Infectious Disease Problems in Indochinese Refugees

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PERSPECTIVE

The United States has historically been a nation of immigrants and a haven to political and religious refugees. With occasional lapses and subject to strict regulation, this tradition continues today.

Since 1975, more than 1.25 million refugees have fled Vietnam, Cambodia, and Laos. Of these, more than 500,000 have settled in the U.S. Since 1980, this nation has committed itself to absorb 168,000 Indochinese refugees annually. The Refugee Act of 1980 established procedures and programs to regulate and implement this policy,[1,2] and, annually, the federal government allocates large sums of money (in excess of 1.1 billion dollars in fiscal year 1982) to move, resettle and assist the newest arrivals.[3]

The influx of large numbers of Southeast Asians, many coming from crowded and deprived conditions, raises concerns regarding their health status and peculiar medical needs as well as the impact of their arrival on public health. The U.S. Public Health Service (PHS), responsible for overseeing medical aspects of the refugee program as they affect both the individual immigrant and the community at large, has accumulated many data which address these concerns. This article will review the general and specific infectious disease issues germane to care of this population. In this discussion, the following reassuring themes concerning Indochinese refugees recur:

1) They are generally healthy.
2) Most of their medical problems are common rather than exotic.
3) Most of their medical problems are of personal significance only.
4) They do not significantly jeopardize the public health. No outbreaks of infectious diseases in the U.S. have been attributable to Indochinese refugees.

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OVERSEAS MEDICAL SCREENING[4,5]

Medical screening of candidates for immigration to the U.S. is conducted abroad by the Intergovernmental Committee for European Migration (ICEM) according to guidelines formulated by the Centers for Disease Control (CDC) of the United States Public Health Service. The purpose of such screening is to identify potential immigrants afflicted with excludable medical conditions. These excludable conditions, as specified by the Immigration and Nationality Act, are: 1) untreated venereal disease (syphilis, gonorrhea, chancroid, granuloma inguinale, and lymphogranuloma venereum); 2) active tuberculosis (excludability may be waived if, under treatment, the patient produces two sputum samples on consecutive days which are negative for acid fast bacilli); 3) infectious leprosy; and 4) mental disorders, past or present (mental retardation, insanity, severe personality disorders including alcoholism and drug addiction). Standard screening procedures include a brief medical history, serology for syphilis (for those 15

TABLE 1
HEALTH STATUS OF INDOCHINESE REFUGEES

General Medical Problems	Specific Infectious Disease Problems	
	Common Conditions	Uncommon Conditions
Emotional trauma	Tuberculosis	Paragonimiasis
Malnutrition	Parasites — Helminths	Melioidosis
Anemia	Protozoans	Leprosy
Dental caries	Malaria	Tapeworms
Dermatitis	Hepatitis B Virus	Trichinosis
Ectoparasites	Venereal Disease/PPNG*	Filariasis
Conjunctivitis	Incomplete Immunizations	Schistosomiasis

*Penicillinase producing Neisseria gonorrheae

years of age or older), visual examination for leprosy and other skin conditions, chest radiograph for active tuberculosis (only for those 15 years of age or older except when younger persons are symptomatic or identified as close contacts of tuberculous persons), and "observation for mental disorders."

Approximately four percent of Southeast Asians screened abroad have excludable medical conditions.[5]

MEDICAL PROCESSING AT U.S. PORTS OF ENTRY[4,5]

The vast majority of Indochinese refugees enter the U.S. through the port of San Francisco. A (non-physician) quarantine officer of the CDC cursorily inspects new arrivals for medical conditions which require immediate care. Ninety-four percent of arriving Southeast Asians have been judged "within normal limits of good health", 0.1% have required immediate hospitalization.

On arrival, the head of each refugee household presents the following standard documents: 1) Voluntary Agency Form ACVA-1, which contains the Immigration and Naturalization Service (INS) alien registration number, names of all accompanying family members, name of the sponsoring agency, city of destination, and date of entry; 2) Medical Examination Form OF-157, which contains the results of overseas medical screening and denotes medical conditions requiring followup (especially tuberculosis), 3) immunization records; and 4) chest radiographs. Copies of each of these documents are retained by the refugees, forwarded to state and local health authorities and to the Quarantine Division of the CDC. State and local health officials are notified of refugees with Class A (active or suspected active) and Class B (inactive) tuberculosis who requi further medical attention. Refugees are given lette urging sponsors to insure appropriate medical care and orienting practitioners to the special needs and concerns involved in caring for the refugee population.

HEALTH STATUS OF INDOCHINESE REFUGEES[4-10]

Table 1 lists medical conditions of concern to the clinician who cares for Indochinese refugees. The first column includes common medical problems present in Southeast Asians in variable frequencies with which most U.S. practitioners are familiar and which they would typically detect, evaluate, and treat in the course of administering standard comprehensive care. The second column includes infectious disease problems which occur with variable frequencies in the refugee population, and which either are unfamiliar or have peculiar features with which U.S. practitioners may be unfamiliar. The special features of these individual conditions will be the subjects of subsequent discussion. The third column lists "exotic" conditions which, while uncommonly encountered in the refugee population, should be considered in generating a complete differential diagnosis in problematic cases.

