



Public Health  
England

Protecting and improving the nation's health

## **Eye of the Needle Report**

**Surveillance of significant occupational exposures to bloodborne viruses in healthcare workers in the United Kingdom - update on seroconversions**

February 2020

# About Public Health England

Public Health England exists to protect and improve the nation's health and wellbeing and reduce health inequalities. We do this through world-leading science, research, knowledge and intelligence, advocacy, partnerships and the delivery of specialist public health services. We are an executive agency of the Department of Health and Social Care, and a distinct delivery organisation with operational autonomy. We provide government, local government, the NHS, Parliament, industry and the public with evidence-based professional, scientific and delivery expertise and support.

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## Executive summary

Public Health England (PHE) monitors significant occupational exposures (SOEs) to HIV, hepatitis B virus (HBV) and hepatitis C virus (HCV) and subsequent seroconversions in healthcare workers (HCWs) and ancillary staff working within a healthcare setting. This report includes data on seroconversions, hepatitis B vaccination and HIV post-exposure prophylaxis (PEP) uptake since the start of SOE surveillance in 1997. The last confirmed seroconversion was a hepatitis C seroconversion following an exposure in 2015. All HCWs and ancillary workers should be vaccinated against hepatitis B, continue to be monitored for SOEs, and, if necessary, offered PEP for HBV and/or HIV.

# Introduction

Public Health England (PHE) monitors significant occupational exposures (SOEs) to bloodborne viruses (BBVs) and any subsequent seroconversions among healthcare workers (HCWs) and ancillary staff working in healthcare settings. Monitoring is conducted via non-mandatory reporting from occupational health services (OHSs) across England, Northern Ireland and Wales; since the start of the surveillance in 1997 reports have been received from over 200 OHSs.

The primary objective of this surveillance is:

- to determine the number of transmissions of HIV, hepatitis B virus (HBV) and hepatitis C virus (HCV) to HCWs as a result of an SOE

The secondary objectives of this surveillance are:

- to estimate the risk of transmission of HIV, HBV and HCV to HCWs as a consequence of an SOE (stratified by type of exposure)
- to describe the number and rate of SOEs over time
- to estimate the uptake of appropriate treatment responses (including HBV vaccination and HIV post-exposure prophylaxis (PEP)) to SOEs and adherence to guidance on testing frequency
- to estimate the impact of interventions (for example, EU Council Directive 2010/32/EU) to reduce SOEs over time

This short report summarises the number of SOEs reported to PHE from the start of SOE surveillance on 1 January 1997 up to 30 June 2018, including whether these HCWs had received hepatitis B vaccination and/or HIV PEP, and the number of seroconversions as a result of the exposure. This data for England, Wales and Northern Ireland has been extracted from the PHE SOE surveillance system SigOcc. Data from Scotland on seroconversions and the number of SOEs only has been extracted from their annual report National Surveillance of Sharps Injuries in Scotland.

Previously, data on SOEs reported to PHE have been published biennially via the Eye of the Needle report. The most recent Eye of the Needle report was published in December 2014. However, due to a lack of consensus over the number of active HCWs currently working in public and private sector healthcare settings, and issues with data completeness across consecutive years, interpretation of trends is limited. For this reason, we also have not been able to estimate the uptake of pre-exposure HBV vaccination, HIV PEP or adherence to guidance; nor to estimate the impact of interventions to reduce SOEs over time. A review of reporting processes and systems will be undertaken to understand these issues further.

