

Education in HIV Risk Screening, Counseling, Testing, and Referral: Survey of U.S. Dental Schools

Lauren L. Patton, D.D.S.; V. Allen Santos, M.P.H.; Rosemary G. McKaig, Ph.D.; Diane C. Shugars, D.D.S., M.P.H., Ph.D.; Ronald P. Strauss, D.M.D., Ph.D.

Abstract: According to Centers for Disease Control and Prevention estimates, thousands of Americans are infected with HIV but are unaware of their infection status. National disease prevention goals to identify and treat these individuals will benefit from HIV risk screening, counseling, testing, and referral services conducted in nontraditional settings and the use of alternative diagnostic methods such as oral fluid-based HIV antibody testing. Using a mail survey of the fifty-four U.S. dental schools (85 percent response rate), this study assessed the teaching and practice of HIV risk screening, as well as the opinions of dental educators regarding HIV counseling and testing and a possible role for oral fluid-based HIV antibody testing in dental offices. All responding dental schools have curriculum and clinical education training regarding HIV behavioral risks, medical history, and use of oral manifestations as indicators of HIV. Educators felt risk screening and referral for HIV counseling and testing was part of a dentist's professional role. One-third of respondents indicated they might include HIV counseling and testing using a rapid oral fluid-based HIV antibody test in their clinics. However, these respondents lacked confidence that graduating dentists have the skills and willingness to conduct HIV counseling and testing in dental practice. Lack of training in prevention counseling was seen as a primary barrier.

Dr. Patton is Associate Professor, Department of Dental Ecology, School of Dentistry; Mr. Santos is a graduate student, Department of Health Policy and Administration, School of Public Health; Dr. McKaig is Research Assistant Professor, Department of Dental Ecology, School of Dentistry; Dr. Shugars is Associate Professor, Department of Dental Ecology, School of Dentistry and Department of Microbiology and Immunology, School of Medicine; and Dr. Strauss is Professor, Department of Dental Ecology, School of Dentistry and Department of Social Medicine, School of Medicine—all at the University of North Carolina, Chapel Hill. Direct correspondence and reprint requests to: Dr. Lauren L. Patton, Department of Dental Ecology, CB 7450, School of Dentistry, University of North Carolina, Chapel Hill, NC 27599-7450; 919-966-2792 phone; 919-966-6761 fax; Lauren_Patton@Dentistry.unc.edu.

Key words: HIV, AIDS, dentistry, HIV antibodies, AIDS serodiagnosis, dental education, questionnaires

Submitted for publication 5/7/02; accepted 8/8/02

Despite extensive education and prevention efforts, the Centers for Disease Control and Prevention (CDC) estimates over 300,000 Americans are unaware they are HIV positive, while an additional 40,000 become infected annually.¹ These numbers may be reduced if more health providers offered voluntary human immunodeficiency virus (HIV) counseling, testing, and referral services to at-risk individuals, employed rapid testing technologies for screening, and offered these services in nontraditional settings.² In the revised HIV guidelines for counseling, testing, and referral,³ the CDC recommends that HIV interventions should ideally consist of integrated prevention counseling and testing services. However, the guidelines also acknowledge the need of public and private providers to have flexibility in offering prevention counseling and HIV testing as separate services. That is, prevention counseling could be offered without HIV testing and vice versa. When disaggregated counseling, testing, and

referral services are offered, clear and appropriate methods of patient referral to other providers are essential to access the missing component. Nevertheless, all HIV testing should include pre/post-test counseling that is considered to be informational in nature and includes how HIV is transmitted and prevented, the meaning of HIV test results, and how to obtain further information or prevention counseling.³

Standard HIV-1 antibody testing with blood-based plasma or serum tests involves an initial screening enzyme immunoassay. If this initial screening test is negative, then the HIV antibody test is read as negative. If the enzyme immunoassay is indeterminate or reactive (positive), the blood specimen is retested in duplicate. If this is negative, the testing ends and the test is reported as negative, whereas if either duplicate test is indeterminate or reactive, a more specific immunofluorescence assay or Western blot assay that detects selective HIV surface protein markers is done as a confirmatory test.³ A report of HIV-anti-

body status using this traditional method of sequential testing involves laboratory testing time varying from a few days (usually when the initial enzyme immunoassay is negative) to one to two weeks (usually when the repeated enzyme immunoassays and confirmatory immunofluorescence assay or Western blot assay are positive).³

