

Health Care Problems of Southeast Asian Refugees

These discussions are selected from the weekly staff conferences in the Department of Medicine, University of California, San Francisco. Taken from transcriptions, they are prepared by Drs. David W. Martin, Jr, Professor of Medicine, and James L. Naughton, Assistant Professor of Medicine, under the direction of Dr. Lloyd H. Smith, Jr, Professor of Medicine and Chairman of the Department of Medicine. Requests for reprints should be sent to the Department of Medicine, University of California, San Francisco, School of Medicine, San Francisco, CA 94143.

DR. SMITH:* *At this time of year, it is customary to invite our chief residents to present Medical Grand Rounds. This enables us to express publicly our appreciation for the superb leadership they have provided our teaching and patient care program. Dr. Tom Ross will speak on health care problems of Southeast Asian refugees. During his senior residency year, Dr. Ross spent six weeks as a volunteer physician in a refugee camp in Thailand. He will begin his discussion by presenting a case.*

DR. ROSS:† The patient is a 63-year-old man from Kampuchea (formerly Cambodia) who was admitted to the Khao I Dang Refugee Camp hospital located on the Thailand-Kampuchea border. He was in his usual state of health until shortly after he arrived at the camp three months previously. A progressive cough productive of blood-tinged sputum developed, and he experienced weight loss, malaise and episodic fever with night sweats. He was taking no medications and had no past history of pulmonary disease.

Physical examination showed a cachectic-appearing elderly man in moderate respiratory distress. Temperature was 38.4°C (101°F), blood pressure 90/50 mm of mercury, pulse 115 beats

per minute and respirations 28 per minute. His weight was 40 kg (88 lb) and height 168 cm (5 ft 6 in). Subcutaneous fat appeared absent and there was pronounced diffuse muscle wasting. The conjunctivae were pale and the neck was supple. Pulmonary findings included bilateral dullness to percussion, bronchial breath sounds and rales. All findings were more prominent on the left. A grade II/VI systolic ejection murmur was heard at the lower left sternal border. The liver was nontender and 11 cm in span. The spleen was not palpable. There was no peripheral edema, cyanosis or clubbing seen. No abnormal neurologic findings were detected.

Results of laboratory tests were as follows: hematocrit 12 percent and leukocyte count 11,400 per cu mm, with 55 percent granulocytes, 12 percent eosinophils, and 25 percent lymphocytes. The peripheral blood smear showed prominent microcytosis and hypochromasia. No malarial parasites were seen. Roentgenogram of the chest (Figure 1) showed bilateral parenchymal infiltrates in all lung fields. Kinyoun stain of sputum specimen showed numerous acid-fast bacilli (AFB). Examination of stool revealed numerous hookworm ova, a moderate number of *Ascaris* ova and rare *Strongyloides* larvae.

The primary diagnosis on admission was pulmonary tuberculosis and treatment was started

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ABBREVIATIONS USED IN TEXT

AFB=acid-fast bacilli
 BCG=bacille Calmette-Guérin
 CDC=Centers for Disease Control
 HBsAg=hepatitis B surface antigen
 PPD=purified protein derivative
 PVA=polyvinyl alcohol

with isoniazid (INH), ethambutol and streptomycin. The protein-calorie malnutrition and anemia were treated with supplemental feedings, vitamin replacement and parenteral iron. Mebendazole was given for hookworm and *Ascaris* but the *Strongyloides* infection was not treated. On this regimen there was gradual clinical improvement with a decrease in pulmonary symptoms and by the seventh hospital day the patient was afebrile. There was a steady increase in weight and hematocrit.

On the 18th hospital day his temperature rose to 41°C (105.8°F), and he had headache and low back pain. Results of a lumbar puncture were negative. A peripheral blood smear showed 10 percent parasitemia with *Plasmodium falciparum*. Treatment was begun with pyrimethamine and sulfadoxine with good clinical response and a peripheral blood smear several days later was free of parasites.

