UK Health Security Agency

NHS Blood and Transplant

Safe Supplies 2024:
Collaborating for Safety

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Executive summary, UK 2024

I'm delighted to introduce 'Safe Supplies 2024: Collaborating for Safety', the latest annual review from the joint NHS Blood and Transplant (NHSBT) and UK Health Security Agency (UKHSA) Epidemiology Unit.

Collaboration is central to the Unit's work with UK blood services, public health, government, academia, and the wider NHS. This year's review highlights how these partnerships helped deliver important epidemiological evidence to guide blood safety policy and respond to emerging threats throughout 2024.

May 2024 saw the publication of the long-awaited Infected Blood Inquiry report by Sir Brian Langstaff, examining the tragic events of the 1970s and 80s when thousands of transfusion recipients and people receiving plasma products were infected with hepatitis C and HIV. The report made 12 specific recommendations. Some of the specific issues raised include lack of speed in introducing changes to donor selection and donation testing and time taken to acknowledge the harm that HIV and 'nonA-nonB' hepatitis (hepatitis C) could cause. The blood services were criticised for the time it took to introduce new tests, improve donor information and eventually begin lookback investigations. In part this was due to the way that the service was organised at the time including how policy decisions were made but it was also noted that decisions were delayed in pursuit of more information or a better test. The report acknowledged that blood safety is much improved, with robust governance, surveillance and haemovigilance systems in place to monitor effectiveness but continued vigilance to new and emerging threats remains essential. Since 1996, the Unit has supported UK blood services in monitoring transfusion-transmitted infections (TTIs), working closely with SHOT (Serious Hazards of Transfusion).

Data from 2024 show blood safety was maintained with relatively few donors identified with markers of infection, and no evidence of transfusion transmissions.

Of the 1.8 million UK blood and apheresis donations, 287 (1 in 3,359 donors) were confirmed positive for chronic or acute hepatitis B, hepatitis C, HIV, Human T-cell Lymphotropic virus (HTLV) or syphilis and removed from the blood supply – a similar level to 2023 and confirms donor selection is working well. In England, 11 lookback investigations were initiated after new infections were identified in regular donors; while no transmissions were identified, three investigations remain ongoing. We thank NHS colleagues in transfusion laboratories and clinical teams looking after these recipients for their support in these often-extensive investigations. The introduction of hepatitis B core antibody (anti-HBc) screening in the UK led to the withdrawal of 1,875 donors in 2024 due to past exposure to hepatitis B, including 3 with occult Hepatitis B Virus (HBV) [DNA detected]. While this has enhanced safety, it has disproportionately impacted Black and Asian heritage donors.

Since the 2020 For the Assessment of Individualised Risk (FAIR) policy review, the Unit has worked closely with the University of Nottingham, continuing collaboration in 2024 through a large-scale survey exploring current blood donors' views and experiences of the FAIR policy which allowed more gay, bisexual, and other men who have sex with men (GBMSM) to donate blood. Analysis of responses from 23,861 (16%) donors has shown that most were eligible under the FAIR policy, and donations were made by LGBTQ+ (lesbian, gay, bisexual, transgender, queer/questioning, intersex, asexual, and more) donors, by transmen, transwomen and non-binary donors.

Aggregate blood donor surveillance data on HIV, acute and chronic HBV, hepatitis C virus (HCV) and syphilis are shared with UKHSA as a sentinel population to complete the national surveillance picture.

The Unit also collaborates closely with UKHSA to provide infection horizon scanning for the UK blood services to risk assess in a monthly Emerging Infection Report.

In collaboration with Imperial College London, we continue to recruit to and manage the HTLV National Register – a one-of-its-kind European study. Recruitment began after the introduction of blood donation screening in 2002 and identifies people without symptoms for long-term follow-up to support wider public health research.

The Unit also carry out surveillance of infection markers in other donor groups, including organ donors and markers of infection in living and deceased tissue donors and cord blood donors. This year we've provided an update on markers of infection in these donors.

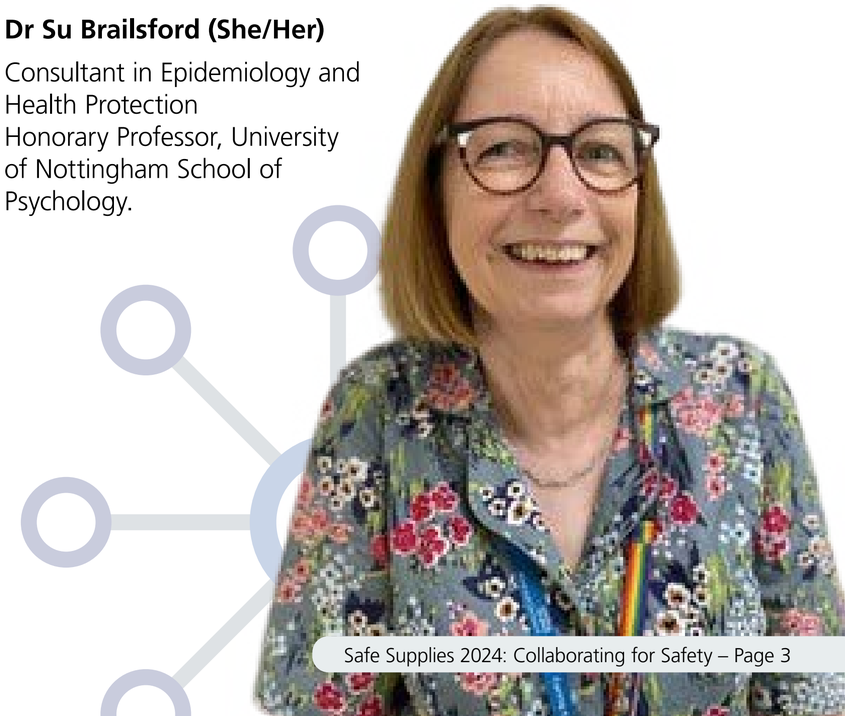
More information from the wider programme of work is available at Epidemiology – Hospitals and Science – NHSBT

As always, we are grateful to the thousands of donors and donor families who make transfusion and transplantation possible and help to save and improve more lives every year.

I hope you will find this year's report interesting and please do not hesitate to contact us (epidemiology@nhsbt.nhs.uk) if you require further information.

Dr Su Brailsford (She/Her)

Consultant in Epidemiology and Health Protection
Honorary Professor, University of Nottingham School of Psychology.



Collaborating for safety since 1995

Since 1995, **The joint NHSBT/UKHSA Epidemiology Unit** has worked in **collaboration** with the UK and Republic of Ireland blood services, UK Health Security Agency, wider NHS, academia and other external partners to **protect** recipients from transfusion-transmitted infections and help ensure donors are **respected** at every stage of their journey.

The Unit are responsible for collating and reporting national epidemiological data on blood-borne infections among donors and recipients, modelling the associated risk of non-detection through transfusion and horizon scanning for new and emerging infection threats. Along with behavioural studies and other research, the Unit have supported policy change across the UK for both blood donation and wider public health. Collaboration with public health enhances awareness of emerging infections and changes affecting donor and blood safety.

The Unit is made up of epidemiologists, public health specialists and a data manager working at both NHSBT and UKHSA.

Blood safety in the UK, 2024

Thanks to every step of the donation journey UK blood safety has been maintained in 2024

But we need to stay vigilant and help *every* donor give blood when *eligible*

Horizon scanning

Horizon scanning continued to inform changes to travel deferrals.

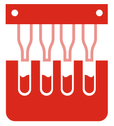
But **spread** of arboviruses requires **ongoing vigilance** and increases **complexity** and **cost**.

Donor selection

99.7% of surveyed negative donors reported donating while eligible to FAIR.

But **25%** of donors confirmed with markers of infection were ineligible: **54** had a history of syphilis, **6** had anal sex with new or multiple partners in the last 3 months and **3** were taking HIV prevention medication.

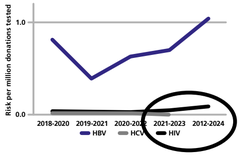
Testing and processing



Just 287 out of nearly 1 million donors gave a donation confirmed positive for markers of acute, chronic or occult hepatitis B, hepatitis C, HIV, HTLV or syphilis, and removed from the supply.

But **6** donors were detected with **recent HIV** including **1 early HIV** detected only on NAT with negative serology.

Close monitoring



Around 1 in 1 million chance that donation screening might not detect a very early HBV, HCV or HIV.

But the small chance of **not detecting** a donation from a donor with **very early HIV** has increased from 0.05 in 1 million to 0.1 in 1 million, or **1 in up to 6 years**.

Haemovigilance

Zero transfusion-transmitted infections identified after **136 investigations** requested by hospitals and **11 lookbacks** in England on repeat donors with markers of infection.

But hospital **engagement** and **collaboration** are key to ensure those affected are **promptly identified, tested** and **referred** for appropriate **care**.

Ongoing collaboration is **key** to supporting the UK blood services to monitor and maintain blood safety.

