Audit of immunization policy and practice of health care workers within National Health Service Trusts in England and Wales

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The purpose of this study was to identify the variation in occupational health immunization policies and practice within NHS Trusts throughout England and Wales. Questionnaires were sent to 440 NHS Trusts and 279 were returned (a response rate of 63%). The results were compared with current Department of Health Guidelines. They highlighted the fact that NHS Trusts do not adopt a consistent approach to immunization practice and that these policies often do not reflect Department of Health Guidance. Of those responding, 249 (89%) stated that they would like additional guidance on immunization practice within the NHS workplace. The production of updated, evidence-based guidelines for immunization practice, may help to ensure that a more consistent approach is taken throughout the NHS. This would benefit both the Trusts and their employees who at present may be confused by being given different advice when moving between Trusts.

Key words: Immunization; occupational health.

INTRODUCTION

The Association of NHS Occupational Physicians (ANHOPS) have been aware that immunization practice for NHS employees varies considerably throughout the country. Advice from the Department of Health provides some guidance which has helped to produce a degree of consistency of practice; however, it is apparent that NHS Trusts are interpreting this guidance in different ways, leading to wide variation in policy and practice.

The occupational risk of specific infections may vary throughout the country, which could account for some variation of immunization policies and practices; however, this should not account for the extent of variation identified by this audit. Inconsistent immunization practice can have significant resource implications for the National Health Service (NHS). For example, one Trust may require all its employees to undergo serological screening for varicella whereas another may not. Such a wide variation in practice is not only confusing for employees who move between Trusts, but brings into question the actual rationale and cost benefits of the immunization programmes being advised.

The immunization of health care staff is undertaken because specific infectious disease hazards have been identified within the workplace, and sometimes, because there is an opportunity to review and update the general immunization needs of individual employees. The latter may be more the role of the general practitioner rather than the occupational health service; however, both parties should be working to the same objective of protecting the individual staff member from infectious diseases.

No attempt was made within this audit to assess compliance with reported policies. The findings will be presented to the Joint Committee on Vaccination and Immunization (JCVI) so that consideration can be given to the production of more detailed evidence-based guidance for NHS immunization practice.

MATERIALS AND METHODS

In September 1997 a postal questionnaire was sent to the chief executive of each of the 440 NHS Trusts in England and Wales. A covering letter asked for the questionnaire to be forwarded to the appropriate manager in
charge of the Trust's occupational health department for completion. Occupational health departments were asked to complete a separate form for each Trust for which they provided a service.

The questionnaire asked for details of the person completing the form and whether or not additional Department of Health (DH) guidance on immunization practice for the NHS workplace would be welcomed. Each Trust was asked if they had written policies for a range of infections of occupational health importance including blood borne viral infections, tuberculosis, rubella, tetanus, polio, diphtheria, chickenpox and influenza. They were asked if these policies specifically addressed the relevant occupational health issues.

For hepatitis B, departments were asked whether immunization was offered to all at-risk staff and, if not, which staff groups were excluded. They were asked who provided the immunization and the arrangements for monitoring antibody levels and administering reinforcing doses. For employees undertaking exposure prone procedures there were questions on how hepatitis B immune status was confirmed for each member of staff and whether there were procedures for checking the identity of staff undergoing testing. They were asked whether new doctors joining the Trust were allowed to commence work before hepatitis B immune status had been confirmed.

Departments were asked about the number of hepatitis B surface antigen (HBsAg) positive staff members who were working within their Trusts, and which groups of staff were tested for rubella antibodies. They were also asked about the process whereby they established immunity to varicella. They were asked about the groups of employees who were offered tuberculin tests and how they determined whether a BCG scar was present. Departments were asked if they undertook serological testing for diphtheria on any groups of staff.

Departments were also asked whether influenza immunization had been offered to any groups of staff over the influenza season 1997/98 and whether they planned to offer vaccine in the forthcoming season. They were questioned as to whether they offered reinforcing doses of polio vaccine or took steps to ensure tetanus immunity in any groups of staff.

