Management of blood and body fluid exposures in police service staff

K. Dunleavy¹, A. Taylor¹, J. Gow¹, B. Cullen² and K. Roy²

¹Institute for Applied Social and Health Research, School of Social Science, University of the West of Scotland, High Street, Paisley PA1 2BE, UK, ²Health Protection Scotland, Clifton House, Clifton Place, Glasgow G3 7LN, UK.

Correspondence to: K. Dunleavy, Institute for Applied Social and Health Research, School of Social Science, University of the West of Scotland, High Street, Paisley PA1 2BE, UK. Tel: +44 (0)141 848 3482; fax: +44 (0)141 849 4264; e-mail: karen.dunleavy@uws.ac.uk

Introduction

Police service staff are an occupational group at risk of exposure to blood and/or body fluids, with a consequent risk of transmission of a blood-borne virus (BBV) such as hepatitis B (HBV), hepatitis C virus (HCV) or HIV [1–3]. Measures can be taken to minimize the risk of acquiring a BBV from an exposure incident. These include pre-incident HBV vaccination and prompt post-incident management. Post-incident management includes risk assessment, which determines the appropriate post-incident strategies and interventions, blood tests, bloods for storage and treatment.

For HBV, post-incident management can involve a vaccination of a booster or accelerated dose of vaccine and where appropriate, in high-risk situations or in a known non-responder to vaccine, hepatitis B immunoglobulin, given concomitantly. Guidance exists on appropriate post-exposure measures, which to be effective need to be administered within 7 days [4]. For HIV, although no vaccine is available, post-exposure prophylaxis (PEP) can reduce the risk of acquiring HIV after an exposure incident; the side-effects, however, can be unpleasant [5]. To be effective, HIV–PEP should be administered as quickly as possible, ideally within an hour of exposure and no later than 72 h afterwards [5]. There is no vaccine and no effective PEP against HCV infection; however, the infection can clear spontaneously in ~20% of cases, and recently developed treatment protocols can be effective in sustaining viral clearance [6–9].

As part of the post-incident management process, blood should be taken for storage as soon as possible after the incident to establish the exposed person’s infection status at the time of the incident. Follow-up blood tests can then be carried out at an appropriate time point (up to 6 months after the incident) to detect the presence or absence of HBV, HCV and HIV. Specific guidance exists on appropriate testing protocols depending on the assessed...
risk of transmission [4–6,10]. If follow-up blood tests show a BBV infection, a test on the stored blood can establish if the infection was present at the time of the incident or, alternatively, could have resulted from the exposure.

Several studies have looked at the medical care provided to individuals who presented to hospital emergency departments with exposures to blood and/or body fluids, in Amsterdam [11], Australia [2] and the USA [12]; some of these have focused on the emergency department care provided to police service staff [13]. There has been research in the UK that has examined the management of occupational exposure incidents in health care workers [7,14]. However, no studies have been identified that have examined the care received by police service staff.

The aim of this study was to evaluate post-incident management by the occupational health (OH) service following exposure to blood and body fluids in Scottish police service staff.

Methods

A standard proforma was designed for police force OH services to collect anonymized details of each case of occupational blood/body fluid exposure reported to the OH department over the 12 month study period that commenced in August 2007. OH staff recorded the circumstances of each incident, the nature of the exposure, factors affecting risk and the care reportedly provided by OH and/or other medical services. OH staff were also asked to give their assessment of the risk of BBV infection, using terms in common usage among OH: none, low, medium, high and cannot determine.

A panel of experts reviewed the risk assessment and post-incident management of all reported exposures to assess the appropriateness and adequacy of the management of each case, with reference to current national guidelines [4–6,10,15,16] and to their knowledge and expertise. Twelve experts, drawn from the fields of OH, infectious diseases and genito-urinary medicine, were assigned to one of two panels, thereby ensuring balanced representation of each discipline. Prior to reviewing incidents, the experts received written guidance and training on the review process to ensure a consistent approach and agreement on the policies being utilized. This method was based on previous work carried out by the research team [17,18]. The panel approach took account of the fact that assessments and opinions in this field can differ.

Experts independently reviewed each proforma. They first assessed the risk of HBV, HCV and HIV infection associated with each case. The risk was assessed using the scale: 0 = none, 1 = low, 2 = medium or 3 = high. They could also answer, ‘Cannot determine as information is inadequate’. They then recorded their agreement or disagreement with the risk assessment given by OH, using the scale: 1 = disagree, OH assessment was too low, 2 = agree and 3 = disagree, OH assessment was too high.

