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Febrile Illnesses with Thrombocytopenia in the Southwest U.S.

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Abstract

Background. Following the description of hantavirus pulmonary syndrome (HPS) in the Southwest U.S., the need to rapidly distinguish the frequently lethal HPS from other endemic infections became urgent. Thrombocytopenia is almost universal in the prodromal phase of HPS but is common in other acute infections. We sought to identify the spectrum of acute infections with thrombocytopenia in the Southwest.

Methods. Subjects with acute undifferentiated febrile illness and thrombocytopenia were referred by primary care physicians and recruited into the study. Blood cultures and serology for hantavirus and Bartonella infection were universal while other tests were at the discretion of the referring and consultant physicians.

Results. Among 141 subjects studied over a ten-year period, a specific or provisional diagnosis was identified in 54 (38%) and no diagnosis was achieved in 87 (62%). Pathogens initially identified as undifferentiated febrile disease included prodromal hantavirus infection, plague, borreliosis, Rocky Mountain spotted fever, bacterial sepsis, and parvovirus B19 among 8 zoonotic and 4 non-zoonotic illnesses. The initial level of thrombocytopenia and leucopenia did not distinguish hantavirus infection from other pathogens, but a continued rapid decrease in platelets was most consistent with HPS.

Conclusions. In the Southwest U.S. fever and thrombocytopenia characterizes a diverse group of pathogens but unfortunately initial hematological findings fail to discriminate among possible pathogens. Fevers with marked leucopenia and thrombocytopenia indicated a need to search for potentially novel pathogens.

Introduction

In 1993 a novel syndrome Hantavirus Pulmonary Syndrome (HPS) was discovered in the Southwest U.S.,¹ followed by discovery throughout most of the U.S. and the Americas². Hantavirus infection begins with a non-specific prodromal illness, characterized by fever, chills, myalgias, and headaches, followed 2 to 5 days later by the precipitous onset of pulmonary edema and shock.¹ Intensive care treatment reduced mortality if found diagnosis was made during the

In this Issue...

161 Febrile Illnesses with Thrombocytopenia in the Southwest U.S.

168 NPTC Formulary Brief: Antihypertensive Guidelines

170 NPTC Formulary Brief: Phosphodiesterase 5 Inhibitors

173 Meetings of Interest

173 Electronic Subscription Available

174 Position Vacancies

prodromal period.³ Since thrombocytopenia was the only consistent feature during the early febrile prodrome,⁴ clinicians were encouraged to refer patients with fever and thrombocytopenia to centers with intensive care units.^{5,6}

The majority of referred patients with undifferentiated febrile illness and thrombocytopenia did not have hantavirus infection, however, resulting in costly long-distance referrals. Other life-threatening infections with thrombocytopenia such as bubonic plague,⁷ however, and two novel infections^{8,9} with thrombocytopenia, also occur in high desert ecosystems and require rapid diagnosis. Clinical features needed to be identified to assist in triaging patients to intensive care units.

This study sought three goals: identify the spectrum of common infections with thrombocytopenia in the Southwest; identify distinctive initial hematological characteristics; and recommend an efficient approach to diagnosis and treatment based on our clinical experience.

Methods

Subjects. Subjects were recruited during two sequential intervals using similar enrollment criteria and approvals by institutional review boards (IRB). The first study focused on the hematologic characteristics of thrombocytopenic patients, utilized retrospective chart review without identifiers, and was approved by the University of New Mexico (UNM) Human Research Review Committee (HRRC) and the Navajo Nation Human Research Review Board (HRRB), with written consent waived as no intervention was involved and the outbreak of a highly fatal disease was classified as an emergency. The second study, utilizing the same admission criteria with more detailed chart review and a minimum panel of diagnostic testing, underwent full review and approval by the UNM HRRC and the Navajo Nation HRRB. Informed written consent was obtained and subjects were informed of any diagnostic findings.

Criteria of undifferentiated febrile illness with thrombocytopenia. Recruitment to the study sought subjects with symptomatic illness of sufficient severity to either require hospitalization or further diagnosis and treatment in the judgment of the referring physician. All subjects presented as undifferentiated febrile illness with a documented body temperature of greater than 38.3° C and the absence of a history of recent travel outside the Southwest. 'Undifferentiated febrile illness' was defined as absence of organ-localizing signs in the lung, heart, brain, or lymph nodes at initial presentation and examination. Subjects with a bubo, coma, stiff neck, abnormal chest x-ray, new cardiac murmur, inflamed joints, exudative pharyngitis or conjunctivitis were not recruited. The presence of a severe headache, arthralgias or rash did not indicate specific organ infection and patients with these conditions were included in analysis. A high index of suspicion for HPS or a need for specialized diagnostic studies resulted in referral to UNM Health Science Center; the remainder were hospitalized in their regional medical center.

The threshold for thrombocytopenia was defined for this study as at least one platelet count in citrated whole blood measured by automated counter as <160,000/mm,³ because this level captured all of the hantavirus infections at first presentation in our experience.

Standard Diagnostic criteria: Hantavirus infection was confirmed by strip immunoblot for IgM and IgG antibody to Sin Nombre virus, an assay shown to have high sensitivity and specificity for hantavirus infection in the Americas.¹⁰ Bubonic plague in the absence of a bubo was diagnosed by blood culture positive for Congo red-positive colonies and characteristic safety-pin gram-negative rods of *Yersinia pestis* visualized on peripheral blood smear. Tularemia was diagnosed by blood or pleural fluid culture positive *Francisella tularensis*. Borreliosis (relapsing fever) was diagnosed by presence of large numbers of spirochetal organisms visualized on Giemsa-stained peripheral blood smear and lymphocytosis in cerebral spinal fluid. Parvovirus infection was indicated by either an EIA IgM titer greater than 1.8 ratio or by virus-specific RT-PCR amplimers identified in acute serum. Spotted Fever was diagnosed by ELISA IgM titer of at least 64. Typhus fever was diagnosed by a positive IgM and IgG EIA titers of at least 256 and the EIA titer was 4-fold greater than the titer for spotted fever. Acute human immunodeficiency virus (HIV-1) infection was diagnosed by characteristic syndrome, documented seroconversion and positive EIA IgM antibody. Acute rheumatic fever was diagnosed by the Jones criteria and elevated ASO titer. Colorado tick fever was diagnosed by abnormal cell count in CSF and positive EIA IgM antibody in serum. Q fever was diagnosed by positive EIA IgM >64 and IgG >256 (Centers for Disease Control, Ft. Collins, CO). Bacterial sepsis was diagnosed by at least two positive blood cultures of known pathogens accompanied by characteristic signs and symptoms. Bacterial endocarditis was diagnosed by positive blood culture, valvular abnormalities by echocardiography, and confirmed by culture of valve tissue obtained at surgery.

