needs in relation to general health status, functional abilities, living arrangements, and dentate vs. edentulous status. As a group, they may have unique problems accessing dental care delivery systems; they display various patterns and prevalence rates of oral diseases; and they have a variety of characteristics that affect treatment planning, treatment acceptance, and delivery of care. Their status may change as they move in and out of functional categories as a result of bouts of illness, surgery, death of loved ones, or other experiences.

Changes in society during the past decade that have been noted consistently in the scientific literature in some groups include: increased levels of discretionary income; increased focus on prevention and wellness; individuals are living longer and often with multiple chronic illness, and sometimes outliving their savings and retirement benefits; more sophisticated technology is increasing medical costs and keeping people alive who have greater medical needs; great variability in support services in the community; less contact with and support from immediate family in many cases, due to smaller families, careers and living farther away.

Numerous effects of aging or disease on use of services are reflected in the literature: unpredict-ability of some illnesses, leading to "good and bad days;" reduced energy reserves, so going to the dentist is a major outlay of energy; dependence on others for transportation and amount of time involved in traveling to appointment or waiting for transportation; hospitalizations or other appointments interfere with scheduling appointments; needing to spend income on medical co-payments or pharmacy bills or assistive care services; safety issues when going out--either for falls or living in an unsafe area for crossing street or dealing with muggings, etc. Biological changes in teeth and the oral environment make provision of care challenging and complex for providers, many of whom have insufficient training in medical problems or complex restorative or periodontal techniques to develop appropriate treatment plans--this results in reduced confidence to provide care, dissatisfied customers, and less than optimal dental health outcomes. The criteria for quality, intensity and appropriateness of services provided may also differ from other age groups (Dolan and Atchison, 1993).

Age cohort also affects elders' attitudes toward dental health and use of dental services. Ettinger (1993) provides a review of the socio-dental and historical influences on five specific age cohorts born between 1905 and 1945. The greatest difference between cohorts is that the "new elderly" tend to be dentate and use dental services similarly to adults who are still in the workforce.

Some authors note that positive clinical experiences for dental or dental hygiene students are essential to increase their skills and overcome any unwillingness and lack of confidence about treating elders, particularly those in long-term care settings. State
practice acts that restrict dental hygienists from practicing in alternative settings, and lack of training and reimbursement mechanisms for any dental professional providing care in homebound or nursing facilities complicates the issue of access to dental care, even when practitioners are willing to provide the care (Dolan et al., 1996; Berkey, 1996).

**Community dwelling elders**
Most of the studies of dental utilization by elders have used cross-sectional designs. Cross-sectional studies are limited in their ability to demonstrate if differences in use of services are due to age effects, cohort effects, or a combination. Three recent longitudinal studies (Gilbert, Branch, Orav, 1990; Lewis and Thompson, 1996; Strayer et al., 1997) analyzing 10 or more years of utilization data in one Canadian province, one Eastern US state and one Midwestern city, provide better insight into the aging and cohort effects. Age cohort, dentate status, education, income, and perceived need were all significant predictors of dental utilization.

Lewis and Thompson analyzed data on 2,071 high users (users for 14 consecutive years) and 2,337 moderate users (users for 7 of the 14 years) in Alberta's universal dental plan for the elderly. All users took advantage of more preventive (prophylaxes and fluoride applications) and periodontal services over time. Compared to high users, moderate users lived in less urbanized areas, made more visits to denturists, and received more complete dentures. Strayer et al. compared 1,378 medical, non-dental users of a Medicare waiver program that reimbursed for health services at cost with 2,086 dental users. Younger cohorts were more likely to use services. The probability of using dental services, declines as more medical services are used, probably indicating more chronic diseases and medical issues that interfere with ability or motivation to visit the dentist. Use patterns of the seniors were similar to those of the age cohort closest to theirs. Unlike what has been reported in most studies, African-Americans used services more frequently than Caucasians, suggesting either that they were comfortable with the dental clinic setting or that elimination of financial barriers increased access. Gilbert, Branch, and Orav found no aging effects over ten years when following 1,625 mostly female, white, noninstitutionalized population in an eastern state. Dentate status was the strongest predictor of dental care use, but education and income were also significant. Cohort effect (versus the effects of aging) was explained by the same variables.

Dolan (1995) reported on a randomized health promotion trial of community dwelling elders age 75 and older using data collected between 1988 and 1993. For the dental interview, 331 subjects began at baseline and 191 remained in the study three years later. Most of the elders were relatively free of functional limitations and only 17 percent were edentulous. The intervention consisted of an in-home assessment and visits/counseling/referrals by a geriatric nurse practitioner every 3 months. Functional impairment, being edentulous, and not having a recent dentist visit before the study were associated with a decreased likelihood of a dental visit over the study period. Being female and a member of the intervention group were associated with a higher likelihood of visiting the dentist.
Greenlick et al. (1986) reviewed data from 2,000 enrollees in an HMO Medicare dental demonstration project in the Northwest. Membership was high in the first year and then decreased to 50 percent over the 4 years. The pattern of care also changed from new exams and treatment to recall and maintenance exams. The average procedure rate declined by more than 35 percent over the 4 years. Most enrollees selected options with no out-of-pocket charges; some dropped coverage as the premium rates increased. The authors cite the need for more data on which to determine appropriate dental premiums for different groups of elders in HMO plans.

Joshi et al. (1996) looked at the relationship between numbers of teeth remaining and dental utilization. The authors examined a representative sample of 1,151 noninstitutionalized subjects aged 70 and older in New England. They were subsequently classified into three categories based on the number of teeth: 1-10 teeth indicated a compromised aging dentition, 11-24, moderately successful, and 25-32, successful aging dentition. Analysis of the utilization data by these categories resulted in the following:

<table>
<thead>
<tr>
<th></th>
<th>1-10 teeth</th>
<th>11-24 teeth</th>
<th>25-32 teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td>dental care in last 12 months</td>
<td>55%</td>
<td>78%</td>
<td>89%</td>
</tr>
<tr>
<td>regular maintenance (check-ups)</td>
<td>26%</td>
<td>51%</td>
<td>65%</td>
</tr>
</tbody>
</table>

Considering the mean number of visits per person, the successful group has twice as many visits as the compromised group.

Another report of the New England study by Tennstedt et al. (1994) showed that 64 percent of the dentate subjects had been to the dentist in the past year but 15 percent had not been in three years or more. Most frequent reasons for visits were cleanings (47.8 percent), prosthodontics (21.3 percent), restorative care (12.2 percent) or extractions (11.2 percent). Ninety-five percent reported having a usual source of dental care. No perceived need was the most frequent reason for non-utilization, 19 percent cited financial factors, and 13 percent noted health or functional impairments. Only 13.3 percent of edentulous subjects had recently visited the dentist, with 73 percent not having seen a dentist in three years or more; 76.6 percent reported having a usual source of care. Reasons for not seeking care were no need (51.2 percent) and no teeth (42.6 percent). In this study, number of visits was more likely to be determined by provider recommendation for follow-up rather than initiation on the part of the older adult. Positive attitudes to dental care and regular oral hygiene practices were related to recency of dental care in both dentate and edentulous subjects. Despite the ruralness of the locality (Maine) most elder adults had a dentist they considered a usual source of care.

Elders account for the use of more than 30 percent of all prescription drugs. More than 70 percent of independent elders report using one or more prescription medications and 30 percent report using four or more per day (Henry, 1995). Oral problems related to medications include mucositis, dilantin gingival overgrowth, and candidiasis. Although these oral symptoms cause significant oral discomfort, elders do not always seek relief from a dental professional.
Other authors have examined the relationship between general preventive behaviors and dental visits. Atchison et al. (1993) reviewed cross-sectional data from an ongoing study at UCLA on community dwelling elders who received regular medical care by private physicians on a fee for service basis. Fifty-eight percent were female and 67 percent were Caucasian. Seventy-six percent reported a dental visit in the past year. Logistic regression analysis showed that general preventive health behavior and preventive service utilization variables were important factors in explaining a recent dental visit, along with income, not having a removable dental prosthesis, and perceiving the need for dental care. Dental utilization was related to other use of preventive health behaviors such as getting a mammogram and pap smear, not smoking, using seatbelts, engaging in regular exercise, and reading to learn about health information. Hayward et al. (1989) reported similar findings with dental visits and medical visits for pap smears, mammograms and breast exams.

Kiyak (1987) reviews additional information about use of services. Awareness of services is not sufficient to motivate elders to use the services, especially if they don’t relate them to their own needs. Although a number of free or reduced-cost services initially may increase utilization slightly, especially for emergency services and prosthetics, utilization rates appear to drop off and are not reflected in maintenance behavior. Access to other health and social services does not necessarily distinguish users from nonusers of dental services. The author suggests that belief systems of the different groups of elders needs to be changed in order to enhance utilization behavior.

U.S. veterans are a unique population to study because of the different levels of eligibility for dental benefits and the ability to receive care at Veterans Administration (VA) facilities or in the community from clinics or private dentists. By the year 2000, 60 percent of elderly men will be veterans (Henry, 1995). Gilbert (1995) provides an overview of some of these systems issues. In a previous paper, Gilbert, Branch and Longmate (1992) studied 1,049 veterans in Massachusetts who were eligible for dental benefits. Forty-two percent used the VA as their only source of dental care, 20 percent were not using a VA facility at the current time, 28 percent had never used a VA facility for dental care, and the rest used both the private sector and a VA facility. Forty-one percent went to a private dentist and their health insurance paid; 5 percent used another source of payment. Only 76 percent were aware that the VA offered dental services. Eligibility status, perceived quality of VA dental care, use of VA medical care, the belief that income meets expenses, and the perceived need for dental care were significant correlates of using the VA as the current source of dental care.

Functionally Dependent Elders

In 1987, 11.4 percent of community dwelling elders had one or more activities of daily life (ADL) limitations. Persons over age 85, African-Americans, and women had the greatest likelihood of being functionally dependent. Rates of dependency increase with age, from about 10 percent at age 65 to about 57 percent after age 85 (Henry, 1995). ADL and instrumental activities of daily life (IADL) limitations are important indicators of quality of life and the need for long-term care or home health services. Persons with identical medical diagnoses, however, may have widely different functional limitations. Long and Miller (1994) studied 592 elders receiving home delivered meals and looked
at the relationship between dental health and general well-being. Persons with more illness and hospitalizations had worse dental health; 44 percent had at least one hospitalization in the previous year, for a mean of 3.6 weeks. The causal direction of the relationship between dental diseases and general illnesses could not be determined.

**Homebound persons**

The term "homebound" has been used to characterize individuals whose illness or condition requires use of at least one type of home health service to prevent institutionalization. Often their condition prevents them from receiving regular services in the community. In fact, some funding programs specifically preclude individuals who are designated "homebound" from traveling to regular appointments or they lose their homebound status for funding and home health purposes. Articles in the dental literature that refer to the homebound tend to use the broader descriptive category of individuals rather than the more restrictive funding category.

Strayer reports on two studies of homebound individuals (1993, 1995). The first study involved 50 functionally dependent clients of an urban social service agency, 30 of whom considered themselves homebound and 20 who did not. Data collection revealed no differences between the two groups on general or oral health characteristics. About 30 percent perceived their oral health each as good, fair and poor. Perceived dental need included: 28 percent a lot of need, 22 percent moderate need, 30 percent a little need, and 20 percent no need. When asked to indicate their last dental treatment, 26 percent noted less than two years ago, 24 percent 3-5 years, 10 percent 6-10 years, and 40 percent more than 10 years. Individuals with more teeth reported better perceived general health, but a greater need for dental treatment. A later study reported very similar findings. In that study, 30 percent relied on Medicaid for dental reimbursement, 60 percent paid for treatment themselves, and 7 percent had insurance.

Paunovich (1994) studied 51 males in a Veterans Home Care Program. They were being managed for an average of 7.3 medical problems per patient--83 percent for cardiac complications, 47 percent for strokes, 22 percent for diabetes and 22 percent for dementia. Fifty-three percent were dentate; 63 percent of the edentulous patients had dentures. The average denture had been worn for 22.5 years. Half of the denture wearers reported loose or broken dentures or inability to eat with them. Median length of time since last dental visit of all subjects was 6 years. Seventy-five percent of the dentate subjects desired care.

**Long-term care residents**

During the past three decades the number of elders aged 75 years and older has increased by almost 130 percent and those aged 85 or older has increased by 225 percent. Approximately 5 percent of the population over age 65 and 16 percent of those over age 85 are residing in long-term care facilities. Two-thirds of these residents stay for one or more years and 25 percent stay for less than 6 months. Many elderly...
who receive care for more than several weeks end up "spending down" to qualify for Medicaid coverage (Berkey, 1996). Long-term care options for veterans include nursing home care units, community nursing homes, and state veterans' homes. In 1992, 35 percent of long-term care for veterans was provided in nursing homes and 22 percent in state veterans' homes (Henry, 1995).

Numerous authors have studied dental service use by residents of long-term care facilities. Ettinger et al. (1988) screened 853 residents of 14 different long-term care facilities in Iowa and determined 66 percent could benefit from some type of dental care. When offered treatment, 48 percent of these gave permission for treatment. Most frequent reasons for not completing treatment were that patients refused further treatment, they did not perceive a need, the dental staff felt there was no further benefit from the treatment, or the person became too ill. Initial reasons for refusal of treatment by the resident or family was "no perceived need."

Berkey et al. (1991) provide a review of studies from 1970-1989 in long-term care institutions. Between 9 and 32 percent of nursing facility residents in the U.S. and Canada had been seen by a dentist in the previous year. Up to 70 percent of nursing home residents have unmet oral needs. Two state surveys, one in California in 1986 (Heylen, 1986) and one in Vermont by the American Dental Association in 1979, reported similar dental utilization rates of 22 to 25 percent. In the California survey, 15 percent were edentulous, and 19 percent were edentulous in the Vermont study. Most frequent reasons for dental visits were for a checkup, cleaning, and dentures. The main reason for not seeking dental care was "felt no need."

The 1987 Omnibus Budget Reconciliation Act (OBRA) regulations require that long-term care facilities that receive Medicare or Medicaid funding actively provide or obtain dental care for their residents. In 1992, minimum data sets (MDS--a comprehensive uniform health assessment tool) began to be required of all long-term care facilities to be in compliance with the federal regulations. The MDS must be completed on all new residents within 14 days of admission. Two sections of the MDS pertain to oral health and should trigger an automatic referral for dental care. Thai, Shuman, and Davidson (1997) performed regression analysis on data from 135 residents (47 dental users and 88 non-users) admitted since the MDS took effect in 21 nursing facilities in Minnesota.

The analysis showed no relationship between triggers and subsequent dental utilization by visits per year. Despite high needs, there were few dental trigger notes. The number of annual dental visits was positively associated with greater lengths of stay, greater functional dependence and being in the age range 80-89.

Warren, Hand and Kambhu (1992) conducted a study in 5 Iowa nursing homes to determine who makes decisions about acceptance of dental treatment. For two-thirds of the residents, the next of kin made the health care decisions. Unmarried residents and those with non-resident guardians were more apt to schedule appointments. Increased use of services was related to the following characteristics of the next of kin: perceived need, dentate, female, younger age, higher education.

A study of nursing home administrators and dentists by Berkey et al. (1988) showed that nursing home administrators report the following as major barriers to dental care:
financial constraints, patient/family apathy, and dentist unwillingness. Dentists, on the other hand, report apathy of the nursing home administrators and staff and lack of portable dental equipment as reasons for lack of care.

**Hospice patients**

Gordon, Berkey and Call (1985) studied the dental needs and perceptions of hospice patients and hospice administrators. Responses were compared on the percentage "agreeing that a particular oral condition was a problem" for patients and believing it was of "great concern." Over 40 percent of patients felt that dry mouth and bad bite were great concerns, while only 27 percent of administrators felt that dry mouth was a concern and none felt bad bite was a concern. Over 50 percent of patients with dentures noted the following were of great concern: food gets under dentures, dentures don't stay in place, and dentures were uncomfortable. Few of the administrators felt any of these were of concern. Of the dentate individuals, over 25 percent felt that missing teeth and food impaction were of great concern. Only a few administrators noted any problems experienced by dentate patients except loose teeth and toothaches. Eighty-six percent of the patients felt that it was important or very important to maintain or improve their oral condition, while only 18 percent of the administrators felt it was important. In short, hospice administrators greatly underestimated the importance of oral health issues to the quality of life of terminally ill persons. In another study of hospice patients, Aldred et al. (1991) also noted a high prevalence of oral symptoms, denture problems, and candidiasis that clearly affected the quality of life of the patients. Since the primary mission of hospice care is maintaining quality of life in the last weeks of life, provision of at least some level of care, even if it is just palliative, would improve patient satisfaction and address the utilization issues.
**Homeless persons**

Homelessness is becoming increasingly prevalent as individuals lose their jobs and families separate or slip into poverty because of the high cost of medical bills, housing or other reasons. In 1991, homeless families represented 34 percent of the total homeless population (Page, 1993). The portrait of a homeless person is no longer the "skid row bum" but a diverse group of individuals and families of every ethnicity, age and educational level. Some work part-time but cannot afford housing. Homelessness can be a transient state of affairs or a long-term issue. No national studies have been conducted on the dental health needs or care patterns of homeless persons. Four descriptive studies of homeless populations in Boston, Denver, Salt Lake City and Los Angeles are reviewed to highlight dental care needs and utilization issues.

Ongoing studies and programs for the homeless have been conducted in Boston since the 1980s. In 1984, of a sample of homeless adults in Boston shelters, 28 percent had not visited a dentist for an average of 14.5 years; 97 percent needed some form of dental treatment, and 85 percent were interested in receiving dental care (Allukian, 1995). In 1988-89, as a result of the Boston Healthcare for the Homeless Project, dental screenings and services were initiated. Of 108 adults surveyed, 66 percent were male with a mean age of 33.6 years; 54 percent were African-American, 31 percent Caucasian, 14 percent Hispanic, and 1 percent Native American. Untreated caries was evident in 91 percent of the subjects, with 77 percent showing signs of previous restorations or extractions. All three edentulous patients had dentures. DFT scores were similar to the general adult population living in the New England Region. The percent DT, however, was much higher than the regional data (Kaste and Bolden, 1995). During the first year of the dental program, 108 persons received dental treatment during 209 visits. No data on number of procedures or visits per person were published (Bolden and Kaste, 1995).

Gelberg, Linn and Rosenberg (1988) completed a study of 509 homeless persons in two beach communities in Los Angeles in 1985. Sixty-four percent were Caucasian, 24 percent Black, 7 percent Hispanic and 5 percent Native American, with an average age of 34. Thirty-one percent were Veterans and 63 percent had completed high school. Median length of homelessness during their lifetime was 25 months, with a range of one week to 50 years. Last dental visit and last prophylaxis by various time intervals are shown in the following table.
Percent distribution of homeless adults by time interval since last prophylaxis and dental visit.

<table>
<thead>
<tr>
<th></th>
<th>past 12 months</th>
<th>&gt;1yr, &lt;2 yrs</th>
<th>&gt;2yrs, &lt;5 yrs</th>
<th>5 or more yrs</th>
<th>never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last prophylaxis</td>
<td>17.2%</td>
<td>17.0%</td>
<td>19.5%</td>
<td>39.8%</td>
<td>6.6%</td>
</tr>
<tr>
<td>Last dental visit</td>
<td>26.7%</td>
<td>11.3%</td>
<td>13.5%</td>
<td>12.6%</td>
<td>5.8%</td>
</tr>
</tbody>
</table>

Twenty-seven percent reported a toothache during the previous month, but only 10 percent of these had sought help from a dental professional. Homeless persons with more gross decay were older, homeless longer, and lived outside (not in shelter programs). They also perceived more barriers to care. Those with more missing teeth were older, veterans, homeless longer, and Caucasian. When asked to list their top priorities, employment, money, shelter and companionship rated far above dental needs.

Usaline et al. (1994) provide a review of general healthcare problems of homeless families from a family medicine perspective. In addition to the unemployment issues, health problems such as alcohol or drug abuse, chronic mental illness and domestic violence can lead to a life on the streets. Malnutrition exacerbates conditions such as diabetes, which in turn increases periodontal problems. Chronic alcohol use and smoking are known contributors to oral cancer, and alcoholism and drug abuse, in addition to the trauma of life on the streets, results in more exposure to injuries and crime, including oral injuries. Severe mental illness with resultant social problems may prevent providers from being able to render safe treatment. Homeless families may also be turned away due to poor personal hygiene or may not seek care due to embarrassment about their condition. Personal hygiene depends on availability of toothbrushes and toothpaste supplies and a place to store them and keep them clean. Care may be postponed until basic survival needs are met. High risk for tuberculosis and inadequate treatment compliance will also present problems for dental care providers. Dispensing pain medications for dental pain to homeless persons creates an ethical dilemma.

Entwistle and Crane (1988) conducted a study of 101 homeless adults in two shelters in Denver. Seventy percent were males and 69 percent had 12 or more years of education. Thirty-three percent of the sample were veterans. Fifteen percent were Hispanic, 33 percent Native American, 29 percent Caucasian, 6 percent African-American, and 16 percent noted other ethnicity. Eighty-four percent were single, divorced, separated or widowed. Fifty-one percent were homeless for the first time, with 45 percent being homeless for less than one month, 28 percent for 1-12 months, 12 percent for 1-2 years, and 15 percent for more than 2 years. Only one person had been previously institutionalized. Thirty-seven percent of the sample had seen a dental
professional within the past year, 27 percent between 1 and 2 years, 41 percent longer than 2 years, and 5 percent never. Seventy percent described their use of dental services as not regular. Percent of participants receiving various types of services in the past are as follows:

<table>
<thead>
<tr>
<th>Service</th>
<th>%</th>
<th>Service</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>x-rays or examination</td>
<td>77%</td>
<td>root canals</td>
<td>22%</td>
</tr>
<tr>
<td>teeth cleaned</td>
<td>68%</td>
<td>crowns or bridges</td>
<td>19%</td>
</tr>
<tr>
<td>fillings</td>
<td>67%</td>
<td>partial or complete dentures</td>
<td>12%</td>
</tr>
<tr>
<td>extractions</td>
<td>58%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Perceived needs correlated fairly accurately with dental needs assessed during the survey examination. Ninety-three percent felt they needed current treatment; most said they would seek care if it were free or they could afford to pay. Perceived barriers to care are listed below and highlight the importance of cost of care for them.

<table>
<thead>
<tr>
<th>Past problems receiving care</th>
<th>%</th>
<th>Reasons for not seeking care</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>cost</td>
<td>34%</td>
<td>cost</td>
<td>42%</td>
</tr>
<tr>
<td>not enough time</td>
<td>20%</td>
<td>no time</td>
<td>17%</td>
</tr>
<tr>
<td>wait too long in office</td>
<td>19%</td>
<td>didn't know where to go</td>
<td>8%</td>
</tr>
<tr>
<td>language problem</td>
<td>11%</td>
<td>other reason</td>
<td>14%</td>
</tr>
<tr>
<td>condition didn't improve</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>condition not diagnosed</td>
<td>26%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Some were embarrassed about their oral health status and wanted their teeth cleaned. When referrals to a local health center for one free appointment were offered, more than 20 percent of the surveyed adults took advantage of this service. Two additional people who remained in the area to pursue part-time employment completed complex restorative care provided at reduced cost by dental students. Subsequently, a dental clinic for homeless persons was integrated into the new health center for homeless populations.

Page, Ainsworth and Pett (1993) studied 161 homeless families and their children's health in the Salt Lake City area. Benefit status included 40 percent eligible for food stamps and 34 percent for WIC. Benefits often are difficult to obtain during a highly mobile lifestyle. Visible dental caries was listed as one of the 7 most frequent health concerns. Inconsistent nutrition, problems managing basic personal hygiene and poor access to care undoubtedly contributed to the caries problems. The authors note the importance of working closely with shelter caseworkers and WIC staff to access healthcare. Also, families who experienced homelessness on an episodic basis had different characteristics and medical needs than long-term homeless families. The majority of families in this study were not long-term welfare recipients. Many were the
working poor who were unable to succeed in their communities and left in search of work and more affordable housing. Almost 50 percent had not finished high school. Health Care for the Homeless projects were funded in 1993 to 120 grantees in 48 states. Seventy-one programs provided some dental services, ranging from 3 to 1,528 dental users, with an average of 302 users per program. Of the 1,859,979 health encounters for 418,255 users, 6.5 percent were for dental services (Allukian, 1995).

In a study comparing differences between the perceptions of homeless mentally ill clients and providers with respect to their need for and use of services, it was found that the greatest differences between clients' and providers' perceptions of service needs were in dental services, which were identified as needs by clients more than five times more frequently than by providers (15.5 percent vs. 3.0 percent, respectively). However, only 11 percent of the clients reported having used dental services during a 60-day period before being interviewed for the study (Rosenheck and Lam, 1997).

**Migrant and seasonal workers**

Estimates of the number of migrant farmworkers in the U.S. vary widely, particularly by season and by region of the country. Some counts encompass all family members, while others just count those over age 12 or 16. Major national studies such as the NHIS or HHANES have not been helpful in enumerating migrant families. The major migrant "streams" shift depending on success of annual crops, the economic status of farmers and the influx of new migrant groups such as Asian/Pacific Islander populations. There is no agreed upon definition of migrants. The US Department of Health and Human Services defines migrant and seasonal workers as those who earn more than 50 percent of their incomes harvesting or performing agricultural labor, and spend the night away from home (or cross a county line) to perform agricultural work. The Migrant Education Act includes children not only of current migrants, but also those of parents who have performed farmwork in the past two to five years. The majority of workers are from Mexico (many of whom go home for a portion of the year). East Coast streams usually are rural African Americans and Caucasians from the southeastern states, and some populations from Caribbean Islands such as Haiti. About one-third are younger than 30; few are over age 60. Half earn incomes below the poverty level and half have completed less than 8 years of school (Slesinger, 1992).