The evaluation did not include the direct collection of data on the management provided by any medical service other than OH. Information on any care provided by other first points of contact could only be that reported by the exposed person. The panel evaluation therefore focused on the care provided by OH.

The experts assessed the appropriateness and adequacy of the care reportedly given or recommended by OH for each BBV in each case, using the scale: 1 = excessive, 2 = somewhat excessive, 3 = appropriate, 4 = somewhat inadequate and 5 = inadequate. Panel members were asked to add comments to explain their assessment. They were also invited to add any opinions or suggestions.

Analyses were performed using Microsoft Excel™ and the Statistical Package for Social Sciences Version 13. A descriptive analysis of the types of incident was followed by analyses of the panel data. For each case, an average score (median), for each of the four questions answered by the panel, was calculated across the six experts. Qualitative data were analysed to identify common concerns among the experts.

Checks of intraobserver and interobserver variation were carried out. Intraobserver variation was examined by sending the same case to each expert on three occasions. Comparisons across the three time periods identified one expert who scored inconsistently but exclusion of this expert made little difference to the results and it was considered appropriate to include this expert in the final analysis. Interobserver variation was examined by looking at each expert’s score in relation to the average (median) score of the six experts for each case. Some differences of assessments and judgements between reviewers had been anticipated. An examination of the spread of the differences for each expert, and between experts, did not identify any marked inconsistencies in any expert’s scores. Consequently, no expert was excluded. Furthermore, the two sub-panels were found to be scoring to the same standard and, consequently, the average scores from the two panels were collated.

The University of West of Scotland (formerly University of Paisley) Research Ethics Advisory Group granted ethical approval for the evaluation.

Results

A total of 141 incidents were reported to OH services over the study period; of these, 105 proformas were forwarded to the research team. In the other cases, the exposed person did not agree to participate in the study.

The exposed individuals were predominantly male (73/105, 69%) and their mean age was 35 years (range
The average length of service was 5 years (range 4 months to 30 years). The majority of exposed individuals were police constables (86%).

The commonest types of incident reported to OH services were spits (27%), bites (26%) and splashes (23%). Five needlestick injuries (NSIs) were reported. A further six individuals had sustained injuries from ‘other sharp’ instruments such as a blade or knife (Table 1).

Of the 105 cases included in the analysis, 71% (74) were ‘legitimate’ exposures (i.e. involving contamination of either the mucous membrane of the eyes, nose or mouth or an area of broken skin or penetration of the skin via a sharp) and 29% incidents were non-exposures (i.e. contamination of intact skin). Of the 74 ‘legitimate’ exposures, 46% involved non-blood-stained fluid (e.g. saliva) and 32% involved blood.

An accident and emergency service (A&E) was the exposed person’s first point of medical contact in just over half of these incidents (54%), while 34% attended OH in the first instance. The remaining 12 individuals made initial contact with a police doctor or a general practitioner.

Of the 105 proformas forwarded by OH to the research team, 97% were reviewed by the expert panel members. Two were received too late for inclusion in the analysis and the third could not be evaluated because it contained insufficient information.

Panel members were rarely in complete agreement about the risk of each BBV infection in any one case, but differences were small. Table 2 below highlights that the experts considered the majority of cases to be of ‘no risk’ (a score of 0) or ‘low risk’ (a score of 1).

For the majority of cases (78%), the panel members considered that OH staff were assessing the general risk of BBV infection correctly (Figure 1 below). However, panel members raised some concerns regarding the small number of cases for which the risk was misclassified by OH, that is, the OH risk assessment was either ‘too low’ or ‘too high’. For example, several incidents that had involved a splash of blood onto intact skin carried no risk but had been assessed as ‘low-risk’ by OH services. Equally, the OH risk assessment of some of the NSIs and a mouth-to-mouth resuscitation involving fresh blood was, in the opinion of the expert panel, ‘too low’. In some cases, however, although not agreeing exactly with the OH assessment of risk, reviewers said that they could understand or accept it. Several noted the difficulties of distinguishing between ‘categories’ of risk, commenting, for example, ‘I can see why they said “low” (although I have said “none”’). Some panel members noted particularly the difficulty of distinguishing (and treating) cases of ‘negligible’ risk.