Research Assays: For all subjects *Bartonella* spp. infection was provisionally diagnosed by seroconversion to rodent-origin *Bartonella* cell wall antigens and negative serology and blood cultures for known human *Bartonella* species.⁸ Serologic assays for selected pathogens were sought by non-commercial diagnostic assays performed in research laboratories for serum samples on 15 subjects with severe infections and leucopenia not diagnosed by available assays. Evidence for acute flavivirus and alphavirus infections causing encephalitis in humans (St. Louis Encephalitis Virus, Eastern EV, Western EV) were sought by ELISA for IgG antibody at U.S.A.M.R.I.I.D, Ft. Detrick, MD. Serological evidence for infection with selected flaviviruses, orbiviruses and bunyaviruses known to be endemic in insects and animals in the Southwest were tested by ELISA or direct fluorescent antibody (DFA) (Centers for Disease Control, Ft. Collins, CO). Evidence for rickettsial infection was sought by IgM-EIA serology (University of Texas Medical

Branch, Galveston, TX). Serologic assays for acute arenavirus infection will be presented in a separate publication.

Statistics. Comparison of means of independent samples were tested by Student's t-test, and comparisons of proportions were tested by the Chi-Squared test, with two-sided test of significance was $p < 0.05$.

Results

A total of 141 subjects with an acute febrile illness and

thrombocytopenia from the Four Corners region were referred for additional diagnostic tests between 1993 and 2002 (Table 1). There were 83 males and 58 females, with ages ranging from 10 to 80 (mean age 37.7 years, median age 32.4 years). The state of residence was New Mexico for 120 subjects, Arizona for 12 subjects, and Colorado for 9 subjects. Among all subjects 54 (38%) had etiologic pathogen identified. The first 8 diseases (25 subjects) listed in Table 1 are zoonotic diseases endemic in the Southwest, and the remaining five diseases (N= 19 subjects) are

Table 1. Diagnoses among 141 subjects referred for diagnosis of fever and thrombocytopenia in the Southwest U.S. 1993–2002.

Infection	N	Platelet counts*	Leukocyte counts#
Diagnosed Infections	44		
Zoonoses			
Hantavirus	15	92 (27-159) [47%]	9.28 (2.2-20.1) [13%]
Non-hantavirus zoonoses grp)	10	99 (55-160) [44%]	6.14 (4.0-12.5) [40%]
Borreliosis	2		
Colorado Tick Fever	1		
Q Fever	2		
Rocky Mtn Spotted Fever	1		
Plague	2		
Tularemia	1		
Murine Typhus	1		
Non-Zoonoses	17	96 (22-160) [47%]	10.5 (1.7-35.0) [21%]
Acute rheumatic fever	1		
Bacterial Endocarditis	1		
Bacterial Sepsis	13	90 (20-141) [54%]	11.5 (1.7-35) [31%]
Parvovirus B19	4	120 (69-160) [255]	7.4 (2.9-14.4) [25%]
Provisional diagnoses	10	110 (23-155) [30%]	7.3 (1.7-29.4) [40%]
Bartonellosis-like	6	93 (23-155) [50%]	9.3 (2.9-29.4) [33%]
Rocky Mtn Spotted Fever-like	4	136 (131-143) [0%]	4.4 (1.7-7.7) [50%]
Undiagnosed infections	87	108 (23-160) [31%]	5.48 (1.2-15.6) [45%]
Total Study Population	141	104 (20-160) [37%]	6.2 (1.2-35.0) [40%]

*platelets $\times 10^3/\mu\text{L}$: mean (range) [percent with counts less than $100,000/\mu\text{L}$].

#total leukocytes $\times 10^3/\mu\text{L}$: mean (range) [percent less than $4300/\mu\text{L}$].

not zoonotic. An additional 10 subjects had diagnostic evidence for two likely zoonotic infections (Bartonellosis-like and Rocky Mountain Spotted Fever-like) but the available assays for these pathogens did not provide definitive diagnoses. The remaining 87 (62%) had no diagnosis.

Among the 45 patients in this series diagnosed with recognizable disease entities, typical organ-localizing signs and symptoms were not apparent at first presentation. The 15 HPS patients presented to medical care during the febrile prodrome, without evidence for pulmonary edema on chest x-ray or oxygen de-saturation below 90%. All but one of the 15 progressed to HPS. These 15 recruited prodromal HPS subjects were a smaller proportion of all HPS cases, compared to the total of 80 HPS patients contemporaneously presenting with established pulmonary edema in the same geographic area.⁸ The three patients with septicemic plague did not have external buboes at initial presentation, and two had abdominal buboes diagnosed by subsequent CT scan. Of the four subjects diagnosed by serology or PCR with parvovirus infection none had arthritis, two had rash and all had transaminasemia. The patients with bacterial sepsis had an initially unrecognized abdominal source. The patient with endocarditis did not initially present with a valvular murmur due to wide-open aortic regurgitation.

As provisional diagnoses, 6 subjects had an 8-fold seroconversion by a direct fluorescence antibody test to a *Bartonella* species isolated from the common woodrat in New Mexico, as previously reported⁸. Repeated blood cultures using techniques able to culture other human *Bartonella* species were negative, however, preventing definitive diagnosis. In 4 subjects commercial assays for IgM antibody with eight-fold levels above background to Rocky Mountain Spotted Fever antigens, but not typhus group antigens, was detected but convalescent antibody assays were not available. The single subject with clinically classical RMSF complicated by petechial rash and gangrene seroconverted with eight-fold increases in IgM and IgG antibody to spotted fever antigens. The extensive cross-reactions among rickettsial antigens prevent any definitive diagnosis.

The 87 undiagnosed subjects had negative serology to hantavirus and *Bartonella* species, two to six negative blood cultures, and peripheral blood smears negative for bacilli consistent with either *Yersinia pestis* or *Borrelia* species. For 24 subjects serologic evidence for rickettsial infection, Q fever, plague, tularemia, and EBV mononucleosis were negative. In a separate group of 12 subjects with marked leucopenia ($<2.0 \times 10^3/\mu\text{L}$), acute and convalescent sera were negative for the above pathogens, as well as antibody to alphaviruses, coltivirus, orbiviruses, bunyaviruses, and flaviviruses.

No undiagnosed subject developed signs of an organ-localizing infection, such as nuchal rigidity, abscess, pulmonary infiltrate, murmur, or abdominal finding, during follow-up observation. Almost every case complained of the triad of chills, myalgias and headache. 14% had an erythematous rash but serology for parvovirus and RMSF were negative. Cough was

noted in 8 undiagnosed subjects, compared with 10 of 15 hantavirus infections (Chi-Squared 29.07, $p < 0.01$). The incidence of abdominal pain, back pain, arthralgias and nausea or vomiting was similar among the diagnosed and undiagnosed groups.

Subjects in the undiagnosed group tended to have higher initial mean platelet counts ($108 \times 10^3/\mu\text{L}$) compared to the other diagnostic groups but these differences were not significant (compared to the HPS group, $p=0.075$). The hantavirus group had a greater decrease in platelet count during the first two days of hospitalization compared to the other groups. The hantavirus group had a mean decrease of 44,000 platelets/ μL compared to other zoonoses (-15,000), non-zoonotic illnesses (-16,000), provisional diagnoses group (-6000) or undiagnosed group (-13,000), all at $p<0.05$. Total white cell count was slightly lower and incidence of leukopenia ($<4.3 \times 10^3/\mu\text{L}$) was slightly more common among undiagnosed infections compared to other diagnostic groups but these differences were not significant. Twelve undiagnosed subjects had marked leucopenia ($<2.0 \times 10^3/\mu\text{L}$) compared to 4 among all the other diagnostic groups, but these differences in proportions were not significant.

