



Blood and Transplant

Data sources and methods 2018

NHS Blood and Transplant and Public Health England Epidemiology Unit

Contents

Introduction	3
1. Blood donor surveillance	4
2. Transfusion-transmitted infections	9
3. Bacterial screening of platelets	11
4. Tissue and cord blood donor surveillance	13
5. Solid organ donor surveillance	15
6. Risk estimates – blood donors	16
7. Emerging infections	18

Introduction

The aim of the NHS Blood and Transplant (NHSBT)/Public Health England (PHE) Epidemiology Unit is to monitor infections in blood, tissue and cell, and organ donors and recipients and to use this information to inform blood safety.

This document provides more detailed information on the data sources and methods used in each of the surveillance schemes run by the NHSBT/PHE Epidemiology Unit. It can be read in conjunction with the annual review.

The surveillance schemes can be modified to incorporate any changes to testing, such as the introduction of a new test, or when new data need to be gathered. These schemes are continually monitored to ensure high quality data are consistently collected.

Data is regularly published in a number of reports for different groups. The main reports include:

- monthly blood donation testing reports
- monthly emerging infections list
- monthly and quarterly bacterial screening of platelets report
- quarterly infected donors report for NHSBT clinical group
- transfusion transmitted infections chapter in the Serious Hazards of Transfusion (SHOT) annual report
- blood donor section for the Public Health England HBV annual report
- blood donor section for the Public Health England HCV annual report
- blood donor section for the Public Health England HIV annual testing report
- Hepatitis rates by region for the Public Health England workbooks
- annual residual risk estimates for Joint United Kingdom Blood Transfusion Services Professional Advisory Committee (JPAC)
- annual NHSBT/PHE review (all surveillance schemes)

The surveillance schemes are described on the Public Health England website:

<https://www.gov.uk/government/collections/bloodborne-infections-in-blood-and-tissue-donors-bibd-guidance-data-and-analysis>

Donated blood, tissues and cells are collected by the UK Blood Services from volunteer adults who do not acknowledge any medical condition, travel history or behaviour that is known to be associated with an increased risk of blood borne infections. The donor selection guidelines are available on the transfusion guidelines website:

www.transfusionsguidelines.org.uk/index.aspx?Publication=DSG&Section=67

Document last updated July 2019

1. Blood donor surveillance

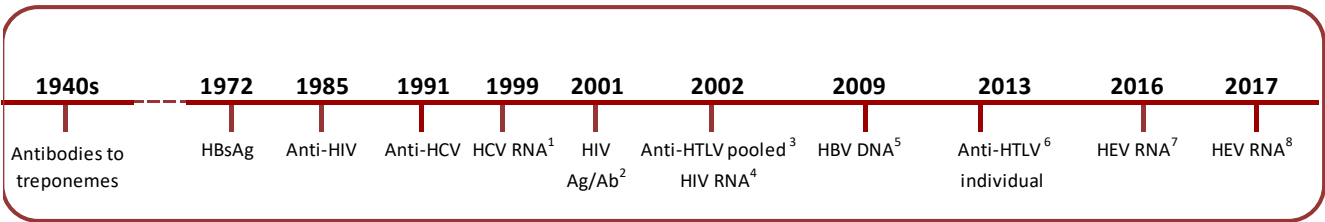
Blood donor data is collected by the NHSBT/PHE Epidemiology Unit through two parallel schemes: (i) blood donation testing and (ii) infected blood donors. Both of these surveillance schemes started in October 1995. The information is used to monitor donation testing reactive rates and infections detected in blood donors. Additional data providing more detailed information on the profile of all blood donors tested is also gathered.