# Reporting of significant occupational exposures

A significant occupational exposure (SOE) occurs if:

- percutaneous exposures where the HCW's skin has been pierced by a needle or other sharp object (for example, scalpel; this also includes bone fragments, human bites and scratches) contaminated with the source patient's blood or other bodily fluids; or mucocutaneous exposures where the HCW's mucous membranes (mouth, eyes, nose etc.) or non-intact skin have been contaminated by a source patient's blood or other bodily fluids; and
- the source patient is known to be, hepatitis B surface antigen (HBsAg) positive, HCV RNA positive and/or HIV positive, or is in a high-risk group and thereafter found to be positive with one of these infections

OHSs also report occupational exposures where the BBV status of the source patient is unknown but the HCW has started on HIV PEP according to the national guidelines. This occurs when the source patient is considered to be at high risk of HIV, but the viral status cannot be obtained or has not yet been obtained, and the decision is made for the HCW to start PEP.

OHSs should inform PHE of any SOEs reported by HCWs in England, Wales or Northern Ireland. Reporting by OHSs uses data received via 4 reporting forms which are:

- Initial Reporting Form - includes questions on which BBV the HCW was exposed to; type of exposure sustained; the bodily fluid involved; and, if percutaneous, the depth of the injury and whether the sharp was visibly contaminated with blood
- 6 Week Follow-up Form - includes more detailed questions on the exposure, including where it took place, what procedure the HCW was performing at the time of the exposure and when in relation to the procedure the exposure occurred. Data are also collected on any factors that may have contributed to the exposure including information on safer sharps and management of the wound immediately following the exposure as well as early post-exposure test results
- 6 Month Follow-up Form - includes data on all post-exposure tests and results for the HCW
- Seroconversion Proforma - following the receipt of the 3 forms above, if there is suggestion that the SOE has led to a transmission of a BBV to a HCW, PHE requests more detailed data on the incident, HCW's test results and treatment plan.

PHE received reports of 8,765 SOEs in England, Wales and Northern Ireland via initial reporting forms between 1 January 1997 and 30 June 2018. During this period PHE received 6,768 (77%) 6-week follow-up forms and 6,194 (71%) 6-month follow-up forms hence complete data is not available for all reported exposures.

Further details on the methodology can be found in previous Eye of the Needle Reports.<sup>1</sup>

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<sup>1</sup> Public Health England. Bloodborne viruses: Eye of the needle. Available at: [www.gov.uk/government/publications/bloodborne-viruses-eye-of-the-needle](http://www.gov.uk/government/publications/bloodborne-viruses-eye-of-the-needle)

# Summary of seroconversions following SOEs

A seroconversion occurs when a HCW has a negative result for a BBV prior to an exposure and subsequently has a positive result following an SOE with the reported exposure considered the likely route of infection.

Between 1997 and June 2018, PHE received reports of 8,765 SOEs in England, Wales and Northern Ireland; Scotland received reports of 234 SOEs via their surveillance between January 2015 and December 2017.<sup>2,3,4</sup> For comparison, in the same timeframe PHE received 1,216 reports of SOEs from England, Wales and Northern Ireland.

Since the most recent Eye of the Needle Report in 2014 there have been 2 reports of confirmed HCV seroconversions among HCWs and ancillary staff in the UK. This brings the total number to 23 HCV seroconversions in the UK, with the last confirmed report in 2015. At the time of writing, there have been no further confirmed HCV seroconversions reported in the UK since this case in 2015.

All 23 reported HCV seroconversions followed percutaneous exposures from hollowbore needles; 11 incidents took place after the procedure being performed, 8 during the procedure and the timing of the other 4 is unknown. The 23 seroconversions were reported among doctors (n=7), nurses (n=7), healthcare assistants (n=2), one dentist, one phlebotomist, one operating department assistant, one domestic worker and the professions of the other 3 cases are unknown (some due to requests not to share information).

