



Serious Hazards
of Transfusion

Useful tips for the SHOT Human Factors Investigation Tool (HFIT)

Background information to help categorise the Human Factors elements of transfusion incidents reported to the SHOT database

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SHOT advises watching their short videos for more information about Human Factors

Coming soon!

2 videos giving more information about human factors and transfusion safety – Part 1 and Part 2 should be viewed together where possible

It will take approximately 6 minutes to view each video

SHOT is producing these videos with the NSHBT Digital Learning Team and we would like to also acknowledge:

All reporting hospitals

SHOT Steering group and Working Expert Group

Health Education England for the funding of this resource

What is Human Factors (HF)?

- The term 'Human Factors' relates to how a human interacts with processes, systems, equipment and the environment
- It is equivalent to the term ergonomics
- It should not be mistaken for being only about factors relating to the human themselves
- A badly designed system or piece of equipment could be categorised as human factors because it could lead to errors and incidents
- The following slide has links to further information if you want to know more about human factors

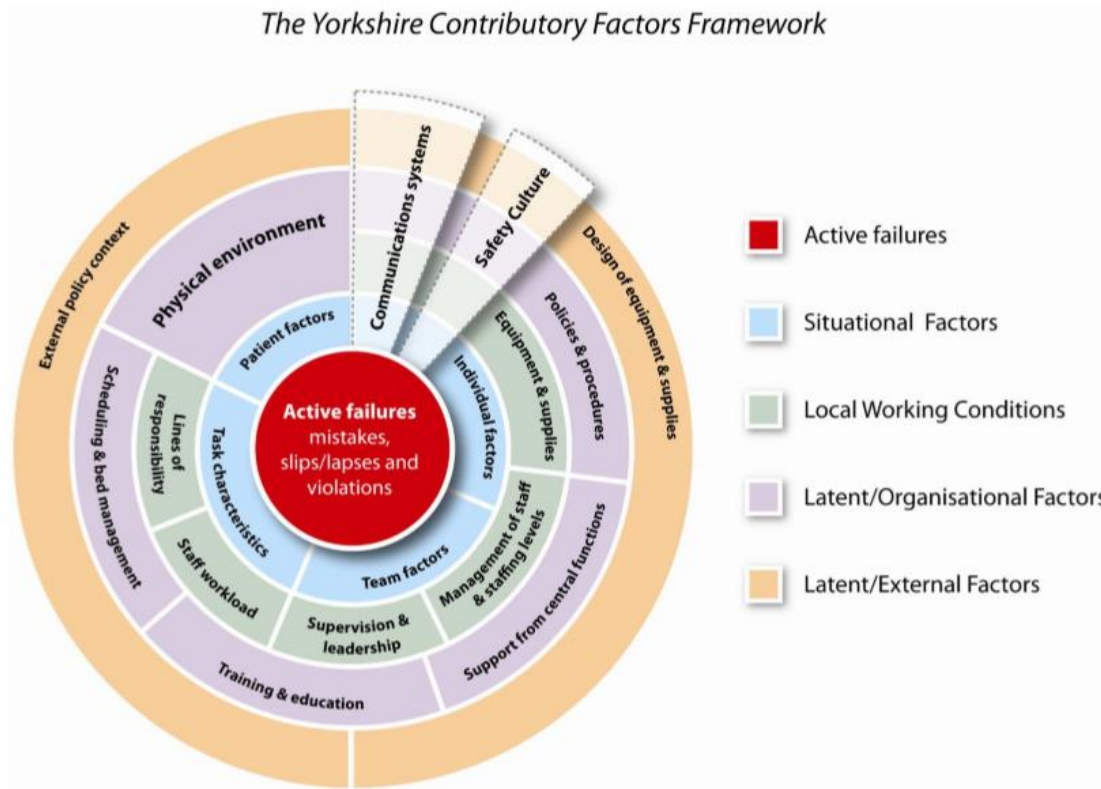
SHOT Human Factors Investigation Tool (HFIT) background

- Errors continue to account for majority of SHOT reports. In 2019, 84.1% (2857/3397) of all reports (including near miss (NM) and right blood right patient (RBRP)), and 74.7% of incidents excluding NM and RBRP were due to errors
- Errors in healthcare may be related to the workplace environment and these can be the human factors that contribute to mistakes in transfusion
- In January 2016, SHOT introduced human factors questions, i.e. a human factors investigation tool (HFIT). Reporters were asked to estimate the factors related to the incident on a scale of 0 to 10, where 0 is none and 10 is the total cause
- In January 2017, SHOT produced and published this learning package and in January 2018 a link was added to a video <https://t.co/qTeUoPiUlq>
- In January 2021, SHOT updated this learning package, reviewed and updated the HFIT and are producing their own human factors videos (available soon)

What's new for 2021!

