

Prevalence of Hepatitis B Antigen Carriers in American Personnel
Entering and Leaving the Republic of Vietnam

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OBJECTIVE: To determine whether the prevalence of Hepatitis B Antigen (HB—Ag) among American personnel increases with exposure to indigenous tropical populations with a high carrier rate of antigen and endemic hepatitis.

BACKGROUND: The prevalence of HB—Ag has been determined for a number of defined populations. Chronic HB antigenemia in temperate zones ranges between 0.1 and 0.5% while tropical populations have prevalences between 5 and 10%. Prevalence rates in the Republic of Vietnam have been found to be approximately 10%.

Studies of HB—Ag in tropical populations indicate that children may be exposed and become carriers at an early age. It is not clear whether the early acquisition of antigen in these populations is related to differences in immune mechanisms due to infancy, to the prevalence of antigen in the environment and/or to other factors such as a genetic predisposition to antigen carriage. In addition to studying the prevalence of HB—Ag in Americans leaving Vietnam, a study of the subtypes of these individuals was undertaken in an attempt to discover the origin of these infections. Subtype adr, the predominant subtype found in Southeast Asia, is rare in temperate climates.

METHODS: Sera were collected from 1293 men arriving in Vietnam during October and November 1970 and from 1072 men leaving Vietnam in November and December 1970. Only those personnel who had been in the Republic of Vietnam for 10 months or more were studied at departure.

Sera were tested for the presence of HB—Ag by immunoelectroosmophoresis (IEOP). Complement fixation (CF) titers were determined on those sera found positive. Antigens were subtyped by agar gel diffusion, using rabbit antisera kindly provided by LTC William H. Bancroft of Walter Reed Army Institute of Research. The method of subtyping is described elsewhere in this report.

RESULTS: Of the 1293 sera obtained from men arriving in Vietnam, 11 or 0.85% contained HB—Ag by IEOP. Five of 1072 or 0.5% of the men leaving after a tour of 10 months or greater had antigenemia (see Table 1). The men arriving in the tropics formed two radically different groups. The first group of 1004, who were entering Vietnam for their initial overseas tour, (mostly low ranking enlisted men) showed a prevalence of HB—Ag of 0.4%. The remaining 289, who were returning to Vietnam for subsequent tours, (an older and higher ranking group) had a carrier rate of 2.4%. It is of note that at least one of these individuals returning to Vietnam was noted to have marks of repeated injections on both arms.

Subtyping of antigen was undertaken on the 16 positive specimens and subtypes were defined in 14 (see Table 2). Twelve of these had complement fixation titers of antigen greater than or equal to 1:16 and required no concentration for typing. The other two sera required concentration with lyphogel before clear precipitin spurs indicating subtype were demonstrable. All sera showed the presence of the group reactive

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a antigen. There were four ay subtypes, all of which were ayw. Ad subtypes accounted for eight of the remaining ten, two were adw and four were adr. In one case a third antigen beyond ad could not be determined. On repeated testing, two antigens appeared to have four determinants. In both instances the a and the w component were clearly defined. However, the d and the y determinants, which previously had been thought to be mutually exclusive, were both present. Selective adsorption of these sera with antibody containing one of these determinants appeared to adsorb out the other indicating that both determinants were present on the same particle.

DISCUSSION: Sera from three groups of men were sampled for the presence of HB—Ag. The cohort entering the tropics for an initial tour showed a prevalence of antigen which was high but within the range found in populations in the United States. Those leaving the tropics showed no increase in the percentage of men carrying HB—Ag despite considerable mixing with the local population. The degree of mixing can be partially estimated on the basis of a venereal disease incidence of 20% among these men during their tours. The cohort returning to the tropics for subsequent service showed a prevalence of HB—Ag six times that of those entering the tropics for their initial tour. The reason for this markedly increased prevalence of antigen carriers is unknown.

Subtyping of the detected antigens showed no predominance of any one subtype in any of the three groups of men (see Table 2). Adw and adr were both found in men entering Vietnam for the first time. Ayw was found in those subjects returning for a subsequent tour as well as those leaving the tropics. This may indicate that they had acquired their antigen in the United States, as ayw is a rare subtype in Southeast Asian populations. It is of interest that both of the adyw subtypes reported above were found following Southeast Asian tours. Further investigation of these antigens is underway.

Table 1. Prevalence of Hepatitis B Antigen among US Military Personnel in the Republic of Vietnam

	# Tested	# Positive	% Positive
<i>Inprocessing</i>			
Initial Tour	1004	4	0.40%
Subsequent Tour	289	7	2.42%
Total Inprocessing	1293	11	0.85%
<i>Out Processing</i>	1072	5	0.47%
Total Tested	2365	16	0.68%

Table 2. Hepatitis B Antigen Positive Subjects among U.S. Military Personnel in the Republic of Vietnam

Age	Inprocessing												Out Processing					
	Initial Tour				Subsequent Tour								20	26	30	21		
	20	25	25	25	29	22	25	38	21	23	20	26					30	21
Rank	E3	E2	SSG	E3	E6	E6	E6	E6	E6	E6	E6	E6	E5	E4	E5	E5	E4	
Subtype	—	adw	adw	adr	ad (?)	adr	adr	adr	ayw	ayw	ayw	ayw	ayw	adr	ayw	—	adyw	ad