The majority of migrants seek health care for acute problems rather than preventive visits since most are not eligible for health benefits and most employers do not provider health insurance to seasonal workers. The Migrant Health Act was enacted in 1962 and provides health care to migrants on a sliding fee basis through contracts to community-based agencies. The children also receive some medical and dental care through the federally-funded summer migrant education programs. The Migrant Clinicians' Network was formed to address some of the ongoing issues in migrant health care, most recently the issue of managed care.
Most studies on migrant families were reported during the 1980s and early 1990s. Two common chronic illnesses of adults that affect oral health are hypertension and diabetes (both are targeted in the Year 2000 objectives). Slesinger and Cautley (1981) studied care in 378 adult migrant farmworkers in Wisconsin. Twenty-five percent had never visited a dentist and the same percentage had seen a dentist in the previous year. Utilization was associated with proximity to one of the migrant clinics. Entwistle and Swanson (1989) studied 231 Hispanic adults (ages 18-55) in Colorado. Sixty-four percent of the sample were males; 59 percent were less than age 35; 82 percent spoke primarily Spanish and 54 percent had no reading proficiency in English. Eighty-five percent felt they were in need of dental care, but only 21 percent had seen a dentist in the past year. Twenty-two percent had never seen a dentist. Over 50 percent had received preventive care in the past and 70 percent had received restorative care. More than 50 percent of the sample still had 27 or 28 teeth present and only one person was edentulous. Perceived needs for care were fairly accurate when compared with needs identified by the examiners. Thirteen (5.6 percent) of the participants were caries-free. Eighty-five percent had one or more decayed teeth; permanent molars were decayed in 35-46 percent of the population, depending on which particular molar was referenced. Eighty-three percent had periodontitis in at least one area of the mouth; 88 percent of the total number of sextants required some form of periodontal debridement. More advanced disease was seen in males and tobacco users. Major reasons for not seeking care were cost and no time (off from work or child care).

Dental health is cited in numerous studies as one of the top ten health problems of migrant children. The literature documents early initiation and progression of dental caries unless preventive measures, especially sealants, are provided (Woolfolk, Hamard and Bagramian, 1984; DiAngeles et al., 1981; Call, Entwistle, Swanson, 1987; Koday, Rosenstein, Lopez, 1990; Weinstein et al., 1992). The Yakima, Washington clinic study by Koday, Rosenstein and Lopez demonstrates the importance of collaboration between a clinic that places sealants and the school system, since 19 percent of the children (three times the national average at that point) had received sealants. Early childhood caries is a major problem and consumes a high percentage of treatment funds, particularly if general anesthesia is required.

**Disabled populations**

The proportion of the U.S. population found to have disabilities has risen in the past 25 years, with greater numbers of children and young adults now reporting disabilities. In 1970, 11.7 percent of the population experienced activity limitation; in 1994 it was 15 percent. The elderly--those 65 years of age and older--experience disability rates twice those of the age group 45-64, and four times those ages 18-44. About 16 percent require personal assistance for ADLs and IADLs. Between 1990 and 1994, disability rates for children increased from 5.5 to 7.9 percent in boys and from 4.2 to 5.6 percent in girls. Increases particularly occurred in the prevalence of asthma, mental disorders, (especially attention deficit disorder/hyperactivity), mental retardation, and learning disabilities. (Kaye et al., 1996). Since elders' dental care utilization has been examined
in previous sections, only literature relating to children and adults with developmental disabilities will be reviewed here.

Due to the wide variability in the medical and educational diagnoses that fall under the term "disabilities" or even "developmental disabilities," national studies of disabled populations have not been attempted. Most early studies were of institutionalized populations or of individuals falling under a primary general diagnostic label such as cerebral palsy or Down Syndrome. As deinstitutionalization became the norm, studies have been conducted in specialty clinics or of residents of group homes. The majority of studies indicate higher rates of dental disease in some populations, not necessarily as a direct result of the disabling condition, but due to personal and professional dental neglect (Entwistle, 1984). Performance of oral hygiene and treatment in light of the complex medical and behavioral problems that sometimes arise is challenging and sometimes creates safety issues for both the individual and the dental practitioners. Behavioral management, therefore, has been deemed a significant barrier to care for some disabled individuals. Lack of training in sophisticated management techniques and complex medical problems also makes dental professionals unwilling to care for this population. Unfortunately, parents respond that stereotypes based on labels and noncompliance with the Americans with Disabilities Act continue to result in discrimination and provision of a great deal of care under general anesthesia (California Connections, 1997).

A number of programs developed in the 1970s under a Robert Wood Johnson Foundation grant program and in conjunction with the University Affiliated Program grants did seem to make a difference in graduates’ willingness to see disabled patients. Many of these programs are no longer in existence or have been subsumed under other clinical programs, while others continue to maintain their important role in the community despite lack of reliable funding. Some of the programs developed referral directories, sometimes in conjunction with programs sponsored by the National Foundation of Dentistry For the Handicapped. Given the amount of effort needed to make and track referrals, update the list, and maintain contact with local agencies, Siegal (1986) notes that these directories were not always as reliable and useful as they were hoped to be.

Most U.S. studies report access problems related to 1) dentists’ unwillingness to treat disabled persons because of inadequate training, time involvement, rising malpractice liability if they use sedation, etc., 2) lack of general dentists and dental specialists who accept Medicaid reimbursement, 3) child’s behavior problems, 4) family's transportation problems, and 5) competing priorities for care (Shuman and Bebeau, 1994.) Since most dentists practice in private office settings, they are not surrounded by other medical expertise and support, nor are they very connected with community organizations and services for people with disabilities. In a 1989 survey by Finger and Jedrychowski of five Regional Centers in the Los Angeles area, 51 percent of the families indicated not having any problems related to dental care, while those with problems noted the ones already described. Parents who reported the most problems were those with less education and those who were told their child needed to be hospitalized for care.
Strauss, Hairfield and George (1985) examined 233 adults in sheltered workshops and determined that treatment cost estimates were $421 per capita, with a median fee of $240 (1983 fees). Many of these individuals had previously been institutionalized and had received care in those facilities. Recent tooth decay reflected dietary changes and lack of care since deinstitutionalization. The adults expressed problems trying to identify dentists who would treat them and did not want to go to a pediatric dental office, even though these dentists had been trained to work with disabled persons. Burtner and Dicks (1994) also note their concerns that dental care in institutional settings was of high quality because of the specialized training of the staff and a number of other factors. Deinstitutionalization has created a gap where these adults cannot find quality care in the community, especially if they have severe impairments with many behavioral manifestations. The authors go on to review a number of alternative care delivery systems that have been used to fill some of these gaps.

A study by Wile and Ferguson (1992) describes the role and experiences of a social worker who provided intake, case management, community outreach, and follow up care with disabled children and their families as part of a university-based dental program. The social worker found that parents of community dwelling children needed the most help, since those in group homes or residential facilities already were assigned case workers.

Shuman and Bebeau (1994) provide an overview of some of the economic, physical and social barriers that disabled people encounter trying to access and receive dental care. The authors address some of the ethical issues in a managed care environment, such as restrictions on treatment options and incentives for conserving resources. They also cover how Public Law 101-336, the Americans with Disabilities Act, impacts access to dental care. This law requires that both public and private dental offices serve persons with disabilities, that treatment is provided on the same basis as it is for non-disabled patients, and that dentists make reasonable modifications to facilitate access.

Tesini and Fenton (1994) emphasize that most persons with disabilities need no additional behavior management modalities to complete care. They note that hospitalization for dental care, particularly preventive procedures, is required infrequently and should never be used as a substitute for good office management techniques.

Training efforts reported by Glassman et al. (1994) have used a pyramid (also known as "train-the-trainer") training approach for managers in residential settings to increase their knowledge of oral hygiene techniques as well as information and referral strategies. This approach uses community networking to create a cadre of providers for in-office and hospital-based care. The model currently is being replicated in other communities.

To determine if the patient population in one dental school-based special patient care clinic had changed over the period of a decade, Jedrychowski and Lindemann (1991)
compared patients attending the clinic in 1977-79 and 1987-89. They found comparable patient populations except the median age had changed from 47 in the 1970s to 34 in the 1980s. Patients were also traveling further from their home to seek care at the clinic. Based on a demographic analysis, the patient population was found to be representative of the general disabled population in the Los Angeles region and in the state of California.

**HIV-infected persons**

People with HIV and AIDS may face substantial barriers to the receipt of needed dental services. Some dentists are reluctant to provide care to infected people, and people with HIV infection also may confront access barriers that affect Americans generally, including lack of private dental insurance coverage and limited availability of publicly supported dental care (Fleishman, Schneider, Garcia, Hardwick, 1997). Several studies have looked at the service needs of HIV-infected persons both before and after the Ryan White Comprehensive AIDS Resources Emergency (CARE) Act, which allocates funds to localities disproportionately affected by the HIV epidemic, was enacted in 1990, and have found that HIV-infected persons have a wide variety of needs, including dental care (Capilouto, Piette, White, Fleishman, 1991; Lenker, Lubeck, Vosler, 1993; Weissman et al., 1994).

Probably the most comprehensive study has been the AIDS Cost and Services Utilization Survey (ACSUS), which was the first multisite study that examined a comprehensive array of health care and support services used by HIV-infected persons. Although the design of ACSUS does not allow unbiased national estimates of usage, the data do support analyses of differences within the study population in use patterns across respondent characteristics such as race, exposure group, insurance coverage, and stage of illness (Mohr, 1994).

The ACSUS found that 51 percent of respondents reported one or more visits to a dentist, oral surgeon, or other professional dental care provider at some point during the 18-month study period. Examining only respondents to the first four interviews in this survey, which spanned approximately one year, 45 percent reported a dental visit. Respondents who were black or Hispanic were less likely to use dental services than were white respondents. Those with no college were less likely to receive dental care than were their more educated counterparts. The probability of any dental use increased with age. Respondents with AIDS had a lower likelihood of using dental services than asymptomatic respondents. Those without medical insurance were significantly less likely to use dental care than were those with public insurance. There were no significant differences between those with private and those with public insurance. The unemployed were significantly less likely to use dental services even when income was excluded from the regression model.

Although dental care use among ACSUS respondents was found to be somewhat lower than for the population as a whole, using the 1989 NHIS as the basis for the latter
estimate, the authors did not believe the difference to be extraordinarily large. For example, the NHIS found that 60.9 percent, 66.6 percent, and 63.2 percent, of people aged 18 to 34 years, 35 to 44 years, and 45 to 54 years, respectively, had one or more dental visits in the past year, compared to 48.6 percent, 55.5 percent, and 48.6 percent for ACSUS respondents, respectively, measured over a longer time period (18 months). Despite the fact that the prevalence of unmet need for dental care was higher than that for other services, including emergency care, home services, and prescribed medications, the highest level of reported unmet need was only 9 percent (Fleishman, Schneider, Garcia, Hardwick, 1997), which was considerably lower than what has been reported in other studies ((Capilouto, Piete, White, Fleishman, 1991c; Fleishman, Piete, Mor, 1989). Although the authors provide no definitive explanation for the large difference between the level of unmet need found in their study compared to other studies, they do point out that Ryan White CARE Act funding became available after the earlier studies and before ACSUS, and that this program provided most ACSUS communities with substantial funding for the delivery of HIV-related dental care. Consequently, they speculate that the low unmet dental need found in ACSUS reflects improvement in the accessibility and supply of dental services over time. They believe their results suggest that continued funding of dental services through the CARE Act is an important factor in maintaining and enhancing access to dental care for this population.

In seeming contrast to the ACSUS, a study of San Francisco agencies funded by the Ryan White CARE Act found that 41 percent of respondents had unmet dental needs, i.e., they reported that they had needed dental services but had been unable to receive them (Marx, Katz, Park, Gurley, 1997). These authors note that although the CARE Act has been reauthorized, the allocation is below projected community needs, and that funding for San Francisco in 1996 was $4 million below the 1994 allocation. They also conclude that the CARE Act is a crucial funding stream for HIV-infected persons most in need of services.

**Incarcerated persons**

The Federal Bureau of Prisons (FBOP) is statutorily charged with providing essential health care services to its inmate population. Dental care is a major element of these services. Dental care is defined qualitatively to be commensurate with acceptable community standards, with the level of dental services described quantitatively by FBOP policy. The staffing pattern per institution is roughly one dental officer per 500 inmates (Kirk, 1996). No large-scale examination of state incarcerants has been attempted to date (Payne, 1997).

In 1994, a cross-sectional survey of a convenience sample of 2,070 FBOP inmates was conducted to investigate the prevalence of decayed, missing, and filled teeth (DMFT) and the periodontal status, as measured by the Community Periodontal Index of Treatment Need (CPITN), of newly-sentenced inmates. The objective of this survey was to assess and compare these oral health parameters to those of the adult U.S.
population. The institutions were selected to represent the range of custody levels in institutions housing both males and females.

The survey found that the prevalence of caries and periodontal disease in the examined inmate population was similar to the U.S. adult population, although there were more decayed and missing teeth, and fewer filled teeth, than the general adult population. These differences were ascribed primarily to differences in socioeconomic status. The prevalence of periodontal disease was higher among non-whites and slightly higher in males than females (Dental Workgroup, Federal Bureau of Prisons, 1995).

While the FBOP dental services system is demand-driven, access to services is unlimited, although qualification for particular services and treatment modalities is predicated on patient compliance with oral health instruction and self-care responsibility. A small (N=58) follow-up study was conducted to measure utilization of dental services by a random sample of the same population. Using a Department of Defense treatment needs classification scheme, it was found that 13.7 percent of the sample were classified as Class I (need prophylaxis, no to minor restorative care, no prosthetics), 31.0 percent were classified as Class II (need prophylaxis, moderate restorative care, minor exodontia, minor prosthetics), and 58.3 percent were classified as Class III (need deep scaling and root planing, substantial restorative care/exodontia/prosthetics). The average number of visits per month provided to these groups was 1.6, 2.0, and 5.4 for those in Class I, II, and III, respectively. Visits were "on demand," i.e., they were unscheduled. Further analysis of these data revealed that the high rate of transfer of inmates in the sample between institutions rendered the findings of dubious value. A repeat survey of disease prevalence and utilization is planned for late 1997/early 1998 (Payne, 1997).

**Military personnel**

Although the oral health of U.S. military recruits has been extensively studied, there have been relatively few studies of their dental utilization behavior. In a study of dental utilization by active duty enlisted and officer Army personnel, Chisick (1993) found that over two-thirds of enlisted personnel and three-quarters of officers had visited a dentist within the past year, although there was no difference in annual utilization between officer and enlisted personnel when age was controlled. The highest rates of no previous dental visit (12.2 percent) were found among 18- to 19-year-olds. Over 90 percent of all Army personnel had seen a dentist within the past two years.

Although these figures may not be surprising considering that the Army's Oral Health Fitness Program requires that every active duty soldier receive an annual dental examination, the annual utilization rates include all types of visits, not just annual exams. Chisick estimated that at most about 62 percent of enlisted personnel and 72 percent of officers complied with the annual dental examination requirement.
Chisick, Poindexter, and York (1996) recently reported findings from a 1994 30-site oral health survey of U.S. active duty military personnel and recruits in the Army, Air Force, Navy, and Marines. They found that, overall, only 38 percent of all recruits had seen a dentist within the past year, with the most striking variation occurring across overall oral health fitness for military deployability, i.e., whereas almost all of those with the best oral health had seen a dentist within the past year, only one-third of recruits with the worst oral health had done so. Using logistic regression to determine what factors contribute to the likelihood of recruits having seen a dentist over the past year revealed that the likelihood was greater for females, singles, Air Force personnel, Native Americans, and the better educated. The likelihood was less for recruits who were black, above 19 years of age, from the Midwest, Southwest, or Pacific regions of the U.S., and who perceive a need for dental care. Education was the strongest predictor of dental utilization prior to entering military service.

Chisick (1992) also compared dental utilization results from a worldwide sample of U.S. Army personnel with their employed civilian cohorts in the U.S. population. Results showed that, regardless of race or gender, over 80 percent of Army personnel had seen a dentist within the past year. Controlling for age, gender, and race, active duty Army personnel were found to have dental utilization rates that greatly exceed their employed civilian cohorts. These results suggest that access barriers to dental care present in the civilian population, especially for minorities, are greatly diminished in the U.S. Army, and that access to free care may be a potent stimulus to utilization of dental services among military or civilian personnel.

Very young children

Knowledge about the prevalence of dental caries and its treatment in U.S. preschool children is limited (Waldman, 1990). Most published studies have looked at 3-5-year-old children enrolled in the Head Start program. Only two studies published between 1986 and 1996 report the prevalence of caries in children younger than age 2, and both of these were limited to Native American children participating in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) (O’Sullivan et al., 1994; Tsbouchi et al., 1995). Tang et al. summarized studies of caries prevalence in preschool children published over the past ten years, and found that not only did many report very high levels of caries in this population, but also that the high caries levels were compounded by low levels of treatment (Tang, Altman, Robertson, et al., 1997). For example, even among Head Start children, whose dental treatment is mandated (U.S. Head Start Bureau, 1982), the percentage of decayed teeth was greater than 50 percent. The NHANES III--Phase 1 data showed an even greater percentage of treatment need, with decayed teeth accounting for 82 percent of the decayed and filled primary teeth (dft) index in 2- to 4-year-old children (Kaste, Selwitz, Oldakowski, et al., 1996).

Tang et al. assessed the prevalence of caries in a large number (N=5,171) of Arizona preschool children ages 5 months through 4 years. Although their survey oversampled children from low-income families, theirs was one of the first to provide detailed
epidemiologic data on caries prevalence in children younger than age 3. They found surprisingly high caries levels even in very young children. Of the 994 one-year-olds examined, 6.4 percent had caries, and in those one-year-olds with caries, an average of more than 2.5 teeth were affected, "a large number, given that these children have on average fewer than 15 erupted teeth." More than 20 percent of 2-year-olds had caries. The mean dmft of the 3-year-olds was nearly twice that of the 2-year-olds, and the mean dmft nearly doubled again in the 4-year-olds (Tang, Altman, Robertson et al, 1997). Caries prevalence was highest among Native American children, followed by Hispanics, blacks, and finally whites.

Little dental treatment was evident until about 36 months of age. However, in no age group were more than 10 percent of the children fully treated. Overall, only 26 percent of the teeth affected by caries in the 2- to 4-year-olds had been treated, which is similar to the 18 percent reported for this age group in NHANES III--Phase 1 (Kaste, Selwitz, Oldakowski, et al., 1996). Even among Head Start children, only 42 percent of the children with caries had received any treatment. The authors postulated that the inadequate treatment evidenced by the children in this study may have been related to a lack of access to care. Although many of the children examined in this survey were low-income and Medicaid-eligible, and access to dental care by Medicaid beneficiaries is known to be affected by low provider participation, the low levels of dental treatment were not ascribed to Medicaid-related issues alone, as treatment levels were also low among children from higher income families (Tang et al., 1997). Rather, the authors believed that other factors, including an inability or unwillingness of general dentists to provide care for "pre-cooperative" children, and a lack of consensus about the age at which a child should first visit a dentist, might be responsible for the low treatment levels.

Utilization of preventive dental services

While access indicators such as the percentage of persons with a dental visit within the past year and the number of dental visits during the past year provide a broad view of overall access to dental care, they give no indication of the reason for the visit. In particular, they do not distinguish between a preventively oriented visit, a visit to treat an acute infection, a visit to extract a tooth so badly decayed it cannot be restored, or a visit to deliver a full set of dentures replacing all the natural teeth.

The Coalition for Oral Health has noted that:

"Perhaps the greatest irony surrounding the extensive oral health problems and lack of access to dental care faced by so many of our people is the fact that they are so easily and inexpensively preventable. For no aspect of health care is the old adage, 'an ounce of prevention being worth a pound of cure,' so true as it is for oral health services."
"...dentistry has a formidable, extensive, well-researched and cost-effective set of preventive procedures to draw upon. For example, it is well known that the use of fluorides and dental sealants can prevent almost all tooth decay for children (Ripa, 1993). Regular effective removal of dental plaque through toothbrushing, use of dental floss, and regular prophylaxes (cleanings) can effectively prevent and control most periodontal diseases. Early detection of oral cancer can markedly increase survival rates and limit disfigurement" (American Cancer Society, 1992).

"While overall the oral health status of the U.S. population is improving for those with access to oral health services, oral diseases continue to affect most Americans. Because dental problems are generally not reversible or self-limiting, and only get more difficult, time-consuming and costly to treat, the most sensible approach for dealing with them is through prevention" (Coalition for Oral Health, 1993).

The effectiveness of fluoride products in preventing dental caries is extensively documented. In 1986, fluoride toothpaste was the most commonly used fluoride product, and was used by nine out of ten children (Jack, Bloom, 1988). Other fluoride products included fluoride supplements, in either pill or liquid form, and fluoride mouthrinses.

In 1989 about 1 out of 10 children aged 2-17 years used fluoride supplements, i.e., fluoride drops, fluoride tablets, vitamin drops with fluoride, or vitamin tablets with fluoride (Bloom, Gift, Jack, 1992). Use of fluoride supplements was highest among children aged 2-4 years (16.4 percent), under 2 years (15.1 percent), and 5-8 years (13.5 percent); usage was lowest among teenagers aged 15-17 years (2.6 percent). The percent of white children who used fluoride supplements (10.6 percent) was double the percent of black children who did (5.4 percent). Fewer Mexican-American children used fluoride supplements (7.1 percent) than did other Hispanic children and non-Hispanic children (9.7 and 10.0 percent, respectively).

Preschool-aged children who did not visit a dentist in the previous year are less likely to use dietary fluoride supplements than children who visit a dentist. Similarly, mouthrinising with fluoride is related to having a dental visit during the past year, the number of dental visits, and the interval since the last dental visit. In addition, brushing with fluoride toothpaste is more frequently reported among children who had a dental visit during the previous year (Wagener, Nourjah, Horowitz, 1992).

About 11 percent of children aged 2-17 years were in a fluoride mouthrinse program at school. As would be expected, participation rates were higher for children of elementary school age, with 16.4 percent of 5-8-year-olds and 19.0 percent of 9-11-year-olds in such programs. The proportion of black students in a fluoride mouthrinse program was larger than that of white students (15.3 and 10.1 percent, respectively, for all ages), and the use of fluoride mouthrinses at school was greater among children in families with incomes less than $10,000 per year (16.9 percent) than in families with
incomes of $35,000 or more (7.2 percent), perhaps reflecting the fact that mouthrinse programs are generally targeted to low income populations (Bloom, Gift, Jack, 1992). There was no significant difference between Hispanic and non-Hispanic participation in a program.

About 9 percent of children aged 2-17 years used a fluoride mouthrinse at home. There was no difference in home use of fluoride mouthrinse by race. However, the proportion of non-Hispanic children who used fluoride mouthrinse at home was greater than that of Hispanic children (9.0 and 5.7 percent, respectively). The use of fluoride mouthrinse at home was greater among children in families with incomes of $20,000 or more than in families with lower incomes.

In 1986-87, only 7.6 percent of children aged 5-17 years had had dental sealants applied to any permanent teeth (Brunelle, 1989). For the period between 1988 and 1991, 1.4 percent of children ages 2-11 years had at least one sealed primary tooth, and 18.5 percent of 5-17-year-olds had at least one sealed permanent tooth (Selwitz, Winn, Kingman, Zion, 1996). For both of these groups of children, there were no significant differences between males and females.

Table 7 presents data from Phase 1 of NHANES III (1988-1991) showing the percent of children with one or more sealants in primary and permanent teeth by age and race/ethnicity.

The percentage of children with at least one sealed tooth was approximately three times higher both for children and adolescents ages 5-17 overall, and within each of the age groups constituting this group, in non-Hispanic white children (21.7 percent overall) than it was in either non-Hispanic black (7.0 percent overall) or Mexican-American (6.9 percent overall) children.

Perhaps the most telling explanation for the disparity in use of sealants is poverty status. Table 8 presents unpublished data (Drury, 1997) on the percent of 8- and 14-year-old children with any sealed first or second permanent molar, by poverty status, from Phase 1 of the NHANES III survey (1988-91). For 8-year-olds, children at or above poverty level were almost 20 times more likely to have received sealants than those below poverty level, and for 14-year-olds, this ratio was almost 6:1.

Nowjack-Raymer, Drury, and Selwitz also analyzed data on sealant prevalence from Phase 1 of NHANES III and its association with the prevalence of untreated decay (Nowjack-Raymer, Drury, Selwitz, 1997). They found that, among children aged 5-17, 27.3 percent of those without sealants and 11.1 percent of those with sealants had untreated decay. Among those with sealants, the poor were almost twice as likely as the nonpoor to have untreated decay (41.0 and 23.3 percent, respectively). Another study of the same population found that parental educational background, family income, and recent dental visits each had independent effects on sealant presence (Stack, Selwitz, Drury, 1997).
Using economic theory on the demand for health services and the Andersen model of health services utilization, Swank, Vernon and Lairson (1986) examined data from the 1971-75 National Health and Nutrition Examination Survey to determine factors associated with the use of preventive dental services. They found that the enabling factors--income and a regular source of dental care--were the most important determinants of use of preventive dental services. Need characteristics, as measured by self-evaluated condition of the teeth, were also significant determinants of use, while the predisposing variables were the least important of the three types.