On the 24th hospital day his temperature again rose to 40°C (104°F) and peripheral blood smear showed 2 percent parasitemia, this time with *Plasmodium vivax*. Therapy was instituted with chloroquine hydrochloride, again with a good response. The remainder of the patient's hospital course was uncomplicated and he was discharged after 1½ months.

Discussion

This discussion will review the major medical problems that have been reported of Indochinese refugees settling in the United States.¹⁻⁵ If the case just described is typical, we might expect to see a variety of infectious diseases including tuberculosis, intestinal parasites and malaria. Additional expected disorders (Table 1) include anemia, malnutrition, inadequate immunizations and a variety of psychiatric and cultural problems.

Between 1975 and March 1981, 475,000 refugees entered this country from Southeast Asia. It is estimated that 35 percent of these persons have settled in California. Potential medical problems in this group are thus of considerable

interest to health care providers in this state. This exodus of refugees has been the result of an unstable political situation involving several countries in Southeast Asia. A demographic analysis of 155,000 refugees who arrived in 1980 reveals a predominantly young population with a median age of 20 years;⁶ 37 percent of the population was under the age of 15 and only 9 percent was over 45. About 53 percent of the refugees who arrived during that period were born in Vietnam, 34 percent in Laos and 6 percent in Kampuchea.

Before analyzing the health care problems of refugees after arrival in this country, it is instructive to review their experiences before immigration. After fleeing their countries of origin by boat or land, they enter refugee camps in Thailand, Indonesia and Malaysia. There they remain for six months to five years before resettling in

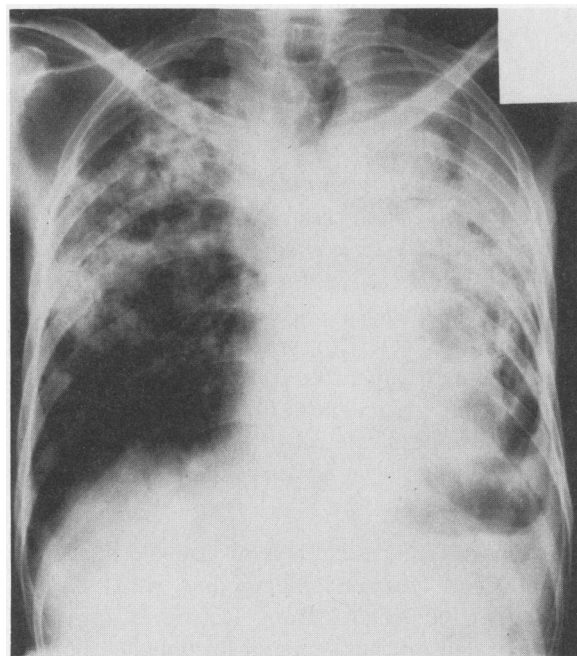


Figure 1.—Roentgenogram of chest showing bilateral parenchymal infiltrates.

TABLE 1.—Major Medical Problems Among Indochinese Refugees

<ul style="list-style-type: none"> Infections <ul style="list-style-type: none"> Tuberculosis Intestinal parasites Malaria Hepatitis carriers Other—skin, respiratory Anemia Malnutrition Poor immunization status Psychiatric and cultural problems

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another country. The crowded conditions and poor medical facilities of these camps have been widely publicized in recent years.^{7,8} A typical refugee camp is that of Sa Kaeo located in Thailand near the Kampuchea border.^{9,10} Opened in late 1979 it quickly swelled to a population of 32,000. During a three-week period in November 1979 the field hospital recorded 2,342 admissions and 144 deaths. Fever and malaria, pneumonia, anemia, malnutrition and diarrhea were responsible for 69 percent of these admissions and deaths. Surveys of the camp revealed evidence of considerable malnutrition in 14 percent of children. Screening for malaria showed a prevalence of 38 percent. Reports from other camps showed variation in the incidence of malaria and other diseases, but in general corroborated the findings of a multitude of major medical problems with high mortality.¹¹

The influx of outside assistance with improved nutrition and medical care had a noteworthy impact on these problems, evidenced by a fall in crude death rates.¹² In early November 1979 the death rate in several camps in Thailand was as high as 1.05 per 1,000 persons per day. By mid-December of that year mortality had dropped to 0.025 per 1,000 persons per day, a level considered no greater than that in Kampuchea and Laos before the present conflict. Current reports from refugee camps continue to document the stability of the death rate and control of major medical problems.

