Plasmodium malariae in Ahsa region, Saudi Arabia, 1994-1995

From January 1994 through May 1995, 45 cases of *Plasmodium malariae* were reported from Ahsa region. Ahsa was malarious before 1970 and since the vector, *Anopheles stephensi* is still present in the area, an epidemiologic investigation was begun. Initially, 17 smears were reviewed by a reference laboratory and the parasitologic diagnosis was reconfirmed on all smears. Nine cases were excluded from the investigation because eight were asymptomatic and were detected through residence permit screening immediately after arrival in Saudi Arabia, and one was from Gizan and could not be found for an interview.

The 36 symptomatic *P. malariae* cases occurred without seasonal pattern. They were scattered throughout the population centers of the Ahsa region. No cases occurred among permanent Saudi, Ahsa residents, or in nationals of non-malarious countries. All but two were nonprofessional workers.

Twenty-two cases (61%) had onset of fever in the first 70 days after arrival in Saudi Arabia, with 13 cases occurring before the first 20 days (minimum incubation period for *P. malariae*). Of these 22 cases, 19 (86 %) were Indian. For each case, five controls were selected from the residence permit list of the malaria center and were matched with case-persons by nationality, sex and age.

According to their passports, all Indian-cases had passed through Bombay in comparison to 73% of Indian control-workers selected at random from the resident permit list ($p=<0.05$,OR=16). Case-patients reported median staying from one to 90 days (median seven days) in Bombay compared to one to 14 days (median two days) for the controls who passed through Bombay ($p<0.001$, Kruskal Wallis test). These case-persons were not associated with any particular home state in India. The remaining 14 cases had onset after 70 days of arrival. We were able to contact and interview seven cases and 70 matched controls. *P. malariae* was associated with sleeping in an open field (odds ratio [OR]=16, confidence interval [CI]=1.2- 222), and a preference for injection for medical treatment (OR=undefined, CI=3.7-infinity).

-- Reported by Dr. Musaad Al-Sulaiman, Field Epidemiology Training Program

Editorial note: The course of *P. malariae* is not unduly severe but its long incubation period and persistence in a human host is notorious. Because recrudescence may occur as long as 52 years after exposure, it is difficult to determine if individual cases are acquired locally. Several findings in this investigation suggest that *P. malariae* with onset more than 70 days after arrival was recrudescent and not locally acquired in Ahsa. The cases did not cluster in time or location. There were no cases among permanent Ahsa residents or in nationals of non malarious countries. The time of exposure did not coincide with the expected season of transmission of malaria in Ahsa. Although two indirect indicators of vector borne or accidental malaria local transmission (sleeping outdoors and preference for injections) were suggested by the case control study, interviews were done up to 16 months after the illness onset, and results were subject to recall bias.

The association of imported cases (onset under 70 days after arrival) with Bombay, suggest foci of transmission in Bombay, India. The continuing importation and possible local transmission of *P. malariae* will require improved surveillance with prompt epidemiologic and case investigations to identify and control introduced malaria transmission in Ahsa.

Automatic conversion of Hejira dates to Gregorian dates in Epi Info version 6.02 software

In the past, a problem with using Epi Info for epidemiological analysis in Saudi Arabia has been the need to convert Hejira dates to Gregorian dates. Recently, this problem became critical when we decided to design a program for the Pediatric Nutrition Surveillance System (PedNSS) in the Primary Health Care Centers (PHCCs). The anthropometric program in Epi Info requires a Gregorian date to accurately calculate a child's age for calculating growth indices.

A formula written for Database was modified for use in the Check or Analysis program of Epi Info version 6.02.[1] This conversion gives an accuracy of +/- one day. This error is acceptable for most epidemiologic applications and is no worse than other conversion programs. To make the conversion, a Hejira date, month, and year should be separated as numerical variables e.g. ***Hejira Day ## Month ## Year ####*** in the questionnaire file. A date variable is also added to the questionnaire file as a place to put the result of the date conversion, e.g. ***{Greg}orian <dd/mm/yy>***. After using ***ENTER*** to make a data entry file, the following formula should be added in a CHECK file:

```
Year
   LET Greg = "01/01/00"
```

(This sets 01/01/1900 as the starting reference point.)

```
   LET Greg = Greg +((year-1)*354.3848121+(month-
1)*29.53206786+day-1)-466607.5
```

(This computes the number of days between the reference point and the Hejira date that is entered and automatically converts these days to the Gregorian calendar.)

```
   UPDATE
END
```

Since Hejira dates may be needed for administrative purposes, a new variable (e.g. S.Hejira <A >) (note: the Hejira variable has eight spaces) can be added to the questionnaire. The following command in a CHECK file will make a single string variable from the three numeric Hejira variables:

```
S.Hejira
   LET S.Hejira=(day+"/"+month+"/"+year)
   UPDATE
END
```

to display the Hejira date as a single string variable in the day, month, year format.

-- Reported by Dr. Adel M. Turkistani and Dr. Robert E. Fontaine, Field Epidemiology Training Program

Reference:

1. T.A. Mohammed. Date program conversion. Alam Al-Computer 1994;7(84): 28-30.