- We have incorporated The Yorkshire Contributory Factors Framework (YCFF) into our HFIT. This Framework has an evidence base for optimising learning and addressing causes of patient safety incidents by helping SHOT, clinicians, risk managers and patient safety officers identify contributory factors incidents
- It is anticipated the that the HFIT questions will take around 15 minutes to complete
- The underlying aim is not to ignore individual accountability for unsafe practice, but to try to develop a more sophisticated understanding of the factors that cause incidents
- These factors can then be addressed through changes and recommendations in systems, structures and local working conditions
- Finding the true causes of patient safety incidents offers an opportunity to address systemic flaws effectively, for the benefit of transfusion patient safety

HFIT now incorporates an adapted version of The Yorkshire Contributory Factors Framework



<https://improvementacademy.org/tools-and-resources/the-yorkshire-contributory-factors-framework.html>



Changes to the scoring on Human Factors questions (Likert scale)

- You will note that we have also made some changes to the scale used to answer each section to simplify the process for investigators
- For each question please estimate on a scale of 0 to 5, where 0 is none and 5 is total cause
- For example, 0-None, 1-Barely, 2-A little, 3-Some, 4-A lot, 5-Fully
- There are 5 sections to the questionnaire as seen on the next page

Human Factors page in SHOT Database (Dendrite)

SHOT DEMONSTRATION Database - October 2017

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Human Factors

Date event reported - 18 October 2017 Selected Patient - 28385 MHRA Ref. Number - 2017/01000000000000000000

Introduction

As three quarters of all incidents reported to SHOT are related to errors, we would like to understand more about why these occur. Errors in transfusion practice related to workplace features. What are the human factors that contribute to errors in transfusion practice?

For the questions below, please estimate on a scale of 0 to 5, where 0 is none and 5 is total cause.

SHOT has recognised how difficult it can be for reporters to score the human factors aspects of an incident, so we have prepared some self-learning material. You may want to save this incident report first if you are planning to access any training material now.

In 2017 a tuition package of slides was published on the SHOT website. An updated version for 2021, including new case studies, can be accessed if you copy and paste the link www.shotuk.org/human-factors-tuition-package/ into your internet browser.

New for 2018, we suggest watching a short video for more information about human factors. Please copy and paste this link <https://t.co/qTeUoPiU1q> into your browser to access the video, which is approximately 6 mins long. (N.B. this video was not produced by SHOT, so we would like to acknowledge the creators as listed in the video).

Please indicate if you read the human factors self-learning tuition package this time

Yes No No; but have read it previously

Please indicate if you watched the human factors video this time

Yes No No; but have read it previously I cannot access a video from my organisation's IT system

Exit Application

Previous page Next page Save & Exit

This is a demonstration of the page in the SHOT Database

Don't worry that you can't see the detail in this screenshot

The questions and answer options are clear in Dendrite

Organisational, external, situational and Government factors can be hard to score

Reporters may struggle to assign scores the farther away it gets from the individual and the actual incident, because these can be difficult to assess.

Discussion points in the following case studies may give ideas for factors to consider that are outside the control of the individual or their local managers.

In particular it may be worth considering if outside factors could result in staff failing to follow policies.

How can we assess cases to get an accurate human factors score?

This tuition package on Human Factors is designed to help reporters to score the SHOT human factors questions.

In particular it may help reporters to consider the non-staff related factors that can contribute to the cause of an incident, such as:

- Situational Factors
- Local Working Conditions
- Organisational Factors
- External Factors
- Communication and Culture

Please note: All scores are subjective and there are no right or wrong answers. Suggested scores given in cases below are not necessarily any more correct than the original scores. Reporters investigating the case locally may have more information that would lead them to score differently.