After a variable period refugees apply for resettlement in a third country. Entry requirements to the United States include a medical examination for tuberculosis, leprosy, venereal disease and mental disorders. Persons with these conditions in an active or infectious stage are excluded from entry.¹ The effectiveness of screening for acute medical problems is shown by the results of a study conducted by the Centers for Disease Control (CDC).¹³ At their points of entry into the US 4,324 refugees were evaluated for acute medical problems. Fever was found in only 1.7 percent and clinical evidence of pneumonia in less than 0.1 percent. Immediate admission to hospital was necessary in 0.1 percent and prompt outpatient medical attention was required at their eventual destination in only 2.2 percent of these refugees.

Tuberculosis

In 1979, 920 cases of tuberculosis were reported in refugees, with a prevalence of 0.9 percent. In

TABLE 2.—Organ System Involvement in Tuberculosis

Organ System	Refugees, 1979 ¹⁴ (percent)	United States, 1976 ¹⁵ (percent)
Pulmonary	90	86
Extrapulmonary	10	14
Lymphatic	52	25
Pleural	18	22
Bone/joint	9	9
Genitourinary	7	18
Miliary	2	8
Meningeal	2	4
Peritoneal	2	3
Other	8	11

the first six months of 1980 an additional 1,272 cases were reported, with a prevalence of 1.1 percent.¹⁴ Although the 920 cases in 1979 represented only 3.4 percent of the tuberculosis reported in the US, in some states the refugees accounted for a relatively large proportion of the cases. Tuberculosis in refugees accounted for 18 percent to 27 percent of all cases in Washington, Colorado, Nevada and Minnesota, and for 10 percent of cases in California. Prevalence rates by country of origin range from 0.4 percent in Laotians to 1.5 percent in Kampucheans. The prevalence in refugees also varies with age and sex. In individuals under the age of 15 the rate is 0.4 percent, but in persons over the age of 45 this rate is greater than 2.7 percent. Tuberculosis occurs 1½ times more frequently in males than in females. Overall, the relative risk of tuberculosis among Indochinese refugees is 38 times that for a US citizen.

As shown in Table 2 organ-system involvement in tuberculosis is similar in refugees and in the general US population, with 85 percent to 90 percent of cases involving the lungs.¹⁵ One exception to this is a twofold increase in lymphatic involvement. This is best explained by the young age of refugees and a recognized increase in lymphatic involvement in younger persons with tuberculosis.¹⁶ The consumption of unpasteurized milk may also play a role.

Screening of refugees for tuberculosis before entering this country consists of a roentgenogram of the chest and a sputum smear for acid-fast bacteria. Chest x-ray films are obtained in all persons over 2 years of age except in Singapore and Indonesia where they are obtained in persons 15 years or older. Sputum smears are obtained in persons with roentgenograms of the chest reported as abnormal. Based on results of these tests refugees are certified in one of three categories:

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(1) active or suspected disease—class A; (2) nonactive disease—class B, and (3) no evidence of disease—not classified.

Class A, active or suspected-active disease, is determined by a chest roentgenogram reported as abnormal, associated with a sputum smear showing the disease or a compatible clinical condition (or both). Persons so certified are excluded from entering the US until the disease is considered inactive or noncontagious, documented by two negative smears for AFB taken at least a day apart. Recommended treatment before entry consists of isoniazid (INH), rifampin and ethambutol in persons with a smear read as positive or a cavitory lesion seen on roentgenogram of the chest (or both). Other persons classified in this category (that is, those with smears reported as negative but with a clinical condition compatible with tuberculosis) can be started on treatment with the three drugs or treatment can be deferred until after arrival in the US.