Discussion

Three observations emerged from the analysis of this convenience sample from a referral population with fever and thrombocytopenia. First, there is considerable diversity of infections and illnesses that present with thrombocytopenia and significant morbidity in the Four Corners region. Second, at initial presentation without specific organ signs, there were no signs, symptoms or clinical pathological analyses obtained at admission which distinguished early hantavirus infection, prior to progression to HPS, from other infections with thrombocytopenia. Third, although there was no attempt to apply a complete diagnostic panel to every patient, this referral population illustrated the high frequency of undiagnosed fevers with thrombocytopenia compared to those diagnosed.

Clinicians referred patients frequently out of concern for HPS and urgent need for extracorporeal membrane oxygenation (ECMO) treatment⁶. Thrombocytopenia may suggest HPS but the decision for urgent transport from rural regions must be made prior to results of definitive serological assays.^{10,11} Hantavirus fever without pulmonary manifestations is rare in the U.S.^{12,13,14} but initial presentation in the prodromal stage is common. The hematological features of hemoconcentration, thrombocytopenia, lack of toxic neutrophil granulation, circulating myelocytes and immunoblasts ('atypical lymphocytes') are distinctive findings only in the cardio-pulmonary phase of HPS.⁴ The laboratory values LDH >1000 IU, bicarbonate <20 , and prolonged PTT are statistically more common in HPS than other acute respiratory infections¹⁵ but are common in many other infections.

In addition to HPS the differential diagnosis of thrombocytopenic infections with rapid progression and high

mortality rate requiring urgent diagnosis and treatment include bubonic plague, tularemia, Rocky Mountain Spotted Fever, bacterial sepsis, and bacterial endocarditis. Other serious thrombocytopenic infections not included in this series are meningococcemia, necrotizing fasciitis due to Groups A and C streptococcus and toxic shock syndrome, although these rarely present as undifferentiated fever. Febrile infections with early thrombocytopenia and rare mortality but substantial morbidity include borreliosis, Colorado tick fever, leptospirosis, infectious mononucleosis, scarlet fever, acute rheumatic fever, alphavirus encephalitis, Ehrlichiosis, babesiosis, acute toxoplasmosis, and Q fever. Drug and alcohol toxicity can contribute to platelet count reduction in any infection.¹⁶

Bubonic plague due to flea-borne *Yersinia pestis* most commonly presents with an exterior bubo,⁷ but when the bubo is an intra-abdominal mass the infection may present as undifferentiated fever or masquerade as a gastrointestinal infection.¹⁷ Thrombocytopenia frequently occurs early in infection, and the high bacteremia often permits visualization of bacilli in Giemsa-stained peripheral blood smears.

Rocky Mountain Spotted Fever (RMSF) is a tick-borne infection caused by *Rickettsia rickettsii* carried by the Rocky Mountain wood tick (*Dermacentor andersoni*). In 2005, an outbreak of 16 cases of RMSF was identified in the rural eastern Arizona⁹ carried by a novel vector, the brown dog tick (*Rhipicephalus sanguineus*). In this Southwestern outbreak, 94% of patients had a fever of 38° C or greater, 94% had a rash primarily on the palms or soles, and 25% had thrombocytopenia (platelet count <130,000/mm³).¹⁸ The modified clinical presentation of this rickettsial infection transmitted by the newly described dog tick vector in eastern Arizona is incompletely described and the diagnosis of RMSF should be pursued by acute and convalescent IgM IFA antibody testing even in the absence of a rash.⁹

Tick-borne Relapsing Fever (TBRF) in the United States is caused by *Borrelia hermsii*, *B. turicatae* and *B. parkerii* carried by ground or tree squirrels and chipmunks and transmitted to humans through the bite of the soft ticks. In a large outbreak in northern New Mexico in 2002, 39 cases of TBRF presented with fever, headache, and myalgias in most cases.¹⁹ Thrombocytopenia is a common finding and severe thrombocytopenia (<20,000/mm³) has been reported.²⁰ Rash, hepatosplenomegaly, and multiple relapses are helpful clues, spirochetes can be visualized on the Giemsa-stained or acridine orange-stained peripheral blood smear,²¹ but many cases rely on serological diagnosis and may have been missed in our study.

We found serological evidence for infections due to rickettsial or related pathogens. Seven subjects in this study were previously reported as presumptively diagnosed by seroconversion to rodent-origin Bartonella antigens, distinct from other known human Bartonella spp. pathogens, including *B. henselae*, *B. quintana*, and *B. elizabethae*.⁸ The clinical presentation described fever, chills, myalgias, and transaminasemia in all subjects, thrombocytopenia and

leucopenia in most patients, elevated serum bilirubin levels and serum aspartate aminotransferase levels over 4000 U/L in several patients, but all routine and blind-passage blood cultures were negative. Whether these patients were infected with zoonotic pathogens such as *B. vinsonii* subsp. *arupensis*²² is unknown but the spectrum of Bartonella spp. infections continues to expand. The 4 subjects with IgM antibody to spotted fever group antigens may have been acutely infected with a mild form of the RMSF described in Eastern Arizona⁹ or may have been infected with emerging rickettsial pathogens.²³⁻²⁶

Most undiagnosed illnesses in this study are likely due ‘viral syndrome’ due to common enteroviruses and to incomplete application of available diagnostic assays. Though not investigated in this study, alcohol and drugs may have caused or contributed to thrombocytopenia in some subjects. The 14% incidence of marked leucopenia among undiagnosed subjects, and the prolonged hospitalization of this group (unpublished data) suggests that a subset of thrombocytopenia with leucopenia may deserve more intensive and innovative diagnostic study. The serological reactions to rickettsial- and Bartonella-related antigens are consistent with infection with novel pathogens, but many other pathogen groups deserve exploration.²⁷⁻³⁰ The Centers For Disease Control and Prevention³¹ established a surveillance system for deaths without diagnosis despite thorough post-mortem exams. High-throughput sequencing to detect novel genomic fragments in acute serum specimens has been successful for pathogens relevant to the western U.S.³² Data-mining and model-building searches for unique clinical signatures³³ may or may not be useful, however, for thrombocytopenic infections with few clinical clues. The strategy of astute clinicians identifying a distinctive severe clinical presentation followed by targeted antibody assays and molecular techniques should continue to focus on these undiagnosed thrombocytopenic infections. For the clinician an organized diagnostic approach is useful, as suggested in Table 2, to avoid missing treatable diseases.

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Table 2. Clinical approach to patient with undifferentiated fever and thrombocytopenia.