Finally, departments were asked about arrangements for antibiotic chemo-prophylaxis for staff who were in contact with cases of meningococcal infection, the circumstances under which prophylaxis would be offered and whether they had recent experience of offering prophylaxis to staff.

RESULTS

Four hundred and forty questionnaires were mailed out and 279 were returned, i.e., a response rate of 63%. Of those completing the forms, 52 (19%) were occupational health physicians and 159 (57%) were senior occupational health nurses. The remaining respondents were managers and other nurses.

Table 1. Number (%) of respondents reporting policies

<table>
<thead>
<tr>
<th>Infection</th>
<th>Written trust policy</th>
<th>Policy addresses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B</td>
<td>269 (95%)</td>
<td>268 (96%)</td>
</tr>
<tr>
<td>HIV</td>
<td>257 (92%)</td>
<td>257 (92%)</td>
</tr>
<tr>
<td>TB</td>
<td>242 (87%)</td>
<td>233 (83%)</td>
</tr>
<tr>
<td>Varicella</td>
<td>161 (59%)</td>
<td>148 (53%)</td>
</tr>
<tr>
<td>Polio</td>
<td>130 (47%)</td>
<td>123 (44%)</td>
</tr>
<tr>
<td>Tetanus</td>
<td>128 (47%)</td>
<td>120 (43%)</td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>138 (49%)</td>
<td>135 (48%)</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>70 (25%)</td>
<td>52 (19%)</td>
</tr>
<tr>
<td>Influenza</td>
<td>72 (25%)</td>
<td>53 (19%)</td>
</tr>
</tbody>
</table>

Of those responding, 249 (89%) said they would welcome additional Department of Health guidance on immunization practice for the NHS workplace.

The majority of those who responded, reported having written Trust policies for HIV, hepatitis B and tuberculosis. These policies were stated to address the specific occupational health issues. Fewer Trusts had policies on hepatitis C, tetanus and varicella, and a minority had policies on influenza and diphtheria. These policies were also less likely to address the occupational health issues (Table 1).

Only 11 respondents said they did not undertake hepatitis B vaccination of all employees at risk of hepatitis B. The staff groups excluded from vaccination included temporary nurses, domestic staff and occupational therapists.

Nearly all those who undertook hepatitis B immunization offered the vaccines themselves, however eight respondents referred staff to their general practitioners. Following successful immunization, a range of different practices for monitoring immunity and providing reinforcing doses of vaccine were reported. The most popular approach appeared to be a regular reinforcing dose every five years without serological testing. However, although most departments appeared to be moving away from serological testing, a wide range of different approaches were reported (Table 2).

For employees undertaking exposure prone procedures nearly all occupational health services surveyed now appear to require firm evidence that they are immune to hepatitis B and are not an infectious carrier. Only seven respondents (3%) would accept the employees word. Two hundred and nineteen (78%) would accept a report

Table 2. Action reported after successful hepatitis B immunization (anti-HBs > 100 miu/ml)

<table>
<thead>
<tr>
<th>Action</th>
<th>Number (%) of respondents*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three yearly antibody check, boost if required</td>
<td>31 (11%)</td>
</tr>
<tr>
<td>Five yearly antibody check, boost if required</td>
<td>36 (13%)</td>
</tr>
<tr>
<td>No antibody check, three yearly boost</td>
<td>12 (5%)</td>
</tr>
<tr>
<td>No antibody check, five yearly boost</td>
<td>104 (39%)</td>
</tr>
<tr>
<td>No antibody check, single boost after five years</td>
<td>33 (12%)</td>
</tr>
<tr>
<td>Other action</td>
<td>60 (22%)</td>
</tr>
</tbody>
</table>

* Percentages may not sum to 100% since some respondents gave more than one response to this question while others did not answer it.
from a recognized laboratory while 200 (72%) would accept a report from an occupational health service. Twenty-four respondents (9%) would accept other evidence including a report on a GP letterhead.

