

Health Promotion and Aging  
"Oral Health"

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I. BACKGROUND

There is a growing interest in the oral health needs of older persons, particularly as the size of the population age 65 and older increases and as the composition of that age group changes. The largest increase in population is occurring in the oldest-old—age 85 and over<sup>1</sup>—a group for which little is known regarding oral health.

Historically, older adults have had fewer financial and social resources than have other age groups, but evidence suggests that the picture is changing. For example, in 1984, 91 percent of older adults received Social Security benefits; 24 percent received income from private pensions, and 68 percent received income from private assets.<sup>2</sup> These represent considerable improvements over the past two decades. Furthermore, it is projected that improvements in the socioeconomic status of older individuals will continue over the next several decades. This does not mean, however, that all older Americans will be financially able to secure the necessary benefits from health care. Even considering these improvements, general health and medical expenditures are sizable. While older Americans represent nearly 12 percent of the population, they account for 27 percent of all health expenditures and purchase 25 percent of all medications sold in this country.<sup>3 4</sup>

In the most comprehensive, published data—the National Medical Care Expenditure Study (NMCES)—it was reported that three percent of the per capita health expenditure for those 65 and older went for dental care in 1977. Modest increases were observed in mean dental expenditure per older person between 1970 and 1977—from \$31 to \$40 (1977 dollars)<sup>5</sup> Traditionally, dental care for older persons has been an out-of-pocket expense. In 1981, nineteen percent of those ages 65-74 had some dental insurance, while 10 percent of those age 75 and older had some coverage.<sup>6</sup> (Self-reported dental insurance is often at a higher level for this age group.) In spite of major successes in dental research, treatment and prevention over the past several decades, oral diseases of all kinds remain among the most costly health problems prevalent in the United States, adding up to a national bill of \$22.7 billion for dental services in 1986.<sup>7</sup>

Older Americans traditionally have accounted for large proportions of less advantaged categories and are more likely to be without major support systems, judged by sociodemographic and access measures. For example, there are high proportions who 1) live alone and are widowed, 2) have few years of education, 3) are below the poverty level, 4) are not in the labor force, or 5) live in non-urban areas.<sup>1 6 8 9 10 11</sup>

Improvements in oral health status and dentally-related behaviors of the older age group have been observed over the past several decades. Continued improvements in oral health status, oral hygiene practices and dental service utilization are projected as upcoming cohorts continue to become better educated, more affluent and dentate,<sup>12 13</sup> yet, the older individual will continue to be at risk for oral diseases.<sup>14 15 16</sup> There is no research evidence to suggest that tooth loss or specific oral diseases are a necessary concomitant of the aging process, nor do all persons over age 65 fall into one descriptive group in terms of oral health or dentally-related behaviors.<sup>17</sup> Rather, it appears that there is a great deal of heterogeneity in the older population. Likewise, there is no evidence that older persons are, by definition, in poor general or oral health.<sup>15 18 19</sup> The combination of genetic predisposition, lifestyle and socioeconomic environment, exposure to fluorides, oral hygiene at home and dental-visit behaviors throughout an individual's lifetime, contribute to the state of oral health, or lack thereof, in later years.<sup>19 20 21 22</sup>

Maintaining quality of life through retention of the dentition requires the prevention and/or treatment of oral diseases beginning at younger ages and continuing throughout the lifetime. Preventive activities for

all ages include professional and self-care. Professional preventive activities include examination of the dentition, supporting structures and mucosal tissue for decay, attrition, abrasion, periodontitis, recession, oral cancers and evidence of oral symptoms of systemic diseases, as well as oral hygiene education and regimens such as prophylaxis and fluoride applications. Appropriate restorative treatment of observed conditions is accepted as preventing further destruction of oral structures.<sup>23</sup> The prescription for maintaining optimal oral health through self-care is the same for the older person as it is for the younger one: daily toothbrushing with a fluoride toothpaste, use of a fluoride and/or antimicrobial rinses, interdental cleaning, dental visits at least once a year and observation of a balanced diet and food intake pattern. Some oral conditions may be prevented or retarded by a change in behaviors including stopping use of tobacco, improving toothbrushing technique or abandoning inappropriate chewing behaviors.<sup>24</sup> Other oral conditions and appropriate treatments may be controlled through careful monitoring of systemic conditions and medications.

The overall quality of life of any individual, particularly an older one, can be enhanced through oral diseases prevention and health promotion.<sup>16, 25</sup> The health of the oral cavity--teeth, oral soft tissues, underlying bone, neural apparatus, immune system and glandular mechanisms--is critical to chewing, tasting, swallowing and speech, as well as adaptation to dentures if they are worn. Health of the oral cavity also contributes to nutrition, facial esthetics and protection from systemic infection and injury.

Most older Americans are relatively healthy and functionally independent. They can be expected to continue to follow habitual patterns of oral hygiene behavior and use of dental services. Still, an estimated 40 percent of older Americans are projected to constitute a special-needs category based on complex health problems and functional status.<sup>26</sup> These include: emotional and physical stresses associated with the aging process; physical and mental disabilities resulting from chronic diseases and physical and financial barriers to access to care.<sup>26</sup>

## II. ORAL HEALTH STATUS--OUTCOMES OF ORAL HEALTH PROMOTION

### A. Data Sources

Descriptions of the oral health and related behaviors of older Americans are available from a number of national and local sources. National data are the most readily available, but many of these studies placed an upper limit on age in the sample. Furthermore, those studies which do include older individuals typically have not focused on this age group, thus the ability to analyze the data may be limited by the number of older individuals in the subsample. The weakness in all surveys conducted to date is the near absence of a comprehensive data set on older individuals--including attitudes, knowledge, behaviors, environmental/structural conditions, as well as clinically-determined oral health status.

The major surveys which include both interview and clinical examination data on older Americans are the National Health and Nutrition Examination Survey (NHANES I), Hispanic Health and Nutrition Examination Survey (HHANES), and A Study of Dental Health Related and Process Outcomes Associated with Prepaid Dental Care: 1981 (HRSA).<sup>8, 27</sup> A National Institute of Dental Research (NIDR) study--National Survey of Oral Health in U.S. Employed Adults and Seniors: 1985-86--contains complete clinical but minimal self-reported data on a sample of 5686 older Americans who attended 208 Senior Centers.<sup>10</sup>

Most other national studies do not include clinical examination and are based on data collected by interview, including information on dentally-related behaviors, attitudes and knowledge. An example is the National Health Interview Survey (NHIS) conducted by the National Center for Health Statistics. Dental health questions have not been a routine part of the core questionnaire since 1981, but issues related to dental health have been included regularly in supplements. Other examples are the 1980 NCHS Personal and Preventive Practices Survey; NHANES I Epidemiologic Followup Study; the National Medical Care Expenditure Survey, 1977; the National Medical Care Utilization and Expenditure Survey (NMCUES), 1980; and Center for Health Administration Studies and National Opinion Research Center Surveys of Medical Expenditures and Use of Health Services: 1953, 1958, 1963, 1964, 1970.<sup>8, 27, 28</sup>

Descriptions provided in this manuscript are based on reported correlations between selected measures of predisposing and enabling factors, perceived need and oral health variables which, most often, have not

been analyzed in combination as part of any predictive model. Emphasis has been placed on national probability samples and verified data over convenience samples or self-reported data. In some cases, reports may appear inconsistent, as recent analyses are providing more in-depth understanding of issues than was available when earlier research was published; for example, separation of the dentate and edentulous groups in the analysis of dental expenditures, visits and oral hygiene behaviors.