Several nontraditional tests for HIV-1 antibodies (shown in Table 1) are currently approved for use in the United States or are undergoing clinical trials. Oral mucosal transudate-based strategies allow fluids to be collected easily, with minimal training, and under safe collection procedures that avoid the use of needles and glass collection tubes. These systems consist of a treated cotton pad or collection platform that is placed between the cheek and lower gum for two minutes.⁴ The devices draw antibody-rich transudate from the oral mucosa that can be tested for HIV-1 antibodies. Rapid enzyme immunoassay HIV-1 tests can be performed accurately, at reasonable cost, and within the time frame (results within one hour) of a typical clinic visit in many public health settings.⁵ Although a preliminary HIV positive diagnosis may be given at the time of testing, a confirmed result requires a return visit and additional testing.³ Rapid, on-site HIV testing has also been preferred by clients in different testing settings and has resulted in significant improvement in the number of persons learning their serostatus, without increasing the costs or decreasing the effectiveness of counseling and test-

ing.⁶ Coupling oral mucosal transudate collection with rapid on-site HIV testing should further improve the delivery of HIV prevention services by allowing test results to be obtained shortly after fluid collection. Because results do not require a laboratory, this test could be conducted in most dental practice settings.

Oral mucosal transudate-based rapid HIV antibody tests might also serve as a means to expand health screening for HIV/AIDS into nontraditional settings such as dental schools and private dental offices. Estimates from several national surveys completed in the 1990s indicate that 58 to 75 percent of the U.S. population visits a dentist yearly.⁷ For the asymptomatic HIV-infected person, a visit to the dentist may be the only health care sought during the year. The national Medical Expenditure Panel Survey indicates that approximately 115 million civilian, non-institutionalized Americans made at least one visit to a dentist in 1996. The vast majority of these visits were for diagnostic procedures including examinations and radiographs.⁸ Each diagnostic visit provides an opportunity to screen for systemic diseases such as HIV/AIDS through medical history review and routine head and neck examinations for HIV-associated oral manifestations such as candidiasis, hairy leukoplakia, Kaposi's sarcoma, lymphoma, or necrotizing ulcerative periodontal disease.⁹ Notably, oral manifestations of HIV are indicators of possible HIV infection in undiagnosed individuals and are markers for immune suppression.¹⁰

Table 1. Oral fluid and/or rapid HIV-1 antibody tests

Test name and manufacturer	Fluid source	Rapid test *	Requires lab	Requires needles	Collection device	FDA approval status
OraSure® [OraSure Technologies, Bethlehem, PA]	OMT	No (traditional test sequence with 1-2 weeks for result reporting)	Yes	No	Treated cotton pad	Collection device approved 12/1994; Western blot approved 6/1996
Single Use Diagnostic System HIV-1® (SUDS) , [Abbott Murex, Abbot Park, IL]	Blood plasma or serum	Yes (results within 1 hour)	Yes	Yes	Venipuncture and serum separator tube	Approved 5/1992
OraQuick® , [Abbott Laboratories, Abbott Park, IL and OraSure Technologies, Bethlehem, PA]	Whole blood plasma or serum	Yes (results within 20 minutes)	No	Yes	Cotton pad collection platform and finger stick device	Conditional approval 5/2002
	OMT	Yes (results within 20 minutes)	No	No	Cotton pad collection platform	In clinical trials

Key: OMT=Oral Mucosal Transudate

*All rapid tests are based on enzyme immunoassays and require subsequent Western blot testing for confirmation.

The professional role of dental health care workers has traditionally been seen as restricted to the care of the oral cavity. However, a broader vision of dentists as full partners in the health care enterprise has been endorsed by some dental leaders.¹¹ The objectives of this study were to determine the curriculum content, clinical practices regarding HIV risk screening, counseling, and testing, and opinions of leading dental educators regarding dental professional roles in health promotion activities, and specifically the feasibility of rapid oral fluid-based HIV counseling and testing in dental practice.

Materials and Methods

The authors developed a thirty-one-item survey in consultation with the CDC that was pretested by several University of North Carolina (UNC) dental school faculty members not on the research team. This survey was then sent by email attachment to associate deans for clinical services/affairs at all fifty-four schools of dentistry in the United States and U.S. territories, as identified in the *1999-2000 Directory of Institutional Members and Association Officers of the American Association of Dental Schools* (now American Dental Education Association). The survey was described in a cover letter as one phase of a national project examining the feasibility of instituting HIV testing of at-risk individuals in dental facilities. Based on pre-testing, the survey was estimated to take ten to fifteen minutes to complete. Associate deans were requested to complete the voluntary confidential survey themselves. If they felt they were not the most qualified or appropriate person to answer the questions, they were asked to forward the survey to whoever could best respond to these questions for their school.

