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Antenatal screening for hepatitis B infection and syphilis in the UK

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Objectives To assess antenatal hepatitis B and syphilis screening policies in the UK.

Design Postal questionnaire survey.

Setting One hundred and ninety-two obstetric units and 116 Public Health directorates.

Main outcome measures Antenatal screening policy and line of responsibility for ensuring vaccine uptake in hepatitis B virus exposed children.

Results Replies were received from 140 (73%) obstetric centres and 99 (85%) Public Health directors. Forty per cent of obstetric centres now offer hepatitis B virus tests to all pregnant women, and nearly one-quarter (24·1%) of all births in the UK in 1996 occurred in centres with a universal testing policy. The prevalence of chronic hepatitis B virus ranged from 0·3 to 17·5 per 1000 deliveries. Universal antenatal screening for serological evidence of syphilis was the norm, but five obstetric centres respondents and three Public Health directors were considering its discontinuation. In the nine London centres, syphilis prevalence was 2·06 per 1000 pregnant women, compared with 0·24 per 1000 elsewhere. Responses from Public Health directors indicated the nonspecific nature of the antenatal care contract. Responsibility for hepatitis B virus vaccination of the newly born infant rests with the hospital paediatrician, with transfer of responsibility to the community usually occurring through a discharge letter. Only two areas had a monitoring system to ensure full hepatitis B virus vaccination coverage of exposed infants.

Conclusions If antenatal screening policies are to be equitable there is a need for a clear national policy, and systems need to be established to monitor local policy and practice.

INTRODUCTION

Hepatitis B virus infection is an important cause of morbidity and mortality worldwide. Following acute infection, some individuals develop persistent infection, with detectable hepatitis B surface antigen (HBsAg)[1]. Transmission of infection from HBsAg carrier mothers to their infants is the dominant mode of acquisition of the infection for children, and up to 90% of infants infected with hepatitis B virus become persistent carriers of hepatitis B virus[1,2]. In northern Europe and North America, less than 1% of pregnant women are HBsAg positive[2,3], but within these countries the prevalence of chronic hepatitis B virus in women originally from areas of high prevalence is similar to that for women in their country of origin[4,5].

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Infection in infants born to women infected with hepatitis B virus can be prevented through the administration of specific immunoglobulin (HBIG) in high risk cases and a three-dose vaccine schedule[6]. Antenatal screening has been advocated to identify infants at risk of hepatitis B virus infection[3,7]. In areas of high prevalence, which often include inner cities in low prevalence countries, universal screening is the most effective approach to case finding, but where prevalence is low a more cost-effective approach might involve selective testing of pregnant women considered to be at high risk of infection[5,8]. However, selective testing fails to identify a considerable proportion of carrier women because of the difficulty of recognising women at risk[8,9]. Currently, there is no clear screening policy for hepatitis B virus in the UK[9,10], but there is a growing consensus that a policy of universal antenatal screening for HBsAg needs to be introduced[11].

Universal antenatal screening for syphilis, which has been routine in the UK for many years[12], has enabled the

identification and treatment of infected women and their newborn infants[13]. Between two and three hundred new infections, or early latent cases of syphilis, are reported annually in England[14]; about one-third in women. It has been suggested that universal antenatal screening for syphilis may no longer be necessary as so few infections among women are reported[13,15,16]. However, the recent outbreak of indigenous heterosexual syphilis in Bristol[17] suggests that the current low level of infection may not be maintained.

As the extent of antenatal screening for hepatitis B virus is unknown and there has never been a survey of antenatal syphilis screening, we undertook a survey of all obstetric units and health authorities throughout the UK. This was a joint initiative of the Institute of Child Health, the Communicable Disease Surveillance Centre and the Scottish Centre for Infection and Environmental Health, and was supported by the Royal College of Obstetricians and Gynaecologists.

METHODS

All 192 UK obstetric units contributing to the Royal College of Obstetricians and Gynaecologists study on HIV in pregnancy[18,19], which manage most births in the UK[18], were contacted in late 1997. A named clinician with responsibility for hepatitis B virus screening was identified and sent a questionnaire. Information sought included antenatal screening policy for hepatitis B virus and syphilis, deliveries in 1996, number of women positive for hepatitis B e antigen (HBeAg) and HBsAg and the policy for follow up of infants born to mothers infected with hepatitis B virus and administration of immunoglobulin and vaccine. Further information collected included the proportion of women tested for syphilis, the number of women with positive syphilis serology, numbers referred and numbers treated, as well as which other infections were screened for. Policy questions relate to 1997, and numbers tested relate to 1996.

The names and addresses of the 116 directors of Public Health were obtained from the Medical Directory, and questionnaires were sent out in October 1997 requesting information on district antenatal screening policies. Non-responders in either survey were sent reminders after one month, and persistent non-responders were telephoned.