## B. Oral Health Status

### 1. Edentulousness (Absence of Teeth)

Traditionally, the primary measure of oral health status of older populations has been the extent of edentulousness. It appears now that each succeeding generation has improved compared to older cohorts and more individuals are retaining their teeth as they age.<sup>14 29</sup> Based on NHIS data, in 1958, 67 percent of persons over age 74 reported being edentulous. The proportion of edentulous persons in this age category has decreased over the years to 60 percent in 1971 and 45 percent in 1983. Decreases also have been seen in populations as they reach the age group 65-74, with 55 percent being edentulous in 1958, 45 percent in 1971 and 34 percent in 1983. Declines were seen among both females and males.<sup>30</sup> Edentulousness is more prevalent among older persons below the poverty level and among those with fewer years of education.<sup>30</sup>

One fourth (27%) of those ages 65 and older who attended senior centers in 1985-86 had 20 teeth or more, while 17 percent had 1-12 teeth. The average number of teeth decreased steadily with age, with the average being 18.1 at age 65 and 15.1 for the age category age 80 and over.<sup>10</sup>

Presence of teeth appears to be related to socioeconomic status and race. Among the Baltimore Longitudinal Study panel members, a primarily healthy, middle-socioeconomic, well-educated, volunteer, older, study group--the average older person has 70 percent of natural dentition (20 of 28 teeth)--and only 4 percent wear full dentures.<sup>31</sup> Data from a North Carolina study, encompassing 15 years, indicate a decrease in mean number of missing teeth in succeeding cohorts of whites, but not in blacks.<sup>32</sup>

The functional adequacy of dentition is further reflected in the measured treatment needs for prosthetic services: in the 65 and older age group in 1981, 8 percent needed bridge unit(s); 19 percent needed partial denture(s); 9 percent needed full denture(s).<sup>6</sup> Based on self-report in 1983, approximately one-fourth of edentulous older persons needed new dentures. This proportion increased to over one-third among those below the poverty level.<sup>30</sup>

### 2. Caries

Caries in older adults is exhibited mostly as recurrent caries surrounding failing restorations, cervical caries associated with plaque accumulation at the gingival margin, root caries associated with gingival recession or as a side effect of medical conditions or pharmaceutical challenges.<sup>33</sup> Research indicates that a small portion of individuals account for most of the restorative treatment needs for caries.<sup>23</sup>

In 1985-86, older adults attending Senior Centers had an average of 20 decayed or filled coronal tooth surfaces. About 92 percent of these surfaces being filled.<sup>10</sup> Additionally, as individuals age, there is an increase in the prevalence of root surfaces caries.<sup>10 34 35</sup> Well over one-half (63%) of the individuals over age 65 have root surface caries.<sup>10</sup> Only about one-half (54%) of these root surfaces are filled.<sup>10</sup>

Prevention of root caries is particularly important, since there is insufficient knowledge of optimal therapeutic approaches for root caries, making restoration difficult. While fluoride traditionally has been associated with prevention of decay in children, a recent study in Canada showed that the occurrence of root decay in adults with lifelong histories of fluoridated water consumption was approximately 60 percent less than it was in nonfluoridated areas.<sup>24 35</sup>

### 3. Periodontal Diseases

Periodontal disease is a frequent self-reported chronic condition in persons age 65 and over, along with hypertension, hearing loss, heart conditions, vision impairments and diabetes.<sup>20</sup> A variety of chronic

diseases of the periodontium affect older persons including gingivitis, periodontitis, gingival recession and trauma from occlusion.<sup>36</sup> In 1985-86, over one half (53%) of older adults attending Senior Centers had gingival bleeding at one site or more, 23 percent had supragingival calculus and 66 percent had subgingival and supragingival calculus--prevalence rates greater than younger adults. Approximately 22 percent of older individuals have loss of attachment of 4 mm or greater at one or more site.<sup>10</sup>

The prevalence of periodontal diseases appears to increase with age.<sup>10 13 36</sup> The higher prevalence and severity of periodontal diseases among older persons may not result from enhanced susceptibility, but rather, may reflect the accumulation of disease over time.<sup>36</sup> If periodontitis is defined as mild pocketing, there may not be greater proportions of older adults with disease. With the increasing numbers of adults in this age group, however, this remains a considerable disease issue. The number of teeth lost due to periodontal diseases is not known, but the number of teeth which need to be extracted from periodontal disease increases with age.<sup>10 13</sup> Whether periodontal diseases are episodic or steadily progressive is still undecided, but evidence suggests that those persons who have retained their teeth to old age have a type of periodontitis that, at any given site, usually progresses slowly.

#### 4. Oral Cancer

The prevalence of oral cancer is greater among men than women and increases with age, with the great majority of cases occurring in people over the age of 40.<sup>37</sup> In 1987, 29,800 new cases of oral cancer were discovered and 9400 deaths were estimated.<sup>38</sup> In a series of screenings conducted between 1957 and 1972 among older white adults in Minnesota, 10 percent had at least one oral lesion unusual enough to be recorded. Leukoplakia had a prevalence of 29.1/1000 and oral cancer a prevalence of .9/1000.<sup>39</sup> The progressive impact of smoking, drinking and use of smokeless tobacco on the condition of teeth and development of soft tissues lesions--specifically oral cancer--is more apparent in older individuals. Use of tobacco products and alcohol, both individually and in combination, is associated with denture-related lesions.<sup>37</sup> Also, lower educational levels and infrequent dental visits are associated with oral lesions.<sup>37</sup>

#### 5. Other oral conditions

Other oral conditions are reported more often in older than younger adults. These include oral motor function and sensori-motor problems, such as difficulties in chewing, tasting or swallowing, oral effects of systemic diseases, acute and chronic pain, among others.

