

NOHC 2004 Abstracts

1. Anne De Biasi, MHA Washington Director, Children's Dental Health Project, Burton Edelstein, DDS, MPH, Mike Ambrose, MS ANALYSIS OF CDHP NEWS*BYTES, A COMPENDIUM OF US PRINT MEDIA'S REPORTING ON CHILDREN'S ORAL HEALTH AND DENTAL CARE

Objective: This research characterizes how oral health and dental care issues are being presented to the US public by the English language lay press. **Methods:** Using advanced Web search technologies, US English-language newspaper articles that contain one or more key words related to oral health and dental care are identified, downloaded, and entered into a relational database on a biweekly basis. A brief abstract of each article is developed by the investigator and distributed with the associated web link through the bi-weekly Children's Dental Health Project News*Bytes electronic newsletter. Articles are further characterized in the database by date, type of publication, and topic. **Results:** During a one-year period (October 28, 2002, to November 7, 2003), 1,063 articles were identified as presenting information on children's oral health or dental care on 5 primary topics and 10 subtopics ranging from Medicaid reimbursement to Head Start programs. The number of articles per month varied from 50 in December 2002 to 121 in February 2003. **Conclusions:** Trend analysis reveals fluctuations in volume of articles with spikes correlated to major national events such as Children's Dental Health Month.

2. Reginald Louie, DDS, MPH, Public Health Consultant ORAL HEALTH AND THE HEAD START PROGRAM INFORMATION REPORT

Head Start serves over 1 million infants, young children, and pregnant women annually. Each year all Head Start agencies submit the Program Information Report (PIR), which provides demographic and programmatic data, including data on oral health. **Objective:** To examine the PIR process/data from an oral health perspective and identify ways to improve the PIR and promote oral health. **Methods:** Programmatic data and information on the PIR process and data collected are reviewed and evaluated for their potential to improve oral health. **Results:** The PIR is the best available data available annually from all Head Start programs. The data are self-reported; thus, reliability, validity, standardization and uniformity of the data may vary. The PIR data are process oriented and not outcome oriented. **Conclusions:** Recommendations are proposed to improve the utility, acceptability, and value of the PIR process and oral health information, including: 1) standardize definitions and define acceptable, appropriate documentation; 2) routine and periodic validation of the data; 3) involve a broad range of stakeholders in the PIR process; 4) enhance program assessment by using PIR in conjunction with other data sources; 5) promote the use of the PIR to justify allocation of resources, additional oral health research, and establishing initiatives; and 6) use the PIR process and data to establish or enhance partnerships for oral health.

3. Edward Condon, California Head Start Association CALIFORNIA HEAD START ORAL HEALTH PRACTICES

Objective: To obtain information from California Head Start Grantee/Delegate programs on local practices utilized in meeting Head Start Performance Standards and identified promising practices in oral health services for young children. **Methods:** A team of key advisors comprised of the California Head Start Association (CHSA), California Head Start State Collaboration Office (CHSSCO), state Department of Health Services, Office of Oral Health, California First Five Commission (CFFC) State Office of Medical, Oral Health and California Dental Association (CDA) established a three-step approach to extracting information from the field. First, the team surveyed reports studies from both state level and regional perspective, constructed a survey instrument and hosted three regional roundtables to present, inform, and expand information base. **Results:** Information on program practices

related to Head Start Performance Standards and local practices were identified from over 48 percent of the organizations funded to provide Head Start services. 132 individuals attended regional roundtables. A wide variety of professionals were engaged to examine significant barriers and successful strategies. **Conclusions:** The team of advisors has documented and validated significant barriers and successful strategies Head Start agencies must address to meet national performance standards and prepare children for school success. The profound impact local professional leadership in oral health has on program success cannot be overrated.

4. John Zimmer DDS, Pine Ridge IHS; D. Starr RDH, IHS, Aberdeen Area ECC Prevention Coordinator; Terry Pourier BS and Florence Martin, BS, Oglala Sioux Tribe Health Administration Pine Ridge SD PROGRESS REPORT: A PILOT PROJECT UTILIZING A DESIGNATED ORAL HEALTH EDUCATOR FOR A COMMUNITY-BASED CARIES PREVENTION PROJECT

Objective: Increase the number and prevalence of caries-free 1-2-year-old children through the efforts of a community-based Oral Health Educator (OHE). **Methods:** Hire and train an OHE to provide and coordinate; oral health education, fluoride treatments, and xylitol gum distribution at existing MCH service locations. Collaboration sites included W.I.C., baby F.A.C.E., Head Start, Early Head Start, In-patient OB ward, and immunization clinics. Data was gathered by the PHNs, IHS database, and the OHE weekly reports. All oral exams were performed at an IHS dental clinic. **Results:** Access to care for children aged 1-2 years old increased by 68 percent and the number of caries-free children examined increased from 27 percent to 38 percent. In addition, a ninefold increase in oral examinations was noted among the children <12 months old. **Conclusion:** The presence of an OHE appears to correlate with the increased access to care of our target group. Changes in the incidence of caries-free children presenting for oral examination is speculative at this time. This project was supported by MCH grant CFDA 93.110

5. Claire Bishop, Senior Program Officer and Joyce Hagen, RDH, MA, Washington Dental Service Foundation CAVITY-FREE KIDS: A PARTNERSHIP TO DELIVER ORAL HEALTH EDUCATION IN HEAD START PROGRAMS

Objective: Implementation of the "Cavity Free Kids" curriculum in Washington Head Start Programs. **Methods:** Series of partnerships were established to: a) develop a science-based curriculum based on Head Start learning dimensions; b) present seven six-hour curriculum "train the implementers" sessions; and c) provide support to Head Start Implementation Teams through email, Website, and listserv technology. **Results:** More than 80 percent of Washington State Head Start programs voluntarily sent teams to training sessions and are now introducing Cavity Free Kids to their programs. Oral Health Coordinators at local health jurisdictions were recruited to join Head Start Implementation Teams and provide ongoing oral health support. **Conclusions:** Organizations with limited resources can achieve a far greater impact by joining forces.

6. Jared I. Fine, DDS, MPH, Alameda County Public Health Department CALIFORNIA'S HEALTHY KIDS, HEALTHY TEETH PROGRAM INCREASING ACCESS TO CARE THROUGH COLLABORATION—THE FIRST 12 MONTHS

Objective: To increase access to dental care for 0-5-year-old Medicaid children in Alameda County. **Methods:** Through collaboration with WIC, Head Start, community clinics, private dentists, the state Department of Health Services, and UCSF, an aggressive outreach campaign to recruit families and dentists was implemented to engage families of children 0-5 years old in a program of early dental care. Families were offered case management services including overcoming access barriers.

ers, orientation to office expectations, and referral to nondental health and social services. Community clinic and private dentists and staff were trained, certified, and offered enhanced reimbursement. Training included epidemiology of ECC, behavior management, caries risk assessment, health education, and use of preventive agents. To sustain collaboration, the following were provided: financial incentives for health education, mini grants to clinics to make facilities child friendly, health education materials to support client provider interaction, a newsletter, and in-service sessions promoting a continuing sense of community. **Results:** More than 600 children have enrolled in the program, 70 percent are 0–3-year-olds. Overall utilization and utilization of preventive services exceeded that of comparable children not enrolled in the program. **Conclusions:** A combination of collaboration of all private and public partners, aggressive outreach, case management, provider training, and a modest financial incentive resulted in a substantial increase in access to dental care.

7. Raymond A. Kuthy, DDS, MPH, Lawrence F. Hill, DDS, MPH, Fang Qian, PhD, University of Iowa College of Dentistry and Cincinnati Health Department

INVENTORY OF CLINICAL SERVICES PROVIDED BY LOCAL ORAL HEALTH PROGRAMS: 2002

Objective: To determine the extent of clinical services among local oral health programs. **Methods:** Several organizations as well as national, state, and local agencies provided the original list of oral health programs. Association of Community Dental Programs, in conjunction with the University of Iowa, developed the items contained within the inventory. After two mailings, 350 of 689 programs provided information concerning type of organization, types of services provided, and number of personnel. **Results:** 290 of 350 organizations provided clinical treatment services. 193 provided care for both children and adults, whereas 91 provided care for children only and 13 provided care for adults only. 236 provide basic restorative care and 148 provide more advanced clinical services. Median number of person's served annually and dentists employed is 2000 and 1.5, respectively. There is a statistically significant relationship between the number of dentists and dental hygienists employed by an organization (Spearman coefficient 0.28, P value < .0001). For those organizations providing care for children, 245 treat Medicaid patients, 165 treat CHIP recipients, 238 treat the uninsured, and 94 treat CHSCN. **Conclusions:** This study provides current information concerning the number and types of clinical services delivered at various local oral health programs. However, there needs to be a complete directory of local oral health programs to gain a comprehensive perspective about the extent of services provided nationally.

8. Britt C. Reid, DDS, PhD, Dept. of Health Promotion and Policy, University of Maryland Joan Warren, PhD, NCI, R. Gary Rozier, DDS, MPH, University of North Carolina

OPPORTUNITIES FOR EARLY DIAGNOSIS OF HEAD AND NECK CANCER IN A MEDICARE POPULATION

Objective: This study assessed opportunities for an early diagnosis of head and neck cancers (HNCA) by identifying contacts with the health care system prior to the diagnosis while accounting for comorbid disease. **Methods:** The study database, which covers approximately 14 percent of the US population, was formed by linking files from the National Cancer Institute's Surveillance, Epidemiology, and End Results Program 1991–99, and those of the Center for Medicare and Medicaid Service Medicare Program. **Results:** After stratifying by anatomic site, increasing numbers of physician visits independently reduced the risk of advanced stage at diagnosis for all anatomic sites, but especially the pharynx and larynx, among persons with no comorbidities. Among persons with one or more comorbidities, physician visits displayed no association with stage at diagnosis with the exception of laryngeal tumors where physician visits further reduced risk of late stage at diagnosis compared to laryngeal tumors in patients with no comorbidities. Persons with advanced stage tumors had numerous visits to physicians in the year prior to their diagnosis. Over 46 percent of persons with advanced stage tumors visited 11 or more times in the year prior to their diagnosis with HNCA. **Conclusions:** We found potential missed opportunities for an earlier diagnosis of HNCA among the numerous contacts with the health care system that patients had prior

to their cancer diagnosis. Such contacts form the basis for in-reach screening approaches.

9. Divesh Byrappagari, BDS, MSD, Jayanth V. Kumar, DDS, MPH, Donna L. Altshul, RDH, BS, Bureau of Dental Health, New York State Department of Health, Albany, NY

ORAL AND PHARYNGEAL CANCER RISK FACTORS AND DENTAL UTILIZATION IN NEW YORK STATE: ANALYSIS OF BRFS DATA

Objective: To assess the utilization of dental services of population at risk for oral and pharyngeal cancers in New York State. **Methods:** The data for this study comes from the 2002 Behavioral Risk Factor Surveillance System (BRFSS). The questionnaire for New York included questions on oral health, tobacco use, alcohol consumption, and visits to a health care provider. Data were analyzed for 4,466 participants of the BRFSS using SAS and SUDAAN. Analyses explored the association between dental service utilization and smoking, drinking, insurance, and other variables. **Results:** Compared to the national median of 23 percent, 22.3 percent (3,191,951) of New York adults (18 years or older) are current smokers and are mostly from the age group of 35–44 years old. Approximately 5.1 percent (717,611) of New Yorkers are chronic drinkers (men who drink more than two drinks a day or women who drink more than one drink a day) as compared to 5.9 percent nationwide. About 1,149,102 (36.6%) smokers and 301,193 (31.8%) of chronic drinkers did not visit a dentist in the past year. Of the estimated 365,131 adults who are at high risk as they smoke and also drink alcohol, 46.1 percent had not visited a dentist in the past year. **Conclusion:** This study shows that a sizable number of New York State residents are at high risk for oral and pharyngeal cancers and do not visit dentists on a regular basis.

10. Timothy Cooke, BDS, MPH, Jayanth Kumar, DDS, MPH, New York State Bureau of Dental Health, Albany, NY

TRENDS IN CHARGES FOR HOSPITAL CARE OF ORAL AND PHARYNGEAL CANCER PATIENTS IN NEW YORK STATE, 1996–2001

Objective: To assess trends in charges for hospital care of oral and pharyngeal cancer patients in New York State between 1996 and 2001. **Methods:** Data were abstracted from SPARCS (Statewide Planning and Research Cooperative System) hospital discharge data sets for all hospitalizations with a principal diagnosis ICD-9 code of 140–149. **Results:** Over the period 1996–2000, total charges for the hospital care of oral and pharyngeal cancer patients increased from \$41 million to \$44 million, but rose to \$53 million in 2001. Approximately 66 percent of the charges were billed to publicly financed insurance programs. In the years 1996–2000, there was a decline in mean length of stay from 11.5 days to 10.4 days, and in hospitalizations from 1,935 to 1,617. From 2000–01 mean length of stay remained 10.4 days while hospitalizations rose to 1,648. Mean per day charges rose from \$2,265 to \$3,834 from 1996–2001. Both a longer length of stay and lower per day charges were most strongly associated with being of African-American race and receiving publicly funded care. **Conclusions:** Total charges for hospital care of oral and pharyngeal cancer patients did not increase in the period 1996–2000 (adjusting for inflation). A combination of decreasing mean length of stay and lower numbers of hospitalizations offset an annual increase in per day charges for hospital care of 7 percent above inflation. A reversal in both these trends in 2001 has led to an inflation adjusted increase in total charges of 17.6 percent over 2000. Supported by a grant from NIDCR (5R21DE1442502).

11. Rufus L. Caine, Jr., DDS, MPH, Sam YP Quek, DMD, New Jersey Dental School

ORAL CANCER INCIDENCE AND MORTALITY TRENDS AMONG ADULTS IN NEW JERSEY

Objective: To determine the age-adjusted incidence trends for anatomical sites of oral cancer in terms of race and gender and to determine the age-adjusted mortality trends for oral cancer in terms of race and gender. **Methods:** The sample size was 2,947 cases of primary and in situ neoplasms of the oral cavity that were reported to the New Jersey State Cancer Registry. The sampling design was a nonprobability convenience approach. The secondary source of data was the NJSCR; a population-based incidence registry with a population of 8.4 million people.

The study design was a cross-sectional approach. Statistical analyses involved the mean, standard deviation, 95 percent confidence interval, and age-adjusted incidence and mortality rates. **Results:** The New Jersey cancer incidence and mortality data from 1996 through 2000 reflected a decline with males having a higher rate than females. All males had the highest incidence rate for the tongue ($X=4.12$; $SD=0.420$; $CI=3.555, 4.642$). White males had the highest mortality rate for the tongue ($X=1.275$; $SD=0.4349$; $CI=0.58829, 1.9670$). All females had the lowest incidence rate for the tongue ($X=4.1869-0.1418$). There was an increase in the mortality rates for all races and gender except black males from 8.5 in 1996 to 10.5 in 1999 and black females from 2.8 in 1996 to 3.4 in 1999. **Conclusion:** There was a general decline in both the incidence and mortality rates for all groups except males from 1996–99.

12. Donald Sadowsky, DDS, MPH, PhD, Angela Ward, BA, RDH, David Albert, DDS, MPH, Columbia University

USING ACADEMIC DETAILING TO PROMOTE TOBACCO CESSATION-RELATED ACTIVITIES BY DENTISTS

Objective: To test the potential of academic detailing as a methodology for promoting tobacco cessation-related activities by dentists. **Methods:** A sampling frame of a dental health maintenance organization's (DHMO) enrolled dentists, in four northeastern states, was obtained from Aetna Dental. Of 507 eligible dentists, 77 agreed to participate and were randomly assigned to intervention (an academic detailing program and financial incentives) or control (practice as usual) conditions. Changes in practice behaviors during a 12-month interval were obtained by questionnaires. **Results:** Even though substantial effort was invested in recruitment of dentists, most potential subjects were reluctant to increase the scope of their practice. However, of those who did agree to participate, dentist-subjects assigned to the intervention condition made substantial behavioral changes, compared to those assigned to the control condition. They were more likely to discuss setting a quit date ($P<.05$) and to discuss strategies for quitting (05), more likely to provide written take-home materials ($P<.001$), more likely to provide advice about the use of nicotine gum ($P<.05$), and more likely to refer patients to cessation clinics ($P<.05$). **Conclusions:** Academic detailing has the potential to increase dentists' cessation activities; however, substantial effort and resources are required.

13. Thomas Dietrich, MD, DMD, MPH, Department of Health Policy and Health Services Research, Boston University, Boston, MA, Kurt Hoffmann, Department of Epidemiology, German Institute of Human Nutrition, Potsdam-Rehbruecke, Germany

THE APPLICATION OF A COMPREHENSIVE SMOKING INDEX TO EFFICIENTLY MODEL SMOKING HISTORY IN PERIODONTAL RESEARCH

Objective: Cigarette smoking is both a strong and common risk factor for periodontal disease (PD). It is a multidimensional exposure that is difficult to model accurately. We propose a new comprehensive smoking index (CSI) that accounts for intensity, duration, and frequency of smoking at the same time and allows estimation of the half-life of the smoking effect. **Methods:** Using NHANES III data of 12,623 subjects aged 20+ years, we compared the performance of the CSI in multivariate logistic regression models of PD with various conventional approaches (various categories of smoking history, pack-years or duration and intensity as continuous variables). The half-life of the smoking effect on periodontal disease risk was estimated by maximizing model fit. Bootstrap sampling with reposition with 1,000 replications was used to produce 95 percent confidence intervals for the half-life parameter. Akaike's information criterion was used to compare the fit of different models. **Results:** The estimate of the smoking effect's half-life was 1.5 years (95% $CI=0.5, 2.5$ years). Compared to any other conventional way of modeling smoking history, use of CSI resulted in best model fit and the highest Wald statistic for the smoking effect on PD. **Conclusions:** The results suggest that the proposed smoking index may be a more comprehensive and yet efficient and parsimonious alternative to model smoking history in periodontal research. Use of the CSI may also be advantageous in the analysis of other oral health outcomes.