- 1) Order routine complete metabolic panel, complete blood count (CBC), urinalysis, chest radiograph and two blood cultures.
- 2) Order urgent complete blood count (CBC) to evaluate for Hantavirus Pulmonary syndrome (HPS) diagnostic criteria:
 - a. Platelet count less than 150 cells/mm³
 - b. Hematocrit >50% in males, 48% in females
 - c. Left shift with myeloblasts present
 - d. Absence of neutrophils
 - e. > 10% of lymphocytes are immunoblasts
- 3) If criteria for HPS are met, transfer patient urgently to a tertiary care facility for Extracorporeal Membrane Oxygenation therapy (ECMO) and intensive care
- 4) If HPS criteria are not met, order the following:
 - a. Diagnostic testing
 1. Hantavirus serology
 2. Rickettsia rickettsiae antibody
 3. Rickettsia typhi antibody
 4. Coxiella burnetii antibody
 5. Colorado Tick Fever antibody
 6. Parvovirus B19 antibody
 7. HIV serology and HIV PCR
 8. Epstein-Barr antibody panel
 - b. Treatment
 1. Mild illness not requiring admission: Doxycycline 100 mg po bid for 7 days
 2. More severe illness requiring admission:
 3. Doxycycline 100 mg po bid plus intravenous Ceftriaxone and Gentamicin
 4. Patients can be discharged home at 48-72 hours to complete 7 days of doxycycline if there is symptomatic improvement, negative culture results and a rising platelet count.

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Indian Health Service
National Pharmacy and Therapeutics Committee
Antihypertensive Guidelines
NPTC Formulary Brief
August 2014



Background:

In August 2014, the IHS National Pharmacy and Therapeutics Committee undertook a comprehensive review of five guidelines published from 2013 through 2014 regarding the management of hypertension. These included guidelines from the European Societies of Hypertension and Cardiology, American and International Societies of Hypertension, Canadian Hypertension Education Program, and the report of the JNC-8 panel, as well as a science advisory published in collaboration by the American Heart Association, American College of Cardiology, and the U.S. Centers for Disease Control and Prevention.

These guidelines were generally formulated based on principles set forth by the Institute of Medicine, representing a departure from the principles of guideline development guiding the JNC-7 panel, whose recommendations were published a decade ago and which had formed the basis of contemporary hypertension management. The current guidelines were largely based upon a systematic review of the literature from 1966 to present, with emphasis placed on randomized controlled trials evaluating the relationship between the pharmacologic management of hypertension and primary outcomes including adverse cardiovascular events, cardiovascular mortality, and all-cause mortality.

Hypertension is a common risk factor for atherosclerotic cardiovascular disease, affecting one in three American adults and two-thirds of adults over age 60 years. It accounts for forty percent of the population attributable-risk for cardiovascular disease, making it the single most important modifiable risk factor for the leading cause of morbidity and mortality in the United States as well as in the I.H.S. service population. Epidemiologic data indicates that roughly one-half of hypertension sufferers in the United States have uncontrolled high blood pressure.

The NPTC focused deliberations on three fundamental questions; 1) When should treatment for elevated blood pressure be initiated, 2) What is the appropriate blood pressure goal to be achieved, and 3) Which pharmacologic treatment strategy is best supported by evidence relative to improvement in the stated primary outcomes.

Discussion:

Hypertension is defined as blood pressure equal to or in excess of 140/90. Evidence suggests that a log linear relationship exists between blood pressure and adverse cardiovascular outcomes such that for every 20/10 increase above the “ideal” blood pressure of 115/75, risk doubles. It should be noted that the best data supporting a benefit from the pharmacologic management of high blood pressure is based upon randomized controlled trials designed to evaluate benefit relative to higher systolic blood pressure targets, particularly for older adults.

Among the general adult population, there is consensus that a blood pressure target of 140/90 is appropriate for both medication initiation as well as ongoing pharmacologic management of hypertension. There is also general agreement that for stage 1 hypertension (which has been defined as blood pressure of 140-159/90-99) among otherwise healthy younger adults, a limited trial of lifestyle modification alone may be appropriate before considering initiation of drug therapy.

For otherwise healthy older adults, the JNC-8 panel was joined by other guideline committees in recommending both an initiation and treatment target blood pressure of 150/90. However, it should be noted that guidelines differed on the appropriate age cutoff for this higher systolic blood pressure target. The majority opinion of the JNC-8 panel based its 60 years age cutoff on the most rigorous principles of study design while other guidelines favored the higher systolic blood pressure treatment target for persons over age 80 years.

The higher systolic blood pressure treatment target for older persons generated some controversy, resulting in a separate published recommendation from a minority representing 5 members of the JNC-8 panel who cited post-hoc analysis of trial data in several studies of isolated systolic hypertension among the elderly, concluding that a target blood pressure in the 140-145 range may produce additional benefit. Several guidelines have advocated tailoring blood pressure treatment goals among older adults based upon variables including general health and comorbid conditions.

For persons with co-existing diagnoses of diabetes mellitus and chronic kidney disease with gross proteinuria, general consensus among the guidelines was a blood pressure target of less than 140/90. However, clinical practice guidelines from the American Diabetes Association and National Kidney Foundation favored blood pressure goals of less than 140/80 and less than 130/80 respectively in these two groups based on some limited study data favoring these more stringent targets.

Findings:

Based on strong outcomes-based data from randomized controlled trials, there was general consensus among the various hypertension guidelines to favor four medication classes as first-line therapy for the general management of hypertension after considering compelling indications in a particular patient. These were thiazides, calcium channel blockers, ACE-inhibitors, and angiotensin-receptor blockers. Agents from these same classes were deemed appropriate additions as second or third line therapy to achieve recommended blood pressure treatment goals.

All of the guidelines cautioned against combination of ACE-inhibitors and angiotensin-receptor blockers. There was also consensus that either ACE-inhibitors or angiotensin-receptor blockers are preferred for management of hypertension among patients with chronic kidney disease and that both classes may have less utility among Black patients.

In a departure from JNC-7 recommendations, the JNC-8 panel, along with most of the other guideline committees, moved beta-blockers as a class to the second tier of medications for blood pressure management after the aforementioned four drug classes, except for compelling indications such as systolic heart failure or post-MI patients.

In a science advisory, the American Heart Association partnered with the American College of Cardiology and Centers for Disease Control and Prevention in issuing a call to action advocating systems changes to improve blood pressure control rates in the United States. Pertaining to pharmacologic management strategies, these partner organizations advocated the use of fixed-dose combination anti-hypertensive medications to improve adherence. This recommendation was echoed by the various expert panels who authored the recent guidelines, who also pointed out that in most major trials, a combination of two or three agents from different classes was necessary to achieve recommended blood pressure target goals.

If you have any questions regarding this document, please contact the NPTC at IHSNPTC1@ihs.gov. For more information about the NPTC, please visit the NPTC website.

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Indian Health Service
National Pharmacy and Therapeutics Committee
Phosphodiesterase 5 Inhibitors
NPTC Formulary Brief
August 2014



Background:

In August 2014, the IHS National Pharmacy and Therapeutics Committee reviewed the four currently available phosphodiesterase 5 inhibitors (PDE5Is) and their role in treatment of erectile dysfunction (ED) after receiving a request for evaluation of this topic. The PDE5Is with FDA approval for ED include avanafil (Staxyn®), sildenafil (Viagra®), tadalafil (Cialis®), and vardenafil (Levitra® and Stendra®).

Discussion:

ED is a problem that affects many men and increases in incidence with each decade of life. From the National Health and Nutrition Survey (NHANES) in 2001-2002, it was estimated that about 18% of men 18 years of age and older are affected. Previous reports estimate anywhere from 8-53% of men have ED. About half of men with diabetes have experienced ED. Within all the age groups reviewed, men with ED had a higher prevalence of cardiovascular risk factors. At least 1 cardiovascular risk factor was reported in 90% of the men included in the survey. One very strong independent risk factor for ED is lack of physical activity. The estimated cost of ED in the United States would be \$15 million if all men sought treatment.