(i) Blood donation testing

Background

Blood donations have been tested for infections since the 1940s when testing for markers of treponemes indicating syphilis (or other disease such as yaws or pinta that are also caused by *Treponema*) first began. Since then, testing for hepatitis B surface antigen (HBsAg), antibodies to HIV (anti-HIV), antibodies to hepatitis C virus (anti-HCV), HCV RNA, combined antigen-antibody for HIV (HIV Ag/Ab) and antibodies to human T-cell lymphotropic virus I/II (anti-HTLV) has been introduced. Although not mandatory, HIV RNA and HBV DNA testing have also been introduced (Figure A) as a by-product of duplex and subsequently triplex assays. In 2016, a proportion of blood and all apheresis donations were tested for HEV virus in pools of 24 to supply HEV-screened components for specific patient groups, and extended in 2017 to all blood donations. In 2017, NHSBT ceased to test for HTLV in leucodepleted repeat donations.

Figure A: Timeline of introduction of microbiological tests for blood donations, UK



1. HCV RNA testing was introduced on a pilot basis in 1999 and became a mandatory test carried out on all blood donations from 2002.
2. Northern Ireland and Republic of Ireland Blood Transfusion Services introduced combined Ab/Ag testing later.
3. HTLV testing was conducted in pools until 2013 when singleton testing was implemented. Republic of Ireland used singleton testing from 2002.
4. HIV RNA testing was introduced in Scotland and Northern Ireland in 2002 and some parts of England and Wales from November 2003, but did not become universal until 2007. HBV DNA testing began on 1 April 2009 in Filton as a by-product of the introduction of triplex NAT testing.
5. HBV DNA testing was subsequently introduced at Manchester on 10 August 2009 and Colindale on 3 December 2009, when all donations in England were HBV DNA tested. HBV DNA testing began on 27 April 2009 in the Republic of Ireland and 1 June 2009 in Wales. Scotland and Northern Ireland began HBV DNA testing on 22 March 2010.
6. Anti-HTLV testing switched from pooled to singleton testing for England in 2013, Scotland switched to singleton testing in 2015, Northern Ireland in 2016 and Wales switched in 2018.
7. HEV RNA screening commenced in spring 2016 on some blood and all apheresis donations to meet the requirements to supply HEV-screened components for specific patient groups.
8. HEV RNA screening introduced for all blood donations in 2017.

Table A: Tests performed on blood donations within the UK blood services in 2018 by country

2018 blood services tested for:	HBsAg	HBV DNA	Anti- HCV	HCV RNA	HEV RNA	Anti- HIV	HIV Ag	HIV RNA	Anti- HTLV	Anti- treponeme
England	✓	pools (24)	✓	pools (24)	pools (24)	✓	✓	pools (24)	New only	✓
Northern Ireland	✓	pools (24)	✓	pools (24)	pools (16)	✓	✓	pools (24)	✓	✓
Scotland	✓	pools (24)	✓	pools (24)	pools (16)	✓	✓	pools (24)	✓	✓
Wales	✓	pools (24)	✓	pools (24)	pools (16)	✓	✓	pools (24)	✓	✓
Republic of Ireland	✓	singleton	✓	singleton	singleton	✓	✓	singleton	✓	✓
Guernsey	✓	x	✓	x	x	✓	✓	x	✓	✓
Jersey*	✓	x	✓	x	x	✓	x	x	✓	✓
Isle of Man**	✓	x	✓	x	x	✓	x	x	✓	✓

* Jersey outsourced their donation testing in 2018 due to laboratory refurbishment.

