	Antigen		
	Typhoid Vi	Meningococcal A	Meningococcal C
<i>Prevaccination antibody titres (geometric mean (range) (mg/l))</i>			
Group A (n=54)	0.3 (0.1-2.1)	5.2 (2.3-21.0)	2.7 (0.9-22.1)
Group B (n=50)	0.3 (0.1-2.0)	5.1 (2.3-15.0)	3.1 (0.8-3.0)
Group C (n=53)	0.3 (0.1-2.7)	5.4 (2.1-16.0)	3.0 (0.8-21.0)
Difference (95% confidence interval†; P value):			
A v C	80 to 130; 0.9	81 to 116; 0.7	83 to 146; 0.5
B v C	75 to 132; 1.0	87 to 126; 0.6	76 to 132; 0.9
<i>Antibody titres at 3-6 weeks (mg/l)</i>			
Group A (n=54)	2.1 (0.3-26.0)	5.3 (2.3-22.0)	2.8 (0.9-22.0)
Group B (n=50)	0.2 (0.1-1.8)	23.3 (5.8-93.0)	34.0 (4.0-420.0)
Group C (n=53)	3.7 (0.3-45.0)	22.2 (5.5-174.0)	31.9 (6.0-520.0)
Difference (95% confidence interval†; P value):			
A v C	79 to 182; 0.4	—	—
B v C	—	76 to 142; 0.8	71 to 160; 0.8
<i>Increase in prevaccination titres (range (mg/l) (%‡))</i>			
Group A (n=54)	1.1-25.1 (804)	-2.0-+1.1 (103)	-1.0-+4.0 (103)
Group B (n=50)	-0.3-+0.7 (101)	1.1-87.0 (452)	1.0-407.0 (1102)
Group C (n=53)	0.1-45.0 (686)	1.3-162.0 (413)	-3.0-+516.0 (1065)
Difference (95% confidence interval†; P value):			
A v C	79 to 175; 0.4	—	—
B v C	—	8.3 to 143; 0.5	65 to 165; 0.9
<i>Antibody titres at 1 year (mg/l) *</i>			
Groups A and B (n=40)	0.6 (0.1-15.0)	15.1 (3.9-176.0)	21.2 (1.7-151.0)
Group C (n=40)	0.6 (0.1-11.0)	16.4 (4.9-85.0)	22.6 (5.8 to 241.0)
Difference (95% confidence interval†; P value)			
	60 to 168; 1.0	77 to 154; 0.6	70 to 163; 0.8
<i>Difference between titres at 3-6 weeks and 1 year (range (mg/l) (%§))</i>			
Group A (n=24)	-10.3-+0.1 (35)	—	—
Group B (n=16)	—	-40.0-+16.8 (77)	51.4-17.5 (79)
Group C (n=40)	-34.4-+0.0 (35)	-89.2-+4.3 (70)	-279.3-+6.9 (62)
Difference (95% confidence interval†; P value):			
A v C	70 to 143; 1.0	—	—
B v C	—	73 to 111; 0.3	62 to 97; 0.03

*Group A, typhoid vaccine followed by meningococcal vaccine at 3-6 weeks; group B, meningococcal vaccine followed by typhoid vaccine at 3-6 weeks; group C, combined typhoid and meningococcal vaccine.

†For difference in geometric mean titre, values in group C being expressed as percentages of those in group A or B.

‡Mean post titre as percentage of mean pre titre.

§For difference in geometric mean titre, values in group C being expressed as percentages of those in groups A and B.

§Mean 1 year titre as percentage of mean 3-6 week titre.

meningococcal C, and typhoid Vi antigens was assessed by radioimmunoassay.^{2,3} It was evaluated by unpaired *t* test (two tailed P values are given) comparing the log values of titres and differences in log titres from prevaccination values and between 3-6 weeks and one year.