The use of three antituberculosis drugs is recommended on the basis of resistance patterns of Indochinese refugees. An ongoing study of primary resistance of antituberculosis drugs is being conducted by the CDC.¹⁷ As of July 1980 7.1 percent of all *Mycobacterium tuberculosis* organisms isolated from persons in the US were resistant to at least one drug. In Asian persons the resistance rate was 12.7 percent, chiefly to isoniazid and streptomycin. Preliminary reports in Indochinese refugees reveal resistance rates between 15 percent and 40 percent for these two drugs. Because of this high rate of primary resistance the use of three-drug therapy is warranted in all Indochinese refugees pending results of sensitivity studies.

After arrival in the US, specimens for culture and sensitivity should be obtained from all persons categorized as class A. Treatment with isoniazid, rifampin and ethambutol should be continued, or started in those persons not already on therapy, pending results of sensitivity tests. Persons with a culture positive for tuberculosis should continue to take two drugs for at least 12 months after smears have been reported negative. Those with cultures reported as negative should continue on three drugs for a minimum of 12 months.

Class B includes those persons considered to have nonactive tuberculosis. This is defined by abnormal findings on roengenogram of the chest associated with two sputum cultures negative for

AFB. These persons are considered noncontagious for travel purposes and treatment is not necessary before entry. After arrival in this country, their status should be reevaluated. Roentgenograms of the chest should be reviewed and sputum specimens obtained for smear and culture. If found to have active disease, treatment with three drugs should be started as in class A. Persons with nonactive disease should be considered for preventive therapy with isoniazid.

Those persons with a normal roentgenogram of the chest and no clinical evidence of tuberculosis are not classified. There is no effect on immigration and consequently no treatment is recommended. Follow-up care after arrival should include a review of the roentgenogram of the chest and purified protein derivative (PPD) placement if the person is under age 35.

Given the above classification we can examine the effectiveness of overseas screening for active tuberculosis by reviewing the 920 cases reported in 1979. Of these, 27 percent were persons certified as class A, 20 percent class B, and 18 percent neither. In the remaining 35 percent, overseas classification was unknown. When the total number of persons in each of these categories is compared, the prevalence of current tuberculosis in refugees certified as class A becomes 61 percent and class B 14 percent. Only 0.3 percent of those persons considered to have no evidence of tuberculosis were later found to have evidence of active disease in this country. Thus current screening procedures appear reliable in identifying high-risk groups.

Preventive therapy is recommended for persons in contact with patients with active disease. Studies of the PPD status of refugees are 30 percent positive in persons under age 18 and 55 percent in persons over 18. For all age groups, 43 percent have positive PPD tests.^{2,5} The PPD test should be interpreted without regard to bacille Calmette-Guérin (BCG) status. Given the lack of preventive health care in those areas of Southeast Asia during recent years and the young age of refugees, the incidence of prior BCG immunization would be expected to be low. Isoniazid should be used for prophylaxis unless there is known exposure to an isoniazid-resistant strain. In this situation options include treatment with isoniazid, treatment with rifampin with or without isoniazid or no treatment but with close follow-up. There are insufficient data to support the superiority of any of these options.

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TABLE 3.—Malaria in California

	1979		1980		1981 (1st quarter)		All U.S.	
	No.	Percent	No.	Percent	No.	Percent	1979	1980
Total cases	318		743		152		..	
Refugee cases	41	13	437	59	101	66	..	
<i>Plasmodium vivax</i>		(71)		(90)		(95)		75
<i>Plasmodium falciparum</i>		(20)		(5)		(0)		15
<i>Plasmodium malariae</i>		(5)		(3)		..		..