No real evidence exists that a generalized deterioration in oral motor function or performance occurs with aging, but selected oral conditions--alteration of lip posture, masticatory muscle function, increasing dysfunction of the tongue and suspensory musculature--appear to be related to aging. Functional problems which might result from these conditions include labial spill of saliva, inability to prepare food for swallowing, altered speech, dysphagia, traumatic bite injury, increased mouth breathing. Very serious dysfunctions in oral motor function can lead to fatal choking, laryngeal food penetration and regurgitation.<sup>40</sup>

Certain diseases of the salivary glands are more common in older adults, specifically local inflammatory diseases and Sjogren's syndrome.<sup>41</sup> Acute suppurative sialadenitis, as well as chronic recurrent sialadenitis, is more common in elderly, seriously ill, debilitated patients. The prevalence of Sjogren's syndrome--lymphoepithelial lesions--is second only to rheumatoid arthritis among the connective tissue diseases and a typical onset is age 40-60. In addition, there is some indication that submandibular saliva and possibly minor gland secretions may be affected by aging.<sup>41</sup>

Evidence suggests that there is a decline in bone mass so that by age 70, the total is only about 60 percent of the peak. These changes can be observed in the oral cavity, can be exacerbated by certain disease processes and can contribute to functional problems, such as poorly fitting dentures.<sup>15 34 41</sup>

Some oral conditions have become stereotypic of aging--diminution of stimulated parotid fluid output, structural changes in epithelium, atrophic change in oral mucosa, and generalized decreases in taste acuity and perception--but research has led increasingly to a lack of consensus on these conditions. Evidence suggests that other factors, such as polypharmacy, inadequate nutrition, or systemic diseases,

may be the precursors of these conditions and not age, per se.<sup>14 41 42 43</sup> Other age-related changes in taste and oral sensation, e.g. touch, temperature, and pressure sensibility, have been observed but not well described or documented.

### III. AREAS OF PARTICULAR CONCERN

#### A. Concomitant Medical Conditions, Pharmacological Challenges and Oral Conditions

##### 1. Nature of Problem

There are approximately 120 physical or mental diseases which manifest symptoms in the oral cavity or affect ability to perform dentally-related behaviors. The prevalence of most of these conditions increase with age.<sup>24</sup> For example:

- Slower movements, less agility, impaired vision and hearing, urinary dysfunction, vascular insufficiency, among other things, may affect the ability to follow recommendations for self-care and may make it impossible for an older individual to visit a dental office;<sup>44</sup>
- The oral symptoms which result from hypofunctional or nonfunctional salivary glands are unpleasant and painful and affect vital functions such as speech, taste, chewing and swallowing. Xerostomia is highly associated with prescribed radiation or medications. It may increase susceptibility to infections—both oral and systemic—and have an impact on nutrition<sup>15 16</sup> and increase susceptibility to caries and periodontal diseases;
- Cancer in the head, neck and oral cavity increases with age;
- Aging diabetic patients are vulnerable to oral infections and impaired healing which may lead to periodontal diseases and related oral problems;<sup>16</sup>
- Psychoses, affective disorders and sleep disturbances may affect the patient's willingness or ability to perform appropriate oral hygiene or seeking of dental services, thus affecting oral health, speaking or swallowing;<sup>16</sup>
- Neurological problems, including stroke and Parkinson's disease, can adversely affect oral functions. Dementing conditions such as Alzheimer's disease increase with age. Traditional education, training or compliance methods might be ineffective in changing any inappropriate dental health beliefs or behaviors for such patients.<sup>56</sup>
- Chronic and acute pain can adversely affect oral functions and the provision of dental care.

Oral health status also can affect general health status. Examples include the impact of missing teeth, inadequate restorations or poorly fitting dentures on food intake which ultimately might affect nutrition. Also, untreated oral infections can result in serious systemic complications, especially in immunocompromised patients.<sup>16</sup>

Medications for age-related systemic conditions—e.g. congestive heart failure, diabetes, depression, sleep disturbances, chronic pain—influence the oral conditions observed, contribute to the cause of some oral conditions, and affect the kinds of treatment which can be provided.<sup>11</sup> More than 75 percent of a rural Iowa population age 65 and older took medications that could affect oral health or dental treatment. About one-half of the older individuals in the Iowa study took drugs which may cause xerostomia, e.g. antihypertensives, antihistamines, decongestants, diuretics, pain killers and tranquilizers. Other commonly used drugs affect blood clotting and cause oral ulcerations or sloughing of soft tissue. About one-fourth of these older adults took muscle relaxants and medications for anxiety, which can interact adversely with drugs commonly used in dental surgery for sedation and pain relief. Drugs used commonly for cardiac conditions by older persons can interact adversely with local anesthetics containing epinephrine. Broad spectrum antibiotics, medications for diabetes, systemic corticosteroids, phenytoin for convulsions, nifedipine used for cardiovascular disease, medications for angina and congestive heart

failure and antipsychotic medications each may be associated with abnormal healing, predisposition to infection, overgrowth of gingival tissue, inability to tolerate long, stressful appointments and/or abnormal oral-facial movements.<sup>57</sup> Also, dental visits create anxiety for many older individuals, a condition which may be heightened by some drugs.

## 2. Mechanisms and Interventions Established To Deal With Problem

Health education and promotion efforts have been used to increase the awareness of older adults or care-takers regarding systemic conditions and medications which relate to oral health. Examples include: Radiation, Chemotherapy, and Dental Health, Detection and Prevention of Periodontal Disease in Diabetes and NIDR Fact Sheet: Dry Mouth (Xerostomia).

Health care providers can play an active role in early diagnosis of systemic and oral conditions, assisting the patient and each other in limiting the progression of diseases. Emphasis on the interaction among the dentist, pharmacist and physician is very important.<sup>58 59</sup>

Education for dentists, physicians, nurses and pharmacists, both in basic training and continuing education, should provide increased attention to medical conditions and pharmacological challenges exhibiting symptoms in the oral cavity. Increased emphasis should be given to recording, routine monitoring and clinical application of medical histories, particularly those specific to changes since the most recent visit. Review of related medical conditions involves recording medications which the individual is taking. This is particularly important for patients who are taking multiple medications.<sup>15</sup>

Dentists should be knowledgeable regarding alternate treatment approaches for compromised patients. For example, the removal of oral infection and employment of antibiotic therapy is especially critical for patients undergoing cardiac or joint-replacement surgery. Where discontinuing medication with negative oral side effects or substituting less harmful agents is not possible, a protective regimen for the oral environment can be instituted. This could include sugar-free chewing gum or candy, artificial saliva, controlled-release devices and specific plaque control programs to reduce bacterial burden.

The National Foundation of Dentistry for the Handicapped and the American Society for Geriatric Dentistry encourage programs which address the needs of older individuals. They encourage dentists to consider the style of furniture, positioning of the patient, office lighting, staff assistance and other aspects of practice to improve the ease and comfort of the delivery of services to the older patient. Hearing and sight limitations have been acknowledged in some dental disease prevention programs for the impaired older adult.

The American Dental Association (ADA) is developing hospital protocols for twelve medical/surgical conditions, including head and neck radiation therapy, cardiovascular disorders, cancer chemotherapy and end-stage renal diseases. These protocols, will assist physicians and hospital-based dentists in understanding oral complications of diseases, why they are important and what to do about them. The Veterans Administration (VA) has established guidelines for the oral health of medically compromised patients in long-term care facilities to assist the health care team.