14. Kathy Phipps, DrPH, Eric Orwoll, MD, Theresa Madden, DMD, PhD, Benjamin Chan, MS, Oregon Health and Science University, Portland, OR

USING SELF-REPORT TO ESTIMATE THE PREVALENCE OF PERIODONTITIS: THE MrOS DENTAL STUDY

Objective: The purpose of this project was to determine if self-report is an accurate indicator of advanced periodontitis. **Methods:** MrOS, the Osteoporotic Fractures in Men Study, is a longitudinal study of risk factors for fractures in men >65 years. In 2002, MrOS added a dental ancillary study that included measures of clinical attachment loss (CAL) and pocket depth (PD) on a random half-mouth, radiographs, and a self-administered oral health questionnaire (SAQ) on oral health status, access to care, symptoms, and previous diagnosis. **Results:** Of the 1,220 dentate men in the MrOS Dental Study, 60 percent had a college degree, 3 percent were current smokers, and 88 percent reported their overall health as excellent/good. The mean (SD) for number of teeth, CAL, and PD were 22.4 (6.2), 3.0 (0.9), and 2.5 (0.5), respectively. 82 percent had 1+ site with CAL ≥ 5 mm, 28 percent had 10+ sites with CAL ≥ 5 mm, 33 percent had 1+ pockets ≥ 6 mm, and 20 percent had 2+ pockets ≥ 6 mm. 81 percent of the men reported annual dental visits, 76 percent reported the health of their gums as excellent or good, 18 percent reported a diagnosis of periodontitis, and 13 percent reported surgery to treat gum disease. Of the variables examined, previous diagnosis of periodontitis had the highest positive predictive value when periodontitis was defined as 1+ pocket ≥ 6 mm ($PV+0.45$ $PV-0.69$) or 10+ sites with CAL ≥ 5 mm ($PV+0.52$ $PV-0.77$). **Conclusion:** In this cohort of healthy educated men, the predictive values of the questions in the SAQ were poor, suggesting that self-report is not an accurate indicator of periodontitis.

15. Howard Pollick, BDS, MPH, University of California San Francisco, CA SUCCESS IN THWARTING AN ANTIFLUORIDATION BALLOT MEASURE

Objective: This community-based effort was designed to thwart an attempt to stop fluoridation in Palo Alto. A coalition of local dentists, local dental educators with prior fluoridation experience, and community leaders responded to the ballot measure that would have stopped fluoridation, which had been in effect for some 50 years. The ballot wording suggested wider implications and was similar to ballot measures in other communities that were passed by voters and that have prevented the implementation of fluoridation. The California Dental Association was requested to provide financial support to hire consultants and develop and distribute targeted mail to likely voters. The Dental Health Foundation provided community-based education. While debates with anti-fluoridationists are generally not recommended, there were two such debates, one of which, televised locally, involved a nationally recognized anti-fluoridationist. Voters rejected the attempt to stop fluoridation by an overwhelming majority of 79 percent to 21 percent. This result is thought to be the largest support for community water fluoridation in the more than 50 years of fluoridation in the United States. This is thought to have been the result of the educational level of the electorate, the lack of perceived problems from some 50 years of fluoridation, the lack of anti-fluoridation support among civic leaders, the visible support of the vice-mayor, the support of the local newspapers, financial support and mailings from the CDA, and the efforts of all involved locally.

16. Stuart A. Gansky, MS, DrPH, Robert S. Wilson, PhD, Center to Address Disparities in Children's Oral Health, University of California, San Francisco, CA

QUESTIONNAIRE INCONSISTENCIES AS PROXIES FOR FUNCTIONAL HEALTH LITERACY IN ASSESSING EARLY CHILDHOOD CARIES RISK IN CALIFORNIA PRESCHOOLERS

Objective: To assess if questionnaire response inconsistencies can serve as proxies for functional health literacy in the 1993–94 California Oral Health Needs Assessment, a population-based statewide oral examination survey. **Methods:** The COHNA (Shiboski et al., 2003) examined 2,520 children aged 2–5 years from 84 preschools (public and private), after obtaining parental consent and a seven-page parent questionnaire. The questionnaire's seven skip patterns were tested as possible proxies for functional health literacy—the ability to read, understand, and act upon health information. Stepwise logistic regression models predicting early childhood caries (ECC defined as $dfcs>0$; Drury et al., 1999), adjusting for parent education and family income, tested the value of

skip pattern errors. **Results:** Omitting items that should have been answered was not related to ECC. Answering items that should have been skipped was significantly related to ECC after adjusting for education and income with three skip patterns being in the final model: odds ratios (95% confidence intervals) were 1.8 (1.2, 2.6), 2.6 (1.1, 6.2), and 1.5 (1.1, 2.1). Indicators for these individual items were more predictive than a total summary score. **Conclusions:** Logical inconsistencies in questionnaire responses such as not following skip patterns may be a good proxy for functional health literacy and are associated with higher risk for oral health problems. Support: CA Wellness Fdn, CA Dept of Health Services Maternal and Child Health Branch and US DHHS/NIH/NIDCR U54DE14251.

17. W. Penn Handwerker, PhD, Dept Head, Anthropology, UCONN, Martha Okafor, Division Director, CT, DPH

USING ETHNOGRAPHIC NEEDS TO DESIGN INTERVENTIONS THAT PRODUCE CULTURALLY COMPETENT DELIVERY OF PRIMARY HEALTH CARE

Objective: Design effective interventions to reduce barriers to health care for underserved populations in CT. **Methods:** 39 protocol-based semistructured interviews with a diverse sample of providers and patients and 288 structured interviews with more diverse set of people tested the hypothesis that emerged from analysis of the protocol interview texts that CT residents shared a single cultural model and a corresponding pattern of behavior bearing on oral health care irrespective of variables like age, gender, class, and ethnicity. **Results:** Ethnographic analysis of narratives and numerical data collected, showed a single cultural system of cognition and behavior with some important forms of intracultural variation identified. An empirical model of oral health knowledge, behavior and preferences was also documented. **Conclusions:** Delivery of culturally competent care within clinics requires a dental provider's ability to effectively elicit and respond to patient concerns, be aware that lives varies over time and that life contingencies elicit behavioral changes. Active listening creates a safe environment that can reduce patient fears. Dental visits should entail dental education in form of both informational pamphlets and instruction by their dental provider. These informational pamphlets require creative thinking about solutions to behavior that leads to poor oral health based on life contingencies and should be available in schools, health facilities, and other locations frequented by the public.

18. Anne Koerber, DDS, PhD, Esther Vega, BS, Khatija Knoorullah, MPH, Izadora Torres, BA, John Crawford, BDS, PhD, Linda Kaste, DDS, PhD, Karen Peters, PhD, University of Illinois at Chicago, Chicago, IL

LATINO COMMUNITY VIEWS ON THE RELATIONSHIP OF DIABETES AND PERIODONTAL DISEASES

Objective: A 1996 AAP paper concludes there is a relationship between diabetes and periodontal diseases. The Latino community bears great burdens of both diseases. This study solicited Latino community's understanding of the relationship between periodontal diseases and diabetes, and how to convey this relationship. **Methods:** Two Spanish-speaking focus groups totaling 21 parents of young children (20 women, one man) were recruited. The members read a paragraph on the bidirectionality of diabetes and periodontal diseases. Discussion around the paragraph's impact on the community was captured via focus groups. **Results:** The participants reported no knowledge on the bidirectionality. While the information was new, they agreed that it is very important, and felt dentists should inform those who are predisposed or are diagnosed with diabetes about potential dental problems. They also preferred information in Spanish. They do not go to the dentist for this information. This information would best disseminated by word of mouth, between families and friends, as "juicy gossip." Possible vehicles are TV and radio, health fairs, community centers, churches, schools, and informational group sessions. **Conclusion:** These focus groups provided a start on seeking means of communication within a Latino community on the relationship of diabetes and oral health. Additional focus groups are planned to build a basis for communicating this relationship. This project was funded by CDC Cooperative Agreement No. U48/CCU415803-05 SIP 2-01.

19. BD Eden, BSDH, MEd, and JD Shulman, DMD, MA, MSPH, Depart-

ment of Public Health Sciences, Baylor College of Dentistry, Texas A&M University System Health Science Center, Dallas

FACTORS INFLUENCING ADULTS' SELF-PERCEIVED NEED FOR DENTAL HYGIENE SERVICES: DATA FROM THE THIRD NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY, 1988-94

Objective: Little is known about dental care-seeking behavior among adults or if perceived need influences such behavior. NHANES III provides the opportunity to relate individuals' perceived need (PN) for dental care to clinical findings and other health information. We examined factors that influence PN for dental hygiene services (DHS). **Methods:** Bivariate and multivariate logistic regressions were performed on NHANES III data (SUDAAN 8.0) using "need for cleaning" as the outcome and demographic, health, behavioral, and clinical variables as predictors. **Results:** Data from 14,763 dentate adults were analyzed. Variables with the greatest effect were: PN for checkup (OR=7.60); last dental visit: within 6-12 months (OR=2.95), 1-2 years (OR=3.83), or <2 years (OR=3.01); and being African American (AA) (OR=2.78) or Mexican-American (MA) (OR=2.70). Age, PN for esthetic care, and having more than three sites of supragingival calculus (SC), while significant (and #945; <.05), had less effect. Significant interactions were found between PN for checkup and SC and between race/ethnicity and last dental visit. **Conclusions:** AA and MA were more than twice as likely to perceive the need for DHS. The association between PN for a dental checkup and PN for cleaning suggests that for many people, DHS are a part of a periodic dental visit. Adults who had longer intervals since their last dental visit were more likely to perceive the need for DHS. The PN for prophylaxis increases with the amount of SC.

20. Elizabeth Mertz, Center for Health Professions, San Francisco, CA EVALUATION OF STRATEGIES TO RECRUIT ORAL HEALTH CARE PROVIDERS TO UNDERSERVED AREAS IN CALIFORNIA

Objective: Evaluate the impact of California programs to recruit oral health care providers to underserved areas. **Methods:** A literature review identified a framework for recruitment strategies. Web searches and expert interviews identified programs and policies in California. Program administrators were contacted by phone and asked a standard set of questions. Data collected were analyzed to estimate the individual and combined impact of all programs on access to care. **Results:** Two types of recruitment programs could show immediate impact on services to underserved patients. Annually, current participants of loan repayment and scholarship programs provide 130,000 visits while dental residents provided 59,000 visits. Examining projected impact, a mandatory PGY-1 residency could provide 280,000 visits annually. Expansion of loan repayment and scholarship programs could provide 153,000 visits annually. Foreign dentists could provide 76,000 visits annually. Independent hygiene practices add 34,000 visits annually. Dental education strategies show promise; however, evaluation of results will not be available for years. **Conclusions:** The programs evaluated clearly have a strong impact in the underserved communities where they place providers. However, the overall impact of current programmatic efforts compared to the oral health care needs and lack of access to care in California remains in stark contrast. Expansion of current programs may be more feasible than entirely new programmatic endeavors in the current budget environment.

21. Ron Nagel DDS, MPH, Alaska Native Tribal Health Consortium ALASKA DENTAL HEALTH AIDE PROGRAM

Objectives: To develop a cadre of nontraditional oral health providers to address issues of access and oral health disparity in Alaska's tribal programs. **Methods:** Congress authorized the Dental Health Aide (DHA) program through a statute and the role of the program is to train local Alaska Natives to provide oral health services in their home region. DHAs are assigned to a dentist and receive supervision and consultation through telephone, radio, or telemedicine contact on a regular basis. Alaska currently has 265 sites telemedicine/teledentistry capable. The DHA program is a multilevel program with a scope that includes community education and prevention, fluoridation, individual patient assessments, sealants, cleanings, early referral of dental problems, emergency dental care, and routine fillings and extractions. The highest level of the program is based on New Zealand's dental

therapist. The program will sustain itself through Medicaid reimbursement of the DHA's services. *Results:* The program has succeeded with the integration and collaboration of federal, state, and private interest in resolving a health disparity. Training and skill consolidation are taking place at many levels in the program. Plans are in place to collect both process and outcome data related to the practice of these dental health aides. *Conclusions:* This program has the potential for transferability to populations in remote areas and to populations with a large population to provider ratios.

22. David H. Lees, DDS, JD, MBA, *The Health Trust, Children's Dental Initiative Director*

STIMULATING A COMMUNITY TO ACTION

Objective: Create an annual event that engages a cross section of the entire community, builds oral health awareness, enhances capacity, and directly benefits hundreds of at-risk children. *Methods:* "Dentists with a Heart" is an event that focuses on children who do not have access to dental care. The Health Trust screens, identifies, triages, and directs the neediest children to volunteer dental offices. Practitioners use their clinical judgment to determine the course of treatment for the day. To ensure continuity of care, the children are referred back to The Health Trust to initiate comprehensive treatment. *Results:* During the 2003 event (second annual), 38 organizations helped identify children, 87 dentists (12 specialists) participated, 622 children were treated (10 sedation) with transportation being provided to any family that requested it. Over \$200,000 of dentistry was done! The event was extensively covered (three languages) in print, radio, and televised media. Preceding the event, a continuing education course for participating dentists was given. Certified application assistants were available to enroll children and families in a government sponsored insurance program. As great as these statistics are, you really need to hear the stories and look into the eyes of the families to get an accurate impression of spirit of the day. *Conclusion:* Working together, an annual event has been created that has a monumental impact on underserved children. Attention is focused on access issues and strategic problem solving.

23. Lisa R. Levy, MPH, Rene Lavinghouze, MA, *Centers for Disease Control and Prevention*

PRACTICAL ASSESSMENT OF COALITIONS

Objective: To characterize tools for evaluating oral health coalitions and to identify the benefits and barriers of using such tools. *Methods:* The sample of evaluation tools was identified or created by Centers for Disease Control staff and ECB Services, Inc., in collaboration with state health agencies. These tools were reviewed by a sample of oral health coalitions in states currently funded by CDC. Tools were reviewed for ease of implementation, appropriateness for various stages of coalition development, ability to assess relevant stakeholder questions, and capacity of coalitions to use evaluation results. *Results:* We created an assessment grid that characterized the benefits and barriers of each evaluation tool. The grid described tools in terms of feasibility and usefulness for assessing oral health coalitions. *Conclusions:* The assessment grid identified promising practices for the evaluation of coalitions, and it may improve the quality of ongoing and future evaluations. The grid documents the information needed to replicate effective oral health coalitions, allowing other coalitions to select evaluation methods based on their own unique circumstances, needs, and resources, including the stage of coalition development, technical abilities, and stakeholder requirements.

24. Julie Ann Janssen, RDH, MA, Lisa Bilbrey, RDH, BA, *IFLOSS Coalition*

COMMUNITY LEADERS BUILD A SUCCESSFUL STATEWIDE ORAL HEALTH COALITION

Objective: Access to oral health care is a multifaceted health problem that continues to plague thousands of Illinois residents. By increasing collaboration, public health administrators were able to form a statewide private-public partnership to address access to oral health care. The IFLOSS Coalition was formed in 1998 to assist communities to develop policies and take actions to improve the oral health of their residents. *Methods:* The IFLOSS Coalition has active participation by more than 80 representatives of influential organizations and agencies. By meeting

quarterly, the group as a whole has the opportunity to discuss issues and find solutions. At these meetings, workgroups are often established to investigate issues more thoroughly. *Results:* The IFLOSS Coalition was successful in increasing the Medicaid reimbursement rates for Illinois. The coalition also published the Illinois Oral Health Plan: Roadmap to the Future, a strategic plan that determined that solutions to oral health problems lie within community efforts, prevention programs, increasing public dental clinics, integration with primary health care, and increasing the workforce. *Conclusions:* By collaborating with other partners, it is possible to reduce the burden of oral disease. Members of the coalition are able to network, develop policies, plan and then implement strategies to improve oral health. The Centers for Disease Control (CDC) has classified the IFLOSS Coalition as one of the premiere oral health coalitions in the nation.

25. J.E. Véronneau, DMD, MSc, J. Snowboy, DH, J.F. Lortie, DH, A. Senior, DH, H. Sirhan, DMD, M. Hallouche, HD, N. Girard, HD, E. Charles, HD, *Cree Health Board*

EVALUATION OF EMPOWERING THROUGH ORAL HEALTH COMMUNITY PLANNING AND PROGRAMMING

Objective: To evaluate the capacity for empowerment through community involvement in Oral Health Planning and Programming. *Method:* The objective was tested in a sample of 12,000 Cree residents of nine northern communities, at extreme risk for dental caries. An epidemiological study took place along with a feasibility study potential preventive interventions. Seven data result conferences were presented to the political and professional authorities. Two workshops and three radios program on the same topic were organized. Five hundred leaflet/questionnaires were distributed in the dental clinics for a communities survey on solutions. Two focus groups were organized on the feasibility and the content of the intervention. *Results:* Cree health and politic leaders adopted Oral Health as a priority. Negotiations focused on oral health were initiated with the provincial government. Three thousand letters were signed in a petition demanding increases resources. One hundred and twenty leaflet/questionnaires were filled with consensus to priorities prevention in early childhood. The content for a culturally relevant early intervention starting during pregnancy was approved. A proposal to finance an RCT was supported by 117 community letters from chiefs, leaders, and organizations. A new role of "Dental Health Rep" was created for Cree-speaking dental assistants. *Conclusion:* High-risk strategy with geographical reference and community-based approach at baseline of planning/programming can lead to empowerment of a population.

26. Deleted (withdrawn)

27. Burton L. Edelstein, DDS MPH, Sabina Ittoop, MS, *Children's Dental Health Project*

INSURANCE COVERAGE AND ITS CONSEQUENCES FOR US ADULTS

Objective: To assess the impact of health insurance coverage, including dental coverage, on delayed dental care due to cost and lost productivity due to dental problems. *Methods:* Data from a Commonwealth Fund 2001 nationally representative multistage survey of US adults over age 17 years were analyzed for failure to see a dentist for treatment of a toothache because of cost and missed work or school due to toothache or other dental problem in the past year. STATA was used to conduct univariate analyses and to calculate correlations with insurance coverage and sociodemographic factors. ANOVA F-statistic was used to test statistical significance of differences between groups and findings with $P < .05$ are reported. *Results:* Overall, 21 percent of US adults report delaying care and 8 percent report missing work or school in the past year. Of adults with no medical coverage, 47 percent report delaying care compared to 35 percent with Medicaid and 17 percent with employer-based coverage. Adults with no dental coverage were almost twice as likely to delay care than those with dental coverage (25% vs 14%). Those without health insurance and those on Medicaid were twice as likely to miss work or school because of a dental problem than those with employer-based coverage and those with dental coverage from any source (16%, 15% vs 8%, 8%). *Conclusions:* For US adults, having employer-based health insurance, with or without dental cov-

erage, reduces the likelihood of delayed dental care or lost productivity compared to having no insurance or having Medicaid coverage.