If serological testing was needed to establish immunity, 230 (82%) departments would take the blood themselves although only 117 (42%) had a procedure for checking the identity of the employee. Sixty-five respondents (23%) would ask the staff member to attend the phlebotomy department and in these circumstances only 33 reported a procedure for checking identity.

Only 10 respondents (4%) said they would allow new doctors to start work involving exposure prone procedures before serology had been checked.

Ninety-six respondents (34%) knew of employees undertaking exposure prone procedures who were HBsAg positive (but HBsAg negative). Of these 92 were able to readily identify them. Seventy-nine of these respondents reported three or fewer affected employees but nine respondents reported five or more.

Departments were asked which groups of staff they tested for rubella antibodies. A range of practice was reported (Table 3). Respondents who tested other selected groups of HCWs reported staff in whom rubella may represent a risk to patients or for whom the consequences of exposure to rubella may be significant including those working in paediatric and maternity departments.

Two hundred and eleven (76%) respondents reported that they would accept a self-report of previous infection from an employee as evidence of immunity to varicella. However, 138 (49%) said they undertake varicella serology on specific groups of staff. These were groups in whom it was perceived that there was a risk of infection spread to patients. They included midwifery staff and those working with immuno-compromised patients.

Only 50 departments (18%) would accept a self-report from a staff member as evidence that they had a BCG scar. Two hundred and twenty-six (81%) would require confirmation by an occupational health professional. Respondents were divided with 149 (53%) reporting that they Heaf test all health care workers (assuming no BCG scar) and 112 (40%) reporting that they Heaf test only those members of staff with clinical contact. Eleven respondents Heaf tested specific groups of health care workers only, including those judged to be at particular risk such as laboratory staff and those working in TB services.

Only 48 respondents (18%) said they undertook serological testing for diphtheria, usually for laboratory staff.

During the influenza immunization season 1997/98, 67 departments (24%) offered influenza immunization to staff members. Of these, 36 targeted specific groups including accident and emergency department staff, Intensive Therapy Unit and Special Care Baby Unit staff.

Fifty-six respondents (20%) said they planned to offer influenza immunization next season (1998/99). Of these, 31 said they would offer influenza immunization to all staff while the others reported that they would be selective and would be guided by public health advice.

Amongst those departments who offered reinforcing doses of polio vaccine to staff a wide range of approaches were reported (Table 4). Seventy-four departments (27%) appeared not to offer this immunization. The 46 respondents who confined their polio immunization to certain groups of staff reported that immunization was offered to staff judged to be at higher risk of contracting polio including infectious disease unit staff and those whose work bought them into contact with infants’ nappies.

One hundred and forty-eight respondents (53%) took action to ensure that their staff were fully immune to tetanus (Table 5).

One hundred and twenty-six respondents (45%) had a policy for antibiotic prophylaxis for staff in contact with meningococcal infection. One hundred and sixty-four (59%) said they would recommend prophylaxis following mouth-to-mouth resuscitation and seventeen (6%) would provide prophylaxis if a meningococcal infection was diagnosed.

### Table 3. Number of respondents reporting selected approaches to rubella antibody testing

<table>
<thead>
<tr>
<th>Approach</th>
<th>Number (%) of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test all HCWs</td>
<td>79 (28%)</td>
</tr>
<tr>
<td>Test all HCWs with clinical contact</td>
<td>66 (24%)</td>
</tr>
<tr>
<td>Test all HCWs who state they are not immune</td>
<td>27 (10%)</td>
</tr>
<tr>
<td>Test all HCWs with clinical contact who state they are not immune</td>
<td>45 (16%)</td>
</tr>
<tr>
<td>Test other selected groups of HCWs</td>
<td>51 (19%)</td>
</tr>
</tbody>
</table>

* Percentages may not sum to 100% since some respondents gave more than one response to this question while others did not answer it.