ED can have organic or psychogenic causes or both. There are multiple diseases and lifestyle choices that can be implicated in causing ED. This includes diseases such as diabetes, hypertension, nerve disease, multiple sclerosis, atherosclerosis, heart disease, and hormonal abnormalities. Increasing age, injury and psychological factors such as stress, anxiety, guilt, and low self-esteem are also implicated. Potentially modifiable causes include smoking, excessive alcohol intake, obesity, lack of exercise, and side effect of medications.

PDE5Is have been studied for ED in many different disease states. These include diabetes mellitus, chronic kidney disease, post-cancer, multiple sclerosis, and spinal cord injuries. They have also been reviewed for treating ED caused by antidepressants. In all of these, PDE5Is have been found to have some benefit in the treatment of erectile dysfunction.

Guidelines:

Both the European Association of Urology (EAU) and the American Urological Association (AUA) have published guidelines for managing ED. The EAU cites ED as a symptom, not a disease, and stresses finding the underlying cause. Each guideline stresses the importance of fully evaluating the patient prior to initiation of treatment. Once it is decided to treat for ED, both guidelines recommend PDE5Is as first line medical management, unless there are contraindications to use.

There are several other treatment options for ED. Alprostadil, in the form of either intra-urethral suppositories or intercavernous injections, is another drug with evidence to support use in the treatment of ED. Testosterone is another agent with some benefit in treating ED, though it has been found more effective for those with hypogonadism when used in conjunction with a PDE5I. Therapies that are not recommended to treat ED include yohimbine and herbal therapies such as Korean red ginseng.

Nonpharmacologic treatments include vacuum constriction devices, penile prosthesis, venous ligation and penile revascularization (rarely indicated), psychotherapy, and lifestyle changes. Psychotherapy in addition to PDE5I therapy has shown better results than PDE5I alone. Lifestyle modifications include physical activity, control of diabetes, and prevention of cardiovascular disease.

PDE5Is should not be given to patients taking nitrates. They should be used with caution in patients taking alpha-blockers. All PDE5Is have interactions with CYP3A4 inhibitors. They are contraindicated with some inhibitors and may require dosing changes with others. If a PDE5I is prescribed, medication reconciliation is extremely important in order to provide appropriate dosing. Renal and hepatic function must also be considered as dosage adjustments are required for many of the PDE5Is. Any patient who has angina during intercourse or has had any arrhythmias in the prior 6 months should not be prescribed a PDE5I.

Caution should be used in patients with preexisting cardiovascular disease. Avanafil is not recommended for use in patients with NYHA Class 2 or greater heart failure.

The PDE5Is all have similar reports of adverse drug reactions. The most common include flushing, headache, rhinitis, dizziness, back pain, and myalgia. Serious reactions, which patients should be educated on prior to initiation of therapy, include non-arteritic ischemic optic neuropathy (NAION), hearing loss, and priapism. NAION can result in changes or loss of vision. It is unknown if it is related directly to PDE5I use, underlying vascular risk factors, or anatomical defects. Patients should be advised to stop the PDE5I and see immediate medical care if they experience any visual changes or loss. Sudden decrease of loss of hearing was reported in temporal association with PDE5I use. Again, advise patients to seek medical care if any hearing loss occurs. Patients should seek care for any erection that lasts for longer than 4 hours.

Findings:

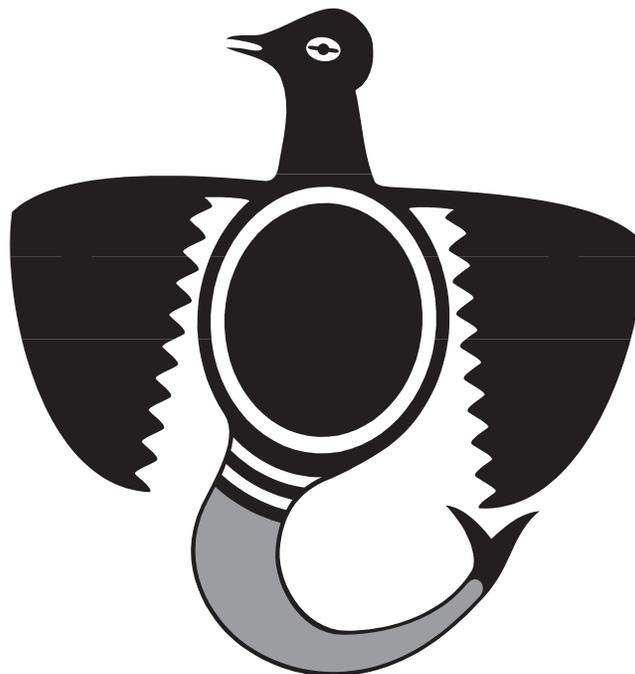
The NPTC had a lengthy discussion about the use of PDE5Is and elected not to add any PDE5Is to the National Core Formulary at this time. The committee does hope that providers recognize the psychological effects ED may have on their patients. The committee recommends educating patients on potential causes of ED and encouraging patients to modify those factors over which they may have some control.

If you have any questions regarding this document, please contact the NPTC at IHSNPTC1@ihs.gov. For more information about the NPTC, please visit the NPTC website.

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MEETINGS OF INTEREST

Advancements in Diabetes Seminars

Monthly; WebEx

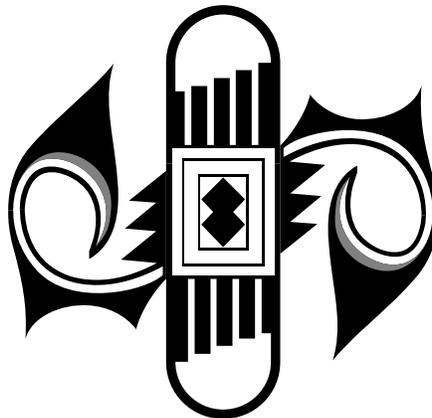
Join us monthly for a series of one-hour WebEx seminars for health care program professionals who work with patients who have diabetes or are at risk for diabetes. Presented by experts in the field, these seminars will discuss what's new, update your knowledge and skills, and describe practical tools you can use to improve the care for people with diabetes. No registration is necessary. The accredited sponsors are the IHS Clinical Support Center and IHS Nutrition and Dietetics Training Program.

For information on upcoming seminars and/or previous seminars, including the recordings and handouts, click on this

link and see Diabetes Seminar Resources: <http://www.diabetes.ihs.gov/index.cfm?module=trainingSeminars>

Available EHR Courses

EHR is the Indian Health Service's Electronic Health Record software that is based on the Resource and Patient Management System (RPMS) clinical information system. For more information about any of these courses described below, please visit the EHR website at http://www.ihs.gov/CIO/EHR/index.cfm?module=rpms_ehr_training. To see registration information for any of these courses, go to <http://www.ihs.gov/Cio/RPMS/index.cfm?module=Training&option=index>.