TUBERCULOSIS

Tuberculosis is the most serious, common, personal health problem of Indochinese refugees and poses the most significant potential threat to the health of the host community.[4]

Among Indochinese refugees entering the U.S. in 1978 to 1979, approximately two percent had Class A and two percent, Class B tuberculosis.[11] As depicted in Table 2, the estimated prevalence of tuberculosis among refugees of

TABLE 2

ESTIMATED PREVALENCE OF TUBERCULOSIS AT THE TIME OF ENTRY AND ANNUAL INCIDENCE AFTER ENTRY AMONG INDOCHINESE REFUGEES, UNITED STATES, 1979-1980

Age Group (years)	Prevalence of Tuberculosis at Entry*	Incidence of Tuberculosis After Arrival†	Incidence of Tuberculosis in the United States, Excluding Refugee Cases, 1980
0-4	197.0	438 5	4.9
5-14	173.1	301.1	1 4
15-24	736.5	293.1	4.5
25-44	1,840.1	488.3	10.3
45-64	4,059.3	768 6	18.4
65+	6,833.5	1,584 9	30.2
All ages	1,137.8	407.4	11.3

*Cases per 100,000.
†Cases per 100,000 per year.
From MMWR 29(47):573, 1980.

all ages at the time of their arrival in the U S. was 1138 100,000; an additional 407 100,000 refugees without evidence of disease upon arrival, developed tuberculosis during the ensuing year.[11] These figures contrast with an overall annual case rate of tuberculosis in the U S of approximately 12 100,000[12] (to which Indochinese refugees contributed 5 3% of national cases reported in 1980[11]). The relative risk of tuberculosis for an Indochinese is 40 to 110 times greater (depending on age) than for the remainder of the U S public[13] (Table 3).

Given the magnitude of this problem, screening of Southeast Asian refugees for tuberculosis and conscientious management of infected persons is necessary.

Because of technical difficulties in administration and interpretation, tuberculin skin testing (5 TU PPD) is not routinely used in refugee screening programs abroad. It is, however, the screening test of choice in the U.S and should be administered to refugees as part of their routine health assessment. Table 4 gives the CDC's recommendations for screening and management priorities for this population.[4]

As many as 50% to 60% of screened refugees are found to be tuberculin-positive.[10, 3] Conversion rates of 20% to 43% after an initially negative skin test have been noted.[14] Possible explanations for this high rate of apparent conversion include transient anergy (due to tuberculosis, malnutrition, concurrent viral illness or vaccine) or incubating tuberculosis causing a "false negative" initial skin test; technical errors in administering or interpreting tests; "booster" effect of the first test; or contraction of disease after arrival in the U S. Irrespective of the explanation, a single tuberculin test is insufficient to reliably exclude tuberculosis in this population and should be routinely repeated at least once, 12 to 16 weeks after arrival.

The frequency with which Bacillus Calmette-Guerin (BCG) vaccination is administered in Southeast Asia is unknown. Although not recommended by the CDC, BCG is routinely given in some refugee transit camps including those in Thailand (to newborns) and Hong Kong (to those 12 years of age or younger). It is generally recommended to disregard a history of prior BCG administration when interpreting tuberculin skin test results because of our inability to reliably distinguish its role in a positive reaction from that of infection with *Mycobacterium tuberculosis*.[4] Intermediate (ie 5mm to 9mm of induration)tuberculin skin test reactions should suggest infection with atypical mycobacteria.

Because of the importance and logistic complexities of

continued on page 236

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TABLE 3

RELATIVE RISK OF TUBERCULOSIS AMONG INDOCHINESE REFUGEES, BY AGE, 1979

Age Group (years)	Prevalence Among Refugees	Prevalence* Among U.S. Persons	Relative Risk
0-4	491	11 8	42
5-14	321	3.2	100
15-24	588	9.8	60
25-44	1,347	22 4	60
45-64	2,734	40.2	68
⩾65	7,160	63 6	113
All ages	926	24.4	38

*Assumes 2-year duration of disease
From MMWR 29(32) 383, 1980

TABLE 4

TUBERCULOSIS IN REFUGEES

Screening Priorities	
Procedures	**Subjects**
1. Evaluation, management, contact investigation	Class A* TB refugees identified abroad
2 Evaluation, management, contact investigation	Class B† TB refugees identified abroad
3 Tuberculin skin testing (5 TU PPD)	All refugee children
4. Tuberculin skin testing (5 TU PPD)	Adult refugees less than 35 years of age
5 Evaluation and management of family and contacts of Class A and B TB children	

*Class A tuberculosis is active or suspected active disease.
†Class B tuberculosis is inactive disease.

continued from page 234

contact identification and case management, these tasks should be coordinated with if not delegated to local tuberculosis authorities The obtaining of appropriate specimens, processing of specimens properly for culture and sensitivity, selection of therapeutic agents, decisions regarding duration and modification of treatment regimens, as well as enforcement of compliance, require expertise and resources frequently beyond the means of the individual practitioner.

