

Human factors initiatives in haemovigilance: Preliminary experience from Serious Hazards of Transfusion (SHOT)

Alison Watt^{1,2}

Gyuchan Thomas Jun¹, Patrick Waterson¹ and Paula Bolton-Maggs²

¹*Loughborough Design School, Loughborough University, Loughborough, UK*

²*Serious Hazards of Transfusion (SHOT), the UK haemovigilance scheme, Manchester, UK*

Definition Human Factors (HF)

"Understanding the interactions of human stakeholders with the organisational and technologic components of the system"

(Chadwick and Jeffcott, 2013)

What is Human Factors?

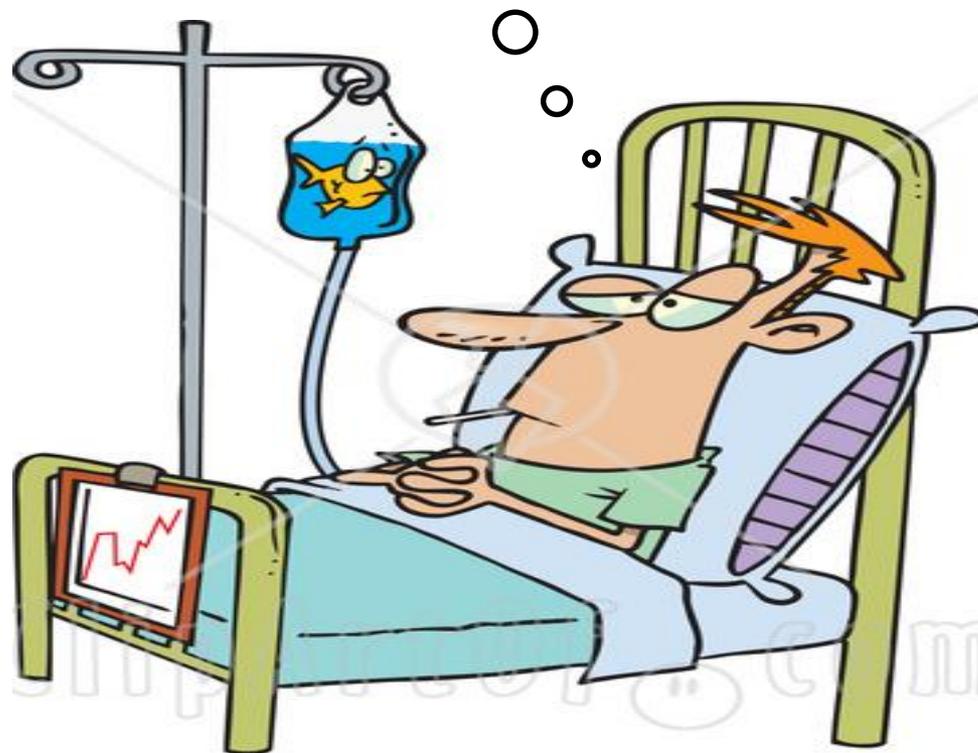
- How to make the system as resilient and human-friendly as possible
- How to make it easier to do the right thing
- Means exactly the same as ergonomics – is often known as HFE (human factors and ergonomics)
- ‘Human factors’ is used as a singular phrase, so ‘human factors is...’ (not HF are...)

What Human Factors is not

- Cannot eliminate human error, that's impossible
- HF does not mean the same as 'human error' – humans might make errors as a result of lack of attention to HF
- Not about changing human behaviour
- Cannot be learnt in one training session

Public perception of blood transfusion?

I've heard you can get
AIDS from blood



Transfusion virus risk is very small

Estimated risk that a donation entering the UK blood supply is potentially infectious (2013-2016)	
Virus	Risk estimate
Hepatitis B (HBV)	1 in 2.1 million
Human Immunodeficiency Virus (HIV)	1 in 15.5 million
Hepatitis C (HCV)	1 in 95.8 million

Public Health England (PHE) epidemiology unit Safe Supplies Annual Review

Risks of error in Transfusion in UK (2017)

Approximate risk of death
from error: 1 in 170,000
components transfused



14
Deaths



1201 errors
led to patient harm

2760 error-related incidents,
almost half were near misses

Approximately 2.4 million components
transfused each year with no complications

Background to this research

- There had been very little HF research in transfusion
- SHOT transfusion incident reports did not include any examination of HF
- So we set up some projects to investigate if HF could be applied to the transfusion process to reduce the risk of errors

