THE IHS PRIMARY CARE PROVIDER

A journal for health professionals working with American Indians and Alaska Natives

October 2001 **Volume 26, Number 10**

The 1999 Oral Health Survey of American Indian and Alaska Native Dental Patients: Children and Adolescents

Nancy Reifel, DDS, MPH, Director, Dental Data Management, Division of Oral Health, Indian Health Service, Los Angeles, California; Kathy Phipps, DrPH, Epidemiologist, Morro Bay, California; and Betty Skipper, PhD, Biostatistician, Albuquerque, New Mexico

The Indian Health Service Division of Oral Health periodically conducts oral health status surveys of dental patients for the purpose of monitoring disease and treatment as well as to assist in program planning. The third national IHS oral health survey was completed during FY 2000. Over 100 clinics, representing all of the 12 IHS Areas, participated. An age-stratified sample of children and adolescents made up the survey population. This report describes the findings pertaining to children ages 6 through 14 and adolescents ages 15 through 19.

Comparability to Previous IHS Surveys

The sampling strategies for the three national IHS National Oral Health Surveys of 1984, 1991, and 1999 were similar. Volunteer clinics from each of the 12 Areas collected data. Participating clinics examined every eligible patient until the required sample size was obtained. In the 1999 Oral Health Survey some clinics oversampled in the age group 6-14. Therefore, the 1999 data were adjusted to the 1997 Indian Health Service three-year user population.

The 1999 survey collected information on diabetes and tobacco use, fluorosis, caries, restorations, and periodontal disease (adolescents only). While the 1984 survey collected tooth specific data only (dmft/DMFT; decayed, missing, or filled teeth, using lowercase for children, uppercase for adults), both the 1991 and 1999 surveys collected surface specific data (dmfs/DMFS; decayed, missing, or filled surfaces). In addition, the method used in 1999 to detect caries was slightly different from that used in 1984 and 1991.

The Oral Health of Elementary and Middle School Children

In children, the permanent teeth start to erupt at about five or six years of age. The permanent teeth gradually replace the primary teeth, and most children will have all of their permanent teeth (except their wisdom teeth) by age 13-14 years. Preventing dental decay in this age group is essential, because the permanent teeth that erupt beginning at age six are meant to last a lifetime.

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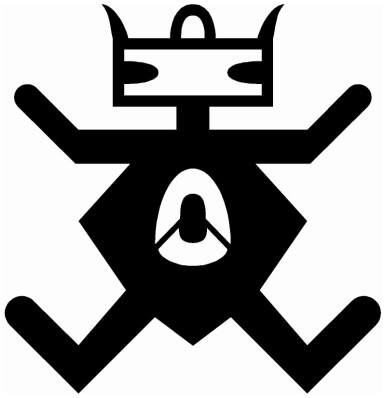
The 1999 survey examined 4,070 children between 6-14 years of age. Almost all of these children (87%) had a history of dental decay (at least one primary or permanent tooth with a filling or untreated decay), and 66 percent had untreated decay at the time of the examination. On average, these children had more than four primary teeth and two permanent teeth that were decayed, filled, or missing because of dental decay.

A high proportion of the children examined had had at least one dental sealant (62%). A dental sealant is a plastic-like material that is applied to the chewing surface of the back teeth. This material covers the depressions and grooves (pits and fissures) of the chewing surfaces and acts as a barrier, protecting the tooth from decay. Sealants are an effective method for preventing tooth decay, and those children with sealants had fewer tooth surfaces that were decayed, missing or filled because of decay compared to those who had not (DMFS = 3.21 vs. 4.02). In this age group the majority of decay in the permanent teeth was on surfaces with pits and fissures (87% of the DFS). Since pits and fissures are the most common areas affected by decay, continued use of sealants is recommended.



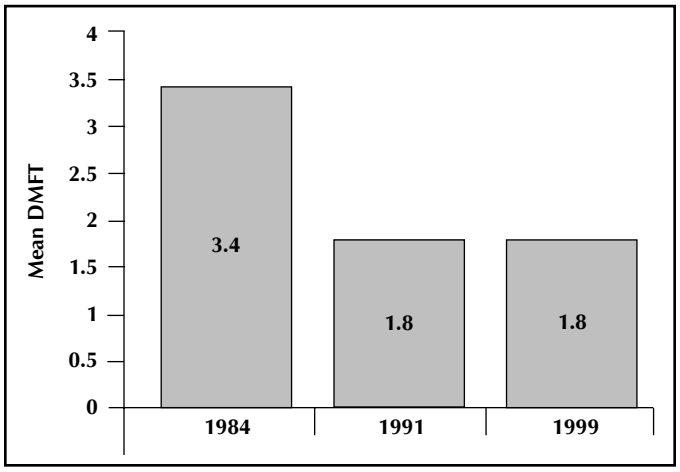
Fluoride prevents cavities on the smooth surfaces of teeth. If excessive levels of fluoride are ingested while the teeth are developing, however, a condition known as dental fluorosis can occur. About 3 percent of the 6-14 year old children examined had at least one permanent tooth with moderate or severe fluorosis. Moderate and severe fluorosis are aesthetically displeasing and should be avoided.

A few children under 13 years of age reported using tobacco on a regular basis. However, two percent of the 13-year-olds and seven percent of the 14-year-olds reported regular tobacco use. Habitual tobacco use is strongly associated with oral health problems that often do not appear until adulthood.