Table 7. Percent of children with sealants in primary and permanent teeth, by age group and race/ethnicity, 1988-91.

<table>
<thead>
<tr>
<th>Age 2-6:</th>
<th>Percent having sealants in primary teeth</th>
<th>Percent having sealants in permanent teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Hispanic White</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>Mexican-American</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>Age 7-11:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>2.8</td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>Mexican-American</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Age 2-11:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>Mexican-American</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>Age 5-11:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>21.3</td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>6.9</td>
<td></td>
</tr>
<tr>
<td>Mexican-American</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td>Age 12-17:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>22.3</td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>Mexican-American</td>
<td>8.7</td>
<td></td>
</tr>
<tr>
<td>Age 5-17:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>21.7</td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>Mexican-American</td>
<td>6.9</td>
<td></td>
</tr>
</tbody>
</table>

Source: Selwitz, Winn, Kingman, Zion, 1996.
Table 8. Percent of children with any sealed first or second permanent molar, 1988-91.

<table>
<thead>
<tr>
<th></th>
<th>All persons</th>
<th>Below poverty</th>
<th>At or above poverty</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 years</td>
<td>20.6</td>
<td>1.4</td>
<td>27.2</td>
</tr>
<tr>
<td>14 years</td>
<td>28.7</td>
<td>5.8</td>
<td>33.4</td>
</tr>
</tbody>
</table>

Source: NHANES III, Phase 1 (Drury, 1997)

In a study of access to care and utilization of preventive services using data from the 1982-1984 Hispanic Health and Nutrition Examination Survey (HHANES), Solis et al. examined three groups of Hispanics: Mexican-Americans, Cuban-Americans, and Puerto Ricans. They found that Mexican-Americans were less likely than either Cuban-Americans or Puerto Ricans to have reported a dental check-up within the previous two years, and far more likely than either of these two groups to have never had a dental check-up (Solis, Marks, Garcia, Shelton, 1990), although the data were not age-adjusted and the Mexican-American sample had a substantially higher number of younger subjects. The authors attribute these differences in part to the fact that Mexican-Americans are less likely than the other groups to have health insurance.

Barriers to access

The IOM identifies three primary types of barriers to health care. Structural barriers are impediments to health care directly related to the number, type, concentration, location, or organizational configuration of health care providers. Financial barriers may restrict access either by inhibiting the ability of patients to pay for needed health services or by discouraging health care providers from treating persons of limited means. Personal and cultural barriers may inhibit people who need health care from seeking it, or, once they obtain care, from following recommended posttreatment guidelines.

Availability of providers

One of the structural barriers to dental care identified by The Robert Wood Johnson Foundation in its report on access to health care was the availability of health care resources, i.e., dentists. The report noted that among the reasons the poor receive less dental care than others is that the number of dentists in a community affects access. Higher-income areas were found to have 66 percent more dentists per capita than low-income areas, and the supply of dentists per capita actually decreased in low- and medium-income areas during the 1980s, while it increased in high-income areas (Center for Health Economics Research, 1993).

In fiscal year 1993, nearly $354 million was provided for 42 health professions training programs aimed at ensuring an appropriate supply and distribution of health professionals to Americans. Thirty of these programs, established under Titles VII and VIII of the Public Health Service Act, are aimed at improving access to health care by 1) increasing the supply of primary care providers and other health professionals, 2) improving their representation in rural and medically underserved areas, and 3) improving minority representation in the health professions (US General Accounting...
Office, 1994a). In an evaluation of whether these programs have been successful in creating greater access to health care in rural and underserved areas, the U.S. General Accounting Office found that the supply of general dentists had increased in all types of urban and rural areas, but the distribution patterns in Health Professional Shortage Areas (HPSAs) had remained relatively unchanged for the past 15 years (US General Accounting Office, 1994a).

There is a good deal of research and experience to show that employing expanded function dental auxiliaries to provide a number of services currently restricted to dentists by state dental practice acts is one way in which the efficiency of the nation’s dental care delivery system could be increased, and that needed services could be provided to more people at less cost (US General Accounting Office, 1980; Liang and Ogur, 1987). Nevertheless, most states continue to have laws precluding dentists from employing such persons for this purpose, and even the federal government has not established an overall policy requiring or promoting the use of such auxiliaries in federally supported dental care delivery programs.

How the supply of health care providers affects access to health care is a matter of some debate. The traditional approach to workforce planning has been to define the supply requirements based on an assessment of "demand" or "need" for services. Little research, however, has gone the next step to attempt to measure how differing levels of supply actually affect the outcomes of care, and so our ability to answer such questions as: What ratio of general dentists and dental specialists to population is "right?" What effect does a higher supply of dentists have on the oral health status of a population? Is access to care better in areas with higher proportions of dentists? Does the presence of public and nonprofit community clinics in an area correlate with improved access to care and health outcomes?

One interesting attempt to address these issues with respect to physicians involved a study to measure how the current supply of physicians and primary care clinics in California communities relates to the underlying demographic characteristics of the community and an outcome measure of health care for community residents. Specifically, the study sought to describe how the distribution of physicians and clinics in the state varies according to the income and racial and ethnic composition of communities, and whether a greater supply of physicians and clinics is associated with better access to care, as reflected in lower hospitalization rates for ambulatory care-sensitive (ACS) conditions after controlling for community demographics. This study found that physician supply was strongly and inversely associated with a community’s proportion of African-American and Hispanic residents, and that physician supply differed only slightly across low-income vs. higher-income areas with similar racial and ethnic compositions. Also, in contrast with the pattern for physician supply, the number of clinic visits per capita in both urban and rural areas varied primarily according to community income characteristics, rather than according to racial and ethnic composition, with higher visit rates in poorer communities, and with the per capita clinic visit rate in rural areas twice that of urban areas (Grumbach, Seifer, Vranizan, et al., 1995).

These results highlight the importance of race and ethnicity in explaining differences in physician supply and health outcomes between areas. People living in low-income,
nonminority areas of urban California had more physicians practicing in their neighborhood than did people living in higher-income areas with high proportions of African-American or Hispanic residents. The authors concluded that poverty and race, often associated with a lack of health insurance, appear to be much more significant factors influencing access to care and preventable hospitalizations within a community. Therefore, policies aimed at improving access may need to focus particular attention on access barriers related to health insurance status, the direct effects of poverty, the ways in which race and ethnicity are associated with disadvantaged health status, and the specific process of care, in addition to considering measures focused on the supply of health care providers in the community. "Policies exclusively directed at increasing the supply of providers in an area may prove of limited benefit if the underlying context and process of health care in the community is not taken into account" (Grumbach, Seifer, Vranizan, et al., 1995).

**Federal programs**
A variety of federal agencies and programs have long supported a broad range of programs aimed at alleviating access problems. While the largest and best known of these is the Medicaid program, which spent over $161 billion in fiscal year 1996 on health and long-term care for low-income Americans, over 30 other programs exist. Together, these programs spent more than $1 billion a year as of 1996 (US General Accounting Office, 1997c). These programs typically use one of three strategies to assure that all populations have access to care:

1. **Providing incentives to health professionals practicing in underserved areas.** Under the Rural Health Clinic and Medicare Incentive Payment programs, providers are given additional Medicare and/or Medicaid reimbursement to practice in underserved areas. In 1996, these reimbursements amounted to over $400 million. In addition, over $112 million was spent on the National Health Service Corps program, which supports scholarships and repays education loans for health care professionals who agree to practice in designated shortage areas. Under another program, called the J-1 Visa Waiver, U.S. trained foreign physicians are allowed to remain in the United States if they agree to practice in underserved areas.

2. **Paying clinics and other providers caring for people who cannot afford to pay.** More than $758 million funded programs that provide grants to help underwrite the cost of health care at community health centers and other federally qualified health centers. These centers also receive higher Medicare and Medicaid payments. Similar providers also receive higher Medicare and Medicaid payments as "look-alikes" under the Federally Qualified Health Center program.

3. **Paying institutions to support the education and training of health professionals.** Medical schools and other teaching institutions received over $238 million in 1996 to help increase the national supply, distribution, and minority representation of health professionals through various education and training programs under Titles VII and VIII of the Public Health Service Act.

Despite the availability and expenditures of the above programs, GAO found that these programs historically have not been held accountable for showing that access had
improved. For example, a review of clinics funded by the Rural Health Clinic program found that 1) the availability of care did not change appreciably for at least 90 percent of Medicare and Medicaid beneficiaries using the clinics; 2) the federal subsidies had not been used to expand access to underserved portions of the populations; and 3) the clinics did not need the federal subsidies to remain financially viable (US General Accounting Office, 1997c).

One method that has been used to try to address barriers to access to health care, whether they be in isolated rural areas or inner-city neighborhoods, has been to designate such areas as underserved, and then target the placement of health care providers to those areas. In fiscal year 1994, the federal government spent about $1 billion on programs for alleviating access problems in such locations (US General Accounting Office, 1995). Two main systems are used to identify such locations: one designates HPSAs, the other Medically Underserved Areas (MUAs). More than half of all U.S. counties are designated as HPSAs or MUAs, and over another fourth have HPSAs or MUAs somewhere within their borders. In 1995, the U.S. General Accounting Office investigated these two systems to determine how well they identify areas with primary care shortages and how well they help target federal funding to benefit those who are underserved. The GAO concluded that these systems do not effectively identify areas with primary care shortages or help target federal resources to benefit those who are underserved, and that, for programs relying on the systems for these purposes, there is little assurance that federal funds are used where they are most needed (US General Accounting Office, 1995a).

The federal government’s main program for placing health care providers in locations with identified shortages of health professionals, designated so as described above, is the National Health Service Corps (NHSC). The GAO found that the NHSC does not distribute provider resources as effectively as it could to alleviate health care needs in the greatest number of eligible shortage areas (US General Accounting Office, 1995b, 1997c). In some cases, the NHSC was found to have placed more providers than needed to remove the shortage area designation. This limited the NHSC’s ability to address needs in other shortage areas. It was found that in some shortage areas, NHSC providers are requested but not received, and others areas that want NHSC providers face barriers to requesting them. For example, 65 percent of the 1,207 shortage areas requesting an NHSC provider in vacancy year 1993 did not receive one, and 143 of these areas had requested but not received an NHSC provider for 3 or more years. The GAO estimated that 22 percent of all shortage areas requesting, but not receiving, NHSC providers have obtained shortage area designation at least in part to be eligible for NHSC providers, but lack adequate resources, information on the NHSC, or infrastructure within the community to apply for providers. They concluded that additional efforts may be necessary to address the barriers to accessing NHSC programs faced by many shortage areas with no pre-existing health care infrastructure (US General Accounting Office, 1995b).

Additionally, GAO found that while almost $2 billion has been spent in the last decade on Title VII and VIII education and training programs, the Department of Health and Human Services has not gathered the information necessary to evaluate whether these programs had a significant effect on changes that occurred in the national supply,
distribution, or minority representation of health professionals or their impact on access to care.

School-based health centers
Another method that has been proposed to help increase access to dental care, at least for school-aged children, is through dental care programs in school-based or school-linked health centers (SBHCs/SLHCs). "School-based" indicates that the services are actually provided in a school facility, whereas "school-linked" refers to services that are linked to schools but provided in off-site facilities, e.g., community clinics. SBHCs/SLHCs improve children's access to health care by removing financial and other barriers in the existing health delivery system. These centers, which take advantage of the fact that children in or linked to school settings represent a "captive audience," are a unique delivery system option that gives children, especially those who are poor or uninsured, easy access to services. Providing services in such settings is a particularly effective way to reach adolescents and also yields benefits for younger children (US General Accounting Office, 1994c).

A GAO study of how SBHCs expand access to health care found that some SBHCs offer or arrange for students to receive dental care, and implied that, since 50 percent of children aged 5 to 17 do not have private dental insurance, and for those with insurance, copayments and deductibles may be as high as 50 percent of the cost of services (Oral Health Coordinating Committee, 1993), SBHCs represent a way of increasing access to dental care for children who lack health insurance and whose parents have difficulty paying for needed health services. In fact, the GAO report cited an anecdote of a child whose family did not have money to pay for dental services and for whom, when a dental need arises, "must choose between seeing a dentist and paying for basic necessities like food and rent" (US General Accounting Office, 1994c).

Of course, while SBHCs could do much to improve children's access to health care, and to dental care specifically, they cannot provide all needed services to all children. They are not always open during the summer or other times when school is not in session. Relatively few SBHCs/SLHCs offer dental service. For example, of 41 SLHCs studied in 1995, only 3 offered dental services, and of 144 SBHCs studied in 1994, 11.8 percent offered dental services (Fothergill, 1997). The comprehensiveness of referral networks varies. And SBHCs generally do not serve children who are not in school, such as those younger than age 5 or adolescents who have dropped out of school. Sometimes, too, students may not be aware of the services offered by their health centers, or there may be organizational aspects of the center that limit optimal utilization. For example, one study of knowledge about SBHC operations and services was conducted among middle and high school African-American students in two urban public schools in Baltimore, and found that almost half the students (49 percent) were unaware of the availability of dental service referrals (Keyl, Hurtado, Barber, Borton, 1996). Another study found that while students who had access to a free, but offsite, school dental service had a greater likelihood of dental visits than students without such access, the optimal effect on dental care was evident only when the service was offered within an organized referral and transportation structure (Brown and Wright, 1987).
Rural residents face a number of barriers to the receipt of health services. During the deliberations on national health care reform, many discussions focused on the provision of primary care services, especially to underserved populations, including those living in rural communities. While critically important, this attention to primary care has often occurred at the expense of other services also vital to rural citizens. Among these other services, rehabilitative care stands out because of the disproportionate need for those services in rural communities and their relative unavailability. With a population aging at a rate faster than the general population, rural citizens are more likely than their urban counterparts to require rehabilitative services (Jones and Brand, 1995).

Lower rates of health insurance in rural areas reflect, in part, the fact that the poverty rate is higher in rural areas than in urban areas, so that rural residents are less able to afford insurance coverage. Rural residents are also more likely to be employed in agriculture and in small businesses, neither of which offer private insurance as extensively as more urbanized industries (Chollett, 1987). Medicaid coverage tends to be less extensive in rural areas due to variations in coverage between states and to the exclusion of coverage for two-parent families in most states (Rowland and Lyons, 1989).

Rural areas also have fewer preventive and health promotion programs than urban areas (Bushy, 1990; Weinert and Long, 1990). Davis and Rowland reflect that "the effort involved in such a search for care may discourage the use of preventive services, resulting in the uninsured only seeking care for serious illness or in crisis" (Davis and Rowland, 1983). Even when health services are available, "rural populations are unique in the extent of physical barriers they may encounter when obtaining health care. Even in relatively well-populated rural areas, the lack of a public transportation system and the existence of few local providers to choose from can make it difficult for many rural residents to reach facilities where they can receive care" (US Congress, 1990a).

Rural values and norms
The social values and norms associated with rural life may discourage the use of preventive services (Strickland and Strickland, 1996). Perceived social distance and discomfort are exacerbated when providers are white and patients are both black and poor (Hall, Roter, Katz, 1988; Ventres and Gordon, 1990). The lack of privacy in small towns may lead individuals to reject preventive services associated with "embarrassing" conditions, such as testing for AIDS, venereal disease, or pregnancy outside of marriage. Rounds observed that while "fear, intolerance, and stigma are not problems unique to rural areas...given the lack of confidentiality and the homogeneous nature of most rural communities, these attitudes are much more pronounced and the impact more strongly felt" (Rounds, 1988).

Provider characteristics
The quality of care that poor and minority rural residents receive can be compromised
even when health services are available and accessible. Twenty-five years ago, Roth observed that the more patients deviated from white, middle-class appearance and behavior, the less likely they were to receive considerate or extensive treatment, and that up to 30 percent of Medicaid recipients did not seek care at some time because of physician attitudes (Roth, 1972).

Utilization of dental services
In nonmetropolitan counties, the ratio of both physicians and dentists to population decreases with declines in population size. This relationship persists even after controlling for population density and income (Taylor, Puskin, Cooley, and Braden, 1993). Urban residents are more likely to have dental examinations than rural residents, and 11 percent of rural residents have never visited a dentist (US Congress, 1990a). Strickland and Strickland looked at the reasons for lack of utilization of several preventive services (physical, vision, dental, gynecological, and prenatal exams) by low-income blacks in five rural counties in Georgia and found that, across the board, the most common reason was the perception that health services were not needed. This belief was cited by more than half of the households in which dental, vision, prenatal, and children’s general physical examinations had not been received. The second most common barrier, inability to pay, was cited in about one-third of the instances that general physical, gynecological, vision, and dental examinations had not been received, and was cited more frequently for dental examinations than for any other of these services (Strickland and Strickland, 1996).

There is a common perception that the rural population is small and decreasing, which to some extent affects the desirability of practicing in rural areas. Indeed, between 1900 and 1991, the urban population of the U.S. increased from 40 percent to 73 percent of the general population, and the farm population decreased from 39 percent to less than 2 percent of the population (Dacquel and Dahmann, 1993). However, over this same period, the number of nonfarm rural residents increased by almost 400 percent, from 16 to 63 million people, and nonfarm rural residents now constitute one quarter of the population of the nation. Waldman (1994), for example, uses these data to argue against the prevailing notion that there are limited opportunities for pediatric dental practice in rural areas.

Inability to pay
The use of preventive services is directly linked to ability to pay through income, private insurance, and entitlement status. Strickland and Strickland point out that for rural blacks living in the South, for example, this suggests that this group is at risk on three fronts (Strickland and Strickland, 1996). First, poverty is associated with rural residence, the South, and minority status in general, and with blacks residing in the rural South in particular (Brown and Warner, 1991; Rowland and Lyons, 1989). Second, blacks in the rural South are one and one-half times less likely to be insured than are whites from the South or non-southern blacks, and two times less likely to be insured than non-southern whites (Korczyk, 1989). Third, the rural poor are less likely to be covered by entitlement programs than are the urban poor (US Congress, 1990a),
with "just over a third (36 percent) of the rural poor hav[ing] Medicaid coverage compared to 44 percent of urban residents" (Rowland and Lyons, 1989). Rural-related impediments to entitlement coverage are numerous and include functional illiteracy, fear of insensitive treatment by agency employees, family pride, and stigma within the community (Bushy, 1990).

"Two-parent families, which are generally not eligible for Medicaid, are even more prevalent among the rural poor. Rural residents may lack information about eligibility, may be reluctant to apply for a means-tested program, or may have less access to providers who accept Medicaid. Finally, many of the rural poor...may be disqualified by farm or business assets...The Medicaid program is clearly reaching fewer of its intended beneficiaries in rural areas than in the nation's cities" (Korcyzk, 1989).

Although it may be difficult for households with Medicaid to locate and receive preventive services, it is often impossible for lower-income households without Medicaid coverage. Unfortunately, many of the barriers to preventive services--such as lack of awareness of relevant agencies and programs, lack of telephone and transportation, and functional illiteracy--are also barriers to establishing Medicaid eligibility (Strickland and Strickland, 1996).

Other barriers to access
The study by Strickland and Strickland showed that even when preventive health programs were available, accessing these services could be difficult. In addition to motivational factors, accessing services often involved knowing about relevant entitlement programs, establishing entitlement eligibility, being aware of local preventive health services, and scheduling and keeping appointments. Consequently, structural barriers included inadequate or ineffective advertisement of services, functional illiteracy, exceeding Medicaid eligibility guidelines, lacking telephone service to inquire about services and make appointments, residing in remote parts of the county, full-time employment, and being homebound due to age, infirmity, child care responsibilities, and/or lack of transportation.

Owning a car did not necessarily eliminate transportation problems when employed members of the household needed the car for work, the car was not safe for long-distance travel, and/or the household could not afford gas. Relying on friends and relatives for transportation was difficult when appointments involved a 15-minute consultation, one hour of driving time, and two hours in the waiting room. Cab fare from the perimeter of the county was often prohibitive.

Lack of confidence in one's ability to negotiate within the health care system in some cases diminished extent and quality of care even further. Many minorities do not receive benefits for which they are eligible because they lack a sense of empowerment (Strickland and Strickland, 1996).

"People with similar health status do not have similar perceptions, nor do they make similar demands for health care because of differences in health beliefs, illness behavior, social networks, willingness or ability to pay for services, and other social,
psychological, economic, and cultural processes. The assessment of need is not simply a matter of relating health status to resource availability and distribution, but also the social, economic, and political environment of individuals and populations (Patrick, Stein, Porta, Porter, and Ricketts, 1988).

When dealing with very low household budgets ($2,500 to $5,000 per year), adults prioritized products and services as absolutely needed or not absolutely needed by household members. For this population, food, shelter, and basic clothing were considered "needed," and indoor plumbing, heat, and transportation were often classified as "not needed" (Strickland and Strickland, 1995). Except in the most extreme cases, medical services were considered a luxury. Consequently, health values and poverty were interrelated, rather than separate barriers to receiving preventive services, and inability to pay reinforced dependence on home remedies and self-treatment. This suggests that preventive services will be considered "needed" when health education is coupled with ability to pay.

Service use was enhanced when entitlement and health programs advertised their services, simplified program access, and treated clients with respect. In addition, individuals who were responsible for their household's health varied in the extent to which they were aware of baseline standards for preventive health screenings, believed that services were attainable and desirable, were motivated to seek services, sought services, and felt empowered within health care settings.

Structural and nonstructural barriers interacted to deter lower income black households from using preventive services in several ways. First, due to a lack of information about entitlement programs and poor treatment by entitlement personnel, some households hesitated or were unable to apply for means-tested programs that covered preventive services. Second, in order to ration limited resources, some program administrators did not aggressively advertise their services, thus limiting awareness of available opportunities. Third, due to limited personal resources apart from ability to pay, a number of households had difficulty applying for entitlement programs, making preventive health appointments, and keeping preventive health appointments. This was exacerbated when services, such as obstetrical care, were far from home. Fourth, the perception of prejudice and discrimination on the part of health care providers and support staff affected some households' desire to obtain services. Finally, preventive services were often considered to be "not needed." These patterns suggest that enhancing the use of preventive services involves identifying the complex of structural and nonstructural barriers that deter special populations from receiving services and addressing these barriers at the community, programmatic, and individual levels.

**Regular source of care**

There is a considerable literature supporting the value of a regular source of medical care on children's access to health care (Kogan et al, 1995; Newacheck et al., 1997), but relatively little comparable research in the dental literature with respect to the impact of having a regular source of dental care on access to dental care among children. Having a gap in insurance coverage affects access to medical care in two ways: first, it requires families already having financial difficulties to pay out-of-pocket for services;
and second, it makes maintaining a continuous relationship with a primary care physician much more difficult (Berman, 1995). Children without insurance coverage are less likely to receive basic preventive care and immunizations, are less likely to seek care from a physician for both acute and chronic illness, and are more likely to delay care and require hospitalization when seen in an emergency department. Gaps in coverage also affect the likelihood of a child having a continuous regular source of primary care during periods of time with insurance coverage as well as periods of time without coverage (Kogan et al., 1995).

As fewer children have dental insurance than have medical insurance, and as dental care is considered a more discretionary service than medical care, it stands to reason that the factors limiting the regular use of medical care will also limit the regular use of dental care. Call (1989), reporting data from the 1986 National Health Interview Survey, noted that the frequency with which the last dental visit for children was stated to be for a "checkup" or for preventive care was clearly income-related. Among children from lower-income families without health insurance, approximately 35 percent reported that their previous dental visit was preventive, whereas this figure was over 60 percent among those from the higher-income category.

Harvey et al. (1997) found that factors that were positively associated with adolescents' self-reports of receiving routine dental care were: younger age (14-16 vs. 17-18+), higher parental education, higher family income, "better" attitude scores toward dental health, greater frequency of brushing and flossing, dental insurance, adolescents who scheduled their own appointments, and nonsmokers. Not significant were race, sex, level of involvement in school activities, employment status, and knowledge about dental disease.

In a study of factors influencing access to dental care by Florida's Medicaid population, Venezie et al. (1997b) reported that the factor most strongly related to use of dental services for children was whether the primary caretaker reported having a usual source of dental care for the child. Those children with a usual source of care were at least 15 times more likely to have had a dental visit in the 12 months preceding the survey. This was true for beneficiaries residing in both urban and rural counties. The authors concluded that providing a usual source of care for Medicaid-enrolled children appears to increase dramatically the likelihood that these children will use dental services.

Among adults, people who report having a regular dentist appear to lose fewer hours of work (Gift, Reisine, Larach, 1992). Also, as noted previously, income and a regular source of dental care have been found to be the most important determinants of use of preventive dental services (Swank, Vernon, Lairson, 1986). Similarly, Evashwick, Conrad, and Lee (1982) found that the presence of a regular source of care, in addition to education levels and the person's perception of the extent of oral health problems, were the most important factors associated with the length of time since the last visit. Newman and Gift analyzed data from a 1981 household survey, *A Study of Dental Health Related and Process Outcomes Associated with Prepaid Dental Care*, which they state to be the most comprehensive cross-sectional data base available in dentistry, to determine factors associated with regular pattern of dental care. They point out that implicit in the concepts, 'regular care,' or 'usual source of care' is the assumption that an individual receives periodic and repetitive services appropriate to
the prevention of diseases or maintenance of health, but that reported indicators of usual source of care or routine care do not adequately measure the concept. That is, neither the periodic behavior nor the preventive nature of the visit is reflected in most of the reported measures. 'Visit,' for example, only reflects acting on a propensity or perceived need, and 'having a usual source of care' represents only a perception that a useable resource is available if needed. The authors believe that a broader concept, having a regular pattern of preventive dental care, should be an indicator of access to and periodic use of preventive and health maintenance services (Newman, Gift, 1992).