Three studies

1. Retrospective analysis of historical SHOT incident reports using 7 known HF models
2. Creation and use of a human factors investigation tool (HFIT)
3. Prospective analysis of resilience in the hospital setting

Study 1

Retrospective assessment

Analysis of historical incidents (n=76)

- Incorrect blood transfusion (IBCT) (n=36)
- Similar near miss (NM) cases, where the error was detected before the transfusion took place (n=40)

Study 1: 7 HF models evaluated

1. SRK

Skills
Rules
Knowledge

2. Active & Latent

Swiss Cheese
Model

3. AcciMap

Accident
Mapping

4. HFACS

HF Analysis and
Classification System

5. STAMP

Systems Theoretic Accident
Modelling and Processes

6. FRAM

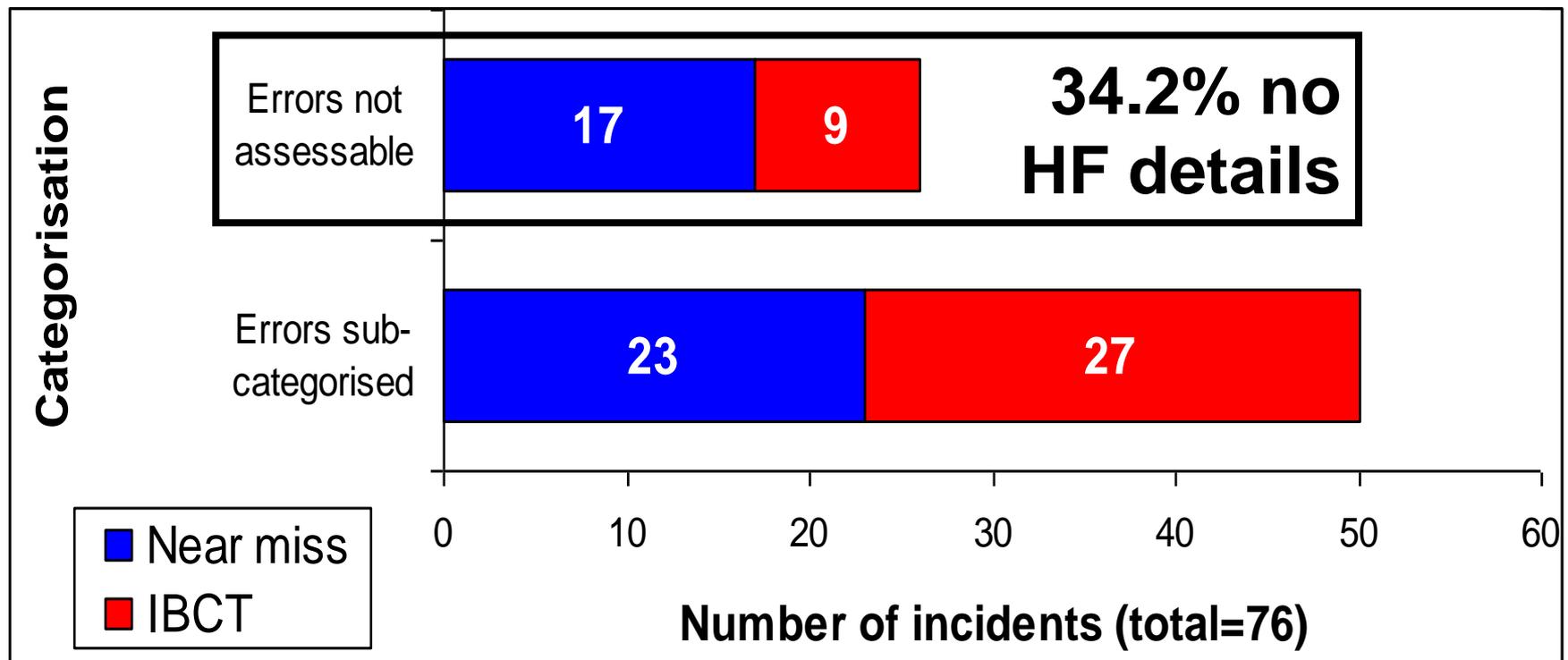
Functional Resonance
Analysis Method

7. SEIPS 2.0

Systems Engineering Initiative
for Patient Safety 2.0

Study 1: Results

Existing incident reports often had insufficient HF information to make a subcategorisation