The American Society of Hospital Pharmacists sponsors a project through affiliated state chapters which distributes materials to educate older consumers on appropriate drug use and compliance.<sup>60</sup> Similarly, the American Pharmaceutical Association, in collaboration with state pharmacy associations, has encouraged the use of Medication and Self-Medication Awareness Tests and Health Check Test to demonstrate to older consumers the importance of having information about medicines and how to use them.<sup>60</sup> "Share the Health", a National Pharmaceutical Council project provides education and assistance for older adults regarding medication identification and purpose through "Operation Brown Bag".<sup>60</sup>

## 3. Apparent Deficiencies

More basic research and health professional education is needed to clarify the linkages among systemic conditions, medications and oral problems seen in older individuals. More health services research is needed to develop, evaluate and demonstrate ways to improve: 1) interaction among the dentist,

physician, pharmacist and patient regarding health care; 2) clinical applications of information on medical histories in the practices of dental and medical professionals; and 3) the routine updating of medical histories in the practices of health care providers; 4) oral health care of medically compromised patients in long-term care facilities.

## B. Orientation toward Oral Health and Oral Hygiene

### 1. Nature of Problem

The importance attached to oral health is a key factor determining actual oral health status and the behaviors which influence its attainment among older adults.<sup>16</sup> A range of attitudinal, behavioral and socioeconomic factors over a lifetime interact to form that orientation. In turn, these factors affect an individual's performance of oral hygiene practices, dental visit behaviors, and compliance with recommended regimens. Attitudes, knowledge and beliefs appear to have the same correlations with dentally-related behaviors among older adults as they do among younger adults.<sup>61</sup> As current middle-aged adults become older, it is assumed that they will keep appropriate levels of knowledge and attitudes thus creating a more informed older sector in the future.

Perceived oral health status, as measured by the self-reported presence of conditions, has been investigated in several research projects and is often a key explanatory variable for visiting a dentist.<sup>44</sup> In a study of older rural Minnesota residents regarding perceived overall health status and presence of common health problems, dental (or denture) problems were frequently mentioned conditions along with vision problems, arthritis, hypertension and obesity. There were no differences in self-reported dental problems when the age group 60-74 was compared to that 75 and older. Other studies have shown that dental problems receive less mention than other chronic conditions of older persons.<sup>45</sup> In a 1981 national survey, only 18 percent of dentate individuals age 65 and older--compared to 28 percent of younger adults--reported two or more oral problems (e.g. broken tooth, bleeding gums, sensitive to hot and cold, canker sores, toothache, sensitive to sweets), while only 10 percent reported problems with chewing and biting.<sup>6</sup>

In a study of older Massachusetts health care panel study members, perceived need for care was best explained by perceived oral health status, dentate status and previous dental utilization. Age, *per se*, was not significantly related to perceived need and socioeconomic indicators were not predictive.<sup>46</sup>

Perceived oral health status is not always a reflection of actual clinical conditions.<sup>45 47 48</sup> For example, in a recent study of older patients scheduled for periodontal treatment, only 18 percent were aware before arriving at the dental school that they had periodontal disease.<sup>47</sup> In another study, it was estimated that 70 percent of older adults need treatment,<sup>49</sup> 25-40 percent of older adults perceive that need, and 20-35 percent of older adults seek treatment.<sup>49</sup>

Lack of perceived need has been a primary reason for not seeking dental care.<sup>8 24 53 55 62 63 64</sup> Additionally, a low relative priority usually is assigned to dental care in comparison to other health and functional activities.<sup>24</sup> Survey research indicates that the combination of perceived need and attitudes toward oral health and dentistry has considerable predictive power in explaining the use of dental services by older adults.<sup>44 61 65 66 67 68</sup> For example, in a sample of older individuals in senior centers in the Seattle area, those who attributed greater importance to oral health, believed they needed dental care, had more teeth, and had more positive dentally-related beliefs, were more likely to seek dental care.<sup>64</sup>

Older Americans seem to be resigned to accepting their oral health status, yet express positive attitudes regarding oral health. Fifty seven percent of adults ages 65 to 74 believe nothing can be done to change oral health, while 70 percent of those age 75 and older believe this. Only 32 percent of older adults strongly agree that some people have good teeth and other have bad teeth no matter what they do, while 9 percent strongly agree that people lose their teeth anyway. The majority of dentate older individuals never expect to lose all of their teeth. It appears that if individuals reaches age 65 and if they have not lost their teeth already, they do not expect to. Interestingly, 80 percent of dentate older adults are satisfied with the way their teeth look.<sup>6</sup> As expected, most older individuals believe that the cost of dental care is often too high; but, most indicate that cost of care is not a barrier for them.<sup>6 8 55</sup>

Information regarding appropriate dentally-related behaviors may never have been learned or may change over time. Today's older people are more likely not to have been exposed to a preventive orientation early in life and/or may remember outdated information. Their early exposure to dentistry may have predated the acceptance of self-efficacy measures for oral health status. Older adults today have received a large amount of conflicting health information over a lifetime. Misinformation and confusion often discourages older persons from changing behaviors or seeking preventive services.<sup>20</sup>

The cognitive skills of older individuals as reflected by attention and recall may be somewhat diminished compared to younger individuals. This may require special attention to methods of communication, including message structuring, repetition and reinforcement, shorter session length, information limitations, active participation and multiple modes of presentation.<sup>15</sup> Research projects are demonstrating that established attitudes and beliefs can be altered or used to the advantage of oral health. For example, the generalized belief that people can take responsibility for their own health has been shown to be associated with reduction in plaque levels. Conversely, older persons who look to others for control and believe that dental prophylaxis is important are more likely to avail themselves of diagnostic, preventive and therapeutic dental care.<sup>67</sup>

Orientation toward oral health is evident also in attitudes, knowledge and behaviors known to affect oral health status. Approximately three-fourths of older adults believe smoking increases risk of cancers in the throat—a lower proportion than in younger adults. Slightly over a third of older adults believe heavy drinking increases risks of mouth and throat cancers, a higher percentage than adults of other ages.<sup>69</sup>

Health professionals may hold inappropriate beliefs which compound the problems faced by the older individual. For example, beliefs that older persons cannot learn, will forget quickly what is taught, that it is too late for them anyway may interfere with effective practitioner-patient interaction.<sup>17, 70</sup> Since physicians have more contact with older adults than dentists, their attitudes toward oral health issues are important to monitor and change as appropriate.

Social and psychological risks are not easily quantified, yet need serious consideration in understanding the promotion of oral health. Significant improvements in oral health may be achieved only when the gap between clinically-determined need and perceived need—as reflected in numerous attitudinal variables—is narrowed.<sup>49</sup>

## 2. Mechanisms and Interventions Established to Deal With Problem

Not only should dental practitioners understand normal and pathological aging, they also should have excellent interpersonal skills. Dental practice provides an opportunity to educate and change the attitudes of the patient through examination and communication. For example, when the dentist or dental hygienist cleans teeth, self-care can be discussed. Additionally, when dentists and other health care providers screen for oral cancer, they can educate patients on the relation of tobacco, alcohol and oral cancer.<sup>24</sup> Precancerous lesions and conditions predisposing to cancer that can be detected and treated early result in less mutilation and increased survival rates.