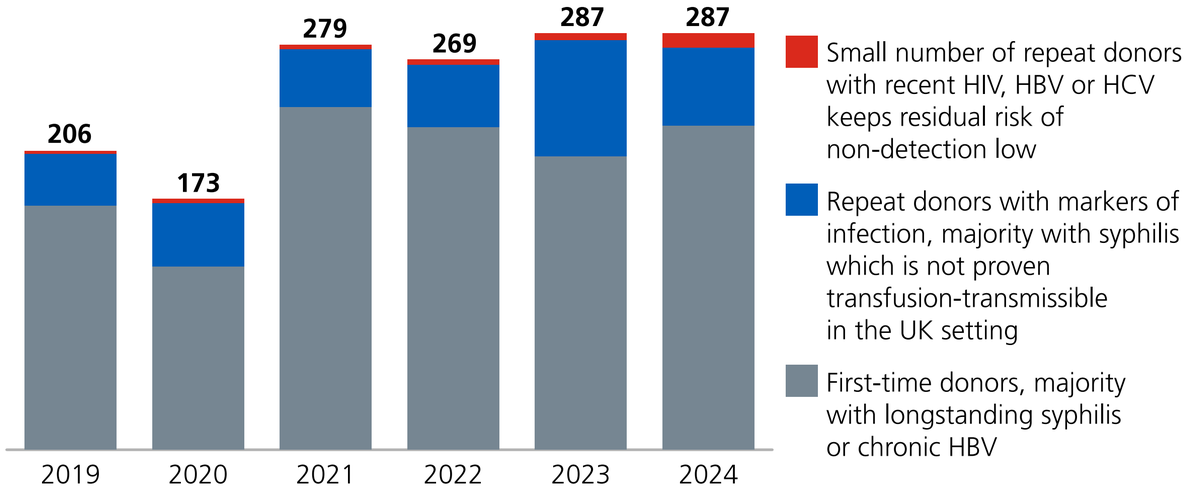
Blood donors with markers of infection, UK 2024

Donor selection helped keep the number of UK blood donors with markers of infection low in 2024.

1.8 million blood donations were made by **964,000** UK blood donors, selected to be at low risk of blood-borne infection.

Just **287** gave a donation which was confirmed positive for either chronic, occult or acute hepatitis B, hepatitis C, HIV, HTLV or syphilis and removed from the supply. Only **10** repeat donors had markers of recent infection.

Figure 1: Blood donors with donations confirmed positive for markers of chronic HBV, occult HBV, acute HBV, HCV, HIV, HTLV and syphilis, UK 2019 to 2024.



Donor selection helped keep the number of UK blood donors with markers of infection low in 2024, at the same level as 2023

There were 287 donors with a donation confirmed positive for markers of acute HBV (4), chronic HBV (59), occult HBV (6), HCV (21), HIV (10), HTLV (8) or syphilis (181) including 1 donor with occult HBV/syphilis and 1 donor with HIV/syphilis. Their donations were removed from the supply and the donors referred for follow-up care. This is approximately 1 in 3,359 whole blood donors, or 16.3 per 100,000 donations tested (whole blood and apheresis donations) (Figure 1). Rates are higher in donations from first-time donors who have not been screened by the blood services before: 147.2 per 100,000 first-time donations and 3.9 per 100,000 repeat donations in 2024.

The increase in seroconverters is being closely monitored

In 2024, 10 donors seroconverted within 12 months of a negative donation: 6 with HIV and 4 with acute HBV. This was an increase from 2023 when 5 repeat donors seroconverted within 12 months: 2 with HIV and 3 with acute HBV. In 2024, 8 out of 10 seroconverting donors were White, age range 31 to 53 years including 6 male donors, 4 reporting sex between men. Of the 6 donors who seroconverted for HIV in 2024, there were 3 men and 3 women. Two reported sex between men; 1 was ineligible, having not reported anal sex and both male and female partners in the last 3 months the other was eligible, but their partner was using HIV prevention medication (PrEP). Four reported sex between men and women including 1 woman with very recently acquired HIV, identified by Nucleic Acid Testing (NAT) alone, who did not report information that may have made them ineligible. The small increase in HIV in repeat donors may reflect that HIV testing in heterosexuals in the general population has not recovered after the COVID-19 pandemic.

UK blood services need to support every donor to give blood when eligible

25% (73/287) of donors with markers of infection including 20 repeat donors were ineligible to donate due to: history of infection (60), sexual behaviour (4) or both (2), HIV prevention medication with (1) and without history of syphilis treatment (2), injecting non-prescribed drugs (1) or a medical history (3) they should have reported before donating. This is an increase from 16% (32/206) in 2019, due to an increase in the number donating with treated syphilis. We are collaborating with the University of Nottingham on the PROMPT study to understand what might help donors disclose information before donating.

Demographics of blood donors with markers of infection, UK 2024

Figure 2: Whole blood donors with donations confirmed positive (for markers of chronic, occult, acute HBV, HCV, HIV, HTLV, syphilis) vs whole blood donors by donor type.

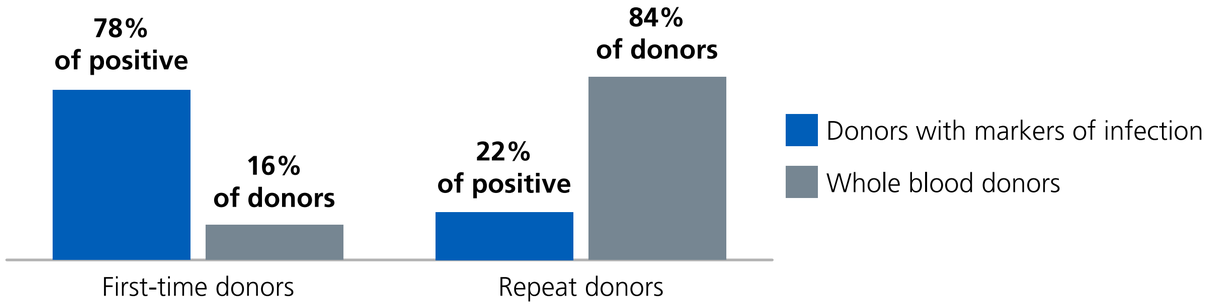


Figure 3: Whole blood donors with donations confirmed positive (for markers of chronic, occult, acute HBV, HCV, HIV, HTLV, syphilis) vs whole blood donors by gender.

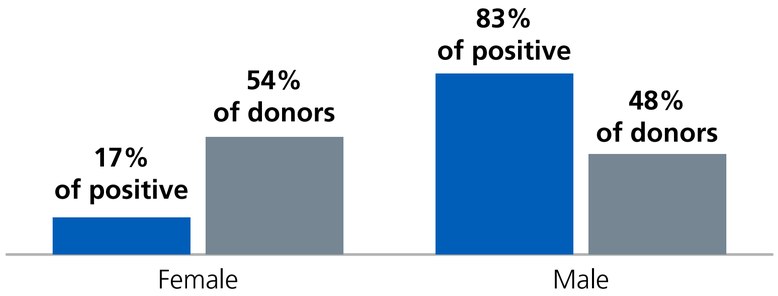
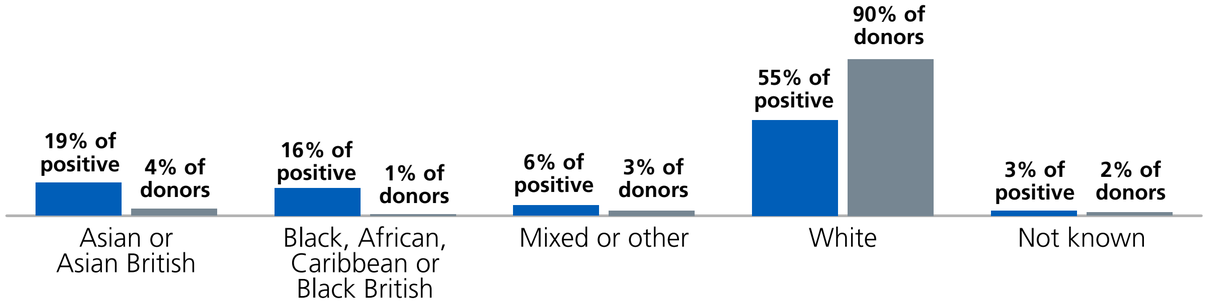


Figure 4: Whole blood donors with donations confirmed positive (for markers of chronic, occult, acute HBV, HCV, HIV, HTLV, syphilis) vs whole blood donors by ethnic group.



Most donors with markers of infection were first-time donors, male and donors of White ethnicity, with longstanding or past infection

Of the 287 blood donors with markers of infection, 78% were first-time donors, 83% were male donors, and 55% identified as White ethnicity. In contrast to the donors with markers of infection, the whole blood donor population was predominantly comprised of repeat donors (84%), female donors (54%), and 90% identified as White ethnicity (Figures 2 to 4).

Among 223 first-time donors, most infections were longstanding or past; 75% had either past syphilis (109) or chronic HBV (59), likely acquired in their country of birth. In contrast, among 64 repeat donors, again, the majority of infection markers were for syphilis, but two thirds showed evidence of recent infections within 12 months typically sexually acquired (30 syphilis, 4 HBV, 6 HIV including 1 female donor with early HIV picked up on NAT screen). HCV seroconversions in repeat donors are now very rare; the most recent was identified in 2020.

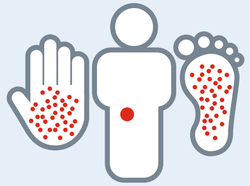
Among male donors with markers of infection, 67% had markers of syphilis vs 46% in female donors. Male donors outweighed female donors for all infection markers, particularly for syphilis, hepatitis B and HIV, while females comprised 63% of donors with HTLV markers.