Groups A, B, and C did not differ significantly ($P > 0.2$; χ^2 test) in the reported frequency or duration of redness (19 patients (35%), 18 (36%), and 27 (50%) respectively) or in the reported frequency of headache (9 (17%), 5 (10%), and 8 (15%)); fever (1 (2%), 1 (2%), and 6 (11%)); nausea (all groups, 3 (6%)); generalised aches (6 (11%), 7 (14%), and 7 (13%)); or itching (2 (4%), 5 (10%), and 6 (11%)). However, volunteers in group A were less likely than those in groups B and C to complain of swelling (7 (13%) v 17 (34%) and 16 (30%) subjects; $P=0.03$, χ^2 test) or to score pain in the arm as 2 or more (12 (22%) v 22 (44%) and 26 (48%) subjects; $P=0.01$, χ^2 test).

There were no significant differences between the three groups in prevaccination titres, in antibody titres at 3-6 weeks, or in the increase in titres after vaccination of antibodies against all three antigens (one subject in group C from whom paired serum samples were not available was excluded) (table). After one year, antibody titres against all three antigens had fallen, but there were no significant differences in titres achieved or in the rise from prevaccination values between separate and combined vaccination. In some subjects from group C, however, the fall in titres between 3-6 weeks and 1 year was greater; it was significant only for antibodies to meningococcal C antigen ($P=0.03$), although the geometric mean titre was still over sevenfold greater than prevaccination values.

Comment

Mixing both vaccines did not increase adverse events, which were similar to those reported previously,² or significantly affect the antibody response. Nevertheless, postvaccination titres of typhoid antibodies were slightly lower than those seen in other comparable studies,^{2,3} possibly reflecting differences in age, previous exposure, ethnic group, or radioimmunoassay. After one year all three titres had fallen from their peak at 3-6 weeks, in keeping with other studies.⁴ The fall tended to be greater for antibodies to meningococcal C antigen in group C, but titres were still high compared with prevaccination values and absolute titres after one year were not different from those in the other groups. Whether these differences mean a more rapid loss of efficacy of the combined vaccine in the longer term (requiring more frequent boosters) needs further study. Our findings suggest that the combination is an acceptable alternative to separate vaccinations before travel.

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Abnormality rates on barium meal examination in different racial groups

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Barium meal examination of the upper gastrointestinal tract is a widely performed investigation readily available to general practitioners and hospital outpatient departments. In central Birmingham a high proportion of the population is of Asian (from the Indian sub-continent) descent. We investigated differences in rates of abnormality on barium meal examination in Asian and white patients attending our departments.

Patients, methods, and results

The reports of barium meal examinations of patients attending two radiology departments in central Birmingham during 1992 were retrospectively analysed. Racial origin was indicated on the request form at the time of examination and was recorded in all patients. All retrievable radiological reports of Asian patients and a comparable number of white patients were studied. Reports were classified as showing (a) normal findings, including small amounts of gastro-oesophageal reflux; (b) minor abnormalities, including conditions such as hiatus hernia, gastric erosions, and duodenitis; and (c) major abnormalities including malignancy or suspected malignancy and gastric or duodenal ulceration.

The data were analysed using χ^2 tests, and subgroups were also compared according to age, sex, and source of referral.

See p 890.

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Variable	Proportion (%) of patients		χ^2 For difference between Asian and white patients
	Asian	White	
Age (years)*:			
<45	38/165 (23)	43/125 (34)	4.6, df=1, P<0.05
45-59	12/66 (18)	38/85 (45)	11.8, df=1, P<0.001
≥60	21/51 (41)	74/121 (61)	5.8, df=1, P<0.025
Sex:			
Male	41/157 (26)	78/175 (45)	12.3, df=1, P<0.0005
Female	30/129 (23)	77/156 (49)	20.5, df=1, P<0.0005
Means of referral:			
By general practitioner	59/225 (26)	77/176 (44)	13.6, df=1, P<0.0005
By outpatients department	11/60 (18)	76/152 (50)	17.8, df=1, P<0.0005
As inpatient	1/1	2/3	
Abnormality:			
Major	35/286 (12)	68/331 (21)	7.6, df=1, P<0.001
Minor	36/286 (13)	87/331 (26)	18.0, df=1, P<0.0005
Total	71/286 (25)	155/331 (47)	32.0, df=1, P<0.0005

*Age was not recorded in four Asian patients.