### Table 4. Number of respondents reporting selected approaches to polio reinforcing doses

<table>
<thead>
<tr>
<th>Approach</th>
<th>Number (%) of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ten yearly booster for all HCWs</td>
<td>78 (28%)</td>
</tr>
<tr>
<td>Ten yearly booster for all HCWs with clinical contact only</td>
<td>52 (19%)</td>
</tr>
<tr>
<td>Once only booster for all HCWs</td>
<td>12 (4%)</td>
</tr>
<tr>
<td>Once only booster for all HCWs with clinical contact only</td>
<td>17 (6%)</td>
</tr>
<tr>
<td>Boosters for other selected groups of HCWs</td>
<td>46 (16%)</td>
</tr>
</tbody>
</table>

* Percentages may not sum to 100% since some respondents gave more than one response to this question while others did not answer it.

### Table 5. Number of respondents reporting groups of staff for whom tetanus immunity is ensured

<table>
<thead>
<tr>
<th>Groups of staff</th>
<th>Number (%) of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>All employees</td>
<td>100 (36%)</td>
</tr>
<tr>
<td>Estates</td>
<td>117 (42%)</td>
</tr>
<tr>
<td>Nursing</td>
<td>28 (10%)</td>
</tr>
<tr>
<td>Administration</td>
<td>2 (1%)</td>
</tr>
<tr>
<td>Other (e.g., gardeners and grounds staff)</td>
<td>37 (13%)</td>
</tr>
</tbody>
</table>

* Percentages may not sum to 100% since some respondents gave more than one response to this question while others did not answer it.
said they would also give prophylaxis following general nursing care contact.

Seventy-three respondents (26%) had been involved in giving or co-ordinating chemo-prophylaxis in the past two years. Forty-three departments had arranged chemo-prophylaxis for between 0–9 persons; 14 departments had arranged chemo-prophylaxis for between 10–19 persons; seven departments had arranged chemo-prophylaxis for between 20–29 persons and three departments had arranged chemo-prophylaxis for 30 or more persons.

DISCUSSION

At a local NHS Trust level, a range of professionals may advise on the immunization policies for health care workers. These could include consultant occupational physicians, consultant microbiologists, consultants in communicable disease control and specialist nurses. There are few specialist occupational physicians within the NHS, and therefore it is possible that the occupational health perspective may not always be reflected within a Trust policy. This may result in the production of policies which do not address the practical issues involved for the department which has to put them into practice. Implementation of the policy will frequently have resource implications for the Occupational Health service. Where the resources are inadequate or it is felt that the evidence for certain actions is inconclusive, the department may fail to implement the full recommendations of the Department of Health. It would be preferable for all concerned if there was a review of the evidence of immunization practices, so that clearer guidance could be given as to which immunizations are essential for employment, within certain specific areas of work. Where there is insufficient evidence to make definite recommendations this should be clearly stated so that Trust policies can be devised based upon local risk factors. The following infectious diseases will need to be considered.

Hepatitis B

The protocol for immunization against hepatitis B was modified by the Department of Health in 1996.1 It was recommended that following successful immunization, a single booster only should be offered after five years. The results of the audit indicate that the majority of Trusts are still offering boosters every five years. This may be due to a lack of awareness of the revised recommendations, or to the uncertainty on the part of occupational health professionals about the strength of the evidence on which the policy change was made. The lack of evidence for these recommendations may have led to a more cautious approach when advising individual patients, especially where they are working within areas that were felt to be of higher risk of infection.

It is apparent that some Trusts refuse to appoint individuals to posts which can entail risk of exposure to hepatitis B unless the individual can demonstrate some immunity to the infection. This action was undertaken following legal advice, which took into consideration the opinions of the local Health and Safety Executive inspectors. It appears, however, to be related to one small area of the country. Most Trusts however do not adopt such strict criteria and therefore it is possible that a prospective employee may be deemed fit for employment within one Trust but not another. Unless there are specific local factors, which increase the risk of infection spread, it seems inappropriate for different decisions to be made.