Trends Over Time

This survey is the third oral health survey of IHS dental patients. The other two surveys were completed in 1984 and 1991. From 1984 to 1991, there was a decrease in decay rates in the permanent teeth of school children, but there has been no change in overall decay rates since 1991. While there has been no change in the overall decay rate (DMFS) since 1991, there has been a significant increase in both the number of missing tooth surfaces (0.34 vs. 0.13, $p < 0.001$) and decayed tooth surfaces (1.78 vs. 1.53, $p = .015$). This coincides with a significant decrease in the number of filled tooth surfaces (1.41 vs. 1.87, $p < 0.001$). These differences are illustrated in Figure 1.

Figure 1. Mean number of decayed, missing and filled permanent teeth for children 5-13 years from IHS patient surveys



The decline in caries between 1984 and 1991 has been attributed to increased access to dental preventive services during the 1980s (e.g., school-based sealant programs). Since 1991, however, some children have had limited access to community prevention programs (sealants and fluoridation) and there has been an increase in the number of vacant dentist positions. This may partially explain the increase in decayed tooth surfaces and the simultaneous decrease in the number of filled tooth surfaces between 1991 and 1999.

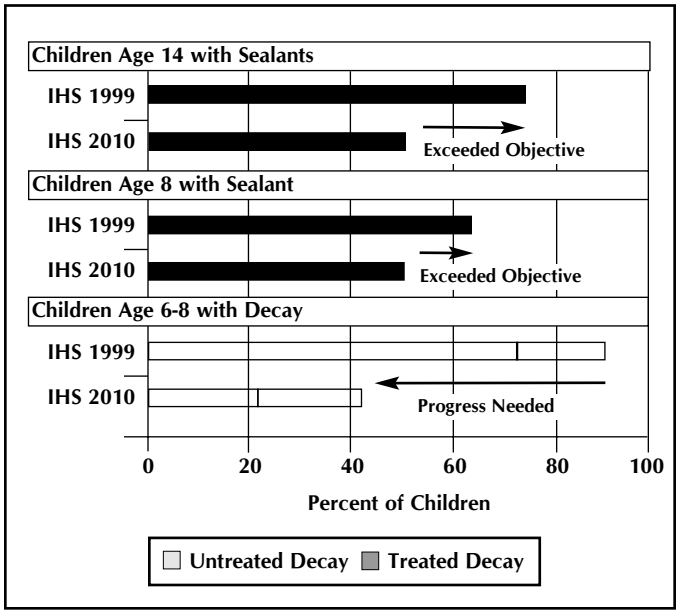
Comparison to *Healthy People 2010*

Healthy People 2010 outlines several oral health status objectives for children between the ages of six to eight years. These include:

- Decrease the proportion of children who have experienced dental caries in permanent or primary teeth to 42 percent.
- Decrease the proportion of children with untreated dental caries in permanent or primary teeth to 21 percent.
- Increase the proportion of eight-year-olds and fourteen-year-olds receiving protective sealants on the occlusal surfaces of permanent molar teeth to 50 percent.

Almost 91 percent of the 6 to 8-year-old children examined by IHS had experienced dental caries in their primary or permanent teeth – substantially higher than the Year 2010 objective of 42 percent. Seventy-two percent of the AI/AN children had untreated caries, compared to the Year 2010 Objective of 21 percent. Sixty-three percent of the eight-year-old children examined had dental sealants on any tooth, higher than the objective of 50 percent (Figure 2). Seventy-nine percent of the fourteen-year-old children examined had dental sealants on any tooth, higher than the objective of 50 percent.

Figure 2. American Indian and Alaska Native children compared to Healthy People 2010 Objectives



Comparison to National Data

The most current national data on oral health in children are from NHANES III, which examined 4,116 children between the ages of 6-14 years.[1] When compared to children in NHANES III, the AI/AN children examined by IHS had more dental decay in both their primary and permanent teeth. In terms of untreated decay, 46 percent of the AI/AN had permanent teeth with untreated decay while only 11 percent of the NHANES III children had untreated decay. The IHS Area with the lowest proportion of children with untreated decay in their permanent teeth was Tucson, and their proportion was still more than twice as high as the national average (22% vs. 11%).

The Oral Health of Adolescents

By the time a child is 15 years of age, they should have all of their permanent teeth except their wisdom teeth, which erupt at about 18 years of age. In addition to the problems associated with dental decay, the risk of developing periodontal (gum) disease begins in adolescence.

A total of 2,061 adolescents between 15-19 years of age were examined during the 1999 Oral Health Survey. About 91 percent of these individuals had a history of dental decay (at least one tooth with a filling or untreated decay), and 68 percent had untreated decay at the time of the examination. On average, these adolescents had almost seven permanent teeth that were affected by dental decay.

A high proportion of the adolescents examined had at least one dental sealant on a first or second molar (64 percent). Dental sealants are effective in preventing decay, and those adolescents with sealants had significantly fewer tooth surfaces that were decayed, missing, or filled because of decay (DMFS = 9.18 vs. 18.24). In this age group a large proportion of decay occurred in pits and fissures (75% of DFS). For this reason, continued use of sealants should be encouraged. Twenty-five percent of the decay, however, was on the smooth surfaces between the teeth – considerably higher than this proportion in 6-14 year olds (13%). Since smooth surface decay

is best prevented by using fluorides, expanding fluoride rinse and/or fluoride tooth brushing programs into middle schools is recommended.