Of 1362 patients attending for barium meal examination, 960 (70.5%) were white and 361 (26.5%) were Asian, with 41 others (3.0%). Radiological reports of 286 Asian and 331 white patients were retrieved and analysed. The mean age of Asian patients was lower than that of white patients (44.5 v 51.0 years). In addition, the proportion of young patients (those under 45) was significantly higher in Asians (59% (165/282) v 38% (125/331) in white patients, difference 21% (95% confidence interval 13.2% to 28.8%); $\chi^2=32.7$, df=2, P<0.001). No significant difference was found between men and women in either racial group. Over three quarters of Asian patients (79% (225/286)) had been referred directly by their general practitioner compared with just over half of white patients (53% (176/331), difference 26% (18.7% to 33.3%); $\chi^2=42.7$, df=1, P<0.0005). There was, however, no significant difference in the rate of abnormality between patients referred by general practitioners and those from hospital outpatient departments in either racial group, and there was no excess of referrals from any particular source.

Abnormality rates were higher in white patients, the overall rate being 47% compared with 25% in Asians (difference 22% (14.7% to 29.4%); $\chi^2=32.0$, df=1, P<0.001) (table). The age standardised rate for Asians was 28%, giving a relative excess of abnormalities in

white patients of 89% using crude rates and 65% after standardising for age. Rates of both major and minor abnormalities were significantly increased in the white patients (table).

Comment

Over a quarter (27%) of patients attending for barium meal examination were Asian, although Asians constituted 16% of the hospital population in the 1991 census¹; this gives a relative excess of attendances among Asians of 68%. Asians may consult a general practitioner more often, rates of up to three times those of white patients being seen among Pakistani men, and Asians are also more likely to have repeated consultations.²⁻⁴ In our study 79% of Asian and 53% of white patients were referred directly by their general practitioner, implying that patient management may vary in different racial groups. Overall rates of abnormality were, however, similar regardless of the means of referral.

Young patients (under 45) were over-represented in the Asian group, an age group in which abnormality rates are low,⁵ but significant differences were found in all age groups and after standardising for age. Communication difficulties in some Asian patients may contribute to inaccuracies in clinical diagnosis, but such difficulties are less likely in younger patients, among whom the differences remain striking.

Variations in prevalence of gastrointestinal symptoms and differing patterns of patient presentation and patient management are all factors that could be examined in more detail in the community and in hospitals, and they might provide opportunities to optimise investigation and management of patients in different racial groups.

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Management of dyspepsia among Asians by general practitioners in East London

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whether this was because of increased dyspeptic disease.

Patients, methods, and results

We reviewed 834 barium meal and swallow examinations requested by general practitioners from October 1991 to September 1992 at the Royal London and Mile End Hospitals. We also reviewed the results of 417 endoscopies requested by general practitioners over the same time, which followed the introduction of an open access upper gastrointestinal endoscopy service in October 1991. The ethnic group of patients was classified as Asian or other according to name, and the populations were analysed by age as under 45 years or 45 years and over. Outcome was subdivided into suspected malignancies, major abnormalities (suspected malignancies, gastric and duodenal ulcer and scarring, oesophagitis, and gastric erosions); and minor abnormalities (gastritis, duodenitis, hiatus hernia, reflux, etc).⁴ We also related endoscopic appearance to the result of urease tests for *Helicobacter pylori*.

The table shows a significantly higher referral rate for barium studies in Asian patients, with fewer

The London Borough of Tower Hamlets has a large Asian community. The largest ethnic groups in the borough are white (64.4%) and south Asian (25.7%)—comprising Bangladeshi (22.9%), Indian, Pakistani, and other Asian subgroups.¹ Use of health services varies between ethnic groups. Asian patients, for example, consult their general practitioners more often than white patients do.² Debate continues about whether this can be explained solely by a higher prevalence of illness.³ We used ethnic data from the 1991 census to study whether the number of referrals from general practitioners for investigation of dyspepsia was disproportionately great for the size of the Asian population in Tower Hamlets and, if so,