** Isle of man screening includes HCV antigen testing

Additional testing

Other additional (discretionary) tests may be performed including the detection of antibodies to hepatitis B core antigen (anti-HBc), malaria (2002) and *Trypanosoma cruzi* (Chagas disease, 1998) and nucleic acid testing (NAT) for West Nile virus (WNV, 2012). These tests are only performed if information given by the donor suggests that they may have been at risk for these infections. For example, anti-HBc testing was previously performed for donations from donors reporting a recent piercing (eg acupuncture, ear or body piercing and/or tattooing), inoculation incident, flexible endoscopy or history of jaundice/HBV infection. At the end of November 2017, anti-HBc testing ceased for donors with recent endoscopy, piercing and complementary therapies (eg acupuncture). Malaria or *T. cruzi* testing is performed where the donor reports a relevant travel history, residency or past infection. Donations repeat reactive for malarial antibodies have been sent for confirmatory reference antibody testing since 30 August 2007. Donations confirmed antibody positive are tested for malarial DNA by PCR. In 2012, WNV NAT testing of donations from donors returning from WNV at risk areas was introduced and replaced the temporary deferral of these donors. Testing continues each year between 01 May and 30 November. Additional testing indications can be found in the donor selection guidelines on the transfusion guidelines website:

www.transfusionguidelines.org

Data collection

Aggregate data on the number of blood donations tested and the number of donations initially reactive is reported to the Epidemiology Unit donation testing scheme each month by the UK blood service's testing centres throughout the UK and the Republic of Ireland and via Scottish National Blood Transfusion Services (SNBTS) for Scottish blood centres. Disaggregate data on the number of donations repeat reactive with confirmatory testing results are also reported by centres outside England and by the NHSBT Microbiology Services surveillance team for centres in England.

The classification of **new and repeat donors** used in the Epidemiology Unit donation testing scheme is made by **testing centres**. This classification of donations tested by new and repeat donors is used in particular to estimate the frequency of infection and give an overview of the donations tested.

- | | |
|----------------|---|
| New donors: | First time donors who were not known to have ever donated blood in the UK. Note: New donors in the UK (excluding Scotland) and the Republic of Ireland may include 'lapsed' donors i.e. repeat donors who have not donated for more than two years. In Scotland, all lapsed donors are counted as repeat donors. |
| Repeat donors: | For most UK centres (excluding Scotland, who include lapsed donors) and the Republic of Ireland, donors known to have previously donated blood in the UK in the last two years were classified as repeat donors, although NOT all previous donations have necessarily been tested for all markers of infection (e.g. anti-HTLV testing was first introduced in 2002). |

Data on additional (discretionary) testing performed by NHSBT is reported on a monthly basis via the following sources:

1. An electronic report from PULSE (the NHSBT national donor database) of the monthly aggregate number of blood donations given an additional test by marker.
2. An electronic line listing of donations sent for anti-HBc testing along with screen results.
3. An electronic list of the repeat reactive and confirmed positive malaria and *T. cruzi* cases from Microbiology Services surveillance.
4. An electronic list of the reference results for samples sent for confirmatory anti-HBc testing from the National Transfusion Microbiology Reference Laboratory (NTMRL).
5. Characteristics of donors sent for confirmatory anti-HBc testing are collected via the infected donor scheme and from PULSE.

(ii) Infected blood donors

When a marker of infection is detected in a blood donation, the donor is offered a post-test discussion, which may be held in a blood centre or more commonly by telephone. The donor is informed of their positive test results and the clinician explains what these test results mean and ascertains a likely source or risk factor for the infection, if possible. The clinician also discusses any infection control measures, testing and treatment of contacts and advises the donor that they will no longer be able to donate blood. Where appropriate, the donor is referred to the appropriate services for specialist care. Clinicians in blood centres in the UK (excluding Scotland) and Republic of Ireland pass anonymised information about infected blood donors to the Epidemiology Unit infected blood donor surveillance scheme using a standard electronic proforma. This information includes the characteristics of the infected donors (date of birth, gender, first part of postcode), details of their donating history (if any, with details of their most recent previous donation) and any behaviour that could be associated with the donor's infection. Infected donors are classified by the Epidemiology Unit as newly tested and previously tested for the marker they are found positive for according to detailed information provided by blood centres about all/any previous donations in the UK. Data from Scotland is supplied on an annual basis.

The classification of ***infected donors as newly or previously tested*** is done by the **NHSBT/PHE Epidemiology Unit**:

Newly tested: A donor who has not been previously tested for the marker under consideration by the blood transfusion services included in this surveillance.