Cognitive behavioral methods that emphasize a strategy of changing an individual's inaccurate beliefs are believed to be effective in oral health promotion. Educational and oral health promotion sessions can be conducted in private practice, but probably can reach more people, at lower cost, if provided in other settings, especially where older persons gather. It has been demonstrated that some preventive dental and educational sessions, in which motivation to achieve oral health is significantly enhanced with regular feedback, can be conducted by paraprofessionals.<sup>25</sup>

Oral health promotion to improve attitudes and change behaviors can relate to and build on the current lifestyle of the older individual. For example, research demonstrates that older people watch more television and read local newspapers regularly. In addition, their use of other media can be targeted and used efficiently to reach them.<sup>20</sup> Non-dental organizations that already have access to older adults can facilitate changes in oral health attitudes and behaviors. The American Association of Retired Persons (AARP) and the American Red Cross work together to keep members informed regarding health

promotion topics through resource manuals, slide/tape programs and articles in publications. Additionally, these organizations have established demonstration projects to encourage health promotion activities.<sup>60</sup>

Educational materials to improve orientation toward oral conditions and appropriate self-care and professionally-provided services are available from several sources. Some of these are specific to older adults—emphasizing problems which are more prevalent in later years or prepared with the older person in mind, e.g. the use of large print. Others addressing general adult problems also are useful to older persons. The Federal government, state public health departments, professional associations, and universities are active in producing oral health education audiovisual and print materials to be used with individuals or in community or institutional settings. Examples include "Keeping Your Smile in Later Years" (ADA brochure), radio spots on special care for older persons and "Prescription for Periodontal Health" (NIDR film).

In May, 1987, as part of the Congressionally proclaimed "Older American Month", the ADA established a National Senior Smile Week. The theme was "A Healthy Smile Can Last a Lifetime" and the purpose of the campaign was to heighten awareness on the part of the general public of the importance of dental care and the availability of dental services for the older adult. The kit, provided to state and local dental societies, included a planning guide, program ideas, a slide and script for television, a cassette for radio and sample advertising copy, as well as posters and other visual aids. The effort was designed to encourage media, special community activities and dental practice programs. Communities were encouraged to work with pharmacists, hospitals, health fairs and nutritional counseling services. The program also encouraged the involvement of more dentists in the provision of appropriate care for older adults. This program will continue on an annual basis.

The American Dental Hygienists Association (ADHA) has developed a national campaign—"A Beautiful Smile is Ageless"—to increase older adults' access to oral health information and services. The national organization developed a 'program kit' for use in promoting oral health care that has been adopted by 349 local chapters of the organization.<sup>60</sup>

### 3. Apparent Deficiencies

The 1980s have shown an increase in efforts to improve attitudes and knowledge of oral health for older adults, yet the efforts have not been widespread, sustained or evaluated. Many have been demonstration projects at the local level. More directed efforts are needed to encourage: 1) positive attitudes regarding the oral health of older persons on the part of both the health practitioners and the public; 2) educational materials for older dentate individuals; 3) education on lifestyle including the oral implications of tobacco use, alcohol consumption and polypharmacy.

#### C. Oral Hygiene Behaviors

##### 1. Nature of Problem

Appropriate toothbrushing with fluoride toothpaste, interdental cleaning and rinsing with fluorides or antimicrobial products are useful methods to keep the oral cavity clean to prevent caries and periodontal diseases. In addition to preventing further oral disease, appropriate oral hygiene behaviors can result in improved physiological and psychological wellbeing. Plaque retention is a major problem in older adults, exacerbated by existing restorations, rough root surface topology, and inability to brush correctly.

Diminished manual dexterity, in addition to more severe functional limitations associated with serious conditions frequently seen in older persons—such as stroke, arthritis, Parkinson's disease—decrease abilities to use a toothbrush and interdental devices.<sup>24</sup> Also, the motivation to prevent diseases and learn new techniques may be less than for a younger adult, and for some people, self-care may not be physically possible.<sup>33</sup>

Most (70%) dentate older Americans believe that brushing is the most important preventive measure for dental problems. This is reflected in their dentally-related behaviors.<sup>6</sup> The great majority (88%) of

dentate older adults report brushing at least once a day—front and back of teeth and over one fourth (27%) of older dentate individuals report flossing at least four times a week. Frequent snacking is reported by less than one third (30%) of adults, age 65 and older.<sup>6</sup> While less than for younger adults, over two-thirds of dentate older adults report using a fluoride dentifrice.<sup>6 30</sup>

## 2. Mechanisms and Interventions Established to Deal With Problem

Availability of appropriate oral hygiene aids, instruction on how to use them and continuation of lifetime oral hygiene activities address this issue. These may be accomplished through maintenance of activities from younger ages or established through special training sessions.

Physical limitations of certain older adults may require oral hygiene measures such as fluoride and antimicrobial rinses. Also, toothbrushes and other oral hygiene aids are being developed with better grips and other specifications to improve ability to clean the entire oral cavity.

The VA has developed an oral hygiene in-service manual which has been used since 1985. It is provided to nursing unit administrators and is designed for periodic updating. Additionally, hands-on in-service training is offered.

Researchers at the University of Washington have demonstrated, using several different groups of older individuals, that oral hygiene can be improved and maintained through behavior management based on contingency reinforcement.<sup>21</sup> Research suggests that older persons benefit most from a combined program of regular oral examinations by a dentist and interactive educational sessions for home care.<sup>25</sup> An interactive educational approach with a self-management focus can improve oral health by increasing the individual's personal responsibility for health, perception of general health and self-esteem. A focus on 1) prevention of further disease, 2) control of iatrogenic disease, 3) prescribed regimens for medical conditions, 4) maximization of oral functions, such as mastication and speech, has been successful in these educational sessions.<sup>25</sup> Trained paraprofessionals and peers have been used to instruct older individuals using such behavioral techniques. A combination of traditional educational booklets, videotapes, modeling, one-on-one interaction with the instructor, self-monitoring, reporting and refining of home-care behaviors and repetitive interventions have resulted in better plaque scores over time as well as improvements in dental behaviors, perceived overall health, morale and beliefs about the importance of oral health.<sup>25</sup>

Demonstration projects with older persons are in place in several major communities, for example, an 'Elders Take Charge' program in Denver. Such programs need to be identified and oral health education and training should be incorporated into these general health efforts.

Commercial manufacturing can encourage oral hygiene behaviors through advertising of products.