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will be sent. Do not type anything in the subject or message boxes; simply click on "send." You will receive an e-mail from LISTSERV.IHS.GOV; open this message and follow the instruction to click on the link indicated. You will receive a second e-mail from LISTSERV.IHS.GOV confirming you are subscribed to *The Provider* listserv.

POSITION VACANCIES

Editor's note: As a service to our readers, The IHS Provider will publish notices of clinical positions available. Indian health program employers should send brief announcements as attachments by e-mail to the.provider@ihs.gov. Please include an e-mail address in the item so that there is a contact for the announcement. If there is more than one position, please combine them into one announcement per location. Submissions will be run for four months and then will be dropped, without notification, but may be renewed as many times as necessary. Tribal organizations that have taken their tribal "shares" of the CSC budget will need to reimburse CSC for the expense of this service (\$100 for four months). The Indian Health Service assumes no responsibility for the accuracy of the information in such announcements.

Psychiatrist

Zuni Comprehensive Community Health Center; Zuni, New Mexico

The Zuni Comprehensive Community Health Center (Indian Health Service) has an opening for a full-time psychiatrist to see adults and children. We do psychotherapy, crisis work, trauma work, as well as work with families, couples, and groups. You will have the opportunity to impact and design mental health for the community as a whole. We are shielded from managed care. You have an opportunity to provide psychotherapy to your patients and families without worrying about insurance approvals. You are not merely hired as a prescriber, but as a biopsychosocial psychiatrist. In this job, you have a chance to feel good about the care you are providing, in a setting that is personally and professionally stimulating, and in a place where your skills are needed and valued. Additional advantages include market pay, no call, and excellent federal benefits.

We are located on the Zuni reservation. The Zuni Pueblo is one of the oldest continuously inhabited Native American villages in the US, estimated to be at least 800-900 years old. The Zuni are located on their ancestral lands and have one of the most intact Native American cultures in the country. Zuni tradition and the Zuni language are a living and vibrant part of daily life in the community. Zuni is nestled amongst beautiful redrock mesas and canyons. It is considered high desert at 6000 - 7000 feet and is located in the northwestern region of New Mexico, along the Arizona border.

For more information or to apply, contact Michelle Sanchez, Zuni Service Unit Behavioral Health; telephone (505) 782-7312; e-mail michelle.sanchez2@ihs.gov.

Staff Clinician

Department of Health and Human Services, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, Division of Intramural Research Phoenix, Arizona

The Diabetes Epidemiology and Clinical Research Section (DECERS), Phoenix Epidemiology and Clinical Research Branch (PECRB), National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) conducts research in the epidemiology and prevention of type 2 diabetes, its complications, and related conditions, primarily among American Indians in the southwestern United States. The section is recruiting a staff clinician to take part in clinical research activities. The position is located in Phoenix, Arizona on the campus of the Phoenix Indian Medical Center.

The staff clinician will work in an interdisciplinary, collaborative environment and have the following responsibilities: a) medical director of the DECERS research clinics, supervising nurse practitioners and medical assistants, and overseeing clinic schedules and operations; b) principal or associate investigator of randomized clinical trials in prevention of diabetes or its complications; c) principal or associate investigator of epidemiologic investigations of type 2 diabetes and related conditions; and d) associate investigator in a randomized clinical trial of optimizing weight gain in pregnancy and effects on the mother and child. There are outstanding opportunities to collaborate with experts in epidemiology, clinical research, physiology, genetics, and biostatistics. Ample clinical, laboratory, and computing resources are available.

The position requires licensure to practice medicine in one of the United States or D.C. and board eligibility or certification, preferably in internal medicine, pediatrics, family practice, or preventive medicine. Clinical or epidemiological research training and experience are desirable. Salary and benefits will be commensurate with experience and qualifications. Outside candidates and current federal employees (civilian or commissioned corps) are encouraged to apply.

Interested candidates may contact William C. Knowler, MD, DrPH, Chief, DECERS, c/o Ms. Charlene Gishie. To apply, please send a cover letter; CV with publications list; and names and contacts of three references to Ms. Charlene Gishie, National Institutes of Health, 1550 E. Indian School Rd, Phoenix, AZ 85014; e-mail charlene.gishie@nih.gov. The deadline to submit an application is March 7, 2014.

NIDDK is a component of the National Institutes of Health (NIH) and the Department of Health and Human Services (DHHS). All positions are subject to a background investigation. DHHS and NIH are Equal Opportunity Employers.

Family Practice Physicians (2)

Cass Lake IHS Hospital; Cass Lake, Minnesota

Leech Lake Reservation is an open reservation located in Minnesota's Northwoods region. Towering pines fringe many of the lakes found within its boundaries. Wild rice beds, deep forests, and shimmering lakes, two of which are among the largest in the state, abound. There are approximately 1,050 square miles within the reservation, nearly all of which is within the boundaries of the Chippewa National Forest.

When you locate here, you are looking for a quality of life for both your workers and your family. That is why it will be worth your while to find out how much Leech Lake can offer with its natural beauty, friendly communities, good schools, and various civic, cultural, and historical organizations. The area also provides many quality outdoor recreational activities, from fishing and boating in the summer to nordic and alpine skiing in the winter. Though Leech Lake's natural beauty, civic attractions, and recreational activities are things to behold, they pale in comparison to the friendliness of the people of the Leech Lake area.

The population within the reservation boundaries is estimated at 91,800. Nearly fifty-eight percent are between the ages of 16 and 65. The resident American Indian population on the reservation has been estimated at 7,763 by the census. Most of the population is concentrated in eight communities dispersed across the reservation. Adjacent to the reservation, there are three major area economic centers: Bemidji, which is 13 miles to the west of Cass Lake; Grand Rapids, which lays 54 miles to the east of Cass Lake; and Walker, roughly 23 miles to the south of Cass Lake.

The Cass Lake Indian Hospital is owned and operated by the Federal Government as a Public Health Service, Indian Health Service Facility. We have a staff of 120 employees, six of whom are physicians and five nurse practitioners; there is a contracted emergency department service. Additional services include ambulatory clinic, dental, optometry, audiology, laboratory, radiology, physical therapy, and diabetes clinic. Our Facility has 13 beds; we had 223 discharges and 1,398 patient days in FY '05. According to the most recent data, we have 99,503 outpatient visits annually, 5,612 Dental visits, and 2,763 Optometry visits; there are 20,512 registered patients. The Leech Lake Tribe operates mental health, substance abuse, podiatry, and diabetes clinics, as well as seven other clinics staffed by various professionals.

For additional information, contact Antonio Guimaraes, MD, Clinical Director (family medicine at telephone (218) 335-3200; e-mail antonio.guimaraes@ihs.gov, or Tony Buckanaga, Physician Recruiter, at telephone (218) 444-0486; e-mail tony.buckanaga@ihs.gov.

Family Practice Physician

Pharmacist

Laboratory Supervisor

EMT Basic/Intermediate

First Responder

Environment Health Assistant

Master Social Worker

Alamo Navajo School Board, Inc.; Alamo, New Mexico

Alamo Navajo School Board, Inc., Health Division is seeking health care practitioners to come work with their dedicated staff on the Alamo Navajo Reservation. Our clinic is located 140 miles southwest of Albuquerque and sixty miles west of Socorro. We have a multiservice community health center that include medical, dental, onsite pharmacy and lab, optometry, mental health, emergency medical, aftercare, and community health education services. One focus is on diabetes awareness and prevention of the disease, which affects one in every five people in Alamo. In support of the effort, the Health Division in collaboration with the Board and Administration constructed a community wellness center. The facility has a full-size gymnasium, aerobic and weight room, classrooms, kitchen, game room, day care, and an outdoor fitness path.