Adapted from *California Morbidity #10*.²¹

Before leaving this topic, it is important to mention two clinical illnesses reported in refugees that may mimic tuberculosis, melioidosis¹⁸ and paragonimiasis.¹⁹ These disorders should be suspected in persons with findings on roentgenogram of the chest and clinical features consistent with tuberculosis, but with a negative PPD response, a positive PPD response but negative culture and smear for AFB, or a poor response to adequate antituberculosis therapy. Melioidosis is an infection caused by a Gram-negative bacillus, *Pseudomonas pseudomallei*. Diagnosis is made on the basis of Gram stain and culture. Serologic tests provide supportive evidence. Successful treatment has been reported with a variety of antibiotics including tetracycline, chloramphenicol, sulfisoxazole and trimethoprim-sulfonamide for a minimum of 30 to 60 days. Paragonimiasis is caused by the lung fluke *Paragonimus westermani*. Diagnosis is suggested by eosinophilia and confirmed by the identification of characteristic eggs in the sputum and feces and on serologic tests. Treatment consists of biothionol, 30 mg per kg of body weight, taken orally on alternate days for a total of ten doses.

Malaria

During the past several years there has been a sharp increase in the number of reported cases of malaria in refugee groups. During the first six months of 1979, 163 cases of malaria were reported in the US, 20 percent of these in Southeast Asian refugees. During the same period of 1980, 553 cases were reported, 64 percent in Indochinese refugees.²⁰ Similar findings have been described in California,²¹ as shown in Table 3. Between 70 percent and 95 percent of reported cases have been *Plasmodium vivax* and most of the rest are *Plasmodium falciparum*. Cases of *Plasmodium malariae* have occurred sporadically.

The prevalence of malaria in Southeast Asian refugees can be estimated from the results of

several screening studies.²⁰ Using an indirect fluorescent antibody technique as an indicator of past or present infection, it was determined that 11.4 percent of refugees had been infected with *P falciparum* and 4.8 percent with *P vivax*. When blood smears were examined for parasitemia it was found that 1.2 percent of refugees had *P vivax* and 0.4 percent had *P falciparum*. Thus by fluorescent antibody techniques, infection with *P falciparum* had a prevalence of almost 2½ times that of *P vivax*; yet, with respect to parasitemia, *P vivax* was more prevalent by 3 to 1. This probably reflects previous adequate schizonticidal therapy that eliminated most *P falciparum* infections but did not eliminate the exoerythrocytic phase of *P vivax*. Thus a substantial number of clinical *P vivax* relapses may appear in the future.

The clinical diagnosis of malaria should be considered in any refugee with fever. It is important to differentiate the organism because of therapeutic implications. *P falciparum* infections must be identified because extremely high degrees of parasitemia can be reached, causing death through the complications of severe anemia, renal failure, cerebral dysfunction and pulmonary edema. Few clinical findings permit this differentiation, though most cases of *P falciparum* have been reported within seven weeks after arrival in the US. Several morphologic criteria allow the nonparasitologist to differentiate species by examination of the peripheral blood smear. Infections with *P falciparum* show multiple infected erythrocytes of normal size with schizonts rarely seen. The banana-shaped gametocyte is diagnostic. *P vivax* is distinguished by the fewer number of infected erythrocytes that are enlarged in size and the presence of Schüffner's dots.²²

Initial therapy pending laboratory confirmation of species should be based on clinical assessment. A seriously ill patient should be started on quinine sulfate taken orally for *P falciparum*.

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TABLE 4.—Prevalence of Intestinal Parasites in Southeast Asian Refugees

	Study Prevalence by Percent						
	Erickson and Hoang ²	Morbidity Mortality Weekly Report ⁵	Jones, Thompson and Brewer ²⁶	Temcharoen Viboolyavantana and Wanaratana ²⁷	Wiesen- et al. ²⁸	Calif. Morbidity #13 ²⁹	Mahmoud ²⁸ All U.S.
Hookworm	21	7	16	18	64	6	0.3
<i>Ascaris</i>	21	12	41	13	9	17	2
<i>Strongyloides</i>	3	1	1	4	..	3	0.2
<i>Trichuris</i>	10	9	30	14	12	5	1
<i>Enterobius</i>	..	..	2	> 1	..	> 1	21
<i>Clonorchis</i>	9	2	2	..	..	1	..
<i>Hymenolepis</i>	..	..	..	> 1	..	> 1	0.05
<i>Entamoeba histolytica</i>	..	1	6	2	..	> 1	3-4
<i>Giardia lamblia</i>	9	4	15	6	18	2	2-7
Total prevalence of one or more parasites	65	15	76	67	78	35	..