Previously tested: A donor who has been previously tested for the marker under consideration by the blood transfusion services included in this surveillance.

Note: this classification differs to that used in the donation testing scheme and donor profile data sources (described above) where the donations are classified according to whether the donor has (or has not) donated blood in the last THREE years.

The classification of a ***seroconverter*** is made by the **NHSBT/PHE Epidemiology Unit**: an infected repeat donor with either a previous negative donation within one year, or microbiological and/or clinical evidence of recent infection.

Surveillance data are being continually updated as new or additional information is received. Therefore, some changes between reports may be identified. For example, the seroconverter definition was changed from previously tested within three years to within one year from 2016 onwards.

Donor profile

Information about individuals donating blood at NHSBT centres (England and north Wales to 1 April 2016) is stored on PULSE, the NHSBT computerised donor information database. Since 1996, this information has been available to the Epidemiology Unit via two sources:

a) NHSBT testing centres

Between 1996 and 2000, the number of donations made each month by gender and age group (17-24, 25-34, 35-44, 45-54, 55 years and over) for new and repeat donors was reported to the Epidemiology Unit by seven of the 14 testing centres in England and north Wales. The breakdown from these centres was applied to the total number of donations tested by blood centres in the UK (excluding Scotland) and Republic of Ireland each year to derive the distribution of donations by gender and age group.

b) NHSBT Donor Insight

Between 2001 and 2006, aggregate information about individuals donating blood was available from NHSBT Donor Insight (the Market Research and Analysis Department). This information included the proportion of donations made by new and repeat donors by gender, age group (as above) and ethnic group (white British, white other, black Caribbean, black African, black other, Indian/Pakistani/Bangladeshi, Chinese, Asian other, mixed, other and not known). This proportion was applied to the total number of donations tested by blood centres in the UK (excluding Scotland) and Republic of Ireland each year to derive the distribution of donations by gender, age and ethnic group. The data from Market Research and Analysis between 2001 and 2006 were based on a random sample of approximately 1.5 million donation records stored on PULSE.

For 2007-2009, data extracts were received for the month of September. These extracts were a complete dataset of every donor who made a donation during that month at NHSBT. Data included gender, age, donation date, date of most recent previous donation, ethnicity, postcode and new/repeat status. Region was identified using the donor postcode and mapped to strategic health authority regions, to provide more detailed geographical information.

For 2010 onwards, a PULSE extract of all individuals donating during the full year was made available to the NHSBT/PHE Epidemiology Unit. These data were used to determine a gender, age and ethnicity profile of all blood donors. As all blood donors are included these data are able to reflect accurately the characteristics of new and repeat blood donors.

For both (a) and (b), individuals were classified as new donors if they had donated blood for the first time ever or if more than two years had elapsed since their last donation.

2. Transfusion-transmitted infections

Blood centres in England, Wales and Northern Ireland report investigations of suspected transfusion-transmitted infections (TTIs) to the NHSBT/PHE Epidemiology Unit. For each report, information on the recipient, the recipient's infection, the implicated transfusion and findings of the investigation are provided using a detailed proforma. Blood centres in Scotland report all incidents to the Microbiology Reference Unit of the SNBTS, and the details and conclusion of each case are passed to the surveillance system annually. NHSBT/PHE Epidemiology Unit data are reconciled with the Serious Hazards of Transfusion (SHOT) and all blood service investigations with outcomes are included in the TTI chapter in the SHOT annual report.