Typically, the role of OH services in post-incident management included providing information, advice and reassurance, recommending follow-up blood testing and ensuring HBV protection (e.g. giving booster injections). Table 3 below shows that, in the majority of cases, OH management was viewed by the expert panel as ‘appropriate’, that is, a median score of 3. Of the 102 cases reviewed, the panel considered that 96, 73 and 94% of the

<table>
<thead>
<tr>
<th>Nature of the incidents (N = 105)</th>
<th>n (%)</th>
</tr>
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<tbody>
<tr>
<td>Spit</td>
<td>28 (27)</td>
</tr>
<tr>
<td>Bite</td>
<td>27 (26)</td>
</tr>
<tr>
<td>Splash</td>
<td>24 (23)</td>
</tr>
<tr>
<td>Other sharpsa</td>
<td>6 (6)</td>
</tr>
<tr>
<td>NSI</td>
<td>5 (5)</td>
</tr>
<tr>
<td>Scratch</td>
<td>4 (4)</td>
</tr>
<tr>
<td>More than oneb</td>
<td>4 (4)</td>
</tr>
<tr>
<td>Mouth to mouth</td>
<td>3 (3)</td>
</tr>
<tr>
<td>Blood to blood via open wound</td>
<td>3 (3)</td>
</tr>
<tr>
<td>Others</td>
<td>1 (1)</td>
</tr>
</tbody>
</table>

The scale used to assess risk was: 0 = none, 1 = low, 2 = medium, 3 = high. Intermediate values (i.e. 0.5, 1.5 and 2.5) were present because the score was based on an average score over the six experts.

<table>
<thead>
<tr>
<th>Median score</th>
<th>HBV (N = 102), n (%)</th>
<th>HCV (N = 102), n (%)</th>
<th>HIV (N = 102), n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>54 (53)</td>
<td>35 (34)</td>
<td>44 (43)</td>
</tr>
<tr>
<td>0.5</td>
<td>18 (18)</td>
<td>9 (9)</td>
<td>10 (10)</td>
</tr>
<tr>
<td>1</td>
<td>28 (27)</td>
<td>50 (49)</td>
<td>43 (42)</td>
</tr>
<tr>
<td>1.5</td>
<td>0</td>
<td>1 (1)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>2</td>
<td>2 (2)</td>
<td>6 (6)</td>
<td>3 (3)</td>
</tr>
<tr>
<td>2.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>1 (1)</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 1. Experts’ level of agreement with OH risk assessment (n = 102). Agreement assessed using the scale: 1 = disagree: OH assessment is too low, 2 = agree or 3 = disagree: OH assessment is too high. Intermediate values (i.e. 1.5 and 2.5) are present because the score is based on an average score over the six experts.
cases had received appropriate HBV, HCV and HIV care, respectively.

In the main, the post-incident care for HBV exposure given by OH was considered to be appropriate. Often, this score reflected the fact that the exposed individual had received pre-incident HBV vaccination, indicating that OH services were regarded by panel members as responsible for ensuring that police service staff were fully immunized; their management of HBV was deemed ‘inadequate’ unless a full vaccination course had been received and response levels checked.

Several experts commented that police service staff, including custody officers and support staff, should be fully vaccinated against HBV before being exposed to any possible risk of BBV infection, and they were critical where an individual, whose duties included risk of exposure, had not been immunized. Perhaps recognizing that HBV immunization was voluntary, some reviewers advised that more education seemed to be required for staff about HBV testing and vaccination.

HCV testing can be recommended at 6 weeks, 3 months and/or 6 months [16]. Inspection of the data indicated some inconsistency in the recommendations for testing between different OH units, suggesting the use of different protocols.

It was noteworthy that fewer cases were considered by the experts to have received appropriate care with respect to HCV in comparison with the other two BBVs (Table 3). In explaining their ratings, experts were particularly critical of the recommended timing of HCV testing. In several cases, it was suggested that an additional antibody test should have been carried out. As one panel member explained, ‘If you are going to test for HCV, it should be at 3 and 6 months to account for the window period’. Many experts also advised that for higher risk cases, a 6 week polymerase chain reaction (PCR) test should have been recommended. For example, PCR testing at 6 weeks had not been recommended after one NSI nor after one spit to the eye with blood-stained fluid. Panel members commented generally that PCR testing seemed to be ‘not widely practised’. The experts also drew attention to a ‘continuing inconsistent approach’ or ‘continuing uncertainty’ about when to test for HCV. They suggested that the evidence of apparent confusion about appropriate testing indicated a need for a consistent protocol.

With respect to HIV exposure management, the majority of the cases received adequate post-incident management, according to the experts (Table 3). However, there was a small number of cases where certain experts disagreed with the recommended HIV follow-up testing, commenting, for example, ‘Why instigate testing for a low-risk event? Some people should simply be reassured’.