Study 1: Summary

None of the HF models was suitable

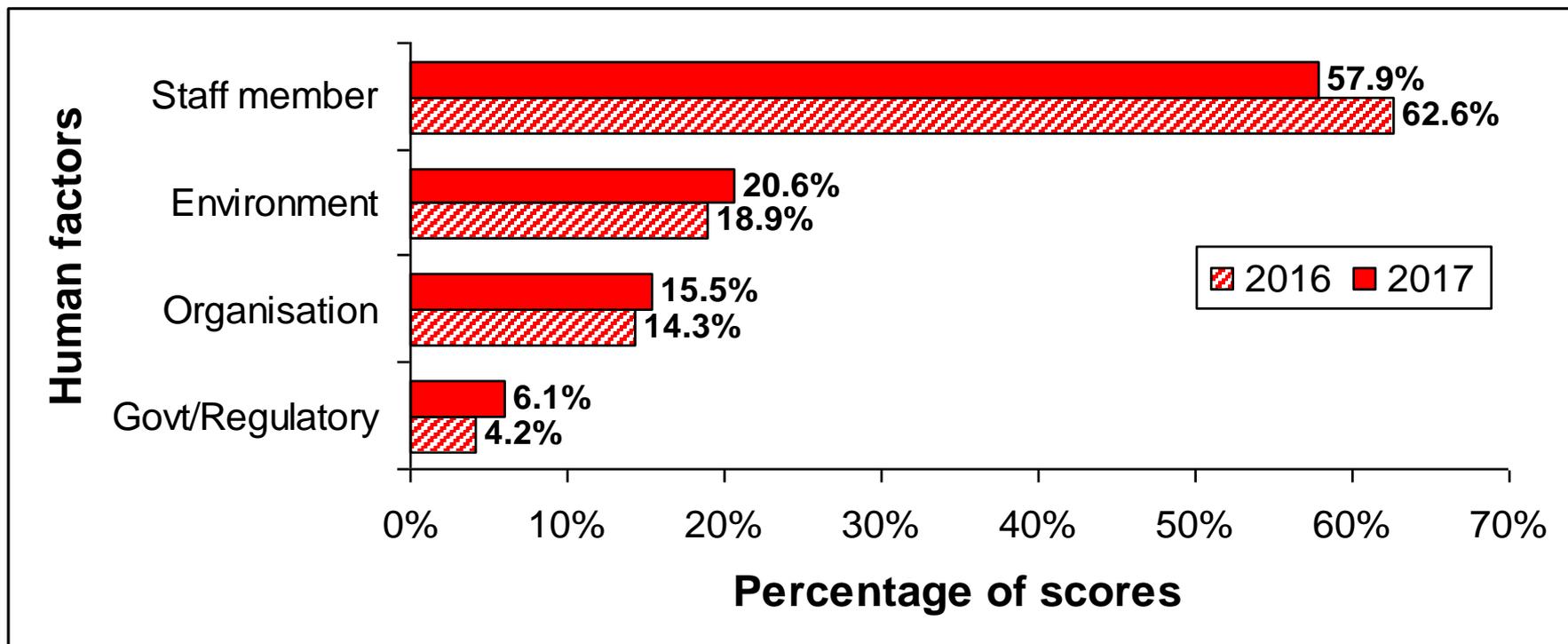
In all seven models the outcome was a tendency to place responsibility for errors on individuals

Study 2: HF Investigation Tool (HFIT)

In January 2016 a human factors investigation tool (HFIT) was added to the SHOT database. Reporters were asked to assess each factor from **0**=no contribution, to **10**=fully responsible