Patients who cannot take medications orally should have quinine hydrochloride administered intravenously. Clinically stable patients can be observed or started on chloroquine hydrochloride. Confirmed cases of *P vivax* are treated with chloroquine (base): 600 mg initially, then 300 mg at 6, 24 and 48 hours.^{1,23} This should be followed with an aggressive regimen (to eliminate the exoerythrocytic parasites) using primaquine phosphate (base): 15 mg daily for 14 days or 45 mg weekly for eight weeks.²⁴ Treatment of *P malariae* is similar to *P vivax* except the aggressive regimen is not required.

There are three oral regimens for the treatment of *P falciparum*.^{1,23} (1) quinine sulfate, 650 mg three times a day for three days, plus pyrimethamine, 25 mg twice a day for five days, plus sulfadiazine, 500 mg three times a day for five days—all drugs administered concurrently; (2) quinine sulfate, 650 mg three times a day for three days, plus trimethoprim, 160 mg, with sulfamethoxazole, 800 mg, 2 tablets twice a day for five days, administered concurrently; (3) quinine sulfate, 650 mg three times a day for three days, plus tetracycline, 500 mg four times a day for ten days, administered concurrently. Strains of *P falciparum* resistant to both chloroquine and pyrimethamine-sulfonamide have appeared along the Thai-Kampuchea border. Refugees from these areas should be treated with option number 3 (quinine sulfate plus tetracycline) unless contraindications exist for the use of tetracycline.²⁵

In summary, because of the relatively low prevalence of malaria, routine screening is not required. In refugees with fever, suspicion is warranted and blood smears should be obtained

for diagnosis and species identification. Screening for glucose-6-phosphate dehydrogenase deficiency should be obtained in all persons treated with primaquine because of an estimated 10 percent to 12 percent prevalence in Indochinese. Further, blood donation should be deferred for at least three years after entry into the US or until three years after treatment. Appropriate mosquito vectors such as *Anopheles freeborni* exist in areas of the US, so domestic transmission of malaria can occur. No such cases have been reported in relation to Southeast Asian refugees, however, which probably reflects the low prevalence and degree of parasitemia in this population.

Intestinal Parasites

A number of studies have reported the presence of multiple intestinal parasites in Southeast Asian refugees.^{2,5,26-29} As shown in Table 4, there is wide variation in reported prevalence, ranging from 15 percent to 78 percent. The predominant organisms are several nematodes, *Entamoeba histolytica* and *Giardia lamblia*. Analysis of these studies reveals several factors that can account for the variations. The number of persons surveyed varied between 31 and 2,000 and included multiple ethnic groups and refugee camp locations. The number of specimens per person ranged from one to three and methods of stool preservation and examination differed. Populations studied included both asymptomatic and symptomatic groups and previous antiparasitic therapy was not determined.

The value of obtaining multiple stool specimens was demonstrated in a study performed by Lindes.³⁰ In this investigation the overall pre-

valence of intestinal parasites was noted to be 77 percent. The percentage of false negatives in single stool specimens when compared with results of three specimens ranges from 6 percent for hookworm to 50 percent for *E histolytica*. The importance of techniques of preservation and examination was demonstrated in a study from the Mayo Clinic.²⁰ In this investigation of 100 refugees, an overall prevalence of 76 percent was noted. Of the 100, 53 persons had three fresh purged stool specimens examined. The remaining 47 persons had an unknown number of stools examined after preservation in polyvinyl alcohol (PVA). There was a marked difference in the identification of intestinal parasites between these groups: a 6-percent prevalence of hookworm in the PVA stools and a 24-percent prevalence in the fresh stools. Ideally, then, a search for intestinal parasites should consist of three purged specimens examined in a fresh condition.

