

# HRSA CARE ACTION



**AUGUST 2008**

Big Barriers: High Costs

HIV Dental Health Issues

Transporting Health

Taking It to the Streets



## INCREASING ACCESS TO DENTAL CARE

*You cannot be healthy without oral health*

—*Oral Health in America: A Report of the Surgeon General*'

Access to oral health care for all people living with HIV/AIDS (PLWHA) remains a critical—and unmet—goal. Uninsured PLWHA are three times more likely to have untreated dental and medical needs than are PLWHA with private insurance. Moreover, oral infections, mouth ulcers, and other severe dental conditions associated with HIV infections go untreated more than twice as often as other health problems related to the disease.<sup>2</sup>

### DID YOU KNOW?

- HRSA-supported community health centers in 2006 provided oral health services to some 2.6 million patients.
- Approximately 108 million Americans lack dental insurance.<sup>3</sup>
- More than 500 medications can lead to xerostomia or “dry mouth,” which can lead to dental decay, periodontal disease, and oral candidiasis (thrush).<sup>4,5,6</sup>

### ONLINE RESOURCES

HRSA Part F Dental Programs  
<http://hab.hrsa.gov/treatmentmodernization/dental.htm>

SPNS Oral Health Initiative Evaluation Center  
[www.hdwg.org/echo/front](http://www.hdwg.org/echo/front)

*Oral health in America: A report of the Surgeon General*  
<http://silk.nih.gov/public/hck1ocv.@www.surgeon.fullrpt.pdf>

HIV Screening in Dental Settings: The Role of Salivary Diagnostics  
[www.nationaloralhealthconference.com/docs/presentations/2007/0430/Jennifer%20Cleveland%20%20Salivary%20Diagnostics%20Potential%20Benefits%20of%20HIV%20Testing%20in%20Dental%20Settings.pdf](http://www.nationaloralhealthconference.com/docs/presentations/2007/0430/Jennifer%20Cleveland%20%20Salivary%20Diagnostics%20Potential%20Benefits%20of%20HIV%20Testing%20in%20Dental%20Settings.pdf)

▶▶▶▶ Please visit our Web site at [www.hrsa.gov](http://www.hrsa.gov)



## DIRECTOR'S NOTES

*When the media covers HIV disease, its impact on dental care and access to oral health services is rarely discussed. As health care professionals, however, we know all too well that oral health problems are often the first manifestations of HIV disease. For HIV-positive persons who don't know their status, dentists can have an important role as diagnosticians. For PLWHA who do know their status, providers must be ever vigilant in linking people to dental providers and preventing oral health problems.*

*Dental care in the United States is a luxury many people cannot afford. In fact, 108 million Americans are without dental insurance. But for PLWHA, the lack of proper oral health care can be devastating. Weakened immune systems can make PLWHA more susceptible to oral infections and dental problems can interfere with nutrition and absorption of life-saving HIV medications.*

*HIV providers across the country are addressing new oral health issues as they arise—and persist. These may include “meth mouth,” or the need for more implants and denture work, as PLWHA continue to age with the disease. This is why the linkages providers create with one another are so essential to creating the comprehensive care PLWHA need if they are going to get healthy—and stay that way.*

*Deborah Parham Hopson  
HRSA Associate Administrator for HIV/AIDS*

### HRSA CAREAction

#### **Publisher**

U.S. Department of Health and Human Services  
Health Resources and Services Administration, HIV/AIDS Bureau  
5600 Fishers Lane, Room 7-05  
Rockville, MD 20857  
Telephone: 301.443.1993

Prepared for HRSA/HAB  
by Impact Marketing + Communications, [www.impactmc.net](http://www.impactmc.net)

#### **Photography**

Cover: a patient at the San Francisco Native American Health Center's pediatric dental facility. © See Change, [www.see-change.net](http://www.see-change.net)  
P. 7, Project coordinator Henry Boza of the Miami Dental Access Project. © See Change, [www.see-change.net](http://www.see-change.net)

Additional copies are available from the HRSA Information Center, 1.888.ASK.HRSA, and may be downloaded at [www.hab.hrsa.gov](http://www.hab.hrsa.gov).