However, clinicians should be aware of differences between "imported" and "domestic" tuberculosis mangement Drug resistance represents a major problem which complicates treatment of Southeast Asian refugees. Approximately one third of isolates of *M tuberculosis* from Indochinese refugees were found to be resistant to one or more of the standardly used anti-tuberculosis agents [11,15,16] Twenty-five percent of strains tested were found to be resistant to isoniazid (INH),[15] which is widely and readily available throughout the Far East. As a consequence, CDC recommends that initial anti-tuberculous therapy include three agents (INH, rifampin, and ethambutol) pending the results of culture and sensitivity testing [4] Authorities disagree on the choice of agent for "preventive" therapy for the Indochinese refugee with a positive tuberculin skin test in the absence of signs of disease. Some recommend INH alone despite concerns for resistance. Others advise a combination of INH and rifampin Still others would withhold anti-microbial therapy until unless the patient showed evidence of disease.[4] Table 5 offers generally accepted guidelines for management of tuberculosis in this population [4]

INTESTINAL PARASITES[17]

Intestinal parasites are routinely recovered from Indochinese refugees Studies of this population[4,7,8,18-21]

TABLE 5

TREATMENT REGIMENS FOR TUBERCULOSIS IN INDOCHINESE REFUGEES

1. Class A tuberculosis (active or suspected active) with positive bacteriology and/or cavitary lesions on chest radiograph (ie, contagious), identified abroad
   a) Institute empiric therapy abroad, using isoniazide (INH), rifampin, ethambutol
   b) Alternative to ethambutol may be chosen for children if unable to assess visual acuity
   c) Adult dosages
      1) INH at 300 mg po qd
      2) Rifampin at 600 mg po qd (450 mg if less than 50 kg)
      3) Ethambutol at 15-20 mg/kg po qd
   d) Pediatric dosages
      1) INH at 10 mg/kg po qd (maximum = 300 mg)
      2) Rifampin at 10-15 mg/kg po qd (maximum = 600 mg)
      3) Ethambutol at 15 mg/kg po qd
2. Class A tuberculosis without positive bacteriology and/or cavitary lesions on chest radiograph (ie not highly contagious), identified abroad
   a) Treat as 1 (above) or defer until arrival in U S.
   b) If deferred re-evaluate as soon as possible, obtaining adequate specimens for culture and sensitivity to permit later modifications in therapy; then treat as 1 (above).
   c) If culture unavailable or sterile, continue all three drugs for duration of therapy
   d) Close contacts should be evaluated, if no evidence of tuberculosis, start on preventive therapy with INH pending re-evaluation in three months
3. Class B tuberculosis (inactive) with abnormal chest radiograph identified abroad
   a) High risk: re-evaluate as soon as possible
      1) If Class A tuberculosis (mistaken evaluation abroad or progressive disease), manage as 2 (above)
      2) If Class B tuberculosis with abnormal chest radiograph, consider year of preventive INH therapy
4. Class B tuberculosis with positive tuberculin skin test and/or abnormal chest radiograph
   a) Consider year of preventive INH therapy
5. Preventive therapy options when known or suspected exposure to INH-resistant TB
   a) INH
   b) Rifampin +/- INH
   c) No therapy

show that up to 80% of screened refugees have at least one, and up to 55%, more than one parasite recovered per stool sample. While surveys vary in the distribution and frequency of parasites identified, the most commonly recovered parasites are as follows

1) Nematodes: *Ancylostoma duodenale* (hookworm), *Necator americanus* (hookworm), *Ascaris lumbricoides* (roundworm), *Trichuris trichuria* (whipworm), *Enterobius vermicularis* (pinworm), *Strongyloides stercoralis*
2) Trematodes: *Clonorchis sinensis* (Oriental liver fluke)
3) Cestodes Taenia species (tapeworms)
4) Protozoans: *Giardia lamblia, Entamoeba histolytica*

Although most individuals with intestinal parasites are asymptomatic, each of these parasites is capable of causing clinically significant disease Of equal concern is the potential for adverse effects on the community Most intestinal nematode ova require one to two weeks of

incubation in appropriate soil conditions before infective larvae develop. Sewage and sanitation standards in the U.S. are generally sufficient to preclude this necessary incubation and to prevent transmission to others. Similarly, most tissue trematodes require specific intermediate hosts (snails), the absence of which in the U.S. eliminates the potential for dissemination to others. In contrast, protozoan cysts, which are shed in stools, are directly infectious, both giardia and *E histolytica* are capable of person-to-person, food and water-borne transmission, providing at least a theoretical basis for concern for the public health. Likewise, cestode ova and cysts are directly infectious if ingested and could be hazardous to the public. However, to date, no spread of parasites has been attributed to refugee sources.

Following are a few noteworthy clinical features of the parasites commonly encountered in refugees from Southeast Asia.