Using logistic regression, Newman and Gift found that there was an increased probability of having a regular pattern of preventive care if individuals had no economic access problems, had higher income, were non-Black, had positive attitudes, reported few oral symptoms, had more teeth, and had fewer teeth needing restorations. In multivariate analyses, they found their results suggested that regular pattern of preventive care was a sensitive measure of access to care. In addition, the results suggested that individuals with resources in the form of finances and education, and a sense of self-efficacy, as expressed in attitude toward oral health, had the greatest probability of having a regular pattern of preventive care.

Among older adults, recency of the last dental visit has been associated with positive attitudes toward dental care, regular dental hygiene, and having a usual source of care (Tennstedt et al., 1994; Gilbert, Branch, Longmate, 1993). Frequency of visits for dentulous subjects was associated with the same variables, as well as with age and social class or education, in addition to need for care. For edentulous subjects, Tennstedt et al. found that only a usual source of care and higher social class were associated with more frequent visits. They concluded that older persons must be convinced of the importance of regular dental care.

Locker et al. found that older adults who were dentally anxious were less likely to report a regular source of dental care and a dental visit in the previous year and more likely to report having avoided or delayed dental treatment (Locker, Liddell, Burman, 1991).

In a study of factors associated with the stage of oral cancer at the time of diagnosis and with the interval between recognition of the first symptom and histologic diagnosis, it was found that the proportion of persons with early stages of cancer was significantly higher among patients who regularly received dental care (Elwood and Gallagher, 1985).

Braimbridge and Eykyn report that about 2 percent of patients with a prosthetic heart valve will develop endocarditis, that the predominant organisms implicated in these infections are staphylococci, and that the commonest source of these organisms is the mouth (Braimbridge, Eykyn, 1987). They conclude that regular dental care and appropriate prophylactic antibiotics should help to prevent these infections.

Other barriers to use of dental services

Although they are more likely to suffer from many chronic conditions, minority, poor, and rural individuals are less likely to receive preventive health screenings than are nonminority, nonpoor, and urban individuals (Department of Health and Human Services, 1991; US Congress, 1990a). To more fully understand health and health
behavior, it is necessary to examine cultural factors related to race within the context of rurality, region, and socioeconomic status (DeFriese and Ricketts, 1989; DHHS, 1991; Green, 1978; Patton, 1989; Weinert and Long, 1990). As observed by DeFriese and Ricketts, "a complex web of social, cultural, and economic values can have enormous influence on the way in which health care needs are expressed as expectations (or as patterns of health services use) by persons in different communities" (DeFriese, Ricketts, 1989).

Ideas about oral health, oral hygiene practices, reactions to pain, diet, eating habits, and the use of dental services are all influenced by culture. What are perceived as symptoms of disease by some groups may be regarded as normal phenomena by others. As the perceived incidence of oral disease depends on its recognition as "abnormal" by different populations, a different interpretation between patient and dentist can have serious consequences for oral health promotion, dental treatment, and compliance (Selikowitz, 1994).


"Distrust and fear are part of the reason why we hesitate to seek early medical attention. Consequently, when an illness is finally diagnosed, it is harder to treat and may already be life-threatening...Partly in response to mistreatment and partly based on our African traditions, an African-American culture grew up that emphasized sharing, family bonding, and

the importance of spirituality—all of which generally conflicted with the mainstream white values of individualism, autonomy, and achievement. History and culture conspired to lead blacks away from physicians and other traditional medical help."

In 1989, the two most frequently reported reasons that persons of all ages had no dental visit in the past year were that they had no perceived dental problem (46.8 percent) and cost (13.7 percent) (Bloom, Gift, Jack, 1992). These and other reasons reported are listed in Table 9 by age group, income, and dental insurance status. Even when income is not a barrier to care, a perceived lack of need can seriously impede access. For example, Venezie et al. (1997b) found that among Medicaid beneficiaries, the most common barrier to access for Medicaid enrolled children was a lack of perceived need for care by the primary caretaker, which accounted for 33 percent of responses—higher even than the 26 percent who indicated lack of a Medicaid provider as the primary reason for their child not receiving dental care.

Although many studies have found a positive association between dental anxiety and irregularity of dental visits (Milgrom, Kleinknecht, Elliot et al., 1990; Milgrom, Fiset, Melnick, 1988; Locker, Liddell, Burman, 1991; Frazer, Hampson, 1988), overall dental fear accounts for a relatively small proportion of the reasons cited by persons who report no dental visits in the previous year (Table 9).

There is some evidence that children are more likely to use dental services if their
parents also do. Bonito and Gooch (1992), as part of the International Collaborative Study of Oral Health Outcomes (ICS-II) conducted in Baltimore, reported that children whose parents both saw a dentist in the past year were 13 times more likely to see a dentist themselves than children whose parents did not both see a dentist in the past year. Similarly, Venezie (1997b) reported that, for rural Florida Medicaid beneficiaries, use of dental services for children was somewhat more likely for families where the primary caretaker was also enrolled in Medicaid and had a recent dental visit of their own.

One of the principal barriers to access to dental care is cost, which includes: 1) the actual out-of-pocket costs to those who cannot afford them; 2) costs to businesses to offer dental insurance as a health care benefit; and 3) perceived or anticipated costs by policy makers fearful of adding a dental benefit (Coalition for Oral Health, 1993). Indeed, during the debate on national health care reform, the perceived expense of including dental benefits was repeatedly raised by policy makers.

In reality, dental expenditures represent a relatively small and declining percentage of personal health care expenditures. Expenditures for dental services grew from $13.3 billion in 1980 to $37.4 billion in 1993, increasing at an 8.3 percent average annual rate. This growth rate made this component the slowest growing medical care category of personal health care expenditures. In 1980, spending for dental services represented 6.2 percent of personal health care expenditures nationwide; by 1993, this share had dropped to 4.8 percent (Levit et al., 1995). [Note: The 1993 percentage was subsequently amended by HCFA to 5.0 percent.] In 1995, dental services represented 5.2 percent of personal health care expenditures (Health Care Financing Administration, 1997f).

Although the value of prevention in dentistry has received much attention, the specific value of early intervention as a potential cost-saving measure has received little study. A recent study by Doykos examined the costs of comprehensive dental care over a two-year period for 100 children between the ages of 4 and 8 years who had no previous dental experience. He found that the average costs per child increased almost linearly over a two-year period, starting at $30 if initial treatment started at age 4; $73 at age 5; $104 at age 6; $144 at age 7; and $169 at age 8. In other words, an average of $34.75 was added each year to the cost of comprehensive treatment for each year the initial visit was postponed (Doykos, 1997).

### Health insurance

As a result of the discussions of health care reform in recent years, many Americans have become more aware of the plight of the uninsured. In the early 1990s, it was fairly common knowledge that some 37-40 million Americans lacked "health" insurance. Not nearly so well known, however, was that many more millions lacked dental insurance. In 1989, approximately half the population, or 122 million persons, had no dental coverage, and it was not known whether some 18 million persons had coverage (Bloom, Gift, Jack, 1992).
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Fear</th>
<th>Cost</th>
<th>Access problem</th>
<th>No perceived dental problem</th>
<th>No teeth</th>
<th>Not important</th>
<th>Other reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years):</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All ages</td>
<td>4.3</td>
<td>13.7</td>
<td>1.7</td>
<td>46.8</td>
<td>14.3</td>
<td>2.3</td>
<td>8.7</td>
</tr>
<tr>
<td>2-17</td>
<td>1.3</td>
<td>15.0</td>
<td>1.5</td>
<td>56.8</td>
<td>0.2</td>
<td>1.9</td>
<td>11.9</td>
</tr>
<tr>
<td>18-34</td>
<td>5.9</td>
<td>19.1</td>
<td>2.4</td>
<td>52.4</td>
<td>0.7</td>
<td>3.2</td>
<td>9.5</td>
</tr>
<tr>
<td>35-64</td>
<td>5.8</td>
<td>12.8</td>
<td>1.5</td>
<td>43.3</td>
<td>17.8</td>
<td>2.2</td>
<td>8.4</td>
</tr>
<tr>
<td>65 and older</td>
<td>2.2</td>
<td>4.1</td>
<td>1.1</td>
<td>31.2</td>
<td>49.7</td>
<td>1.1</td>
<td>3.9</td>
</tr>
<tr>
<td><strong>Family income:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than $10,000</td>
<td>3.8</td>
<td>19.7</td>
<td>1.7</td>
<td>42.8</td>
<td>22.5</td>
<td>1.4</td>
<td>6.4</td>
</tr>
<tr>
<td>$10,000-$19,999</td>
<td>4.0</td>
<td>18.8</td>
<td>1.5</td>
<td>47.0</td>
<td>17.4</td>
<td>1.7</td>
<td>6.5</td>
</tr>
<tr>
<td>$20,000-$34,999</td>
<td>4.8</td>
<td>13.7</td>
<td>1.7</td>
<td>51.3</td>
<td>11.5</td>
<td>2.3</td>
<td>11.1</td>
</tr>
<tr>
<td>$35,000 or more</td>
<td>5.9</td>
<td>6.8</td>
<td>2.6</td>
<td>52.3</td>
<td>8.1</td>
<td>4.1</td>
<td>14.1</td>
</tr>
<tr>
<td><strong>Dental insurance coverage:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have dental insurance</td>
<td>6.2</td>
<td>7.2</td>
<td>2.5</td>
<td>53.2</td>
<td>10.1</td>
<td>3.4</td>
<td>15.2</td>
</tr>
<tr>
<td>Without dental insurance</td>
<td>4.0</td>
<td>18.5</td>
<td>1.5</td>
<td>48.7</td>
<td>17.2</td>
<td>2.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Insurance status unknown</td>
<td>1.6</td>
<td>3.9</td>
<td>0.7</td>
<td>23.8</td>
<td>9.3</td>
<td>0.8</td>
<td>2.9</td>
</tr>
</tbody>
</table>

It is often assumed that the uninsured come from nonworking families, and that lack of coverage lasts for relatively brief periods. Also, contrary to popular myth, the uninsured are not all poor, elderly, or otherwise vulnerable (US Department of the Treasury, 1994). For example, for children, a recent report found that the uninsured child population was comprised primarily of children whose parents worked. Of the children who lacked insurance for one or more months, nine out of ten (89 percent) lived in households where the head of the household worked during all or part of the 24-month period. Further, almost half of uninsured children (47 percent) had uninsured spells of 12 months or longer, and more than one out of seven (15 percent) lacked health insurance for the full two-year period (Costello and Fish-Parcham, 1997). Although most private health insurance for children is acquired through a parent's employer, in 1993, almost one-fourth of the workforce worked for an employer that did not cover dependents (US General Accounting Office, 1997e).

Persons without health insurance are not only less likely to receive the health coverage afforded by typical health insurance plans; they are also less likely to get needed dental care. A series of recent reports from the 1993 NHIS (Figure 1) show that: 1) children (ages 0-17) with no health insurance are three times as likely as privately insured children to be unable to get dental care when they need it (15.5 percent and 4.6 percent, respectively) (Simpson, Bloom, Cohen, Parsons, 1997); 2) working-age adults (ages 18-64) are four times as likely as their privately insured counterparts to be unable to get dental care when they need it (24.4 percent and 6.7 percent, respectively) (Bloom, Simpson, Cohen, Parsons, 1997); and 3) older adults (age 65 and over) with no health insurance are twice as likely as privately insured older adults to be unable to get dental care when they need it (7.5 percent and 3.3 percent, respectively) (Cohen, Bloom, Simpson, Parsons, 1997).
The Families USA Foundation recently analyzed data on children from the 1994 NHIS that showed results similar to those from the 1993 survey. In their report, they found that 15 percent of children uninsured for one year or less had been unable to get dental care when they needed it, vs. 17 percent of children uninsured for more than one year, and only 4 percent for insured children. They also examined differences in this aspect of access to dental care for uninsured and insured children who are in fair or poor health, in order to help avoid analytic distortions that may occur between uninsured and insured children due to health status. They found that uninsured children in fair or poor health were almost five times as likely to have needed dental care and been unable to get it as insured children in fair or poor health (Pollack, Fish-Parcham, Hoenig, 1997).

Using 1993 NHIS data, Newachek et al. compared children's access to three major categories of needed health care—medical care; dental care; and prescriptions, eyeglasses, and/or mental health care, the results of which are displayed in Table 10. Comparing children from poor families, minority children, and uninsured children with a
reference group of children from nonpoor, white, insured families, they found a higher proportion of children in every group were unable to get needed dental care than was the case for any of the other health care services. In particular, they found that uninsured children were more than twice as likely as children from poor families, more than three times as likely as children from minority families, and almost four times as likely as children from nonpoor, white, insured families to have reported they were unable to get needed dental care (Newachek et al., 1997).

Overall, the study by Newachek et al. showed that while poverty and minority status posed significant barriers to gaining access to primary care, the most important barrier was lack of insurance coverage. For example, the study found that: 1) uninsured children were eight times more likely to lack a usual source of care (24 percent for uninsured children vs. three percent for insured children from non-poor, white families); and 2) children without health insurance were nearly four times as likely to go without at least one needed service--such as medical care, dental care, prescriptions, eyeglasses, or mental health care.

It is often assumed that having any health insurance is associated with better health, and in particular, that having public, welfare-based insurance has better health consequences for the poor than does having no insurance. In an analysis of data collected in the 1987 National Medical Expenditure Survey (NMES), Hahn and Flood examined those assumptions. They concluded that the health of adults uninsured for all of 1987 was associated with having poorer general health compared to those with private insurance, and that the relationship between having no private insurance and being in poorer health is significant after controlling for major potentially confounding factors such as age, sex, and socioeconomic factors; health-related lifestyles such as obesity, smoking, and exercise; and use of health services during the prior year. Hahn and Flood also found that the health of working-age adults who qualify for public insurance is the poorest of any group--poorer even than those without any insurance--even after controlling for these same major health-related factors (Hahn and Flood, 1995).

Although adolescents are typically regarded as among the healthiest of Americans, and those least in need of health care services, many have serious health problems and face formidable barriers in trying to obtain basic health care services (U.S. Congress, 1991). As a group, adolescents are more likely to be underinsured than any other age group (Klein, Slap, Elster, Schonberg, 1992; Gans, McManus, Newachek, 1991).

<table>
<thead>
<tr>
<th>Population characteristic</th>
<th>Percent unable to get needed medical care</th>
<th>Percent unable to get needed dental care</th>
<th>Percent unable to get needed prescriptions, eyeglasses, and/or mental health care</th>
<th>Overall percent unable to get needed care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children from poor families ..................</td>
<td>3.5</td>
<td>8.5</td>
<td>4.3</td>
<td>12.8</td>
</tr>
<tr>
<td>Minority children ......</td>
<td>2.4</td>
<td>5.5</td>
<td>3.3</td>
<td>8.7</td>
</tr>
<tr>
<td>Uninsured children ..</td>
<td>7.2</td>
<td>17.6</td>
<td>7.4</td>
<td>24.0</td>
</tr>
<tr>
<td>Children from nonpoor, white, insured families .......</td>
<td>1.0</td>
<td>4.5</td>
<td>1.9</td>
<td>6.4</td>
</tr>
<tr>
<td>All children .........................</td>
<td>1.9</td>
<td>6.2</td>
<td>2.9</td>
<td>9.0</td>
</tr>
</tbody>
</table>

Source: Adapted from Newacheck et. al., 1997.

Ryan et al. studied a group of urban middle and high school students to determine adolescents' utilization of ambulatory health services and its association with sociodemographic and health status characteristics. It should be noted that their sample, although urban and ethnically diverse, was socioeconomically homogeneous: most students were from middle class families with educated parents. In bivariate analyses, they found that age, gender, and mother's education were unrelated to the recency of the last dental visit, but race/ethnicity and living situation were significant factors. Black and Caucasian students were least likely to have received dental care within the previous year (70 percent and 72 percent of Blacks and Caucasians, vs. 88 percent and 89 percent of Hispanics and Asians). Subjects living in households led by nonparent providers were also significantly less likely to have seen a dentist within the previous two years. In fact, 47 percent of the adolescents living in households run by nonparent guardians had not seen a dentist in the previous two years, compared with only 8 percent of the students living with both biologic parents, and 10 percent of those living with one biologic parent (Ryan, Millstein, Greene, Irwin, 1996).

Although insurance status was unrelated to the interval since most recent visit to a physician or clinic for routine care or illness-related care, a significant relationship was found between health insurance status and recency of dental visit. Ninety-two percent of students with private insurance had seen a dentist within the previous 12 months, compared to 57 percent of those on Medicaid and 65 percent of those without any medical insurance. When the authors used multivariate analytical methods to control for certain variables, they found that health insurance was the only significant factor influencing use of dental care, with those students having private insurance 3.1 times more likely than those without insurance to have received care. Once health insurance was controlled for, race/ethnicity was only marginally significant and living situation was not significant (Ryan, Millstein, Greene, Irwin, 1996).

The authors believed that their results were consistent with Andersen's original findings that use of dental services was correlated not with sociodemographic variables, but with
enabling characteristics, such as family resources, including health insurance (Andersen, 1968). More recently, while socioeconomic differences in the use of medical services have diminished, differentials in dental service use have been much less affected, especially in pediatric and adolescent populations (Gans, McManus, Newacheck, 1991; Kronenfeld, 1979; Wolinsky, 1982), with poor and minority children receiving far fewer services than nonpoor, nonminority children (Center for Health Economics Research, 1993). This suggests that discretionary services may be better represented by dental services than routine medical services, and that family resources, including health insurance coverage, are particularly important predictors of discretionary health care use (Ryan, Millstein, Greene, Irwin, 1996).

Although many studies have established that lack of insurance reduces access to health care, there is evidence that even insured, working-age adults are having access problems due to financial reasons (Hayward, Shapiro, Freeman, Corey, 1988). In fact, one fairly recent report shows that private health insurance, with its usual cost-sharing features in the form of co-payments and deductibles, does not remove financial access barriers for the poor (Freeman, Corey, 1993). Further, it has been shown that even when publicly funded clinics are available to the urban poor, financial barriers to access remain (Kiefe, Hyman, 1996).

**Dental insurance**

Private dental insurance has been a factor of increasing significance in the use of dental services since the 1970s (Bloom, Gift, Jack, 1992). Prior to that period, because dental insurance coverage was not widespread, little national data were collected on it. However, by 1974, the proportion of the population with coverage was estimated at more than 10 percent, and so more detailed data began to be collected through the National Health Interview Survey beginning in that year (US Department of Health and Human Services, 1980). In 1986, a question was added to the National Health Interview Survey concerning private health insurance coverage for dental care, and additional questions on this topic were asked in 1989. However, respondents who indicated they had dental coverage were not asked if the dental care they had received was covered by the policy, nor were they asked about the extent of coverage of the policy. Rather, the question simply asked whether the individual's health insurance paid for any dental services other than oral surgery.

By 1989, the most recent year for which a representative sample of the US population was available, 95 million Americans had private dental insurance benefits (Bloom, Gift, Jack, 1992), representing approximately 38 percent of the total US population at that time. Most recently, the National Association of Dental Plans/InterStudy 1996 National Dental Benefits Industry Census estimated that approximately 117 million Americans, or 45 percent of the total 1995 US population, had private dental insurance benefits (National Association of Dental Plans, 1997).

Dental benefits are the third most commonly provided of employer-provided health benefits. The 1996 Edition of the U.S. Chamber of Commerce Employee Benefits Survey (benefit year 1995) reports that 96 percent of all reporting employers provide a medical benefit, 56 percent provide long term disability, and 49 percent provide a dental
benefit program. These can be compared with other types of health benefits that are provided, including vision/physical and mental fitness by 40 percent, short-term disability by 36 percent and payment for retiree health benefits by 24 percent of the employers reporting. The percentage of companies offering medical and dental benefits decreased 2 percent from the 1994 Chamber survey, while the number of companies offering long term disability dropped 5 percent from the earlier survey. According to a 1996 Foster Higgins National Survey of Employer-Sponsored Health Plans, 52 percent of all employers provide a dental benefit (National Association of Dental Plans, 1997). Of large employers (500 or more employees) the Foster Higgins report found that 87 percent provide dental benefits.

Of the population 2 years of age and over, 40.5 percent reported having some private dental insurance coverage in 1989. Table 11 indicates the nature of this coverage. Interestingly, the vast majority (32.7 percent of the 40.5 percent with any private dental insurance, or 81 percent) of persons with any private dental coverage were provided that coverage as part of a comprehensive insurance plan. This is fairly close to the percentage of conventional insurance plans providing coverage for general dental care reported by the Health Insurance Association of America--37 percent--in 1989 (Health Insurance Association of America, 1990). In 1996, KMPG Peat Marwick reported that only about half or less of the private health plans used by firms with 200 to more than 5,000 workers covered dental or vision care (US General Accounting Office, 1997e).

Table 11. Percentage of persons 2 years of age and over with private dental insurance for any dental services other than oral surgery, 1989, by type of coverage

<table>
<thead>
<tr>
<th>Type of coverage</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part of comprehensive insurance plan</td>
<td>32.7</td>
</tr>
<tr>
<td>Single service (dental only) plan</td>
<td>6.8</td>
</tr>
<tr>
<td>Both</td>
<td>1.0</td>
</tr>
<tr>
<td>Total</td>
<td>40.5</td>
</tr>
</tbody>
</table>


Figure 2 shows the distribution by age group of persons 2 years and older who had private dental insurance or no dental insurance in 1989. People between the ages of 35 and 54 were the most likely group to have dental insurance; males were more likely than females (41.4 percent and 39.6 percent, respectively) to have coverage, especially those 45 years of age and older. A larger proportion of white persons (41.8 percent) than black persons (32.4 percent) had coverage, and non-Hispanics were more likely to be covered than Hispanics (41.5 percent and 29.7 percent, respectively). These relationships did not change when the data were age-adjusted.
A higher proportion of those living in the suburbs had dental coverage (46.8 percent) than those residing in central cities (36.8 percent) or outside an MSA (32.0 percent). Persons living in the West had the highest rate of coverage (43.6 percent), and those living in the South had the lowest rate (36.1 percent). Westerners were also twice as likely as Southerners to be covered by a dental-only dental insurance plan (10.2 and 4.8 percent, respectively).

Not surprisingly, persons with higher levels of education and income were more likely to have dental insurance, as health insurance is typically provided as an employee benefit, and persons with higher income and education are more likely to be employed in jobs that provide dental coverage. Using age-adjusted data, only 15.9 percent of those with less than 9 years of education had coverage, compared with 48.4 percent of those with some college education. Similarly, only 10.4 percent of those with income of less than $10,000 had coverage, compared with 58.6 percent of those with income of $35,000 or more, an almost six-fold difference.

Figure 2 illustrates decreases in dental insurance in two age groups. Nearly 12 million previously insured young adults lose their dental insurance between the ages of 18 and 24, and for those 65 years old and older, only 15 percent had dental insurance, a decrease of more than 33 percent from the 45-54 age group. Since dental insurance coverage is usually employment-based, persons who don't work or who work part-time are less likely to be insured (Oral Health Coordinating Committee, 1993).

**Effect of dental insurance on utilization**

The policy assumption underlying the relationship between dental insurance and utilization of dental services is that people will be more likely to use dental services if some portion of the cost is covered by a third-party payor (Bloom, Gift, Jack, 1992). A number of studies have examined the relationship between the price of dental insurance and utilization, or the demand for services. Phelps and Newhouse used data from various dental insurance plans to estimate the effects of price on utilization (Phelps and Newhouse, 1973). They found there was a 30 percent increase in utilization when full coverage was provided over that when there was 20 percent
coinsurance. They predicted a shift from no insurance to full coverage would result in a
doubling of utilization among adults and a tripling of utilization among children (Yule and
Parkin, 1985). Phelps and Newhouse also compared the use of dental services by
groups covered by a New York prepaid group practice plan with data for the U.S.
population as a whole. They found that the utilization of individuals automatically
enrolled through employment arrangements was 80 percent higher than in the
population as a whole, and that of voluntarily enrolled individuals was 180 percent
higher. However, no account was taken of factors such as income or fluoride coverage,
which may have contributed to the differences in utilization. They also found that
children's utilization was considerably more responsive to price than adults', and that
the effect of dental insurance increasing the number of dental visits appears to be much
stronger for lower income groups (Yule and Parkin, 1985).

Persons with private dental insurance were significantly more likely to have had a
recent dental visit than were those without such coverage (Bloom, Gift, Jack, 1992).
Overall, 71.4 percent of those with coverage had had a dental visit in the past year,
compared with 50.0 percent of those without coverage. Among those with coverage,
children 5-11 and 12-17 years of age had the greatest likelihood of a recent visit (81.3
and 82.1 percent, respectively), and persons aged 75 years and over had the least
likelihood (36.0 percent).

Persons with private dental insurance had a higher number of dental visits per person
per year (2.7) than did persons with no coverage (1.7). These differences existed in
most age, sex, and race groups; however, there were still disparities between those
with and without private dental insurance by age, sex, and race. The expected pattern
of increased use of dental services associated with higher income was not as clear in
the two lower-income categories for those with private dental insurance coverage.
Insured persons with a family income less than $10,000 used dental services more
often than those with an income of $10,000-$19,999.