Definition of a transfusion-transmitted Infection

A report of an infection suspected to be due to transfusion was classified as a transfusion-transmitted infection if the following criteria were met at the end of the investigation:

- the recipient had evidence of infection following transfusion of blood components, and there was no evidence of infection prior to transfusion and no evidence of an alternative source of infection and, either:
 - at least one component received by the infected recipient was donated by a donor who had evidence of the same transmissible infection
- or
- at least one component received by the infected recipient was shown to have been contaminated with the agent of infection

Criteria for reporting in the SHOT annual report

Inclusion criteria:

An incident should be reported if receipt of the transfusion is confirmed, and either:

- a) The infection in the recipient had been confirmed by detection of antibody, antigen, RNA/DNA or culture as appropriate and there was no evidence that the recipient was infected prior to transfusion

or

- b) The recipient had acute clinical hepatitis of no known cause (including no evidence of acute hepatitis A virus (HAV), HBV, HCV, HEV, Epstein-Barr virus or CMV infection in post-transfusion samples to date).

Exclusion criteria:

An incident should NOT be reported if:

- a) The incident involved HCV, HIV or HTLV in recipients who had received transfusions in the UK prior to routine testing (September 1991 for anti-HCV, October 1985 for anti-HIV, August 2002 for anti-HTLV)¹.
- b) The incident involved HTLV in a recipient identified through the HTLV National Lookback².
- c) The incident involved a transfusion outside UK.
- d) The incident was identified as part of the HEV study³.

1. The blood services are rarely able to conduct follow-up investigation of all untested donors implicated in post-transfusion HCV or HIV incidents, and these cases do not contribute to knowledge of the current infection transmission risks of blood transfusions.

2. Any post-transfusion HTLV infections identified through the HTLV National Lookback are excluded but will be collated, analysed and published elsewhere, as was done previously with HCV 'lookback'.

3. HEV study in NHSBT published in *The Lancet* by Hewitt *et al.* (2014).

Data is published annually in the SHOT report, the PHE's Health Protection Report and in the NHSBT/PHE Epidemiology Unit annual review. The SHOT reports can be found on their website:

<https://www.shotuk.org/shot-reports/>

3. Bacterial screening of platelets

Platelets may be manufactured as pooled platelets from whole blood donors (a platelet pool from four donors) or as apheresis platelets where between one and three apheresis platelet packs may be manufactured from one component donor.

Testing of apheresis platelets by NHSBT began in February 2011 and testing of pooled platelets in June 2011. NHSBT was the last of the UK blood services to introduce bacterial screening of platelets. Bacterial screening was already in place in the other UK blood services. The BacT/ALERT culture system is used for bacterial screening across all four services but with slightly different sampling methods (see Table A). A surveillance system was put in place within NHSBT in 2011 to report the number of confirmed and indeterminate reactions each month and bacterial species on a quarterly basis.

NHSBT introduced the use of Platelet Additive Solution (PAS) for pooled platelets in 2015; by the end of June 2015 all pooled platelets were manufactured in PAS.

NHSBT produces and screens the largest number of platelets of the four services. Platelets are held for a minimum of 36 hours post-donation before being sampled. An 8ml sample is inoculated into an aerobic and an anaerobic bottle and placed on the BacT/ALERT system. If samples are negative after a minimum six-hour incubation, the associated platelet donation can be released as negative-to-date. Platelets are released to stock with a seven-day shelf life since time of donation; prior to the introduction of bacterial screening platelets had a five-day shelf life. Table A shows the sampling volumes and incubation conditions used for the four UK blood services

Table A: Bacterial screening methods used by the UK blood services

	Time of sampling* (hr)	Volume sampled (ml)	Apheresis sample	Time at release (hr)	Length of screening
NHSBT	36	2 x 8	<i>Post-split</i>	6	Day 7
NIBTS	36	2 x 8	Pre-split	6	Day 9
SNBTS	36	2 x 8	Pre-split	6	Day 7
WBS*	36	2 x 8	Post-split	12	Day 7

* Screening methods in Wales changed mid-2018 from testing on day 1 and day 4 to testing on day 2 only
 NHSBT = NHS Blood and Transplant, NIBTS = Northern Ireland Blood Transfusion Service, SNBTS = Scottish National Blood Transfusion Service, WBS = Welsh Blood Service