28. Laurie A. Buckles, RDH, BA, Maricopa County Department of Public Health

EVALUATION OF A METHOD TO INCREASE ADULT UTILIZATION OF DENTAL SERVICES THROUGH A SUBSIDIZED DENTAL INSURANCE PLAN

Objective: To increase access to dental care, awareness about the value of dental insurance/service, and collect utilization data to raise awareness about the benefits of dental services through Medicaid and employer based programs. **Methods:** Adults from families living in Maricopa County who receive subsidized childcare through the Arizona Department of Economic Security received an opportunity to enroll in a dental plan that included a typical commercial benefit package. Maricopa County Office of Oral Health provided program administration and Saint Luke's Health Initiatives (SLHI) funded administration costs and the "employer" costs for the coverage. An evaluator monitored program impact on participants and provided demographic and utilization data. **Results:** The program offered insurance to 696 persons between June 1999 and May 2003. More than 50 percent (377) of the enrollees used their dental insurance benefits. During their program experience, enrollees averaged 12.6 procedures, predominantly diagnostic (42%) and restorative (24%). Program costs were \$511,915. SLHI paid 60 percent of the costs. Participants were responsible for the balance. **Conclusions:** This study provided important information about the interest, utilization, cost, and potential benefit of providing dental insurance for a relatively low-income, working population of adults. It will be useful in educating policy makers and business owners about the benefit of dental insurance and in designing dental insurance products and programs.

29. J. David Hardison, DMD, MBA, University of Kentucky, College of Dentistry

ASSOCIATION OF DENTAL INSURANCE TO ORAL HEALTH STATUS OF CHILDREN

Objective: To investigate the association of dental insurance to oral health status indicators in Kentucky school children. **Methods:** A stratified, cluster PPS sample was selected across five regions. Parents of 3rd ($n=3244$) and 6th ($n=2718$) graders completed a questionnaire, followed by a visual screening exam using Basic Screening Survey (BSS) protocols by standardized screeners. SUDAAN statistical software was used with weights and sample design specifications for calculating population estimates and assessing associations with chi-square and by grade Cochran-Mantel-Haenszel tests. **Results:** Children with Medicaid insurance had higher oral disease levels than children with private insurance (e.g., untreated caries=38% vs 23%, caries experience=70% vs 51%, treatment needs=44% vs 26%). Intermediate disease levels were seen in the other insurance categories. Levels varied significantly ($P<.5$) among dental insurance status categories for untreated caries, caries experience, number of carious permanent first molars, treatment urgency, number of dental quadrants needing treatment, presence of dental sealants, number of permanent first molars sealed, and screener assessment of overall oral condition. **Conclusion:** Significant associations between oral health status indicators and status of dental insurance exist among Kentucky school children. Supported by the Kentucky Department for Public Health.

30. Lynn Ann Bethel, RDH, BSDH, MPH, Seal, Education, Advocate Learning: A School-Based Preventive Dental Program, Myron Allukian, Jr., DDS, MPH, Boston Public Health Commission

INSURANCE COVERAGE, DENTAL CARE UTILIZATION, AND DENTAL SEALANT STATUS OF BOSTON SCHOOLCHILDREN

Objective: To determine the relationship between dental insurance coverage, dental care utilization, and dental sealant status of Boston school children. **Methods:** SEAL, a school-based preventive dental program, provides sealants, screenings, and oral health education for inner-city second grade Boston schoolchildren. In 2003, a self-report survey questionnaire in English and Spanish was sent to 273 parents for the SEAL program to determine insurance coverage and dental care utilization. **Results:** 187(69.2%) parents agreed to have their child participate in the

SEAL program, while 158(57.8%) of the 273 parents responded to the survey; 75.3 percent responded in English and 24.6 percent in Spanish. 84.6 percent of the parents reported they have dental insurance coverage, including Medicaid, and 70.4 percent reported that their child visited the dentist in the last year. After performing a dental screening, it was found that 89.2 percent of the children needed dental sealants. **Conclusion:** Even though the majority of Boston children had dental insurance and had been to the dentist within the last year, most (89.2%) did not have dental sealants. Parents/guardians were amenable to the application of sealants as evidenced by the majority of the parents consenting for their child to participate in the SEAL program. Future studies are needed to investigate factors that may influence dental professionals and parents to utilize dental sealants to prevent unnecessary disease in high-risk children.

31. David M. Krol, MD, FAAP Children's Dental Health Project/Columbia University, Burton L. Edelstein, DDS, MPH, Children's Dental Health Project

DENTIST AND PHYSICIAN ATTITUDES TOWARD MEDICAID AND MEDICAID PATIENTS

Objective: To review the professional literature on dentists' and physicians' attitudes toward the Medicaid program and attitudes toward Medicaid patients to identify factors that may be amenable to interventions that can increase access to primary care. **Methods:** A literature search, inclusive of studies from January 1966 through December 2001, was conducted using MEDLINE search strategies designed to identify the greatest number of relevant studies. **Results:** Twenty-eight papers met inclusion criteria and were included in the study (19 physician-centered, nine dentist-centered). Physicians and dentists had similar attitudes toward Medicaid: the reimbursement is poor, program paperwork is burdensome and not all services needed by children are provided for in the program. Studies that examined specific physician attitudes toward Medicaid patients reveal that physicians perceive Medicaid beneficiaries as unreliable, people who break appointments, are noncompliant, and are difficult or have complex problems. By far, the prevailing concern of dentists was the perception that Medicaid patients exhibit high rates of broken appointments. **Conclusions:** This review provides insight into some of the reasons, explanations, and contributing factors in the decision making process that leads to providing care to Medicaid patients. One key question is whether physician and dentist attitudes play a larger part in the decision making process of Medicaid participation than is apparent.

32. John J. Warren, DDS, MS, Steven M. Levy, DDS, MPH, Michael J. Kanellis, DDS, MS, Barbara Broffitt, MS, University of Iowa College of Dentistry

DENTAL CARIES IN THE PRIMARY DENTITION AS A PREDICTOR OF CARIES IN THE MIXED DENTITION

Objective: Caries in the primary dentition may be predictive of caries in the permanent dentition. The purpose of these analyses are to assess how caries in the primary dentition diagnosed at age 4-5 years, along with other risk factors, predicts caries occurrence in the mixed dentition (age 8-9 years). **Methods:** Children were examined by two trained and calibrated examiners at age 4-5 years and at age 8-9 years as part of the longitudinal Iowa Fluoride Study. Caries experience at the age 4-5-year exams, measures of fluoride dentifrice use and sweetened beverage consumption were related to caries experience at the age 8-9-year exams. **Results:** Data were available at both time periods for 413 children; 108 (26%) had frank decay or filled surfaces at age 4-5 years. Those with caries experience at age 4-5 years were much more likely to have caries in the permanent dentition at age 8-9 years compared to those with no primary dentition caries experience (46% vs 20%, OR=3.45, 95% CI=2.2, 5.5), and the mean DFS (permanent teeth) was significantly higher (1.31 vs 0.36; $P=.001$). Less frequent fluoride dentifrice use and higher sugared beverage consumption (area under the curve estimates) were significantly associated with caries experience in the early-erupting permanent dentition. **Conclusions:** Caries in the primary dentition is predictive of caries in the early-erupting permanent teeth. Lower fluoride dentifrice exposure and higher sweetened beverage consumption are also risk factors. Supported by NIH grants R01-DE09551, R01-DE12101, and RR00059.

33. Martha E. Nunn, DDS, PhD, Michelle M. Henshaw, DDS, MPH, Elizabeth A. Krall, PhD, MPH, Raul I. Garcia, DMD, MMS, Department of Health Policy and Health Services Research, Goldman School of Dental Medicine, Boston University

THE HEALTHY EATING INDEX AND THE PREVALENCE OF EARLY CHILDHOOD CARIES IN US CHILDREN

Objectives: To investigate the relationship of the Healthy Eating Index (HEI) to the prevalence of early childhood caries (ECC) in US children. **Methods:** Data from NHANES III was used to investigate the association of individual and total HEI's to the prevalence of ECC in children (2 to <7 years). Weighting was used to obtain population-based estimates. Logistic regression was used to investigate the association of HEI's to the prevalence of ECC. Adjustment was made for confounding by race, age, recent dental visit, income, and educational level. A subtotal HEI was formulated from significant individual HEI's with an inverse association with ECC. The subtotal HEI was categorized into quartiles for logistic regression analysis. **Results:** Dairy, sodium, variety, and total HEI's were inversely associated with ECC. In contrast, saturated fat HEI was directly associated with ECC. Logistic regression analysis of the subtotal HEI revealed that children in the second quartile were 35 percent less likely to have ECC compared to children in the first quartile (OR=0.65, $P=.008$), children in the third quartile were 49 percent less likely to have ECC compared to children in the first quartile (OR=0.51, $P<.001$), and children in the fourth quartile were 61 percent less likely to have ECC compared to children in the first quartile (OR=0.39, $P<.001$). **Conclusions:** This study demonstrates that certain healthy eating habits are significantly associated with a lower prevalence of early childhood caries in US children. Supported by NIDCR Grant U54 DE014264.

34. Irene V. Hilton, DDS, MPH, Dental Bureau, San Francisco Department of Public Health, Samantha Stephen, RDH, MS, Dental Bureau San Francisco Department of Public Health, Shannon Thyne MD, Department of Pediatrics, University of California San Francisco

DESCRIPTION AND EVALUATION OF A PROGRAM TO TEACH ECC RISK ASSESSMENT TO PEDIATRIC RESIDENTS

Objective: To develop, implement, and assess the effectiveness of a program to teach Early Childhood Caries (ECC) risk assessment to pediatric residency students. **Methods:** A series of presentations was developed to provide oral health information, including ECC risk assessment, into a pediatric residency program based at a large county hospital. Residents received oral health inservices monthly. Concurrently, a monthly specialty "dentist" clinic was embedded in the pediatric ambulatory clinic, to follow-up on at-risk children ages 6-36 months referred by the pediatric residents. An analysis of the demographics, ECC risk status and disposition of children seen in the "dentist" clinic during the first 12 months of the program was conducted to determine the characteristics of the children referred, and ascertain if appropriate ECC risk assessment and referral was made by the pediatric residents. **Results:** 85 children aged 6-36 months were seen in the "dentist" follow-up clinic for an initial exam during the first 12 months of the program. The average age was 22 months. The dentist assessed 84 percent of the children referred by the pediatric residents to be at moderate or high risk for ECC. Nine of the children were immediately referred for restorative care due to the extent of decay. **Conclusions:** Pediatric residents can be trained to conduct ECC risk assessment and make appropriate referral for follow-up care. Residency programs may be an excellent location to introduce oral health content to medical professionals.

35. Nancy Reifel, DDS, MPH, Division of Public Health and Community Dentistry, School of Dentistry, University of California, Los Angeles, Kathy Phipps, DrPH, Oral Health Research Consultant, Morro Bay, CA

EVALUATION OF A DENTAL CLINIC SAMPLE TO MONITOR EARLY CHILDHOOD CARIES

Oral health status of preschool populations is difficult to determine because surveys of this age group often use convenience samples that may not be representative. The Indian Health Service (IHS) regularly assesses the oral health status of its dental clinic users, which for preschool children include Head Start enrollees and self-referred dental

patients. **Objective:** Determine whether the IHS dental clinic user sample is an accurate representation of the general preschool population. **Methods:** A population-based random sample of 175 children, age 0-5 years, residing in one reservation community received dental screenings by trained, calibrated examiners. A sample of 498 IHS dental clinic users in the same geographic region, age 2-5 years, were screened by trained examiners for the IHS 1999 Oral Health Survey. The population sample was age adjusted to the clinic sample. Means and standard errors were calculated for six oral health parameters: dmft, dmfs, ds/dmfs, percent with two affected upper incisors, percent with active decay, and percent caries free. **T-tests** were performed to compare the two samples. **Results:** There were no statistical differences between the two samples. **P-values** ranged from 0.10 to 0.81. **Conclusions:** For preschool-aged children, oral health monitoring surveys based on a convenience sample of IHS dental clinic users provide an accurate estimate of both disease prevalence and severity.

36. Warren LeMay, DDS, MPH, Nancy McKenney, RDH, MS, Wisconsin Department of Health and Family Services and Kathy Phipps, DrPH, Consultant, Morro Bay, CA

ORAL HEALTH SURVEY OF HEAD START CHILDREN—WISCONSIN, 2003

Objective: To establish a baseline for monitoring oral disease trends in Wisconsin. **Methods:** This survey followed the methods outlined in the ASTDD publication Basic Screening Surveys: An Approach to Monitoring Community Oral Health. A sample of Head Start agencies was obtained for each of the five public health regions of the state. The number of children screened in each region was proportional to the number of children in that region enrolled in Head Start. The screenings were completed by a trained and calibrated dental hygienist. **Results:** A total of 456 children were screened. Among children screened, 48 percent had a history of dental caries, 24 percent had untreated decay, 22 percent had a history of Early Childhood Caries, and 3 percent needed urgent dental care. The highest proportion ($P<.05$) of children with a caries history were white, non-Hispanics (51%). The highest proportion of children with untreated decay were Hispanics (28%). Compared to white (21%) and Hispanic (29%) children, black (10%) Head Start children had a lower prevalence of Early Childhood Caries. Hispanic (28%) children were more likely to require early or urgent dental treatment. Caries experience was lowest in the southeastern (37%) and western (42%) regions. Children in the southern region (16%) had less untreated decay than children from the other regions while having a similar or greater level of decay experience. **Conclusions:** Significant disparities exist in the oral health status of Head Start children in Wisconsin by race, ethnicity, and region.

37. Joseph A. Bartoloni, DMD, MPH, Department of Community Dentistry, University of Texas Health Science Center, San Antonio, TX

MEASURING THE VALIDITY OF TWO IN-OFFICE DENTAL UNIT WATERLINE TEST KITS

Objective: To determine the validity of two in-office water test kits (A and B) compared to R2A agar (gold standard). **Methods:** Over a 12-week period, 9 dental units from a teaching institution were monitored. Each unit was equipped with an independent water reservoir. A total of 351 samples were collected, cultured via the three test methods, manually counted, and validity was assessed using two different cutoff values: <200 colony-forming units per milliliter [American Dental Association (ADA) goal], and <500 colony-forming units per milliliter [Environmental Protection Agency (EPA) mandate]. **Results:** Using the ADA goal: kit A had a sensitivity of 66 percent, specificity of 93 percent, positive predictive value of 99 percent, negative predictive value of 27 percent, with an accuracy of 69 percent; kit B had a sensitivity of 18 percent, specificity of 93 percent, positive predictive value of 95 percent, negative predictive value of 14 percent, with an accuracy of 31 percent. Using the EPA mandate: kit A had a sensitivity of 30 percent, specificity of 97 percent, positive predictive value of 96 percent, negative predictive value of 31 percent, with an accuracy of 51 percent; kit B had a sensitivity of 1 percent, specificity of 97 percent, positive predictive value of 50 percent, negative predictive value of 24 percent, with an accuracy of 26 percent. **Conclusions:** The in-office test kits underestimated bacteria levels, producing inaccurate measures of bacterial levels

compared to the gold standard. Our data suggest this could result in a lack of compliance with either recommendation for water quality in dental unit waterlines.

38. Michael E Ambrose, MS, Niloo Mofakhami, DDS, Children's Dental Health Project, Washington, DC

PEDIATRIC DENTISTS' OFFICE POLICIES REGARDING ADOLESCENT PATIENTS: SURVEY OF MARYLAND AAPD MEMBERS

Objective: To assess pediatric dentists' adolescent patient treatment and referral patterns. **Methods:** A survey was sent to the 87 Maryland-based members of the American Academy of Pediatric Dentistry, which included 21 quantitative and open-ended questions. **Results:** A response rate of 61 percent (53/87) was obtained with 45 usable surveys. More than two-thirds of responding pediatric dentists who practice in Maryland report having an upper age limit for accepting patients to their practice (mean=20). The most common reason reported for referring adolescent patients out of the practice is that the "treatment is too complex" (71%), followed by "prefer not to treat" (24%). The most commonly reported type of treatment provided to adolescent patients is basic care (100%—45/45), followed by orthodontic treatment (73%) and cosmetic treatment (58%). While 84 percent of responding practitioners reported that they can accommodate more adolescent patients, only 24 percent would like to see more adolescents. Regarding their residency training experience, 90 percent reported that fewer than 25 percent of patients were adolescents. Almost two-thirds of respondents report having had no formal instruction in dental care for the adolescent. **Conclusions:** A majority of pediatric dentists in this pilot study group appear to take age of patients into consideration for treatment; opportunities for specific pediatric residency and continuing education training in the treating of adolescents is indicated.

39. Roderick MacRae, DDS, FAGD, Assistant Manager, New York State Task Force on Special Needs Dentistry

THE NEW YORK STATE TASK FORCE ON SPECIAL NEEDS DENTISTRY: REPORT ON A NEW COLLABORATION

Objective: To create a partnership with a state government agency to enhance access to care for special needs populations and serve as an advisory group to suggest improvements in delivery of care. **Methods:** The New York State Office of the Mentally Retarded and Developmentally Disabled and dentists in voluntary NFP agencies, private practice and community dental centers formed a Task Force. **Results:** In less than one year significant and measurable contributions have been made in areas impacting access, best practices, education, and training programs, as well as creating networking opportunities via a dedicated website. **Conclusions:** The Task Force allows the opportunity for more informed decision making by providing input from the field and will result in improved access to care.

40. Paul Glassman, DDS, MA, MBA, Christine Miller, RDH, MHS, MA, University of the Pacific School of Dentistry

IMPROVING ORAL HEALTH OF PEOPLE WITH DISABILITIES THROUGH COMMUNITY-BASED SYSTEMS

Objectives: The objectives of this \$2,000,000 grant project were to train personnel from social service agencies in eight communities in California about using a community-based model for improving oral health care for people with special needs and to demonstrate the effectiveness of this model. **Methods:** Pacific faculty trained a Dental Coordinator and Project Liaison in each community in using triage and referral and tracking systems and educational materials and methods. Oral health and social assessments were conducted in these communities before and after the project. **Results:** In the three years of the project 5,000 clients were supported by the dental coordinators, training was conducted for 9,000 caregivers and consumers and 4,000 professionals, 223 dental practices developed or expanded their services to people with special needs, and 102 dental hygiene and dental assisting education programs and community clinics became involved in the program. There was a 38 percent improvement in visible dental caries, a 44 percent improvement in defective restorations, a 21 percent improvement in gingivitis, and a 51 percent improvement in reports of people having problems finding dental care. **Conclusions:** These and other results demonstrated

the effectiveness of this model in expanding oral health workforce and access to oral health services, improving oral health, increasing community capacity, integrating oral health with medical and social systems, and increasing awareness of the importance of oral health for people with special needs.