Giardiasis is found in up to 18% of immigrants (as contrasted with a background prevalence in the U.S. of less than four percent).[19] It is the leading protozoal cause of diarrhea in travelers and water-borne outbreaks in the U.S. In addition to Southeast Asia, it is found extensively in the USSR, West and Central Africa, Mexico, Western South America and Korea. Fifty percent to 90% of infestations can be diagnosed by two stool samples, but duodenal fluid obtained by aspiration or "Enterotest" is required to make the diagnosis in some cases. Treatment of all infected individuals is advised. Asymptomatic cyst passers (13%), particularly food handlers and children, are a risk to others and may themselves become symptomatic.

Amebiasis is very common in the tropics, especially in Southeast Asia where more than 40% of individuals may be infected (as contrasted with a background prevalence in the U.S. of three to four percent). Its worldwide prevalence is proportionate to the level of sanitation and personal hygiene. While the asymptomatic carrier is the most common situation, colonic ulceration and dysentery are the most common symptomatic presentations. Extracolonic involvement of liver, pleura, peritoneum, pericardium, brain, or skin occurs infrequently. Treatment of all infected individuals is advised.

There are one-half billion cases of **trichuriasis** worldwide (as contrasted with 2.2 million cases in the U.S.) with the greatest prevalence and highest worm burden occurring in children, five to 15 years of age. Most infestations are asymptomatic, but heavy parasite burdens may be manifested by mild anemia, bloody diarrhea, and rectal prolapse.

Enterobiasis has worldwide prevalence and is the most common helminth in the U.S. (42 million cases), typically affecting children. Its usual clinical manifestation is *pruritus ani*.

Ascariasis affects approximately one billion persons throughout the world, mostly young children in tropical climes. Most cases are asymptomatic, but gastrointestinal or biliary obstruction may develop. Larvae may migrate from the intestine to produce Loeffler's pneumonitis.

Hookworm infests one quarter of the population of tropical and subtropical regions. Clinical manifestations include iron-deficiency anemia (average daily blood loss equals 0.03 ml to 0.2 ml/worm), hypoalbuminemia, "ground itch" at the dermal site of larval penetration, Loeffler's pneumonitis, and gastroenteritis.

Strongyloidiasis is widely distributed in tropical zones (with a prevalence of 0.4% to 4% in Southeastern U.S.). One-third of cases are asymptomatic. The clinical manifestations include "ground itch" at the site of penetration, gastrointestinal symptoms (burning, colicky abdominal pain, mucousy diarrhea, vomiting, weight loss, protein-losing enteropathy), urticaria (5% to 22% of cases), and Loeffler's pneumonitis. Because of the potential for autoinfection with consequent massive parasitic burdens, aggressive therapy aimed at eradication is warranted.

Clonorchis sinensis is commonly encountered in Southeast Asians who ingest raw fish containing encysted cercariae. Most cases are asymptomatic. When clinically apparent, infestations present with cholangitis or cholangiohepatitis secondary to localized biliary obstruction. Patients have an increased risk of developing cholangiocarcinoma. Treatment with praziquantel is experimental, the drug is available from the CDC *

Given the high prevalence of parasites in Southeast Asian refugees and the potential for adverse personal or public consequences, screening of stool specimens for ova and parasites is recommended as part of a complete evaluation of symptomatic refugees and as part of routine health care maintenance of newly arrived refugee children. Individual laboratories should be consulted for their preferred method of processing stool samples. As a rule, three fresh stool specimens should be submitted.

It should be noted that peripheral eosinophilia,

*Physicians may consult the Parasitic Disease Division of the Centers for Disease Control which can offer advice in diagnosis and treatment of possible infections. Written requests should be sent to Parasitic Disease Drug Service, Parasitic Disease Division, Center for Infectious Diseases, Centers for Disease Control, Atlanta, Georgia 30333. Telephone inquiries should be made as follows (weekdays, 8:00 a.m. to 4:30 p.m. Eastern time): parasitic disease drug requests, 404-329-3670; parasitic diseases medical consultation, 404-452-4061; for consultation regarding malaria, 404-452-4046. For emergencies on nights, weekends, and holidays, 404-329-3644.

frequently, mistakenly considered to be the hallmark of parasitic infestation, is commonly found only in instances of tissue invasion as is encountered with ascariasis, strongyloidiasis, and hookworm infestation.

Decisions regarding therapy reflect an assessment of the balance between the pathologic potential (personal and public) of the infestation and the efficacy and toxicity of the available therapies.[7] Symptomatic patients should generally be treated. Concise recommendations for specific therapeutic regimens are available.[22]

Treatment of asymptomatic individuals is more controversial, but some guidance can be offered. Since protozoans multiply in the host, can increase and be perpetuated indefinitely in the absence of a new exposure, thereby extending the period of jeopardy even in the initially asymptomatic host, and pose problems to both the individual and the community, they should be definitively and aggressively treated if possible.

Helminths (with the exception of Strongyloides) do not multiply within the host, but they may persist for years, and the initially asymptomatic infestation may belatedly achieve clinical significance. Available antihelminthic therapy is generally both safe and effective. Consequently, in general, therapy is recommended for the refugee population, once removed from regions of high re-exposure. Reduction rather than elimination of worm burden may be an appropriate therapeutic goal.