BacT/ALERT uses a colourimetric system that detects change in pH. A decrease in pH results in an initial reactive report. In some cases, units will have already been transfused. All associated units will be recalled and the BacT/ALERT bottle and any associated packs will be re-tested and a final result released. Platelet donations are reported as confirmed positive if both the initial screen bottle and the index and/or at

least one associated pack is positive and the same organism is identified in both. An indeterminate positive result is reported if bacteria are detected in only the initial screen bottle plus no index/associated packs are received or no index packs are received and there's no growth in any associated pack. For indeterminate negative packs, there is no growth from the initial reactive bottle but a negative result cannot be confirmed because the index pack is not available. Units are confirmed negative if no organism is isolated from the initial reactive bottle and the index pack.

Bacteria isolated from the pack and the bottle are identified to the species level and an assessment will be made of any significance to the donor's health. If a unit has been transfused the transfusion laboratory is notified and asked about any reaction in the recipient.

4. Tissue and cord blood donor surveillance

The NHSBT / PHE Epidemiology Unit tissue and cell donor scheme collects information on tissue and cord blood donations tested by NHSBT, SNBTS and Northern Ireland Blood Transfusion Service (NIBTS). Tissue donors include deceased and living donors who gave surgical bone. Corneas are donated by deceased donors, some of whom have also donated other tissues; those tested by NHSBT have been included in this scheme since 2012. Since 2013, deceased donors have been reported according to their type of donation i.e. those who gave only corneas, those who gave multi-tissue donation including corneas and those who gave multi-tissue excluding corneas.

(i) Donations tested by NHSBT

Data collection

Testing for the following mandatory markers of infection is carried out: on antibodies to HIV, HCV, HTLV and treponema; HBsAg and anti-HBc; HBV, HCV and HIV nucleic acid testing (NAT; singletons, triplex). Although not mandatory, blood donations are also tested for HEV RNA. Disaggregate data on the number of donations tested for mandatory markers of infection, as well as data on additional testing for malaria and *T. cruzi*, are extracted from PULSE (the NHSBT national donor database) on an annual basis. Donations are classified according to donor type (cord blood, living surgical bone or deceased donors [the latter including cornea donors]). The information extracted includes product/component type donated (ie femoral head, left knee etc.) and gender and date of birth of the donors. Ethnicity of these donors is not currently recorded on PULSE and is therefore not available. In 2012 for the first time, the same data for cornea donors managed and tested by NHSBT were included in this scheme. Some data for stem cell and amnion donors are available but information is limited, thus these donors are not fully integrated into the surveillance scheme and are not reported upon.

Changes to testing

There have been a number of changes to tissue and cord blood donor testing within NHSBT since surveillance began in 2001. HCV, HIV, HBV and HEV NAT (on single samples NOT pools) have been introduced for different donor types at different times:

- *Cord Blood Donors*: HIV NAT and HCV NAT introduced in November 2003. HBV NAT since April 2009. HEV NAT since October 2017.
- *Deceased Donors*: HIV NAT and HCV NAT since 2001. HBV NAT since September 2008. HEV NAT since October 2017.
- *Surgical Bone Donors*: Triplex HBV/HCV/HIV NAT since September 2008 (Note: A small number of surgical bone donors require two serology samples [initial and 6-month] where there is insufficient sample for NAT. Any follow-up samples are excluded from the count of number of donors tested, as they do not represent new donors). HEV NAT since October 2017.

Anti-HBc testing has been mandatory for all tissue and cord blood donors since 2006 under EU Commission Directive 2006/17/EC.