41. John E. King, DDS, MPH, University of Tennessee College of Dentistry, Sanford J. Fenton, DDS, MDS, University of Tennessee College of Dentistry, John H. Unkel, DDS, MPA, Virginia Commonwealth University School of Dentistry

OVERCOMING WORKFORCE BARRIERS TO ORAL HEALTH IN A MISSISSIPPI RIVER DELTA REGION OF ARKANSAS

Objectives: To increase dentist workforce diversity and capacity, and improve access to pediatric dentistry for an underserved population. **Methods:** The University of Tennessee (UT) partnered with Crittenden Memorial Hospital (CMH), the Arkansas Department of Health and federal agencies to increase the number and diversity of pediatric dentist residents educated in a venue of a culturally diverse and underserved population. **Results:** The Arkansas Legislature awarded a grant that provided funds to construct a 5,000 square foot pediatric dental clinic. The federal government provided GME funds to support stipends for residents and a three-year HRSA grant to support recruitment of a minority student and initial salary of a minority faculty member. The UT recruited disadvantaged/minority applicants for residency and faculty positions, built community-based linkages with disadvantaged populations, provided pediatric dental services and addressed the problem of Early Childhood Caries. All of these measures significantly improved services to this region and contributed to overcoming the shortage of culturally competent, pediatric dentists. The CMH dental clinic has become financially self-sustaining, thus perpetuating the program for the area. **Conclusions:** A program to improve the quality of dentist specialty workforce can also improve access to underserved populations through developing partnerships among a variety of healthcare and education agencies.

42. Allen Cheng, BS, Stuart A. Gansky, DrPH, Center to Address Disparities in Children's Oral Health, University of California, San Francisco, CA

ORAL HEALTH NEEDS OF CALIFORNIA PRESCHOOL CHILDREN COMPARED TO DENTIST SUPPLY WITH ZIP CODE VALIDATION

Objectives: 1. Validate merging 1993-94 California Oral Health Needs Assessment (COHNA) preschooler data to 1998 dentists supply data using changes in ZIP codes to assess error rate. 2. Compare need (deft index) of children in ZIP codes that changed to children in randomly chosen unchanged ZIP codes. 3. Assess correlation between need (deft) and supply (dentist:population ratio) in California rational care areas—Medical Service Study Areas (MSSAs). **Methods:** Mean absolute percent population change was compared between changed ZIP codes and a random sample of unchanged ZIP codes (rank-sum test). Mean weighted proportion $\text{deft} > 0$ (need) was compared between changed ZIP codes and randomly chosen unchanged ZIP codes (*t*-test). In all COHNA MSSAs, need was compared to supply (parametric and non-parametric correlations). **Results:** In 204 COHNA MSSAs, errors were in 5.8 percent of ZIP codes (95% CI=3.4, 9.3%). The difference in population changes between changed ZIP codes and unchanged ones was 25.4 percent ($P=.066$); difference in need was -16.3 percent ($P=.145$). Need and supply among the 204 MSSAs had Pearson correlation of -0.10 ($P=.139$) and rank correlation of -0.15 ($P=.032$). **Conclusions:** ZIP code error rate was modest, but should be considered for future studies. Changes in ZIP codes may be associated with changes in population, but no significant difference in need was found. Need appears to have a modest negative correlation with dentist supply. Support: US DHHS/NIH/NIDCR T35DE07103, U54DE14251.

43. Peggy B. Yamagata RDH, MEd, Dental Health Specialist, County of San Diego Health and Human Services Agency

DEVELOPING AN EMERGENCY/PREVENTIVE DENTAL SAFETY NET

Objective: Developing and maintaining an emergency and preventive dental safety net for children aged 5-18 years with no other resources for care. **Methods:** Dental professionals willing to provide pro bono care

in their own office or at community events were recruited to provide emergency treatment and sealant clinics. A system was developed to triage children referred to the program, track them to appointments, and assist them with locating a dental home. A collaborative program was implemented to support community-based sealant clinics that allow for screening of the scheduled children and their siblings, education of the entire family and assistance with linkage to a dental home for all children. *Results:* Since 1994, over 553 professionals have donated treatment to 3,805 children valued at over \$516,481. A steady decline in the number of dental emergency referrals has been countered by an increase in requests for assistance for children awaiting results on their application for medical/dental insurance. Parents recognizing the importance of dental sealants are willing to wait for appointments and request further assistance with documented dental needs at the clinics. *Conclusion:* As long as a specific system is in place to triage children and assist their families in keeping appointments, many dental professionals are willing to provide pro bono services in their own office or at a community based site on a periodic basis.

44. Tanya D. Darlington, Columbia University School of Dental and Oral Surgery

ORAL CARE FOR THE ELDERLY IN NEW YORK CITY: HOME HEALTH AIDES' KNOWLEDGE AND PRACTICES

Objective: To assess baseline oral health related knowledge, practices, and opinions of home health aides caring for the elderly in NYC. These data will be used to develop an oral health training curriculum and manual for use by home care agencies in NYC. *Methods:* Data were collected by administration of a 62-item questionnaire to 200 home health aides. Two focus groups with 12 to 15 participants each were convened to inform survey item content, and the questionnaire was tested for item readability, validity, and appropriateness. *Results:* Preliminary data indicate that although 69 percent of home health aides helped clients with daily oral care, 50 percent felt that they would benefit from additional training. Almost 20 percent of the respondents stated that they had received no oral health related training in the past year. Although 89 percent of subjects felt daily brushing and flossing can prevent periodontal diseases, 47 percent of subjects stated that tooth loss was a natural consequence of aging. *Conclusion:* Focus group and preliminary survey data indicate that oral health related knowledge and practices vary by home health care agency, and that receipt of oral health training is not standardized or regulated. In addition, delivery of oral care services is not a quality assurance measure, and is not regularly monitored. Improvements in the delivery of daily oral care services for homebound elderly will require improvements in the training, assessment, and regulation of oral care services for this vulnerable population.

45. Tiffany H. Hsu, BA, University of California, San Francisco School of Dentistry, Janice K Chaw, MPH, Samantha Stephen, RDH, MS, San Francisco Department of Public Health, San Francisco, CA, Jane A. Weintraub, DDS, MPH, University of California, San Francisco School of Dentistry

POTENTIAL EFFECTS OF PROPOSED BUDGET CUTS ON ACCESS TO ORAL HEALTH SERVICES IN SAN FRANCISCO

The San Francisco Dept of Public Health (SFDPH) has been facing severe budget cuts that have threatened their continued provision of adult dental services. *Objectives:* 1) To compare dental utilization in the past year (d-util) among adult patients at four SFDPH health centers, two with adult dental services (w/A ds) and two without adult (woA ds); 2) To address the potential ramifications of eliminating these dental services. *Methods:* A 10-minute interview was conducted among eligible adult medical patients (all sites), dental patients (sites w/A) and parents accompanying children for dental visits (sites woA). Results were analyzed with chi-square tests, stepwise logistic regression analysis and bootstrap resampling. *Results:* Of 726 people approached, 420 (58%) were enrolled; 67 percent had < high school education, 66 percent family income <\$15,000; and 50 percent without dental insurance. Overall, 59 percent reported d-util within a year. Only dental insurance ($P<.0001$) and income >\$35,000 ($P<.03$) were sig. associated with increased d-util. Patients at sites w/A ds were more likely to have a usual source of dental care ($P=.002$). If adult ds were eliminated, 32 percent would not know an alternate source of care and 67 percent would seek

dental care less often. Of those with Denti-Cal (Medicaid), 49 percent would be unable to pay for a large filling on a posterior tooth if Denti-Cal was discontinued. *Conclusion:* Public health center patients may be less likely to utilize dental care if these programs are abolished. Support: US/DHHS/NIH/NIDCR T35DE07103.

46. Sharon J. Perlman, DDS, MPH, Cook County Department of Public Health, Kenzy Vandeberoek, Chicago Department of Public Health, Laura B. Landrum, MUPP, Sherry E. Weingart, MPH, Chicago Department of Public Health

COLLABORATIVE EFFORTS IN PLANNING TO ADDRESS ORAL CANCER IN COOK COUNTY, IL

Objective: To assemble a diverse partnership of highly motivated professionals in an intensive planning process designed to craft strategic solutions to long-standing problems concerning oral health. *Methods:* The Chicago and Cook County Departments of Public Health agreed to collaboratively develop an oral cancer strategic plan and assembled an advisory Oral Cancer Task Force to oversee the process. The MAPP (Mobilizing Action Through Planning and Partnerships) strategic planning model was used to conduct an oral cancer profile, oral health resource inventory, assessment of community perspectives obtained through consumer focus groups and provider interviews, and forces of change appraisal. *Results:* Four strategic issues—public awareness, medical and dental practice, system of care and funding policy—were identified based upon the four assessments. Specific implementation recommendations for each strategy were collaboratively developed. *Conclusions:* This unique collaborative process yielded creative solutions to identified issues around oral cancer prevention and early detection while establishing a community and professional constituency to support implementation of the strategic plan.

47. Suzanne W. Hubbard, DDS, Tennessee Department of Health-Oral Health Services

UTILIZING AN INTEGRATED COMPUTER DATA SYSTEM TO IDENTIFY ORAL HEALTH DISPARITIES

Objectives: To utilize an integrated computer data system to identify disparities in oral health services. *Methods:* The central data collection system used by the state of Tennessee Department of Health was loaded into a computer system model called CUBES. This rapid query system allows for large numbers of variables to be identified and processed. Other data sources have also been loaded into this system allowing queries to link health department clinic data to statewide and national Healthy People 2010 statistics for Tennessee. The ability to interlink and therefore query data from a variety of sources allows for incredible options in ways of looking at health services and identifying disparities. The system allows selection of variables such as age, gender, date, and type of service. To change the query and look at the data from a different perspective is as simple as clicking and dragging the selected variable. Standard monthly reports are also available from this system. *Results:* The CUBES system was used to examine access to dental services for children in high risk populations. It aided the Division of Oral Health Services in identifying disparities in dental services to children less than 5 years of age. *Conclusion:* The CUBES system is a valuable tool for customizing queries, identifying disparities, and managing clinics.

48. M. Satuito, DMD, Charles Drew University, V. Greene, DDS, MPH, USC School of Dentistry

INTERDISCIPLINARY TEAM MANAGEMENT OF ELDERLY HIV+ PATIENTS

It has been 22 years since HIV/AIDS was identified, yet a cure has not been found. However, advances, e.g., HAART (Highly Active Anti-Retroviral Therapy) have improved and prolonged the quality of life for many. Elderly are living longer, more productive lives, suggesting broader risk assessment for diseases among the elderly; including HIV/AIDS. AIDS is pandemic; the WHO recently reported that more people died or were infected with HIV/AIDS in 2003 than ever before. The CDC reports that older adults (>50 y/o) account for 11 percent of the total AIDS cases in the United States as of December 2001. In our HIV-ambulatory clinic, 3.9 percent of cases are persons >60 years old. Despite this, the elderly are still not being targeted in education or prevention outreach. *Methods:* We reviewed three cases: algorithms

were developed to categorize by risk factors, co-morbid illnesses, laboratory signs, and treatment options. Dentists played a key role in assessing these hospitalized patients. *Results:* Multisystems review and diagnostic work-up demonstrated unusual or unrelenting infections or conditions that were linked to HIV/AIDS only after ruling out at least four other potential etiologies. The algorithms used for these cases will be exhibited in a poster. *Conclusion:* Interdisciplinary team management of HIV/AIDS in elderly patients was invaluable to both providers and patients. Practitioners may enhance their risk assessment, diagnostic, and interpersonal relationship skills by using this problem-based approach.

49. Janet G Bauer, DDS, Sue Spackman, DDS, Paulo Prolo, MD, Francesco Chiappelli, PhD, School of Dentistry, UCLA, Los Angeles, CA

CLINICAL DECISION TREE OF ORAL HEALTH

Objective: To develop a Clinical Decision Tree of Oral Health to assist dental practitioners in formulating individual treatment plans for their older patients. *Methods:* A task panel was developed with members from the Evidenced-based Dentistry and Bayesian modeling communities. Discussions and presentations regarding the conceptual form of the decision tree and mechanics of data design, acquisition, management, and dissemination were accomplished. *Results:* A conceptual Clinical Decision Tree of Oral Health developed three categorical areas: triage, treatment/therapy services, and maintenance and follow-up. Data design included determination of treatment options and outcomes, judgment and values analysis, economics, and philosophical approaches to health care. The mechanics included data acquisition for best evidence, value and judgments, and hierarchical management of decision making. Dissemination of results included interdisciplinary Web-based presentations, case studies, and pedagogic activities online and in real time. *Conclusions:* A decision-making model was developed to promote the best evidence-based dental treatment planning for the oldest of the old, frail, and dependent older adults. A Web site for purposes of data acquisition, pedagogic activities, and dissemination of information was offered as a method for interdisciplinary collaboration.

50. Marcia A. Manter, BS, MA, Kansas Head Start Association

EARLY HEAD START ORAL HEALTH INITIATIVE PROJECT COORDINATOR

Objective: To design and evaluate an early intervention system to prevent Early Childhood Caries in Early Head Start (EHS) children 0-3-year-olds. *Methods:* Kansas has 1,200 children enrolled in 15 EHS programs across the state, but research conducted by Kansas Head Start Association (KHSA) shows that only 3 percent of these children have seen a dentist for preventive care. And yet the "Window of Infectivity" for ECC documented by Caufield and others coincide with the age of EHS children. To design an effective early intervention system KHSA examined scientific literature on preventing ECC, presented by Edelstein, Tinanoff, and Kanellis at the National Head Start Oral Health Forum in September 1999, plus other subsequent reviews of studies. KHSA has designed the system, including the early intervention protocol for EHS programs, an evaluation model, advocacy approach to solicit support from community dentists, pediatricians, and community health clinics, and a training package for staff, families, and community health providers. *Results:* KHSA began implementation of the project in November 2003. *Conclusions:* KHSA's study of ECC prevention strategies in EHS children will increase the percentage of children receiving intervention and treatment to prevent ECC, will increase the percentage of children remaining caries-free, and will generate data on the effectiveness of the individual interventions used in the system.

51. Consuelo Sandoval, Lifetime Smiles Dental Project

LIFETIME SMILES INTEGRATED DENTAL ACCESS EDUCATION AND ACCESS PROJECT

Objective: To improve the overall health of southwest Kansas residents by improving and expanding oral health education, decay prevention, and access to dental care. Most program participants are medically underserved and have limited English proficiency. *Methods:* The project's approach to addressing the primary objective include: visual oral screenings, follow-up and intervention, integration of dental education

into community and medical models, a newspaper media campaign, and case management. *Results:* The oral health care access to care issues are also an important theme among not just the dental community but the medical and social service entities. In October 2003 we received additional funding from the ADA for the formation of an oral health coalition. Lifetime Smiles also partnered with the Kansas Dental Association, United Methodist Health Ministry Fund, and a local dentist to host Kansas' first Mission of Mercy. This Mission of Mercy served 1,733 persons with \$510,000 worth of free dental care in two-and-a-half days. *Conclusions:* The data analyzed to date has shown that from the approximately 7,000 children in 21 schools screened from August 2000 through December 2003 referral rates are dropping. Our dental consultants have also noticed that children in the targeted communities are now accessing dental care at a younger age. They feel this is due to our methods in screenings, education, and case management.

52. C. Culler, RDH, MPH, M. Henshaw, DMD, MPH, Boston University Goldman School of Dental Medicine, Department of Health Policy & Health Services Research

DENTAL SCREENING AND REFERRAL: PROGRAM OUTCOMES AFTER TWO YEARS

Objective: To evaluate the effect of screening and referral program on oral health status of Pre-K through 8th grade students during two consecutive school years in Chelsea, Massachusetts. *Methods:* 774 students were assigned to one of four categories based on dental need. After year 2, students were divided into those whose oral health improved or remained problem free (favorable outcome), and those whose oral health declined or who continued to need treatment (unfavorable outcome). The two groups were compared to determine if individual student characteristics predicted oral health outcome. *Results:* 70 percent of students rescreened had a favorable outcome, while 30 percent had unfavorable. Students in grade 1 during year 1 were more likely to have a poor outcome than students in other grades ($P < .001$). Serbo-Croatian-Bosnian native speakers were also more likely to have a poor outcome ($P = .03$). There was no difference in oral health outcome by race, sex, or enrollment in the free/reduced lunch program (representing lower income). *Conclusions:* Oral health status among students screened did not improve as much as expected at year 2 screenings. While 417 (54%) students needed no dental care at either screening, 235 did not obtain necessary treatment, perhaps due to lack of access to affordable care. In 2003, a new school-based clinic opened to address this need by offering free restorative and preventive care.

53. Sara Schlievert, RDH, BS, Heather Miller, RDH, AA, Tracy Rodgers, RDH, BS, Iowa Department of Public Health, Des Moines, IA

IOWA ABCD: BUILDING LOCAL INFRASTRUCTURE TO IMPROVE ACCESS

Objective: Building local infrastructure to improve access to dental care for Medicaid-enrolled children. *Methods:* From 1999 to 2002, the Iowa Department of Public Health offered grants of \$50,000 each to 4 Title V child health agencies as pilot projects for the Iowa Access to Baby and Child Dentistry (ABCD) program. Funds were used to mobilize community partners, implement community-based outreach, improve care coordination, and provide oral health education. Due to the success of the pilot projects, ABCD was expanded statewide and made available to all 26 Title V child health agencies in 2003. Twenty-two child health agencies are currently using ABCD funds. *Results:* All pilot sites have shown a consistent increase in the number of children receiving any Medicaid dental service each year following initial funding. Rate increases range from 9 percent to as much as 18 percent for the agency averages. Current ABCD activities include creating oral health task forces, improving data systems for tracking dental referrals, increasing collaboration with local boards of health and other local partners, and increasing awareness through public service announcements. *Conclusions:* Communities successful in building infrastructure have done so with the aid of oral health grants. Expanding the ABCD program statewide has allowed more communities to use funds to best meet the access needs of their areas. It is anticipated that the number of children receiving Medicaid dental services will increase in most participating counties due to the ABCD program.

54. Heather Miller, RDH, AA, Tracy Rodgers, RDH, BS, Sara Schlievert, RDH, BS, Iowa Department of Public Health, Des Moines, IA
COLLABORATIVE DEVELOPMENT OF A FLUORIDE VARNISH PROGRAM

Objective: Implementation of a fluoride varnish program. **Methods:** In 1999 the Iowa Department of Public Health, in collaboration with The University of Iowa, developed a fluoride varnish protocol. Also at this time, the Department of Human Services created guidelines to reimburse Title V child health agencies for fluoride varnish applications provided by dental hygienists in public health settings. Agencies had to request an exception to Medicaid policy, documenting access barriers for children in their areas. The DHS created a specific code for fluoride varnish application through Title V agencies, and approved reimbursement three times a year per child for those granted an exception. At this time, over one-third of Iowa's counties have a fluoride varnish program for children through Title V agencies, with most applications provided in WIC clinics or at Head Start. **Results:** In SFY00, Medicaid paid for 348 fluoride varnish applications; in SFY01, Medicaid paid for over 860. In SFY02, Medicaid paid for applications for 3,588 clients; 2,202 were under the age of 3 years. In 2002 the DHS determined that reimbursement to Title V agencies for screenings and fluoride varnish applications by hygienists for children would be EPSDT standard of care, eliminating the need to request an exception to policy. **Conclusions:** Collaboration between IDPH, DHS, the University of Iowa, and Title V agencies has created a preventive oral health program for at-risk children, in addition to an effective billing mechanism.