Among White donors with markers of infection, 83% had markers of syphilis but only 57% in donors of Asian heritage and 22% in donors of Black heritage. Hepatitis B was the main marker seen in donors of Asian heritage (35%) and donors of Black heritage (67%).

The number of donors with markers of infection are influenced by several factors

Factors include epidemiology of infection in the UK and blood-borne infections that donors may be exposed to, donor selection and changes to the donor population and the screening assays used. Since 2021, syphilis-positive donations among first-time donors have risen, likely reflecting increased community transmission and the FAIR policy allowing more GBMSM to donate. Recruitment of Black and Asian heritage donors who are more likely to be affected by chronic hepatitis B also contributes to case numbers. In 2023 a more sensitive screening assay was introduced for syphilis which detected low levels of syphilis antibody in past or treated cases.

Blood donors with markers of infection, UK 2024, cont



Syphilis is one of the most detected markers in donors but is not a transfusion risk in the UK.

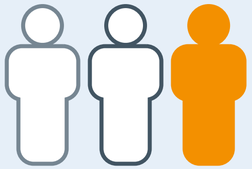
Testing is an **additional safety measure** to identify donors who may be at increased risk of HIV.

Donors with a **history of syphilis** are not eligible to donate.

Hepatitis B core antibody screening aims to reduce chance of **occult HBV transmission**.

In 2024, this led to the deferral of 1,875 donors with past exposure to HBV, 3 of whom had markers of occult HBV.

Black and Asian heritage donors were disproportionally affected by the deferral.



Additional **testing for travel** associated infections averted up to 6% loss of donations, in the UK in 2024.

Syphilis is not thought to be a risk to transfusion recipients in the UK setting but testing helps give assurance of lower risk in donors

Syphilis screening remains an additional safety step as part of the FAIR policy due to evidence in higher risk GBMSM of increased chance of HIV after a bacterial sexually transmitted infection like syphilis[1,2]. Since syphilis is sexually acquired and one of the most common markers of infection in donors, it helps us monitor donor eligibility to sexual behaviour criteria. Donors are also referred for onward care and treatment to avoid serious consequences of tertiary syphilis. Donors with a history of treated syphilis are asked not to donate since antibodies may be remain for years which means the donation cannot be used.

Hepatitis B core antibody screening in the UK led to deferral of 1,875 donors with past exposure to hepatitis B in 2024

In 2024, hepatitis B core antibody screening identified 3 donors with occult HBV while HBV NAT screening identified a further 3 donors with occult HBV. There were 1,875 donors deferred for having hepatitis B core antibody without detectable HBV DNA, a marker of past exposure including 1,366 with antibody to hepatitis B surface antigen (anti-HBs) over 100 mIU/ml. Hepatitis B core antibody testing for every donor at least once, was introduced in 2022 to mitigate the risk of non-detection of occult hepatitis B.

This has improved safety and reduced risk of HBV transmission through blood transfusion but has disproportionately impacted Black and Asian heritage donors as since screening introduced, 26% of deferred donors were of Asian heritage and 19% were of Black heritage.

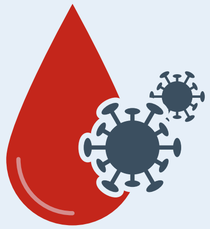
Additional testing for travel prevented the loss of up to 6% of donations in the UK in 2024

In 2024, 65,215 UK donations were tested for West Nile virus (WNV) with 1 showing non-specific reactivity and the rest available for release subject to other tests. Additional testing for Chagas disease was performed for 2,583 donations with 2 showing non-specific reactivity. Additional testing for malaria antibodies was performed for 44,502 donations with 985 confirmed antibody positive indicating past exposure while a further 4 donors in England were also PCR positive and referred for care. This approximates to 6% of donations released due to these additional tests in 2024 although this does not take into account any overlap in testing for the same donation. Work is underway in collaboration with University of Nottingham to understand donor travel patterns impacting on deferrals and how well donors recall their travel history.

1 Flannagan J, Davison KL, Reynolds C, Brailsford SR. Determining the strength of evidence for an association between sexual indicators and risk of acquiring HIV and sexually transmitted infections: Providing evidence for blood donation policy change. Transfus Med.2024 Dec;34(6):466-477.

2 Ratna N, Harrison C, Kolawole T, Bell E, Ogaz D, Brown A, Saunders J, Djuretic T, Mohammed H. Annual HIV incidence among gay, bisexual and other men who have sex with men in England, 2014 to 2023: A prospective cohort analysis using national surveillance data. medRxiv 2025.07.02.25330732; doi: https://doi.org/10.1

Risk of non-detection of HBV, HCV and HIV, UK 2024

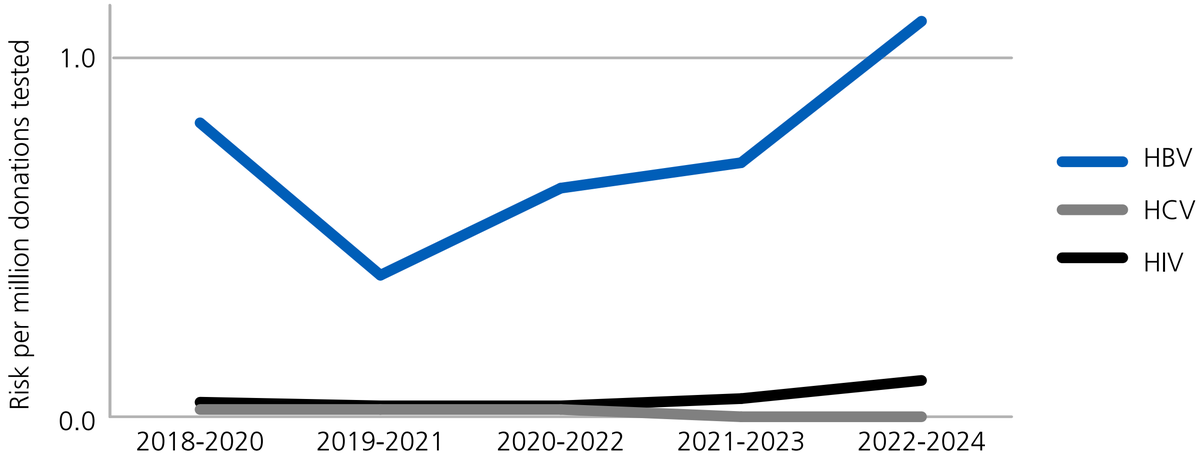


Few HBV, HCV and HIV seroconverters combined with sensitive screening maintains the very **low chance of non-detection**.

In 2022-2024 this was estimated to be around **1 in 1 million donations screened**, highest for HBV.

Non-detected cases are estimated at **~2 HBV per year, 1 HIV every 6 years, and 1 HCV every 59 years**.

Figure 5: Residual risk of non-detection of HBV, HCV and HIV.



The low number of HBV, HCV and HIV seroconverters detected in repeat donors each year maintains the very low chance of non-detection

This is estimated for the UK as the residual risk a potentially infectious donation is made in the window period of the screening tests in use. The estimates for HBV are for acute infections only and do not consider risk due to occult HBV. Hepatitis B core antibody (anti-HBc) screening for blood donations was rolled out across the UK in 2022 to mitigate occult hepatitis B infection (OBI) risk.

The RR of potentially infectious HBV, HCV or HIV window period donations that testing did not detect during 2022-2024 was estimated to be around 1 in 1 million highest for HBV at 1.09 per million (95% confidence interval (CI) 0.65 to 3.35), with HIV risk at 0.10 per million (95% CI 0.04 to 0.28) (Figure 5). This represents an increase in HBV risk from the previous estimate of 0.70 per million (95% CI 0.48 to 2.50) for 2021-2023, and a two-fold increase in HIV from 0.05 per million (95% CI 0.01 to 0.08).

There were no HCV seroconversions detected during 2022-2024, however HCV risk is unlikely to be zero so is reported here as less than 0.01 per million donations, based on an estimated value if 1 seroconverter had been observed during 2022-2024. Based on the testing of 1.7 million whole blood donations annually in the UK, it's estimated that undetected cases would include around 2 HBV each year. For HIV, 1 undetected case might occur every 6 years, and for HCV it would be at least 59 years before non-detection.

In 2024, testing for HAV and B19 began for the release of the frozen Plasma for Medicine stocks to the fractionator, alongside the supply of data to assess safety

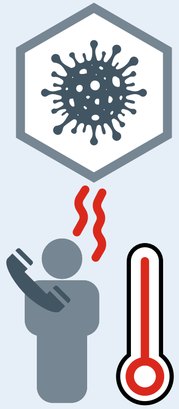
The Unit and NHSBT's Donor Insight team worked together to supply the fractionator with the number of donations screened and confirmed positive for HIV, HBV and HCV by collection team for whole blood and Plasma for Medicine to meet the regulatory requirements to assess and provide assurance of the safety of plasma-derived products.

Residual risk estimates for HEV are not routinely calculated

Uncertainty around the length of the window period and fluctuating incidence in the donor population makes the standard 3-year incidence-based model, used for HBV, HCV, and HIV, less reliable for hepatitis E virus (HEV). However, when an estimate was calculated using a 14-day WP, the residual risk for HEV was considerably higher than for HBV, HCV, or HIV[3].