The following case studies are real cases

- The following case studies and the initial scores given are from real cases reported to SHOT using the original human factors investigation tool (HFIT). These have been updated to include worked examples using the 2021 HFIT
- SHOT is very grateful to reporters for sharing their cases and completing the original HFIT questions
- Reporters are not expected in any way to be human factors experts, so there is no criticism implied by the discussion of scores originally given or now suggested in these case studies
- Cases are fully anonymised

Case study 1 - Total cause of incident initially attributed to individual

- Patient was transfused 2 units of red cells with a Hb of 79g/L, despite known risk factors for transfusion-associated circulatory overload (TACO)
- According to the protocol only 1 unit should have been administered initially and then the patient clinically reassessed, but the patient was not monitored between units and the consultant haematologist for transfusion believes the second unit was inappropriate
- The nurse administering the transfusion had not recognised the risk and only carried out routine blood transfusion observations
- A junior doctor (F1) reviewed the patient after the 2nd unit for complaints of shortness of breath. The F1 documented unlikely to be TACO as the patient calmed down during the examination with reassurance and was not in consistent respiratory distress. The case was reviewed by the Transfusion consultant and SHOT experts who concluded this was an inappropriate transfusion that resulted in TACO
- Patient had a cardiac event, but survived

Case study 1

Human factors scores initially given using HFIT 2016

Cause attributable to unsafe practice/conditions associated with:	Score out of 10
Individual staff member(s)	10
The local environment or workspace	0
Organisational or management issues in the Trust/Health Board	0
Government, Department of Health or high level regulatory issues	0

Case study 1 - discussion

- This case was originally scored with a maximum score for the individual staff member and nothing for any other human factors
- However, the **local environment or workspace** was not ideal, because no pump was available so the transfusion was given by free flow. The second unit was given too quickly at 1 hour 45 mins instead of 3 hours
- There were also **organisational issues** with shared care and co-morbidities:
 - The patient was on regular transfusions at a different hospital for myelodysplastic syndrome (MDS) but treated here for infected leg ulcers
 - The patient was taken off regular diuretic medication prior to having computerised tomography (CT) angiography, but was on fluids for acute kidney injury (AKI)
 - Appears to have been given the blood, because her regular 3-weekly transfusion was due, without taking into account her inpatient status
- A patient with complex transfusion issues was being monitored by a nurse who didn't recognise the TACO risk and was referred to a junior doctor to assess the shortness of breath. If apparently inexperienced staff were involved due to poor staffing levels that could be seen as a **Department of Health level issue**, because of possible underfunding of the health service

Case study 1 - HF scores when further info considered and reworked using HFIT 2021

Section 1- Situational Factors

Section 1 – Situational Factors	
To what extent is the cause of this incident due to any failures in team function?	4
To what extent did individual staff factors make this incident more likely?	4
To what extent did task features make the incident more likely?	0
To what extent were there reasons that this incident was more likely to occur to this particular patient	5
Please give any additional relevant information for situational factors	<p>The patient was being monitored by a nurse that didn't recognise TACO risk and reviewed by a junior doctor. A lack of experience could have been a factor here.</p> <p>The patient had complex transfusion issues and risk of TACO</p> <p>The patient was known AKI but had been taken off diuretics for investigations</p>

*** The suggested scores assume all discussion points are valid, but the local investigator may know more detail and might score differently**

Section 2- Local working Conditions

Section 2 – Local Working conditions		<p>* The suggested scores assume all discussion points are valid, but the local investigator may know more detail and might score differently</p>
To what extent was there a mismatch between workload and staff provision around the time of the incident?	0	
To what extent was there any failure of team function in relation to leadership, supervision and roles?	5	
To what extent were there any difficulties obtaining the correct equipment and/or supplies?	5	
Please give any additional relevant information for local working conditions	<p>No transfusion pump was available on the ward meaning the transfusion was given by free flow. This resulted in the second unit being given too quickly at 1 hour and 45 minutes instead of 3 hours.</p> <p>As above, the patient was being monitored by a nurse that didn't recognise TACO risk and reviewed by a junior doctor. Delegation to inexperienced and junior staff could have been a factor here</p>	

Section 3- Organisational Factors

Section 3- Organisational Factors	
To what extent did the environment hinder work in any way?	0
To what extent were there problems in other departments that contributed?	5
To what extent did organisational pressures play a role in the incident?	4
To what extent were there issues or gaps with staff skill or knowledge?	5
Please give any additional relevant information for organisational factors	<p>There were issues around shared care The patient was regularly transfused at a different hospital and had co-morbidities and transfusion needs that may have been poorly communicated or subject to a lack of information and handover between organisations</p>

*** The suggested scores assume all discussion points are valid, but the local investigator may know more detail and might score differently**