Exposure prone procedures

Department of Health guidelines recommend that any employee who is undertaking exposure prone procedures should have evidence of immunity or non-infectivity.1,2 This may require a blood sample to be taken in circumstances in which the employee’s identity can be confirmed. There are practical difficulties in achieving this level of compliance which are outlined by the results. Particular problems arise in the appointment of locum doctors and in the accuracy of data which is transferred between occupational health departments. It is not always clear to what standards were in use by the Occupational Health Service in the recording and relaying of immunization results.

Rubella

The Department of Health advises that to avoid the risk of transmitting rubella to pregnant patients, all health service staff, both male and female, should be screened and those who are seronegative should be immunized with rubella vaccine. Less than one third of Trusts that responded in this survey appear to be following this advice. The majority of respondents restricted testing to HCWs who had contact with patients or those who reported that they were not immune. Presumably a judgement about immunity is made on the basis of some history of previous immunization or previous serological testing.

Rubella is a mild infectious disease, which in non-immunized populations is most commonly seen in children aged 4–9 years. Clinical diagnosis is unreliable since the symptoms are often transient and a similar clinical picture can be caused by other viral infections. In particular, the rash is not diagnostic of rubella and therefore a history of rubella should not be accepted without serological evidence of past infection.

Maternal rubella infection in the first 8–10 weeks of pregnancy results in foetal damage in up to 90% of infants and multiple abnormalities are common. This syndrome is known as congenital rubella syndrome (CRS).

MMR vaccine in which rubella was combined with measles and mumps vaccines was introduced in 1988 for 12-month-old infants. This was intended to interrupt the circulation of rubella amongst young children, thereby protecting susceptible adult women from exposure.

Following the introduction of the vaccine there was a considerable decline in rubella in young children;
However, in 1993 there was a large increase in both notifications and laboratory-confirmed cases of rubella. Many of these cases occurred in males in colleges and universities.

In November 1994 a national immunization campaign was implemented throughout the United Kingdom. Eight million children aged between 5–16 years were immunized with measles/rubella vaccine. Following this campaign, the susceptibility to rubella in males aged up to 16 years, was reduced by about 85%. However, sero-epidemiology has shown higher levels of susceptibility to rubella in males aged 10–40 years, compared to women of this age. This difference is due to the effect of the selective rubella immunization programme, which was targeted at secondary school age girls. It is expected that in the future the increasing levels of immunity in males will prevent transmission of rubella to susceptible pregnant women, and that outbreaks of rubella can be expected to stop. Immigrants who have entered the UK after the age of school immunization are less likely to be immune to rubella. Approximately 40% of children currently born with congenital rubella syndrome are of Asian ethnic origin.

The only group of patients within a hospital who are at risk of the effects of rubella infection are pregnant women in the early months of pregnancy. However, the majority of these will be immune as a result of previous immunization and the remainder are likely to have had their immune status checked. Some Trusts may consider that immunocompromised patients may also be at greater risk from staff members who are not immune to rubella; however, there is little evidence to indicate that this is a significant rather than a theoretical risk.

A number of women who are recent immigrants to the UK may be susceptible to rubella. Within the population as a whole males aged over 22 years are the only group which is currently at significant risk of acquiring rubella. In view of this fact it may be reasonable to propose that serological testing for rubella is confined to males over 22 years of age whose work specifically brings them into contact with pregnant women or immunocompromised patients. The risk from other groups of staff is minimal.

NHS occupational health services must agree whether their role is purely to prevent harm from occupational risks or whether they have a wider role in supporting general practitioners to undertake general immunization programmes.

**Polio**

Most UK healthcare workers should be fully immunized against polio, having received primary immunization consisting of three separate doses of oral polio vaccine as an infant or child. This would have been followed by a reinforcing dose given just before school entry.

Any adult who has not been immunized against polio should receive a primary immunization with three doses of oral polio vaccine at intervals of four weeks.

Reinforcing doses for adults are not necessary, unless they are at special risk. Persons at special risk are travelers to areas or countries where polio is epidemic or endemic, and health care workers in possible contact with polio cases. It is very rare for cases of polio to be admitted to hospital in the UK and therefore it is reasonable to conclude that UK health care workers are not at increased risk of contracting polio. Reinforcing doses for health care workers would therefore not be routinely required.