## 3. Apparent Deficiencies

The importance of oral hygiene for all ages needs to be emphasized more by dental and medical personnel and the media. Other forums which have ready access to older people, e.g., retirement homes, consumer advocacy groups, Visiting Nurses Association, could be encouraged to promote oral hygiene.

For those people for whom self-care is not possible, caretakers who provide necessary oral health regimens are essential. The lack of acceptance by caretakers of this responsibility is a glaring deficiency.

## D. Professionally-Provided Dental Care

### 1. Nature of Problem

Use of dental services has increased over the past two decades among older adults.<sup>50 51</sup> The percent of the population age 65 and older visiting a dentist during the past year increased from 21 percent in 1964 to 39 percent in 1983.<sup>50 51</sup> The 1983 data show that older people have an average of 1.5 visits to the

dentist during the past year, in contrast to 2.0 visits for those age 45-64. Less than one percent have never been to the dentist<sup>51</sup> and 38 percent have received no dental services in the past five years.<sup>50</sup> Only 31 percent of older adults, 75 years of age and older, have been to the dentist during the past year. Older white individuals are about twice as likely to have gone to a dentist during the past year than black individuals (40% vs. 19%)<sup>50</sup> As is the case among younger adults, having a dental visit during the past year is directly related to income.<sup>50</sup>

It appears that the dental visit pattern of the dentate older person is very similar to the younger adult, while it is the edentulous older adult who is less likely to visit the dentist.<sup>6 30 47 52</sup> Over one-half of dentate older Americans reported visiting the dentist during the past 12 months in 1983, compared to approximately 10 percent of edentulous older adults.<sup>30</sup> Similar data are reported from the 1986 NIDR National Survey of Oral Health in the U.S. Employed Adults and Seniors.<sup>10</sup> At the other extreme, in 1986 two-thirds of edentulous older adults reported that it had been three years or longer since they went to a dentist, while only 19-20 percent of the younger adults or dentate older adults had this visit pattern.<sup>52</sup>

Reasons for visiting a dentist are similar for younger adults and dentate older adults, with 'prevention and checkup' being the primary reason followed by 'something being wrong'.<sup>6 10 53</sup> Edentulous older adults cite 'something wrong' or 'prosthodontic care' as the reason for their most recent dental visit.<sup>10 53 54</sup> Some evidence suggests that level of education influences the reason for visit more than does the number of visits per se. As with younger adults, older adults are more likely to give no need (dentate) or no teeth (edentulous) as reasons for not visiting a dentist.<sup>6 53</sup>

Most older individuals report having reasonable access to a dentist, yet, access to care is not easy for some older adults, particularly frail and medically compromised individuals. Access problems may include actual availability of dentists, perceived barriers to medical care, immobility, isolation, problems with meeting expenses, functional impairments or the need for assistance in daily living.<sup>71</sup>

The evidence of the extent to which finances and isolation are problems is inconsistent. For example, the best predictors of the use of dental services in a study of older individuals in Massachusetts were presence of teeth and perceived need for care. Once these people reached age 75, dentate status and perceived need outweighed education and liquid assets in differentiating a dental user from nonuser.<sup>46</sup> Income and other socioeconomic variables appear to be associated with the priority and relative value attached to oral health. These priorities and preferences (relative values) develop from many sociocultural influences which occur over a lifetime and are not overcome by provision of money, per se.

Expenditures for dental services as well as utilization of dental services and oral hygiene behaviors among older persons traditionally are reported to be less than for younger adults. Absence of visits and lower levels of oral hygiene behaviors have been shown to be related to social and economic factors--such as lower level of education, rural residence, and inability to pay--which are characteristics common among older adults. Some research has demonstrated that Medicaid, reduced-fee and free care have not increased use of dental services in any significant way; yet little was done in analysis to differentiate dentate and edentulous older persons.<sup>49 61 66 67 72 73</sup>

Recent analyses suggest that dental visits and expenditures among dentate older adults are similar to those of younger adults.<sup>6 10</sup> Historically, the large percent of older adults who were edentulous appears to be associated with the lower expenditure and visit level. With an increasing number of dentate older adults, the issue of finances may need special consideration. With the need for complex restorations and the lack of insurance, the influence of cost of care among the older person may be considerable.

Having a regular source of care is highly correlated with the use of preventive health services. In fact, having a regular source of care may predict the use of preventive dental services far better than do perceived need, enabling or predisposing characteristics of older individuals.<sup>6 74</sup> While preventive services are generally less expensive than are restorative services, the absence of insurance or prepayment for most older individuals or the failure of many reimbursement systems to acknowledge preventive services may create a barrier for their regular use.<sup>74</sup>

## 2. Mechanisms and Interventions Established to Deal With Problem

Improvements in financial capabilities, such as availability of dental insurance and reduced-fee programs, address this problem for older adults. The ADA is working actively to encourage the coverage of dental care in Medicare and is encouraging corporations and insurance companies to extend dental benefits to retired and older Americans.

National and local efforts established to improve access for older adults who have financial, disability, or geographical barriers to dental care address this issue. For example, during the late 1970's, the ADA and its constituent and component societies began a directed effort to improve the use of appropriate dental services by addressing the issues of convenience and available resources in Prevention and Control of Dental Disease Through Improved Access to Comprehensive Care.<sup>75</sup> Through this program, over 119 state and local dental societies provide a toll-free number for referrals to local dentists. Seventy percent of the programs offer a full range of dental services, nine percent denture services only. Over 70 percent of the programs are directed toward older adults and over 80 percent are reduced fee programs. Transportation or portable equipment are available through 10 percent of the access programs.<sup>75</sup> In 1988, the ADA plans to encourage the component and constituent societies to re-emphasize the access programs. Additionally, the ADA contributes funds to help sustain the activities of the National Foundation of Dentistry for the Handicapped and endorses the dental degree program--Disabled Dental Services--promoted by the Association of Geriatric Dentistry.

Through the ADHAs nationwide geriatric outreach project--"A Beautiful Smile is Ageless"--hygienists work on a voluntary basis in oral health care programs. The programs provide dental screening and on-site visits to long-term care facilities, senior group settings and individual homes.

Improving access to residents of nursing homes has been an objective of other projects. As part of their teaching programs, some dental schools work with nursing homes. Many provide slide/tape materials to assist nurses in looking for oral health problems in patients, health education materials for patients and preventive treatment prescriptions along with a recall program for residents.

Some dentists throughout the United States have begun to provide care to homebound and institutionalized older Americans. Using vans furnished with portable dental equipment, dentists can screen a large number of older individuals and provide appropriate care to those who need it. These dentists, working with nursing home administrations, cooperating with caretakers and attending to records, are making the provision of services in institutions a reality.<sup>15</sup>

## 3. Apparent Deficiencies

Except for the VA, most of the programs mentioned above have been developed on a local and voluntary basis, resulting in inconsistent availability of care for many older adults. More directed efforts are needed to assure adequate oral health care for indigent, institutionalized and homebound older adults. Few programs exist in combination with non-dental organizations, e.g. Visiting Nursing Association. Continued efforts are needed to encourage payment assistance, e.g. dental insurance or Medicare for retired adults, as well as reduced-fee programs or improved medicaid for dental services for those unable to pay.