3 Harvala H, Reynolds C, Brailsford S, Davison K. Fulminant Transfusion-Associated Hepatitis E Virus Infection Despite Screening, England, 2016-2020. Emerg Infect Dis. 2022 Sep;28(9):1805-1813.

Blood donors with markers of HEV infection, UK 2024

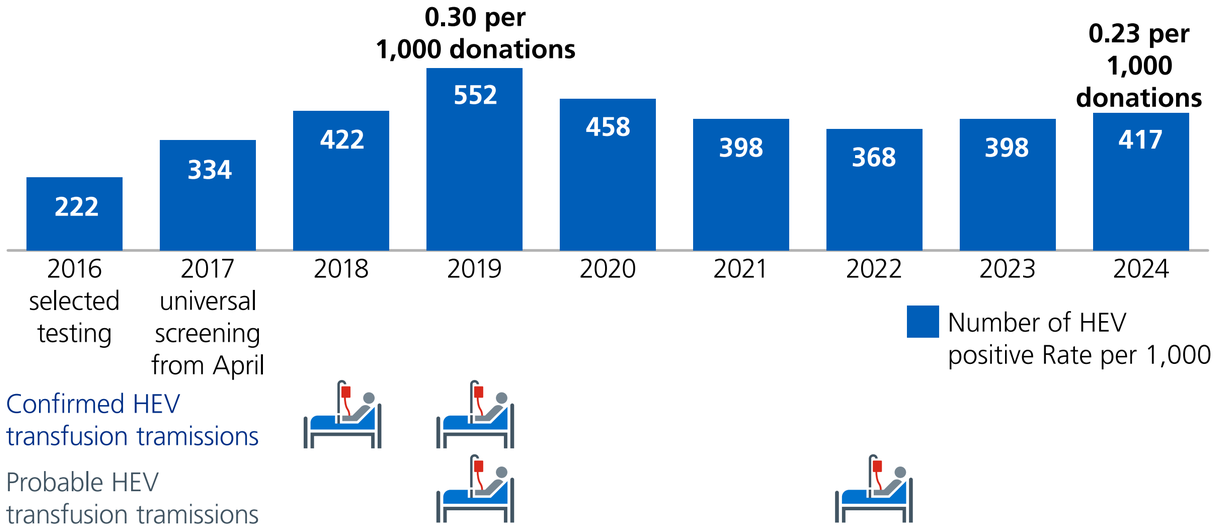


HEV RNA screening removed **417** positive donations in 2024.

HEV transfusion-transmission is now **rare**, with **2** confirmed and **2** probable HEV transfusion-transmissions reported under screening.

Donors recently ill with HEV must not give blood and should report any post-donation infections.

Figure 6: HEV RNA positive donations detected and removed, with transfusion-transmission shown below, UK 2016 to 2024.



Screening detects and removes hundreds of HEV RNA positive donations each year

In 2024 in the UK, 1,786,381 blood and apheresis donations were screened for hepatitis E virus (HEV) with 417 donations confirmed positive and removed from the supply, a rate of 0.23 per 1,000 donations, similar to 2023 (see Figure 6). Whole blood donations are screened in pools of 24 or 16. Welsh Blood Service (WBS) confirmation is based on resolving minipool reactivity to the individual sample. Apheresis donations are tested in pools in England and on individual donation samples in Northern Ireland, Scotland and Wales. In 2024, 7,441 apheresis donations were tested individually and 7 confirmed positive, a rate of 0.94 per 1,000 donations.

HEV transfusion-transmission is now rare but may still occur

There have been 2 confirmed transfusion-transmitted infection (TTIs) in 2018 and 2019, and 2 probable TTIs, in 2019 and 2022 since screening was introduced. The 2 confirmed incidents were identified via lookback investigations in repeat donors. Prior to the introduction of HEV testing in 2016 there were 11 proven HEV TTIs.

There is no specific donor selection policy for HEV

HEV RNA screening detects recent infection, mainly acquired in the UK via the food-borne route, with some travel-associated HEV. A study in the general population showed that non-travel associated cases were more likely to have HEV genotype 3 strain (related to the pig strain).

Donors are asked not to donate if they think they have had an infection within 2 weeks and are asked to report post-donation infection. However, HEV can be asymptomatic, and donors may be unaware of their infection. Positive donations are discarded but donors can return to donate after 6 months once they have cleared their infection.

Close collaboration with public health informs our awareness of emerging infection, changes to epidemiology, testing or treatment that might impact donors and blood safety

Rates in blood donors are generally lower than in the general population which adds to assurance that donor selection is effective. Conversely, blood donor data on HBV, HCV, HIV, and syphilis form a sentinel population to complete the national surveillance picture on rates and exposures in a low-risk population and may indicate people living with undiagnosed infection.

Bacterial screening of platelets, UK 2024

Bacterial screening confirms very low rates of bacterial contamination in platelets, most bacteria detected are skin commensals.

Of **305,518** platelet packs screened, **677** were initially reactive, with **172** (0.06%) donations confirmed positive.

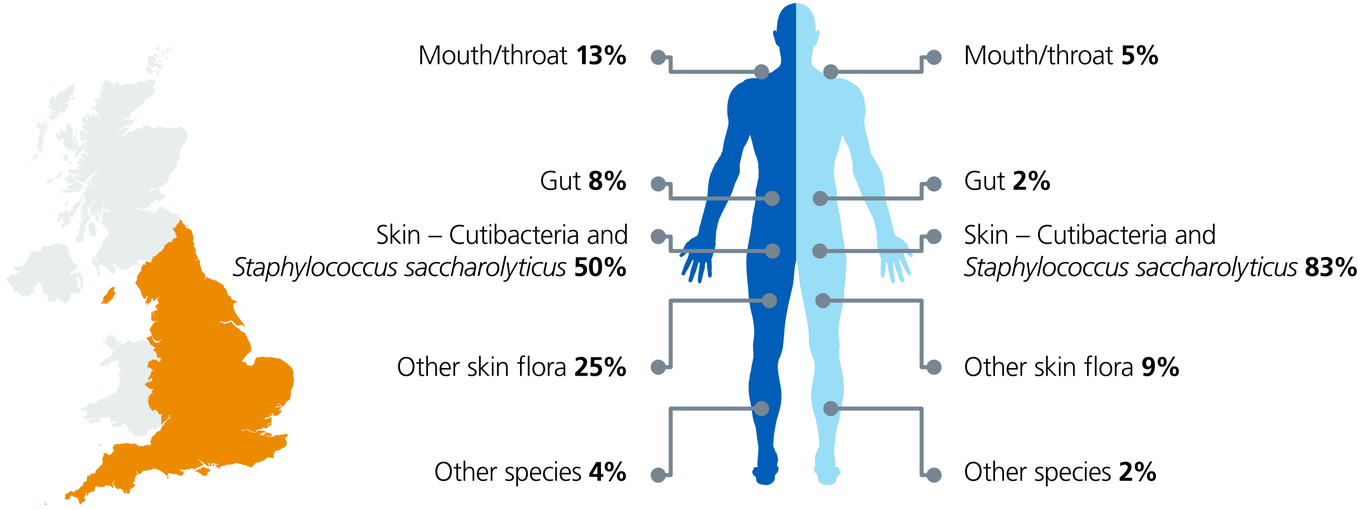
Clinically significant bacteria identified in England continue to remain at low levels.

UK Apheresis platelets;
139,625 components screened,
213 initially reactive (0.15%), **28** confirmed positive (0.02%)

UK Pooled platelets;
165,893 components screened,
464 initially reactive (0.28%), **144** confirmed positive (0.09%)

Species identified from confirmed positive apheresis platelets, England (n=24)

Species identified from confirmed positive pooled platelets, England (n=132)



Very low rates of bacterial contamination confirmed in platelets

A large volume bacterial culture screening technique is used across the UK, however the method of sampling of apheresis platelets varies between countries. Blood services in Scotland and Northern Ireland sample the donation pack, while England and Wales sample after splitting into multiple packs.

In the UK in 2024, of the 305,518 platelet packs screened, 677 were initially reactive, with 172 donations confirmed positive for bacterial contamination.

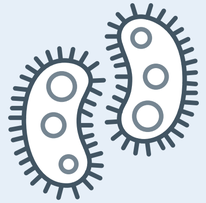
Platelet donations are manufactured from either 4 whole blood donations (pooled platelets) or a single-donor apheresis donation which may be manufactured into 2 or 3 units. Pooling of donations gives rise to a higher chance of contamination and generally pooled platelets have a higher confirmed positive rate than apheresis platelets; in 2024 this was 0.09% versus 0.02%.

Clinically significant bacteria identified in England continue to remain at low levels

In England, of the 156 confirmed positive donations, 78% of identified isolates were either Cutibacteria (67%) or *Staphylococcus saccharolyticus* (11%), 50% of confirmed positive apheresis platelets were either Cutibacteria (42%) or *Staphylococcus saccharolyticus* (8%), compared to 83% of pooled platelets confirmed as either Cutibacteria (71%) or *Staphylococcus saccharolyticus* (11%).

These bacteria are unlikely to be of clinical significance.Overall,12% were other skin flora (25% and 9% in apheresis and pooled platelets respectively), 6% mouth/throat flora (13% and 5% in apheresis and pooled platelets respectively), 3% gut flora (8% and 2% in apheresis and pooled platelets respectively) and 2% of other source (4% and 2% in apheresis and pooled platelets respectively).