Two follow-up mailings (a cover letter, paper copy of the survey instrument, and a self-addressed stamped return envelope) were sent to initial nonrespondents, as well as an additional email correspondence. Surveys were completed between December 2000 and August 2001. Data were entered into an ACCESS database created for the project, and survey item response frequencies were analyzed in a SAS statistical package (SAS Institute, Cary, NC).

Results

Completed surveys were received from forty-six of fifty-four schools, representing a response rate of 85 percent. Of these, twenty-nine schools participated in the training of dental hygiene students. The respondents' primary role at the school were: 59 percent associate dean for clinical services/affairs; 13 percent department chairs or program directors; 17 percent other teaching faculty; and 11 percent others, often self-described as the occupational health or infection control educator. Forty-one of the forty-six respondents held dental degrees. Two-thirds of respondent schools were public and one-third were privately funded. Geographic distribution was 35 percent from the South, 26 percent from the Northeast, 22 percent from the Midwest, 15 percent from the West, and 2 percent from U.S. Territories.

Curriculum and Practices

Table 2 shows the degree to which topics relevant to HIV risk screening and testing are covered in the dental school curriculum, based on the respondent's interpretation of what constituted little versus moderate versus extensive coverage. A moderate to extensive degree of coverage was given by

Table 2. Degree to which the following topics are covered in the dental school curriculum

(Percentage of schools responding out of 46 schools)

	Extensive	Moderate	Little	None	Don't Know
Epidemiology of HIV disease (demographics)	52%	43%	4 %	0	0
Screening for HIV behavioral risks (e.g., injection drug use, unsafe sex, etc.)	46%	50%	4 %	0	0
Medical history suggesting HIV risk (e.g., hepatitis, sexually transmitted diseases, <i>pneumocystis carinii</i> pneumonia, etc.)	70%	30%	0	0	0
Oral manifestations as markers of HIV (e.g., thrush, Kaposi's sarcoma, hairy leukoplakia, etc.)	78%	22%	0	0	0
Legal aspects of HIV testing and sharing information about HIV with a patient	33%	30%	30%	0	6%
Referring at-risk patients for HIV counseling and testing	15%	33%	37%	2%	13%

95-100 percent of schools for the topics of: 1) epidemiology of HIV disease, 2) screening for HIV behavioral risks, 3) medical history suggesting HIV risk, and 4) oral manifestations as markers of HIV. The legal aspects of HIV testing and sharing of information about HIV with a patient received moderate to extensive coverage by 63 percent of schools. Less than half (48 percent) of schools reported moderate to extensive education regarding referring at-risk patients for HIV counseling and testing.

Because new graduates are likely to model the practice behaviors they learn in their dental school clinics, respondents were asked this question: "In your clinics, how often does your school screen for HIV using: a) HIV risk behaviors such as injection drug use; b) medical history findings suggesting HIV risk such as sexually transmitted diseases or hepatitis C; c) oral manifestations of HIV as markers of disease; and d) actual testing for HIV-antibody seropositivity?" Response options were: always, sometimes, rarely, never, and don't know.

Table 3 summarizes the responses. Oral manifestations and medical history findings were always used in the school clinics by 78 percent and 76 percent, respectively, of respondent schools. HIV risk behaviors were always used by 54 percent of schools. Actual testing for HIV-antibody seropositivity was never used by 63 percent, sometimes used to screen patients for HIV by 13 percent of schools, and rarely used by 22 percent.

All schools reported having prompt HIV counseling, testing, and post-exposure prophylaxis medications available for students, faculty, and staff who encounter occupational blood and body fluid exposures. However, these services were not always on-site at the dental school. Prompt HIV counseling and testing for source patients involved in occupational exposures was provided for 93 percent of schools. Sixty-three percent of respondents were aware that rapid HIV antibody tests were available at their institution or referring facility for source patient testing. The dental school is the site where source pa-

Table 3. Frequency with which schools screen patients for HIV in their clinics using the following indicators of HIV risk. (Percentage of schools responding out of 46 schools)

Risk indicator	Always screen	Sometimes screen	Rarely screen	Never screen	Don't know/skip
Oral manifestations	78%	15%	2%	0%	4%
Medical history	76%	4%	9%	4%	7%
HIV risk behaviors	54%	13%	9%	17%	7%
Actually test for HIV	0%	13%	22%	63%	2%

Table 4. Respondents' level of confidence in their dental and dental hygiene graduates' viewing health screening and promotion activities as part of their professional roles