The rationale for treatment of intestinal parasites is based on analysis of potential public health problems and patient morbidity. Examination of Table 4 shows a substantially higher prevalence of nematode infections in refugees than in the US population as a whole and a modest increase in the prevalence of *E histolytica* and *Giardia*. Because of this, concern has been raised about the potential spread of these organisms. With few exceptions this appears unlikely because adequate sewage disposal interrupts the extended extracorporeal development stage of many nematodes, improved hygienic practices may decrease fecal-oral transmission of infective stages of parasites, and the specific intermediate hosts of several parasites are not present in this country.

Treatment of patients is based on three principles. First, morbidity is generally proportional to parasite burden.³¹ Notable exceptions occur, however. Even a single *Ascaris* worm can cause significant morbidity in certain unusual situations. Second, a parasitologic cure is not necessarily the end point of therapy if the worm burden can be greatly reduced. Third, antiparasitic drugs may have unacceptable toxicity.

Treatment of many roundworm infections (hookworm, *Ascaris*, *Trichuris* and *Enterobius*) is with a nontoxic drug, mebendazole, at a dosage of 100 mg twice a day for three days. With this regimen, reported cures range from 75 percent to 96 percent and substantial reductions in egg count occur in greater than 95 percent of cases.^{32,33} *Strongyloides* infections are treated

with thiabendazole, 25 mg per kg of body weight twice a day for two days.²³ Current recommendations for *Entamoeba histolytica* include metronidazole, 750 mg three times a day for five to ten days plus diiodohydroxyquin, 650 mg three times a day for 20 days. *Giardia* can be treated with quinacrine, 100 mg three times a day for five days.²³

Hepatitis

Concern has been voiced regarding the prevalence of hepatitis B carriers (hepatitis B surface antigen [HBsAg] positive persons) in the refugee population.^{1,34} Pooling the results of four studies reveals a carrier rate of 15 percent.^{2,5,26,35} In comparison the prevalence is 0.3 percent in the US as a whole and 6 percent to 7 percent in high-risk groups such as homosexual men and patients maintained on dialysis. Based on current populations, 71,000 new carriers have been added to a pool of 600,000, an increase of 12 percent. A further increase in prevalence among Indochinese appears unlikely because most refugees arrive in family groups and a high degree of immunity to hepatitis B exists in this population. High-risk groups for transmission do exist, however, and include neonates, medical and dental workers, and host families or persons in close contact with refugees. Because of this, routine screening for HBsAg is recommended.

Other Infections

Screening and treatment for syphilis before entering this country accounts for the reported low incidence, 1 percent to 5 percent of positive VDRL tests.^{5,26,35} During the past several years sporadic cases and limited outbreaks of cholera, measles, diphtheria, epidemic conjunctivitis and typhoid fever have been reported in refugees.³⁶⁻³⁹ Follow-up studies have failed to show notable secondary spread. Leprosy has been reported in only a few persons, its general prevalence unknown.¹ Skin infections (including those caused by fungus, impetigo, scabies and lice) have been reported in 7 percent to 15 percent of refugees.^{2,5,35} Infections of the upper respiratory tract and otitis media have been reported in 20 percent of persons.^{5,26} Also, the importation into the US of highly resistant bacteria by Southeast Asian refugees is another potential problem.⁴⁰

Hematologic Disorders

Erickson and Hoang² examined 194 refugees and found eosinophilia in 47 percent, the degree

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TABLE 5.—Prevalence of Hemoglobin Disorders in Southeast Asia

	Viet-nam ⁴² Percent	Laos ⁴³ Percent	Thai-land ⁴⁴ Percent	Kam-puchea ⁴⁵ Percent
Hemoglobin E	2	35	40	30
α Thalassemia	6	40	25	..
β Thalassemia	3	15	6	..
Glucose-6-phosphate dehydrogenase deficiency	3	13	15	..