The proportion of persons with one, two, and three or more dental visits in the past year
was higher in every case for those with private dental insurance, although the
differences were least pronounced for those having just one visit—24.2 percent for
those with insurance, and 22.5 percent for those without insurance. Out of all the
sociodemographic characteristics reported in the 1989 NHIS, lack of private dental
insurance coverage had the most disparate effect on Blacks who made three or more
visits in the previous year, with the insured group having almost twice the proportion
with three or more visits as the uninsured group (Bloom, Gift, Jack, 1992). These
disparities in number of visits between insured and uninsured persons suggest that the
insured are not only less likely to have seen a dentist recently, but also less likely to
be using preventive dental services and having all their dental needs addressed, and
more likely to be making episodic use of the dental care delivery system.

Capilouto reported that insured youths (5-11-year-olds) were much more likely to have
described their last visit as a check-up, an indication that they may be receiving routine
diagnostic exams and preventive procedures. Further, blacks and low-income groups,
even when covered by dental insurance, were less likely to report check-up visits than
were their corresponding cohorts (Capilouto, 1991a).
Even for those with dental insurance, it cannot be assumed that coverage is anywhere near comprehensive or uniform; rather, the scope of services varies widely, as do copayments, coinsurance, deductibles, and maximums. As an example, Title XXI of the Social Security Act was recently enacted, creating a new federal program--the State Children's Health Insurance Program. This program allows states to offer a benefit package with several options for the scope of services, one of which is that it be equivalent to that in the Federal Employees Health Benefits Program (FEHBP) Standard Blue Cross/Blue Shield Preferred Provider Organization plan. However, the scope of dental benefits in this plan are somewhat limited. Included are exams, minimal diagnostic procedures, prophylaxis and topical fluoride application, space maintenance, basic restorative services (amalgams, resins, and inlays), and extractions. More important is what is excluded, which includes sealants (perhaps the most important and effective preventive procedure in dentistry), stainless steel crowns (a very common procedure for children) as well as all other crowns, endodontics (root canals), orthodontics, periodontics (only prophylaxis is covered), bridges, and dentures (U.S. Office of Personnel Management, 1997).

Dental insurance coverage is usually provided as a fringe benefit of employment. When employees or dependents enroll in a dental plan, each has different dental needs that are partially known to the subscriber but not to the insurer. When enrollment is positively correlated with a high need for dental care, initially high rates of dental utilization and expenditure, or adverse selection, may result. Dental insurers typically use a variety of mechanisms to minimize adverse selection and overutilization in order to control actuarial risk.

One common mechanism used to control risk is coinsurance, i.e., the percent of the dental fee paid by the employee. Several studies have examined the influence of coinsurance and its corollary, out-of-pocket price, on demand for dental services (Hu and Slaysman, 1980; Mueller and Monheit, 1984; Grembowski and Conrad, 1984). One of the most well-known of these studies, the RAND Health Insurance Experiment, found that among adults and children, the probability of any use of dental services was approximately 14 percent greater in the free care plan than in the plan with a 25 percent coinsurance rate (Manning et al., 1985). Overall, these studies indicate that, for insured populations, price elasticities approach zero as out-of-pocket price approaches zero (Manning and Phelps, 1977).

Based on this information, Grembowski, Conrad, and Milgrom (1987) studied a large representative sample of Pennsylvania Blue Shield insured children to determine the effect of cost-sharing on the probability of using dental services. None of the insureds had a deductible in their dental plan. There were different coinsurance rates for five groups of dental services, and all children received basic dental benefits at coinsurance rates ranging between 0 and 50 percent. The authors found that cost-sharing has little influence on either the probability of using dental services or basic dental expenditures. Similarly, family income and parents' education, which are strong predictors of dental demand in uninsured populations, generally had little influence on these variables. The authors speculated that "by reducing the cost of dental care for basic dental services, cost-sharing stimulates dental demand among children from low-income families and/or who have parents with little formal education, equalizing demand levels across most income and education groups. Thus, cost-sharing attenuates social class differences in
dental demand common in uninsured populations” (Grembowski, Conrad, Milgrom, 1987).

Among preschool children, very different results from the RAND Health Insurance Experiment were found when the effects of cost-sharing plans on the health of the primary teeth were studied (Bailit et al., 1986). In this case, children covered by the plan with no cost-sharing had significantly fewer decayed, extracted, and filled teeth than did children covered by one of the cost-sharing plans. The authors note that the disease that exists is concentrated primarily in children from low-income families, that providing children with free dental care results in significantly fewer decayed teeth, and the effect is mainly a result of the prevention, rather than the treatment, of carious teeth. Also, children from the middle- and low-income families enrolled in the free plan showed the greatest reductions in decay. These data suggest that dental insurance with no cost-sharing requirements and aimed at preschool children from middle- and low-income families should lead to improvements in oral health.

Of course, the ultimate aim of efforts to increase access to dental services is an improvement in oral health. A recent study examined trends in the use of a wide range of dental services by insured individuals over the period of 1980 to 1995, based on several large groups that have had dental coverage through Delta Dental Plan of Michigan over this period (Eklund, Pittman, Smith, 1997). Overall, utilization increased from about 60 percent in 1980 to 70 percent in 1995, which is consistent with the 1986 and 1989 NHIS findings in which just over 70 percent of those with private dental insurance reported a dental visit in the preceding 12 months.

A clear pattern was found of increasing use of oral examinations and prophylaxes per user per year. A substantial decline in amalgam and resin restorations was found, both among children and adults. Declines in simple extractions were also found for all age groups over this time period. Among adults, declines in endodontic procedures, especially among those under age 35, accompanied the declines in extractions. When considered along with the decline in restorations, this pattern suggests that those under age 35 have less disease requiring treatment than was typical among young adults in the past.

While the use of cast crowns among older persons increased, their use declined among those under age 35, providing further evidence of an improvement in oral health in this age group. Even more encouraging, the use of full dentures for beneficiaries under age 35 had literally ended by 1990 and is rapidly declining among all older age groups. Other than periodic examinations and prophylaxes, the one area of treatment that has increased in use most notably is periodontics, with the greatest increase seen among those 45 years of age and older. This is probably a consequence of the fact that more of these individuals still have teeth, and therefore more teeth are at risk. In summary, the patterns of dental care among this large group of insured people shows clear trends suggesting profound improvements in oral health. These improvements were evident among all age groups, indicating the effect of the caries decline in children had moved well into the adult population.
Other factors influencing utilization of dental services

It has been observed that between 1950 and 1989, per capita real dental expenditures in the U.S. grew at an average annual rate of 3.33 percent. Between 1978 and 1989, however, there was virtually no net growth in this measure of dental care utilization, with growth at a rate of only 0.16 percent between 1979 and 1989 (Brown, Beazoglou, Heffley, 1994). This sharp reduction in utilization growth has prompted considerable debate about possible explanations, which have ranged from a reduction in dental disease due to increased exposure to fluoridation, the substitution of noncaloric sweeteners for refined sugar, preventive dentistry, improved oral health habits, an increase in the net price of dental services, and the cost-containment efforts of insurers and employers (Beazoglou, Brown, Heffley, 1993).

In an attempt to isolate and quantify the individual effects of some of these variables, Beazoglou, Brown, and Heffley developed an econometric model for conducting a time-series analysis of dental care utilization. Their model incorporates economic factors (out-of-pocket or net dental prices, per capita income, and nondental prices) as well as dietary factors (refined sugar consumption, noncaloric sweeteners, and exposure to fluoridated water). Using this model, their results show that both economic and dietary factors are significantly related to changes in utilization. Decreases in cane and beet sugar consumption, facilitated by the increased use of noncaloric sweeteners, are associated with reductions in utilization, whereas fluoridation appears to be weakly but positively related to utilization. They also found that there appears to have been a significant structural shift in demand since 1978, which reduced per capita dental expenditures by roughly 10 percent, leading to an estimated cumulative savings of $39.1 billion over the period 1979-1989, measured in 1990 dollars (Brown, Beazoglou, Heffley, 1994). Overall, their analysis suggests that economic, dietary, and structural shift factors have all contributed to the curtailment of growth in utilization.

Dental managed care

The dental managed care industry is young and rapidly growing. Between 1990 and 1996, enrollment grew more than 150 percent, from 7.8 million to an estimated 23.8 million persons. Enrollment growth continues in the double digits, exceeding growth in medical managed care enrollment. Data for 1995 reported in the 1996 National Managed Dental Plan Industry Statistical Profile and NADP Directory show that 3.8 percent of the dental HMO business is Medicaid, 3.3 percent is Medicare and 92 percent is some form of private market benefits (National Association of Dental Plans, 1997a).

Fundamental differences between medicine and dentistry are reflected in differences between medical managed care and dental managed care, including the relative scarcity of dental managed care plans. Other differences include the undersupply of dentists compared to physicians, their concentration as generalists rather than specialists, their location and business structure in independent offices, their lack of dependency on hospitals and expensive medical technology, their direct dealings with patients with respect to the financing of care, and the nature of their services (Edelstein,
For the most part, dental care is not accessed primarily through the medical care system; it is a freestanding health care system. NADP statistics show that 79 percent of all dental HMO benefits are sold on a freestanding basis. According to the 1996 Foster Higgins National Survey of Employer-Sponsored Health Plans, 58 percent of those employers providing a dental benefit did so through a freestanding dental plan. Of large employers, the Foster Higgins report found that 73 percent purchased dental benefits from a freestanding dental plan (National Association of Dental Plans, 1997).

Most dental HMOs provide group benefit plans on an employee-pay-all basis as well as an employer paid basis. According to a 1993 NADP survey, 90 percent of the reporting dental HMOs offer an employee-pay-all group dental benefit plan, referred to as "voluntary group" plans in the industry. The 1996 National Dental Benefits Industry Census published by NADP and InterStudy found that 24.4 percent of the total business written by dental HMOs was in voluntary group. Another 6.7 percent was for individual coverage. Thus, individuals pay for approximately 31 percent of the total dental HMO benefits (National Association of Dental Plans, 1997).

In 1995, the top ten states for dental HMO enrollment (California, Florida, Texas, Pennsylvania, Illinois, Maryland, New York, Arizona, New Jersey, and Ohio) represented three-fourths of the total market. California, with 6.4 million persons enrolled, outpaced the next four highest states combined (National Association of Dental Plans, 1997).

**Medicaid coverage**

Most information about persons with dental insurance comes from the dental component of the NHIS, primarily the 1989 survey. However, this survey excludes dental coverage provided by programs such as public assistance, public welfare, Medicaid, care given free of charge to veterans, care given under the Uniformed Services Health Benefits to Military Dependents Program, and care given under the Crippled Children Program or similar programs (Bloom, Gift, Jack, 1992).

Consequently, it is of interest to examine the effectiveness of public programs in improving access to dental care. In particular, the Medicaid program, as the largest public program designed to reduce inequities in access to health care among the poor, bears some scrutiny.

Created in 1965 by the enactment of Title XIX of the Social Security Act, Medicaid is a program which finances health care for certain individuals and families with low incomes and resources. The program is a jointly-funded cooperative venture between the federal and state governments to assist states in the provision of adequate health care to eligible needy persons.

Medicaid is the largest program providing medical and other health-related services to America's poorest people. Although other federally funded programs, such as Head Start, Community and Migrant Health Centers, the Indian Health Service, and the
National Health Service Corps provide or pay for dental care for low-income persons, even these programs bill Medicaid for services they provide to eligible persons (Johnson, Siegal, 1989). Within broad national guidelines established by the federal government, each state: 1) establishes its own eligibility standards; 2) determines the type, amount, duration, and scope of services it will provide; 3) sets the rate of payment for services; and 4) administers its own program. Thus, the Medicaid program varies considerably from state to state, as well as within each state over time. For example, Holahan recently reported that, for children under age 19 in families with incomes below 200 percent of the federal poverty level, the variation in the proportion covered by Medicaid ranged from a low of 19.7 percent in Utah to a high of 62.7 percent in the District of Columbia (Holahan, 1997). Overall, the program covers approximately 36 million individuals including children, the aged, blind, and/or disabled, and people who are eligible to receive federally assisted income maintenance payments (Health Care Financing Administration, 1997a).

Although Medicaid was enacted to finance and improve access to health care for the poor, it has evolved into the largest public funder of long-term care for the elderly. When nursing home care is needed, the elderly "spend down" to a level of poverty so as to qualify for Supplemental Security Income and Medicaid. The inadequacy of coverage by Medicare and private insurance for long-term care services forces many older Americans onto Medicaid. This shift of funds toward the aged and disabled has contributed to the erosion of Medicaid coverage for uninsured children in poverty (Oberg, 1990). In 1975, 63 percent of low-income persons were covered by Medicaid; by 1985, the program served less than half (46 percent) of those living in or near poverty (Blendon, Aiken, Freeman, et al., 1986).

The Early and Periodic Screening, Diagnosis, and Treatment (EPSDT) program was established in 1967 as the pediatric component of the Medicaid program. However, dental guidelines for the EPSDT program were not developed until 1980 (Herz, Chawla, Sredl, et al., 1996). The goal of this program is to periodically screen enrolled Medicaid children throughout their development, up to 21 years of age, in order to detect correctable conditions early and provide appropriate treatment services for those conditions.

As a result of amendments to the Social Security Act enacted through the Omnibus Budget Reconciliation Act of 1989 (OBRA 89), all states must "provide for screening, vision, hearing and dental services at intervals which meet reasonable standards of medical and dental practice established after consultation with recognized medical and dental organizations involved in child health care," and must also "provide for medically necessary screening, vision, hearing and dental services regardless of whether such services coincide with...established periodicity schedules for these services." Additionally, any service that states are permitted to cover under Medicaid that is necessary to treat or ameliorate a defect, illness, or condition identified by a screen, must be provided to EPSDT participants regardless of whether the service or item is otherwise included in the state's Medicaid plan (Health Care Financing Administration, 1995).

Because of the strength of the EPSDT statutes, children in most states are eligible to receive quite a comprehensive array of dental benefits under Medicaid, although, as will
be discussed shortly, eligibility for services does not always equate with receipt of those services. Unfortunately, adults do not fare nearly as well as children under Medicaid, because the provision of any adult dental services, as well as the scope of those services, are at the discretion of the states. Consequently, most states provide very limited dental benefits to adults, and many provide only emergency dental services. HCFA reports that 12 states provide optional dental services to adults that are categorically needy, 31 states provide them for both categorically and medically needy adults, and 6 states provide them as part of demonstration projects (Ruff, 1997). However, the scope of this optional coverage in each state is not described.

A number of studies have looked at the use of dental services under Medicaid; most often, these studies have looked at children's use of services. In one early study, Mueller used data from the 1977 National Medical Care Expenditures Survey (NMCES) to compare access to and use of dental care by three mutually exclusive groups of children: those without any form of dental insurance, those with private dental insurance, and those with Medicaid coverage. Overall, 49 percent of all children visited a dentist in 1977, but the likelihood of use varied considerably by insurance status. Children with private dental insurance were most likely to see a dentist (57 percent), followed by the uninsured (49 percent). Medicaid-eligible children experienced the lowest levels of use of dental services, with only 36 percent seeing a dentist. When the uninsured were further broken down into all uninsured vs. "needy" uninsured (those from families with incomes less than 1.25 times the federal poverty level), it was found that use of dental services by Medicaid-eligible children was even lower than the neediest of the uninsured (37 percent). The pattern of use of dental services by specific service was similar. Medicaid children overall were only two-thirds as likely to receive a dental examination as the average child, and only 60 percent as likely to receive a cleaning, whereas they were 110 percent as likely to have had an extraction (Mueller, 1984).

Using multivariate analytical techniques to control for other factors which affect children's use of dental care (age, sex, race, education of head of household, family income, family size, proportion of county population exposed to fluoridated drinking water, and dentist-to-population ratio) Mueller found that Medicaid-eligible children experienced higher likelihoods of some dental care use than the low-income uninsured. Once access was realized, however, the number of visits did not vary systematically between Medicaid eligibles and the uninsured. Mueller also found that education of the head of household and the supply of dentists exerted important, direct effects on the probability that low-income children would receive dental care, as well as statistically significant differences in access by race/ethnicity, with nonwhite groups tending to receive care less frequently (Mueller, 1984).

A study of access to dental care for Medicaid beneficiaries in California was undertaken in 1989. The objectives of the study were: 1) to determine the accessibility of dental services for Medi-Cal (California's Medicaid program) beneficiaries; 2) determine how Medi-Cal dental fee schedules compare with fee schedules for private dental practitioners; 3) evaluate the perceptions of dentists toward Medi-Cal patients and toward the Medi-Cal program; and 4) evaluate the Medi-Cal dental referral program's ability to increase access to care (Damiano, Brown, Johnson, Scheetz, 1990).
The study found that Medi-Cal recipients faced a number of barriers limiting their access to care. First only 16 percent of general dentists and pediatric dentists said they would accept children as new patients, and only 15 percent of general dentists would accept adults as new patients. Second, Medi-Cal patients had to wait almost 40 percent longer for their first appointment than patients with private insurance. Third, many dentists imposed additional restrictions on the type of Medi-Cal patient they would accept, e.g., only those with emergency needs or needs related to dentures. The study also found that Medi-Cal fees were, on average, less than half the fees for the same procedures charged by a sample of general dentists, pediatric dentists, and a dental HMO.

At the request of the House Energy and Commerce Committee and its Subcommittee on Health and the Environment, the Congressional Office of Technology Assessment (OTA) undertook a study in seven states to determine whether a list of "basic" dental services was being provided to children enrolled in the Medicaid program, and whether these programs impose barriers that restrict eligible children's access to these services (US Congress, 1990b). The states (California, New York, Michigan, Ohio, Mississippi, Texas, and Nevada) were selected to provide examples of a range of programs by size and resources. Almost half (45 percent) of Medicaid's total payments were represented in the sample, as well as 43 percent of the dependent children under 21 enrolled in the program nationwide.

OTA found that there were major differences among the states in terms of the dental services offered, but that every state program failed, in varying degrees, to adequately cover "basic" dental services. Although some services were found to be provided by all the states studied, e.g., initial examinations, x-rays, and restorations, some preventive services (sealants) and many basic therapeutic services, e.g., periodontal, prosthetic, and orthodontic services were found at that time to either not be covered, or to be of limited availability. OTA also found that there were some services dentists said they don't provide to Medicaid children, but that they do provide for other children of the same ages, and that a number of barriers restrict Medicaid children's access to dental care.

Clarridge, Larson and Newman report on a study of the health status and use of preventive health services by children from two rural Wisconsin counties who were eligible either for the EPSDT program, or for a program providing comparable health assessment services for children ineligible for Medicaid but who were uninsured, underinsured (i.e., covered by a policy with a large deductible), or their insurance didn't provide preventive health care benefits. They found that children eligible for EPSDT were significantly more likely to have made a dental visit than the other group of children (68 percent vs. 52 percent, p=0.0000), whereas there were no significant differences in the case of medical visits. They also found that among the distribution of health problems detected by these two programs, dental problems represented the most frequent problem in both groups, accounting for 33 percent and 32 percent, respectively (Clarridge, Larson and Newman, 1993).

In 1992, the Health Care Financing Administration (HCFA) funded a study to evaluate the impact of OBRA 89 on the performance of the EPSDT program. Initially, HCFA asked the evaluators to measure OBRA 89's impact on health status, service use, and
expenditures of Medicaid children in four states—California, Georgia, Michigan, and Tennessee—in which uniform research files had been constructed from Medicaid eligibility and claims data.

The study originally had four components: 1) case studies of the four states to determine how they operate their EPSDT programs and how program policies changed as a result of OBRA 89; 2) a pre-post analysis of children’s Medicaid utilization and expenditures using claims data for 1989 (the year before OBRA 89 was enacted) and 1992 (the first year in which the OBRA 89 provisions were fully implemented); 3) a pre-post analysis of the supply of child health providers participating in Medicaid and EPSDT, also using claims data from 1989 and 1992; and 4) an analysis of national survey data to determine how the health status and health care utilization and expenditures of Medicaid children differed from those of other children in the US both prior to and following OBRA 89. A fifth component of the study subsequently was added to measure participation among dental providers for Medicaid children in the four study states and to investigate the impact of dental provider supply on Medicaid children’s use of dental services (Gavin et al, 1997).

The evaluation found very different results for the four states studied, with oral health care needs accounting for much of the difference. Fifty percent of the Georgia screening visits and 63 percent of the Michigan screening visits included treatment and/or referral for dental care, whereas comparable figures for California and Tennessee were 2 percent and 13 percent, respectively. The extremely low referral rate for dental services in California was explained in part by the "severe shortage of dental providers participating in the Medicaid program at the time," (Bernardin, Gavin, Schroeder, 1995) but did not account for the fact that far more children are self-referred to California dentists than are referred through the EPSDT program (Isman, 1997a).

While significantly higher numbers of medical providers were found to be serving Medicaid children in 1992 compared to 1989, the number of dental providers increased only modestly in three of the study states (2 to 3 percent in Georgia and Tennessee, and 9 percent in California), and significantly declined in the fourth (-10 percent in Michigan). This modest growth in dental providers serving Medicaid children, combined with large increases in the number of Medicaid enrollees from 1989 to 1992, led to substantial increases in the ratios of child enrollees to participating dental providers and the average Medicaid child caseloads per participating dental provider (Gavin et al, 1997).

Medicaid coverage was found to be far broader than most private health insurance policies, including the preventive care that is often excluded from standard indemnity plans. (No specific comparison was made with coverage provided under dental insurance plans.) However, despite the broad coverage of medical services, the evaluators noted that "critical gaps in access remain. In particular, access to dental care was found to be severely limited in all four study states, despite being a central component of the EPSDT program" (Hill and Zimmerman, 1995).

The data from the evaluation, as well as reports from the state officials that were interviewed in conjunction with the study, confirmed that one of the most common health care needs found during EPSDT screens was for oral health services, and one
of the most frequently made referrals by EPSDT providers was to dentists. Despite the fact that the American Academy of Pediatric Dentistry recommends a first dental visit within six months of the eruption of the first primary tooth or by the first birthday, whichever comes first (American Academy of Pediatric Dentistry, 1994), one consistent finding across all four states was that a very small proportion of children under three years of age had had a dental visit, ranging from 3 to 7 percent for 1-2-year-olds and less than 1 percent for children under 1 year of age in all the states.

Table 12 reveals that fewer than 30 percent of Medicaid children received any dental care in the four study states during both study years (Herz, Sredl, Albers, 1996). In California, only 20 percent of the enrolled children received any dental care in 1989, increasing only slightly in 1992. The situation was not much different in the other three states, with the percentage of children with any dental care decreasing from 28 percent to 27 percent in Georgia, remaining constant at 26 percent in Michigan, and increasing only two percentage points, from 27 percent to 29 percent, in Tennessee.

For each state and year analyzed, Medicaid children aged 7 to 12 years had the highest percentage of users of dental services, ranging from 31 to 46 percent in both 1989 and 1992. For children ages 3 to 6 years, the range was from 23 to 37 percent in both analysis years. And for children aged 13 to 20 years, the range was from 24 to 33 percent (Herz, Sredl, Albers, 1996).

In the final component of this evaluation, the evaluation team sought to determine whether Medicaid coverage improved access to dental care among low-income children, and whether it provided access equal to that of children in families with moderate to high incomes, despite reports that many states fail to adequately cover "basic" dental services (US Congress, 1990) and that dental provider participation rates are low (Hill and Zimmerman, 1995; Capilouto, 1991).

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<th>Percentage of Children with Any Dental Care</th>
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<td>California</td>
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Source: Herz, Sredl, Albers, 1996

To determine this, the authors examined 1991 NHIS data for 2-6-year-olds by health insurance and income categories. These data are presented in Table 13.

Medicaid children were significantly more likely to have visited a dentist during the year compared to uninsured, low-income children, and slightly less likely than insured, low-income children, but this latter difference was not statistically significant in a multivariate analysis. In addition, Medicaid and other children aged two to six years in low-income families were significantly less likely than children in the higher income group to have visited a dentist. There was little variation in the number of dental visits among children with visits; Medicaid children had a slightly higher number of visits, but the difference was not statistically significant. It should be noted that "insurance" in this study referred to health insurance, not to dental insurance.

Based on these data, the authors concluded that Medicaid coverage increased the use of dental care among children in low-income families who would otherwise be uninsured, but not at levels comparable to those of children in higher income families. Given the greater dental care needs of low-income children documented in other studies (Edelstein and Douglass, 1995), the authors believe that their findings suggest that significant barriers to dental care remained even with Medicaid coverage (Gavin and Bencio, 1997). Another conclusion reported by one of the authors was that, in addition to insurance coverage, significant outreach and education programs are needed to achieve equal access to care for children in low-income families.

Gavin has also reported, in conjunction with this same study, that higher physician fees were associated with greater numbers of physician contacts among Medicaid children (Gavin, 1996). A number of other studies have found that the lower the Medicaid payments are relative to private fees, the less office-based physicians participate (Held and Holahan, 1985; Mitchell, 1983; Gabel and Rice, 1985; Perloff, Kletke, Neckerman, 1986; Perloff, Kletke, Neckerman, 1987; Yudkowsky, Cartland, Flint, 1990; Cohen and Cunningham, 1995). The ability of Medicaid programs to improve access to dental care in the private dental sector depends upon the willingness of dentists to treat Medicaid-eligible children (Venezie, Vann, Cashion, Rozier, 1997). Given that low Medicaid reimbursement to dentists has been reported as a barrier to access in several studies (Damiano, Brown, Johnson, Scheetz, 1990; US Congress, 1990b; Venezie and Vann, 1993; US Department of Health and Human Services, 1996; Nainar, Edelstein, Tinanoff, 1996; Damiano, Kanellis, Willard, et al., 1997), it is not unreasonable to
assume that higher dentist fees would also be associated with greater numbers of dentist contacts in this population.