Transfusion-transmitted bacterial infection, UK 2024

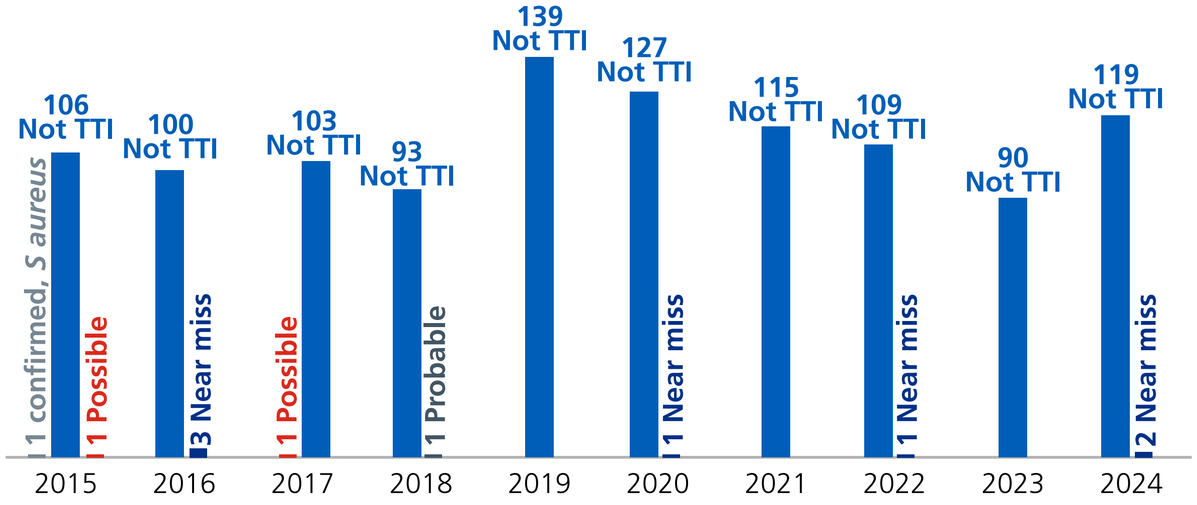


Transfusion-transmission of bacterial infection is rare, but screening of platelets **cannot guarantee** the absence of contamination.

In 2024, there were **0** confirmed bacterial TTI among **118** investigations of suspected transmission. The last confirmed bacterial TTI was identified in 2015.

Bacterial TTI investigations are initiated following hospital reports of reactions in transfusion **recipients**, with most concluded as not a TTI.

Figure 7: Bacterial TTI investigations and outcomes, UK 2015-2024.



Screening of platelet components cannot guarantee the absence of bacterial contamination

Since 2015, over 100 bacterial TTI investigations are conducted annually, mostly with no confirmed transmissions identified. Occasionally, near miss incidents are confirmed when bacteria are identified in a platelet pack before transfusion. The last probable bacterial TTI was identified in 2018 and the last confirmed bacterial TTI was identified in 2015.

In 2024, there were 118 suspected bacterial TTI investigations, initiated following a reaction in a recipient. None were confirmed as bacterial transfusion-transmissions (Figure 7). Two further investigations were concluded as near misses. In the near miss incidents, the packs were identified as abnormal following visual inspection by hospital transfusion laboratory staff and hospital services staff respectively, prior to transfusion. The associated packs had already been transfused but fortunately no adverse reaction was reported. It has been noted that *Staphylococcus aureus* may be more difficult to detect possibly due to biofilm formation, which further emphasises the importance of visual inspection of units prior to transfusion and prompt reporting by hospitals to blood service. Both were negative on bacterial screening. *Staphylococcus aureus* was identified on further culture in both cases[4].

Regular visual inspection of packs is crucial to minimise risk of bacterial TTI as it can alert staff to signs of bacterial growth, investigate any suspected bacterial TTI and report promptly to the blood service to ensure that other components can be recalled preventing further harm.

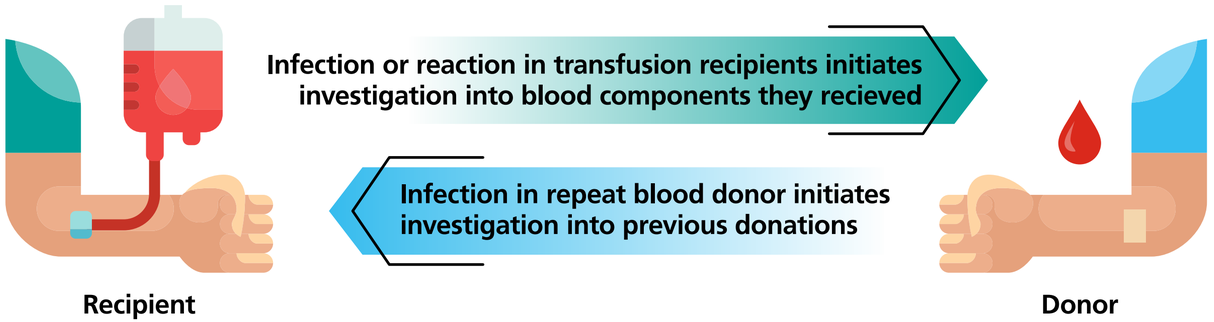
4 Narayan, S.et al., 2024. The 2024 Annual SHOT Report, Manchester: Serious Hazards of Transfusion (SHOT) Steering Group.

Non-bacterial transfusion-transmitted infection and lookback investigations, UK 2024

TTI and lookback investigations support the UK blood services in monitoring blood safety and haemovigilance by identifying donors and recipients potentially at risk.

In 2024, there were **0** confirmed viral TTI among 18 investigations of suspected transmission.

Hospital engagement and collaboration are key to ensure those affected are promptly identified, tested, and referred for appropriate care.



136 reports for TTI investigation, UK.

118 suspected bacterial incidents.

0 TTI.

2 near miss (Staphylococcus aureus).

18 suspected viral incidents.

1 possible HCV TTI (transfusion in 1993).

2 pending parvovirus B19.

11 lookbacks investigations initiated, England.

1 B19, **1** HAV, **1** HCV, **1** HEV, **1** HIV, **4** OBI, **2** syphilis.

29 components transfused.

22 recipients identified.

7 recipients tested.

0 transmissions identified.

3 recipient results pending.

There were no confirmed viral transfusion-transmissions in the UK in 2024

Suspected TTI investigations are initiated when hospitals report a suspected TTI (which are rare), either as a result of an infection or a reaction in transfusion recipients and involve investigation of the associated blood components.

In the UK in 2024, 18 suspected viral incidents were investigated, with no confirmed viral transmissions identified in 2024, and 1 possible HCV transmission identified from a transfusion in 1993. HCV nucleic acid testing (NAT) was not available at the time of testing. Results of 2 suspected parvovirus B19 investigations are pending[5].

Lookback investigations in England in 2024 did not identify any transfusion-transmissions

Lookback investigations are triggered by blood services in response to positive markers of infection in repeat donors, either by donor seroconversion for a newly acquired infection, post-donation information supplied by a donor or following the introduction of a new test that detects previously undetectable infection. Investigations involve reviewing donor history, retesting archive samples, tracing the fate of components with hospitals, and working with clinical care teams to trace and test recipients.

In England in 2024, 11 donors were identified for lookback investigations including 1 parvovirus B19, 1 Hepatitis A Virus (HAV), 1 HCV, 1 HEV, 1 HIV, 4 OBI and 2 syphilis infections. Tracing identified 29 components that were transfused, and 22 recipients were identified. Recipient testing was conducted for 7 recipients who were alive, 15 recipients were not tested as they were deceased. No transmissions were identified although 3 investigations are still in progress.

To date, no transmissions as a result of the FAIR blood donation policy changes have been reported (either identified either by TTI or lookback investigations).

Historical investigations that were part of the Infected Blood Inquiry (IBI) are supported by the team as we continue to assist the infected and affected.

5 Narayan, S.et al., 2024. The 2024 Annual SHOT Report, Manchester: Serious Hazards of Transfusion (SHOT) Steering Group.

HTLV National Register, UK 2024

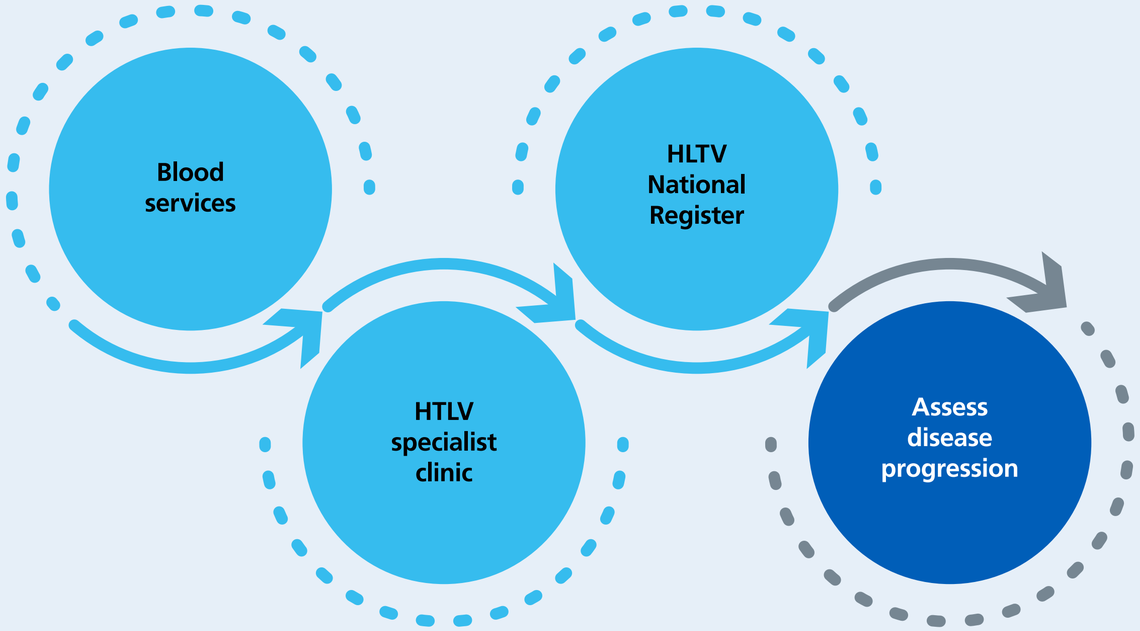
The HTLV Register is a one-of-a-kind cohort assessing disease progression in a non-endemic population to guide public health policy.