Section 4 – External Factors

Section 4- External Factors	
To what extent were there any characteristics about the equipment that were unhelpful?	0
To what extent have any national policies or high-level regulatory issues influenced this incident?	3
Please give any additional relevant information for external factors	If inexperienced staff were involved, and a lack of patient monitoring occurred due to poor staffing levels this could be seen as a Department of Health level issue because of underfunding of the health service

*** The suggested scores assume all discussion points are valid, but the local investigator may know more detail and might score differently**

Section 5-Communication and Culture

Section 5- Communication and Culture	
To what extent did a lack of safety culture in your clinical area contribute to this incident?	4
To what extent did poor written, or verbal communication worsen the situation?	5
Please give any additional relevant information for communication and culture	<p>The patient was not clinically reassessed or monitored between blood units, suggesting lack of knowledge of transfusion safety</p> <p>There were issues around shared care between hospitals. This was possibly compounded by suboptimal communication and handover</p>

*** The suggested scores assume all discussion points are valid, but the local investigator may know more detail and might score differently**

Section 6- Summary

Section 6- Summary	
Which are the most important contributory factors for this incident?	Lack of knowledge around TACO risk and single unit transfusion Inexperienced doctor and possibly nurse involved Issues with shared care as patient out of usual transfusion environment
If you could change one thing to make this incident less likely to happen again, what would it be?	Improve intrahospital communication Better skill mix Increased knowledge of transfusion risks and recognition of adverse reactions

*** The suggested summary assumes all discussion points are valid, but the local investigator may know more detail and might score differently**

Case study 2

Causes attributed evenly to all factors

- A group A D-positive patient received a haemopoietic stem cell transplant (HSCT) from a group A D-negative donor
- The transplant protocol was received in the laboratory, but the specific transfusion instructions were not recorded in the laboratory information management system (LIMS)
- Post transplant, two units of A D-positive platelets were transfused instead of A D-negative platelets. The lack of transplant information in the LIMS means a new sample may not have been tested before issuing platelets
- A later group and save request highlighted the error that the patient's transplant had not been recorded in the LIMS
- There was no harm to the patient and it can be shown that at the time of the platelet transfusion the recipient was still grouping as A D-positive, i.e. had not yet converted to the donor's A D-negative group

Case study 3

Human factors scores initially given

Cause attributable to unsafe practice/conditions associated with:	Score out of 10
Individual staff member(s)	5
The local environment or workspace	6
Organisational or management issues in the Trust/Health Board	5
Government, Department of Health or high level regulatory issues	6

Case study 2 - discussion

- This case had scores attributed evenly in the original incident report
- Explanatory comments were given about each score, so their accuracy could be determined
- No suggested changes to the original scores were needed when the further information was analysed

Case study 2 - HF scores when further info considered and reworked using HFIT 2021

Section 1- Situational Factors

Section 1 – Situational Factors	
To what extent is the cause of this incident due to any failures in team function?	3
To what extent did individual staff factors make this incident more likely?	3
To what extent did task features make the incident more likely?	
To what extent were there reasons that this incident was more likely to occur to this particular patient	0
Please give any additional relevant information for situational factors	BMS followed procedure but omitted one step Interruptions by colleagues and other healthcare professionals whilst inputting data into the LIMS

*** The suggested scores assume all discussion points are valid, but the local investigator may know more detail and might score differently**

Section 2- Local working Conditions

Section 2 – Local Working conditions		<p>* The suggested scores assume all discussion points are valid, but the local investigator may know more detail and might score differently</p>
To what extent was there a mismatch between workload and staff provision around the time of the incident?	3	
To what extent was there any failure of team function in relation to leadership, supervision and roles?	3	
To what extent were there any difficulties obtaining the correct equipment and/or supplies?	0	
Please give any additional relevant information for local working conditions	<p>Staff shortages</p> <p>Implementation of a shift pattern has resulted in fewer qualified staff available during routine hours</p>	

Section 3- Organisational Factors

Section 3- Organisational Factors	
To what extent did the environment hinder work in any way?	3
To what extent were there problems in other departments that contributed?	0
To what extent did organisational pressures play a role in the incident?	3
To what extent were there issues or gaps with staff skill or knowledge?	3
Please give any additional relevant information for organisational factors	<p>Interruptions by colleagues and other healthcare professionals whilst inputting data into the LIMS</p> <p>Implementation of a shift pattern has resulted in fewer qualified staff available during routine hours</p>