Infected donors

Follow-up/risk exposure information is received for living surgical bone donors and, where possible, cord blood donors whose donations had markers of infection. As for blood donors, these donors are contacted and asked to telephone the blood centre to discuss their results. The post-test discussion commonly takes place over the telephone and, as for infected blood donors, a behaviour history is sought. For infections detected among deceased donors, an assessment is made to see if any family member or other individual is likely to be at risk before the donor's family is contacted. Risk exposures are not requested for deceased donors. These data are reported to the infected donor surveillance scheme by NHSBT clinicians using standard proformas.

(ii) Donations tested by NIBTS

Aggregate data on the number of surgical bone and cord blood *samples* (not donors) tested for HBV, HCV, HEV, HIV, HTLV and treponema are received electronically from NIBTS on an annual basis. Follow-up six-month samples for surgical bone donors are included and so the number of individual donors tested cannot be identified. However, this is estimated at approximately 60% of all samples tested (Mark Clarke, personal communication). Follow-up/risk exposure information is received for infected surgical bone and cord blood donors identified by NIBTS.

5. Solid organ donor surveillance

Data collection

Organ donor data are derived from the UK Transplant Registry (UKTR), and provided by NHSBT Organ Donation and Transplantation (ODT), and includes donor characteristics, cause of death, reactive test results, and a description of organs donated and organs transplanted. This information is collected by the NHSBT and hospital staff and submitted to the UKTR either by paper or electronic form.

Further information on the data collection, as well as a wider overview of NHSBT donation activity is available in ODT's Annual Activity Report:

<http://www.odt.nhs.uk/uk-transplant-registry/annual-activity-report/>

6. Risk estimates – blood donors

The estimated risk that a donation entering the UK blood supply is potentially infectious, but not detected on screening because the donation is made during the infectious 'window period', is calculated annually for a rolling three-year period. This statistical process combines information about tests in use by the UK blood services, the infection itself, and data on characteristics of blood donors and donations to produce a point estimate for each infection. An infectious donation may not be detected if a blood donation is made during the infectious 'window period'. This is the period early in the course of infection when the tests in use will not detect the marker of infection. It is also possible that a false negative test result may arise because of issues relating to assay sensitivity other than window period or a blood donation may be erroneously issued as negative due to sampling/processing/issuing error. The contribution of these latter two elements is thought to be extremely small and is no longer estimated because of uncertainty around these values.

The model combines data collected in a number of the surveillance schemes. The data required includes:

- number of donations tested (from new and repeat donors), taken from monthly donation testing surveillance.
- number of infections detected, by marker (for new and repeat donors), from infected donor surveillance.
- number of seroconverting donors - from infected donor surveillance. A seroconverter is defined as an infected repeat donor with either a previous negative donation within one year, or microbiological and/or clinical evidence of recent infection.
- inter-donation interval (IDI) for all donors, taken from NHSBT Donor Insight department data.

Parameters used in the model include:

- window period: from expert opinion and literature.
- blood donor and donation characteristics: infected donors, NHSBT's Donor Insight department data.

The window period risk is calculated as the incidence multiplied by the length of the window period and multiplied by one million. This gives an estimate of the number of potentially infectious donations in one million donations entering the blood supply. Incidence in repeat donors is calculated as the number of observed seroconversions divided by the number of person years exposed, which is estimated from the number of donations from repeat donors multiplied by the average inter-donation interval (IDI) in years. The IDI is created by calculating the difference in days between each donation and the most recent previous donation by the same donor. The average of all these differences is then taken. New donors who returned within the year to donate were

excluded, as were donations with IDIs greater than 730 days (two years). Incidence in new donors is derived by adjusting the repeat donor incidence by the relative difference in acute/recent infections among the two groups.

Each year, 95% confidence intervals for the point estimates are calculated by a simulation approach. The same calculation of risk was repeated 1,000 times each time using a different set of parameter values. Assumed sampling distributions were intended to reflect the degree of uncertainty in incidence; in average window period length and all other uncertainties in the calculation of the risk of a window period donation. From the resulting 1,000 different estimates of risk, we then selected the 2.5 percentile and the 97.5 percentile as the lower and upper limits of a 95% confidence interval.