Blood services

By 2024, **306** participants were recruited by blood services and HTLV specialist clinics, including **132** donors.

HTLV clinics

Among **248** participants symptom-free at registration, over **1,839** person-years of follow-up revealed a low incidence of severe disease (1%).



The UK's HTLV National Register is a collaboration between UKHSA, NHSBT and Imperial College Healthcare NHS Trust, UK 2024

The Register represents a unique, long-term UK cohort, offering rare insight into Human T-cell lymphotropic Virus (HTLV) in a non-endemic setting, and supporting future public health decisions. HTLV is uncommon in the UK, with higher risk among people born in endemic regions. While up to 10% of people with HTLV may develop serious illness such as Adult T-cell Leukaemia/Lymphoma (ATLL) or HTLV-Associated Myelopathy (HAM), little is known about disease progression in non-endemic countries like the UK.

Blood donation screening for HTLV began in 2002. In 2003, the HTLV National Register was set up to track disease progression in donors and recipients, and patients from HTLV specialist clinics. This one-of-its-kind European study is a collaboration between Imperial College London, NHSBT, and UKHSA. The Register supports public health by monitoring HTLV-related diseases. While initially including individuals who were both positive and negative for markers of HTLV, since 2013 it has focused on asymptomatic HTLV-positive participants to better understand long-term outcomes.

By 2024, blood donation testing had identified 300 donors with markers of HTLV, with 127 agreeing to join the HTLV National Register. Combined with 5 tissue and cell donors, 165 specialist clinic attendees (19 had markers of HTLV) and 9 blood recipients (4 had markers of HTLV), a total of 306 individuals were enrolled by the end of 2024. Most participants who were had markers of HTLV were for HTLV-1 (n=267), 13 for HTLV-2 and for 3 HTLV type is undetermined. Of the 283 participants who had markers of HTLV, 76% are female and 41% are of Black Caribbean ethnicity. Health and wellbeing questionnaires are completed at recruitment and every 2–3 years.

Responses from individuals who were symptom free at registration have provided 1,839 person years follow-up. Findings from these show that only 1% developed HAM-like symptoms, while overall quality of life remained high. The 9th follow-up is underway in 2025.

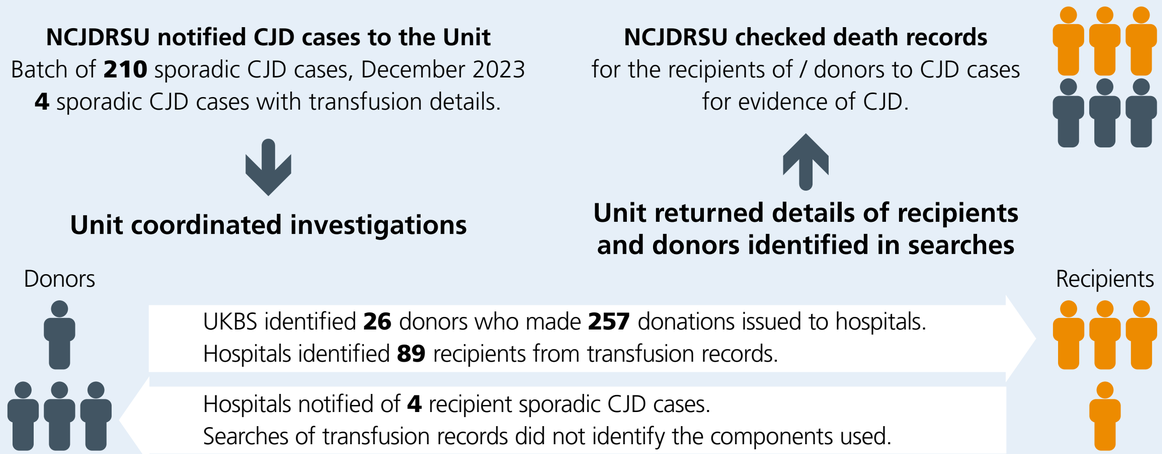
Data from the Register have supported wider public health research. During the 8th follow-up in 2022, participants were asked about antenatal screening for HTLV. Most expressed support for its introduction. However, it was acknowledged that views from a broader population would better reflect those affected by targeted testing and a similar survey is underway to address this.

Creutzfeldt–Jakob disease (CJD) surveillance, UK 1997 to 2024

Collaborative CJD surveillance between the National CJD Research and Surveillance Unit and the UK blood services since 1997 linked information to identify transfusion-transmission of variant CJD to **4** recipients before leucodepletion began in 1999.

There is no evidence of sporadic CJD transfusion-transmission to date, despite continuing searches in 2024.

TMER process and activity, UK 2024



The Transfusion Microbiology Epidemiology Review (TMER) surveillance was a collaborative project which ceased in 2025

The National CJD Research and Surveillance Unit (NCJDRSU) in Edinburgh and the UKBS, funded by Department of Health and Social Care (DHSC), collaborated to link information over time on donors and recipients to look for evidence of CJD transfusion-transmission. Specific funding ceased on 31 March 2025. The Unit will continue to coordinate lookback for CJD cases notified to the Unit via UKHSA.

The TMER identified 3 clinical and 1 asymptomatic case of transfusion-transmitted variant CJD

The variant CJD (vCJD) transfusion transmissions occurred prior to leucodepletion safety mitigation in 1999 (Figure 8). No further links were made; the most recent vCJD case was in 2016 and not a donor. Another highly precautionary safety step is permanent deferral for blood transfusion recipients, not to be confused with the individuals at higher risk requiring surgical assessment (see Annex J). The vCJD risk was downgraded in 2018 and Plasma for Medicine collection has restarted.

2024 CJD surveillance activity identified 89 recipients of sporadic CJD donors with no evidence of sporadic CJD transfusion-transmission to date

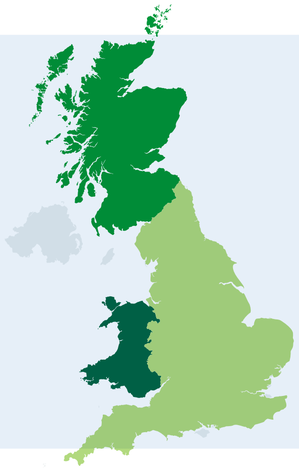
In 2024, the UK blood services searched donor records for 210 sporadic CJD (sCJD) cases, identifying 26 donors, with 257 donations issued to hospitals where searches identified 89 recipients. The Unit also conducted an exercise to follow up outstanding data, with 26 additional recipients identified. Additionally, details of 4 transfusion recipients diagnosed with sCJD were sent to blood services to identify components and associated donors. No components were identified in hospital searches since some transfusions were many years ago, which meant the donors who donated to these recipients could not be identified. To date there is no evidence for transfusion-transmitted sCJD.

Figure 8: Key dates for CJD transfusion medicine surveillance.

Year	Surveillance
1997	CJD surveillance in transfusion medicine began.
1996 to 1999	**4 recipients** were transfused prior to leucodepletion, from donors who later developed vCJD. Three recipients went on to die from vCJD up to 8 years later while post-mortem showed prion development in a fourth.
2016	Most recent report of vCJD case in the UK, search did not identify them as a donor.
2018	UK vCJD risk assessment downgraded after surveillance indicated the vCJD outbreak was smaller than originally predicted.

Blood donor survey, UK 2024

Blood donor survey shows diversity among responders and high eligibility to FAIR donor selection questions.



146,445
invited donors.

England, Scotland and Wales.

23,861 responders **(16%)**.

Donors responding included members of the LGBTQ+ community, including non-binary individuals, trans men and trans women.

99.7% donated while eligible to FAIR.

Donors surveyed in England, Scotland and Wales in 2024

In 2024 across England, Scotland and Wales, 146,445 blood donors were invited by their blood service to take part in an anonymous online survey conducted by UKHSA in collaboration with the University of Nottingham (Figure 12).

The survey was conducted as part of post-implementation monitoring of FAIR to assess the impact of the policy on donors and understand more about who is donating.

Donors were asked about their health, sexual behaviours, why they chose to donate and their views on the change to a more individualised donor selection policy.