In addition to common oral health problems, such as caries (decay) and gingivitis, PLWHA have a high incidence of rare oral health issues (see Table 1) because of their weakened immune systems.<sup>7</sup> Dental problems can also impede food intake and nutrition,<sup>8</sup> leading to poor absorption of HIV medications and increasingly impaired immune function, particularly because all antiretroviral medications are given in relation to food intake.<sup>9</sup>

Poor oral health conditions can also interfere with social functioning and limit educational and career opportunities as a result of the disfigurement and odor caused by decayed teeth and gum disease.<sup>10</sup> Completing the circle, reduced quality of life related to oral health is associated with poor clinical status and reduced access to health care.<sup>11</sup>

These data are not news to most providers of HIV/AIDS care to the uninsured. Yet, the unmet need for oral health services and the incidence of entirely preventable oral health problems among underinsured PLWHA remains persistent. In fact, even people who have medical insurance, whether or not they have HIV/AIDS, may have limited or no dental benefits.

Providers who are most successful at helping PLWHA transcend barriers to good oral health are applying perhaps one of the most important lessons learned—and relearned—since the Ryan White HIV/AIDS Program was adopted: Eliminating health disparities often isn't about doing just one thing; instead, it is about meeting PLWHA “where they are” and helping them address the specific barriers they face.

### **Big Barriers Extract High Costs**

HIV-positive people face challenges in maintaining oral health that go beyond remembering to brush and floss their teeth. First among them may be fear. As much as 20 percent of the American population does not regularly visit the dentist because of anxiety, and an estimated 8 to 15 percent of Americans avoid dental treatment entirely because of this fear.<sup>12</sup>

A more systemic issue is that the number of oral health professionals per capita is declining. The number of practicing dentists in the United

States has remained stagnant at around 150,000 since 1990, although the U.S. population has grown significantly since then.<sup>13</sup> The diminishing availability of dentists exacerbates the shortage of dentists who are experienced in treating—or willing to treat—PLWHA.

“The number of dentists providing dental care to HIV-positive patients is inadequate. Consumers consistently identify oral health as one of their top unmet needs,” according to Mahyar Mofidi, project director of the Ryan White HIV/AIDS Program Part F Community-Based Dental Partnership Program.

PLWHA are among the 108 million Americans without dental insurance—a number 2.5 times greater than the number of Americans who lack medical insurance.<sup>14,15</sup> Fewer and fewer people have dental insurance for a host of reasons, including lack of health literacy, inadequate coverage from public programs, loss of dental insurance after retirement, and employer insurance plans that do not cover dental care. This lack of insurance is interwoven with many familiar problems for PLWHA, such as the inability to pay for care and unmet needs for essentials like transportation, housing, and child care.

As Steven Toth of the University of Medicine and Dentistry of New Jersey (UMDNJ) explains, poor oral health carries a stigma. “We had a patient who was very embarrassed about his smile,” says Toth. “When we saw him for the first time, he had maybe two teeth. We were able to give him back his smile, and now his teeth are reflective of his personality.”

## HIV-Specific Dental Health Issues

PLWHA can develop the same oral health problems as HIV-negative people. But some conditions are seen almost exclusively in people who are HIV positive (see Table 1, page 4). In fact, more than one-third of PLWHA have oral conditions resulting from a weakened immune system.<sup>20</sup> Oral lesions from candidiasis (thrush), oral hairy leukoplakia, herpetic ulcers, and Kaposi’s sarcoma, for example, are often among the first symptoms of HIV infection.<sup>21</sup>

Bacteria are the culprits behind the two most common oral health conditions affecting everyone, regardless of HIV status: dental caries and periodontal disease.<sup>22</sup> These bacterial infections that begin in the mouth can potentially inflict great harm to the heart, brain, and other organs if not treated, particularly in PLWHA with severely compromised immune systems.<sup>23</sup>

In addition, antiretroviral medications taken by many PLWHA may cause a reduction in salivary secretions called *xerostomia*, commonly referred to as “dry mouth,” which predisposes people to caries, periodontal disease, and oral candidiasis.<sup>24,25</sup> In fact, more than 500 medications can lead to dry mouth, and approximately 30 percent of PLWHA have moderate to severe dry mouth.<sup>26</sup>

Saliva neutralizes acids in the mouth from food and drink and helps prevent microorganisms from adhering to teeth; in the absence of sufficient saliva, acids and pathogens have deleterious effects on teeth and gums.<sup>27</sup> Fortunately, dry mouth is easily treated with artificial

---

*“The number of dentists providing dental care to HIV-positive patients is inadequate. Consumers consistently identify oral health as one of their top unmet needs.”*