TABLE 6.—Recommendations for Vaccine Administration to Indochinese Refugees*

Age	Vaccine†
2 to 14 mo.	DTP, TOPV
15 mo. to 6 yr.	DTP, TOPV, MMR
7 to 13 yr.	Td, TOPV, MMR
14 to 19 yr.	Td, TOPV, MMR‡
20 yr.	Td

Reproduced with permission of *Morbidity Mortality Weekly Report*.⁴¹
 DTP = diphtheria, tetanus, pertussis; Td = tetanus-diphtheria, adult type; TOPV = trivalent oral polio vaccine; MMR = measles, mumps, rubella.

* Begun in transit centers as of January 1980.

† Doses given in transit centers: 1 of MMR and first series for DTP or Td and TOPV. Additional doses in series will depend on the time spent in transit centers.

‡ MMR not given to girls 14 to 19 years of age in transit centers because of unknown fertility status.

of which was greater than 10 percent in half of these persons. In light of the prevalence of parasitic infections it is not unexpected that considerable eosinophilia has been detected. Anemia has been detected in 16 percent to 40 percent of refugees with higher prevalence in young children.^{5,41} The major causes include iron deficiency in 37 percent, hemoglobin disorders in 30 percent and chronic disease in 10 percent.² Hookworm infections are thought to be the major cause of iron deficiency. The incidence of hemoglobin disorders varies considerably between countries in Southeast Asia (Table 5). Hemoglobin E and thalassemia are the most prevalent conditions.⁴²⁻⁴⁵ Hemoglobin E in the homozygous state results in a mild microcytic anemia with target cells. Based on the above, evaluation of anemia in Indochinese refugees should include examination of a peripheral blood smear, serum iron studies and possible qualitative and quantitative hemoglobin serum electrophoresis.

Malnutrition

Few studies have evaluated the nutritional status of refugees after arrival in this country. The CDC screened 605 children under the age of 5 for weight, height and age and compared the findings with a control population of Asian

descent already residing in this country.⁴¹ Malnutrition was considered significant when anthropomorphic measurements were greater than 2 standard deviations below the mean of a reference population obtained from the National Center for Health Statistics.⁴⁶ Evidence for acute malnutrition, suggested by decreased weight for height, was found in 3 percent of refugees and 1 percent of the Asian control population. In children under 2 years of age, however, a 6-percent incidence was noted in refugees. A low height for age, suggestive of chronic malnutrition, was found in 38 percent of refugees but only 9 percent of the control population.

Vaccinations

Because of absent preventive health care few refugees have been adequately vaccinated by US standards. In January 1980, however, an immunization program for refugees was begun in Southeast Asian transit centers.⁴⁷ After arrival in the US immunization records should be reviewed and the vaccine series recommended for each age group should be completed.¹ This schedule is shown in Table 6.

Psychiatric and Social Problems

Given the cultural changes encountered by refugees arriving in this country and their experience during recent years, a substantial number of psychiatric problems could be anticipated. The prevalence of such disorders is unknown, but their existence is well documented.^{48,49} A study of 194 refugees revealed a 10-percent incidence of psychiatric problems including psychosis, depression, tension and anxiety.²

Emphasis must also be placed on cultural differences between Indochinese refugees. It must be remembered that these persons represent a multitude of ethnic origins including Vietnamese, Laotians and Kampuchean. There exist major differences in language, religion, education, employment, social and family life and customs. As well, there are differences in attitude toward their traditional approaches and Western approaches to medicine.^{50,51}

Conclusions

Several medical problems have been reported in Southeast Asian refugees during recent years. Infections are a significant cause of morbidity and include tuberculosis, intestinal parasites, hepatitis carriers and malaria. Anemia is common, often

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due to iron deficiency and hemoglobin disorders. Acute malnutrition does not appear to be a major problem except in young children, but evidence suggests chronic malnutrition may be widespread. Psychiatric and cultural problems exist and may increase.

Based on these findings several recommendations can be made for the medical evaluation of Indochinese refugees. All persons should have a complete history and physical examination with close attention paid to nutritional status and possible psychiatric problems. Routine laboratory studies should include complete blood count (CBC) with differential, screening of stool for ova and parasites, and screening for HBsAg. Tuberculosis status should be reevaluated and a full set of immunizations based on the refugee's age should be started.

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