The only report of an HIV seroconversion among HCWs in the UK was due to a percutaneous exposure from a hollowbore needle in 1999 and further details can be found in previous reports.<sup>5</sup>

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2 Health Protection Scotland, NHS National Services Scotland. Healthcare Associated Infection Annual Report 2016. Available at [www.hps.scot.nhs.uk/web-resources-container/healthcare-associated-infection-annual-report-2016/](http://www.hps.scot.nhs.uk/web-resources-container/healthcare-associated-infection-annual-report-2016/)

3 Health Protection Scotland, NHS National Services Scotland. Healthcare Associated Infection Annual Report 2017. Available at [www.hps.scot.nhs.uk/web-resources-container/healthcare-associated-infection-annual-report-2017/](http://www.hps.scot.nhs.uk/web-resources-container/healthcare-associated-infection-annual-report-2017/)

4 Health Protection Scotland, NHS National Services Scotland. Healthcare Associated Infection Annual Report 2018. Available at [www.hps.scot.nhs.uk/web-resources-container/healthcare-associated-infection-annual-report-2018/](http://www.hps.scot.nhs.uk/web-resources-container/healthcare-associated-infection-annual-report-2018/)

5 Health Protection Agency. Eye of the Needle December 2012. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/337065/Eye\\_of\\_the\\_needle\\_2012\\_accessible.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/337065/Eye_of_the_needle_2012_accessible.pdf)

Between 2001 and 2005, 2 of the SOEs which led to seroconversions for HCV occurred where the HCWs were exposed to source patients who were co-infected with HCV and HIV. These HCWs were started on HIV PEP and remained HIV negative after treatment.

As of 30 June 2018, there have been no confirmed HBV seroconversions as a result of SOEs among HCWs and ancillary staff reported in the UK.

## Hepatitis B Vaccination

Hepatitis B vaccination for HCWs has been recommended since the 1980s and further information can be found in the relevant chapter of Immunisation against Infectious Disease (commonly known as The Green Book) which includes guidance on the occupational health immunisation of HCWs and laboratory staff (Chapter 12) and hepatitis B vaccines and hepatitis B immunoglobulin (HBIG) (Chapter 18).<sup>6</sup>

Under the Health and Safety at Work Act (HSWA) 1974, employers need to assess the risks to their staff and others. The Control of Substances Hazardous to Health (COSHH) Regulations 2002 require employers to assess risks from exposure to hazardous substances and to protect workers from those risks.

New employees should complete a pre-employment health assessment and any HCWs, ancillary workers and laboratory/pathology workers at risk of exposure to patients' blood or blood-stained bodily fluids/tissues must be offered hepatitis B vaccination. In addition, HCWs should be adopting good working practices by using Personal Protective Equipment (PPE) and safer sharps appropriately and vaccination should not be regarded as a replacement even though it provides a safety measure. Post-exposure prophylaxis for HBV and/or HBIG should be offered as per the guidance in The Green Book.

Table 1 summarises the hepatitis B vaccination status of the 8,765 HCWs reporting the SOEs received by PHE from 1 January 1997 to 30 June 2018.

A total of 2,056 (23%) HCWs reporting an SOE since 1997 had an unknown HBV vaccination status. Of those with a known status, 6,448 (96%) were known responders to at least 1 dose of the hepatitis B vaccine and 107 (1.6%) were naturally immune to HBV. Only 154 (2.3%) HCWs reported not responding to the hepatitis B vaccine.

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<sup>6</sup> Department of Health. The Green Book, Immunisation of healthcare and laboratory staff, Chapter 12. Available at: [www.gov.uk/government/collections/immunisation-against-infectious-disease-the-green-book](http://www.gov.uk/government/collections/immunisation-against-infectious-disease-the-green-book)

**Table 1: Hepatitis B Vaccination Status in HCWs (January 1997 to June 2018)**

<b>HBV Vaccination Status</b>	<b>Number of HCWs</b>	<b>Percentage</b>
Vaccinated with at least one dose:	6,602	98.4
<i>Anti-HBs not known</i>	237	3.5
<i>Known responder</i>	6,211	92.6
<i>Known non-responder</i>	154	2.3
Naturally acquired immunity	107	1.6
Not known	2,056	
Total	8,765	100

## HIV PEP

Table 2 summarises the number of HCWs who reported an SOE where the source patient was HIV positive or had an unknown HIV status but the HCW commenced HIV PEP following the exposure between 1997 and 30 June 2018. Of 8,292 exposures, 89% (n=7,367) had a known HIV PEP status and, of these, 46% (n=3,385) of HCWs commenced HIV PEP.