MALARIA

Although there are an estimated 100 million cases of malaria worldwide, resulting in approximately one million deaths annually,[17] malaria is not presently a numerically significant problem in the U.S. However, when malaria does occur in this country today, it is primarily among the refugee population and secondarily, in travelers from or military personnel stationed in endemic regions. Figure 1 illustrates the changing pattern of U.S. experience with malaria from 1933 to 1980 and demonstrates a recent resurgence of cases. In 1980, there were 1,864 cases of malaria reported in the U.S., representing a 113% increase over the previous year and nearly 500% increase since 1975. More than 99% of cases were imported. Eighty-two percent occurred in foreign born individuals and 55% (1,034) in Southeast Asian refugees. The malaria case rate in 1980 was 6.7 / 1,000 Southeast Asian refugee arrivals with infection in males (7.8 / 1,000) more prevalent than in females (4.6 / 1,000). The majority of cases occurred in the young with the highest case rate occurring in the 10- to 29-year age range (8.2 / 1,000).[23]

Only two isolated episodes of introduced, autochthonous malaria (neither attributed to Indochinese refugees) have been reported in the U.S. since 1980.[24]

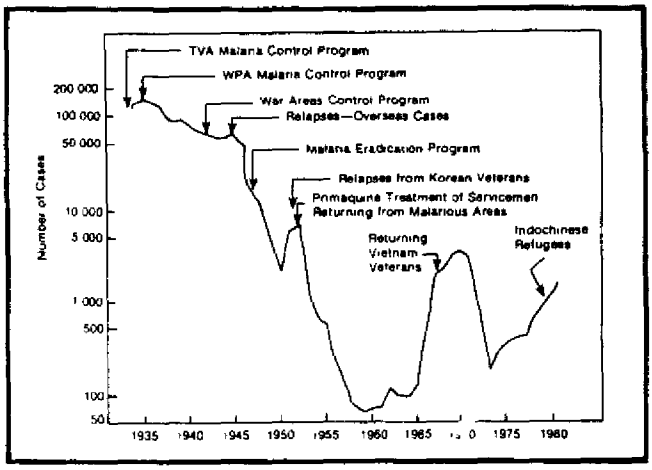

Figure 1. Cases of Malaria in the United States by year of report 1933-1980. Modified from *Morbidity and Mortality Weekly Supplement* Summary, 1977.

Nonetheless, the theoretical basis for this public health concern exists given the presence of the necessary Anopheles mosquito vector in western and southern parts of the country. Transplacental transmission ("congenital malaria," of which 26 cases in the past 14 years and 13 cases in the past 18 months have been reported in the U.S.),[25-27] and induced acquisition (blood transfusion associated malaria, of which five cases were reported in 1980[23]) are two other uncommon events but causes for medical vigilance.

The following facts regarding malaria are noteworthy for the clinician who cares for Indochinese refugees.[17] There are four species of parasites capable of producing malaria: *Plasmodium vivax, P. falciparum, P. ovale,* and *P. malariae*. Of these, *P. vivax* and *P. falciparum* are the predominant forms found in Southeast Asia. *P. vivax* is responsible for three quarters of malaria found in the U.S. and the vast majority (82%) of cases which occur in Indochinese refugees.[23]

P. vivax and *P. ovale* (which is found predominantly in Africa) have both erythrocytic and exoerythrocytic phases. They, therefore, require "radical curative therapy" (including primaquine) to prevent relapses after the erythrocytic forms are killed with conventional (chloroquine) treatment. *P. falciparum* and *P. malariae* (which have a wide geographic distribution) do not have exoerythrocytic phases, and, therefore, do not require "radical therapy." Similarly, congenital malaria and transfusion-induced malaria, due to any species, do not have exoerythrocytic phases and don't require "radical therapy."

While *P. ovale* and *P. vivax* parasitize only young erythrocytes and *P. malariae*, only old erythrocytes, *P. falciparum* is capable of invading erythrocytes of any age,

thereby achieving high degrees of parasitemia (greater than five percent) which are associated with potentially fulminant and fatal courses

Routine screening of all Indochinese refugees for malaria is not appropriate However, it is mandatory for all Southeast Asians and travelers to areas with endemic malaria who present with unexplained fever or other unexplained signs and symptoms compatible with malaria (eg anemia, splenomegaly, chills, headache, backache and malaise).[4]

A definitive diagnosis of malaria requires expert microscopic examination of Giemsa-stained blood smears Thick smears are used to screen for malarial parasites and to measure the density of parasitemia. Thin smears are used to identify the infecting species of plasmodium. Density of parasitemia is monitored for prognostic reasons and serves as a gauge of therapeutic success In general, if a smear is not clear of non-gametocytic parasites within four to five days of completion of therapy for *P. falciparum*, drug resistance must be suspected.