55. Gina Thornton-Evans DDS, MPH, Susan Griffin PHD, CDC, Atlanta, Georgia, Mark Greer, DMD, MPH, Hawaii's State Department of Health, Keith Larson, DDS, Palau Ministry of Health
COST EFFECTIVENESS OF A CARIES PREVENTION PROGRAM: PALAU 1993-99

Objective: To estimate the cost effectiveness of Palau's caries prevention program to all 3,000 elementary schoolchildren (grades 1-8). **Methods:** Data were obtained from two cross-sectional convenience samples, 1993 at the program's inception ($n=485$), and 1999 ($n=932$). To estimate annual averted caries increment, we regressed (1) child's age and sex, (2) whether the sample was collected in 1999 (proxy for participation in program), and (3) the interaction between age and participation on observed DMFT. Cost data for personnel (including travel), capital equipment, materials and the number of children living on each island as well as distance and mode of transportation to the nearest dental provider were obtained. We assumed that all equipment had a five-year useful life, no salvage value, and a social discount rate of 3 percent. We used data from the ADA Survey Center to estimate the cost of a restoration (\$82.98 for a two-surface amalgam). **Results:** Among 1999 children, DMFT was 0.29 lower for each year of participation. The mean annual program cost per child was \$26.61 and the total costs of a restoration (travel + fees) equaled \$106.82. The cost of averted decay (\$30.98) exceeded that of administering the program; therefore, the program was cost saving. The program will remain cost saving if averted annual DMFT increment exceeds 0.25. **Conclusion:** Findings in this community support the cost effectiveness of targeted school-based caries prevention programs for children of similar caries-risk status.

56. Kari Jones, University of Georgia Department of Finance
SEALS: AN EVALUATION TOOL FOR COMMUNITY SEALANT PROGRAMS

Objective: To help community sealant programs better allocate scarce public health dollars, CDC and Wisconsin created and pilot-tested a computer program named SEALS, which standardizes and automates the analysis of sealant programs' data. **Methods:** Through an extensive literature review and consultation with administrators at various levels of Wisconsin's sealant program, we developed summary/performance measures and created mechanisms for collecting the required data. After an initial version of SEALS was written and distributed, we solicited feedback from those who would be using it and incorporated the suggested improvements. **Results:** Performance measures were developed to summarize amount and quality of services delivered, effectiveness in targeting and reaching high-risk populations that lack access to care, and efficiency of input usage. Because raw data are input at the

program level and shared with the state, performance measures may be calculated at the event, program, and state levels. SEALS is now available to the public health community and we welcome the opportunity to demonstrate it. **Conclusions:** By automating the process, SEALS decreases sealant programs' data entry and analysis costs. Program managers can use the comparative summary measures and relative rankings to learn from the success of others and continuously improve their programs' effectiveness and efficiency. SEALS output can also be used to demonstrate the benefits of community sealant programs to the general public, policymakers, and funders.

57. Tracy Rodgers, RDH, BS, Sara Schlievert, RDH, BS, Xia Chen, DDS, MS, Heather Miller, RDH, AA, Iowa Department of Public Health, Des Moines, IA
METHODOLOGY FOR ASSESSING SEALANT RATES OF THIRD GRADE CHILDREN

Objective: Annual sealant assessment (NPM#9). **Methods:** Each of the past 5 years, a survey has been done to assess the percent of third graders with at least one sealant on a first permanent molar. A random sample of schools is made using SPSS software. Each Title V child health agency (26) has at least one school in its service area selected, with no more than two per agency. The past three years, each agency contracted with a dental hygienist to complete the survey; written protocols are provided to each hygienist. Explorers are not used, other than in schools doing exams for sealant programs (4). Consent forms are sent to the schools for collection prior to the survey. Information collected on consent forms includes payment source for dental care, participation in the free/reduced lunch program, last dental visit, and if a child has a dentist. Costs for the 2003 survey were about \$3,200. **Results:** Sealant rates have been near 40 percent the past three years. Low-income students and those with no insurance were less likely to have a sealant, and the rate of insurance coverage has been decreasing. Title V agencies are assessing preventive oral health needs and finding hygienists to provide services. **Conclusions:** The annual sealant survey is an inexpensive and reliable method to measure the NPM, in addition to benefiting Title V agencies and schools by building linkages within communities and emphasizing preventive oral health care. The annual survey may be easily enhanced to provide additional information such as untreated decay.

58. Joshua Albert Zane, Georgia Institute of Technology, Atlanta, GA, Susan Osborn Griffin, PhD, Division of Oral Health, Center for Disease Control and Prevention, Atlanta, GA, Paul Marshal Griffin, PhD, Georgia Institute of Technology, Atlanta, GA
DEVELOPING SOFTWARE TO ANALYZE THE COST EFFECTIVENESS OF SEALING PERMANENT FIRST MOLARS

Objective: To develop software to (1) estimate the cost effectiveness of sealing permanent first molars and (2) to analyze the robustness of findings. **Methods:** The software uses a nine-year analytic horizon, a 3 percent discount rate, and assumes sealants are placed in a school setting, lost sealants are not replaced, and the annual amalgam failure rate equals 4.6 percent (obtained from published studies). For all other parameter values users may input their own values or select default values provided by the software. Default sealant loss rates (20% in year 1 and 3% thereafter) were obtained from published studies. Default cost estimates for sealant (\$27) and restoration (\$63), as well as average wait and travel time for a dental visit (1.6 hours) were obtained from the ADA Survey Center. Hourly compensation (\$20.29) and annual caries increment (0.0624 surfaces) were obtained/imputed from national surveys. **Results:** Using default data, cumulative caries increments per permanent first molar with and without sealants were 0.21 and 0.49 surfaces, respectively. Sealants were cost saving; the cost of averted decay (\$31.14) exceeded the sealant cost. **Conclusion:** Analyzing the cost effectiveness of sealants allows community programs to allocate their prevention dollars more efficiently and effectively and to demonstrate the investment potential to policy makers. Using default values taken from national data indicates that sealing permanent first molars is a good public health investment.

59. Rene Lavinghouze, MA, Centers for Disease Control/Division of Oral Health, Don Compton, PhD, ECB Services, Inc.

EVALUATING SEALANT PROGRAMS FOR PROGRAM IMPROVEMENT AND EVIDENCE-BASED DECISION MAKING

Objective: To develop sealant program evaluation tools that are practical, feasible, and able to be embedded within current activities. **Methods:** The Division of Oral Health at the Centers for Disease Control and Prevention (CDC) collaborated with funded states to create tools and a process for evaluating sealant programs that enables states to answer stakeholder questions, document success, improve replication, and add to the science base for program implementation. **Results:** This presentation will provide an overview of the menu of sealant program evaluation tools and logic model developed collaboratively by CDC, ECB Services, Inc., and funded state oral health programs. How these tools might be operationalized in the field and used for program improvement and policy decisions will be discussed. **Conclusions:** Scarce resources and long hours devoted to implementing successful sealant programs necessitates answering evaluation questions posed by stakeholders. Evaluation designs should be practical, feasible, and appropriate to the stage of development of the program. Good program evaluations can provide information necessary for program improvement, replication of the program, and evidenced-based decision making. The evaluation framework developed emphasizes use of evaluation results for program improvement and decision making, as well as creating a systematic way to make quality evaluation a routine part of program operations.

60. David J. Reynen, MPH, MPPA, Chronic Disease Epidemiology and Control Section, California Department of Health Services, David Nelson, DDS, MS, Office of Oral Health, California Department of Health Services, John H. Kurata, PhD, MPH, Chronic Disease Epidemiology and Control Section, California Department of Health Services

FACTORS ASSOCIATED WITH HAVING HAD NO DENTAL VISIT IN THE LAST YEAR: FINDINGS FROM THE CALIFORNIA HEALTH INTERVIEW SURVEY, 2001

Objective: Healthy People calls for an increase in the use of the oral healthcare system. To this end, it is critical to study populations that fail to use the system. This study describes factors associated with having had no dental visit in the last year. **Methods:** Using 2001 California Health Interview Survey data: Adults were classified as (a) those who had had a visit in the last year and (b) those who had not. Age-adjusted prevalence estimates (percent with no visit) were determined. Via logistic regression, factors associated with having no dental visit during the last year were described. **Results:** Overall, 43 percent report having had no dental visit in the last year. Estimates are higher for Latinos (55%), American Indians (49%), and African Americans (49%); and for men (44%) vs women (41%). Preliminary results suggest the following factors are associated with a failure to use the oral health care system: nonwhite (OR=1.27; 95% CI=1.20, 1.35); male (OR=1.07; 95% CI=1.02, 1.13); no dental insurance (OR=1.85; 95% CI=1.75, 1.96); no MD visit, last 12 months (OR=1.48; 95% CI=1.38, 1.58); smoker (OR=1.39; 95% CI=1.28, 1.49); health status is "less than 'good'" (OR=1.32; 95% CI=1.22, 1.42); physical limitation (OR=1.35; 95% CI=1.22-1.51); no "medical home" (OR=1.28; 95% CI=1.17, 1.40); and education, vs four-year degree/+ (OR [some college]=1.44; 95% CI=1.35, 1.54; OR [HS grad]=1.63, 95% CI=1.51, 1.76; [OR<HS grad]=1.82; 95% CI=1.65, 2.01). **Conclusion:** Understanding these factors may facilitate the development of programs and policies focused on improving the utilization of the oral health care system.

61. Valerie Robison, DDS, MPH, PhD, Ranjitha Krishna, BDS, ORISE Fellow, Paul Eke, PhD, MPH, PhD, Laurie Barker, MSPH Division of Oral Health, Centers for Disease Control and Prevention, Atlanta, GA

TRENDS IN DENTAL VISITS IN THE PAST 12 MONTHS AMONG PEOPLE 18 YEARS AND OLDER: BRFSS 1999-2002

Objective: Using 1999 and 2002 BRFSS estimates for persons 18 years and older, we assessed national and state-specific trends in self-reported dental visits. **Methods:** 50 states and some territories (two in 1999 and four in 2002) administered oral health questions in their 1999 and 2002 BRFSS surveys. For the question, "How long has it been since you last visited a dentist or a dental clinic for any reason?" we estimated the percentage of people who reported such a visit within the past 12 months for both years and looked at any significant changes that

occurred from 1999 to 2002. **Results:** National estimates for reporting a dental visit in the past 12 months for 1999 are 67.9 percent (95% CI=67.5, 68.3), with state estimates ranging from 56.4 percent to 78.2 percent (median=68.1); and for 2002, 69.5 percent (95% CI=69.2, 69.8), with state estimates ranging from 54.2 percent to 80.2 percent (median=69.2). The national estimate increased significantly from 1999 to 2002. 25 states showed a significant increase. Three states showed a significant decrease. **Conclusion:** The percentage of adults who reported a dental visit in the past 12 months increased nationally and in half of the states. National BRFSS estimates in 1999 (67.9%) and 2002 (69.5%), are comparable to NHIS data in 2000, where 66.2 percent of the population aged 2 years and older visited a dentist in the previous 12 months.

62. Paul Eke, PhD, MPH, PhD, Ranjitha Krishna, BDS, ORISE Fellow, Valerie Robison, DDS, MPH, PhD, Laurie Barker, MSPH Division of Oral Health, Centers for Disease Control and Prevention, Atlanta, GA

ADULTS (35-44 YEARS OLD) REPORTING NO PERMANENT TOOTH LOSS: BRFSS 1999-2002

Objective: To determine national and state-specific percentage estimates of adults (35-44 years old) reporting loss of no permanent tooth for 1999 and 2002. **Methods:** Estimates were determined from BRFSS data for 1999 and 2002. Fifty states and some territories (two in 1999 and four in 2002) administered three oral health questions in both years. From responses to one question, "How many of your permanent teeth have been removed because of tooth decay or gum disease?" we estimated the percentage of people between 35-44 years of age who reported no loss of a permanent tooth, and looked for any significant changes in these estimates from 1999 to 2002. **Results:** National estimates for no permanent tooth loss due to decay or gum disease in 1999 were 54.5 percent (95% CI=53.8, 55.5), with state estimates ranging from 27.9 percent to 72.8 percent (median=57.15), and for 2002, 58.4 percent (95% CI=57.6, 59.2) with state estimates ranging from 31.1 percent to 72.8 percent (median=60.15). Overall, the national estimate increased significantly from 1999 to 2002. Twenty-seven states showed significant improvement from 1999 to 2002. **Conclusion:** BRFSS data for 1999 and 2002 suggest an increasing national trend for adults (35-44 years old) who report loss of no permanent teeth due to caries or periodontal disease. Several states also showed significant increasing trends between the years. However, because BRFSS is a telephone survey, it may underrepresent persons of lower socioeconomic status and thus bias these national and state estimates.

63. Ranjitha Krishna, BDS, ORISE Fellow, Valerie Robison, DDS, MPH, PhD, Paul Eke, PhD, MPH, PhD, Laurie Barker, MSPH Division of Oral Health, Centers for Disease Control and Prevention, Atlanta, GA

ADULTS (65-74 YEARS OLD) REPORTING COMPLETE TOOTH LOSS: BRFSS 1999-2002

Objective: A Healthy People Objective states that by 2010, the percentage of adults aged 65-74 years with complete tooth loss should decrease from a baseline of 26 percent in 1987 to 20 percent. Since complete tooth loss can be measured by self-report or clinical exam with comparable validity, we used BRFSS to measure progress towards the HP2010 target and to determine national and state specific trends in tooth loss from 1999 to 2002. **Methods:** Fifty states and some territories (two in 1999 and four in 2002) administered oral health questions in their 1999 and 2002 BRFSS surveys. For the question, "How many of your permanent teeth have been removed because of tooth decay or gum disease?" we computed the percentage of 65-74-year-old adults who reported having lost all their natural teeth. **Results:** National estimates for complete tooth loss for 1999 are 22.4 percent (95% CI=21.4, 23.4) with state estimates ranging from 11.3 percent to 43.2 percent (median=23.9); and for 2002, 20.4 percent (95% CI=19.6, 21.2) with state estimates ranging from 7.8 percent to 43.1 percent (median=20.8). From 1999 to 2002, the national estimate decreased, eleven state estimates decreased, and one state estimate increased, all significantly. In 2002, 31 states had not yet reached the HP2010 target. **Conclusions:** Although the percentage of adults aged 65-74 years who report complete tooth loss has declined in the United States, more than half the states have not met the HP 2010 objective of 20 percent. State-specific variations are large, and some states are far from the HP2010 target.

64. Se-Hwan Jung, College of Health Dentistry, Yangnung National University

RELATIONSHIPS OF OROFACIAL PAIN WITH EATING DISCOMFORT AND HEADACHE AMONG KOREAN ELDERS

Objectives: To determine and compare the association of orofacial pains (OPF) with eating discomfort and headache. **Methods:** Of 4,342 Korean elders (55+) from the cohort of Korean National Interview Survey of Oral Health Status (KNISOH) in the year of 2000, 1,092 subjects agreed to participate telephone interview. The interview questionnaires consisted of five items of OPF from the instrument of Physical pain in OHIP during the past 12 months and two items of eating discomfort and headache. A response was based on five-point Likert scale. Bivariate and multiple logistic regression analyses were used for odds ratios (OR) of separate items. **Results:** In eating discomfort, the odds of prevalence was 5.2 times (95% CI=3.08, 8.69) higher for the elders with sore spot than for those without it, while sore jaw was not related with headache. In headache, the odds of prevalence was 3.6 time (95% CI=1.88, 6.87) higher for the persons with sensitive teeth than for those without it, while sore spot was not related with headache. In eating discomfort and headache, the odds of prevalence was 5.9 times (95% CI=2.31, 14.90) higher for the persons with painful gum than for those without it, 4.2 times (95% CI=1.81, 9.95) higher for the persons with toothache than for those without it. **Conclusions:** The highest influencing factor was sore spot in eating discomfort, sensitive teeth in headache, and painful gum in eating discomfort and headache; sore jaw was not associated with eating discomfort and sore spot was not associated with headache.

65. Dai-Il Paik, College of Dentistry, Seoul National University

FACTORS INFLUENCING ON KNOWLEDGE ABOUT EARLY SIGNS AND CAUSES OF ORAL CANCER AMONG KOREAN ADULTS

Objectives: The aims of this study were to determine influencing factors on the knowledge about early signs and causes of oral cancer and to evaluate their impact. **Methods:** Of 4,342 Korean adults (55+) from the cohort of Korean National Interview Survey of Oral Health Status 2000, 1,032 subjects agreed to participate in the telephone interview. The main questionnaires about oral or mouth cancer consisted of five items as suggested in a Maryland study. Present and past medical history, present medication, orofacial pain, smoking, and sociodemographic characteristics were obtained. Logistic regression analyses and structural equation modeling were used for odds ratio and impact of separate items. **Results:** Male respondents were 2.1 (95% CI=1.27, 3.62) times more likely to know early signs and/or causes of oral cancer (SCOC) than female. Respondent who had taken a test or examination of oral cancer were 2.5 times (95% CI=1.06, 5.82) more likely to know SCOC than respondents without it. Respondents who had ever heard of oral cancer were 2.0 times (95% CI=1.14, 3.34) more likely to know SCOC than respondents who had never heard of it. **Conclusions:** Factors influencing the knowledge of SCOC were having an oral cancer examination, having heard of oral cancer, and gender, in order of total impact. New initiatives should be directed at prevention and early diagnosis using the education for health professionals and the public.

66. Harpreet K. Singh, Boston University

EARLY CHILDHOOD CARIES IN 1- TO 3-YEAR-OLD BOSTON CHILDREN

Objective: To describe the baseline prevalence of Early Childhood Caries (ECC) in 1-3-year-old children seeing primary care pediatricians at an urban medical center in Boston. **Methods:** For this study, ECC is defined as at least one upper primary incisor that is decayed, missing, or filled due to caries. A convenience sample (N=125) of all children who presented for well child visits between February and November 2003 was recruited. Parents/caregivers were asked to complete a questionnaire about clinician interaction and sociodemographic background including education, insurance coverage, income, employment status, nation of birth, primary language spoken at home, and length of time in the United States. After obtaining informed consent a dental hygienist conducted a noninvasive clinical examination using a penlight and disposable mirror. The presence, number, and location of both noncavitated and cavitated carious lesions on tooth surfaces were recorded. **Results:** Of the 125 subjects, 48.8 percent were male; 81.6 percent black,

14 percent white, and 4 percent Asian; 15 percent Hispanic; 42 percent 1-year-olds, 30.4 percent 2-year-olds, and 19.2 percent 3-year-olds. ECC was found in 6 percent of the subjects. **Conclusion:** Data on ECC in very young children are limited and prior studies have not reported ECC prevalence among a population seeking well child ambulatory care. ECC prevalence in this cohort was comparable to NHANES III. Analyses are ongoing to examine association of other variables with the presence of ECC. Supported by NIDCR U54 DE14264.