Before launch, the survey was reviewed through a patient and public involvement and engagement (PPIE) exercise to ensure it was appropriate and understandable for donors and multiple governance approvals were obtained.

The survey was carried out in the Republic of Ireland in 2025. It was not carried out in Northern Ireland due to challenges with an additional sign-up step needed to adhere to the Northern Ireland Blood Transfusion Service (NIBTS) privacy policy.

Representation from a diverse range of responders

A total of 23,861 donors (16.3%) participated in the survey. The majority were repeat donors (90%), most identified as female (53%), and 95.5% identified as White heritage.

Compared to the overall donor population, younger donors, first-time donors, males, and individuals from Black, Asian, or Mixed heritage were underrepresented among responders. Donors not taking the survey may have different risk profiles and experiences to responders.

Nonetheless, there was some participation from a range of diverse groups. Self-reported ethnicities included Asian or Asian British, Black, Black British, Caribbean or African, and Mixed or Multiple ethnicities.

A small number of respondents 84 (0.4%) identified as non-binary or with other gender identities, and 122 individuals (0.5%) reported identifying as a gender different from their sex registered at birth.

In terms of sexuality, 1,941 donors (8.1%) identified as something other than heterosexual, including 469 (2.0%) who identified as GBMSM.

Most donors donated while eligible. There were 64 donors who reported donation while ineligible to FAIR due to anal sex with new or multiple partners, chemsex or syphilis history.

The remaining 23,797 (99.7%) appeared eligible.

Deceased organ donor surveillance, UK 2024

A decrease in the number of deceased organ donors was seen in 2024, following some recovery to pre-pandemic levels between 2020 and 2023.

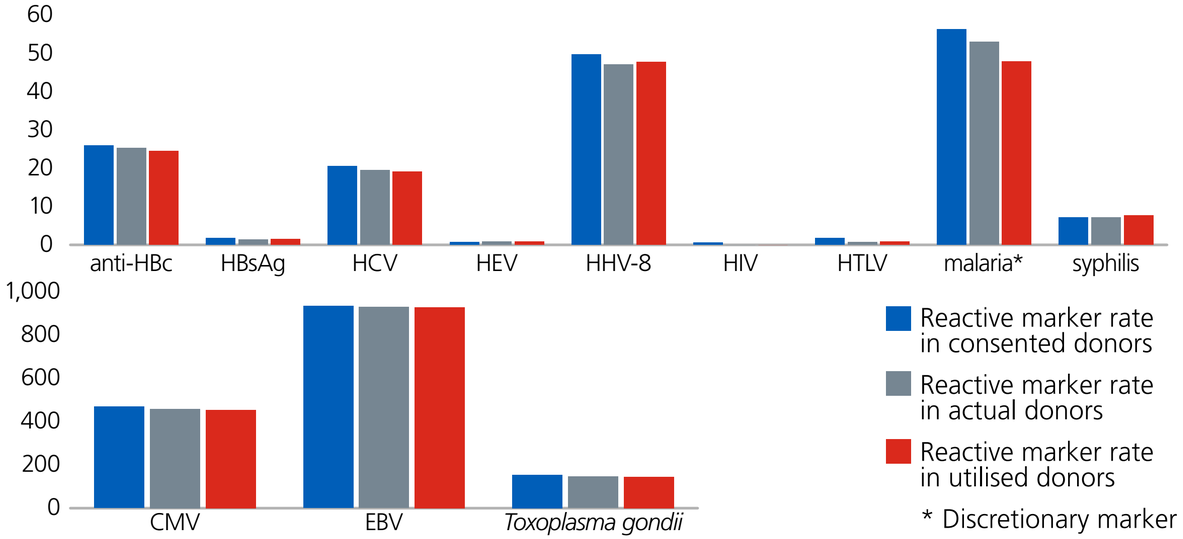
Consented donors undergo mandatory testing for markers of infection, and some donors will also undergo discretionary testing depending on their exposure to risk criteria, including travel history.

Reactive results are not confirmed.

Screening identified **2** HBV, **25** HCV, **1** HEV, **54** HHV-8, **1** HTLV, and **10** syphilis reactive markers of infection in donors where organs were utilised for transplantation.

Markers of infection are not necessarily barriers for transplantation.

Figure 9: Reactive marker rates in consented, actual and utilised deceased donors, UK 2024.



A decrease in the number of deceased organ donors was seen in 2024, following some recovery to pre-pandemic levels between 2020 and 2023

In 2024, following a comprehensive donor health and clinical history assessment, 82% (1,385) of the 1,699 donors consented to donate became actual donors with at least 1 organ retrieved. Donors can either donate following brain stem death or after circulatory death; the category of death affects the type and quality of organs that can be donated, these donors were split evenly in 2024 with 699 brain stem donors and 686 circulatory death donors. In 2024, 94% (1,307) of 1,385 actual donors became utilised donors with their organ(s) transplanted. The number of deceased organ donors decreased from 2023 to 2024 following some recovery to pre pandemic levels between 2020 and 2023[6].

Consented donors are tested for pathogen reactivity; these results are not confirmed

Before an organ is retrieved, blood samples from potential consented donors are tested for: hepatitis B virus surface antigen (HBsAg); combined antibody and antigens for HIV; and antibodies to hepatitis B core, HCV, human herpes virus 8 (HHV8), HTLV, *Treponema pallidum* (syphilis), *Toxoplasma gondii*, cytomegalovirus (CMV) and Epstein-Barr virus (EBV).

After donation, HEV RNA testing occurs. Confirmatory results of initial reactive tests may not always be available at the time of transplantation, but specialist advice and informed patient consent may allow transplantation to proceed without results if the benefits are deemed greater for the recipient than the risk of infection. HBV, HCV and HIV NAT is conducted based on initial reactivity from hospital-based testing and a history of increased risk behaviour, to inform post-surgical management of the recipient.

Additional criteria for screening of malaria, *Trypanosoma cruzi*, and WNV RNA include country of birth, transfusions whilst abroad and travel to affected areas.

Markers of infection are not necessarily barriers for transplantation

In 2024, the most common detected markers in utilised donors were for EBV (929 per 1,000 donors) and CMV (455 per 1,000 donors), both circulate widely in the general population.

Of the other main viruses screened for, HHV-8 was the most common (48 per 1,000 utilised donors) (Figure 9). In addition, there were also 2 HBV, 1 HEV and 1 HTLV reactive results in utilised donors.

6 Annual Activity Report – ODT Clinical – NHS Blood and Transplant.

Cord blood donor and living and deceased tissue donor surveillance, tested by NHSBT in 2024

Living surgical bone donors give femoral heads.

In 2024 there were **767** donors.

1 positive for HBV and **1** HCV markers of infection.

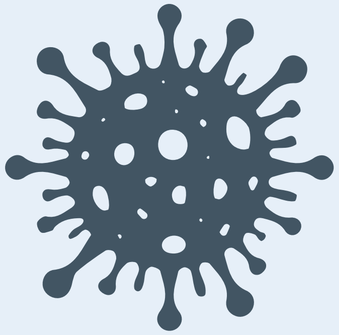
No evidence of recent infection.

Cord blood collection targets ethnically diverse populations around London.

In 2024 there were **135** donors.

1 positive for HTLV.

2 of **52** tested for malaria were positive.



Deceased tissue donors give bone, skin, heart valves, corneas and tendons.

In 2024, there were **2,684** donors.

15 were positive for markers of infection.

7 OBI, **3** HCV, **1** HCV/HBV, **1** HEV and **3** syphilis.

NHSBT uses similar protocols for tissue and cord blood donors as for blood donors, but with individual NAT testing and phased FAIR policy implementation

NHSBT manage living and deceased tissue donors, and cord blood donors to a similar protocol as blood donors. However, except HEV NAT which is performed on pools, testing is by individual NAT. The FAIR blood donation policy was in place for living donors from November 2023, compared to June 2021 for blood donors. FAIR was implemented for deceased tissue donors in 2025.

In 2024, infection markers were found in 261 per 100,000 living tissue donors and 559 per 100,000 deceased tissue donors, with no evidence of recent infections

Living tissue donors give surgical bone (femoral heads) when undergoing elective primary hip replacement and generally have only 1 opportunity to give. In 2024, of 767 people who donated surgical bone and were tested by NHSBT, 2 donors were confirmed positive for markers of infection (1 HBV and 1 HCV), giving an overall rate of 261 per 100,000 donors.

Deceased tissue donors give bone, skin, heart valves, corneas, and tendons and are generally older than blood donors. In 2024, there were 2,684 donors and 15 were positive for markers of infection. These included 7 OBI, 3 HCV, 1 co-infection HBV/HCV, 1 HEV and 3 syphilis, approximating to an overall rate of 559 per 100,000. There was no evidence of recently acquired infections.

Cord blood collection targets ethnically diverse populations around London to ensure a diverse supply

In 2024, there were 135 cord blood donors. All cord blood donor self-identified as female and were aged between 19 and 43 years. Donations were made immediately post-partum.

Donors are expected to have been routinely screened for markers of HBV, HIV and syphilis, and sometimes HCV, during antenatal testing. One cord blood donor was found positive for markers of HTLV, and 2 of 52 tested for malaria based on travel history were positive.

There was no evidence of recently acquired infections.

Horizon scanning for emerging infections, UK 2024

There is a clear process for horizon scanning for emerging infections that may impact the safety or sufficiency of the blood supply that relies on close links with public health and One Health surveillance.