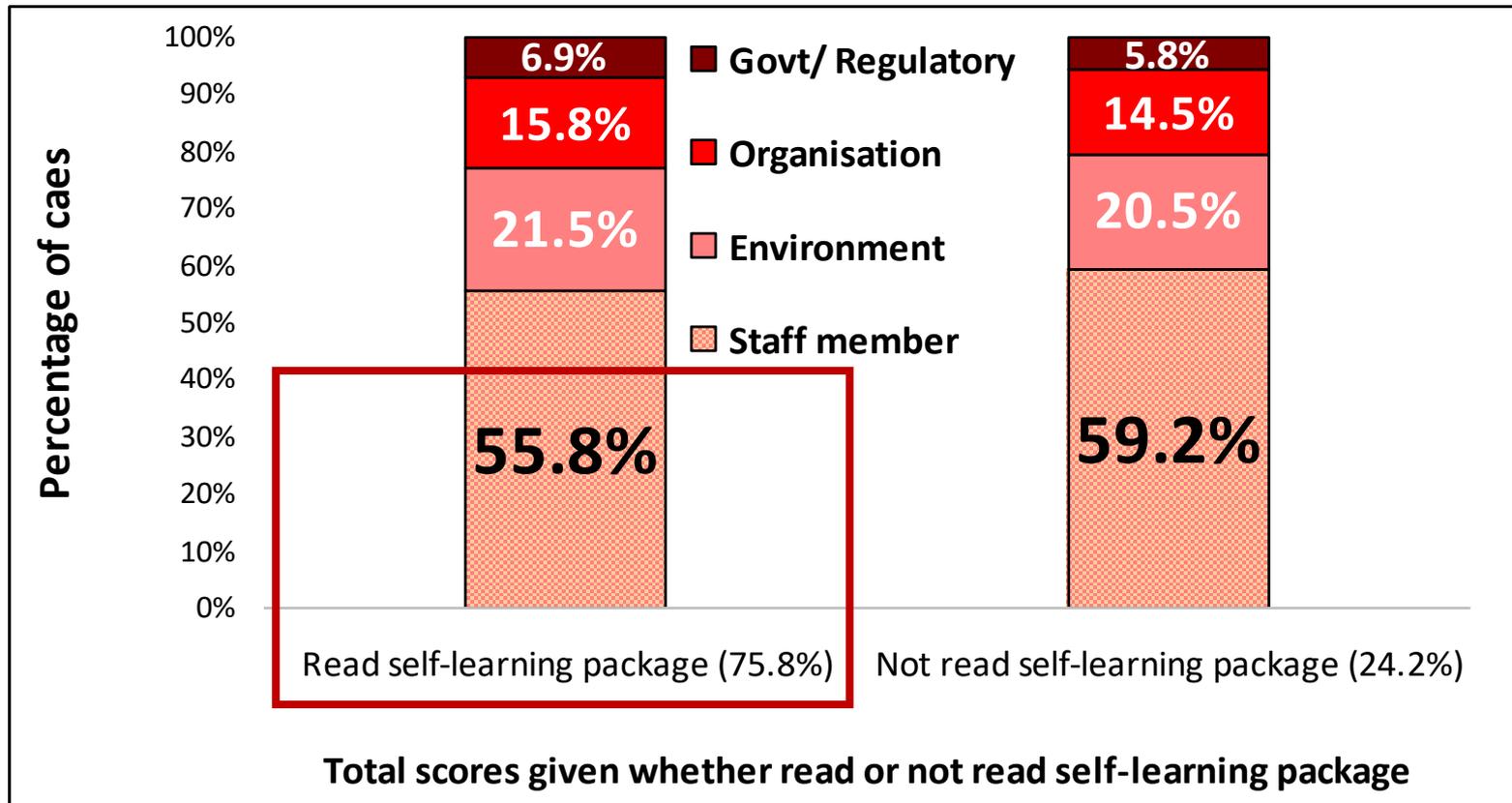
- **Staff:** Unsafe practice by individuals
- **Environment:** Unsafe local environment or workspace
- **Organisation:** Unsafe organisational/management conditions in the Trust/Health Board
- **Government/Regulatory:** Conditions in government, Department of Health or high level regulatory issues

Study 2: Scores decrease as system and organisational factors become more remote from the individual (2016 & 2017)



Study 2: Effect of self-learning (2017)