67. Grace Whitney, PhD, Director CT Head Start State Collaboration Office, Linda Miklos, Health Manager, Education Connection, Pamela C. Painter RDH, MS, CT Dept of Public Health

OPERATIONALIZING ENHANCED ORAL HEALTH OF CHILDREN AGED 0-5 YEARS WITHIN THE EARLY HEAD START/HEAD START SETTING

Objective: Enhancing the oral health of children aged 0-5 years. **Methods:** A priority objective for the CT EHS/HS Oral Health Presenter: Forum was to enhance HS and oral health advocacy and promotion. The workgroup discussed advocacy from the perspective of EHS/HS facilities, community partnerships and collaborations, and finding the necessary resources. **Results:** 1) A PowerPoint presentation was developed to raise awareness of HS within the dental community; 2) HS is represented at each of the local community oral health collaboratives; 3) HS devoted part of their annual fall meeting to oral health; 4) HS gained representation on the state's independent, nonprofit organization dedicated entirely to oral health issues; 5) State Dental Association has agreed to collaborating with HS on improving access to and quality of oral health care for EHS/HS children in CT; 6) an adaptation of CT's OPENWIDE curriculum has been developed which is specifically tailored to the needs of early childcare providers; 7) plans are underway for a regional EHS/HS oral health forum tentatively scheduled for June 2004; 8) CT DPH received funding from HRSA for a State Early Childhood Comprehensive Systems grant—a component of this involves oral health enhancement in EHS/HS; and 9) DPH has submitted a proposal to the Department of Health and Human Services/Administration for Children and Families for an innovative oral health promotion mentoring project involving adolescent siblings of EHS/HS families.

68. Stefano Petti, DMD, Giuliana Aragona, DMD, Stefania Iannazzo, MD, Gianfranco Tarsitani, MD, Department of Public Health Sciences, "La Sapienza" University of Rome, Italy

EFFECTIVENESS OF MULTIVARIABLE MODELS IN PREDICTING PRESENCE OF ECC AND ANY CARIES IN A SAMPLE OF YOUNG CHILDREN FROM AN ITALIAN SEMIRURAL COMMUNITY

Objective: To investigate applicability of the high-risk preventive strategy in children from a semirural Italian community with different behavioral pattern than their urban peers. **Methods:** 211 3- to 5-year-olds (mean age=4.0; SD=0.8; M/F=101/110; immigrants=1.4%) from a small town in a prevalently rural area were recruited. They were examined at school and classified as caries free (d₁DF=0), any caries+ (d₁DF>0), ECC+ (at least two upper anterior d₁DF teeth). Background, behavioral, clinical, microbiological variables were also investigated. Stepwise multiple logistic regression was used to design the best any-carries and ECC prediction models, the included variables were those producing coefficients with P<.3. The individual any-carries and ECC probabilities resulting from the regression analysis were calculated and different cutoff points chosen to classify subjects into low/high any-carries and ECC risk. The effectiveness of the two models was assessed by the highest Youden's index value (J) obtained with the various cutoff points. **Results:** prevalence of any caries and ECC were 38.4 percent (95% CI=31.8, 45.0; mean d₁DF=1.5 (2.6)) and 7.1 percent (3.6-10.6), ECC+ children [mean d₁DF=6.8 (4.3)] had 32.5 percent of all d₁DF teeth. The highest J values were 41.9 for the five-variable any-carries model and 52.4 for the six-variable ECC model. **Conclusions:** Retrospective studies produce biased higher values of effectiveness. However, the models were not effective enough to justify the application of the high-risk preventive strategy in this community.

69. Steven M. Levy, DDS, MPH, John J. Warren, DDS, MS, Barbara Broffitt, MS, Michael J. Kanellis, DDS, MS, University of Iowa College of Dentistry

ASSOCIATION BETWEEN DENTAL FLUOROSIS OF THE PERMANENT AND PRIMARY TEETH

Objective: Along with the substantial decline in dental caries among children and young adults in the United States and other developed nations, a concern is the increased prevalence of dental fluorosis. Substantial efforts have focused on permanent tooth fluorosis prevalence, risk factors, and prevention; however, primary tooth fluorosis has been studied little. The purpose of this presentation is to report the associations between fluorosis of the permanent and primary teeth. **Methods:** Subjects are participants in the Iowa Fluoride Study, which has included dental fluorosis examinations of the primary dentition (age 4.5–6.5 years with TSIF index) and early-erupting permanent dentition (age 8–10 years with FRI index) by trained dentist examiners. **Results:** 8 percent of the 435 subjects had primary molar fluorosis and 34 percent had definitive, 29 percent questionable, and 37 percent no permanent incisor fluorosis. Those with primary molar fluorosis were significantly more likely to have definitive permanent incisor fluorosis (78% vs 34%, $RR=2.32$, $P<.001$). Results were similar for primary molar fluorosis predicting permanent molar fluorosis (definitive fluorosis 61% vs 16%, $RR=3.75$, $P<.001$). **Conclusions:** Results show the association between primary and permanent tooth fluorosis, suggesting overlap of fluoride intake risk factors. Early intervention to assess/modify fluoride intake among those with primary tooth fluorosis to reduce permanent teeth fluorosis needs further research. Supported in part by NIH grants R01-DE09551, R01-DE12101, and RR00059.

70. Scott A. Trapp, DDS, Linda Yaroch RN, MPH, Northwest Michigan Community Health Agency, Charlevoix, MI

IMPLEMENTATION OF THE HEALTHY PEOPLE 2010 DENTAL OBJECTIVES AS A BENCHMARK FOR DENTAL HEALTH IN A COMMUNITY HEALTH PRACTICE

Objective: To utilize the Healthy People 2010 Dental Caries Objective benchmark for improving dental care delivery in a community health practice. **Methods:** 334 patient visits were evaluated during a two-month period. The data was collected through a Pocket PC to collect age, history of caries, restorations, missing teeth, sealants, and edentulism. **Results:** The percentage of patients aged 2–4 years with a caries experience in month 1 was 85.71 percent $n=21$; in month 2, 50 percent $n=10$. The percentage of patients aged 6–8 years with a caries experience in month 1 was 86.79 percent $n=53$; month 2, 86.96 percent $n=23$. The percentage of patients age 15 with a caries experience in month 1 was 75 percent $n=4$; month 2 100 percent $n=3$. The percent of patients aged 2–4 years with untreated decay in month 1 was 71.43 percent $n=21$; month 2, 50 percent $n=10$. The percentage of patients 6–8 with untreated decay in month 1 was 39.62 percent $n=53$; month 2, 39.13 percent $n=23$. The percentage of patients age 15 with untreated decay in month 1 was 50 percent $n=4$; month 2, 66.67 percent $n=3$. Sealant experience for patients aged 8 years in month 1 was 40 percent $n=15$; month 2, 71.43 percent $n=7$. Age 15 showed month 1 of 50 percent $n=4$; month 2, 66.67 percent $n=3$. **Conclusions:** The use of the HP 2010 objectives can serve as a benchmark for evaluating the level of dental health in a community practice. These benchmarks can then be referenced to national statistics and interventions for improvement of oral health determined. Future studies will continue to follow the patient base so that trends may be established and changes may be related back to specific interventions.

71. Sisko Honkala, BDS, DrOdont, Eino Honkala, BDS, DDPH, MSc, DrOdont; Faculty of Dentistry, Kuwait University, Kuwait; Arja Rimpela, MD, MPH, MSc, PhD, Matti Rimpela, MD, MSc, PhD, Lasse Pere, MSc, Tampere School of Public Health, University of Tampere, Finland

TOOTHBRUSHING AND SMOKING TRENDS AMONG FINNISH ADOLESCENTS BETWEEN 1977 AND 2003

Objective: To find out the trends in toothbrushing and smoking behavior of adolescents in Finland during the last 26 years. **Methods:** A part of the Adolescent Health and Life-style Survey, which has been conducted every second year since 1977. A nationwide cross-sectional representative sample of 16- and 18-year-old Finns drawn from the population registry, based on the consecutive birthdays, was used for this study. The total sample was 47,135; the response rate varied between 85 and 90 percent. Postal questionnaires with structured questions were used. **Results:** Only about one-fifth of the boys and slightly more than

half of the girls brushed their teeth according to recommendations, twice a day. About one-third of the adolescents smoked daily; boys more often than girls up to year 1999. In 2001, figures were equal and in 2003 girls are smoking more often than boys (32% vs 27%). Twice-a-day toothbrushing increased consistently among boys who were not daily smokers. There was no improvement in toothbrushing among boys who smoked daily. Among girls, the toothbrushing frequency started to decline from 1985 onwards among nonsmokers and already earlier, from 1981, among smokers. **Conclusions:** There seems to be a distinct unfavorable declining trend in twice-a-day toothbrushing among all girls and among the smoking boys. More emphasis is required for smoking cessation programs related to oral hygiene education.

72. Irene G. Bober-Moken, DMD, MPH, MS (Lt Col, USAF, DC); Nancy K. Fagan, DVM, PhD (Lt Col, USAF, BSC); Susan Y. Chao, MS, United States Air Force Medical Support Agency/Population Health Support Division, Brooks City-Base, TX

DISTRIBUTION OF CARIES RISK IN THE UNITED STATES AIR FORCE ACTIVE DUTY POPULATION

Objective: This study describes the associations between demographic and behavioral characteristics and the distribution of caries risk among individuals serving on active duty who received a dental examination between October 2000 and September 2001. **Methods:** Caries risk and tobacco use recorded during periodic dental exams ($n=260,306$) were linked with the following demographic characteristics: gender, age, race/ethnicity, pay grade, education level, and Air Force Specialty Code (AFSC). Pearson chi-square statistic was used to test for the association between the demographic characteristics/tobacco use and caries risk. The Cochran-Armitage trend test was used to assess linear trends across levels of a demographic characteristic. **Results:** Eleven percent of our study population was found to be at high caries risk. High caries risk was inversely related to age, pay grade, and education and found to be lowest among Hispanics (9.7 percent) and highest in the security forces. Only 8.9 percent of nonsmokers were at high caries risk compared with 17.1 percent of smokers and 21.1 percent of smokers also using smokeless tobacco. With the exception of the relationship between gender, all demographic characteristics and tobacco use were significantly ($P<.05$) associated with caries risk. **Conclusion:** Further investigation into the independent contribution of tobacco use and AFSC career in relation to high caries risk may enable the development of targeted interventions.

73. J.W. Simecek, DDS, MPH, J.L. McGinley, DDS, MPH, K.E. Diefenderfer DMD, MS, and J.C. Ragain, Jr. DDS, MS, PhD, Naval Institute for Dental and Biomedical Research, Great Lakes, IL

INCIDENCE OF LOCALIZED ALVEOLAR OSTEITIS IN US NAVY PERSONNEL

Objective: To determine the incidence of localized alveolar osteitis (LAO) following the extraction of mandibular third molars in a cohort of US Navy personnel. **Methods:** A cluster sample of dental records from 1,109 personnel who entered naval service during the calendar year 1997 was drawn from eight US Navy dental treatment facilities. A subset of 360 subjects who had at least one mandibular third molar extracted subsequent to recruit training was included in this investigation. Records were reviewed to document information pertaining to the following: teeth extracted and subsequent LAO, gender and age of subject, use of tetracycline as a component of the extraction procedure, use of tobacco at entry into the Navy, orientation and eruption status of the tooth extracted. Logistic regression techniques were utilized to select significant predictors of LAO. **Results:** 644 mandibular third molars were extracted from the 360 subjects included in this study; mean patient age was 21 years; 84 percent were male. 77 (12%) of the individuals for whom mandibular third molar extractions were performed required treatment for LAO. Of the variables studied, tobacco use at entry into the Navy, female gender, and increasing age were significant predictors of LAO. **Conclusions:** LAO continues to occur in approximately 10 percent of personnel receiving mandibular third molar extractions even with advanced treatment modalities. Emphasis on tobacco cessation and early extraction may impact the incidence of LAO.

74. R. Ferro, A. Besostri, M. Beghetto, Italy

ASSESSMENT OF EARLY CHILDHOOD CARIES IN A KINDERGARTEN POPULATION IN VENETO REGION (ITALY) AND COMPARISON WITH THE PREVIOUS DATA OF BBTD SYNDROME

Objective: To assess the prevalence of Early Childhood Caries (ECC) among preschool children attending nursery schools and to compare the current data with those of a previous survey carried out in 1994 in a sample of 4-year-old children when the investigators used the term BBTD syndrome. **Methods:** Cross-sectional survey of 1006 children aged 1-6 years was carried out in the area of Ulss n 15 (Veneto Region, Italy) from October 2002 to May 2003. The overall sample (children younger than 36 months old, n=29; 3-year-old children=271; 4-year-old children=364; 5-year-old children=290) was visited by an only one examiner (Cohen's kappa=0.96) using the diagnostic criteria for ECC definition reported in J Public Health Dent 1999;63(3)192-97; for this reason 52 children aged more than 71 months were excluded. A previous survey carried out in 1994 in the same area with a sample of 401 children aged 4 years was used as comparison with current data. On that occasion the term BBTD syndrome was used and the diagnostic criteria was at least two maxillary incisors teeth affected by cavitation. **Results:** 19.7 percent of the overall sample presented ECC. The prevalence of ECC (and S-ECC) were, respectively, by age: under 36 months: all the cases were S-ECC=17.2 percent; at 3 year old=13.28 percent (6.64%), at 4 years old 18.95 percent (9.34%); at 5 years old=26.9 percent (12.75). In 1994 the prevalence of BBTD syndrome was 11.9 percent. The current one is 6.5 percent (less 42.8%). **Conclusions:** The ECC prevalence, in its two forms, "generic" (ECC) and severe (S-ECC), increased with age. From 3 to 5 years old, the number of children affected doubled from 13.28 percent at 3 years old to 26.9 percent at 5 years old according to ECC definition; from 6.64 percent at 3 years old to 12.75 percent at 5 years old according to S-ECC. The Severe form shows an annual constant increment (3%). From 1994 to 2003 the prevalence of BBTD in the area dropped from 11.9 percent to 6.5 percent with a decrement of 42.84 percent.

75. Eino Honkala, BDS, DDPH, MSc, PhD, Department of Developmental and Preventive Sciences, Kuwait University, Shabiha Al-Mutawa, DDS, MSc, DDSc, Ministry of Health, Kuwait, Madadi Shyama, BDS, MSc, PhD, Ministry of Health, Kuwait, Sisko Honkala RN, BDS, PhD, Department of Developmental and Preventive Sciences, Kuwait University

GOHAI AMONG PARENTS AND TEACHERS OF DISABLED SCHOOLCHILDREN

Objective: To assess oral health as a quality life among the parents and teachers of disabled schoolchildren in four schools in Kuwait. **Methods:** The three-category (12 questions) General Oral Health Assessment Index (GOHAI) was used by the questionnaires in two Down's syndrome (boys and girls) and in two physically disabled children's schools in September-December 2002. The response rates were 92 percent (n=308) among the parents and 75 percent (112) among the teachers. The mean age of the teachers was 37.9 years and the parents 44.9 years. Analysis of variance was used to test the differences of the means between the groups. **Results:** The mean GOHAI was 20.8 (SD=3.4) among the parents and 20.2 (3.3) among teachers (n.s.). There was no difference between Kuwaiti and non-Kuwaiti respondents. GOHAI seemed to decrease with the increasing education ($P<.001$), there were small differences between the residential regions ($P=.034$) and between the schools ($P=.011$) among the parents. Altogether 37 percent of the teachers and 43 percent of the parents were always pleased and happy with the looks of their teeth and gums, or dentures. **Conclusions:** Oral health seemed to have less impact on the quality of life of these adults in Kuwait than on the subjects of the other studies with the same indicator. This study was supported by Kuwait University grant DI 02/01.

76. Noelle Huntington, PhD, Dante Spetter, PhD, Setareh Ghafouri, DMD, Avron Spiro III, PhD, Boston University

THE PERSPECTIVES OF CHILDREN ON ORAL HEALTH-RELATED QUALITY OF LIFE

Objectives: The purpose of this research is to develop a measure of oral health-related quality of life for use with children using a series of focus

groups to capture the "voices of the consumers" and create an instrument that reflects what is important to them. **Methods:** Focus groups were designed separately for 5-7- and 8-12-year-old children. Groups begin with an open discussion about children's oral health, emphasizing the personal experiences of the participants. Potentially important topics not raised spontaneously by participants are prompted by the facilitator. Subjects are recruited from low- and middle-income communities in the Boston area with an attempt to include English-speaking members of different cultures. **Results:** Preliminary data from discussions with 8-12-year-old children have yielded some interesting themes: 1) children talked more about esthetic concerns than clinical disease; and 2) children seemed to put greater emphasis on social impacts than functional impacts. **Conclusions:** The focus of 8-12-year-old children on issues that concern the way other people see them is not unexpected given their current developmental stage. However, it is interesting that the more objective experiences of pain or functional limitation were given so little attention. Clearly, the views and experiences of younger children need to be determined as well. Additional focus groups have been scheduled or planned to explore these and other themes in greater depth. Research supported by NIH grant #U54DE14264.

77. Javier de la Fuente, MSc, Segio Sanchez, DDS, Adriana Zubeta, DDS, Gilberto Ros, DDS, Department of Dental Public Health, School of Dentistry, UNAM, Mexico

ORAL HEALTH-RELATED QUALITY OF LIFE MEASURES AS A RESULT OF DENTAL TRAUMA

Objective: To assess dental trauma and quality of life in low-income adolescents in Mexico City. **Methods:** From a sample of 1,410 adolescents, 166 were selected for having a dental trauma in the last six months (11.77%). The Oral Impacts on Daily Performance (OIDP) index was used (alpha Cronbach=0.9595 validity in Mexican population). **Results:** 59.6 percent (n=99) were male, the most common traumas were enamel fracture 30.7 percent (n=51), enamel/dentin fracture 24.6 percent (n=41) and tooth loss 18 percent (n=30). The most common causes of trauma were accidental blows, 39.8 percent (n=66), and falls, 31.3 percent (n=52). The degree of affection was 99.4 percent (n=165) for eating and enjoying the food, 31.9 percent (n=53) for brushing their teeth, 30.7 percent (n=51) for smiling with confidence, 21.7 percent (n=36) for speaking, the rest (doing homework, practicing sports, and emotional stability) were less than 13 percent. Just 26.5 percent of all receive dental treatment or any advice. **Conclusions:** Dental trauma has an important impact in daily life and quality of life in adolescents. There are differences between sexes. Most dental traumas were unattended.