Periodontal (gum) disease begins in the adolescent years. It is caused by a bacterial infection that, if left untreated, can result in the loss of tissue (bone and soft tissue) that hold the teeth in the jaw. The teeth can eventually become loose or painful, and may be lost. Almost all of the adolescents (92%) had bleeding gums, calculus, or periodontal pockets. Eighteen percent had the first stages of gum disease (periodontal pockets of 3.5-5.4 mm) while two percent had advanced periodontal disease (periodontal pockets > 5.5 mm).

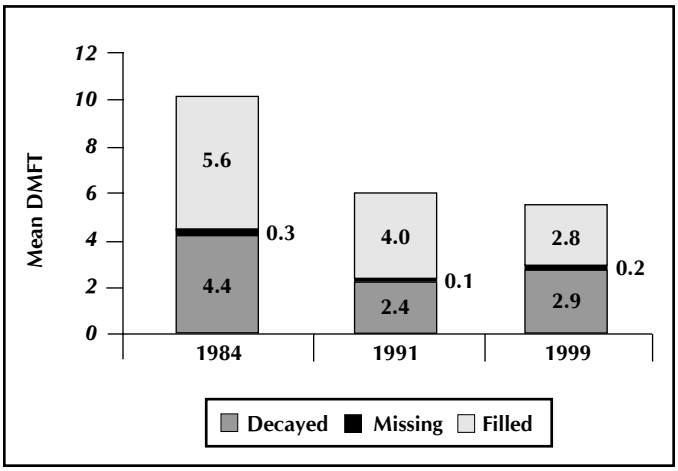
Localized Juvenile Periodontitis (LJP) is a rare form of inherited periodontal disease that affects only adolescents. It has been reported in several, but not all, Areas of the IHS. Because it is such a rare disease, it is difficult to evaluate patterns of LJP through oral health surveys such as this. Some of the advanced periodontal disease found in the AI/AN adolescents, however, may be due to LJP.

Since tobacco use is a known risk factor for periodontal disease, oral cancer, and other systemic diseases, the survey gathered information on current tobacco use. Approximately 23 percent of the young adults used tobacco on a regular basis, and the prevalence increased with age, ranging from 14 percent in 15-year-olds to 34 percent in 19-year-olds. For those who use tobacco, 52 percent smoke daily, 40 percent smoke on some days, 4 percent use smokeless tobacco daily, and 12 percent use smokeless tobacco on some days.

Trends Over Time

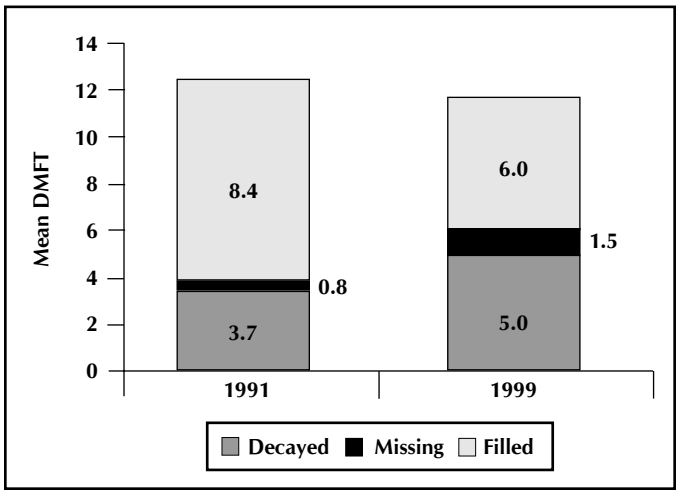
The 1984 IHS Oral Health Survey gathered information on 13 to19-year-olds rather than 15 to19-year-olds. For this reason, comparisons with 1984 are based on adolescents between 13-19 years of age. Decay rates have steadily declined in this age group since 1984, with the majority of the decline occurring between 1984 and 1991 (Figure 3). Since 1991, the overall decay rate (DMFT) in 13 to 19-year-olds has decreased slightly from 6.52 to 5.89 ($p < 0.001$). There has, however, been an increase in both the number of decayed teeth (2.88 vs. 2.37, $p < 0.001$) and the number of missing teeth (0.25 vs. 0.14, $p < 0.001$). There has also been a concurrent decrease in the number of filled teeth (2.76 vs. 4.00, $p < 0.001$).

Figure 3. Mean number of decayed, missing and filled permanent teeth for adolescents 13-19 years from three IHS patient surveys



In adolescents between 15-19 years of age, there was no change in the overall number of tooth surfaces with a history of decay between 1991 and 1999 (Figure 4). There was, however, a significant increase in the number of decayed and missing tooth surfaces ($p < 0.001$) along with a significant decrease in the number of filled tooth surfaces ($p < 0.001$). This suggests that, compared to 1991, adolescents today are having more difficulty accessing or receiving restorative dental care.

Figure 4. Mean number of decayed, missing and filled permanent tooth surfaces for adolescents 15-19 years from two IHS patient surveys



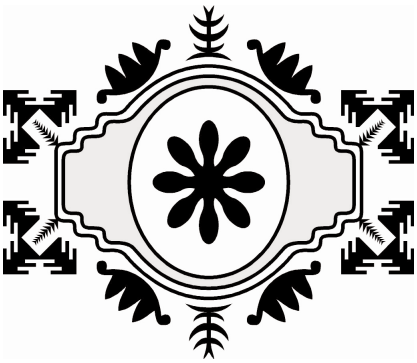
As with decay rates, there has been a slight decrease in the prevalence of tobacco use since 1991. In 1991, 25 percent used tobacco, compared to 23 percent in 1999 ($p = 0.12$). There has been a slight shift, however, from smokeless tobacco use toward cigarette smoking.