---

In addition to large-scale issues, such as cost of services and access to care, smaller, more personal ones play a significant role in oral health. People with substance abuse problems, for example, have an increased incidence of poor oral hygiene. Some illicit substances increase cravings for sugary foods and drinks which, over time, can erode teeth.<sup>16,17</sup> Drugs like ecstasy and crystal methamphetamine make users more susceptible to tooth grinding and cause dry mouth. The corrosive properties of methamphetamine can lead to decayed oral tissue and severe damage, causing teeth to break, rot, and discolor.<sup>18,19</sup>

saliva products or sugar-free citrus candies, such as lemon drops, which stimulate saliva production.<sup>28</sup>

Steps can be taken to prevent many other oral health care issues that disproportionately affect PLWHA. Along with regularly brushing and flossing, PLWHA should limit smoking and alcohol intake—both of which are strongly associated with oral cancers, which have a poorer patient prognosis than other types of cancer.<sup>29</sup>

Finally, PLWHA should receive dental examinations every 6 months. It is preferable if examinations are conducted by providers familiar with the particular conditions associated with decreased immune function.

*(continued on bottom of page 4)*

**TABLE 1. ORAL HEALTH PROBLEMS COMMON AMONG PLWHA**

Condition	Description/Cause
Aphthous stomatitis	Also known as canker sores, this condition is characterized by red sores that can be topped by a yellow-gray film and are usually found on the tongue or inside of the cheeks and lips <sup>30</sup>
Caries	Tooth decay caused by bacteria <sup>31</sup>
Herpes simplex	Viral infection that causes red sores (“fever blisters”) on the roof of the mouth or on the lips <sup>32</sup>
Human papilloma virus (HPV)	Virus associated with genital and other warts and one of the most common sexually transmitted infections; can produce serious and hard-to-treat lesions in the mouths of PLWHA <sup>33</sup>
Linear gingival erythema	Inflammation of the gingiva, the tissue surrounding the neck of the tooth; unique among people with compromised immune systems <sup>34</sup>
Kaposi’s sarcoma (KS)	Cancer that causes red or purple patches of abnormal tissue to grow under the skin; in the lining of the mouth, nose, and throat, or in other organs <sup>35</sup>
Necrotizing ulcerative periodontitis	Severe form of periodontal disease (see definition below) in which the gums pull away from the teeth and form pockets that are infected; if not treated, the bones, gums, and connective tissue that support the teeth are destroyed <sup>36</sup>
Oral candidiasis	A fungal (yeast) infection of the mouth also known as thrush; one of the most common opportunistic infections among PLWHA, usually appearing when CD4 counts fall below 300 <sup>37</sup>
Oral hairy leukoplakia	White, hairlike growth that usually appears on the side of the tongue or the inside of the cheeks and lower lip; caused by the Epstein-Barr virus <sup>38</sup>
Periodontal disease	Chronic bacterial inflammation of the gums, ranging from gingivitis, in which gums become red and swollen and can bleed easily, to serious disease that results in damage to the bone <sup>39</sup>

**Oral Health Care—A Consumer Priority**

Oral health care is considered a core medical service under the Ryan White HIV/AIDS Treatment Modernization Act. The Ryan White HIV/AIDS Program tackles oral

health care on several fronts. In addition to Part F dental programs, Ryan White Parts A and D address oral health care and, in 2006, provided approximately \$43 million for oral health care services for nearly 70,000 people.

Currently, three specific dental programs exist within the Ryan White HIV/AIDS Program: the Community-Based Dental Partnership Program, the Dental Reimbursement Program, and the Special Projects of National Significance (SPNS) HIV/AIDS Oral Health Care Initiative. The sections that follow describe each program.

### **Community-Based Dental Partnership Program**

The Community-Based Dental Partnership Program provides dental care and provider training in community based settings. The program aims to increase oral health services for PLWHA in underserved communities and to provide hands-on training for dental school students and residents in treating PLWHA. The training is particularly valuable, according to Mofidi, because it is “important for the students to see how dental care fits into overall health of PLWHA.”