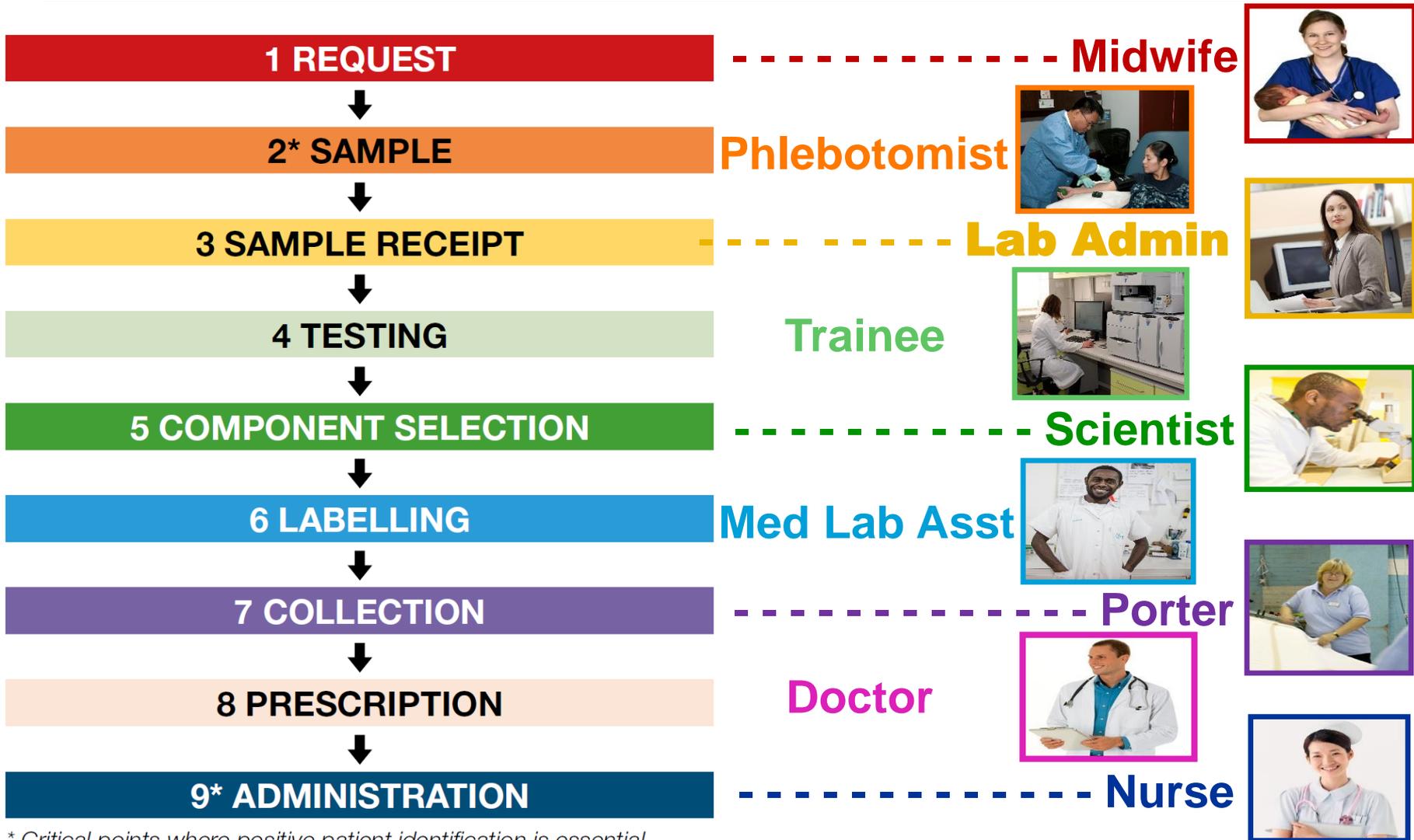
Slightly less tendency to put responsibility onto individual staff members if the self-learning package was read (55.8%) compared to if not read (59.2%)



Study 3: Process resilience

- Method = an open question
 - “Please give a short outline of the biggest or most recent difficulty that you have faced when carrying out this procedure and what did you do about the issue?”
- All employees questioned (n=37) gave at least one example of a problem/adaptation and several gave more than one (n=66)