Comparison to *Healthy People 2010*

There are several oral health objectives for adolescents 15 years of age outlined in *Healthy People 2010*.

- Decrease the proportion of adolescents who have experienced dental caries in permanent teeth to 51 percent.
- Decrease the proportion of adolescents with untreated dental caries in permanent teeth to 15 percent.
- Reduce tobacco use by adolescents (grades 9-12) to 21 percent for all tobacco products.

Eighty-seven percent of the AI/AN 15-year-olds had experienced dental caries – substantially higher than the Year 2010 objective of 51 percent. Sixty-nine percent of the AI/AN



15-year-olds had untreated caries compared to the Year 2010 Objective of 15 percent. In terms of tobacco use, 23 percent of the AI/AN 15 to 19-year-olds reported using tobacco compared to the Year 2010 objective of 21 percent (for students in grades 9-12).

Comparison to National Data

The most current national data on the oral health of young adults are from NHANES III, which examined 1,381 teenagers between the ages of 15-18 years.[1] When compared to the teenagers in NHANES III, the AI/AN teenagers examined by IHS had more dental decay in their permanent teeth (DMFT = 3.5 and 6.5 respectively). In terms of untreated decay, 68 percent of the AI/AN teenagers had permanent teeth with untreated decay while only 24 percent of the NHANES III teenagers had permanent teeth with untreated decay. The IHS Area with the lowest proportion of adolescents with untreated decay was California, and their proportion was still more than twice as high as the national average (54% vs. 24%).

Summary and Recommendations

The results of the 1999 Oral Health Survey indicate that, regardless of age, oral disease is a significant health problem for American Indians and Alaska Natives. Dental decay starts in childhood and continues throughout life. Periodontal disease becomes evident during adolescence. In order to address these problems, significant steps must be taken to prevent and treat oral disease. Because disease prevalence, along with prevention and treatment strategies, are age specific, recommendations by life stages are presented.

Elementary and Middle School Children

The prevalence and severity of tooth decay increases with age, and older children also have inadequate access to preventive and restorative dental treatment. Although a large proportion of AI/AN children have dental sealants, not all children have access to this valuable service. Preventing tooth decay in this age group is extremely important because the permanent teeth that erupt at age six are meant to last a lifetime. Tobacco use also starts to increase among middle school children – putting these children at risk of periodontal disease, cancer, and heart disease in later life.

Adolescents

American Indian and Alaska Native adolescents are a high-risk group for dental decay, and most are likely to have experienced tooth decay by the time they reach their late teenage years. Since the prevalence of tooth decay continues to increase with age, some adolescents do not develop decay until their later teenage years. Access to restorative dental care continues to be a problem, with 68 percent of the adolescents having untreated tooth decay. Even though a high proportion of adolescents have had access to caries prevention services (64% had at least one dental sealant), there remains a significant number who do not receive adequate preventive services. For example, those adolescents who had sealants averaged only fours sealants when there are eight eligible molars.

Periodontal disease begins in adolescence. For a small number of individuals, gum disease may advance rapidly during their teenage years. Because of habitual tobacco use, a significant proportion of adolescents are at risk for developing severe periodontal disease, cancer, and heart disease later in life. People who begin smoking early in life have the highest risk of developing smoking related oral disease.

Recommendations for Prevention Programs

- Encourage and support community water fluoridation to reduce the rates of dental disease among AI/AN populations.
- In areas without a fluoridated community water supply, encourage and support topical fluoride application programs in schools.

- Implement and evaluate the use of school-linked and school-based sealant programs in both elementary and middle schools.
- All adolescents should be carefully evaluated for both caries and periodontal disease risk.
- Collaborate with middle schools and high schools to improve access to preventive services for adolescents.
- Develop and implement tobacco education programs in elementary, middle, and high schools to prevent habitual tobacco use.

Recommendations for Access to Dental Care

- Coordinate referrals for treatment with school-linked and school-based sealant programs.
- Adolescents with periodontal disease should receive special access to dental clinics, aggressive periodontal therapy, and routine recall appointments.
- Increase enrollment of eligible families into publicly financed programs (Medicaid and SCHIP) and utilize third party reimbursement to contract for more dental providers.
- Increase the number of dental providers (dentists, dental hygienists, and dental assistants) who can supply preventive and restorative services.
- Use auxiliary personnel such as dental hygienists and expanded functions dental assistants to improve the efficiency of the delivery of dental services.
- Recruit and train non-dental health care personnel to provide oral health education, screening, referral, and, wherever possible, preventive dental services.

Recommendations for Education of Children, Parents, and the Community

- Encourage children, adolescents, and parents to practice preventive hygiene procedures including daily brushing with fluoridated toothpaste.
- Encourage children, adolescents, and parents to limit consumption of foods and beverages containing sugar.
- Educate community members, administrative and program staff, and tribal health and advocacy groups about the oral health of children and adolescents.