Health Screening or Promotion Activity	Dental Graduates (Respondent n=46)			Dental Hygiene Graduates (Respondent n=29)		
	Confident Number (%)	Not Confident Number (%)	Don't Know/Skip Number (%)	Confident Number (%)	Not Confident Number (%)	Don't Know/Skip Number (%)
Oral cancer screening	46 (100%)	0 (0%)	0 (0%)	23 (79%)	0 (0%)	6 (21%)
Hypertension/blood pressure screening	45 (98%)	0 (0%)	1 (2%)	23 (79%)	0 (0%)	6 (21%)
Tobacco screening/tobacco cessation	40 (87%)	2 (4%)	4 (9%)	23 (79%)	0 (0%)	6 (21%)
Nutrition screening/diet counseling	32 (70%)	10 (22%)	4 (8%)	22 (76%)	0 (0%)	7 (24%)
HIV risk screening	30 (65%)	9 (20%)	7 (15%)	14 (48%)	2 (7%)	13 (45%)
Refer for HIV counseling and testing	23 (50%)	13 (28%)	10 (22%)	6 (21%)	8 (27%)	15 (52%)
Alcohol/drug abuse screening	23 (50%)	14 (30%)	9 (20%)	11 (38%)	6 (21%)	12 (41%)

tient HIV counseling and testing is typically provided for 26 percent of schools, while HIV counseling and testing for students, faculty, and staff with occupational exposures is provided in dental schools only 13 percent of the time. The majority of student, faculty, and staff testing occurs in the student or employee health service (70 percent), and source patient testing most often occurs in either the student/employee health service (37 percent) or the university hospital (35 percent).

Opinions of Dental Educators

Regarding general health assessment and health promotion activities, respondents were asked to answer on a “Yes, No, or Don’t Know” scale the following question: “Do you feel confident in saying that your dental (dental hygiene) graduates view the following as part of their professional roles?” Table 4 shows the responses. Nearly all respondents felt their dental graduates viewed screening for oral cancer (100 percent) and hypertension (98 percent) as part of their professional roles. Other health screening and counseling activities were perceived with varying degrees of lower confidence in their dental students, despite having been indoctrinated to view the activity as part of a dentist’s professional role, including: tobacco screening/cessation (87 percent); nutrition screening/diet counseling (70 percent); HIV risk screening (65 percent); alcohol/drug abuse screening (50 percent); and referring at-risk patients for HIV counseling and testing (50 percent). Respondents from the twenty-nine schools that offered or participated in dental hygiene educational programs were, as a whole, relatively less confident in the dental hygienist perceiving a professional role for health promotion activities other than nutrition screening and diet counseling. However, a hygienist’s role in oral cancer screening, hypertension screening, and tobacco screening and cessation was still expected by approximately four of five respondents.

When asked to give their perspective on whether HIV risk screening and then referral for HIV counseling and testing to other health care providers should be part of the role of dentists, 63 percent thought it should and 24 percent thought it possibly should. A parallel question asked whether actual provision of HIV counseling and testing in the dental office was part of the role of dentists. Only 13 percent agreed that it was, and another 33 percent thought that HIV counseling and testing possibly

should be part of the role. Thirteen percent of respondents thought their school would be very likely to include HIV testing in the clinics for patients identified to be possibly at risk if there was an easy-to-administer, accurate, and inexpensive chair-side HIV antibody test that used a quick mouth swab and gave results in twenty minutes. An additional 20 percent of schools would be somewhat likely to use such a test in their clinics.

If a rapid chair-side oral-fluid HIV test became commercially available, 24 percent of respondents thought their graduating dental students would have the skills to do HIV counseling and testing, but only 11 percent thought they would be willing. Issues or challenges and positive aspects involved in conducting HIV counseling and testing in dental settings as observed by respondents are indicated in Figure 1. The most common concern was the dentist’s lack of counseling skills. Although 80 percent of respondents reported their students received some training in counseling skills for risk behaviors such as tobacco use or recreational drug use, only twelve schools (26 percent) reported that this included some degree of HIV counseling, such as pre- and post-test informational and/or prevention counseling. Thirteen schools (28 percent) used either role-playing or patient simulation or both to teach counseling skills and often used small groups, videos, or direct observation to enhance the patient simulations or role-playing. Content about HIV was included in role-playing or patient simulations by seven schools (15 percent).