Alamo Navajo School Board, Inc., provides a highly negotiable and competitive salary; signing bonus; student loan assistance; housing; and an excellent benefits package that consist of a group health insurance/life insurance at no cost for employees and shared cost for dependents; 403(b) Retirement Plan and 457(b) Deferred Contribution Plan; Relocation reimbursement; 13 major holidays off; personal leave; and community wellness center access. Hiring preference will be given to Navajo and Indian Preference. For more information, please contact Hotona Secatero, Director of Personnel, at (575) 854-2543 extension 1309; or e-mail hsecatero@ansbi.org.

Clinical Director

Family Medicine Physician

Kodiak Area Native Association; Kodiak, Alaska

The Kodiak Area Native Association (KANA) is searching for an adventurous, highly motivated physician to lead our team that is committed to patient centered care, customer service, quality improvement, and stewardship. KANA is celebrating its 48th year of providing patient and family focused health care and social services to Alaska Natives and other beneficiaries of KANA throughout Kodiak Island. KANA's award winning medical staff is comprised of four physicians who work in conjunction with two midlevel providers, dedicated nurse case managers, and ancillary staff to deliver the highest quality, team-based health care to an active user population of 2,800 patients. Integrated behavioral health and pharmacy services within the

primary care setting also facilitate an advanced support system to ensure our patients' needs are met.

The spectacular scenic beauty of Kodiak Island offers a backdrop for an abundance of outdoor and family activities, including world-class fishing, hunting, wildlife viewing, kayaking, and hiking just minutes from your door. Its sometimes harsh climate is balanced by mild temperatures and unparalleled wilderness splendor that provide Kodiak's residents with a unique lifestyle in a relaxed island paradise.

KANA offers competitive compensation and an excellent employee benefits package, including medical, dental, vision, flexible spending accounts, short term disability insurance, life insurance, accidental death and dismemberment insurance, 401k with employer contribution, fitness membership, and paid time off.

If you're interested in hearing more about how you can start your journey to an adventure of a lifetime, please visit our website at www.kanaweb.org, give Lindsey Howell, Human Resources Manager, a call at (907) 486-9880, or contact our HR Department at hr@kanaweb.org. Alaska's Emerald Isle awaits you!

Clinical Director
Family Practice Physician (2)
Physician Assistant
Family Nurse Practitioner
Clinical Nurse

Tohatchi Health Center; Tohatchi, New Mexico

Tohatchi Health Center is the quality innovation and learning network (QILN) site for Gallup Service Unit. We are located approximately 30 miles north of Gallup, New Mexico, nestled against the Chuska Mountains. Ambulatory services include family medicine, internal medicine, obstetrics and gynecology, optometry, dental, pharmacy (including anticoagulation clinic), podiatry, physical therapy, social services, public health nursing, laboratory, limited radiology, and support services. Our facility provides health care Monday through Friday, 8:00 am to 4:30 pm. Our focus is building our medical home and supporting a patient centered health care system with the patients and communities we serve.

For more information, you can contact CDR Pamela Smiley, RN-SCN, Acting Health Systems Administrator at (505) 733-8100 or e-mail at pamela.smiley@ihs.gov.

Primary Care Providers

Koosharem Community Health Center; Richfield, Utah
Kanosh Community Health Center; Kanosh, Utah

The Paiute Indian Tribe of Utah (PITU) has job openings for full-time mid-level practitioners at each location. The tribe operates health clinics in four communities, two of which are newly funded Community Health Centers in Richfield and Kanosh, Utah. Our outreach area encompasses 15 cities in Millard and Sevier Counties with an approximate service

population of 25,311. Our goal is to provide excellent health care and services to those with economic, geographic, cultural, and language barriers. Clinical services include family medicine, prenatal and women's health care, dental, optometry, nutrition and dietetics education, and social service programs.

Richfield is located in west central Utah and lies in a valley surrounded by beautiful red rock mountains. Richfield is part of Panoramaland, and is a popular thoroughfare to several nearby national parks and forests. Kanosh is a small farming town located in Millard County; it was named in honor of the Paiute Indian Chief Kanosh. These areas have long been known for their outdoor recreational opportunities, such as hiking, fishing and hunting, mountain biking, and all-terrain vehicle events.

We offer an excellent benefits package that consists of a competitive annual salary, no cost health/dental/life insurance for the entire family, a 401(k) retirement plan with tribal match, 14½ paid holidays, annual (vacation) and sick leave accruals that roll over year to year, ability to earn compensatory time for time over 40 hours weekly, plus eligibility for NHSC or IHS loan repayment.

Interested candidates should submit a PITU application; CV/resume; and copies of medical license, driver's license, highest level of education achieved, and CIB (if applicable) to Paiute Indian Tribe of Utah, Attention: Kim Kelsey, 440 N. Paiute Dr., Cedar City, UT 84721. Job posting closes January 17, 2014, although the position will remain open until filled. Visit www.utahpaiutes.org to download application; call (435) 586-1112, ext. 110; or e-mail kim.kelsey@ihs.gov with questions or for more information.

Primary Care (Internal Medicine or Family Practice) Physicians

Phoenix Indian Medical Center; Phoenix, Arizona

The Departments of Family and Internal Medicine at the Phoenix Indian Medical Center have openings for board certified/eligible outpatient family and internal medicine physicians. Our adult primary care services are provided by eleven family physicians, six internists, and two midlevel providers. Our physicians work in multidisciplinary health care teams with the active participation of nurse care coordinators, nutritionists, pharmacists, nurses, clerks, and other staff, all of whom work together to provide a medical home for patients with chronic illnesses. We have an advanced access appointment system and have been using the Electronic Health Record for over six years. Full time 8 and 10 hour per day schedule options are available. Competitive federal salaries and benefits are available, and Commissioned Officer applicants are also welcome. Job applications should be made online at USAJOBS.gov. For more information, please contact Dr. Eric Ossowski, Family Medicine, or Dr. Dorothy Sanderson, Internal Medicine at dorothy.sanderson@ihs.gov; telephone (602) 263-1537.

Hospitalist (Family Practice or Internal Medicine) Physicians**Phoenix Indian Medical Center; Phoenix, Arizona**

The Phoenix Indian Medical Center (PIMC) is actively seeking board certified/eligible family medicine or internal medicine physicians to staff its inpatient unit. PIMC is an inpatient and outpatient facility located in downtown Phoenix that provides medical care to patients from over 40 tribes. Hospitalists typically round/admit/consult on 8 to 12 patients per shift. Typical admitting diagnoses include diabetic ketoacidosis, hepatic encephalopathy, pneumonia, asthma, pyelonephritis, and cellulitis. Specialty services available to provide consultation on the inpatient service include surgery/wound care, ENT, obstetrics and gynecology, rheumatology, infectious diseases, nephrology, orthopaedics, podiatry, and dermatology. Competitive federal salary and benefits are available, and Commissioned Officers are also welcome to apply. Interested physicians should contact Dr. Dorothy Sanderson at dorothy.sanderson@ihs.gov, or telephone (602) 263-1537, ext. 1155.