### Discussion

This study found that only a small proportion of the exposure incidents reported by Scottish police service staff to their OH department resulted in a high risk of BBV transmission. This is consistent with the findings from other research [13,19,20]. The types of incident typically reported in this study were spits, bites and splashes. Sonder et al. [3] similarly found that bites and splashes of blood were common exposure incidents among Dutch police officers, while NSIs were less typical.

Overall, the expert panel judged that police OH providers were performing well by correctly assessing the general risk of BBV infection and in providing appropriate post-incident management. However, some concerns were raised in relation to a small number of incorrect risk assessments and an inconsistent approach to HCV follow-up blood testing.

This evaluation has provided the first evidence in the UK of the adequacy of post-incident management of exposure to blood or body fluids in police service staff. The findings of some inconsistency and inappropriateness in HCV follow-up testing reflect those of a Health Protection Agency (HPA) study, which found that only 22% of health care workers exposed to HCV-positive source patients were offered the appropriate HCV tests at the correct time [7]. Another study of the management of occupational exposure incidents in health care workers found that OH management was more consistent and appropriate than that provided by A&E [14].

A key limitation of this evaluation was that, because any information collected on the care provided by medical services other than OH was ‘second-hand’, the adequacy of the management offered by these services could not be evaluated. Two-thirds of police service staff who reported to OH had first sought help from another medical service, which was typically A&E.

The findings from this evaluation have highlighted two issues that, if addressed, would improve the post-incident

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Table 3. Percentage of cases by median ‘evaluation of care’ score for each BBV

<table>
<thead>
<tr>
<th>Median score</th>
<th>HBV (n = 102) %</th>
<th>HCV (n = 102) %</th>
<th>HIV (n = 102) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2.5</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>96</td>
<td>73</td>
<td>94</td>
</tr>
<tr>
<td>3.5</td>
<td>1</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>4.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The scale used was 1 = excessive, 2 = somewhat excessive, 3 = appropriate, 4 = somewhat inadequate or 5 = inadequate. Intermediate values (e.g. 1.5 and 2.5) were present because the score was based on an average score over the six experts.
management offered to police service staff and others, following incidents of exposure to blood or body fluids. Our recommendations are supported by the literature.

First, as discussed above, the risk of infection had been misclassified by OH in a small number of cases. It is recognized that blood or body fluid exposures which occur in the community, as opposed to health-care settings, may be more difficult to assess in terms of the risk of BBV infection since less may be known about the circumstances surrounding the incidents and source testing may be problematic [3,21]. Nevertheless, risk assessment is fundamental to OH practice [14] and there is a duty of care to assess BBV risk appropriately as this determines treatment and support. Incorrectly assessed risk could lead to raised anxiety in an injured person, unnecessary blood testing and inappropriate prescribing of prophylactic treatment if no actual risk was present or, conversely, in high-risk cases, to inadequate treatment [14].

Risk assessments may, however, differ between experts because of differences in knowledge, experience and adherence to guidelines [21]. The risk assessments given by the experts in this study were not always in agreement. Our findings have also suggested that different individuals (OH nurses as well as BBV experts) might ascribe different meanings to the risk assessment terms ‘none’, ‘low’ and ‘high’. These findings have indicated a need for greater clarity around the terms used to assess risk. The recently published Health & Safety Executive guidance has also noted this problem and has suggested the use of the terms ‘very low risk’ (e.g. splashes of blood on intact skin), ‘low risk’ (e.g. a percutaneous injury from an abandoned needle in a public place) and ‘high risk’ (e.g. an injury with exposure to blood or body fluids from a source with significant risk factors for a BBV infection) [22].

The second issue concerns the panel findings that the recommendations of police force OH staff for HCV follow-up testing were not always adequate or appropriate. The HPA has reported similar findings in National Health Service (NHS) OH services [7]. This evidence suggests the need for the development of a clear HCV testing protocol to be used by all medical services.

Little is known, in the UK, about the post-incident management of occupational exposure by medical services other than OH. Since services such as A&E are commonly the first point of contact following exposure to blood or body fluids, for police service staff, other public safety workers and members of the public, there is a need for research to investigate the care provided by all NHS services.

To conclude, this study found that Scottish police OH services were providing adequate and appropriate post-incident management to staff exposed to blood or body fluids in the course of their work; however, the above recommendations should enable improvements in services to be made.

Key points
- In general, the post-incident management provided to Scottish police by their occupational health services was adequate and appropriate.
- There is a need for greater clarity regarding risk assessment terminology.
- There is a need for the development of a standardized hepatitis C virus testing protocol.

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Conflicts of interest
None declared.

References