Much of the dental care system, as it exists today, is passive--individuals must seek out care. Some efforts have been made to accommodate the service delivery system to the needs of the older adults, but more consistent attention needs to be given to reaching out and meeting needs where they exist--community, senior centers, nursing homes or individual residences.

### E. Oral Health of the Edentulous

#### 1. Nature of the Problem

Edentulousness, while decreasing in the overall older population, is highly associated with level of education. Beyond this, its prevalence among older people reflects a predominant form of dental practice and patient expectation that existed when these people were younger. To continue the decrease in-

edentulouness, individuals must perceive the value of retaining their teeth. Also, dentists, as well as other health care professionals, must encourage and reinforce the value of retention of teeth.

Appropriate oral health care changes after an individual receives dentures.<sup>6 24</sup> Self-care usually involves cleaning dentures to prevent bad breath and oral infections as well as to preserve healthy tissues for denture support. Regular visits to the dentist are important for instruction on appropriate home care, detection of soft tissue lesions, refitting of dentures to accommodate changing bone structure and repairing ill-fitting or broken dentures.<sup>24</sup> Although approximately 3 million denture wearers experience denture retention problems because of alveolar ridge deterioration, dental visits after receipt of dentures are low, on average. Most denture wearers believe that they need never again go to the dentist.<sup>6 13</sup>

## 2. Mechanisms and Interventions Established to Deal with Problem

Professionally-developed educational tools as well as mass media have been used to encourage denture wearers to maintain adequate oral hygiene and to visit the dentist regularly. The ADA Access Program encourages denture wearers to visit the dentist regularly at reduced fees.

## 3. Apparent Deficiencies

Even with a decreasing proportion of edentulousness in the older population, the number of denture wearers will remain substantial and increased efforts to improve the oral health of these individuals are needed. Efforts to educate denture wearers must counter a strongly held traditional belief that routine dental care is not needed.

## F. Professional Training for Research, Teaching and Patient Care

### 1. Nature of Problem

Evidence suggests that dental, medical, pharmacy, and gerontology professionals have access to information in their own specific areas of concern, but they know little about each other's areas.<sup>20</sup> Attention to oral health symptoms of systemic diseases and basic principles of oral disease prevention are underemphasized in schools of medicine, nursing and pharmacy. Oral health care as it relates to overall medical conditions is not consistently integrated into the learning experience in schools of dentistry, dental hygiene and dental assisting.

Diagnosis and management of oral diseases in older adults have received minimal emphasis in training dental professionals. The older adult may require special management because of potentially complicating medical conditions; the high prevalence of gingival recession, microbial plaque, gingival inflammation; reduced periodontal support and fewer teeth. Educational needs for dentists are many but greater emphases are needed on general internal medicine, morbidity patterns, pharmacology, psychological and social conditions and developmental disabilities as they relate to the oral health of older adults. The aim should be placed on prevention of further disease and maintenance of current oral health status. Training should emphasize provision of treatment using this acquired knowledge. Traditionally, the training of dental professionals has been in dental schools, separate from the remainder of provision of health care. Not only has this created a care system separate from health care, it has emphasized care for the well, ambulatory elderly—those who can voluntarily come to the dental school.<sup>38</sup> Not only have dental students not been taught about dental implications of medically, mentally or socially compromised individuals, they received no clinical decision-making experience with at-risk patients. This has created a cohort of practitioners who are ill-informed regarding geriatric dentistry.

Up until 1979 only 12 percent of the nation's dental schools indicated that they offered courses in geriatric dentistry in their curricula. In 1984, 60 percent of the dental schools had a course in geriatric dentistry. Nearly all dental and dental hygiene schools have begun to develop curricula, clinic and research opportunities in geriatric dentistry. Of the more than 20 topics taught, most schools devote less than one hour to each. Only 'modification of dental techniques', 'oral manifestations of systemic diseases', and 'prosthetic management' receive more than 4 hours.<sup>76</sup> Less than one percent of continuing education courses are directly related to geriatric dentistry.<sup>28</sup>

There is a critical need for trained professionals in research and clinical care. In 1986, there were 20 to 25 dentists with special training in oral health care for the older adult.<sup>26</sup> Beyond the insufficient number of dental professionals trained for the clinical care and informational needs of the older population, it has been suggested that some dentists have inappropriate attitudes regarding older individuals and many general practitioners may be unwilling to treat older patients.<sup>16 24 48</sup>

## 2. Mechanisms and Interventions Established to Deal With Problem

Geriatric dentistry curricular guidelines were developed by the American Association of Dental Schools (AADS) in 1982 and are being reviewed and revised in 1987. These guidelines set forth educational goals and behavioral objectives and outline a core content that includes essential elements and elective experiential learning objectives. A special committee is developing guidelines for postdoctoral geriatric fellowships. The ADHA, with the support of Health Services and Resources Administration (HRSA), developed a Geriatrics Curriculum for Dental Hygiene Education in which cognitive and behavioral objectives were defined, and four learning modules developed. The AADS Section on Dental Hygiene Education is developing geriatric curricula guidelines.

Dental schools are expanding advanced geriatric training opportunities with post-graduate programs for training consultants and coordinators in geriatric dentistry, two-year M.S. program in geriatric dentistry, among others. Currently, there are 270 general practice residency programs, with about 1,000 first-year positions. While older patients are not a primary objective of most of these programs, management of patients with complicating conditions is emphasized.

The VA offers a Geriatric Fellowship, providing dentists with opportunities to work with many older patients and other health care providers. Five fellows per year since 1982 have been trained, most of these staying with the VA. The VA has stimulated an elective geriatric dentistry rotation in VA medical centers (VAMC) for junior and senior dental students, as well as general practice residents in several locations. Such rotations expose the undergraduate dental student to the full continuum of care in an interdisciplinary setting available through the VA health care system.

HRSA funds regional Geriatric Education Centers which encourage multidisciplinary training of health professionals in geriatrics. Located in universities, these centers serve as resources and provide short term faculty training, curriculum development, in-service and continuing education programs, and assistance to practicing professionals. Twenty-four of the 31 centers have a dental component.

Title VI of P.L. 99-660 adds new authority to train physicians and dentists who plan to teach geriatric medicine or geriatric dentistry. The options include one-year retraining programs in geriatrics to professionals who are faculty members and one-two year fellowship programs to provide training in clinical research and teaching skills for professionals who have completed graduate education programs. An AADS committee developed program considerations in responding to this new authority.

The Administration on Aging (AoA) has recently funded ten oral health promotion grants which address the issues of the older adult through continuing education for health professionals, extension of oral hygiene services through health professionals, improved strategies and interventions for the homebound, dissemination of educational and promotional materials, improved networking and cooperation among existing community and health agencies. The AADS, the recipient of one of these grants, is using the funds to encourage implementation of newly revised geriatric curricula guidelines.