Discussion

HIV/AIDS Curriculum and Practices in U.S. Dental Schools

Information about HIV/AIDS was first introduced into the dental school curriculum in the mid-to-late 1980s. The stimulus was concern for maintaining universal blood and body fluid precautions and routine infection control procedures to prevent cross-contamination and occupational transmission of HIV to health care workers.¹² A Task Force on AIDS and Dental Education was convened by the American Association of Dental Schools in September 1987 to identify and explore issues applicable to the training of primary health care providers in attitudes, knowledge, and skills required for the preven-

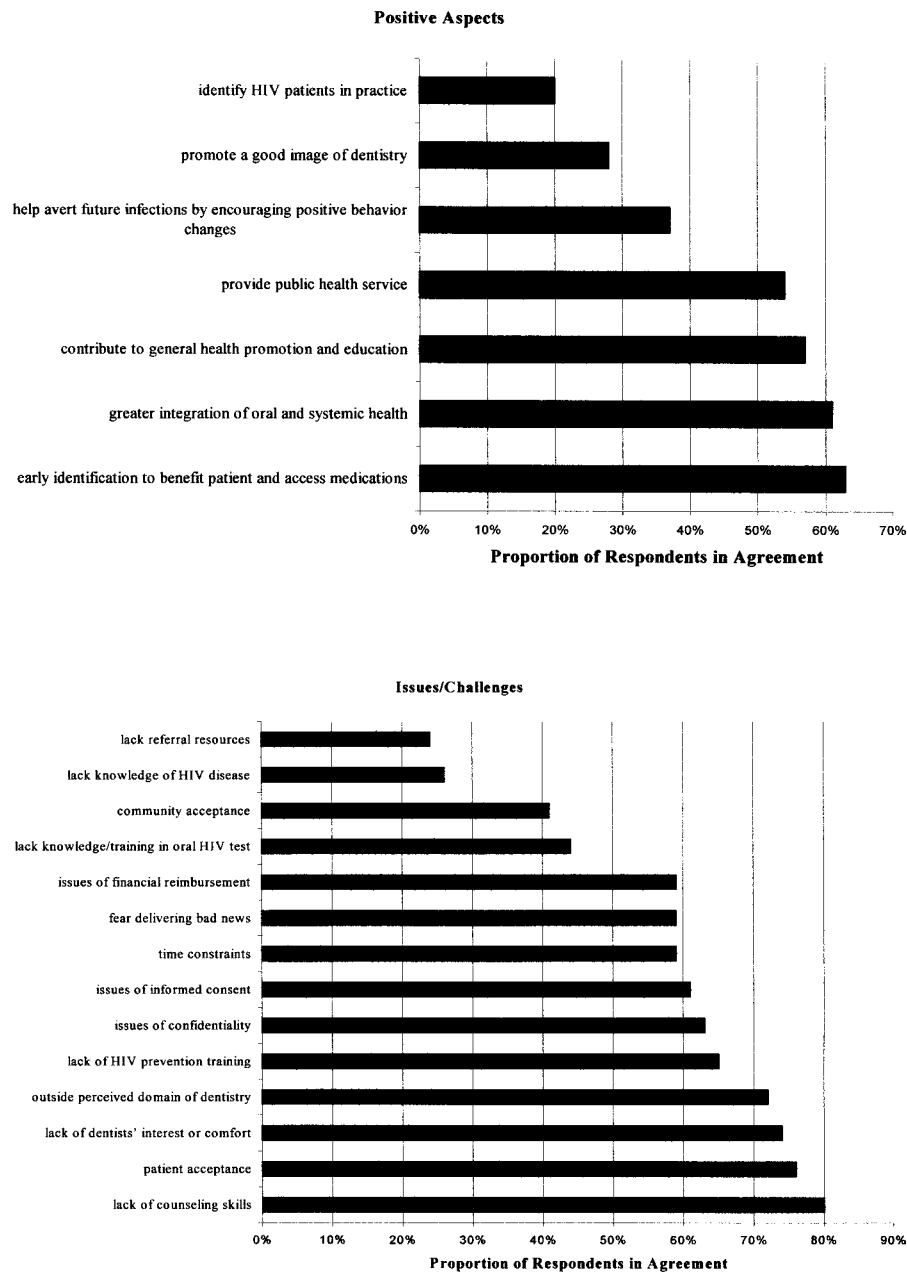


Figure 1. Dental administrator/educator's opinion of the positive aspects and issues/challenges of doing HIV counseling and testing in dental settings

tion, diagnosis, treatment, and management of HIV infection and other infectious diseases.¹³ At the start of the third decade of our experience with AIDS, virtually all dental schools include the following HIV/AIDS-related topics in the predoctoral curriculum: epidemiology, behavioral transmission risks, medical history findings, common associated systemic opportunistic diseases, and oral manifestations.