Parameters and estimates are reviewed annually by the NHSBT/PHE Epidemiology Unit. They are then approved annually by the UKBTS/PHE Joint Professional Advisory Committee (JPAC) Standing Advisory Committee on Transfusion Transmitted Infection (SACTTI).

7. Emerging infections

The Emerging Infections Report (EIR) produced by the NHSBT/PHE Epidemiology Unit is distributed monthly. A range of sources are checked for relevant infection issues relating to patient safety and/or blood and tissue availability in the UK and collated into a monthly listing. Sources include outbreak alerts, various regular outbreak surveillance reports, journals, websites and online news resources, listed in more detail below.

The EIR is sent to the Chair of the UK Standing Advisory Committee on Transfusion Transmitted Infection (SACTTI). The chair of SACTTI also receives early warning communications or other reports deemed urgent as they arise.

These monthly listings, alongside other sources of information are reviewed by SACTTI and may lead to further risk assessment and changes to the donor selection guidelines, or other blood safety measures, where necessary. Sources of information for the EIR include:

Outbreak alerts and reports

ProMED

www.promedmail.org

National Travel Health Network and Centre (NaTHNaC) travel health updates

<http://travelhealthpro.org.uk/>

The Infectious Disease Surveillance and Monitoring System for Animal and Human Health: Summary of notable events/incidents of public health significance

<https://www.gov.uk/government/publications/emerging-infections-monthly-summaries>

Monthly summary of new or emerging infectious disease events that could affect UK public health; published monthly by PHE, on behalf of the Human Animal Infections and Risk Surveillance group.

ECDC Weekly Communicable Disease Threats Report (CDTR)

<https://ecdc.europa.eu/en>

A weekly bulletin summarising information gathered through epidemic intelligence by ECDC regarding communicable disease threats of concern to the European Union. It also provides updates on the global situation and changes in the epidemiology of communicable diseases with potential to affect Europe including diseases under elimination.

Health Protection Report (HPR)

www.gov.uk/government/collections/health-protection-report-latest-infection-reports

Published weekly, routine data and commentary reporting on infectious diseases.

Health Protection Scotland eWeekly Report

<http://www.hps.scot.nhs.uk/ewr>

Published weekly, it is the national health protection bulletin for Scotland and contains current news and articles as well as surveillance reports.

Morbidity and Mortality Weekly Report (MMWR)

www.cdc.gov/mmwr

A weekly report prepared by the Centers for Disease Control and Prevention (CDC).

Saved PubMed search

Set to run monthly for transfusion transmitted infections, blood donors and infection and selected organisms such as hepatitis E.

Journal tables of contents checked include:

- American Journal of Transplantation <https://onlinelibrary.wiley.com/toc/16006143>
- Clinical Infectious Diseases, <https://academic.oup.com/cid>
- Emerging Infectious Diseases, <http://wwwnc.cdc.gov/eid>
- Epidemiology and Infection, www.cambridge.org/core/journals/epidemiology-and-infection
- Eurosurveillance, www.eurosurveillance.org
- Journal of Infectious Disease <https://academic.oup.com/jid>
- PLOS Pathogens, www.plospathogens.org
- PLOS Neglected Tropical Diseases, www.plosntds.org
- Transfusion, [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1537-2995](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1537-2995)
- Transfusion medicine, <https://onlinelibrary.wiley.com/toc/13653148/current>
- Vox Sanguinis, [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1423-0410](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1423-0410)

Monthly scan of websites includes:

- NaTHNaC, www.nathnac.org
- ECDC, www.ecdc.europa.eu

Online news resources

- American Association of Blood Banks (AABB) emails, www.aabb.org

Further information is sought from the PHE Tuberculosis, Acute Respiratory, Gastrointestinal, Emerging /Zoonotic Infections, and Travel and Migrant Health Division (TARGET) where necessary.