First funded in 2002, this program supports 12 grantees serving 11 States. In 2006, more than 4,300 HIV-positive patients received dental care through this program in a total of 22,000 patient visits—about five visits per patient, per year.<sup>40</sup>

### **Dental Reimbursement Program**

The Dental Reimbursement program is the oldest Ryan White HIV/AIDS Program dental initiative. It reimburses schools of dentistry and oral hygiene for a portion of the costs of providing dental care to PLWHA. In 2006, 65 schools received reimbursements totaling more than \$22.9 million. This program has served more than 32,000 PLWHA and helped train more than 11,000 dental students and residents in 2006.<sup>41</sup>

### **SPNS HIV/AIDS Oral Health Care Initiative**

The Health Resources and Services Administration, HIV/AIDS Bureau, Special Projects of National Significance (SPNS) HIV/AIDS Oral Health Care Initiative is funded through Part F of the Ryan White HIV/AIDS Program. Launched in 2006, the 5-year, multisite initiative is developing, implementing, and evaluating innovative models of oral health care around the country. Fifteen demonstration sites are being funded in both urban and nonurban areas where oral health services do not exist or are inadequate to meet current demand.

The Oral Health Care Initiative includes an evaluation and technical assistance center—the Evaluation Center for HIV & Oral Health (ECHO) at the Boston University School of Public Health. ECHO implements and coordinates the multisite evaluation of the initiative, gathers data, and shares lessons learned across the

15 demonstration sites. In addition, it coordinates the provision of technical assistance through presentations and trainings by leading experts in HIV oral health care. ECHO also coordinates semi-annual grantee meetings to bring grantees together to share their experiences and lessons from the field, and learn from each other’s experience in delivering oral health care and evaluating their service models. (For more information about ECHO, visit [www.hdwg.org/echo/](http://www.hdwg.org/echo/).)

### **Transporting Clients, Transporting Care**

Ann Ferguson is a nurse at the AIDS Care Group in Chester, Pennsylvania, a SPNS Oral Health Care Initiative grantee. “Part of the problem for our patients,” she says, “is the barriers imposed by providers and the general fear and anxiety associated with dental care.” She points out other issues too, such as the need for ancillary services. “We are impressed on a weekly basis by the transportation needs associated with this program,” says Ferguson. The AIDS Care Group utilizes a van with a Global Positioning System (GPS). “It has already logged 20,000 miles on this grant alone.”

Cindee Shapiro echoes the need for transportation among her clients. Shapiro is vice president of the AIDS Resource Center of Wisconsin (ARCW) in Green Bay, another SPNS Oral Health Care Initiative site. About 60 percent of ARCW clients require transportation assistance. Shapiro says that providing this assistance has raised clients’ awareness of ARCW’s other services. For example, she says, “ARCW is experiencing a doubling of food disbursed through its Green Bay food pantry since the dental clinic initiated services in April 2007.”

The HIV Alliance of Lane County in Eugene, Oregon, expected to transport clients all over its 63,000 square-mile service area when it wrote its SPNS Oral Health Care Initiative grant application. “We had thought one shuttle would be fine,” says Dental Program Coordinator Amanda McCluskey, “but that has not been the case.”

Instead, the HIV Alliance is finding that opening satellite clinics “is a great way to build capacity and get involvement in our clinics,” says McCluskey. One satellite clinic has opened so far; three more are expected to open this spring, and another two or three over the summer. The clinics offer cleaning and preventive care from hygienists, and dentists perform services ranging from extractions to denture work.

“Partnerships have been the key to the project’s success,” says McCluskey. “We are partnering with dental hygiene programs, federally qualified health centers, community health departments using spaces that

already exist," she explains. "So we are replicating our model across the State to give clients greater access."

### **Taking It to the Streets**

Hurricane Katrina devastated the dental school at Louisiana State University (LSU) in New Orleans and damaged half of all the dental practices in Orleans Parish. Charity Hospital, which had a large, 28-chair dental clinic, was lost.

Dental services for city residents after the hurricane were set up in a military tent in a parking lot with a single dental chair, recalls Janet Leigh, chair of oral medicine and radiology at the LSU School of Dentistry and principal investigator for the Oral Health Initiative project called "Smile Again, New Orleans!" The services were then moved to the city's convention center to allow for increased space. The program moved again, this time to a vacant department store building, before a final move to its current location in the Medical Center of Louisiana at New Orleans.

The SPNS grant has provided Leigh's program with a mobile unit that can be moved around to areas with potential patients but no public transportation services. The project believed the van's dental services would attract people already infected with HIV and others at risk who were unlikely to have been tested or have accessed care even before the storm.