Although oral examination combined with medical and social history has been suggested as a limited screening tool for HIV infection,¹⁴ less emphasis has been placed in the dental school curriculum on the legal aspects of HIV counseling and testing and referral of at-risk patients when suspicion is aroused by medical history and oral exam. As the numbers of individuals infected with HIV continues

to increase, dental practices could be important places to provide access to HIV counseling, testing, and referral for patients at increased risk for HIV. Competence and knowledge about HIV disease, testing procedures, and skill in counseling are needed for the dental clinician faced with this challenge.¹⁵

The use of laboratory tests by dental school providers to evaluate systemic health risk was assessed in 1990.¹⁶ In this study, six U.S. dental schools reported conducting from two to twenty routine screening blood tests on undergraduate clinic patients, and six others were performing selective testing according to medical history, symptoms, planned treatment, and relative risk.¹⁶ Screening was most often undertaken to diagnose anemia, diabetes, and syphilis. One school engaged in serologic HIV counseling and testing near the start of the HIV epidemic in the United States. Between 1985 and 1987 at the University of Minnesota, Murrah and Scholtes¹⁷ reported serologic screening of 206 new dental patients for HIV antibodies when medical history and oral exam findings suggested high risk. All patients positive for HIV underwent risk prevention counseling and referral for further medical evaluation and treatment by infectious disease specialists. Eleven, or 5.3 percent, of those tested were positive, comparing favorably with the 7.1 percent seroprevalence in area physicians' offices.¹⁷

Today, dental school-based HIV counseling and testing are largely related to management of occupational injuries according to locally organized, formal protocols.¹⁸ As healthcare organizations, dental schools are required by the 1992 Occupational Health and Safety Administration blood-borne pathogen standard¹⁹ to establish blood-borne pathogen exposure-control plans with written protocols for prompt reporting, evaluation, counseling, treatment, and follow-up of exposures to potentially infectious materials, including HIV. The most recent guidelines from the U.S. Public Health Service²⁰ for management of occupational exposures to HIV and recommendations for post-exposure prophylaxis call for testing of the source patient for hepatitis B and C viruses and HIV as soon as possible, with use of U.S. Food and Drug Administration-approved rapid HIV-antibody tests, particularly if testing by enzyme immunoassay cannot be completed within twenty-four to forty-eight hours. This is because agents used for post-exposure prophylaxis must be administered promptly (i.e., within hours) in order to be effective. Thus, timely knowledge of the source patient's HIV status is important for making informed decisions about the need

for postexposure prophylaxis and appropriate drug regimens. Protocols for HIV testing of source patients should include methods for obtaining informed consent, in accordance with applicable state and local laws, and for maintaining confidentiality.²⁰

Although the majority of source patients were tested at facilities affiliated with the respondent's dental school, approximately a quarter of schools we surveyed had some provision for on-site HIV testing. If the source patient could be tested immediately at the dental site with a rapid test and the source patient was HIV-infected, post-exposure prophylaxis could be offered immediately. If the source was HIV-negative, exposed dental personnel may be less likely to begin taking antiretroviral medications (while they are waiting for test results), thus reducing unnecessary days on post-exposure prophylaxis and associated risks and costs.^{21,22}

Opinions of Dental Educators on Health Promotion and HIV

Respondents' opinions of dentist involvement in health promotion and disease prevention activities related to oral and systemic health varied from a strong endorsement of screening for oral cancer and hypertension as being part of the dentist's professional role to moderate acceptance of the dentist's role in tobacco screening and cessation. Significantly less confidence was held that dentists view their professional role as including nutrition screening, alcohol and recreational drug use screening, HIV risk screening, or referral for HIV counseling and testing. Dental practice health histories are routinely updated, blood pressure is monitored, and screening oral examinations are conducted by dental hygienists, who play a key role in oral health promotion activities,²³⁻²⁵ but respondents held significantly less confidence in a professional role for the hygienist compared to the dentist in those health promotion activities.

Some of the challenges to conducting HIV counseling and testing in dental settings recognized by respondents include factors directly related to HIV such as the dentist's lack of adequate HIV prevention training, issues of informed consent, concern about maintaining confidentiality, and patient acceptance. It is important for the dentist to understand the ethical and federal- and state-specific medicolegal aspects regarding HIV testing and pre-test/post-test counseling prior to engaging in this activity. Other concerns are common to general health promotion

activities in dental settings, such as: lack of interest on the part of dentists, perception that health promotion is outside the domain of dentistry, time constraints of dental practice, and lack of reimbursement.