Recommendations for Advocacy

- Share information with the U.S. Congress, foundations, and advocacy groups. Develop partnerships to address these health disparities.

Recommendations for Tobacco Use

- Establish a tobacco control program for adolescents and children.
- Implement community-based smoking prevention and smoking cessation initiatives targeted to adolescents and children.
- Support legal and regulatory action to reduce tobacco sales to minors.

Recommendations for Research

- Identify factors that contribute to the high prevalence of tooth decay among AI/AN children.
- Test and evaluate programs to reduce the incidence of tooth decay and prevalence of untreated caries.
- Evaluate the prevalence and distribution of Localized Juvenile Periodontitis in AI/AN adolescents.

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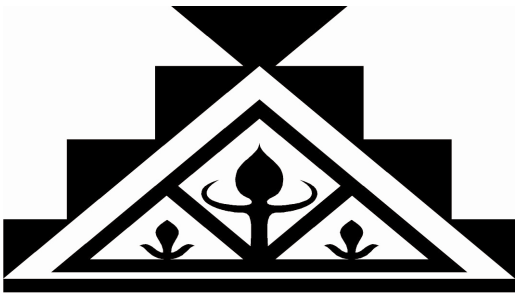


Necrotizing Soft Tissue Infections Caused by Group A Streptococcus

Robert A. Kaye, MD, Orthopedic Surgeon, Tuba City Indian Medical Center, Tuba City, Arizona

Introduction

Necrotizing soft tissue infections are associated with significant morbidity and mortality. Often, treating physicians do not initially recognize the seriousness of these conditions. Appropriate intravenous antibiotic therapy and early and repeated surgical debridement of affected areas are the most important treatment modalities. The purpose of this paper is to review the presentation, evaluation, and treatment of a spectrum of necrotizing soft tissue infections. Emphasis will be on those problems caused by Group A streptococcus because these are frequently seen.

Presentation

Expeditious diagnosis is the key to reducing morbidity and mortality resulting from necrotizing Group A streptococcus infections. A difficult problem is differentiating less serious cellulitis from the life-threatening necrotizing infections. Three elements of the initial presentation help to identify the more serious conditions: 1) pain out of proportion to the physical findings, 2) rapid progression of erythema and swelling, and 3) failure to respond rapidly to intravenous antibiotic treatment.[1]

Wall, et al[2] have published a model to predict necrotizing soft tissue infection based on a combination of abnormal vital signs and laboratory tests. Usually the diagnosis can be established by careful review of the history and physical examination findings present when the patient presents. Recognized risk factors include malnutrition, diabetes mellitus, trauma, surgery, intravenous drug use, obesity, immunocompromise, and alcoholism.[3] A check for risk factors is worthwhile, but many people who develop necrotizing infections have no risk factors.

Physical Examination

Vital signs may provide a clue to impending cardiovascular collapse. Tachycardia is especially common. Most patients have at least a moderate fever. Hypotension usually occurs late in the course; it is an especially ominous finding. The areas of involved skin are extremely tender. Induration and erythema of the skin are more severe than in routine cases of cellulitis. Skin in the affected area is significantly elevated compared to the uninvolved adjacent areas. The zone of involvement progresses rapidly, often over just a few hours. Therefore, serial checks of the patient's physical findings, as often as once every hour or two, are very important.

Crepitus due to bacterial gas production may be present, but may be subtle. Detection requires careful palpation of painful areas. Any purplish or violaceous discoloration of the skin in the affected zone immediately differentiates necrotizing infections from cellulitis. These discolored regions develop into bullae and indicate full thickness death of subcutaneous fat, dermis, and epidermis. Regional lymphadenopathy and extensive lymphangiitis are nearly always present.

Laboratory Evaluation

Laboratory findings are generally nonspecific. The white blood cell (WBC) count is moderately or markedly elevated but a level greater than 20,000 cells per high power field (HPF) is typical of the more severe infections. Often there will be a left shift in the differential, with up to 50% immature cells (bands) present. The sedimentation rated usually is markedly elevated. Blood cultures should be drawn, especially when fever is greater than 101.5 degrees. The incidence of bacteremia is as high as 60%.[1] Wound cultures may be useful if there are open lesions present. Abnormal renal function with increased creatinine is an ominous sign that may presage toxic shock syndrome.

Radiography

Radiographs of the affected areas should be reviewed for the presence of subcutaneous gas collections. CT (computerized tomography) scans have a better chance of identifying subcutaneous gas but they are time consuming and expensive.[4] Gas forming organisms besides streptococcus include clostridia, Bacteriodes, peptostreptococcus, Klebsiella, E. coli, and Aeromonas.[5] MRI (magnetic resonance imaging) has been used successfully to differentiate uncomplicated cellulitis from necrotizing fasciitis and deep abscess formation. Accuracy is enhanced by intravenous contrast administration.[6] Nevertheless, use of high technology should never delay the surgical treatment of a patient with a suspected necrotizing soft tissue infection.

Pathology

When patients have simple cellulitis, the infection is limited to the superficial layers of the skin. Involvement is much deeper with necrotizing cellulitis and necrotizing fasciitis. Extensive necrosis of the deep subcutaneous fat is typically found. Penetrating veins and arteries become thrombosed, leading to tissue death. At times only the subcutaneous fat layer will die leaving a viable overlying skin flap. With necrotizing fasciitis the deep fascia overlying and between muscle layers undergoes destructive change.