For specific chemoprophylactic and curative therapies, readers are referred to the literature.[4,22,28,29] The following features peculiar to treatment of malaria in the Indochinese refugee population should be noted

Presumptive antimicrobial therapy is often warranted prior to definitive diagnosis, especially when *P. falciparum* infestation is suspected [4]

Chloroquine-resistant *P. falciparum* has been widely reported including Southeast Asia (as well as from Bangladesh, Brazil, Burma, China, Colombia, Comores Islands, Ecuador, Fr. Guiana, Guyana, India, Indonesia, Kenya, Madagascar, Malaysia, Panama, Papua New Guinea, Philippines, Solomon Islands, Surinam, Tanzania, and Venezuela) [17] Accordingly, therapy adequate for chloroquine-resistant *P. falciparum* should be empirically instituted for patients with documented or suspected *P falciparum* malaria who come from suspect regions including Southeast Asia Such therapy includes quinine for three to 14 days (to rapidly reduce the parasite load) in conjunction with more slowly acting schizonticides [eg combination of a sulfonamide, a folic acid antagonist (such as pyrimethamine or trimethoprim), and/or tetracycline]. Such therapy is generally successful in 95% of cases, but recurrences may occur within 30 to 90 days; retreatment may be with the same or an alternate regimen [4]

P falciparum resistant to "Fansidar" (a combination of pyrimethamine and sulfadoxine used widely for both prophylaxis and curative therapy in areas with high rates of chloroquine resistance) have been reported in Thai-Kampuchean border camps, Indonesia, Papua New Guinea, and Brazil.[29,31,32]

It should be noted that sensitivity testing is available only in experimental settings, and *P falciparum* resistance must be clinically inferred.

Prior to receiving primaquine for radical curative therapy for *P. vivax* or *P. ovale*, Southeast Asians should be screened for glucose-6-phosphate dehydrogenase (G6PD) deficiency which occurs in 10 to 12% of Indochinese.[4] Inadvertent use of this agent in a G6PD deficient individual risks precipitating an acute hemolytic crisis.

HEPATITIS B VIRUS (HBV)

Acute and chronic HBV infection occurs most frequently in Orientals. Screening of Indochinese refugees entering the U S. and Canada revealed evidence of such infection [ie Hepatitis B Surface Antigen (HB$_s$Ag) positivity] in 12% to 20%.[33-35] Most of the affected refugees are asymptomatic, chronic carriers. This prevalence contrasts with a background rate of less than one percent in the U S. (reflecting an estimated 600,000 chronic carriers). The influx of refugees is expected to increase the overall U.S rate by approximately four percent

The chronic carrier state is associated with an increased risk of chronic liver disease (25%), cirrhosis, hepatic failure, and hepatocarcinoma. Close contacts of chronic carriers, especially uninfected family members and sexual consorts, are at increased risk of acquisition of HBV infection and are appropriate candidates to receive the new HBV vaccine.[36,37] Some reports suggest increased rates of acquisition of HB$_s$Ag-positivity by U S. children of families which hosted HB$_s$Ag-positive Vietnamese orphans.[38] However, with the observance of good personal hygiene, the community at large is not at significantly increased risk for HBV infection by virtue of contact with infected refugees. Consequently, HB$_s$Ag-positivity should not be the basis for limiting travel, placement or activities of refugees.

Health personnel who care for infected Indochinese refugees (particularly those who come in contact with blood, blood products or, as in the case of dentists, potentially infectious oral secretions) are at heightened risk for HBV infection.[34] Consequently, it is recommended that selected medical personnel be screened for the presence of protective antibody to HB$_s$Ag (anti-HB$_s$) In its absence, appropriate precautions should be taken. Dentists should use gloves, masks, and glasses if they are susceptible. Hepatitis B immune globulin (HBIG) should be administered following inadvertent exposure (especially parenteral) to infectious materials. Such medical personnel are appropriate candidates to receive the new HBV vaccine [36,37] Health workers should be attentive to proper cleansing of potentially contaminated

TABLE 6

LOCATIONS WITH IDENTIFIED STRAINS OF β-LACTAMASE-PRODUCING *NEISSERIA GONORRHEAE* THROUGH MAY 1981*

Africa	Americas	East Asia	Europe	South East Asia
Morocco	Canada	Philippines	France	Indonesia
Ghana	United States	Hong Kong	Belgium	Singapore
Mali	Mexico	Taiwan	Netherlands	Malaysia
Nigeria	Panama	Guam	United Kingdom	Thailand
Central African Republic	Argentina	Japan	West Germany	India
	Colombia	Republic of Korea	Denmark	Sri Lanka
Gabon		New Zealand	Poland	
Zaire		New Hebrides	Switzerland	
Madagascar		Australia	Sweden	
Zambia			Norway	
Senegal			Finland	

Information obtained through WHO Epidemiological Surveillance System; adapted from PAHO Epidemiologic Bulletin. (From MMWR 31(1&2) 1 1982

instruments, using either sterilization with gas or steam, or disinfection with a phenolic or glutaraldehyde solution.