Dentists are usually not experienced in delivering diagnoses of potentially life-threatening conditions, with the exception of cases of infrequent diagnoses of oral cancer, and may find the experience to be stressful.²⁶

It is encouraging that most respondents felt HIV counseling and testing in dental practice for at-risk patients would make a positive contribution to the public and the profession. These benefits included early identification of HIV infection so the patient could access life-prolonging antiretroviral medications, greater integration of oral and systemic health efforts, contribution to general health promotion and education, and provision of a public health service. An additional benefit to the provider may be avoiding potential legal action for failure to recognize the oral manifestations of HIV disease and for failing to refer the patient for follow-up care and testing.²⁷

Dental school training molds graduates' opinions of their professional roles and duties and influences their future practice patterns.²⁸ A dental professional role in tobacco screening and cessation activities, although not endorsed by all of our respondents, was relatively well accepted. Acceptance of the dental professional's role in tobacco cessation has grown over time as the adverse effects of tobacco on oral tissues and on general health and well-being have been recognized and dental organizations have developed supportive policy statements.²⁹ In 1998, twenty-three U.S. dental schools and 110 dental hygiene programs had formal tobacco use cessation activities integrated in their student clinics.³⁰ Effective interdisciplinary tobacco cessation programs incorporated into the dental school curriculum have been described³¹ and may serve as models for other public health interventions, such as HIV prevention. It appears that the stigma historically associated with HIV disease remains a barrier to increasing HIV risk screening and referral, but dental school faculty tolerance toward individuals with AIDS fortunately appears to be improving.³² Support by local and national dental organizations for HIV risk screening and referral for testing or actual HIV counseling and testing in dental facilities may increase professional acceptance of this concept, particularly in areas of the country where HIV seroprevalence is high.

Limitations of this study include several factors. Respondents were not provided with guidelines for how to determine if their curriculum provided little, moderate, or extensive coverage of specific areas of HIV education. This allows for individual variability in the interpretation of the adjectives. Importantly, only one respondent from each dental school was asked to respond to the survey; hence, student and clinical instructor opinions were not elicited. In the future, it would be important to understand clinical instructors' and dental students' willingness and ability to conduct HIV counseling and testing and patients' willingness to obtain such services in dental facilities, both as part of post-exposure protocols in response to needlestick injuries and as voluntary testing to determine the patient's HIV status.

Conclusion

Dental schools have the curriculum and clinical education environment necessary to facilitate dentists' performing HIV risk screening and referral in dental practice. Respondents felt that risk screening and referral for HIV counseling and testing were part of a dentist's professional role. A third of respondents might perform HIV counseling, testing, and referral using a rapid oral fluid-based test in their clinics to identify HIV disease in selected patients. Additional training and also modeling of effective counseling skills in promoting healthy behaviors (particularly in HIV prevention) are needed to provide effective patient-centered counseling. Most dental educators lacked confidence that graduating students would be willing to actually conduct HIV counseling, testing, and referral in their dental practices.

HIV counseling, testing, and referral of patients in dental facilities, using rapid oral fluid-based tests, are most likely to be accepted by the profession and public when viewed as an important health screening activity within the scope of dentistry. Linkages to health care stakeholders like physicians and public health resources should be established to facilitate follow-up confirmatory testing, psychological and prevention counseling, and medical care.

Acknowledgments

The authors acknowledge the support of CDC Cooperative Agreement U48/CCU409660.