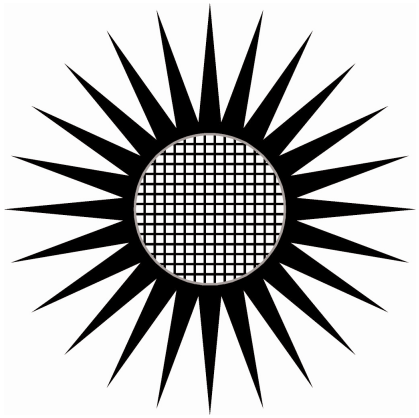
Pathophysiology

Group A streptococcus produces damage through a variety of mechanisms. Streptococcal M protein types 1 and 3 are highly associated with cases of toxic shock syndrome.[7] Streptococci also manufacture and excrete pyrogenic exotoxins. These are the so-called superantigens that interact with the host immune system. The ultimate result is an induced production of tumor necrosis factor, interleukins, and other potent lymphokines. A cascade develops with amplified responses that may eventually develop into the clinical picture of toxic shock syndrome. It is important to note that bacteria produce toxin both while they are rapidly growing and in the static phase of their life cycle. This has important implications for the selection of antibiotics for the treatment of serious soft tissue infections.

Treatment

The mainstay of treatment for the necrotizing varieties of Group A streptococcus infections is surgical exploration of the involved areas and debridement of all necrotic tissue. Multiple debridements are often needed. In large series of such cases, the average number of operations is 4 to 6. Rarely, life-saving extremity amputation must be employed. Large soft tissue defects are often produced by appropriate surgical debridement. These areas require expert wound care to prevent further loss.

It is important to keep wounds moist. Avoid the use topical agents that promote further necrosis, such as Betadine, Dakin's solution, and hydrogen peroxide. Saline dressings are most useful, although they are labor intensive. After the infection is controlled, primary wound closure is rarely possible. Split-thickness skin grafting covers many wounds but frequently more complex soft tissue coverage methods must be utilized.



Intravenous antibiotics significantly affect the course of disease. Penicillin-like antibiotics are useful during the stage of rapid bacterial proliferation because they inhibit the formation of the bacterial cell walls. These drugs are not effective during the stationary phase. In severe infections there is high morbidity and mortality when penicillin analogs are used alone. Eagle[8] pointed out the effect of bacterial growth phase and inoculum size on the reduced efficacy of penicillins. Clindamycin is recommended because it inhibits the synthesis of bacterial proteins. It is effective regardless of the inoculum size and growth phase of the bacteria. Importantly, clindamycin inhibits the synthesis of M proteins and pyrogenic exotoxins. Broad-spectrum antibiotic coverage is indicated until bacteria are positively isolated from blood or wound cultures.[7]

Morbidity and Mortality

As noted above, the medical and surgical treatment of patients with necrotizing soft tissue infections is complicated with multiple operating room sessions. The necessary debridements and wound closure techniques often are disfiguring. It is not unusual to develop associated regional joint stiffness. The reported mortality rate for necrotizing fasciitis has ranged from 20 to 80%.

Summary

Group A streptococcus produces a spectrum of soft tissue infections. The most innocuous is simple cellulitis. The more serious cases must be identified early. This can be achieved by being aware of these conditions and maintaining a high index

of suspicion. Clues are patients presenting with systemic symptoms or patients who have disproportionate pain, blistered skin lesions, and impaired renal function. A surgeon should be consulted immediately when pain appears to be out of proportion to the initial physical findings or when patients do not improve within 24 hours while on broad-spectrum intravenous antibiotics. Clindamycin should always be one of the antibiotics selected for the treatment of unusually severe cellulitis unless the patient has a history of allergy to clindamycin. Aminoglycosides or alternatively macrolides should then be utilized.

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PHS Physician Mentoring Program

The Physician Professional Advisory Committee (PPAC) to the Surgeon General is initiating a voluntary mentoring program for new and junior Commission Corps (CC) physicians. Initially this program will be limited to Commissioned Officers (CO), but the plan is to expand it to Civil Service PHS physicians in the future. The goal of the program is to promote professional growth and career development. New and junior physicians (protégés) with less than two years of service can be matched with more senior physicians (mentors) by agency, geographic area, or discipline.

Initially, the PPAC is recruiting senior CC physicians who are willing to serve as mentors. A senior CC physician is one with over five years of experience in the PHS and who is at the grade of 0-5 or above. A description of the program and a mentor application form is available at *www2.IHS.gov/ppac/Mentoring_Intro_page.htm*. Information and applications can also be obtained through CAPT Dean Effler, 401 Buster Rd. Toppenish, Washington 98948; telephone (509) 865-2102, Ext. 224; or e-mail *usphsmentor@prodigy.net*.

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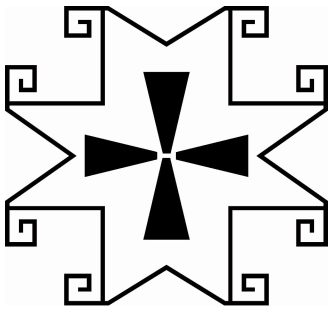
For additional information contact Judy Whitecrane, CNM, at Phoenix Indian Medical Center; telephone (602) 263-1550; or e-mail *judy.whitecrane@mail.ihs.gov*.