**Table 2: HCW HIV PEP Status where source patient positive or unknown for HIV (January 1997 to June 2018)**

<b>HCW HIV PEP Status</b>	<b>Number of HCWs</b>	<b>Percentage</b>
Commenced HIV PEP	3,385	45.9
Not commenced HIV PEP	3,982	54.1
Not known	925	
Total	8,292	100

The number of HCWs that commenced HIV PEP is detailed further in Table 3. Of the 996 HCWs with known information on recommendations and outcomes of HIV PEP, 607 (61%) took PEP (431 following recommendations and 176 taken despite not being recommended) and 389 (39%) HCWs did not take PEP (176 as it was not recommended and 26 did not take PEP despite being recommended).

**Table 3: HCW HIV PEP recommendations and outcomes where source patient HIV positive/unknown (January 1997 to June 2018)**

<b>PEP Outcome</b>	<b>Number of HCWs</b>	<b>Percentage</b>
PEP recommended, accepted	431	43.3
PEP recommended, declined	26	2.6
PEP not recommended and not taken	363	36.4
PEP not recommended but was taken by HCW	176	17.7
Not known	3,120	
<b>Total</b>	<b>4,116</b>	<b>100</b>

## Conclusion

Since reporting began in 1997, there have been 8,765 SOEs reported to PHE in England, Wales and Northern Ireland to 30 June 2018. In the same period, there have been 23 reports of HCV seroconversions and 1 report of an HIV seroconversion in the UK. There have been no confirmed reports of HBV seroconversions among HCWs following SOEs. HCWs continue to be vaccinated against HBV with over 98% of those with a known vaccination status receiving the vaccine.

This report includes all confirmed seroconversions reported to PHE as of June 2018. The surveillance of SOEs and seroconversions is reported to PHE on a non-mandatory basis. As a result of this, as well as uncertainty around key denominators such as the total number of HCWs in the UK, analysis and interpretation in this report is limited. We are reviewing the way in which OHSs report SOEs to PHE to try to overcome some of the barriers to reporting. Due to these reasons, the number of seroconversion cases reported to date likely underestimates the true number of SOEs and seroconversions from occupational exposures to BBV positive source patients. Therefore, data in this report are not directly comparable to data published in previous reports.

# Recommendations

The recommendations of this report are:

- HCWs should ensure that they follow local guidelines about reducing the risk of injury when carrying out procedures and should report any SOEs to their OHS
- OHSs should ensure that HCWs are tested and treated within the appropriate timeframes and given appropriate guidance, treatment and assistance to prevent injuries being sustained in future
- hospital trusts and other healthcare settings should have clear processes for the review of SOEs so that policies and procedures can be reviewed and updated to address patterns of exposures and identify any new risks
- hepatitis B vaccination should be offered to HCWs and other hospital staff including ancillary workers in line with appropriate guidance<sup>7</sup>
- HIV PEP should be offered to exposed HCWs in line with appropriate guidance<sup>8</sup>

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7 Department of Health. The Green Book, Immunisation of healthcare and laboratory staff, Chapter 12. Available at: [www.gov.uk/government/collections/immunisation-against-infectious-disease-the-green-book](http://www.gov.uk/government/collections/immunisation-against-infectious-disease-the-green-book)

8 UK Chief Medical Officers' Expert Advisory Group on AIDS (EAGA). Guidance on HIV post-exposure prophylaxis. Available at: [www.gov.uk/government/publications/eaga-guidance-on-hiv-post-exposure-prophylaxis](http://www.gov.uk/government/publications/eaga-guidance-on-hiv-post-exposure-prophylaxis)