Neonates born to mothers with either acute HBV hepatitis or chronic antigenemia [especially those whose blood additionally contains Hepatitis B e antigen (HB_eAg)] are at significantly increased risk for HBV infection (mostly chronic carriage). Among Orientals, the rate of such vertical transmission exceeds 70% (in contrast to Western Caucasian rates of less than 20%). Therefore, according to currently recommended schedules,[19] offspring delivered to HB_sAg-positive women should receive 0.5 ml HBIG as soon as possible after delivery and (in the absence of serologic evidence of infection) again at three and six months of age. Other perinatal precautions include avoidance of any traumatic procedures which might permit innoculation of HBV (eg scalp monitors, rigorous suctioning, injection of Vitamin K before thorough cleansing of the skin) and gentle aspiration to empty the stomach of infectious amniotic fluid. Breast feeding is a more controversial topic, but probably should be avoided in circumstances where acceptable alternatives are available.[40] It is likely that current studies will conclude that active immunization with HBV vaccine will be an appropriate part of management of such neonates.[16,17]

Because of these concerns, it is recommended that all Indochinese refugees be screened for HB_sAg as part of their routine care. Priority should be given to testing pregnant women, other women of child bearing age, orphans, and preschool children.[33]

SEXUALLY TRANSMITTED DISEASES

While venereal diseases have not represented a numerically significant problem in Indochinese refugees,[4] a few features peculiar to this population should be noted.

Although serologic screening for syphilis, routinely performed as part of pre-immigration screening abroad, shows rates of positivity of only one to two percent, there is some evidence to suggest higher rates (approximately five to ten percent) of positive reactions when tests have been repeated upon arrival in the U.S.[10,35] The reasons for this discrepancy are unclear (technical difficulties, incubating disease at the time of performance of the first test), but the implication is clear: history of a negative serology for syphilis is not sufficient, even if documented; sexually mature refugees should be retested as part of routine health care. Reports of clinically unsuspected congenital syphilis[35] and sexual abuse (rape by pirates) suggest that serologic testing of children may also be warranted.

Gonorrhea and penicillin-resistant penicillinase producing *Neisseria gonorrheae* (PPNG), while widespread, are not common problems among Indochinese refugees. Only three of 1,100 cases of PPNG reported in the U.S. in 1980 were attributable to refugees.[41] Nonetheless, in light of the extensive prevalence of PPNG (Table 6),[42] and its high prevalence in Southeast Asia, concern for this entity

TABLE 7

TREATMENT REGIMENS FOR DOCUMENTED OR SUSPECTED PPNG INFECTIONS

1) Uncomplicated ano-genital gonorrhea
   a) Spectinomycin 2 g IM x 1 (pediatric dose: 30-40 mg/kg x 1)
   or alternatively
   b) Cefoxitin 2 g IM x 1 with probenicid 1 g po
   or
   c) TMP/SMZ* (80/400 mg tablets) 9 tablets po qd x 3 d
2) Salpingitis
   a) Spectinomycin 2 g IM qd x 5-10 d
   or alternatively
   b) Cefoxitin 2 g IM or IV q8h x 5-10 d
3) Pharyngitis
   a) TMP/SMZ (80/400 mg tablets) 9 tablets po qd x 5 d

Trimethoprim-sulfamethoxazole

TABLE 8

VACCINES ADMINISTERED IN TRANSIT CENTERS, SOUTHEAST ASIA

Age of Individual	Vaccine*
2-14 months	DTP, TOPV
15 months-6 years	DTP, TOPV, MMR
7-13 years	Td, TOPV, MMR
14-19 years†	Td, TOPV, MMR†
≥20 years	Td

**Doses to be given. 1 MMR and first of series for DTP or Td and TOPV; additional doses in series will depend on the time spent in transit centers.*
†MMR will not be given to females age 14-19 years.
From MMWR 29(4):38, 1980.

is justified and is reflected in the following recommendations:[42]

1) All isolates of *N. gonorrheae* should be routinely tested for penicillinase production.
2) All sexual partners of patients with PPNG should be promptly identified and treated.
3) Groups considered to be at high risk for PPNG infection (eg prostitutes, persons with multiple consorts, homosexuals, drug abusers) should be screened for PPNG
4) All patients and sexual partners of patients with ano-genital infections due to PPNG; or ano-genital infections due to *N. gonorrheae* acquired in countries where PPNG is prevalent, as well as all patients for whom penicillin or tetracycline therapy fails, as determined by follow-up cultures obtained three to seven days after therapy, should be treated with spectinomycin.*

Recommended treatment regimens for documented or suspected PPNG infections are included in Table 7.[43,44]

CHILDHOOD IMMUNIZATIONS

Prior to 1980, Indochinese refugees arriving in the U.S. were either unimmunized, inadequately immunized, or had no documentation of immunization status.[4] Large numbers of unimmunized individuals located in crowded Asian refugee camps resulted in epidemics due to measles and diphtheria However, in January 1980, a program initiating immunization of all Indochinese refugees in Asian transit camps was instituted. Table 8 shows the immunization schedule used.[45]

Because most refugees leave Asian transit camps before completion of primary childhood vaccinations, it is necessary for U.S. practitioners to complete the process according to established, age-appropriate guidelines contained in standard references.[39] If in doubt, or if documentation of prior vaccination is unavailable (98% arrive with immunization records), it is prudent to institute a complete series of appropriate immunizations.