National Diabetes Education Program Adopts A1C Name for the Hemoglobin A_{1c} Test

Yvette Roubideaux MD MPH, Assistant Professor, College of Public Health, University of Arizona, Tucson, Arizona and Chair, National Diabetes Education Program American Indian Campaign

The National Diabetes Education Program (NDEP) Steering Committee has agreed to adopt a simple name for the hemoglobin A_{1c} test, which is the test that is used to monitor long-term blood glucose control. The new name **A1C** will be used in all NDEP communications with people with diabetes.



"People with diabetes and their health care providers told us that use of this simple name will help reduce confusion and make consumers more familiar with this important test," said Dr. Charles M. Clark, Jr., chair of the NDEP. "We hope that as more people with diabetes become familiar with the A1C, they will take an active role in asking for the test and its results and work with their health care providers to reach their target A1C number," he added.

As NDEP partners, the NDEP American Indian Subcommittee and the Association of American Indian Physicians encourage their members and Indian health providers to use the name **A1C** in all communications with people with diabetes concerning the test. To help standardize use of the new name, the two letters on either side of the number "one" should be capitalized.

Multiple research studies, including the Diabetes Control and Complications Trial (DCCT) and the United Kingdom Prospective Diabetes Study (UKPDS), have shown that lowering blood glucose levels is associated with reduced rates of the complications of diabetes. Every person with diabetes should know their A1C level, and work with their health providers to take control of their diabetes and prevent complications.

NDEP encourages everyone to disseminate the patient information handout (found on page 155) about the A1C to increase awareness about the test. Please feel free to include it in newsletters articles and to distribute it to individuals with diabetes.

The A1C Test

What is the A1C test?

A1C (pronounced "A-one-C") refers to a lab test that measures the average level of blood glucose (sugar) in your body over the last 3 months. It is the best way for you and your health care team to know if your blood glucose is under control. The A1C test shows if your blood glucose has been close to normal or too high. It does not take the place of regular self-testing of blood glucose that shows day-to-day or hour-to-hour changes in your blood glucose.

What is a good A1C goal?

A1C test results show the percent of A1C in the blood. The A1C goal for people with diabetes is usually less than 7 percent. Ask your health care team what your A1C goal should be and write it down. If your A1C is less than 7 percent, your treatment plan is working and it is likely that your blood glucose is under good control. If your A1C is higher than 7 percent, ask your health care team about your treatment plan. Any lowering of the A1C toward normal can help reduce your chances of getting eye disease, kidney disease, nerve damage, or heart disease.

How often do I need this test?

Make sure you get an A1C test at least twice a year. You should have the test more often if your blood glucose stays too high or if anything in your treatment plan changes. This test uses a blood sample taken from your arm or finger.

What about home testing for A1C?

Some people with diabetes use a home test for A1C. Be sure to follow the testing instructions and ask your doctor to discuss the results with you.

Should I keep a record?

Write down each AIC along with the date of the test. This will help you see how your diabetes is controlled over a long period of time and whether your treatment plan is working properly. Talk to your doctor and health care team about your test results.

For more information about the National Diabetes Education Program call (800) 860-8747, or visit the NDEP web site at *http://ndep.nih.gov.*

A1C Values

Normal	**Less than 6%**
Goal	**Less than 7%**
Take extra action	**Over 8%**

Web-based Program Offers Unique Opportunity to Complete Family Nurse Practitioner/Master of Science in Nursing

This exciting graduate nursing program is made available in response to the need and interests of nurses who have work or home responsibilities that cannot be left behind. The program offers a curriculum for self-directed learners whose goals are to achieve higher education and expand their professional expertise while working and continuing to live in their place of residence. The curriculum is web-based and designed for adult learners. Adult learning principles that foster independent study, flexible scheduling, and student responsibility for learning are fundamental to the curriculum.

The College of Graduate Nursing at Western University of Health Sciences offers a Master of Science in Nursing/Family Nurse Practitioner (MSN/FNP) program and four other tracks for nurses holding baccalaureate degrees: a Post-Master's Family Nurse Practitioner Certificate (FNP-Only), a Master of Science in Nursing for nurse practitioners (MSN-Only), an Adult Nurse Practitioner to Family Nurse Practitioner (ANP-FNP), and a Master of Science in Nursing for Harbor-UCLA women's health nurse practitioners (MSN-Harbor).

The College of Graduate Nursing MSN/FNP program is completed in six nontraditional, 15-week semesters, with three semesters scheduled each year. The MSN-Only track may be completed in three semesters, while FNP-Only students may complete their track in three or four semesters. During these time periods, students complete self-directed, web-based courses that are accessed via computer. Syllabi, which provide detailed direction for study, are posted on the Western University/College of Graduate Nursing website each semester. The majority of courses include asynchronous discussion sessions in which students and faculty participate in collaborative learning related to assigned readings.

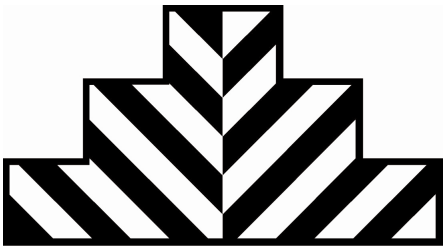
Each semester students are required to attend two intensive, three-day weekends on campus. These classes provide valuable time for faculty and peer interaction, student presentations, lectures, clinical and didactic testing, skill laboratories, and selected clinical practice with faculty. Faculty maintain regular contact with students via phone or e-mail to respond to questions and/or to offer guidance.