RESULTS

By March 1998, responses were received from 140 (73%) of the 192 obstetric units, and 99 (85%) of the 116 Public Health directors. Responses covered all areas of the UK. In the case of non-responders, completed questionnaires were received from neighbouring units or from the corresponding Public Health directorate in all except 3 instances, one of which was in the Midlands, one in the North and one in South-East England. There were 400,567 births in 1996 in the 136 Units providing this information, covering 56·6% of the 733,375 births in the UK.

The prevalence of hepatitis B virus infection in the antenatal population was calculated using data from 56 centres where all pregnant women were tested; 23 (41%) provided information on the number of HBsAg positive women, but only 20 (36%) of these had information on HBeAg status (Table 1). The prevalence of HBsAg positivity ranged from 0·3 to 17·5 per 1000 deliveries and HBeAg positivity from 0 to 6 per 1000. The highest prevalence was reported in units in London and Birmingham, and the lowest in Northampton and Shrewsbury.

Hepatitis B virus screening policies

In 56 (40%) centres, hepatitis B virus testing was offered to all women, in 68 (49%) women perceived to be at risk of hepatitis B virus infection were selectively tested, and in 16 (11%) there was no specific policy (Table 2). The type of screening policy was, in general, associated with the prevalence of hepatitis B virus in pregnant women[20]; universal testing occurred in 64% of centres located in areas of high prevalence, such as Lon-

Table 1. Prevalence of hepatitis B virus (HBV) infection in 22 centres with population based data. HBsAG = hepatitis B surface antigen; HBeAG = hepatitis B e antigen.

Region	No. of centres providing information*	No. of women tested	Prevalence of HBV infection in women screened (per 1000) [range]	
			HBsAg	HBeAg
London	8	25,519	9·84 [1·7–17·5]	1·99 [0–6·0]
South East England	4	13,578	3·17 [0·87–7·2]	0·29 [0–0·86]
Midlands	4	14,978	1·27 [0·33–4·3]	0·67 [0·17–1·90]
North	2	5300	1·13 [0·71–1·6]	0·57 [0·71–0·4]
Scotland	4	12,775	1·64 [0–2·1]	0·65 [0–0·87]

*One centre did not provide information on the total number of women tested.

Table 2. Antenatal screening policies; responses from obstetric centres and public health directorates.

	No. of centres (%)	
	Obstetric centres	Public health directorates
Hepatitis B virus	(*n* = 140)	(*n* = 99)
Universal	56 (40)	17 (17)
Selective	68 (49)	6 (6)
No policy	16 (11)	74 (75)
Don't know		2 (2)
Syphilis	(*n* = 139)	(*n* = 88)
Universal	139 (100)	41 (46)
Yes, type of policy unspecified		19 (22)
No		28 (32)
Other infections		
Rubella	(*n* = 139)	(*n* = 88)
Universal	137 (99)	59 (67)*
Hepatitis C virus	(*n* = 128)	(*n* = 82)
No policy	56 (43)	73 (89)

*Universal or type of policy unspecified.

don and Birmingham, and in 29% of centres in areas of low prevalence[20]. Four of the 16 centres with no hepatitis B virus screening policy were planning to start screening, and 9 of the 67 with a selective screening policy were considering the introduction of universal screening.

Responses from 70 obstetric units could be linked to responses from their Public Health directorate. Whereas 42 Public Health directors reported that there was no specific policy, the obstetric unit respondents reported a clear policy. However, 15 of these Public Health respondents commented that, although hepatitis B virus screening was not specified in the antenatal care contract, they were aware that it took place; and a further 3 observed that the contractual arrangements did not specify this level of detail (Table 2).

The 68 obstetric centres with a selective screening policy included 2, both in the Midlands, where women were screened on the basis of being pregnant for the first time in that area[20] (Table 3). In practice, even with a policy of universal screening, not all pregnant women were actually tested. In 1996, in 32 of the 56 centres reporting a universal screening policy, all pregnant women were tested, in six centres 90%–99%, and in three 80%, 50% and 21% respectively. Fifteen centres did not provide information on testing uptake.

Whether or not pre-test consent for hepatitis B virus testing was specifically requested was associated with the type of screening policy: 110 centres responded to this question. In 81% (48/59) of centres with a selective screening policy pre-test consent was requested, compared with 22% (11/51) in centres with a universal screening policy. Consent was obtained verbally in 83 (72%) of 116 centres for which this information was reported, written consent was required in only 5 (4%) and in the remaining centres specific consent was not obtained.