**Family Physician with Obstetrical Skills
Ethel Lund Medical Center; Juneau, Alaska**

The SEARHC Ethel Lund Medical Center, Juneau, Alaska is searching for a full-time family physician with OB to join a great medical staff of 14 providers at a unique clinic and hospital setting. Have the best of both worlds by joining our practice where we share hospitalist duties and spend our remaining time in an outpatient clinic with great staff and excellent quality of life. We have the opportunity to practice full spectrum family medicine with easy access to consultants when we need them. Maintain all your skills learned in residency and expand them further with support from our tertiary care center, Alaska Native Medical Center.

Clinic is focused on Patient Centered Medical Homes, quality improvement with staff development from IHI, and using the Indian Health Service HER. Frequent CME and opportunities for growth: teaching students & residents and faculty status at University of Washington available to qualified staff. Loan repayment site for Indian Health Service and National Health Service Corps and State of Alaska SHARP program.

Work in Southeast Alaska with access to amazing winter and summer recreational activities. Live in the state capital with access to theater, concerts, annual musical festivals and quick travel to other communities by ferry or plane. Consider joining a well rounded medical staff of 14 providers at a beautiful clinic with excellent benefits. For more information contact, Dr. Cate Buley, Assistant Medical Director, Ethel Lund Medical Center, Juneau, Alaska 1-907-364-4485; email cbuley@searhc.org. Position open March 2014. Look us up online at www.searhc.org job vacancies.

**Family Medicine Physician
Internal Medicine Physician
Emergency Medicine Physician
Sells Service Unit; Sells, Arizona**

The Sells Service Unit (SSU) in southern Arizona is recruiting for board certified/board eligible emergency room physician, family/internal medicine physician, and physician assistants to join our experienced medical staff. The Sells Service Unit is the primary source of health care for approximately 24,000 people of the Tohono O'odham Nation. The service unit consists of a Joint Commission accredited 34-bed hospital in Sells, Arizona and three health centers: San Xavier Health Center, located in Tucson, Arizona, the Santa Rosa Health Center, located in Santa Rosa, Arizona, and the San Simon Health Center located in San Simon, Arizona with a combined caseload of approximately 100,000 outpatient visits annually. Clinical services include family medicine, pediatrics, internal medicine, prenatal and women's health care, dental, optometry, ophthalmology, podiatry, physical therapy, nutrition and dietetics, social work services, and diabetes self-management education.

Sixty miles east of the Sells Hospital by paved highway lies Tucson, Arizona's second largest metropolitan area, and home to nearly 750,000. Tucson, or "The Old Pueblo," is one of the oldest continuously inhabited sites in North America, steeped in a rich heritage of Indian and Spanish influence. It affords all of southern Arizona's limitless entertainment, recreation, shopping, and cultural opportunities. The area is a favored tourist and retirement center, boasting sunbelt attributes and low humidity, with effortless access to Old Mexico, pine forests, snow sports, and endless sightseeing opportunities . . . all within a setting of natural splendor.

We offer competitive salary, relocation/recruitment/retention allowance, federal employment benefits package, CME leave and allowance, and loan repayment. For more information, please contact Peter Ziegler, MD, SSU Clinical Director at (520) 295-2481 or by e-mail at peter.ziegler@ihs.gov.

**Mid-Level Practitioner
Health Director
Quileute Tribe; La Push, Washington**

The Quileute Tribe has a job opening for a full-time mid-level practitioner. Must be a certified physician assistant, licensed in the state of Washington, and must have a valid Washington driver's license. Submit your application, professional license, cover letter, resume and three references by August 16, 2013, although the position will be open until filled.

We are also looking for a health director, who will provide administrative direction, negotiate and administer IHS contracts, develop and administer budgets, write reports, insure HIPPA

compliance, comply with ACA, manage EHR, evaluate staff, and insure third party reimbursements are done. Must have a bachelor's degree related to health administration, and two years of management experience. This position is open until filled.

Telephone (360) 374-4366 or visit our website at www.quileutenation.org for a job application and job description. Alternatively, you may contact Roseann Fonzi, Personnel Director, PO Box 279, 71 Main Street, La Push, Washington 98350; telephone (360) 374-4367; fax (360) 374-4368; or e-mail roseann.fonzi@quileutenation.org.

Pediatrician

Gallup Indian Medical Center; Gallup, New Mexico

The Gallup Indian Medical Center is in northwest New Mexico, on the edge of the Navajo Reservation, about 140 miles west of Albuquerque. The Department of Pediatrics has immediate openings for board-certified/eligible pediatricians. Our current seven (7) pediatricians divide their time between outpatient and inpatient, offering comprehensive medical care to children, birth through age 18 years. We provide well-child and preventive care for children with chronic diseases (including asthma and obesity), provide some walk-in care for acute conditions, admit patients to our Pediatric Inpatient Unit, attend high-risk deliveries, and occasionally stabilize certain ill newborns and children for transfer to higher level of care in cooperation with our Women's Health Unit and Emergency Department. We enjoy the services of a dedicated pediatric nurse case manager to assist in referrals. Children in need of pediatric subspecialty care are referred to centers in Albuquerque or Phoenix. Other services represented include Emergency Medicine, Internal and Family Medicine, OB-GYN (with midwifery), General Surgery, Orthopedics, Podiatry, Diabetes Specialist, Optometry and Ophthalmology, Dental, Physical

Therapy, Occupational Therapy, and Speech & Language Therapy, as well as comprehensive laboratory and radiology services on-site. Job applications should be made on-line at USA Jobs. For more information, please contact Dr. John Ratmeyer by e-mail at john.ratmeyer@ihs.gov or by telephone at 505-722-1000 (page).

Family Practice Physician

Hopi Health Care Center; Polacca, Arizona

The Hopi Health Care Center currently has openings for family practice physicians and family nurse practitioner or physician assistants. The Hopi Health Care Center is a small rural IHS hospital providing full spectrum family practice medical services including ambulatory care, adult/peds inpatient care and low risk obstetrics, and ER care. We currently staff for 12 full time physicians, and 5 full time FNP/PA positions. Our facility is located in northern Arizona, 90 miles NE of Flagstaff and 70 miles N of Winslow, on the Hopi Indian Reservation. Services are provided to both Hopi and Navajo reservation communities. The reservation is located in the heart of the Southwest and within a 90 mile radius to abundant mountain areas, lakes, forests, and archeological sites. The Hopi Health Care Center is a new facility established in 2000 with a full ambulatory care center environment including a dental clinic, physical therapy, optometry, and behavioral health services. We are a designated NHSC site, and qualify for the IHS Loan Repayment Program.

For more information please contact Jon Stucki, MD at (928) 737-6147 or jon.stucki@ihs.gov. Additionally, you may contact Darren Vicenti, MD, Clinical Director at (928)737-6141 or Darren.Vicenti@ihs.gov. CVs can be faxed to (928)737-6001.



THE IHS PRIMARY CARE PROVIDER

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



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