REFERENCES

- Centers for Disease Control and Prevention. Guidelines for national human immunodeficiency virus case surveillance, including monitoring for human immunodeficiency virus infection and acquired immunodeficiency syndrome. *MMWR* 1999;48(no. RR-13):1-28.
- Centers for Disease Control and Prevention. HIV prevention strategic plan through 2005, January 2001. At: www.cdc.gov/nchstp/od/news/prevention.pdf. Accessed March 1, 2002.
- Centers for Disease Control and Prevention. Revised guidelines for HIV counseling, testing, and referral and revised recommendations for HIV screening of pregnant women. *MMWR* 2001;50(no. RR-19):1-85.
- Hodinka RL, Nagashunmugam T, Malamud D. Detection of human immunodeficiency virus antibodies in oral fluids. *Clin Diagnostic Lab Immunol* 1998;5:419-26.
- Kassler WJ, Haley C, Jones WK, Gerber A, Kennedy EJ, George JR. Performance of a rapid, on-site human immunodeficiency virus antibody assay in a public health setting. *J Clin Microbiol* 1995;33:2899-902.
- Kassler WJ, Dillon BA, Haley C, Jones WK, Goldman A. On-site, rapid HIV testing with same-day results and counseling. *AIDS* 1997;11:1045-51.
- Brown LJ, Lazar V. Dental care utilization: how saturated is the patient market? *J Am Dent Assoc* 1999;130:573-80.
- Manski RJ, Moeller JF. Use of dental services: an analysis of visits, procedures and providers, 1996. *J Am Dent Assoc* 2002;133:167-75.
- Greenspan JS, Barr CE, Scubba JJ, Winkler JR, U.S.A. Oral AIDS Collaborative Group. Oral manifestations of HIV infection: definitions, diagnostic criteria, and principles of therapy. *Oral Surg Oral Med Oral Pathol* 1992;73:142-4.
- Glick M, Muzyka BC, Lurie D, Salkin LM. Oral manifestations associated with HIV-related disease as markers for immune suppression and AIDS. *Oral Surg Oral Med Oral Pathol* 1994;77:344-9.
- Jeffcoat MJ. A matter of life and death. *J Am Dent Assoc* 2002;133:142-3.
- McCauley KR, Gerbert BJ, Greene JC, et al. Hazards of occupational transmission and strategies for prevention of infectious disease in dental education. *J Dent Educ* 1988;52:530-4.
- Molinari J, Gray CF. Report of the Task Force on AIDS and Dental Education. *J Dent Educ* 1988;52:123-6.
- Robinson PG, Challacombe SJ, Sheiham A. Oral examination: a screening tool for HIV infection? *Sexually Transmitted Infections* 1998;74:345-8.
- Tillis TI. Recommending serologic HIV testing for the dental patient. *Am J Dent* 1995;8:263-6.
- Hart GT, Burton EL, Mincer HH. Use of screening blood studies in dental schools. *J Dent Educ* 1991;55:735-7.
- Murrah VA, Scholtes GA. Antibody testing and counseling of dental patients at risk for human immunodeficiency virus (HIV) infection and associated clinical findings. *Oral Surg Oral Med Oral Pathol* 1988;66:432-9.
- Stewart CM, Jones AC, Bates RE, Boeff D, Migliorati C, Bentrup K. Percutaneous and mucous membrane protocol in a southeastern dental school. *Oral Surg Oral Med Oral Pathol* 1994;78:401-7.
- Department of Labor, Occupational Health and Safety Administration. 29 CFR Part 1910.1030. Occupational exposure to bloodborne pathogens: final rule. *Federal Register* 1991;56:64004-182.
- Centers for Disease Control and Prevention. Updated U.S. Public Health Service guidelines for the management of occupational exposures of HBV, HCV, and HIV and recommendations for postexposure prophylaxis. *MMWR* 2001;50(no. RR-11):1-42.
- Greub G, Maziero A, Burgisser P, Telenti A, Francioli P. Spare post-exposure prophylaxis with round-the-clock HIV testing of the source patient. *AIDS* 2001;15:2451-2.
- Cleveland J, Griffin S, Barker L, NaSH Surveillance Group. Cost effectiveness of a rapid HIV test for management of occupational exposures among dental healthcare personnel. In: Abstracts of the 12th Annual Scientific Meeting of the Society of Healthcare Epidemiology of America, 2002.
- Mullen PD, Holcomb JD, Fasser CE. Selected allied health professionals' self-confidence in health promotion counseling skills and interest in continuing education programs. *J Allied Health* 1988;17:123-33.
- Mullen PD, Holcomb JD. Selected predictors of health promotion counseling by three groups of allied health professionals. *Am J Prev Med* 1990;6:153-60.
- McConaughy FL, Lukken KM, Toevs SE. Health promotion behaviors of private practice dental hygienists. *J Dent Hyg* 1991;65:222-30.
- Chioldo GT, Tolle SW. Delivering bad news to dental patients. *General Dent* 1997;45:228-30, 232, 234.
- Grimes RM, Richards E, Flaitz CM. Avoiding malpractice for nondental conditions: the example of human immunodeficiency virus. *J Am Dent Assoc* 2001;132:499-507.
- Cotton KT, Seale NS, Kanellis MJ, Damiano PC, Bidaut-Russell M, McWhorter AG. Are general dentists' practice patterns and attitudes about treating Medicaid-enrolled preschool age children related to dental school training? *Pediatr Dent* 2001;23:51-5.
- Tomar SL. Dentistry's role in tobacco control. *J Am Dent Assoc* 2001;132:30S-35S.
- Barker GJ, Williams KB. Tobacco use cessation activities in U.S. dental and dental hygiene student clinics. *J Dent Educ* 1999;63:828-33.
- Christen AG. Tobacco cessation, the dental profession, and the role of dental education. *J Dent Educ* 2001;65:368-74.
- Cohen LA, Romberg E, Grace E. Revisiting the attitudes of dental faculty towards individuals with AIDS. *J Dent Educ* 2001;65:249-52.