Syphilis screening policy

Universal antenatal screening for serological syphilis was the norm in all centres, although in five the discontinuation of screening was under consideration. None of the corresponding Public Health directorates reported this, but three other Public Health directors said they were considering abandoning syphilis screening. The prevalence of positive syphilis serology in the 92 obstetric centres for which this information was provided was very low: 61 (66%) centres reported no women who had tested antibody positive for syphilis in 1996, 16 reported one positive case, 4 centres two, and 10 reported three or more positive cases. However, for most of these women this reflected past infection. One of the centres consider-

Table 3. Criteria for selective screening for hepatitis B virus in 68 obstetric centres.

Criteria included	No. of centres (%)
History of injecting drug use	66 (97)
Origin	
Far East	49 (72)
Africa	39 (57)
Indian sub-continent	34 (50)
Partners of haemophiliacs	33 (49)
Blood transfusion recipients (pre-1991)	13 (19)
Other	
Women with tattoos	9 (13)
History of hepatitis	4 (6)
Partners of high risk group	3 (4)
Pregnant for the first time in the area	2 (3)

ing discontinuation of syphilis testing had a prevalence of 3·6 per 1000 women screened in 1996. In the 9 London centres the overall prevalence of positive syphilis serology was 2·06 per 1000 pregnant women, compared with 0·24 per 1000 elsewhere (76 centres).

Other infections included in the antenatal screening package

Pregnant women in all the centres were screened for rubella, although in two women were tested only if their immunity to rubella was unknown. In five centres there was a policy of universal screening for hepatitis C infection, and in 67 (53%) a selective hepatitis C virus screening policy. In the remaining 56 (43%) centres there was no hepatitis C virus testing policy, but a selective hepatitis C virus screening policy was being considered in one. In most centres, selective testing for cytomegalovirus and toxoplasmosis infection were offered only when clinically indicated (Table 2).

Although in all obstetric units there was a policy of routine antenatal screening for syphilis, Public Health directors indicated that this was not necessarily specified as a district policy, with one-third reporting that syphilis was not specifically mentioned in the antenatal care package (Table 2). Similar discrepancies were apparent for other infections, with generally more specific testing policies reported by the obstetric respondents than by the Public Health directors.

Both clinical professionals and administrators of the hospital trust or health authority are involved in determining the content of the antenatal screening package. Usually (95% of centres) hospital clinicians played an active role in defining screening policy in collaboration with the microbiologists/virologists (53%), Public Health consultants (25%), the hospital trust (13%), and midwives (9%). The Public Health responses specifically referred to hepatitis B virus antenatal screening, and indicated that for the 23 centres where antenatal hepatitis B virus screening was specified in the contract, in 5 (22%) the policy had been determined by the Public Health directorate only, in 5 (22%) in collaboration with hospital clinicians and microbiologists, in 2 by hospital clinicians only, and in the remainder by a combination of clinicians, microbiologists, department of public health, immunisation advisor and other professionals involved in hepatitis B virus infection.

Children born to hepatitis B virus carrier mothers

Responsibility for the administration of hepatitis B virus immunoglobulin and the first dose of hepatitis B virus vaccine to the newborn infant rested with the paediatrician and/or neonatologist in 85 centres (64%); with the paediatrician and midwife in 10 centres (8%); the midwife only in 7 centres (5%); with the consultant microbiologist in one centre (1%) and with nurses, obstetricians or a combination of professionals in 29 (22%) centres. Eight respondents did not answer this question.

Seventeen (17%) Public Health responders reported that the responsibility for administration of hepatitis B virus immunoglobulin and hepatitis B virus vaccine was specified within the paediatric contract, and was given to either paediatricians, consultant community paediatricians, GPs, Consultants in Communicable Diseases Control, health visitors, the immunisation co-ordinator, or to combinations of professionals. In Lambeth, Southwark and Lewisham Authority, community trusts were commissioned to provide a specific service to ensure that all at-risk infants were followed up, with vaccinations given after hospital discharge by a specialist health visitor with support from the generic health visitor. Seventy-three (74%) respondents reported that this detail was not specified in the contract and 9 respondents did not know.

Twenty-nine centres provided information on the number of infants who had received the first dose of vaccine, and in all but three this corresponded to the number of HBsAg positive women. In seven of these centres, HBIG was also given to all infants of HBsAg positive mothers as the presence of anti-HBe was usually not known[6]. In all but one centre, infants born to known HBeAg positive mothers received HBIG.

In contrast to the clear line of responsibility for administering the first dose of hepatitis B virus vaccine and HBIG, the responsibility for subsequent immunisation was unclear. The responsibility for the infant was transferred from hospital, usually by means of the discharge letter, without hospital follow up. In 25% (29) of the centres it was the GP who was assumed to be responsible, and in 21% (24) the hospital paediatrician. Health visitors, community paediatricians, specialist health visitor, Consultants in Communicable Diseases Control or nurse immunisers were also involved, with no clear indication of who had overall responsibility for ensuring completion of hepatitis B virus immunisation.