Students complete clinical practice with a program-approved preceptor near their place of residence and, in addition, may work in a clinical setting with faculty, if needed. Some students may desire to come to campus before seminar weekends for assessment and mentoring by clinical faculty. Preceptors are certified family nurse practitioners or primary care physicians who are approved by the faculty. Faculty guide student learning through interaction during seminar sessions, periodic site visits, and review of detailed student reports of patient care via electronic logs. In order to prepare competent nurse practitioners, the College requires 675 clinical hours of practice. This requirement exceeds the national norm of 600 hours.

The Western University campus is located approximately 35 miles east of Los Angeles, California. The campus is a cluster of buildings, with a bookstore, a new library, high-tech classrooms, student computer labs, and a student commons. Western University support services include Library Services, Information and Instructional Technology (computer) support, Financial Aid, Center For Disabilities, and Student Services.

In addition to teaching clinical and primary care courses, nurse practitioner faculty maintain current practices in a variety of settings near the campus, such as private nurse practitioner offices, urgent care, and community clinics. Doctoral prepared faculty teach master's degree courses, such as Health Care Systems, Nursing and Family Theory, and Research.

Students are admitted each fall semester, with classes beginning in September. Applications are accepted all during the year, with a final date for application completion in February. For more information about Western University and the College of Graduate Nursing, please visit the websites at *www.westernu.edu* and *www.westernu/cogn*, respectively. Applications are available by e-mailing our admissions specialist at *ttaylor@westernu.edu* or by calling (909) 469-5523. Please call or e-mail for answers to your questions, or to discuss special needs.



Promises to Keep: Public Health Policy for American Indians and Alaska Natives in the 21st Century

Edited by Mim Dixon, PhD, and Yvette Roubideaux, MD, MPH. Foreword by Michael Bird, MSW, MPH. Published by the American Public Health Association, 2001; 311 pages, softcover, $25.95 ($19.95 APHA Member price). ISBN 0-87553-024-9

Promises to Keep explains the changes that are occurring in the Indian health care delivery system as it evolves from a federal government program to a health care system that increasingly is operated by tribes.

Policymakers, public health professionals, and health care financing administrators in both federal and state governments often have questions: Why do Indians have free health care? Why are Indians treated differently than other minority groups? What is tribal sovereignty? What is the federal trust responsibility? Who is considered an Indian? Why are there different rules for urban Indians than for Indians living on reservations? Who is paying for Indian health care? How do we work with tribes? Won't Indians receive better health care if they are enrolled in private sector HMOs? What do tribes want?

Promises to Keep describes the history, legal basis, financing, and organizational structure of the complex health care delivery system that is intended to serve American Indians and Alaska Natives. This book provides an excellent orientation for all who are involved in the development of health policy at the federal and state levels. Building on 25 years of experience with tribally operated health care systems, *Promises to Keep* charts a course for public policy that would reduce the disparities in funding and health status among American Indians and Alaska Natives.

Available from APHA Publications Sales, P.O. Box 753, Waldorf, MD 20604-0753; telephone (301) 893-1894; website *www.apha.org/media*.

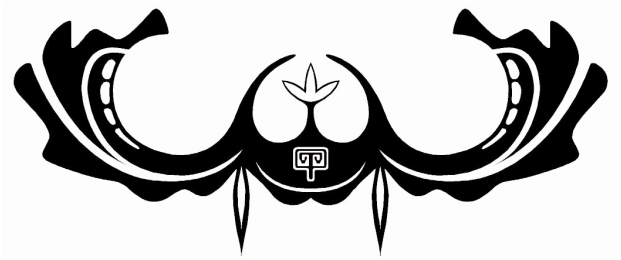
Managed Care in American Indian and Alaska Native Communities

By Mim Dixon, PhD. Published by the American Public Health Association, 1998; 189 pages, softcover, $10.00 ($7.00 APHA Member price). ISBN 0-87553-238-1

Managed care is touching the lives of some of the most culturally distinct people living in both remote, rural areas and impoverished, inner cities – American Indians and Alaska Natives. This book provides a look at the unique federal health system provided by the Indian Health Service, with an emphasis on public health.

Each of the four case studies in this book illustrates how managed care works. Cases have been selected from different parts of the country and from different types of Indian health delivery systems delivered by tribes through contracts or self-governance compacts under the Indian Self-Determination Act, and by urban Indian programs.

Available from APHA Publications Sales, P.O. Box 753, Waldorf, MD 20604-0753; telephone (301) 893-1894; website *www.apha.org/media*.



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THE IHS PRIMARY CARE PROVIDER

THE PROVIDER is published monthly by the Indian Health Service Clinical Support Center (CSC). Telephone: (602) 364-7777; Fax: (602) 364-7788; e-mail: *the.provider@phx.ihs.gov*. Previous issues of THE PROVIDER (beginning with the February 1994 issue) can be found at the CSC home page, *www.csc.ihs.gov*.

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Opinions expressed in articles are those of the authors and do not necessarily reflect those of the Indian Health Service or the Editors.

Circulation: THE PROVIDER (ISSN 1063-4398) is distributed to more than 6000 health care providers working in the IHS and tribal health programs, to medical and nursing schools throughout the country, and to health professionals working with or interested in American Indian and Alaska Native health care. If you would like to receiver a copy, send your name, address, professional title, and place of employment to the address listed below.

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