Damiano, Kanellis, Willard, et al. (1997) also recently examined attitudes toward Medicaid and participation of Iowa dentists, and reported that access to dental care is decreasing for Iowa residents. They identified the most important problems with the Medicaid program for all dentists as being low fees, broken appointments, and patient noncompliance. Similarly, Venezie, Garvan, Michell, et al. (1997) found that limited dentist participation in Medicaid was a significant barrier to use of dental services for children, and that a number of provider characteristics were associated with the level of dentist participation--defined as the degree to which dentists accept new Medicaid patients into their practices. Those dentists accepting all new Medicaid patients who seek care were more likely to be Hispanic, to be older, and to practice in more populous counties. They were twice as likely to file Medicaid claims electronically, and twice as likely to participate in capitation-based dental managed care programs. Also, their expectations about rates of payment compared to their usual and customary charges were apparently somewhat lower than their counterparts accepting fewer Medicaid patients. Both providers and non-providers of Medicaid dental services cited low fees as the most significant problem with the Medicaid program. Broken or canceled appointments were also of concern, and there was agreement that Medicaid clients have more severe oral health problems than other patients.

One of the most recent studies of access to dental care under Medicaid was conducted by the Department of Health and Human Services’ Office of Inspector General (OIG). The OIG used data provided by the states to HCFA, as well as telephone and personal interviews with Medicaid, EPSDT, and/or dental public health consultants in all 50 states to determine the proportion of eligible Medicaid children who received preventive dental services in 1993. Based on data submitted to HCFA, the OIG determined that only about 20 percent of these children received preventive dental services in 1993, which represented a slight decrease from the 22 percent reported for 1992 (US Department of Health and Human Services, 1996). The OIG also found that in 1993, three-fourths of the states provided preventive services to fewer than 30 percent, and none of the states provided them to more than 50 percent, of all eligible children.
Table 13. Dental Care Indicators by Health Insurance and Income Category Among Children Aged Two to Six Years, 1991
National Health Interview Survey

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<thead>
<tr>
<th>Category</th>
<th>Percentage With Visits</th>
<th>Visits per Child With Visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicaid coverage only</td>
<td>38.6</td>
<td>2.0</td>
</tr>
<tr>
<td>Medicaid and other insurance coverage</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Income &gt;= 200% of FPL</td>
<td>56.2</td>
<td>1.7</td>
</tr>
<tr>
<td>Income &lt; 200% of FPL with insurance</td>
<td>41.8</td>
<td>1.7</td>
</tr>
<tr>
<td>Income &lt; 200% FPL with no insurance</td>
<td>31.6</td>
<td>1.7</td>
</tr>
</tbody>
</table>

* Sample size not large enough for statistically reliable estimates
FPL = federal poverty level
Source: Gavin and Bencio, 1997

**Barriers to use of Medicaid dental services**

Even when dental services are available at no cost as a Medicaid benefit, and even when dentists are available and willing to accept Medicaid beneficiaries as patients, beneficiaries may not avail themselves of the services. A recent study commissioned by the Washington State Dental Association and conducted by Evans/McDonough Company, Inc., sought to determine obstacles to the receipt of dental care by Medicaid beneficiaries (Evans/McDonough Company, Inc., 1997). Personal interviews were conducted with 425 Medicaid-eligible adults in Washington over a one-month period at the end of 1995. In addition, several focus groups were held with Medicaid-eligible adults who did not visit the dentist regularly.

The study found that there were three main obstacles to increased utilization of dental care by Medicaid-eligible adults. First, this population did not have enough information about their eligibility for dental coverage. Almost one-fourth (22 percent) of respondents were not aware that Medicaid includes dental coverage. Those who were aware were twice as likely to have a regular dentist (59 percent vs. 30 percent), and more than twice as likely to describe themselves as going to the dentist at least once a year (55 percent vs. 25 percent).

Second, Medicaid-eligible adults were not given information about how to find a dentist who accepts Medicaid, and this leads to a perception that Medicaid dentists are not available. Those respondents who were motivated to find a Medicaid dentist, either because they were in pain or because they placed a high value on preventive dental care, were able to find a dentist who accepted Medicaid. Also, respondents with children were able to find a Medicaid dentist for their children. The third obstacle to increased utilization was that preventive dental care was found to not be important enough to most of the respondents for them to overcome the obstacles of finding out about coverage and finding a dentist.

In order to increase preventive dental care utilization by Medicaid-eligible adults, it was of preventive dental care for adults. It was found that there was general understanding about the importance of preventive dental care for children, but not for adults. In addition, it was recommended that the Medicaid-eligible population be better informed about their dental coverage and about how to find a Medicaid dentist.
Dental managed care in Medicaid

In 1995, Medicaid financed health and long-term care services for 34.8 million low-income, elderly, and disabled Americans at a cost of $157.3 billion (Holahan, Liska, 1996). For fiscal year 1996, this figure was estimated at $160 billion, accounting for roughly 6 percent of total federal expenditures (US General Accounting Office, 1997a). Medicaid is one of the largest single items in state budgets, second only to elementary and secondary education. Medicaid expenditures rose from 14 percent of state spending in FY 1990 to 20 percent in 1995. In other words, one of every $5 currently spent by the states for everything goes to Medicaid.

Between 1988 and 1992, Medicaid's total expenditures more than doubled, growing at a rate of 22.4 percent per year. Since 1992, however, Medicaid's spending growth has slowed dramatically, growing at an average rate of about 9.5 percent per year.

With this kind of growth and these levels of expenditures, it is hardly surprising that states are looking at ways of controlling these costs, and since managed care is seen by states as a way to reduce Medicaid spending, and in some cases, also as a way to broaden coverage, states have increasingly turned to managed care as a way of controlling their escalating Medicaid costs. The percentage of Medicaid beneficiaries enrolled in managed care plans doubled between 1992 and 1994, and quadrupled between 1990 and 1995. Between 1994 and 1995 alone, the number of Medicaid managed care enrollees grew by 3.8 million to 11.6 million beneficiaries, or about one-third of the Medicaid population. By mid-1996, 48 states, the District of Columbia, and Puerto Rico had implemented or applied for Medicaid managed care waivers, and 13.3 million beneficiaries--just over 40 percent--of the Medicaid population were enrolled in some form of managed care program (Health Care Financing Administration, 1997c).

Although quite a bit is known about Medicaid medical managed care, very little has been reported on what the states are doing with respect to dental managed care. The Office of Inspector General study of children's access to and utilization of dental services under Medicaid, noted earlier, reported that 22 states had set up some form of dental managed care program, either statewide or pilot projects (US Department of Health and Human Services, 1996), but it was not reported how such programs were defined. More recently, a survey of state health agency dental directors asked several questions about dental managed care activities. Of the 31 states that responded, 14 said they currently had some or all Medicaid eligibles covered under a managed care dental plan, and another 9 said they were studying the feasibility of or planning to implement a dental managed care project (Empey, 1996).
Preliminary data from the most detailed survey to date of all state Medicaid programs to
determine whether they have a dental managed care program, and the characteristics
of any such programs, reveal that, out of the 47 states responding, 13 report that they
have some form of a dental managed care program in place, 27 report they have no
dental managed care program in place and no plans to start one, 2 are planning one,
and 4 have no plan in place but are thinking about starting one (Isman, 1997b).
However, these figures are believed to underestimate the extent to which states are
entering the Medicaid dental managed care arena, as data from HCFA and key
informants in state health and Medicaid agencies indicate that 22 states actually have a
dental managed care program in place (Isman, 1997d). A recent review of state
Medicaid contracts with managed care organizations (Johnson, 1997) revealed that
many contracts fail to cite dental service requirements at all.

Whether Medicaid managed care has increased access to medical care remains
unclear. Gold, Sparer, and Chu conducted site visits to Medicaid managed care
programs in five states in order to determine their effects on the health care system.
The states' experience indicates that Medicaid managed care initiatives affect persons
who are already insured or covered by Medicaid in a different way than they affect
persons who gain coverage through a new initiative. For example, Oregon's
controversial health plan expanded Medicaid coverage to all residents below the
poverty level, resulting in new coverage for those who were previously uninsured, and
leaving those who previously received Medicaid in essentially the same position (Gold,
Sparer, Chu, 1996). Similarly, several states have used savings resulting from
managed care enrollment to expand the number of individuals covered by Medicaid
and/or the number of services covered under their programs (Health Care Financing
Administration, 1997c).

Most concerns expressed about Medicaid managed care focus on the chronically ill and
those with special needs, rather than on the average enrollee. Persons become eligible
for Medicaid because of either low income or sickness and disability. The latter group,
generally adults, is more likely to have special needs, chronic illnesses, or other
problems that cause them to function less effectively in traditional, mainstream care
systems, and it is these groups that are more vulnerable to delivery system problems or
disruptions associated with the start of a new initiative. The states' experience also
indicates that managed care on its own will not remedy access problems related to
provider shortages, nor does participation in a state's Medicaid managed care program
seem to be a good proxy for safety-net protection (i.e., it does not assure the availability
of traditional sources of care such as hospitals and community health centers) (Gold,
Sparer, Chu, 1996). For example, federally-qualified health centers (FQHCs) in Rhode
Island lost their traditional system of cost-based reimbursement, which seriously
threatened their viability, and the Medicaid program ultimately decided to pay them a
supplemental capitation fee for each member who selected them as their primary care
site (Woolridge et al., 1997). Gold, Sparer, and Chu conclude that both positive and
negative effects on access to care appear likely in all of the states they studied.
However, they also noted that few of the states had good baseline data on access,
making it very difficult to judge whether the effort was worth it. In an evaluation of
California's experience in implementing its new "two-plan" model of mandatory
Medicaid managed care, the US General Accounting Office (1997d) found that while
this model provides some assurances that plans will assign beneficiaries to safety-net providers, it does not guarantee that these providers will receive a specified level of enrollment, nor can it guarantee that they will maintain their enrollments. Some providers reported that they are having difficulty operating under the two-plan model, especially in maintaining their former patient base.

In a detailed analysis of the Oregon Health Plan's experience with Medicaid managed care and its impact upon safety-net providers, Bodenheimer (1997) describes several problems related to states' reliance on managed care organizations to provide services to the poor. The first is a provision in the Medicaid law that entitles community health centers (both federally qualified health centers and "look-alikes") to receive Medicaid payments on the basis of the actual cost of providing services (referred to as "cost-based reimbursement"). These payments have allowed community health centers to use Medicaid funds to subsidize care for the uninsured. However, Section 1115 waivers may eliminate the requirement that community health centers be reimbursed on the basis of cost. In several states that have received these waivers, community health centers are receiving drastically reduced Medicaid reimbursement, threatening their survival.

The second problem is related to a law intended to assist safety-net hospitals, which are often public, linked to universities, or both. The law channels extra federal and state Medicaid dollars to hospitals serving a disproportionate number of low-income persons ("disproportionate-share hospitals"). However, Section 1115 waivers allow states to add these dollars to their general Medicaid funds without disbursing them to the disproportionate-share hospitals. As a result, hospitals in states with waivers stand to lose a substantial amount of revenue.

The third threat to the safety-net is the effort to shift Medicaid patients from safety-net providers to private managed care plans. As more and more states require Medicaid recipients to enroll in such plans, the plans are trying to attract those who are relatively healthy, leaving hospitals and community health centers to provide care to those with complex conditions requiring high-cost services, in addition to the uninsured, representing a worst-case scenario of adverse selection. To prevent the loss of Medicaid patients, safety-net providers in several states have formed their own managed care organizations. However, because the federal government requires these "safety-net HMOs" to be reimbursed at relatively high rates, the states prefer to contract with private HMOs.

If little is known about the ability of Medicaid managed medical care programs to increase access for the traditionally underserved Medicaid population, even less is known about the ability of Medicaid dental managed care programs to increase access to dental care. Isman recently reported on a Medicaid dental managed care pilot program in one California county where it is believed that the annual utilization rate for dental care either stayed the same or possibly increased slightly over the rate under a fee-for-service financing system for the year immediately preceding implementation of the managed care program. However, utilization of specific dental procedures was reported to be lower under the managed care program than under fee-for-service arrangements for virtually every type of covered dental procedure (Isman, 1996b).
Trends and implications for public policy

General trends

Overall, if measured using traditional indicators—the proportion of the population with a dental visit in the past year, and the number of visits per person—access to dental care in the U.S. appears to have increased for many populations between 1983 and the most current national surveys in 1988-94. In fact, among the non-institutionalized population, there have been increases in utilization for every age group, both sexes, all income levels, all levels of education, and the major racial/ethnic groups. In some cases, these increases have been dramatic, as with those for persons aged 75 years and over.

There are also encouraging trends among use of dental services by some racial/ethnic groups, e.g., the fact that Blacks are gaining relative to Whites. (Utilization rates for Blacks and Whites were separated by more than 15 percentage points in 1983, and by less than 10 in 1988-94). It is also encouraging that inequities attributable to income appear to be lessening. For example, the greatest gain in utilization between 1983 and 1988-94 was for those with the lowest income, and the least gain among those with income of $20,000 and above. These trends suggest that differences in "access" (utilization) attributable to race and income are becoming less important, and that we are moving towards a more equitable distribution of services as envisioned in the definition of access by Andersen (Andersen, Kravits, Anderson, 1975).

As encouraging as these trends are, they are no cause for complacency, as the overall trends tend to mask the more subtle, but important, differences between populations that continue to exist. For example, while Blacks have gained relative to Whites in terms of the proportion with a dental visit in the past year, the number of dental visits per person for Whites is almost twice that of Blacks. Further, as noted earlier, there are significant differences between Blacks and Whites in terms of the effects of the characteristics associated with their use of health services: Education has significant positive effects on the use of dental services by Whites, but no significant effects among Blacks, and there may be other culturally-determined reasons for the disparities in the use of dental services between Blacks and Whites that will not be ameliorated by improvements in socioeconomic status. These examples illustrate why just looking at overall utilization rates gives an incomplete, and in many ways inadequate, picture of access.

Another persistent and troubling racial difference is in the use of preventive services, in particular the use of sealants. As noted earlier, among 5-17-year-olds, the percentage of White children who have had one or more sealants applied to their permanent teeth is three times that of Black and Mexican-American children.

One of the lowest rates of dental service use in the past year is among the edentulous population aged 65 years and over; only 10-11 percent of this group had a dental visit in the past year, which is less than one-fourth that of the entire population in this age group. However, because rates of edentulism are continuing to decline, the steady
increase in use of dental services by the elderly population should also continue.

**Special needs populations**

*Elderly and disabled*

It is clear from a review of the literature on use of dental services by elderly and disabled populations that grouping them in such broad categories as "persons over 65," "persons with developmental disabilities," and ethnicity, are not effective for purposes of funding or for targeting programs. Rather, the focus should be more directed to services for families, not categories based on age or disability, and families and individuals should be provided with a range of options to reduce barriers and increase access to care. For example, in the case of transportation, options might include wheelchair accessible public transportation, special vans to pick up at home or another designated place, vouchers for bus/train/taxi, reimbursement for parking fees, mobile clinics, vans, or portable dental equipment to transport to a home or facility, and rides provided by volunteers.

Other lessons include the need to: 1) target different health messages and services to dentate and edentulous people; 2) coordinate appointments/services/consultation more for people receiving multiple services from different health care providers or agencies, i.e., there is a need for "real" case management; 3) consider including options for some services (e.g., preventive dental or medical care) for elders under health policies for their employed sons/daughters, i.e., treating some elders as dependents of their children; and 4) base programs on actual needs assessments rather than on provider assumptions of needs.

*Persons with HIV and other medical conditions*

The future of dental service use by the HIV-infected population is clouded by conflicting evidence. While early studies showed a high unmet need for dental services among this group, probably due to the recency of the epidemic, the fear associated with it, and the relative scarcity of resources to deal with it, the largest study conducted on the health services needs of HIV-infected persons after implementation of the Ryan White CARE Act found the utilization of dental services to be not remarkably different from that of the general population. On the other hand, a recent study in San Francisco, also conducted after implementation of the CARE Act, found unmet dental needs that were quite high. If the need for dental services is so acute in San Francisco, the city with perhaps the best reputation in the U.S. for its system of services for HIV-infected persons, then the continuing proportion of this population with high levels of unmet dental need is troubling. Possibly the relatively large HIV population in San Francisco has strained the limits of funding agencies more than in communities with lower proportions of infected persons, so that, as the authors of the study conclude, the funding provided through the CARE Act still falls far short of meeting identified community needs. Nevertheless, as the HIV epidemic continues, and becomes more widely dispersed, the need for continued, and perhaps expanded, funding of health services for this population seems unlikely to abate.
On April 10, 1997, Maryland Congressman Steny Hoyer introduced HR 1288, entitled *The Medicare Medically Necessary Dental Care Act of 1997*. This legislation would make dental care services available to Medicare-eligible persons with congenital or acquired valvular heart disease, cancer of the head or neck, lymphoma, leukemia, and organ transplants. In addition, the bill would allow for coverage of additional dental services for diagnoses not listed when such services would result in reduction of expenditures to Medicare. Although the future of this bill is unknown, it represents the culmination of many years of work in trying to expand medically necessary dental services for persons with serious medical conditions and could potentially establish a precedent for public and private third-party reimbursement.

**Incarcerated**

Virtually all that is known about access of incarcerated populations to dental care is limited to the federal prison population. As noted earlier, dental care in the federal prison system is demand-based, i.e., if an inmate requests dental services, there appears to be an adequate supply of dental manpower in federal prison settings to be able to meet the current demand. Although it has become somewhat of a cliché to suggest that, “if you want good health care, just get yourself tossed in jail,” and there is some anecdotal evidence that some persons have actually done this, the extent to which the demand for services reflects the need is unknown, and the question of whether it should be society’s obligation to try to stimulate additional demand in incarcerated populations is one that is beyond the scope of this paper to address.

**Very young**

Recent studies indicating relatively high caries rates and low use of dental services among preschool age children--especially among low-income children--are indicative of a problem that heretofore has gone largely unrecognized because of the paucity of studies among children this young. Even where policy exists that mandates dental care when necessary, e.g., the federal Head Start program, agency funding and/or the availability of sufficient providers still sometimes results in children not being served. As has been noted previously, part of the explanation for the low use of dental services among preschool children is related to the inability or unwillingness of general dentists to see children in this age group. The problem is compounded by trends of declining numbers of pediatric dentists. Even if the number of pediatric dentists were to expand by several orders of magnitude, however, the relative number of these specialists seems unlikely to be able to effectively meet the dental needs of very young children. Thus, without action to substantially increase the number of general dentists treating this population, the use of dental services by this group seems unlikely to improve.

**Medicaid coverage**

Between 1985 and 1995, the number of Medicaid dental service recipients increased from 4.7 million to 6.3 million, or about 37 percent. However, the total number of Medicaid recipients grew from 16.5 million to 36.3 million, or more than 120 percent. During this period, payments for dental services increased from $458 million in 1985 to a little over $1 billion in 1995. This represented a decrease in dental expenditures as a
proportion of total Medicaid expenditures in almost every year of this decade, from 1.22 percent in 1985 to 0.85 percent in 1995 (Table 14). At the same time, total current dollar Medicaid dental expenditures increased every year except 1994. However, since 1975, constant dollar total and per recipient spending have not kept pace with the rates of inflation. In 1994, constant dollar expenditures per recipient were less than half the amount spent in the mid-1970s (Waldman, 1997a). Medicaid authorities estimate that one-half of one percent of Medicaid expenditures fund children's dental care. This is considerably less than reported Medicaid spending for laundry services in nursing homes (Edelstein, 1997b).

Although dental expenditures represent a trivial and steadily declining proportion of total expenditures in the Medicaid program, the overall increase in Medicaid expenditures has placed increasing financial pressure on federal and state governments. This has resulted in a variety of actions and proposals to contain

Table 14. Medicaid Dental and Total Recipients and Expenditures, 1985-1995

<table>
<thead>
<tr>
<th>Year</th>
<th>Dental Recipients</th>
<th>Total Recipients</th>
<th>% Dental Recipients</th>
<th>Dental Payts</th>
<th>Total Payments</th>
<th>% Dental Payts</th>
<th>Dental Payts/Recip</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>4,671,750</td>
<td>16,463,413</td>
<td>28.4%</td>
<td>457,945,871</td>
<td>37,507,639,305</td>
<td>1.22%</td>
<td>98.02</td>
</tr>
<tr>
<td>1986</td>
<td>5,161,071</td>
<td>22,514,902</td>
<td>22.9%</td>
<td>531,348,152</td>
<td>41,005,171,195</td>
<td>1.30%</td>
<td>102.95</td>
</tr>
<tr>
<td>1987</td>
<td>5,131,429</td>
<td>23,108,760</td>
<td>22.2%</td>
<td>540,509,774</td>
<td>45,049,895,357</td>
<td>1.20%</td>
<td>105.33</td>
</tr>
<tr>
<td>1988</td>
<td>5,071,950</td>
<td>22,906,663</td>
<td>22.1%</td>
<td>577,365,685</td>
<td>48,710,157,836</td>
<td>1.19%</td>
<td>113.84</td>
</tr>
<tr>
<td>1989</td>
<td>4,214,074</td>
<td>23,510,689</td>
<td>17.9%</td>
<td>497,855,341</td>
<td>54,500,203,640</td>
<td>0.91%</td>
<td>118.14</td>
</tr>
<tr>
<td>1990</td>
<td>4,552,049</td>
<td>25,255,067</td>
<td>18.0%</td>
<td>593,005,616</td>
<td>64,858,936,389</td>
<td>0.91%</td>
<td>130.27</td>
</tr>
<tr>
<td>1991</td>
<td>5,209,285</td>
<td>28,279,781</td>
<td>18.4%</td>
<td>709,668,774</td>
<td>77,048,353,128</td>
<td>0.92%</td>
<td>136.23</td>
</tr>
<tr>
<td>1992</td>
<td>5,700,157</td>
<td>30,926,390</td>
<td>18.4%</td>
<td>851,136,862</td>
<td>90,813,508,480</td>
<td>0.94%</td>
<td>149.32</td>
</tr>
<tr>
<td>1993</td>
<td>6,174,306</td>
<td>33,432,025</td>
<td>18.5%</td>
<td>961,435,146</td>
<td>101,708,889,399</td>
<td>0.95%</td>
<td>155.72</td>
</tr>
<tr>
<td>1994</td>
<td>6,351,953</td>
<td>35,053,013</td>
<td>18.1%</td>
<td>968,715,758</td>
<td>108,270,147,366</td>
<td>0.89%</td>
<td>152.51</td>
</tr>
<tr>
<td>1995</td>
<td>6,382,937</td>
<td>36,281,586</td>
<td>17.6%</td>
<td>1,018,989,939</td>
<td>120,140,904,458</td>
<td>0.85%</td>
<td>159.64</td>
</tr>
</tbody>
</table>

Source: Health Care Financing Administration, Medicaid State Data Tables, HCFA 2082 Reports, 1985-1995.

Medicaid costs, including a rapidly escalating rush toward managed care. As noted earlier, by mid-1996, 48 states and the District of Columbia had implemented or applied for Medicaid managed care waivers, and over 40 percent of the Medicaid population were enrolled in some form of managed care program.

Another cost-containment strategy has been the idea of replacing the current Medicaid program with a modified "block grant" to the states, which would reduce coverage and eliminate federal standards for services covered, quality of care, and levels of provider payments. Although the Medicaid program itself managed to elude this fate during the recent deliberations over a balanced budget, the block grant approach emerged as a major option for states wishing to take advantage of new federal funding for a children's health insurance program under the Balanced Budget Act. Continuing financial pressures on government, the possibility that managed care strategies may not offer much hope for further cost-containment, and a history characterized by an incremental approach to health care reform mean that block grant proposals may continue to be the way in which health coverage is expanded in our society.
The arbitrary time limits placed on receipt of welfare benefits under the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA, also known as the Welfare Reform Act), signed by President Clinton in August 1996, and many state "welfare reform" efforts could result in a loss of Medicaid coverage. For example, 37 percent of non-elderly women on Medicaid are covered five years or more (Davis, 1996). Without Medicaid, half of non-elderly Americans with low or modest incomes would be uninsured. To be uninsured often means failure to get preventive care, inadequate maintenance of chronic conditions, and adverse health outcomes. More importantly, the block grant approach fails to assure that beneficiaries receive health insurance coverage, or coverage under a managed care plan. Instead, states could redirect federal funds to a selected set of hospitals and other health care providers (Davis, 1996). Any consideration of reductions in federal and state Medicaid funding now, at a time when the numbers of uninsured are growing, and hospitals and other sources of care for the poor are under great stress, would seem to be a particularly shortsighted strategy. The outcomes of policy debates in state legislatures and court cases will likely have serious implications for the families involved, as well as for the nation as a whole.

A number of changes were made in the Medicaid program as part of the Balanced Budget Act of 1997, which was signed into law on August 5, 1997. There are two new eligibility options for states. The first allows states to provide continuous Medicaid coverage for twelve months for all children, whether or not they continue to meet income eligibility tests. It is projected that this provision will expand coverage by up to one million children (Waxman and Alker, 1997). The impact of this change is that children would remain eligible for the whole year, whether or not their parents' income rose above income eligibility levels.