For those who are at a continuing risk of infection, i.e., are working directly with the live virus, a single reinforcing dose is desirable every 10 years. If a health care worker does receive oral polio vaccine then they can continue to work with immuno-suppressed patients. There is no known case of nosocomial vaccine-related contact polio, which has involved a health care worker and an immuno-suppressed patient.

**Varicella**

A major review entitled the *Occupation and Infection Control of Varicella* has suggested that there is no evidence to support the view that certain staff groups are more at risk of routine exposure to varicella than others. Good laboratory standards should ensure that staff such as laboratory workers are not at increased risk. Post-mortem personnel, however, who perform procedures on individuals who have died of disseminated chickenpox are likely to be exposed to high concentrations of virus and have been advised to have varicella antibody tests prior to undertaking such work. Based upon this advice it may be reasonable to propose that once readily available, vaccination of susceptible post-mortem personnel would be advisable.

Staff have been known to contract varicella from patients. Most occupational health departments have also experienced difficulties in trying to trace and check the immunity status of staff who have been exposed to patients or family members with varicella. There are particular concerns where the patients or staff members may be more susceptible to the effects of infection, i.e., those who are pregnant or immuno-compromised. Staff who are susceptible to varicella should not attend immunocompromised, obstetric or neonatal patients from days 7–21 after contact with varicella. If this is not possible they should be given leave of absence.

A pre-employment record of an employee's immune status to varicella is therefore extremely helpful when trying to assess the risk of infection transmission following exposure. There has been debate as to the means whereby this immunity is determined. Some professionals believe that a past history of varicella is a reasonably reliable method of determining immunity. However, other professionals have suggested this method may be inaccurate and therefore serological samples should be taken and assessed. Whilst this may be the ideal situation, it is clear from the audit results that the majority of occupational health departments (76%) are not currently doing this. However within areas such as maternity where the consequences of spread of infection may be greater, 48% of departments reported that they are testing for varicella. If a wider programme of serological screening is to be introduced there are likely to be
significant resource implications in respect of the time to collect the samples and the cost of undertaking them.

Influenza

There is clear evidence that influenza and influenza-like illnesses have considerable impact on productivity in the workplace. In view of these costs there has been interest in trying to reduce sickness absence levels related to flu by means of immunization programmes.7-9

Experience has shown that when influenza vaccine is offered to employees, the uptake by staff is low. This is only likely to change if there is national agreement and support for immunization programmes in the workplace. Occupational health services would need additional resources for this to be put into practice, although some would say that these costs could be offset by savings that would be made through reduced sickness absence and the reduced length of stay for inpatients.

This research needs to be extended to confirm whether such an approach is cost effective throughout the NHS. While this is being evaluated, it seems inappropriate for one Trust to offer immunization for its staff while an adjacent Trust with similar risks does not. A consistent approach throughout the NHS is desirable.

CONCLUSION

The results of this audit show that amongst NHS Trusts there is wide variation in immunization practice for health care staff. The evidence to support insistence on one common mode of practice may not be available for all immunization practice and therefore it is recommended that this evidence be reviewed.

Where there is clear evidence of an infection risk to health care workers, agreement should be reached as to what occupational health and immunization practices are appropriate. Where the evidence is less conclusive, though it is perceived that immunization would benefit the health care worker, suggested procedures should then be recommended, but these could be modified dependent upon local risk assessments.

Where there is little evidence to support an immunization practice, this should be stated so that any action that is undertaken is clearly as a result of a local risk assessment.

There appears to be an urgent need for the Department of Health, through the Joint Committee on Vaccination and Immunization, to review the evidence for current immunization practice within the NHS. It would be beneficial if they could work with occupational health physicians and control of infection professionals, in order to agree and publish practical and consistent guidelines relating to the immunization of health care staff.

REFERENCES