Study clubs and continuing education opportunities are developing across the nation. For example, the ADA has offered clinical symposia in preparing dentists to treat the aging population.<sup>77</sup> Also, dental students in universities have developed geriatric study clubs, networks and newsletters.<sup>77</sup> The VA and local dental societies have formed study clubs to encourage interaction.

### 3. Apparent Deficiencies

It is estimated that 40 percent of older adults fall into the special needs-patient group and that about 50 percent of these will seek dental care. Based on an assumption that a dentist with specialized training in geriatric dentistry can serve approximately 1000 older patients, there will be a need for 7,500 trained dental practitioners by the year 2000, and 10,000 by 2020. Even with this projection, this special group of dentists will account for only about 5 percent of all practicing dentists.<sup>26</sup>

There is a near absence of models to effect interdisciplinary education or to encourage the interaction among health care professionals. There is a need for routinely available training opportunities for health professionals with ambulatory as well as frail older adults for general medical and oral conditions.. Continuing education courses in geriatric dentistry need to be encouraged, specifically for those dentists who serve large number of older patients.

#### G. Biomedical and Health Systems Research Basis for Planning and Implementing Health Promotion

##### 1. Nature of Problem

An adequate research base is critical for planning oral health promotion for older persons. There are still considerable gaps in knowledge regarding the severity, rate of progression, and likelihood of occurrence of oral diseases and disorders, as well as the nature of oral flora and host defense mechanisms in aging. More research is needed on how generalized or specific changes in oral diseases affect and are affected by overall health status, the oral implications of medication side effects and drug-induced oral diseases; improving pain control; improving infection control; the impact of professional health promotion (dental school or continuing education) on improving the oral health of older adults; evaluation of patient management techniques required to plan multiprofessional care.

##### 2. Mechanisms and Interventions Established to Deal With the Problem

The National Institutes of Health (NIH), specifically NIDR and the National Institute on Aging (NIA), as part of broader research missions, have several ongoing programs which could improve knowledge regarding the oral health of the older population. Of special note are NIAs ten 5-year geriatric dentistry academic awards and Teaching Nursing Home Award.

The VA conducts research specific to the veteran population as well as general health problems which are prevalent among veterans. In addition to general clinical research opportunities, the VA considers ways of improving effectiveness and efficiency of its health delivery, which has implications for institutional as well as outpatient care. The VA has several opportunities which specifically encourage research on oral health of older adults: Dentist Geriatric Fellow Programs (a 2-year geriatric fellowship); Dental Education Centers; Career Development Programs; the Geriatric Research, Education and Clinical Centers; Interdisciplinary Team Training in Geriatrics; and the Office of Academic Affairs.

Several important Federal intramural research efforts are concentrated in ongoing longitudinal studies: The VA at the Boston Outpatient Clinic and the NIA at the Gerontology Research Center in Baltimore. Both the Boston VA Normative Aging Study and the NIA Baltimore Longitudinal Study provide an opportunity to study normal oral physiology as it ages. These studies of volunteer groups who have frequent and comprehensive dental care, a high concern for dentition and a positive lifestyle enable the researchers to observe normal aging in the oral cavity relatively free of complications that disease or complex treatment may introduce.<sup>31</sup> Research on periodontal diseases and aging is being conducted by the University of New York at Buffalo and the University of Texas at San Antonio under contract with NIDR.

The NIA, NIDR and VA collaborated in the development of A Research Agenda On Oral Health in the Elderly to encourage more biomedical and behavioral research in relation to oral health in aging. This Agenda, which was published in 1986, identified research needs and established the basis for an implementation plan which is leading to program announcements, symposia, workshops, or other ways of informing.

the research community of opportunities. The Research Agenda encourages grant requests from individuals as well as proposals for collaborative and interagency studies.<sup>16</sup>

As part of an ongoing Implementation Plan, A Catalog of Resources summarizing existing resources and funding mechanisms available at the three agencies has been developed. Also, the three agencies (NIDR, NIA, VA) issued a Request for Application (RFA) in October, 1987 inviting applications for the support of research centers on oral health in aging. Applicants are to propose multidisciplinary studies on oral health with older Americans and must represent a consortium that includes a VA and one or more non-VA institution. In addition to conducting research, successful applicants are asked to apply for a research training grant during the first year of their grant award. The development of research centers, which can emphasize the aging process should provide critical knowledge on which to base any proposed oral health promotion activities for older Americans.

### 3. Apparent Deficiencies

The basis for all oral health promotion programs or training opportunities to improve the oral health of older adults requires fundamental knowledge of the nature of the principal diseases and their progression, as well as how to prevent them or diminish their impact. Equally important, clinical and social and behavioral sciences research must go forward to supply essential information on epidemiology, risk factors and other sociodemographic data as well as assure that the results of research are transferred readily to appropriate application.

### IV. Summary and Conclusions

A relatively high level of oral health can be achieved for most older adults through the promotion of appropriate self-care and regular dental visits. An emphasis on prevention from early childhood through middle to old age--fluoridation of community water supplies, the use of fluoride applications and mouth rinses, dental sealants, appropriate oral hygiene behaviors and routine dental visits--will promote oral health of older adults. A better understanding of the natural history of caries, periodontal diseases and other oral diseases, particularly as they relate to general systemic conditions, also should be a major focus for oral health promotion for older adults. While current epidemiological data provide some guidelines, considerably more basic, clinical and epidemiological research is needed to enhance opportunities for improving oral health for all of the nation's older adults.

Older individuals can have the same oral diseases as do younger individuals, yet the range of risk factors--behavioral, socioeconomic, biological, physical and mental--is broader, resulting in different prevalence rates and expressions.<sup>78</sup> Some portion of older adults will experience complicated oral conditions requiring intensive and sophisticated care. As with other special care populations, many of these individuals will have multiple medical problems with associated drug therapy, both of which may seriously affect oral health and related treatment.

While improvements in oral health of older persons are impressive, major needs still exist which can be met through health promotion efforts: 1) developing information targeted to older people--especially homebound, minorities and those in remote areas; 2) developing and implementing techniques and strategies for teaching older people ways to prevent disease and promote oral health; 3) improving training and continuing education of medical, pharmacy, nursing, health planning and dental professionals; 4) increasing the availability of assessment, prevention, and promotion services, including the use of nondental settings, e.g. alter the service delivery organization to accommodate older persons special access situations; 5) continuing efforts to reduce the financial burden of oral health care for older persons.

Oral health promotion includes efforts at the individual, health professional, community and environmental levels. Programs need to be directed toward the public--at the individual and community levels--as well as the health care professionals to improve knowledge, attitudes and behaviors. While oral disease prevention is critical, cognitive, attitudinal and behavioral dentally-related outcomes can and should be taken into consideration as values that can improve overall health and the quality of life of the older individual.

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