It is unclear how states will respond to this provision, because the extent to which the administrative cost savings from annual recertification of eligibility will be offset by the additional costs of providing coverage to children who would have been found ineligible for benefits with more frequent recertification is not known. It would seem, though, that this new provision would benefit state efforts to enroll Medicaid recipients in managed care plans, as it would help stabilize a population that is notorious for its lack of continuous enrollment. This in turn should please managed care plans (including dental managed care plans) and their providers, as it would allow them more time to care for children's urgent health care needs and then have them on a preventive maintenance schedule, rather than continuously having to care for urgent needs. The second new option allows states to create a Medicaid "buy-in" program for individuals whose income is under 250 percent of the federal poverty level and who would--but for income--be eligible for Supplemental Security Income (SSI). The buy-in amounts would have to be set on a sliding scale based on income. This provision has been sought by the disability community for a long time.

Another provision of the Balanced Budget Act of 1997 is that States must reinstate Medicaid coverage for children who lost coverage as a result of the change in the definition of eligibility for SSI as a result of the PRWORA. Also, states now have the option to presume eligibility, for a few months, for children who are likely to meet Medicaid eligibility standards.
Currently, mandatory enrollment of Medicaid beneficiaries into managed care plans requires a federal waiver under Section 1115 or Section 1915(b) of the Social Security Act. One of the most significant changes made to the Medicaid program by the new law is that states will now be able to move Medicaid beneficiaries into managed care without first obtaining such a waiver. There are exceptions for children with special needs, persons who are eligible for both Medicaid and Medicare, and Indians. While the federal government rarely denied a waiver request in the past, states did not like the protracted negotiations that accompanied the process.

There are a number of important protections for Medicaid beneficiaries included in the law, including an access requirement that managed care plans provide the state and the Secretary of Health and Human Services with adequate assurances that the plan: 1) has the capacity to serve the expected enrollment; 2) maintains a sufficient number, mix, and geographic distribution of providers; and 3) offers an appropriate range of services and access to preventive and primary care services. In addition, each Medicaid managed care plan is subject to an annual external independent review of quality outcomes, timeliness, and access to services (Waxman and Alker, 1997).

PRWORA gave states the option to eliminate Medicaid benefits for all undocumented immigrants as well as legal immigrants who are not yet naturalized (Braveman, 1997). Under the Balanced Budget Act, legal immigrants living in the U.S. who lost their SSI and Medicaid benefits as a result of PRWORA will have those benefits restored. Also, legal immigrants residing in the U.S. before August 22, 1996 may become eligible for SSI and Medicaid if they become disabled in the future. Legal immigrants arriving in the country after August 22, 1996 will still be barred from receiving SSI and Medicaid benefits.

**Employment-based health insurance**

The percentage of children without health insurance coverage has increased significantly in recent years as children have lost private health insurance coverage. In particular, the portion of America’s children with employment-based health insurance coverage has dropped significantly (Sheils and Alexih, 1996). Holahan found that employer-sponsored coverage fell 8 percentage points for children up to age 10, and 7 percentage points for children ages 11 through 17 (Holahan, 1997).

Several factors account for the decline in employment-based health insurance coverage for children. As employers have required employees to pay larger shares of premiums, many workers have been unable to afford insurance. Cost is one of the primary factors contributing to this decline. While health insurance premium cost increases have slowed during the past three years, many health care analysts are predicting an increase in health insurance premiums during the next few years. Inflationary pressure may come from health care providers, health insurers, consumers, and/or policymakers. If inflationary pressure increases health insurance premiums, we are likely to see a continued decline in employment-based health insurance and a subsequent increase in both the Medicaid and uninsured populations (Employee Benefit Research Institute, 1997b).
An Employee Benefit Research Institute/Gallup survey indicates that there is a direct link between a worker’s decision to retire early and the availability of retiree health benefits. In 1993, 61 percent of workers reported that they would not retire before becoming eligible for Medicare if their employer did not provide retiree health benefits. Further, workers expecting to receive retiree health insurance are more likely to expect to stop working before age 65 than workers who do not expect to have retiree health insurance. Twenty-one percent of workers with retiree health insurance expected to stop working before age 65, compared with 12 percent of workers not expecting to receive retiree health insurance (Employee Benefit Research Institute, 1997b).

In addition, structural economic changes have increased the number of jobs that do not provide health insurance. A higher proportion of Americans now work as contractors or as temporary or part-time workers—positions that do not typically bring with them employer-based health insurance (Costello and Fish-Parcham, 1997). A recent report prepared for the American Hospital Association shows that the decline in employer-based coverage disproportionately has affected workers’ dependents (Sheils and Alexxih, 1996).

As private coverage of children has decreased, an increase in the number of young children covered by Medicaid has partly offset the loss of employer-based coverage. In a series of steps starting in the late 1980s and continuing into the 1990s, Medicaid eligibility was expanded nationally to cover additional lower income children besides those who already qualified because they received welfare. However, increases in children’s coverage through Medicaid have not resulted in an overall increase in the percentage of children covered by health insurance. This is due, in part, to the fact that almost three million children who are eligible for Medicaid do not receive coverage but remain uninsured as a result of poor outreach and other barriers (General Accounting Office 1996a). However, the primary reason for increasing levels of uninsurance among children is that many children have been losing private coverage but remain ineligible for Medicaid (Newachek, Hughes and Cisternas, 1995).

In the years ahead, the number of children with gaps in health insurance coverage is likely to continue to increase. The continued decline in employment-related health benefits will result in ever-larger numbers of children who go without health insurance for significant periods of time. The increase in the number of young children covered by Medicaid may partly offset the loss of employer-based coverage for this age group. However, some evidence points to the fact that it is the children of the working poor (those earning $10,000 to $19,999 per year) who are most likely to experience gaps in health insurance coverage, suggesting that there continues to be a group of vulnerable children that falls outside the safety net provided by Medicaid (Kogan, Alexander, Teitelbaum, et al., 1995). Overall, the increase in children covered by Medicaid is unlikely to stem the growing tide of children without health insurance—and, hence, the number of children without health coverage is likely to grow (Costello and Fish-Parcham, 1997).

Unfortunately, among children, the evidence suggests that health insurance (i.e., not just dental insurance) is an important predictor of the use of dental services. Therefore, the continuing downward trend in children’s health insurance coverage suggests that
the use of dental services among this population may suffer.

**Health care reform efforts**

Beginning even before attempts were made to make major health care reforms at the national level, states have experimented with a variety of initiatives to improve access to health care. These efforts have taken place in two arenas—state Medicaid programs and private health insurance—although there has been overlap between the two. The Medicaid-based expansions have taken place primarily in two major ways. Many states have used optional Medicaid eligibility categories, while others have received approval from HCFA to cover otherwise ineligible groups of children and adolescents—those who fall outside even the optional Medicaid eligibility categories—through the use of Medicaid demonstration waivers under Section 1115 of the Social Security Act (English, 1997). According to a recent survey, at least 28 states have used Medicaid to expand coverage for uninsured children and adolescents (Schneider, 1997).

As of 1995, at least 31 states had in place some type of state-level initiative, apart from Medicaid, to provide health insurance coverage for children and adolescents who would otherwise fall through the cracks between Medicaid and private insurance (US General Accounting Office, 1996a). Under the purely state-funded and privately-funded initiatives, a relatively small number of children and adolescents receive health insurance coverage. The GAO report suggests that, in 1994, the publicly-funded programs covered about 2 percent of all insured children, while the private sector initiatives covered only about another 40,000 children. Due to limited budgets, even when children are eligible for these programs—which are not entitlement programs like Medicaid—they may be unable to enroll. Also, coverage provided by many of the programs is often more limited than the full scope of Medicaid benefits and may include only primary care and preventive services (English, 1997). The extent to which these programs are providing any dental coverage is unknown.

A recent study of whether these initiatives have succeeded in reducing the number or composition of the uninsured population, or altering the distribution of coverage, found that few reforms have resulted in increased coverage. Those which appear to have succeeded include Medicaid eligibility expansions, employer tax credits, and selected rules governing open enrollment and continuity of coverage in small group and individual insurance policies. Overall, Medicaid expansions had a much more potent effect on reducing the risk of being uninsured among adults than did other state policies to stimulate private insurance coverage (Sloan, 1996).

In the context of the size of the problem being addressed, i.e., 40 million uninsured persons, and in light of the predicted rate of growth of this population to 50 million by the year 2000, the policies adopted to date fall very far short of an effective response, according to Sloan. "They may appear politically attractive to policymakers by giving the appearance of taking action, but policymakers also should recognize that as a practical matter, their efforts to stimulate private coverage have barely any impact on a large and growing problem" (Sloan, 1996).

The impact of the Balanced Budget Act of 1997 on improving access to health care,
including dental care, at least for children, remains to be seen. As noted previously, states have the option of expanding Medicaid coverage to previously uninsured children, in which case they would be responsible for providing the full EPSDT scope of benefits, which includes generous dental coverage. They also have the option of developing their own block grant program which, depending on the type of health insurance plan with which it is linked, may or may not include a dental benefit. Because Medicaid remains an entitlement program, states would be responsible for continuing coverage to an expanded population if they selected the Medicaid option, and many states may be reluctant to do that. If they choose the block grant option, they are free to stop enrollment or change eligibility criteria at any time in response to budgetary constraints.

On the other hand, many advocates for children and the poor and analysts familiar with the intricacies of Medicaid believe that it is the best vehicle for reducing the number of uninsured children. For example, the Center on Budget and Policy Priorities recently cited several reasons why expanding Medicaid is preferable to creating a new block grant program:

• Medicaid is the nation's largest health insurance program for low-income children and a majority of states are already using it to reduce their uninsured child populations;

• federal dollars offer greater purchasing leverage (e.g., influence with managed care organizations) in the Medicaid program than in a separate block grant program serving a small number of children;

• a new block grant program could lead to a two-tier system of health care for low-income children;

• increasing Medicaid coverage would reduce the demand on state-funded programs to cover uninsured children and would complement rather than undermine them;

• although states would have less flexibility under Medicaid than under a block grant, Medicaid provides true health insurance while still giving the states significant flexibility;

• under Medicaid, children are entitled to a basic package of essential services, but would not be entitled to any specific benefits under a block grant;

• accountability for federal dollars is more difficult to assure under a block grant program than Medicaid (Schneider, 1997).

With respect to the potential for setting up a two-tier system, one concern is that if states establish block grant programs that serve a new population of uninsured children and reimburse providers any differently than they are currently being reimbursed by Medicaid, they could create a financial incentive for providers to favor the group covered by the higher reimbursement.

Several provisions of the Balanced Budget Act appear to work to the advantage of
managed care programs. The most obvious is the removal of the requirement for states to obtain a federal waiver before being able to mandate enrollment of Medicaid beneficiaries in a managed care plan. In addition, the so-called "75/25" protection, which currently prohibits states from enrolling Medicaid beneficiaries in plans where fewer than 25 percent of the enrollees are commercially insured, is repealed. Another less obvious provision that was added allows states to provide continuous twelve-month eligibility for children, regardless of whether they continue to meet eligibility tests. This provision, as noted earlier, would benefit state efforts to enroll Medicaid recipients in managed care plans by helping to stabilize the enrolled population and allow managed care plans to better capitalize on the provision of preventive services to help control costs.

Whether Medicaid managed care ultimately fulfills its promise of improving access to health care services for Medicaid beneficiaries remains to be seen. Rosenbaum and Darnell state that, "[M]anaged care for Medicaid recipients is unlike that for other populations. Their higher health risks and greater need for care make Medicaid patients particularly good candidates for the access and delivery features of managed care; at the same time, these same characteristics make beneficiaries particularly vulnerable to its frailties, just as they may have been especially vulnerable to abuses in the fee-for-service system. As higher need Medicaid populations increasingly are enrolled in managed care plans, the need for access and quality standards will increase" (Rosenbaum and Darnell, 1997).

Although Medicaid dental managed care programs offer some potential for increasing access to dental care and for quality assurance, their potential for controlling costs seems to be not nearly so great as is medical managed care’s. In part this is because Medicaid dental expenditures represent less than 1 percent of overall Medicaid expenditures, and in part it is because of the nature of where most of the cost savings come from in managed care programs. Medical managed care programs save money primarily by lowering the number of inpatient hospital days, which is pretty much a non-issue for dentistry, and by controlling referrals for specialty care. As a much higher proportion of dentistry is provided by generalists than is the case with medicine, again there is relatively little opportunity to control costs this way in dental care programs. Nevertheless, Medicaid dental expenditures still represent a sizeable amount of money in the larger states. For example, California spent approximately $644 million on Medicaid dental services in FY 1996-97 and is one of the states that has a portion of its Medicaid beneficiaries enrolled in dental managed care programs (Isman, 1997c). Consequently, it is likely that some states will continue to experiment with Medicaid dental managed care arrangements, and some of the provisions of the Balanced Budget Act may further encourage such experimentation.

Most low-income persons, whether privately insured or covered by Medicaid, receive dental services in the private sector. Thus, private dental care plans and providers must address the needs of low-income persons as the rule rather than the exception. Ensuring that private sector health care services are designed to meet the needs of low-income persons will become increasingly important as more Medicaid enrollees receive care in the private sector through Medicaid managed care initiatives. Without information on income, plans and providers may underestimate the proportion of their patients who are low-income. This may have both positive and negative
consequences. To the extent that lack of information on income is able to lessen any stigma that dental providers associate with low income, it is positive, but to the extent that it means plans or providers are insensitive to or unaware of the special needs of low-income populations and are therefore less willing to redesign their services as needed, it may be a negative effect (Braveman, 1997).

Although the Balanced Budget Act will allow states to move Medicaid beneficiaries into managed care without first obtaining a federal waiver in most cases, the Act still contains a number of important protections for beneficiaries. These include requirements for: a choice of plans for most beneficiaries; the ability to change plans at any time with cause; clarity of enrollment and informational materials; information comparing plans; prohibiting the default of beneficiaries who do not choose a plan into one not in compliance with federal requirements; state approval of marketing materials and prohibition of materials that contain false or misleading information; plans to provide adequate assurance that it has the capacity to serve the expected enrollment with an adequate number and mix of providers; standards for access to care; regular, periodic assessments of the scope and content of the plan's quality assurance strategy; and an annual external independent review of quality outcomes, timeliness of, and access to services (Waxman and Alker, 1997).

Notwithstanding these protections, because of the incentives of capitated managed care programs to provide fewer services, it will be important for those states that choose to pursue dental managed care in their Medicaid programs to be aware of the need to monitor not only overall utilization, i.e., the percentage of the eligible population that makes one or more dental visits per year, but also the rates at which specific procedures are provided—especially preventive procedures. As noted earlier, there is some evidence that without such oversight as well as sanctions for substandard performance, important services may tend to be underprovided (Isman, 1996b).

Expansion of health insurance for children

One possibly encouraging note with respect to dental coverage of children is the recent enactment of the Balanced Budget Act of 1997. Included in this compromise to achieve a balanced budget by the year 2002 was the creation of Title XXI of the Social Security Act, which provides $24 billion in federal funds over five years for children's health coverage, including grants that will allow states to: 1) expand Medicaid eligibility for children, 2) provide health insurance under a new State Children's Health Insurance Program (SCHIP), or 3) provide a combination of the two. The Act also allows states to use a portion of their allotments for outreach efforts to increase Medicaid enrollment by already eligible but uninsured children. If the state uses the money to expand Medicaid, the Medicaid benefit package, including EPSDT, must be provided. If the state designs its own insurance program, a number of options are available. At a minimum, the package must include so called "basic services" including hospital inpatient and outpatient, physician, surgical and medical, laboratory and x-ray, and well child/ well baby care, including immunizations. The value of the benefit package must be equivalent to the actuarial value of one of the so-called "benchmark plans." To determine how generous the package must be, a state will have to determine the actuarial value of all the benchmark plans and then decide how much within that range
it wants to spend per child on coverage.

Benchmark plans include the standard Blue Cross/Blue Shield preferred provider plan for federal employees, any state employee health plan that is generally available in the state, and the HMO with the highest commercial (non-Medicaid) enrollment. Instead of designing a new package, the state could offer any of these benchmark plans. The state could also obtain approval from the Secretary of Health and Human Services for a plan that does not meet any of the above mentioned criteria but that is determined to provide "appropriate coverage" for the targeted population.

Unfortunately, while dental coverage is allowable under the Act, it is not a required component. States have wide discretion in determining whether and how to cover dental services. Since, as described earlier, the standard Blue Cross/Blue Shield preferred provider plan for federal employees provides only modest dental benefits, the largest HMOs in many states do not include dental benefits, and health benefits plans offered to state employees often do not include dental coverage, the extent to which uninsured children are likely to see an increase in their dental benefits if states choose either the "benchmark" or "benchmark-equivalent" coverage option is unknown, but appears to be minimal. In California, for example, a recent study found that dental benefits were offered by 37 percent of HMOs, 56 percent of point-of-service plans, 35 percent of preferred provider organizations, and 21 percent of indemnity plans (Schauffler, Brown, Rice, 1997). On the other hand, again using California as an example, a proposal by Governor Pete Wilson for a new health insurance program for children in response to the federal legislation resulted in enactment by the California Legislature of the "Healthy Families" Plan, which includes a reasonably comprehensive dental benefit package, including sealants, space maintainers, topical fluoride applications, crowns, and even bridges (State of California, 1997). The Governor's office estimates that 580,000 of California's 1.6 million uninsured children will qualify for coverage in the Healthy Families program, with the actual number receiving coverage depending on program enrollment. SCHIP may significantly increase children's access to dental care or may perpetuate problems such as those in Medicaid, which would limit the program's potential to improve children's oral health.

**Loss of retirement health benefits**

The availability of employer-based health benefits is of particular concern to older Americans approaching or at retirement age—individuals who consume a higher level of medical services and whose health care costs are commensurately more expensive. For those under age 65 and not yet eligible for Medicare, the decision to retire may depend on the continuation of health benefits by an employer. For those 65 or older living on a fixed income, employer-based benefits may help fill coverage gaps in Medicare such as deductibles and copayments or the lack of a prescription drug or dental benefit.

A recent GAO report indicates that coverage for such employer-based retiree health benefits is eroding. There has been a steady decline in the number of retirees with coverage through a former employer—both for early retirees and those who are Medicare eligible. Foster Higgins, a benefit consulting firm, reported in 1996 that only
40 percent of large employers with more than 500 employees offered health benefits to early retirees—a 6 percentage point decline since 1993. Even fewer small and medium-sized firms offered retiree coverage (US General Accounting Office, 1997b).

Although the decline in the number of large employers who offer retiree coverage has been significant since 1988, the GAO points out that the decline in the availability of employer-based coverage has not resulted in as large an increase in early retirees without private health insurance. Among the reasons are that (1) the decision to retire is often predicated on the availability of health coverage and (2) access to other sources of private coverage appear to be filling a significant portion of the gap created by fewer employers offering retiree health benefits. For example, if employer-based coverage is not available, early retirees may purchase coverage themselves (e.g., through so-called "Medigap" policies) or obtain insurance through a working or retired spouse.

Even if retirees manage to keep their employer-sponsored coverage, the likelihood is that such coverage will not include a dental benefit. For example, a survey of 192 employer-sponsored retiree health plans conducted by the GAO revealed that only 30 percent covered dental care (US General Accounting Office, 1994b). This can be compared to the Foster Higgins survey of employer-sponsored health plans cited earlier, which found that 52 percent of all employers provide a dental benefit (National Association of Dental Plans, 1997).

Retiree surveys provide another important perspective on the erosion in retiree health coverage. Comparing 1988 and 1994 data for all retirees aged 55 and older, the Labor Department reported that the number of individuals who continued to receive employer-based health benefits into retirement declined by 8 percentage points; in addition, the number still covered sometime after retirement dropped by 10 percentage points. There are several explanations for the erosion in coverage during retirement. First, some employers have ceased to offer retiree health benefits. Escalating health care costs have spurred employers to look for ways to control their benefit expenditures. Among the cost-control techniques adopted by employers are eliminating retiree coverage, tightening eligibility requirements, increasing cost-sharing, and requiring those covered to choose more cost-effective delivery systems. In addition, a new financial accounting standard developed in the late 1980s has changed employers' perceptions of retiree health benefits and may have acted as a catalyst for reductions in retiree coverage. The new rule makes employers much more aware of the future liability inherent in retiree health benefits by requiring them to account for its estimated value as a cost against earnings.

A second contributor to the erosion in employer-based health coverage during retirement is retirees' responses to changes in their coverage. According to the Labor Department, fewer retirees are choosing to participate in employer-based coverage when offered because firms are asking them to shoulder more of the costs. At the same time, retirees who decline employer-based benefits may have access to less expensive coverage through a working or retired spouse (US Department of Labor, 1995).

Losing access to employer-based coverage poses three major challenges for retirees: (1) higher costs in purchasing individual coverage on their own; (2) a related problem,
the potential for less comprehensive coverage because of higher premiums; and (3) until recently, the possibility that coverage will be denied or restricted by a preexisting medical condition. Beginning July 1, 1997, the implementation of the Health Insurance Portability and Accountability Act (HIPAA) will provide uniform federal standards to ensure that individuals leaving employer-based group plans can purchase insurance on their own if they can afford to do so.

Today, most companies have reserved the right in plan documents to modify health benefits for current and future retirees. However, the right to purchase continuation coverage from an employer is only guaranteed to workers in certain circumstances, for example, if an employee is fired, laid off, quits, or retires. Individuals who are already retired when an employer terminates coverage are not eligible to continue that firm’s health plan at their own expense.

**Workforce trends**

Among the health professions, dentistry alone is projected to experience a decline in the ratio of professionals to population over the next two decades if current trends continue (Pew Health Professions Commission, 1995). While medicine has moved rapidly (some would argue too rapidly) into the managed care arena, which has often involved the creation of integrated networks, group practice arrangements, and the formal employment of physicians, the vast majority of dental care is still delivered by single dentists practicing in ambulatory settings. For example, in the most recent survey of dental practice by the American Dental Association, it was found that about 67.4 percent of the nation’s private practitioners were working in a practice with no other dentists in 1994, while 20.3 percent were working in a practice with one other dentist, and 12.4 percent were working with two or more dentists (American Dental Association, 1997a).

The Pew Health Professions Commission, in considering this projected undersupply of dentists, felt that, if left alone, the dental profession might be able to control the manner in which care is delivered more effectively than will medicine or nursing, but that this would be true only for the portion of the population that the profession is serving. The more daunting problem facing the profession is how it will serve the oral health care needs of the nation as its numbers decline and its practice modalities remain constant (Pew Health Professions Commission, 1995). Having posed this question, the Commission answered it in part by supporting a recommendation from a 1995 Institute of Medicine report on the future of dental education that dental school class size be maintained at its 1993 level (Field, 1995).

The Pew Commission believed that the opportunity for improving access to dental care was in changing the manner in which dental care is organized and delivered, e.g., by using dental hygienists and assistants more expansively, by linking more directly with the rest of the health care system, and by creating more efficient practices, but that these changes would be unlikely to occur without the pressure of being oversupplied or as the result of a strong push from managed care organizations.

To provide a sense of the magnitude of what was suggested by the Pew Commission, it
should be noted that, in 1994, almost 40 percent of solo dentists and 28.9 percent of all non-solo dentists did not employ any dental hygienists (American Dental Association, 1997a). Even if there were a dramatic increase in the number of dentists employing dental hygienists, there is nothing to suggest that dentists' practice locations would change, that they would use the skills of dental auxiliaries more effectively, or that their clientele would change. It thus seems unlikely that the degree of additional efficiency to be gained by the changes suggested by the Pew Commission would be sufficient to address issues such as the diversity, geographic maldistribution, and aging of the dental professional workforce, or disparities in access to oral health services. Further, while maintaining the current dental school class size may address the current demand for services if efficiency can be increased, if that demand should increase as the result of, say, additional incremental health care reform or a more educated public, it is doubtful whether the additional efficiency will be sufficient to address the increased demand (Isman, 1996a).

It may be instructive to note that a number of years ago, at a time when the federal government was projecting an undersupply of dentists and tried to create incentives to increase not only the supply but also the efficiency of dentists by funding programs to train expanded-function dental auxiliaries, these changes were strongly resisted by the profession and in fact relatively few of these allied health workers were trained. The notion that managed care might drive this kind of efficiency in dentistry is an intriguing one that remains to be investigated, but that does not appear to have attracted much attention yet, even within dental managed care organizations. It would surely be ironic if managed care turned out to be what drives an increase in the efficiency of dental care delivery.

Despite the fact that the nation's more than 3,100 pediatric dentists account for 2.2 percent of all active private dentists (American Dental Association, 1997b), they provide 19 percent of all dental services for children between 2 and 4 years of age (Jack, 1986), in part because many general practitioners do not feel comfortable or prepared to treat infants and younger children (Crall, 1995). Further, while some evidence suggests that pediatric dentists are treating an increasing proportion of the youngest Medicaid dental users, they may also be treating a decreasing number of school-age users (Venezie, Vann, Cashion, Rozier, 1997). Also, the majority of dental care for children is provided by non-pediatric dentists (approximately 60 percent for preschool children and 75 percent of school age children) (Waldman, 1997b).

Kanellis, Damiano, Oldero-G-Hermiston et al. (1997) asked Iowa dentists at what age they believed children should make their first visit to the dentist, and at what age they were willing to see children in their practice. They found that only 11 percent of the dentists thought children should be seen by age 1, 35 percent thought children should be seen by age 2, and 84 percent believed that children should visit a dentist by age 3. Twenty-six percent of dentists reported they were willing to accept patients as young as age 1, 47 percent at 2 years of age, and 82 percent at 3 years of age. Lopez (1997) found very similar results in a survey of Texas dentists. She found that 91 percent of actively practicing dentists said they would see children, 82 percent said they would see children under 6, but only 11 percent said they would see 1-year-olds. In addition, of those dentists who said they would see children under age 6, 59 percent said they would refer the child automatically to another dentist if treatment needs were
found. Lopez concluded that there was a shortage of dentists in Texas who could provide evaluations and anticipatory guidance beginning at age 1, as well as a potential shortage of dentists to deliver care to very young children when treatment needs are found.