78. Wanda G. Wright, RN, DDS, MS, Boston University; Nancy R. Kressin, Edith Nourse Rogers Memorial Veterans Hospital, Boston University; Judith A. Jones, Boston University, Edith Nourse Rogers Memorial Veterans Hospital

THE USE OF OUTCOME MEASURES IN DENTAL EDUCATION: THE VALUE OF THE OH-1 AND DELTA

Objective: To examine the effect of dental treatment on patient-assessed outcomes of dental care. **Methods:** We measured self-assessed oral health in three groups of patients who presented for either prophylaxis (n=32), endodontic care (n=15), or for a removable prosthesis (n=16) in a dental school setting before and after treatment. Main outcome measures included the single-item self-report of oral health (OH-1) and the 6- and 12-item versions of the DELTA, a newly developed brief measure of oral quality of life. We used ANOVA to compute means of self-reported oral health by treatment group. **Results:** Of the 63 patients who completed the baseline questionnaire, 44 returned questionnaires after treatment (70%). The sample averaged 43+/- 15 years, 48 percent male and 56 percent with some college education. Ethnic representation included 35 percent white, 33 percent black and 32 percent other—mostly Latino. The mean self-reported number of teeth was 20.6. Endodontic patients had worse self-rated oral health on all measures. There were significant differences ($P=.001$) in pain and distress between prophylaxis and endodontic patients ($P=.001$) and between endodontic and removable prosthesis patients ($P=.001$). Of the 44 patients who completed both surveys, there was an improvement in the OH-1 in all groups. Items assessing being upset, depressed, and worry about dental

problems discriminates well between groups. **Conclusion:** Dental treatment had a positive impact on self-rated oral health in all groups. Individual items from the DELTA discriminate well between groups.

79. Angela Lee, Paolo Prolo, MD, Monica Cruz Rosenblum, Negoita Neagos MD, and Francesco Chiappelli, PhD, UCLA School of Dentistry, Los Angeles, CA

DOES MINDFULNESS MEDITATION STRESS REDUCTION AND MUSIC THERAPY WORK IN DENTISTRY? A SYSTEMATIC EVALUATION OF THE LITERATURE BY MEANS OF AN EVIDENCE-BASED RESEARCH APPROACH

Objective: Our purpose was to apply the systematic process of evidence-based research to determine whether mindfulness meditation-based stress reduction and music therapy are reliable in reducing dental anxiety. **Methods:** Evidence-based research consists of five specific points: a) state research question, b) establish required methodology, c) determine design, d) analyze the data, e) formulate inferences. We utilized Timmer, Jadad, and WWH scales to assess the quality of abstract, clinical trial design, and of paper's methodology, design, and statistical analysis in papers on mindfulness meditation-based stress reduction and music therapy. **Results:** All papers on mindfulness meditation for stress reduction therapy obtained an adequate WWH score (17 or above). Similar results were found for music therapy. Findings cast doubts about the reliability of Timmer scale: Timmer scores did not correlate with WWH scores ($r=0.06$, NS). **Conclusions:** Evidence-based research in medicine and dentistry is an emerging science of systematically formulating critiques of published research literature to establish the best available evidence in any domain in the health sciences. Our study establishes that both mindfulness stress reduction and music therapy are overall beneficial programs for patients with dental anxiety. Our analysis determines that missing information about the reliability and validity of questionnaires, and weak or erroneous statistical analyses are the most frequent deficiencies in this literature.

80. Kishore Shetty, DDS, MS, DDPH, Assistant Professor, LSU Health Sciences Center

EFFECTIVENESS OF ANTIBIOTICS IN HIV-POSITIVE PATIENTS UNDERGOING DENTAL PROCEDURES

Objectives: The aim of this systematic review was to investigate the effectiveness of prophylactic and postsurgical antibiotic use in HIV-positive patients undergoing invasive dental procedures in the era of highly active antiretroviral therapy using data from randomized controlled clinical trials (RCT). **Methods:** The review was prepared according to Cochrane Collaboration guidelines. The Cochrane Oral Health Group Specialist Register and the Cochrane Controlled Trials Register were searched (Cochrane Library 2002, Issue 2), together with Medline from 1966 or Embase from 1974. Several journals and proceedings from dental conferences in the past two years were also reviewed. **Results:** No RCT studies comparing the effectiveness of prophylactic and postsurgical antibiotics in HIV-positive patients undergoing invasive dental procedures. **Conclusions:** Clinicians and health care policy makers ought to be aware of the lack of reliable clinical evidence for or against the clinical effectiveness of antibiotic use during dental procedures. There is a great need for RCTs to determine the need for prophylactic or postsurgical antibiotic therapy.

81. Prasad Challagulla BDS, MPH, Victor Badner DMD, MPH, Cheryl Stolarski, DDS, Montefiore Medical Center, Bronx, NY

COMPARISON OF DMFS COUNTS BETWEEN HIV-POSITIVE AND NEGATIVE INDIVIDUALS

Objective: To compare DMFS between patients infected and those not infected with HIV. **Methods:** Subjects for this cross-sectional study were recruited from the Bronx Lebanon Hospital Center include 87 HIV+ and 100 HIV- individuals. Participants completed a questionnaire about drug history, dental care, demographics, etc. A dentist examined participants' teeth using NIDCR criteria. Data was analyzed using SAS version 6.12. **Results:** No significant difference is seen between DMFS of HIV+ and HIV- individuals (68 vs 63.4). We specifically considered the relationship of methadone therapy to HIV and DMFS as C. Stolarski et al. recently showed that mean DMFS is higher in methadone + vs methadone- individuals (84 vs 48.5; $P<.001$). The mean DMFS in HIV+

and - individuals without a history of methadone is not significant (48.7 vs 48.2). The mean DMFS in HIV+ and HIV- individuals with a history of methadone therapy was significantly different (88.5 vs 48.7; $P<.5$). The mean DMFS is highest in patients who are HIV+ and methadone+ and lowest in HIV- and methadone- individuals (88.5 and 48.2; $P<.001$). **Conclusions:** In general, there is no significant difference in mean DMFS counts between HIV+ and HIV- individuals. But, the mean DMFS count is significantly higher for those HIV+ vs HIV- individuals with a history of methadone therapy. While HIV may not directly be related to increased DMFS, there may be an interaction between methadone therapy and HIV infection that leads to the higher DMFS count seen above.

82. Vladimir W Spolsky, DMD, MPH, Division of Public Health and Community Dentistry, UCLA, Los Angeles, CA, John P Brown, BDS, PhD, Department of Community Dentistry, UTHSC, San Antonio, TX, Nancy Hudepohl, PhD, Academic Informatic Services, UTHSCSA, Raul I. Garcia, DMD, MMS, Department of Health Policy and Health Services Research, Goldman School of Dental Medicine, Boston University

THE TEACHING OF CARIES PREVENTION IN US AND CANADIAN DENTAL SCHOOLS: A NEW INITIATIVE

Objective: To describe the process, strategy, and short-term outcomes of the Clinical Preventive Dentistry Leadership Conference (December 2002, Cincinnati, OH). **Methods:** A preconference survey of current teaching and clinical practices in caries prevention was sent to all invitees. Faculty responsible for teaching caries prevention were invited from 66 dental schools in the United States and Canada to attend the Leadership Conference. Proceedings included reviews on health policy, etiology, diagnosis, science of cariology (including risk assessment), diet, and health behavior. A planning model (Senge) was employed to review organizational barriers to change in clinical teaching programs. Program changes made in four selected dental schools were presented as examples. **Results:** Faculty from 64 of the 66 dental schools attended. 85 percent were responsible for teaching clinical prevention and represented a cross-section of disciplines. 68 percent of the schools have written competencies in preventive dentistry. One short-term outcome is that about one-third of all schools have developed or are developing plans for improving caries prevention education. **Conclusions:** Planning that takes account of organizational barriers to change can lead to improvement in teaching dental caries prevention and management. Students who graduate with enhanced skills in caries diagnosis and management, and delivering dental services efficiently will ultimately change dental practice in the United States and Canada. Supported by Procter & Gamble Oral Care.

83. Mina Habibian, DMD, MS, PhD, Jennifer Holtzman, DDS, Hazem Seirawan, DDS, MPH, Niel Nathanson, MS, MPH, Roseann Mulligan, DDS, MS, USC School of Dentistry

THE IMPACT OF A SERVICE-LEARNING PROGRAM (SL) ON FRESHMAN DENTAL STUDENTS' ATTITUDES

Objectives: To investigate the impact of a service-learning (SL) program on the attitude of dental students toward underserved populations. **Methods:** Freshmen at the USC School of Dentistry participated in a mandatory SL program. Groups of four students provided four OHE sessions and one screening to 639 second graders at six schools located in low-income, inner city Los Angeles. A validated questionnaire (Crandall et al., 1993) was used to obtain information on attitudes toward providing care to underserved populations. Pre- and postquestionnaires were administered during the first year. **Results:** 104 out of 142 students completed both questionnaires. 39 percent were female, mean age (SD) was 24 (3) years, 49.5 percent were Caucasian, 40 percent Asians, 4 percent Hispanic, and 7 percent others. Mean attitude scores were 78.8 (7.8) and 78.4 (8.3) at pre- and posttest, respectively. Univariate analysis showed no difference in the total attitude scale, and declines on professional responsibilities ($P=.02$) and personal efficacy ($P=.03$) at posttest. Attitudes on access to free care improved at posttest ($P=.03$). Females scored better than males at both pre- and posttests ($P=.004$). Only the posttest was statistically significant ($P=.004$). Caucasians scored lower on professional responsibility at posttest ($P=.01$). Attitude was not related to education debt and experience of volunteer work. **Conclusions:** Freshman students have generally favorable attitudes to-

ward providing care to underserved patients with attitudes remaining stable after completion of a SL program.

84. *Amber L. Ryan, Health Educator/Community Academic Coordinator, Linda Kaste, DDS, PhD, Associate Professor and Director, Predoctoral Dental Public Health, University of Illinois at Chicago*

A POSITIVE COMMUNITY EXPERIENCE FOR DENTAL STUDENTS: LESSONS LEARNED

Objective: To introduce dental students to the strategies and importance of community-based education (CBE). **Methods:** "Introduction to Community-based Education" was a new 15-hour course taught to all first-year dental students in the fall of 2003. The course was taught in small group rotations. Students participated in didactic and interactive education prior to their off-campus activities. The 65 dental students visited four elementary schools located in select underserved areas of Chicago, where they provided oral health education to first, second, and third graders. Each group summarized their experiences in the form of an oral presentation, which took place on the last day of class. The course was graded, and each student completed a final course evaluation. **Results:** Proactive organization and consistent communication with students as well as community partners made for a positive and rewarding experience for all parties. The majority of students reflected on their experiences as being a confidence-builder, an eye-opener, and a valid use of their time. Students expressed an increased desire to participate in future CBEs. **Conclusions:** A nonclinical CBE for first-semester first year dental students is a great way to build momentum and morale for students, as well as a way to identify off-campus education as interesting and valuable. Take-away messages include: taking time to build community relationships, allowing time for student self-learning, and providing student with the tools necessary to make the most of their experience.

85. *Jennifer Holtzman, DDS, Mina Habibian, DMD, MS, PhD, Hazem Seirawan, DDS, MS, and Roseann Mulligan, DDS, MS, University of Southern California, Los Angeles*

METHODS AND MATERIALS USED BY DENTAL STUDENTS FOR ORAL HEALTH INTERVENTIONS

Objectives: Freshman dental students were asked to provide oral health education programs to 2nd graders. We evaluated the methods and materials chosen for these interventions. **Methods:** All freshman dental students participated in the development and implementation of four one-hour classroom interventions with second grade classes that covered topics including oral health self-care, professional care, and careers in dentistry. Dental students were encouraged to use their creativity to develop a curriculum. Students were offered faculty and staff support as well as a limited amount of financial resources. Each group of students was asked to record the methods and materials of each intervention. **Results:** A total of 127 interventions out of 144 interventions were recorded by students. Of these, 54 percent of the interventions were lecture, 53 percent group demonstration, 40 percent individual instruction, 10 percent play/skit, 5 percent song, and 15 percent other. Dental students used a variety of materials in the interventions, namely giant mouth models and giant toothbrushes, 67 (53%); visual aids, 48 (38%); large props, 28 (22%); disclosing tablets, 26 (20%); video, 5 (4%); and others, 18 (14%). **Conclusions:** Data indicate that freshman dental students are capable of providing oral health interventions and using a variety of intervention methods and materials; however, they are most comfortable using lectures and group demonstrations as methods of instruction.

86. *Niel Nathason, MA, MPH, Division of Health Promotion, Disease Prevention and Epidemiology, University of Southern California, Los Angeles, CA*

CAMPUS-COMMUNITY COLLABORATIONS TO IMPROVE DENTAL CARE

Objective: To explore community partnerships of an academic health training program as effective models of increasing access to care for inner-city populations. **Methods:** To provide preventive and comprehensive oral health care to indigent, noninsured adults and children in several areas of central Los Angeles, innovative collaborations have been formed between the USC School of Dentistry (USCSD) and 1) a

hospital conversion foundation (QueensCare), 2) faith-based homeless shelter (Union Rescue Mission), and 3) public school district (LA Unified SD). Through outreach and networking, faculty from USCSD have established formal affiliations with these organizations to develop: a three-vehicle, 10-chair, mobile clinic program; seven operator fixed site clinic; and eight-chair portable program. **Results:** Effective program development and budget sharing have been accomplished to initiate and operate these clinical services. Resources have been optimized, e.g., USCSD DDS/DH student staffing, agency contributions and volunteers, corporate/charitable donations, foundation funding, and government grants/reimbursements. Not only are thousands of patients benefiting from these partnerships, but also hundreds of DDS and DH students participating in service-learning activities. **Conclusions:** Campus-community collaborations are effective in increasing access to care to underserved populations and in developing clinical practice, multidisciplinary training, and public health experience for university dental schools.

87. *Juana Cavinder, DDS, University of Southern California School of Dentistry, Office Of Community Health Programs*

UNIVERSITY OF SOUTHERN CALIFORNIA SCHOOL OF DENTISTRY/QUEENSCARE MOBILE DENTAL CLINIC PROGRAM

Objective: To describe a program whereby dental school operated mobile clinics in partnership with nonprofit foundations and a school district provide free comprehensive dental care to underserved second/third graders at their school site. **Methods:** Collaborative planning among the USCSD, QueensCare (QC), Everychild Foundation, and the Los Angeles Unified School District (LAUSD) facilitated the development/operation of two mobile dental vehicles, with six dental operators. LAUSD schools with adequate space to park and secure vehicles collaborate with QC and USC to host clinics. Senior dental/hygiene students are assigned to one-week rotations. Two DAs, one office manager, and 1.5 FTE faculty complete the staffing. In addition to comprehensive care, oral hygiene instruction is provided in the classrooms by USCSD. **Results:** The USC/QC Mobile Clinic has operated successfully for two years. Screening statistics show that 65 percent of the children had never seen a dentist and 55 percent had advanced tooth decay. Depending on the size of the school and the needs of the children, 4-8 schools are visited in one year. At one school, more than 600 children were screened. Treatment provided included 400 cleanings, 1,500 sealants, and 1,000 procedures (fillings, extractions and pulpotomies). **Conclusion:** Partnering with schools and nonprofit organizations allows dental school programs to multiply resources, thereby providing greater access for underserved children with significant need and no previous oral health care.

88. *Diana Christie, DMD, Marvin Marcus, DDS, MPH, Division of Public Health and Community Dentistry UCLA School of Dentistry*

EVALUATION OF A COMMUNITY-BASED DENTAL CLINIC STUDENT PROGRAM

Objective: To compare an existing one-week block assignment with a new one-year longitudinal rotation of students to a community-based clinic. **Methods:** We established a senior select pilot program with six students to provide comprehensive care one day per week for a year. Data on visits, procedures, and production were gathered from the UCLA computer database for the period 7/1/01 to 6/30/02. Case completion was determined by manual chart review. **Results:** Select students completed 291 visits in 112 days. Average production was \$107.29 per visit and \$278.77 per day. The same students on block rotation completed 131 visits in 43 days. Average production was \$52.89 per visit and \$161.14 per day. Select students had 103 percent increased production per visit and 73 percent increased production per day. Select students completed 70 percent more amalgams, 26 percent more composites, and 15 percent more extractions. They completed crowns and root canals, while block students did not. Block students completed 93 percent more examinations and 72 percent more simple cleanings. Select students completed 26/106 (25%) cases and block students completed 18/108 (17%). **Conclusions:** Results indicate that a longitudinal rotation is more productive than a block assignment for providing comprehensive care. While select students completed 47 percent more

cases, they still only completed 25 percent of cases. This raises questions regarding case selection for specific procedures that might partially explain the increase in operative productivity among select students.

89. Laura Kathleen Elizondo, DDS, Armando Lopez, DDS, USC-Union Rescue Mission, Los Angeles, CA

DEVELOPMENT OF A UNIVERSITY-BASED CLINIC TO MEET THE ORAL HEALTH CARE NEEDS OF THE HOMELESS IN LOS ANGELES' SKID ROW

Objective: Improve the oral health status of the homeless, increase the number of homeless seeking dental care, and increase the number of dental/dental hygiene students providing care to the homeless. **Methods:** Through a joint effort between the University of Southern California School of Dentistry (USCSD) and the Union Rescue Mission (URM), a six-chair dental clinic was opened in 2000 for the homeless in Los Angeles' Skid Row. Two USCSD faculty members manage the clinic. USCSD students volunteer for six-week rotations, providing comprehensive and emergency dental care. The program's success is being assessed through data on the number of homeless receiving care and the services rendered; and the number of students rotating through the clinic and their evaluation of the experience. **Results:** Approx. 2,000 homeless individuals have received care. All nonemergency patients receive a comprehensive exam, prophylaxis, and oral hygiene instruction. Other services provided include: fillings (40%), extractions (25%), dentures (25%), and root canals (10%). Last year, >185 students provided care and the majority reported a very positive experience. **Conclusions:** A dental clinic for the homeless, operated by USCSD faculty and students, has been a successful model for: 1) reaching the homeless to improve their oral health status, 2) increasing the number of homeless persons receiving dental care, and 3) increasing opportunities for students to provide care to this population.