Sure enough, "The van has helped channel HIV patients into the medical care they need," says Leigh. It also has helped rebuild the HIV outpatient oral health clinic from three to five chairs. The project has partnered with Covenant House, a shelter for runaway and troubled youth; St. Anna's Episcopal Church, an African American parish that regularly offers HIV testing; LSU Behavior Science, an inpatient psychiatric and addiction program; the Louisiana Office of Public Health; and the New Orleans AIDS Task Force. These partnerships demonstrate the repeated success HRSA-funded programs have had in maximizing limited resources through relationships and referral systems with community based organizations.

### **Partnering for Lasting Results**

The UMDNJ began providing oral health care services to PLWHA in 1989, and its oral health care services for PLWHA have been supported by the Ryan White HIV/AIDS Program for years. Jill York, director of the UMDNJ's Special Services Dental Unit, says that the unit served 616 unduplicated oral health care patients in 2007, accounting for 2,634 patient visits. This success

was achieved through a partnership with Access One, an AIDS service organization serving three counties.

York says that the partnership helps fulfill UMDNJ's goal of improving both access to care and primary health care for PLWHA. At the most fundamental level, the partnership is successful because it works for all the players: It creates access to patients for UMDNJ's Special Services Dental Unit, and it helps Access One serve its clients.

The partnership also provides opportunities to train dental students and medical students, who do a rotation through the unit's clinical sites. York is hoping to develop a national model for oral health care in Ryan White programs within 5 years and is now conducting follow-up interviews with former students to see how they have implemented what they learned in the program. "We had a great chance to inspire them," she says, "so we want to see how many people are serving the underserved, particularly HIV patients."

More than one-half of all the HIV patients seen at UMDNJ are between 45 and 64 years old.<sup>42</sup> The high percentage of older PLWHA served in the program demonstrates how aging with HIV is changing the landscape not only of primary care but also of dental care.

Partnerships like those spearheaded by the UMDNJ Special Services Unit are occurring across the country. A longtime collaboration between the University of Louisville's Community-Based Dental Partnership Program and Ryan White-supported physicians and social service care coordinators has been the foundation of its excellent patient care and educational opportunities for dental students, according to Program Director Theresa Mayfield. The oral health portion of the program's Ryan White grant supports its collaboration with two clinics—one urban and the other rural. "We have taught the staff of these clinics, and they have embraced the need for their clients to receive oral health care," says Mayfield. "It is just as important for them to coordinate for those services as for housing and other services."

The embrace has been mutual, because medical providers have realized the value of coordinating their services with the social service providers. "It takes the joint effort of medical providers and people doing social services to make it seamless," says Mayfield. "You can't do it if you don't have everybody onboard."

The WINGS Clinic, a Ryan White-supported outpatient medical clinic for PLWHA at the University of Louisville, is not just a close partner of the university's dental program—it is just down the hallway in the same building. "Proximity at the school has been mutually



*The Miami Dental Access Program (MDAP) and Louisiana's "Smile Again, New Orleans!" are two Oral Health Initiative projects using a mobile van to expand HIV/AIDS dental care into urban communities. MDAP's Henry Boza is shown above with a prospective client.*

beneficial," says Clinic Program Director Deborah Wade. "It has meant that if WINGS Clinic patients have dental emergencies, or are in pain, we can just walk them right next door," adds Wade. "The beauty of that is we have their records and can tell the dentist their CD4 count, viral load, whether they've been adherent to their medications, and any background information they might need as they deliver oral health care."

Likewise, Wade says the dentists "have trained all our medical providers on how to do a visual screen at a medical appointment." As a result, a medical patient in the WINGS Clinic who might be experiencing a dental issue can get an initial assessment in the medical clinic. It provides a seamless approach to then refer the patient for dental care. "Now we are pretty much set on autopilot," says Wade. "We have all our medical providers do oral screens as a routine part of each medical visit."

This collaboration of the WINGS Clinic and the Ryan White oral health programs has helped educate both PLWHA and medical providers about the connection between oral health and general health. "Now we are all speaking the same language and can communicate better about patients' oral health care needs," says Wade.

At Matthew 25 AIDS Services in Henderson, Kentucky, Cyndee Burton, the nurse-administrator and co-founder, says the partnership with the University of Louisville dental school "has been a Godsend for us." The agency has been able to use the relatively small amount of dental care funding it had before to provide transportation for dental clients, taking them to either Louisville or nearby Elizabethtown, Kentucky, for the specialized care they cannot receive in Henderson.