The number of pediatric dentists has not kept pace with increases in the U.S. population; as a result, the ratio of pediatric dentists to children remains quite low at approximately 1.2 per 100,000. This ratio is projected to decline in the future as a result of a decline in the number of graduates of pediatric dentistry specialty training programs in recent years. For example, in 1979 there were 185 graduates of pediatric dentistry programs, but by 1990 that number had fallen by roughly 20 percent to 150 (Crall, 1995). The mix of trainees and graduates of pediatric dentistry training programs also has changed in ways that are likely to result in further reductions in capacity. For example, a number of first-year residents in these programs are graduates of foreign dental schools, many of whom will leave the United States upon completion of their training. Also, there has been a substantial increase in the number of women completing pediatric dentistry programs in recent years, and some data suggest that time away from practice for child rearing and different work patterns for women result in less time spent delivering services (Dolan, 1991).

**Reductions in the dental public health infrastructure**

As of 1993, only 35 (69 percent) of the 51 State Health Agencies (SHAs) had full-time dental directors, 5 had part-time directors and 11 SHAs had no director. As of August 1997, these figures were 34 full-time and 11 part-time, with 6 SHAs having no dental director (Perkins, 1997). It has been documented that substantially more oral health-related assessment, policy development and assurance activities occur in states with full-time dental directors. Such leadership is essential to meet the national oral health objectives for the year 2000 and to ensure that individuals at greatest risk for oral diseases are effectively targeted for preventive intervention (Morbidity and Mortality Weekly Report, 1994). In a mid-decade review of progress toward the *Healthy People 2000* objectives, it was noted that, "[b]ecause of fewer state and local dental directors, declining funds devoted to dental care from block grants, and the lack of comprehensive dental service programs in many community and migrant clinics, moving the Nation's oral health closer to the established targets will require more effort. Real progress will occur only if interventions to change behaviors and prevent disease are instituted in communities" (National Center for Health Statistics, 1996).

Similarly, a diminished oral health presence has been noted in many federal agencies. In April, 1996, a workshop on Oral Health Access Public/Private Leadership was held to bring together the leadership of public and private dental organizations to discuss the problems and potential solutions associated with access to oral health for vulnerable populations (University of Iowa College of Dentistry, 1997a). This workshop identified, for example, that there was no individual with oral health expertise dedicated to oral health policy and training in the Health Care Financing Administration, no clearly identified oral health director in Medicaid, and no dental leadership on the Medicaid Technical Advisory Group or National Medicaid Advisory Committee. In addition, the
workshop identified: 1) a need for a strong, full-time Chief Dental Officer at the Health Resources and Services Administration (HRSA); 2) strong budget support for the National Health Service Corps and enhanced dental participation in the program; 3) strong budget support for Community and Migrant Health Centers and mandates for oral health treatment and prevention services in these programs; increased funding for health professions primary care training programs; and 4) a need to strengthen oral health expertise and presence at the regional level, where there has been a drastic reduction in regional dental consultants and concomitant program support in Public Health Service regional offices in recent years (University of Iowa College of Dentistry, 1997b).

Conclusions and recommendations

While overall access to dental care has improved in recent years for many segments of the population that have been studied, and some of the racial and income inequities in use of dental services are beginning to lessen, there is clearly a long way to go before the U.S. can boast of equitable access to dental care for all of its people. Worse, current levels of access for many groups, and the programs attempting to improve access for these groups, are clearly inadequate to achieving the Healthy People 2000 objectives, much less being able to assure equitable access. Indeed, some indicators are headed in the wrong direction!

Because there continue to be major inequities in access attributable to income, age, race, education, and geographic location, policy makers are faced with decisions about what more can be done to lessen these inequities, and to speed up the process. It should be noted that, for the most part, the following recommendations do not necessarily represent new ideas. However, in many cases they represent ideas that, based on the evidence reviewed, appear to have merit but may have lacked sufficient resources to be adequately tested. A somewhat oversimplified, very succinct, and remarkably comprehensive solution to children's access problems, which is equally applicable to other age groups, was recently provided in one sentence by the US General Accounting Office (1997e): "To ensure access to high-quality care, public and clinical experts recommend that children have a stable source of health insurance benefits that cover their health care needs, a relationship with a primary care provider that helps them obtain more complex care as needed, primary care facilities that are conveniently situated, and outreach and education for their families."

An ounce of prevention

Prevention, in particular community-based prevention programs, remains the cornerstone of any effort to make dental care available to more people. Prevention in dentistry works; dentistry has the capability of providing effective preventive services quickly and inexpensively. A greater emphasis on making preventive services available to more people will, in turn, allow more efficient use of the dental workforce and ultimately free up more resources to provide more extensive dental care for more people.
Community water fluoridation remains the quintessential dental public health measure, largely because of its ability to provide a substantial preventive benefit to large numbers of people without any conscious action necessary on the part of those receiving the benefit. Although approximately 62 percent of the public served by public drinking water supplies has access to fluoridated water, there has not been appreciable progress made in recent years in bringing the benefits of fluoridation to new communities. In 1995, California became the first state in 20 years to enact a "mandatory" statewide fluoridation law, although it is a requirement of that law that the state health department find non-public funds for capital, operations, and maintenance costs before any water supplier is required to fluoridate. The result is that no communities have been fluoridated two years after enactment of this law.

The slow progress made on fluoridation in recent years is perhaps a reflection of the political controversy that inevitably surrounds this issue. Recently, the Senate and House Appropriations Committees issued report language urging the federal Maternal and Child Health Bureau to allocate Fiscal Year (FY) 1997 Special Projects of Regional and National Significance (SPRANS) funds to help promote fluoridation in seven states with less than 25 percent of their population having access to fluoridated water. However, no additional appropriation was provided for this purpose, only $200,000 was made available from existing SPRANS funds to support up to seven grants, and individual grant amounts were limited to no more than $130,000 over a 30-month period. Further, the funds were restricted to: 1) building state capacity to initiate community water fluoridation; 2) building state capacity to expand community water fluoridation; and 3) improving the quality of community water fluoridation delivered by public water systems, except that the funds could not be used to purchase fluoridation equipment. Until there is a more concerted national effort to promote fluoridation, with more adequate funding levels, progress on fluoridation seems destined to remain slow.

Dental sealants represent the other major caries prevention tool at our disposal, and while the use of sealants is gradually increasing, there are large disparities in who receives them, with poor and minority children many times less likely than their White and more affluent counterparts to have received them. A number of states and local communities have responded to these inequities by instituting sealant programs targeted to underserved children, and there are perhaps 200 or fewer such programs in the U.S. today. In addition, every state Medicaid dental program except one (Kentucky) covers sealants as a benefit for children, although many states restrict the teeth that can be sealed, when they can be sealed, and other conditions under which they can be sealed. Further, most Medicaid programs reimburse for sealants at rates well below those of private insurance companies and dentists' usual fees, which in some cases limits dentists' willingness to provide them. Because of these limitations, for the most part public sealant programs are able to reach only a small fraction of even the underserved children to whom they are targeted.

Together, the use of fluorides and sealants continues to be our best means of controlling caries at the community level. The combination has been likened to childhood immunizations, i.e., the extent to which they can prevent caries is roughly comparable to the extent to which immunizations can prevent vaccine-preventable disease. Without a concerted effort to redirect public monies into fluoridation to serve the entire community, and sealant programs to serve underserved children, there will be
little progress in fluoridating more communities and sealants will likely remain a privilege of the "haves" in American society.

One possible new opportunity available to states to expand community-based dental services is related to a provision of the State Children's Health Insurance Program (SCHIP) that limits states to spending no more than 10 percent of their allotment on expenditures not used for Medicaid or health insurance, such as administration and outreach. States can get a waiver from this cap if the coverage represents a cost-effective alternative to what would otherwise be provided under their plan, and such coverage is provided through the use of a "community-based health delivery system," such as a federally-funded health center. Although this term has not yet been further defined, several states have begun looking into the possibility of using a portion of these funds for the provision of community sealant programs, and it is conceivable that they might also be used to support community fluoridation efforts.

Because the caries process can begin at a very early age, its prevention must likewise begin early--even before the first tooth erupts in children identified as high risk. Edelstein (1997a) notes that recent findings of caries progressing faster in very young children than fillings can keep up with suggests that we may be focusing on the wrong treatments, or that the dental profession is not prepared to repair the teeth of children this young. He advocates that a new model of primary dental care needs to be developed for high risk young children, with a shift away from filling cavities to managing the caries process.

One such model is represented in Bright Futures in Practice: Oral Health, a tool for pediatric oral health supervision recently published by the National Center for Education in Maternal and Child Health (Casamassimo, 1996). Among the innovations in oral health supervision contained in this document are, first, recognition that nondental health professionals are the primary providers of oral health supervision during the first year of life. After the child has a first dental visit, ideally by age one, the dental professional is the primary provider of oral health supervision and the health professional provides screening and reinforces oral health messages during other health supervision visits. Second, Bright Futures emphasizes early intervention, beginning with prenatal counseling and the scheduling of a dental visit by the child's first birthday.

Unfortunately, as noted earlier, there are still few dentists--both general dentists and pediatric dentists--who are willing to see children as early as age 1. Further, few health professionals have been trained to provide adequate levels of oral health supervision to children prior to their first dental visit. Some ways of addressing this issue include: 1) increase training of primary care providers to provide exams, preventive care, and parental counseling/anticipatory guidance for young children; 2) provide reimbursement for preventive dental counseling and exams for young children; 3) provide on-site day care for families during their appointments, and incorporate a health education/wellness focus into the day care activities; 4) involve parents and members of underserved groups in planning programs for their care; 5) incorporate more preventive dental services into medical HMOs; 6) develop certification programs for dental professionals who wish to improve their skills in working with young children, individuals with chronic medical problems, or other types of special needs; and 7) teach child care providers to
assess oral health needs and arrange for palliative care for oral symptoms.
School-based dental services

As noted earlier, school-based health centers (SBHCs) operate by taking advantage of the captive audience represented by school-age children. In doing so, they often provide important health services to the populations that need them the most. Although relatively few SBHCs currently offer dental services, the overall number of SBHCs has increased substantially in recent years, and there is no reason that dentistry should be excluded from the services offered by these centers. The availability of such centers with dental components would offer tremendous potential for improving children's access to dental care, especially to preventive services. In fact, the vast majority of existing community-based sealant programs are located in schools.

School-based health centers have a large stake in the success of efforts to increase children's access to health insurance, such as the State Children's Health Insurance Program. SCHIP offers a possible opportunity to use a portion of the 10 percent set-aside to strengthen the child health care delivery system, including SBHCs. In addition, it is estimated that one-quarter of children from families below 150 percent of the federal poverty level who are eligible for Medicaid have not been enrolled. Without special efforts, the new state initiatives will likely experience similar difficulties. Given their high rates of uninsured patients, SBHCs may be particularly well-placed to enroll students in both Medicaid and state programs (Anonymous, 1997).

Community/rural/migrant health centers and other federal programs

The contribution of community and migrant health centers to increasing access to dental services for the poor is often overlooked. While only 60 percent of these centers provided dental services in 1996, they served more than 1 million people (Anderson, 1997). They represent an established and successful model for serving hard-to-reach populations that often will not seek care from private dental providers in a community, even if they are available. In some rural counties in California, clinics have quadrupled Medicaid dental utilization rates. At the same time, in keeping with the GAO findings of inefficiencies and a lack of accountability in many of these programs, federal programs aimed at increasing access to care must improve their focus on access, including developing better ways of measuring need and evaluating the success of individual programs in meeting this need (United States General Accounting Office, 1997c).

Integration of oral health with primary care

Serious consideration must be given to investigating how to better integrate oral health with primary care. It is not by chance that most "health" insurance excludes dental coverage, or that only 60 percent of health centers provide dental coverage, or that Medicare virtually ignores dental services, or that many state health agencies have no dental programs to speak of. For a variety of reasons, many health care professionals and policymakers have an underappreciation for the value of oral health services, and the dental profession itself has sometimes played down the importance of its own services. The result is a health care system that routinely excludes the mouth in
discussions of so-called "comprehensive" health care, but would never consider excluding other body parts from coverage. Until policymakers recognize the mouth as part of the body, dentistry seems destined to play a minimal role during negotiation of health benefits.

Although the dental profession has fought vigorously to maintain its own identity as distinctly separate from medicine, there is some evidence to suggest that integration may offer some benefit. For example, Block and Freed (1996) question the traditional assumption that keeping dental benefits separate from medical benefits will necessarily lead to greater coverage of dental benefits. In an examination of the Oregon Health Plan (a waiver to Oregon’s Medicaid program which expanded access to health insurance for Oregon residents, and which is targeted to those with incomes below the federal poverty level, including the Medicaid population; those unable to purchase health insurance because of a pre-existing health condition; and those who are employed but have no employer-based health insurance) they note that when dental coverage is developed under a separate benefit package, it is usually added after implementing the medical plan, and then only if additional funding becomes available. Also, they point out that a free-standing dental program can be a convenient target for budget cutters faced with two distinct programs and who elect to eliminate or reduce one without considering the relative importance of the services. In Oregon, however, following implementation of the Oregon Health Plan, when it was discovered that the original fee schedule for the capitation portion of the dental program had been compiled with rates that were too low to attract enough dentists to participate in the program, the Oregon Health Services Commission increased fees by 40 percent in September 1994, and did not reduce dental services in order to fund the increase. Rather, the additional $3.7 million required to fund the program was found within the $400 million overall health plan.

Medicaid and health insurance reform efforts

Medicaid dental performance falls far short of its promise. By law and regulation, Medicaid entitles one-quarter of all American children to comprehensive dental care, but by administration and implementation, it substantially fails these children (Edelstein, 1997b). If the nation is going to continue to rely on the Medicaid program to serve the poorest Americans, some major reforming of that program will be necessary if services are to be provided through the existing workforce. Some potentially positive changes, such as allowing states to determine eligibility only once a year, were enacted as part of the recent balanced budget negotiations. Other changes that would help increase access include incentives for states to provide dental exams at an earlier age, financial incentives for providing preventive services, adequate reimbursement levels, and broader coverage for adults than many states currently allow.

Some evidence that changes such as those suggested above can increase access to dental services for Medicaid enrolled children was recently reported by Milgrom, Hujoel, Grembowski, and Ward (1997). They describe a program, entitled Access to Baby and Child Dentistry (ABCD), supported by Washington’s Medicaid program, in cooperation with the local dental society, regional health district, state dental association, and the University of Washington, in which dentists were trained and certified to provide an
array of improved dental services to Medicaid enrolled children younger than 5 years of age, and for which these dentists received enhanced payments. They found that in the first year of the program, 37 percent of the enrolled children had made at least one dental visit, compared to 12 percent of children not enrolled in the program.

Damiano et al. (1996) have suggested that the number of Medicaid children under age 3 who receive oral health screenings could be improved by more effectively reaching these children in locations where they already seek other health care or social services, such as public health clinics, Maternal/Child Health centers, and WIC (Women, Infants, and Children Supplemental Food Program) clinics. They have proposed, for example, that public health clinics be recognized as EPSDT providers and reimbursed for screening exams, thereby obviating the need to refer many 1- and 2-year-olds from these clinics to a dentist for screening. Reimbursing the clinics in this way would provide them with the resources needed to retain or hire dental hygienists, as well as providing other low-income children not eligible for Medicaid with access to the screenings, education, and referrals to the dentist.

Whether the new State Children's Health Insurance Program will be able to improve the delivery of dental services to children will depend on the design of the coverage. SCHIP may significantly increase children's access to dental care or may perpetuate problems such as those in Medicaid which limit the potential to improve children's oral health. To the extent that states choose to expand coverage by expanding Medicaid coverage, whether through traditional fee-for-service or managed care financing arrangements, there may not be significant improvements in service unless existing, poorly-functioning Medicaid programs are substantially enhanced. Non-Medicaid managed care programs will likely succeed only to the extent that the existing dental managed care infrastructure is able to provide adequate access. And non-Medicaid fee-for-service programs will succeed or fail depending upon such design issues as sufficiency of reimbursement, allowance of co-insurance and deductibles, benefits design and coverage limitations, and administration (Edelstein, 1997b).

For states that elect to design new health insurance programs for children in lieu of expanding Medicaid coverage, their ability to improve the delivery of dental services to children will depend upon, first, whether they even include dental coverage, and second, some of the same issues of coverage as apply to Medicaid, i.e., reimbursement levels, extent of co-insurance and deductibles, benefits design and coverage limitations, and administrative issues. Early reports of how the states are responding to SCHIP with respect to dental coverage are not particularly encouraging, with some states not including dental coverage at all, some providing coverage of only emergency services, and some linking children's coverage to what is available primarily to adults.

Although in theory dental managed care would appear to offer some potential for increasing access to dental care under Medicaid, there is little evidence available yet to support that perspective. In any event, because of managed care's potential for the underprovision of services, plans will need to be carefully monitored for both the quality and quantity of services they provide and should be held financially accountable for predetermined utilization rates.
Workforce issues

A variety of ways of addressing dental workforce issues need to be examined. In particular, attention needs to be directed at the already small yet decreasing number of practitioners willing and able to see young children. There appears to be a growing consensus that the way to do this is not by training more pediatric dentists, but by training more general dentists in how to handle children, and by making more efficient use of auxiliary personnel.

To the extent that the provisions of state dental practice acts represent barriers to access, restrictions that limit who can provide services must be reexamined. There is ample evidence that expanded function dental auxiliaries could increase the efficiency of the dental workforce and assure the provision of needed services to more people at lower cost. In addition, the role of non-traditional providers needs further exploration. In medicine, it has been suggested that greater use of non-physician providers has potential for providing greater access to care, and in fact several studies have found that 60 to 90 percent of the diagnoses seen in outpatient primary care settings can be handled capably by non-physician providers, such as physician assistants or nurse practitioners. In addition, The US General Accounting Office (1993) has reported on some innovative programs that use other types of non-physician providers to increase access, including an Indian Health Service program that trains local Alaska village residents as Community Health Aides (CHAs) to provide emergency and primary care in villages, with the federal government assuming responsibility for medical malpractice claims against services provided by CHAs. Elements of the Alaska program have been studied for application in other settings, including a proposal to increase access to primary care in St. Petersburg, Florida, using paramedics.

If such programs are viable alternatives in medicine, there is no reason comparable dental programs cannot be established. As noted earlier, nondental health professionals are the primary providers of oral health supervision during the first year of life. Consequently, mechanisms need to be established to allow such providers, as well as other nonprofessional caregivers, to conduct oral health assessments and provide preventive services to very young children. As one example, the State of Washington is currently experimenting with allowing physicians to apply fluoride varnishes to the teeth of young children.

In the Third Report of the Council on Graduate Medical Education, a number of recommendations for improving access to health care through physician workforce reform were presented. A number of these are equally applicable to dentistry. For example, two recommendations included: 1) Providing undergraduate financial incentives, including loan and scholarship programs, to recruit and retain more underrepresented minorities; and 2) Increasing incentives for primary care practice and service in inner-city and rural areas, through physician payment reform, reduction of administrative burdens, National Health Service Corps scholarship and loan programs, tort reform, and differential Medicare and Medicaid reimbursement for practice in shortage areas (US Department of Health and Human Services, 1992).

Because minority mentors and role models are needed to encourage more minorities to enter the dental professions, and to practice in minority communities, additional steps...
should be taken to increase the number of minority dental providers available to teach minority students and serve the minority community, including changing the culture of dental professional school faculty so that they can serve as adequate role models for future dental professionals. Recent setbacks for affirmative action programs provide little basis for optimism about the potential of this avenue for increasing access.

**Strengthening the infrastructure**

As previously noted, substantially more oral health-related assessment, policy development and assurance activities occur in states with full-time dental directors, and such leadership has been identified as essential to ensure that individuals at greatest risk for oral diseases are effectively targeted for preventive intervention. It has also been noted that there is a diminished oral health presence in many federal agencies. At least two of the recommendations emanating from the Oral Health Access Public/Private Leadership Meeting in April 1996, referred to earlier, address these issues and are pertinent to include here:

- Obtain, maintain, and/or enhance a dental presence within federal government agencies by securing dental leadership involvement on advisory groups, task forces, committees, and panels addressing issues of relevance to oral health. Specific critical examples: establish positions of dental policy and programmatic expertise (a dental presence) in the Medicaid Bureau, HCFA; the provision of public/private dental leadership representation on the Medicaid Technical Advisory Group, National Medicaid Advisory Committee; enhance the provision of public/private leadership advisory input to the U.S. Public Health Service Oral Health Coordinating Committee; assure that each of the PHS Regional Offices has a Regional Dental Consultant.

- Encourage all public and private dental organizations to develop, update, and/or strengthen current policy that advocates for dental public health programs and representation within state and local health departments.

**Need for multiple partners**

Many communities and many organizations have come to realize that solutions to access problems are not just the purview of government, the private dental sector, or philanthropies. Today, the focus is increasingly on collaborative partnerships between these and other sectors. It is difficult to get a grant funded today without providing evidence of such partnerships. This perspective probably reflects growing recognition of the failure of many programs that have relied on a single sector to deal with a multi-sector problem.

The continuing inability of large segments of our population to realize adequate access to dental services remains a large and complex problem. Some barriers to the utilization of dental services will require long-term social, political, and economic changes, e.g., improving the educational level of both patient and parents; recognizing the role played by cultural and geographic residence factors; reducing the travel
distance and waiting time for a dental appointment; and even understanding that the way in which a person is paid for his/her services can affect their ability to get dental care (hourly wages lost because of time needed to go to the dentist reflects an additional hidden cost of treatment) (Hazelkorn and Baum, 1990).

Other barriers are likely to only be adequately addressed through collaborative efforts of the public and private sectors. Many of the recommendations emanating from the Oral Health Access Public/Private Leadership Meeting also address this issue:

- Form a "National Working Group on Access to Oral Health for Vulnerable US Populations" based on the public/private partnership model similar to the National Cancer Institute's National Dental Tobacco-Free Steering Committee. Participation in this "National Working Group" should expand the Bethesda Advisory Panel to include non-dental business, labor, advocacy, and other groups interested in access to oral health.

- Promote public/private forums at state and local levels similar to the Bethesda Oral Health Access Public/Private Leadership Meeting to foster collaboration on access issues of mutual interest that strive to improve access to care for vulnerable populations and to assure a dental presence on state and local advisory groups, task forces, committees, and panels addressing issues of relevance to oral health.

- Assure public and private leadership participation in dental organization leadership training, management conferences, and policy forums. Examples include: ADA's President-Elect's Conference and Executive Directors' Management Conference; AGD's Biennial Leadership Conference; ADHA's Constituent Officers' Workshop; AAPHD and APHA's Annual Meeting; National Oral Health Conference, etc.

- Through collaborative efforts of the public and private sector, expand and enhance current efforts of support for dental student loan repayment programs for establishment of practice in underserved areas defined and determined by public/private partnerships at state and local levels and to develop new approaches for increasing the number of dental professionals working in underserved areas.

- Advocate the expansion of educational opportunities for students and oral health professionals to learn of the need, responsibility, and special care treatment of vulnerable U.S. populations as discussed and recommended in the Institute of Medicine's Future of Dental Education Report, "Dental Education at the Crossroads: Challenge and Change."

- Identify successful state and local oral health access initiatives that benefit from public/private partnerships and promote replication of those models.

In summary, despite gradual improvements in access to dental care for some populations, and despite the presence of a number of programs that have sought to increase access, one cannot help but assess the net effect of past and current efforts to improve access to dental care, especially for traditionally underserved populations, as falling far short of their potential. Edelstein (1997c) recently proposed several principles
upon which policy makers could address changing public policy with respect to early childhood caries that are equally relevant to policy pertaining to access, and so are paraphrased in that context below:

1) Policy must be grounded in scientific evidence. Much has been learned about barriers to access that has not been applied. Policy must establish mechanisms to translate research findings into appropriate interventions within reasonable time frames.

2) Policy must reflect differential risk. Individuals, families, and communities require different levels and types of intervention in order to attain equivalent levels of access.

3) Policy should cast access to dental care as a community health problem, rather than a dental problem. Because dentistry is already marginalized in the perceptions of many policy makers, conceptualizing access as a dental problem limits the community of interest to address the problem and reduces the likelihood of meaningful attention. Characterizing access to dental care as a community health problem allows oral health access to be viewed in the context of broader health access issues and facilitates multidisciplinary approaches to solutions.

4) Policy must recognize access, at least in part, as behaviorally determined. As such, policy must support behavioral interventions to improve access, and such interventions in turn must address cultural barriers to access and the relative importance of competing demands on individuals and families.

5) Policy must require that programs to improve access be community-based, and performance must be measured at the community level. Concomitantly, performance measurement requires reliable information systems. Consensus needs to be reached on appropriate measures of access, and policy must assure that information systems are capable of quantifying those measures.

6) Policy must address the need for properly trained personnel, including not only traditional dental providers, but also non-dental personnel who can help assure access and address prevention and behavioral issues affecting access before dental professional help is typically sought.

These policy determinants require creativity and experimentation, which in turn require political will. With political will comes resource allocation. As a nation, we have the knowledge and resources to improve access to dental care for our underserved populations. What we have lacked is the political will to do so. It is hoped that this paper will help stimulate that will.
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