Only eight obstetric respondents were aware of the existence of an audit system for the uptake of hepatitis B virus immunoglobulin and vaccine. Eighteen of 98 Public Health respondents reported a routine audit in their district, 2 of which were the corresponding authority to the three obstetric centres mentioning an audit system.

DISCUSSION

The 140 obstetric units surveyed covered more than half of all UK births in 1996, and indicated that about half occurred in units with either a universal or a selective

hepatitis B virus screening policy. The overall findings are unlikely to be biased due to non-response, since a similar number of responders and non-responders were from high prevalence areas. Although details provided by the Public Health directorate were less specific, they generally agreed with responses from obstetric units. This study highlights the importance of obtaining information from obstetric units as well as Public Health directorates.

Although the collection of prevalence data was not the study objective, it was possible to obtain information from 22 centres where data were available for the whole antenatal population. Our results confirm the previously reported low hepatitis B virus prevalence among pregnant women in the UK[2–4,8,20,21]. Although there is no clear screening policy in the UK, it is recommended that antenatal HBsAg screening be considered for all women, with further determination of e-antigen status for women who are HBsAg positive[9], an approach adopted in many European countries[22,23], which is cost effective even in areas of low prevalence[1,7,20,21,24]. Our results suggest that universal screening has become more widespread in the UK: 40% of obstetric centres had a policy of offering hepatitis B virus tests to all pregnant women in 1997 compared with 17% of districts in England and Wales surveyed in 1991[9]. However, 16 obstetric centres had no specific hepatitis B virus antenatal screening policy. The effectiveness of a selective screening approach has been questioned in view of the difficulty in identifying a substantial number of carrier women[8]. Perinatal acquisition of infection is the dominant mode of transmission in children in the UK[25], and infants acquiring the infection perinatally have a high risk of developing chronic carriage and the associated risk of horizontal transmission. Identification of HBsAg positive pregnant women and vaccination of their infants must remain a priority[3,5,11,20].

The management of infants born to women carrying the hepatitis B virus and at risk of hepatitis B virus infection has been cause for concern[26]. Immunoglobulin may not always be given to all newborn infants who need it, and some may not receive the recommended three doses of vaccine[27,28]. There is currently no national system to ensure vaccination uptake for exposed infants, and the problem is compounded by the fact that hepatitis B virus vaccination falls outside the routine childhood vaccination schedule, and is therefore neither recorded nor monitored within local or national vaccine programmes. Furthermore, there is confusion as to who has the responsibility for hepatitis B virus vaccination in the community, and too much reliance is given to the GP. Parental involvement is critical if the full vaccination programme is to be implemented. There is an urgent need to strengthen the infrastructure required to ensure that all exposed infants receive three doses of vaccine for optimum protection[6,27,28], and to monitor vaccine uptake[9].

If national guidelines recommending universal screening for hepatitis B virus infection are introduced, this would have implications for the majority of obstetric centres. Universal serological screening for syphilis is currently widely practised. In five centres discontinuation of syphilis screening was being considered to reduce the cost of the antenatal screening package, yet an appraisal of syphilis screening currently being carried out by the PHLS suggests that the financial saving would be limited (PHLS, unpublished data). Other centres mentioned funding as the main limiting factor in decisions about the content of the antenatal screening package. The general nature and lack of specific components of the antenatal screening package were highlighted in this survey.

Our findings are consistent with those of surveys which also find a low overall prevalence of syphilis through specialists in genitourinary medicine, and higher rates in London[29]. The numbers provided in our survey related to serological evidence and could reflect past, treated infection or current infection. It is interesting to compare policies for hepatitis B virus and syphilis. Both have a low overall prevalence with a focus in urban areas and an association with women born abroad and belonging to ethnic minority subgroups. Given these similarities, and the failure of the selective hepatitis B virus screening strategy, it would seem inappropriate to abandon universal syphilis screening without a careful review of the current situation, particularly in view of the increase in syphilis in Eastern Europe[29].

This survey has revealed a uniform screening policy for syphilis, an inconsistent and changing policy for hepatitis B virus, and more *ad hoc* arrangements for other infections. The National Screening Committee has recently recommended that all pregnant women should be offered screening for hepatitis B virus. This UK policy should be implemented by April 2000[30], replacing the inappropriate strategy of individual clinicians devising screening policies for their centre. However, it remains important for public health professionals to develop structured systems to monitor the effectiveness of antenatal screening and the management of affected women and children[30].

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