Clients who receive regular dental care have been transformed by these important services. In a State where more than 40 percent of the adult population experience the loss of more than 5 teeth, receiving dental care can literally be life changing.<sup>43</sup>

"We have one guy who, when he first came in, would hang his head because his teeth were so bad," recalls Burton. "He was a meth user and had gone through treatment and gotten out. He immediately started volunteering at our clinic, but I noticed he always did things in the background. You could never get him to smile." That all changed when the patient was referred to the dental clinic. "He now has the most beautiful teeth, and he is also one of our leading volunteers," she marveled.

## REFERENCES

- <sup>1</sup> U.S. Department of Health and Human Services (HHS). *Oral health in America: A report of the Surgeon General*. Rockville, MD: U.S. Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health, 2000.
- <sup>2</sup> Agency for Healthcare Research and Quality (AHRQ). *Dental problems go unresolved in many HIV patients*. April 6, 2001. Rockville, MD: AHRQ. Available at: [www.ahrq.gov/news/press/pr\\_2001/dentalhivpr.htm](http://www.ahrq.gov/news/press/pr_2001/dentalhivpr.htm). Accessed April 7, 2008.
- <sup>3</sup> Centers for Disease Control and Prevention (CDC). Public health & aging: Retention of natural teeth among older adults—United States, 2002. *MMWR*. 2003;52:1226-9. Available at: [www.cdc.gov/mmwr/preview/mmwrhtml/mm5250a3.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5250a3.htm). Accessed April 4, 2008.
- <sup>4</sup> Project Inform. *Dealing with drug side effects: Dry mouth*. 2008. Available at: [www.projinf.org/info/sideeffects/11.shtml](http://www.projinf.org/info/sideeffects/11.shtml). Accessed April 6, 2008.
- <sup>5</sup> Abel S, Reznick D. New York/New Jersey AETC and Southeast AETC. *Current trends in HIV oral health care*. Unpublished presentation to staff of Health Resources and Services Administration, HIV/AIDS Bureau, March 28, 2007.
- <sup>6</sup> Public Broadcasting Service (PBS). *Frontline: the meth epidemic: How meth destroys the body*. 2006. Available at: [www.pbs.org/wgbh/pages/frontline/meth/body/](http://www.pbs.org/wgbh/pages/frontline/meth/body/). Accessed April 6, 2008.
- <sup>7</sup> Epstein JB. Oral malignancies associated with HIV. *J Can Dent Assoc*. 2007;73:953-6. Available at: [www.cda-adc.ca/jcda/vol-73/issue-10/953.pdf](http://www.cda-adc.ca/jcda/vol-73/issue-10/953.pdf). Accessed April 9, 2008.
- <sup>8</sup> Gennaro S, Naidoo S, Berthold P. Oral health and HIV/AIDS. *MCN Am J Matern Child Nurs*. 2008;33:50-7.
- <sup>9</sup> School of Dentistry, Louisiana State University Health Sciences Center. *HIV+ Outpatient Clinic: Overview*. 2007. Available at: [www.lsusd.lsuhs.edu/patient/hiv\\_clinic1.htm](http://www.lsusd.lsuhs.edu/patient/hiv_clinic1.htm). Accessed April 9, 2008.
- <sup>10</sup> Abel & Reznick, 2007.
- <sup>11</sup> Abel & Reznick, 2007.
- <sup>12</sup> Fischler MS. A tooth fairy's gift: freedom from fear. *New York Times*. June 16, 2002. Available at: <http://query.nytimes.com/gst/fullpage.html?res=9A00E7DE173CF935A25755C0A9649C8B63&sec=&spon=&pagewanted=all/>. Accessed April 11, 2008. <http://jada.ada.org/cgi/content/abstract/118/5/591>
- <sup>13</sup> TARGET Center, HRSA, HAB. Ryan White National TA call: Oral health and HIV. Call summary and Transcript. October 25, 2007.
- <sup>14</sup> CDC, 2002.
- <sup>15</sup> HHS, 2000.
- <sup>16</sup> McGrath C, Chan B. Oral health sensations associated with illicit drug use. *Brit Dent J*. 2005;198:159-62.