*** The suggested scores assume all discussion points are valid, but the local investigator may know more detail and might score differently**

Section 4 – External Factors

Section 4- External Factors	
To what extent were there any characteristics about the equipment that were unhelpful?	0
To what extent have any national policies or high-level regulatory issues influenced this incident?	3
Please give any additional relevant information for external factors	Insufficient NHS funding leading to inability to increase staff levels to cope with increased work loads and changes in work patterns

*** The suggested scores assume all discussion points are valid, but the local investigator may know more detail and might score differently**

Section 5-Communication and Culture

Section 5- Communication and Culture	
To what extent did a lack of safety culture in your clinical area contribute to this incident?	0
To what extent did poor written, or verbal communication worsen the situation?	2
Please give any additional relevant information for communication and culture	Staff were multitasking

*** The suggested scores assume all discussion points are valid, but the local investigator may know more detail and might score differently**

Section 6- Summary

Section 6- Summary	
Which are the most important contributory factors for this incident?	Interruptions by colleagues and other healthcare professionals whilst inputting data into the LIMS Implementation of a shift pattern has resulted in fewer qualified staff available during routine hours
If you could change one thing to make this incident less likely to happen again, what would it be?	Improved skill mix Create a workspace for BMS free from interruptions

*** The suggested summary assumes all discussion points are valid, but the local investigator may know more detail and might score differently**

Summary

- Human factors is all about how humans interact with processes and systems
- It is common to think the individual is totally responsible for an error, but consider whether they may be working in a poor system
- Our top tip is to review all contributing factors before scoring the human factors section in the SHOT Database questionnaires
- If in doubt, please ask the SHOT Office, SHOT@nhsbt.nhs.uk, 0161 423 4208

Thank you

- SHOT owes a huge debt of gratitude to all reporters for their diligent reporting and sharing their cases with us
- SHOT would like to acknowledge the Yorkshire and Humber Improvement Academy. Creative Commons Bradford Teaching Hospitals NHS Foundation Trust for the YCFF
<https://improvementacademy.org/about-us/>
- Many thanks for reading these tips about Human Factors and we hope you have found them useful

Kind regards,

The SHOT Team

SHOT resources on Human Factors

- SHOT human factors resources (N.B. current resource listings may later be archived)
 - Current resources <https://www.shotuk.org/resources/current-resources/>
 - Includes SHOT Bite no.12 on Cognitive Bias here <https://www.shotuk.org/resources/current-resources/shot-bites/>
 - SHOT webinar which aired 5 Nov 2020 <https://www.shotuk.org/resources/current-resources/webinars/>
 - SHOTcast1 on HF <https://www.shotuk.org/resources/current-resources/shot-casts/>
 - SHOT HF videos – coming soon!
 - Figures from 2019 Report – Fig 6.1 onwards
 - Cases from Annual Reports – Cases slide 8 onwards
 - Archived resources <https://www.shotuk.org/resources/archived-resources/>

Further information and reading about human factors

These links are provided for information only

Their inclusion should not be considered as approval or endorsement by SHOT

- Clinical Human Factors Group <http://chfg.org/>
- NHS England Human Factors Concordat <https://www.england.nhs.uk/wp-content/uploads/2013/11/nqb-hum-fact-concord.pdf>
- Chartered Institute of Ergonomics & Human Factors healthcare page <https://www.ergonomics.org.uk/Public/Resources/Sector%20Information/Healthcare/Public/Resources/Sectors/Healthcare.aspx>
- Free book - *Safer Healthcare, Strategies for the Real World* by Vincent & Amalberti <http://www.springer.com/gb/book/9783319255576>
- Steven Shorrock's Humanistics Systems, a Human Factors blog site <https://humanisticsystems.com/author/stevenshorrock/>
- Erik Hollnagel's website <https://www.erikhollnagel.com/>
- Video produced by www.systemsthinking.com, Loughborough University <https://www.youtube.com/watch?v=5oYV3Dqe0A8>
- Free online course by the University of East Anglia, supplied via Future Learn, part of the Open University <https://www.futurelearn.com/courses/human-factors-healthcare>
- The national Human Factors development and networking website for Scotland <http://www.knowledge.scot.nhs.uk/hfe.aspx>
- Textbook of Patient Safety and Clinical Risk Management <https://link.springer.com/book/10.1007/978-3-030-59403-9>