It should be noted that females over 14 years of age will not have received MMR vaccine in Asian transit camps (because of concern for undetected pregnancy) and will routinely require it. Serologic screening shows that Southeast Asian women of childbearing age have the same high degree (10% to 15%) of susceptibility to rubella as their American counterparts.[45]

While most adult Indochinese have naturally acquired immunity to poliovirus, should vaccination of such adults be contemplated, inactivated polio vaccine should be used.[39]

EXOTICA

There are a large number of pathologic entities with which U S practitioners are unfamiliar and which they seldom (knowingly) encounter The following are a few

**There has been one case of PPNG which was also resistant to spectinomycin reported by the CDC in 1981.[41]*

selected conditions which should be considered in a complete evaluation of Indochinese refugees with medical problems with unusual presentations or unexpected courses.

PARAGONIMUS WESTERMANI (LUNG FLUKE)[46,47]

Paragonimiasis, which is endemic in Southeast Asia, should be considered when evaluating an Indochinese refugee (or West African, Indian, Central or South American) who presents with chronic cough, fever, dyspnea, bronchitis, bronchiectasis, pneumonia, lung abscess, or pleural effusion who either has a negative tuberculin skin test, or, if tuberculin-positive, fails to respond to appropriate anti-tuberculous therapy.

It is acquired from eating raw crabs or crayfish, but the absence of the necessary intermediate snail host in the U.S. precludes domestic transmission. Peripheral eosinophilia is a frequent laboratory finding. Treatment is with bithional or praziquantel (available through the CDC).

MELIOIDOSIS[48]

Pseudomonas pseudomallei, a Gram-negative rod isolated from the soil, is endemic in Southeast Asia, Asia Minor, Australia, New Guinea, Guam, Panama, Ecuador, and the USSR. Its clinical manifestations include sepsis, chronic abscesses involving soft tissues or any organ, and pulmonary disease which resembles tuberculosis. Only 11 cases have been reported in the pediatric literature. Diagnosis is by culture (on special media), biochemical tests, and serology. Treatment of soft tissue abscesses is with trimethoprim-sulfamethoxazole or tetracycline. Treatment of systemic disease is with a combination of chloramphenicol and an aminoglycoside.

LEPROSY[35]

Leprosy has been an uncommon problem among Indochinese refugees. Patients with a diagnosis of "infectious" leprosy are excluded from admission to the U.S., but may be permitted to enter if under appropriate therapy. Some cases of leprosy have been diagnosed in refugees only after arrival in this country.

The diagnosis must be considered in Southeast Asian refugees with anesthetic macular skin rashes or lesions similar to tinea or pityriasis alba which do not resolve or respond to usual therapies. Diagnosis is based on demonstration of *Mycobacterium leprae* in skin biopsies or in buffy coat smears of peripheral blood. Treatment consists of diaminodiphenylsulfone (probably in combination with rifampin or clofazimine) and should be coordinated with Public Health Service experts.

OTHER EXOTICA

Other esoteric infectious considerations in the refugee population include schistosomiasis (*S. japonicum*, presenting with hepatosplenomegaly); *Diphyllobothrium latum* (fish tapeworm); *Taenia saginata* (beef tapeworm); *Taenia solium* (pork tapeworm, presenting with cysticercosis); *Echinococcus granulosis* (hydatid cyst); *Hymenolepsis nana* (dwarf tapeworm); trichinosis; and filariasis.

SUMMARY AND CONCLUSIONS

It is necessary to systematically anticipate and sympathetically address a number of both emotional and physical problems with which Indochinese refugees commonly enter our society.[49] Their infectious medical problems are generally common rather than exotic, although unusual diagnoses must occasionally be considered. If diagnosed, they are generally amenable to treatment. They pose little risk to the public health, and the little danger that they do represent can largely be obviated by attention to principles of infection control, personal hygiene, and public sanitation.

Table 9 summarizes the screening and management recommendations appropriately applied to clinical care of this population.

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TABLE 9

SUMMARY RECOMMENDATIONS FOR INDOCHINESE REFUGEE SCREENING AND MANAGEMENT

Tuberculosis

1. PPD—at least all refugees less than 35 years of age
2. BCG—ignore history of prior administration in interpretation of PPD
3. Obtain sputum for culture and sensitivity on all diseased patients
4. Treatment must reflect high rate of (INH) resistance

Parasites

1. Stool for ova and parasite examination on all symptomatic refugees and all refugee children
2. Treat all parasites for which therapy is safe and effective
3. Blood smears for malaria examination in refugees with unexplained fever
4. Treatment of malaria must reflect high rate of chloroquine resistance

Hepatitis B Virus

1. HB_sAg determination in all refugees
2. HBIG and/or Hepatitis B Vaccine for high risk contacts of carriers

Sexually Transmitted Diseases

1. Syphilis serology—at least all sexually mature refugees*
2. Test all isolates of *N. gonorrheae* for penicillinase production
3. Treatment must reflect high rate of penicillin resistance (PPNG)

Incomplete Immunizations

1. Complete administration of all age-appropriate immunizations

**Syphilis serology should be repeated after arrival in the US because of observed discrepancies between serology results obtained abroad and in US.*

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