- <sup>17</sup> PBS, 2006.
- <sup>18</sup> McGrath & Chan, 2005.
- <sup>19</sup> PBS, 2006.
- <sup>20</sup> National Institute of Dental and Craniofacial Research (NIDCR). *Mouth problems and HIV*. 2007. Available at: [www.nidcr.nih.gov/NR/rdonlyres/D8E70B65-6F27-46BC-8043-30C309508B5F/0/MouthProblemsAndHIV.pdf](http://www.nidcr.nih.gov/NR/rdonlyres/D8E70B65-6F27-46BC-8043-30C309508B5F/0/MouthProblemsAndHIV.pdf). Accessed April 6, 2008.
- <sup>21</sup> Gennaro et al., 2008.
- <sup>22</sup> NIDCR, 2007.
- <sup>23</sup> Renvert S, Pettersson T, Ohlsson O, Persson GR. Periodontal bacteria linked to heart disease. *J Periodontology*. 2006;77:1110-9. Available at: [www.joponline.org/doi/abs/10.1902/jop.2006.050336](http://www.joponline.org/doi/abs/10.1902/jop.2006.050336). Accessed April 11, 2008.
- <sup>24</sup> Project Inform. *Dealing with drug side effects: Dry mouth*. 2008. Available at: [www.projinf.org/info/sideeffects/11.shtml](http://www.projinf.org/info/sideeffects/11.shtml). Accessed April 6, 2008.
- <sup>25</sup> CNN. Oral thrush. August 20, 2007. Available at: [www.cnn.com/HEALTH/library/DS/00408.html](http://www.cnn.com/HEALTH/library/DS/00408.html). Accessed April 7, 2008.
- <sup>26</sup> Abel & Reznick, 2007.
- <sup>27</sup> Brosky ME. The role of saliva in oral health: strategies for prevention and management of xerostomia. *J Supportive Oncol*. 2007; 5:215-25. Available at: [http://www.oralcancerfoundation.org/dental/pdf/mgmt\\_of\\_xerostomia.pdf](http://www.oralcancerfoundation.org/dental/pdf/mgmt_of_xerostomia.pdf). Accessed April 11, 2008.
- <sup>28</sup> NIDCR, 2007.
- <sup>29</sup> Kerawala C. Oral cancer, smoking and alcohol: A patient's perspective. *Brit J Oral Maxillofacial Surg*. 1999; 37:374-76.
- <sup>30</sup> NIDCR, 2007.
- <sup>31</sup> U.S. National Library of Medicine, National Institutes of Health (NLM). *Health topics: Dental cavities*. March 18, 2008. Available at: [www.nlm.nih.gov/medlineplus/ency/article/001055.htm](http://www.nlm.nih.gov/medlineplus/ency/article/001055.htm). Accessed April 7, 2008.
- <sup>32</sup> NIDCR, 2007.
- <sup>33</sup> Cheah PL, Looi LM. Biology and pathological associations of the human papillomaviruses: a review. *Malays J Pathol*. 1998;20:1-10.
- <sup>34</sup> Southeast AIDS Training and Education Center, Emory University School of Medicine. Linear gingival erythema. In *Clinical management of the HIV-infected adult*. Available at: [www.seatec.emory.edu/clinicalprotocols/chpt5/LinearGingivalErythema.htm](http://www.seatec.emory.edu/clinicalprotocols/chpt5/LinearGingivalErythema.htm). Accessed April 4, 2008.
- <sup>35</sup> NLM. *Health topics: Kaposi's sarcoma*. March 31, 2008. Available at: [www.nlm.nih.gov/medlineplus/kaposissarcoma.html](http://www.nlm.nih.gov/medlineplus/kaposissarcoma.html). Accessed April 6, 2008.
- <sup>36</sup> NLM. *Health topics: Gum disease*. March 14, 2008. Available at: [www.nlm.nih.gov/medlineplus/gumdisease.html](http://www.nlm.nih.gov/medlineplus/gumdisease.html). Accessed April 6, 2008.
- <sup>37</sup> NIDCR, 2007.
- <sup>38</sup> NIDCR, 2007.
- <sup>39</sup> NLM, March 14, 2008.
- <sup>40</sup> HIV/AIDS Bureau (HAB). Health Resources and Services Administration. *Ryan White HIV/AIDS Treatment Modernization Act: Dental programs*. n.d. Available at: <http://hab.hrsa.gov/treatmentmodernization/dental.htm>. Accessed April 9, 2008.
- <sup>41</sup> HAB, n.d.
- <sup>42</sup> University of Medicine and Dentistry of New Jersey. *Ryan White HIV/AIDS data report*. 2006. Unpublished data.
- <sup>43</sup> CDC, 2002.