90. Michael S. Oliphant, BA, University of Illinois at Chicago (UIC); Linda M. Kaste, DDS, PhD, UIC; Larry B. Salzmann, DDS, UIC

CAN-DO: EVALUATION OF A PROGRAM PROMOTING PARTNERSHIPS BETWEEN A DENTAL SCHOOL AND COMMUNITY HIV/AIDS CLINICS

Objective: To increase collaboration between the University of Illinois at Chicago College of Dentistry (COD) and community HIV/AIDS clinics, thereby changing dental students' perceptions and apprehensions of possible risks and patient stereotypes, and giving future dentists a chance to practice in a real-world setting. **Methods:** Using HRSA support, Chicago AIDS Network for Dental Outreach (CAN-DO) provides for a community HIV clinic to be among the students' first off-campus clinical rotations. During the 2003-04 academic year, D4 students will spend two full days treating patients at this clinic. The partnership is further enhanced by the Midwest AIDS Training and Education Center's assistance in training the students prior to their rotations. **Results:** While still in the initial year of clinical partnership, much has been gained from the experiences. The COD has learned much about the processes of establishing clinical affiliations, students have learned to see themselves as community health care providers, and the clinics see their influence on engaging future dentists as providers of health care to patients with otherwise limited access to it. **Conclusions:** Initiation of this rotation has shown great potential for adding services to a vulnerable patient population living with HIV, as well as providing a platform to see if CAN-DO graduates will be more likely to service special-needs patients than those who have not gone through community-based rotations.

91. Susan G. Reed, DDS, MPH, DrPH, Nadia G. Duffy, MD, MPH, Gabrielle F. Cannick, BS, DMD/PhD student, K. Christian Walters, BS, MD student, Terry A. Day, MD, Medical University of South Carolina

ORAL CANCER PREVENTION AND DETECTION: A SURVEY OF DENTAL AND MEDICAL STUDENTS

Objective: To elucidate differences in oral cancer knowledge, opinions, and experience amongst the dental and medical students. **Methods:** This study was a cross-sectional survey of a census of the dental and medical students using a self-administered questionnaire of 25 pilot-tested multiple choice and Likert-style questions. Questions related to oral cancer prevention—i.e., knowledge of risk factors and counseling for high-risk

behaviors—and questions related to oral cancer detection—i.e., knowledge of signs and symptoms, and examination skills. Data were entered twice using Epidata and analyzed with the SAS statistical program. **Results:** The overall response rates were 80 percent for the 163 dental students and 78 percent for the 450 medical students. For all students, results showed statistically significant differences between the first and second year students compared to the third and fourth year students for knowledge of risk factors, tobacco cessation techniques, and signs and symptoms of oral cancer. Compared to the medical students, a higher proportion of the dental students gave correct responses for knowledge of risk factors and signs and symptoms of oral cancer. In general the medical students did better with the extraoral compared to intraoral information and the dental students did better with the intraoral information compared to the medical students. **Conclusions:** Results of this study provide evidence to support revised training for the dental and medical students in oral cancer prevention and detection.

92. Irene Hilton, DDS, MPH, Samantha Stephen, RDH, MS, San Francisco Department of Public Health, Tina McRee, MA, Center for Health Professions, University of California San Francisco

EXPLORING CULTURAL BELIEFS AND PRACTICES INFLUENCING ACCESS TO EARLY PREVENTIVE ORAL HEALTH CARE IN CHILDREN AGES 1-5 YEARS

Objective: Cultural beliefs and practices that could influence access to preventive oral health care in children were assessed among African-American (AA), Chinese, Filipino, and Hispanic caregivers of children 1-5 years of age. **Methods:** 4-6 focus groups of between 8-12 participants were conducted in each of the African-American, Chinese, Hispanic, and Filipino communities. Participants were caregivers of children ages 1-5. Groups were stratified by age and, except the African-American community, by place of birth. **Results:** Groups varied in attitudes to preventive care. African-American participants desired preventive care so their children could have better outcomes. In Chinese and Filipino groups, perspectives on preventive care differed among young/old, and US-born/non-US-born. Latino respondents viewed dental care as an accepted practice, but felt that children's oral health outcomes were uncontrollable. All groups stated that the purpose of baby teeth was for eating. Only Chinese respondents related teeth as a marker of overall health. For Latino and Filipino groups the significance of teeth related more to appearance. Dental fear, from prevailing community beliefs or personal negative dental experiences, also influenced attitudes of accessing preventive care. **Conclusions:** There are both similarities and differences among racial/ethnic groups in how cultural beliefs and practices influence accessing dental care. These factors need to be explored more. Support: DHHS/NIH/NIDCR U54 DE142501 Center to Address Disparities in Children's Oral Health.

93. Faith Y. Miller, CDA, RDH, MSED, and Leigh A. Tiebout, CDT, MSED, Department of Health Care Professions, Southern Illinois University, Carbondale

DENTAL HYGIENE AND DENTAL TECHNOLOGY: AN EFFECTIVE COLLABORATION FOR THE SUCCESS OF PROJECT MOUTHGUARD

Objective: The purpose of the Project Mouthguard (PM) grant program from the Illinois Department of Public Health/Division of Oral Health (IDPH/DOH) was to provide protective mouthguards (MGs) to primarily underserved children aged 5 to 17 years who were actively engaged in sports or recreation activities that posed potential risk of orofacial injury. An additional goal of PM was to change policy among schools regarding the wear or inclusion of MGs as part of protective sports equipment. **Methods:** The SIUC Dental Hygiene Program (DHP) received grant funding for PM. The project employed the use of dental hygiene students and faculty who collected medical and dental information, and took impressions needed for models. Dental Technology Program (DTP) students and faculty poured the models and fabricated the MGs. Services were provided to not only grant-eligible children, but also any child who wanted to participate. Delivery settings varied from the campus clinic and private practice to a church multipurpose room and a sports center. **Results:** The collaboration has enabled the successful and timely completion of 78 MGs, two orthodontic appliance, and three night guards for bruxing. **Conclusions:** Both students and faculty were

able to benefit from the experience of planning and coordinating activities in their respective disciplines to deliver custom manufactured mouthguards. The future status of the project depends on available funding from IDPH/DOH or other source, and the continued efforts of the DHP and DTP.

AAPHD Student Merit Award Program Abstracts

94. Douglas T. Manning, DMD, JD, MPH, University of Florida College of Dentistry

EXAMINING RACIAL DISPARITIES IN ORAL AND PHARYNGEAL CANCER MORTALITY AND SURVIVAL RATES: IS HEALTH INSURANCE A FACTOR?

Objective: This study assessed whether differences in health insurance may contribute to the racial disparities in oral and pharyngeal cancer mortality and survival rates. **Methods:** The Shands Tumor Registry provided a sample of 987 oral or pharyngeal cancer cases registered at Shands hospital at the University of Florida from 1996 to 2002. Simple frequencies revealed gross distribution of cases among insurers. Chi-square analysis, binary logistic regression, and Cox regression were used to evaluate crude associations among covariates, insurer, and death. Crude unadjusted mortality rates and mean relative survival rates were determined for race among insurers and race within specific insurers. **Results:** Mortality and survival outcomes differed among insurers. Generally, the more an insurer paid toward treatment coverage, the better the outcome. Blacks were more likely than whites to have insurance with poorer outcomes, while whites tended to have insurance with better outcomes. However, within the same or similar insurance plans, whites still had better outcomes than blacks. **Conclusions:** The results of the study indicate that health insurance may be a significant factor in the racial disparity in oral cancer mortality and survival rates.

95. Justine Kolker, DDS, PhD, University of Iowa College of Dentistry
THE COST EFFECTIVENESS OF LARGE AMALGAM AND CROWN RESTORATIONS OVER A 10-YEAR PERIOD.

Objective: Studies have shown that crowns last longer than large amalgams, but few have incorporated the difference in cost between these procedures into the equation. This study compared the cost effectiveness of large amalgams (LA) and large amalgams with crowns (LAC) over five and 10 years with catastrophic subsequent treatment (root canal therapy or extraction) as the outcome. **Methods:** Administrative data for patients seen at the University of Iowa, College of Dentistry for 1,735 LA and LAC restorations in 1987 or 1988 was used. Costs of initial treatment (LA or LAC) and future treatment were determined, discounted, and averaged. The effectiveness measure was defined as the number of years a tooth remained in a state free of catastrophic subsequent treatment (FOCT). FOCT years were discounted and averaged. FOCT years also accounted for individuals who dropped out or withdrew from the study. **Results:** LAC teeth had higher effectiveness values at a much higher cost. LA teeth had lower cost-effectiveness ratios at five and 10 years. Teeth in women and those in the maxillary arch had better cost-effectiveness ratios. **Conclusions:** When cost is factored into the decision making process, LAs are more cost effective than LACs, even when considering the first replacement of an LA. This has important implications for rational treatment planning undertaken routinely in public health clinics as well as for private practitioners.

96. Jayasanker Valiyaparambil, BDS, MPH, Oral Health Section, NC Division of Public Health, Raleigh, NC and School of Public Health, University of North Carolina at Chapel Hill, Chapel Hill, NC

IMPROVING RESPONSE RATES IN A SCHOOL-BASED DENTAL SURVEY: A GROUP-RANDOMIZED TRIAL

Objective: The purpose of this study was to determine the effects of teacher and student monetary incentives on response rates in a school dental survey. **Methods:** 1,482 students in first, sixth, and tenth grades attending public schools in North Carolina were recruited into a group-randomized trial. The sample was stratified according to county median household income and participation in the school free and reduced lunch program. Positive response required completion of a 41-item questionnaire distributed to parents by way of the child, parental consent to screen the child, and the dental screening. The effects of

incentives to teachers and to students on group response rates were each tested against a control group using a chi-square test, controlling for school grade and income level. **Results:** The overall positive response rate was 38 percent, but differed by school income level and grade. For low-income schools, teacher incentives were effective in grade 1 (57% vs 38% control), student incentives in grade 6 (73% vs 39% control), and both teacher (35% vs 18%) and student incentives (32% vs 18%) in grade 10. In high-income schools, only student incentives in grade 10 were effective (49% vs 23%). **Conclusion:** The results of this study suggest that monetary incentives can help improve response rates in school-based dental surveys. The decision to use monetary incentives in school surveys may depend on the socioeconomic characteristics of the community and the grade level in addition to budgetary considerations.

97. Khaled Alblouishi, BDS; Raul Garcia, DMD, MMedSc, Professor and Chair Department of Health Policy and Health Services Research, Boston University, Goldman School of Dental Medicine

ASSESSMENT OF ORAL HEALTH PROFESSIONALS' KNOWLEDGE, ATTITUDE, AND PRACTICES TOWARDS TOBACCO USE AND CONTROL IN THE UNITED ARAB EMIRATES

Objective: To assess the knowledge, attitudes, and practices of health providers in the United Arab Emirates toward tobacco use and control, and to compare these to other health providers. **Methods:** An anonymous self-administered questionnaire was distributed to 1,460 oral health providers and physicians in the main cities of the UAE. Except for the private dental clinics in Dubai, which received the questionnaires by mail, distributing and collecting the questionnaires were done personally by the primary investigator from September to December 2001. **Results:** The response rate was 64.4 percent. The prevalence of tobacco use among the health care providers was 9.3 percent. Tobacco use rate was higher among the dentists than physicians. The use of tobacco inversely influenced their interest in and tobacco control activities. More than two-thirds of them were considered moderate in terms of knowledge and had a positive attitude toward tobacco control. However, tobacco control services were not a routine practice of majority of health care providers. Physicians were better than dentists in providing tobacco control activities. Attending a tobacco control course improved the tobacco control activities. However, 88.1 percent of them didn't have the training. **Conclusion:** The tobacco use rate is relatively low among the health care providers. The provision of tobacco control services for patients was not routinely provided. The authorities in the UAE should develop and implement comprehensive clinical guidelines in tobacco control. Also, there is an imperative need for tobacco control training courses.

98. Joseph A. Bartoloni, DMD, MPH, Dental School, University of Texas Health Science Center at San Antonio

THE VALIDITY OF TWO IN-OFFICE DENTAL UNIT WATERLINE TEST KITS

Objective: To determine the validity of two in-office water test kits (Millipore HPC Sampler, Clearline Water Test Kit) compared to R2A agar (gold standard) used for monitoring the quality of dental treatment water. **Methods:** Over a 12-week period, nine dental units from a teaching institution were monitored. Each unit was equipped with an independent water reservoir. A total of 351 samples were collected, cultured via the three test methods, bacterial colonies were counted manually, and validity was assessed using two different cutoff values: ≤ 200 colony-forming units per milliliter (American Dental Association goal), and ≤ 500 colony-forming units per milliliter [Centers for Disease Control and Protection (CDC) recommendation, and Environmental Protection Agency (EPA) mandate]. **Results:** Of the 351 samples taken, the in-office test kits had an accuracy rate ranging from 26 percent to 69 percent based on both the ADA and CDC/EPA guidelines. **Conclusions:** Overall, the in-office test kits underestimated bacteria levels, producing inaccurate measures of bacterial levels compared to the gold standard. The data suggest that use of the two in-office test kits could result in a lack of compliance due to underestimation of bacterial contamination with either recommendation for water quality in dental unit waterlines.

99. Susan Hyde, DDS, MPH, PhD, Jane Weintraub, DDS, MPH, University of California San Francisco, CA

AN EVALUATION OF THE SAN FRANCISCO DEPARTMENT OF HUMAN SERVICES WELFARE DENTAL PROGRAM

Objective: To evaluate the welfare-to-work San Francisco Personal Assisted Employment Services (PAES) Dental Program. **Methods:** A cohort of 377 study participants in the novel PAES Dental Program were followed through their baseline examination, rehabilitative dental treatment, follow-up exam, and completion of patient satisfaction survey. A framework of structure, process, and outcome measures was used to evaluate the success of the Dental Program. Chi-square test, logistic regression, and paired *t*-test were used to analyze the levels of participation and satisfaction in the program. **Results:** Of the 377 study participants, 265 (70%) completed their rehabilitative dental treatment. Those who completed their dental treatment had more missing teeth and fewer decayed teeth at baseline than those who did not complete their treatment. Based on a Medicaid fee schedule, the mean treatment cost was \$1,035 per person. High levels of patient satisfaction were reported for the Dental Program. Ninety-seven percent of 173 respondents felt that they had been treated with respect, 92 percent were satisfied with the scheduling of their appointments, 91 percent were satisfied with their Dental Program experience, and 90 percent felt that their chief complaint had been solved. **Conclusions:** The PAES Dental Program provided high levels of patient satisfaction for process and outcome measures.

100. Karin Weber-Gasparoni, DDS, MS, PhD, Department of Pediatric Dentistry, University Iowa, Iowa City, IA

THE EFFECTIVENESS OF THREE EDUCATIONAL INTERVENTIONS IN THE PREVENTION OF EARLY CHILDHOOD CARIES

Objective: This study investigated the ability of educational interventions to modify maternal knowledge, behavioral intent and behavior, and children's plaque and *Streptococcus mutans* (SM) levels for the prevention of Early Childhood Caries (ECC). **Methods:** 115 WIC-enrolled mother-child dyads were randomly assigned to three groups: Group I (videotaped autonomous message), Group II (videotaped controlling message), and Group III (educational brochure). Self-determination Theory of Motivation provided the theoretical support for the message delivered to Group I. Data collection consisted of pre-/post-intervention questionnaires and pre-/postscores of children's plaque and SM levels. Time elapsed between baseline and follow-up was three months. **Results:** 86 mother-child dyads (75%) completed the study. All three groups demonstrated significant decreases in child SM levels ($P=.031$) and positive significant changes in maternal self-reported knowledge ($P<.001$) behavioral intent ($P<.001$) and behavior. Between-group differences were not significant. Positive behavioral changes reported included: increase in child's daily brushing habits ($P=.001$), increase of fluoridated toothpaste use ($P<.001$), decrease in child's frequency of daily snacks ($P<.001$), improvement in child's sippy-cup's content ($P=.013$), and decrease in mother's habit of kissing their child

on the mouth ($P=.013$). **Conclusions:** Educational interventions can improve children's SM levels and maternal knowledge, behavioral intent, and behavior related to ECC.

101. Gabrielle F. Cannick, BS, Medical University of South Carolina ORAL CANCER KNOWLEDGE AMONG SOUTH CAROLINA DENTAL STUDENTS

Because South Carolina (SC) has the highest oral cancer (OC) mortality rate among the 50 states, Medical University of South Carolina (MUSC) dental students should acquire knowledge concerning OC prevention and early detection. **Objective:** This cross-sectional study describes the OC knowledge of MUSC dental students. **Methods:** In 2002, 163 students were surveyed using a written questionnaire (response rate=80%). The questionnaire included OC risk factors and OC diagnostic signs, symptoms, and examination procedures. Univariate and bivariate analyses were performed using SAS. **Results:** At least 93 percent of students replied that the use of tobacco, alcohol, and having a prior oral cancer lesion were risk factors for OC. About 65 percent correctly knew that the most likely site for OC is the ventral-lateral border of the tongue. Third and fourth year dental students were more knowledgeable in all areas compared to first and second year students. **Conclusions:** Although the level of OC knowledge increased with academic year, a greater emphasis needs to be placed on OC education and training in dental school. Morbidity and mortality from oral cancers are more likely to be reduced if dental providers know how to prevent and detect oral cancer.

102. Michael Franzman, BA, University of Iowa

PATTERNS OF DENTIFRICE USE IN CHILDREN AGE 6-60 MONTHS

Objective: The objective of this project is to describe toothbrushing and fluoride dentifrice use in a cohort of children from ages 6 to 60 months and to disperse this information via professional journal publication and presentations. **Methods:** The data for this study are from the Iowa Fluoride Study, a longitudinal study that has gathered data on about 700 children from birth. Data were collected every few months by questionnaire concerning fluoride exposures and ingestion, and 698 had dental caries examinations of the primary dentition at 4-5 years of age. Data was collected and statistical analyses were conducted to observe patterns of dentifrice use and brushing. **Results:** The number using dentifrice increased rapidly to 20 percent (9 months), 71 percent (16 months), and over 97 percent (36 months). The percentage with teeth brushed twice or more per day increased from 4 percent (6 months) to 25 percent (24 and 36 months), and 40 percent (60 months). The mother alone most often placed the dentifrice on the toothbrush. At 6 months, 86 percent had their mothers alone clean their teeth, decreasing to 68 percent (12 months), 22 percent (36 months), and 5 percent (60 months). **Conclusions:** Even at age 5 years, only about 40 percent of children were brushing the recommended twice per day. Mothers played the most important role in the children's home care habits throughout the five years. Children's oral health habits must be improved to lower the rates of caries.

Copyright of Journal of Public Health Dentistry is the property of American Association of Public Health Dentistry and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.