In 2024, **952 entries** in the Emerging Infection Report were reviewed with spread of arboviruses, mpox and avian influenza accounting for a significant proportion of activity.

Horizon scanning for emerging infections

A monthly **EIR** lists emerging infections with potential to affect the UK blood and tissue supply. A range of national and international sources are used. Urgent items sent without delay for review

Good links to public health surveillance are crucial

Feedback helps refine EIR reports

Clear process for risk assessment and action

EIR sent to the JPAC SACTTI for **risk assessment**

SACTTI highlight whether further action required by JPAC and its Standing Advisory Committees including changes to donor selection or donation testing

JPAC SAC actions included:

Changes to travel-related deferral areas.

Updating risk assessments.

Monitoring epidemiology:

- Oropouche virus.
- Usutu virus in UK mosquitos.
- Mpox.
- Avian influenza H5N1.

The joint Unit collaborates closely with UKHSA to provide infection horizon scanning for the UK blood services

The Epidemiology Unit produces a monthly Emerging Infections Report (EIR); a horizon scanning list of global outbreaks, emerging and re-emerging infections with potential to affect the UK blood and tissue supply. The Unit scans daily and weekly UKHSA reports and other information against the Geographical Disease Risk Index (GDRI) and escalates urgent items for review without delay. Collaboration and links to public health surveillance are crucial. The process is audited and regularly fine-tuned based on feedback from the Standing Advisory Committee on Transfusion-Transmitted (SACTTI) and review of the sources used each year.

In 2024 the Unit escalated items for immediate attention including: WNV in Spain prior to the May to November transmission season, locally acquired dengue in areas not covered by the GDRI (France, Italy, Spain, Iran, United Arab Emirates and USA) and Marburg virus disease outbreak in Rwanda.

There is a clear process for risk assessment and action

The EIR is sent to the JPAC SACTTI for review. Using the EIR and other sources such as alerts from the European Blood Alliance Emerging Infectious Disease Monitor group and other public health sources, SACTTI highlight whether further action or risk assessment is required by Joint United Kingdom (UK) Blood Transfusion and Tissue Transplantation Services Professional Advisory Committee (JPAC) and its Standing Advisory Committees including changes to donor selection or donation testing.

UK blood service focus in 2024 centred on the spread of arboviruses, mpox and avian influenza

Frequent changes were made to travel-related deferrals including for local dengue transmission in Europe and other areas not covered by the tropical deferral. Several infections were closely monitored including the spread and pathogenicity of Oropouche virus; limited transmission of mpox clade 1 cases in the UK; pandemic potential of avian influenza H5N1; Crimean-Congo Haemorrhagic fever (CCHF) cases in Europe; watching brief for Babesia and potential establishment of Usutu virus in UK mosquitos.

Risk assessments were also updated for Tick-Borne Encephalitis Virus (TBEV), Ebola Virus, Middle East Respiratory Syndrome Coronavirus (MERS-Cov), Zika Virus, Simian Foamy Virus (SFV) and Human parvovirus B19 (B19V).

Peer reviewed publications of the NHSBT/UKHSA Epidemiology Unit, 2024

Flannagan J, **Davison KL, Reynolds C, Brailsford SR**. Determining the strength of evidence for an association between sexual indicators and risk of acquiring HIV and sexually transmitted infections: Providing evidence for blood donation policy change. *Transfus* Med.2024 Dec;34(6):466-477.

Mills R, Merz EM, Croucher M, Masser B, **Brailsford SR**, Smith R, Ferguson E. The Infected Blood Inquiry: Impact on public perceptions of blood supply risk, safety, and donation attitudes. *Transfus* Med.2024 Dec;34(6):478-490.

Lewin A, Goldman M, Busch MP, **Davison K**, van de Laar T, Tiberghien P, et al. End of selection criteria based on sexual orientation: An international symposium on alternatives to donation deferral. *Vox Sang*. 2024 Apr;119(4):388-401.

Ferguson E, Mills R, Dawe-Lane E, Khan Z, **Reynolds C, Davison K**, Edge D, Smith R, O'Hagan N, Desai R, Croucher M, Eaton N, **Brailsford SR**. Questions on travel and sexual behaviours negatively impact ethnic minority donor recruitment: Effect of negative word-of-mouth and avoidance. *Vox Sang*. 2024 Dec;119(12):1245-1256.

Ferguson E, Bowen S, Mills R, **Reynolds C, Davison K**, Lawrence C, Maharaj R, Starmer C, Barr A, Williams T, Croucher M, **Brailsford SR**. The prototypical UK blood donor, homophily and blood donation: Blood donors are like you, not me. *Vox Sang*. 2024 Dec;119(12):1223-1233.

Lieshout-Krikke R, Hoad V, Chua SS, Kam G, Satake M, Hino I, Stramer SL, Groves JA, de La Taille V, Laperche S, Cheng A, Goodison K, Tsoi WC, Lee CK, Prati D, Pati I, Drews SJ, Bigham M, Gratz G, Jungbauer C, Charlewood R, Smith M, O'Flaherty N, Raftery A, Oyonarte S, Gubbe K, Luhm J, Ngcobo S, Slot E, **Davison K, Brailsford S**, Dunbar N.Fu International Forum on Donor – and Recipient-triggered Lookback for Traditional Transfusion-transmitted Infections: Summary. *Vox Sang*. Epub 2024 Nov 14.

Publications in collaboration with ISBT Transfusion Transmitted Infectious Disease Working Party

Fu MX, et al. International review of blood donation screening for anti-HBc and occult hepatitis B virus infection. *Transfusion*. 2024 Nov;64(11):2144-2156.

Faddy HM, et al. An international review of the characteristics of viral nucleic acid-amplification testing (NAT) reveals a trend towards the use of smaller pool sizes and individual donation NAT. *Vox Sang*. 2024 Jul;119(7):745-751.

Faddy HM, et al. International review of blood donation nucleic acid amplification testing. *Vox Sang*. 2024 Apr;119(4):315-325.

Acknowledgements

Thanks to all our collaborators and reporters for their expertise and data including the UK Blood Services (NHSBT, NIBTS, SNBTS, WBS), IBTS, Jersey Blood Donor Service, Isle of Man Blood Transfusion Service, hospitals, NCJDRSU, Imperial College NHS Healthcare Trust, University of Nottingham, NHSBT OTDT, NHSBT and UKHSA colleagues and to everyone who takes part in our surveys. EIR Sources include: UKHSA EpiIntel reports; European Centre for Disease Prevention and Control (ECDC) communicable disease threat reports, news alerts and peer-reviewed literature. We are grateful to the donors and donor families who make transfusion and transplantation possible and help to save and improve more lives every year.

Ongoing collaboration is **key** to supporting the **UK blood services** to monitor and **maintain blood safety.**

Glossary

anti-HBc	Antibody to Hepatitis B Core Antigen
anti-HBs	Antibody to Hepatitis B Surface Antigen
ATLL	Adult T-cell Leukaemia/Lymphoma
B19	Parvovirus B19
BTRU	NIHR Blood and Transplant Research Units
CCHF	Crimean-Congo Haemorrhagic fever
CI	Confidence Interval
CMV	Cytomegalovirus
CJD	Creutzfeldt–Jakob disease
DHSC	Department of Health and Social Care
DNA	Deoxyribonucleic acid
EBV	Epstein-Barr virus
EIR	Emerging Infections Report
FAIR	For the Assessment of Individualised Risk
GBMSM	Gay, Bisexual, and other Men who have Sex with Men
HAM	HTLV-Associated Myelopathy
HAV	Hepatitis A Virus
HBsAg	Hepatitis B Surface Antigen
HBV	Hepatitis B Virus
HCV	Hepatitis C Virus
HEV	Hepatitis E Virus
HHV8	Human Herpes Virus 8
HIV	Human Immunodeficiency Virus
HTLV	Human T-cell lymphotropic Virus
IBI	Infected Blood Inquiry
ISBT	International Society of Blood Transfusion
JPAC	Joint UK Blood Transfusion and Tissue Transplantation Services Professional Advisory Committee
mIU/ml	milli-international units per millilitre
LGBTQ+	Lesbian, gay, bisexual, transgender, queer/questioning, intersex, asexual, and more
NAT	Nucleic Acid Testing
NCJDRSU	The National CJD Research & Surveillance Unit
NIBTS	Northern Ireland Blood Transfusion Service
NHSBT	NHS Blood and Transplant (England)
OBI	Occult Hepatitis B Infection
OTDT	NHSBT Organ Donation and Transplantation
PCR	Polymerase Chain Reaction
PROMPT study	Prompts to Reduce Omissions in deferral or testing for Malaria, Past infection and Travel
RNA	Ribonucleic Acid
ROI	Republic of Ireland
SaBTO	Advisory Committee for the Safety of Blood, Tissues and Organs
SACTTI	Standing Advisory Committee on Transfusion Transmitted Infection
SNBTS	Scottish National Blood Transfusion Service
SHOT	Serious Hazards of Transfusion
sCJD	sporadic Creutzfeldt-Jakob disease
TMER	Transfusion Microbiology Epidemiology Review
TTI	Transfusion-Transmitted Infection
UKBS	UK Blood Services
UKHSA	UK Health Security Agency
vCJD	variant Creutzfeldt-Jakob disease
WBS	Welsh Blood Service
WNV	West Nile virus