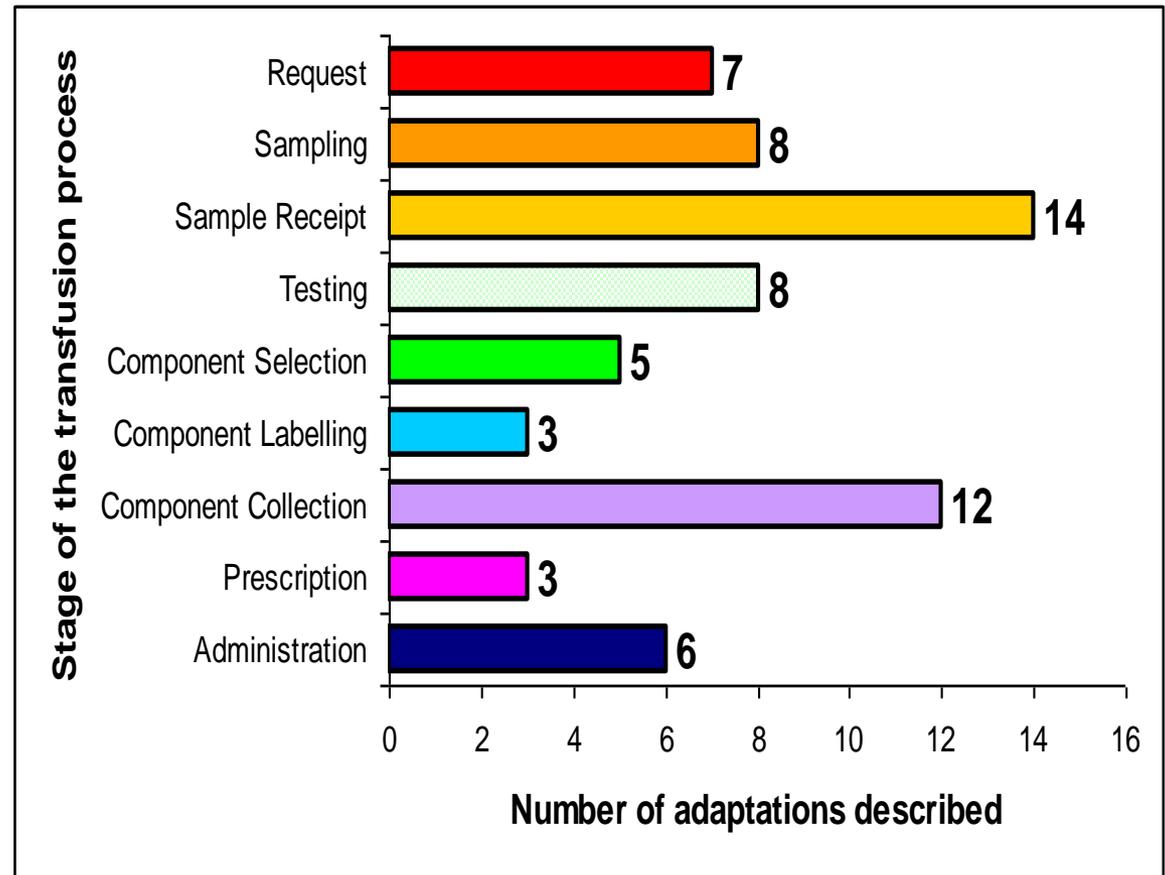
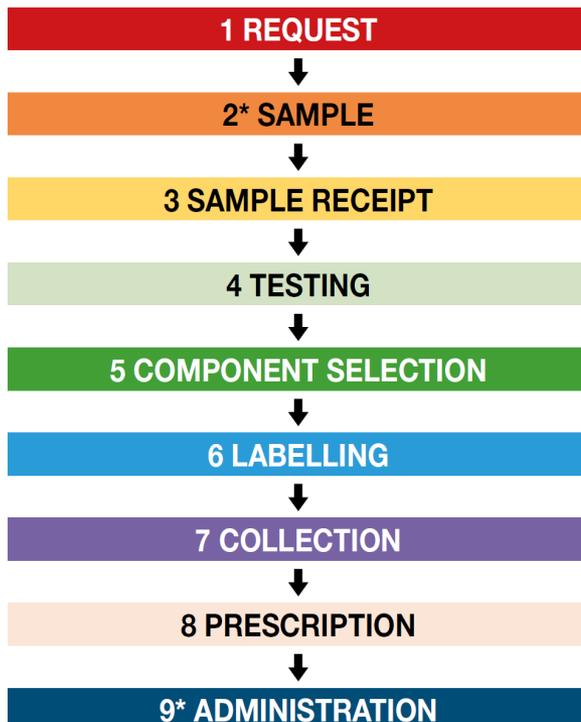
Transfusion process very complex



* Critical points where positive patient identification is essential

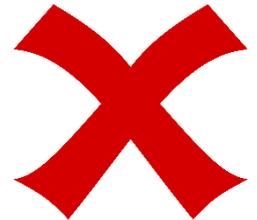
Study 3: Prospective review of resilience

Adaptations were seen at every stage of the nine-step transfusion process (total n=66)



Poor adaptation

- Nurse prescriber assesses patient need for transfusion and posts a request form for pre-transfusion sample
- Standard process is for posting to be done by the hospital admin team, but this causes delays
- For urgent transfusion, the nurse buys own stamps for posting



Good adaptation

- Patients on the day ward were increasing the flow, so their transfusions finished quicker
- This puts patients at risk of transfusion associated circulatory overload
- They have introduced programmable pumps to stop patients increasing flow



Study 3: Adaptations go unnoticed

Follow up question:
"How supportive was your manager or department for how you solved the issue?"

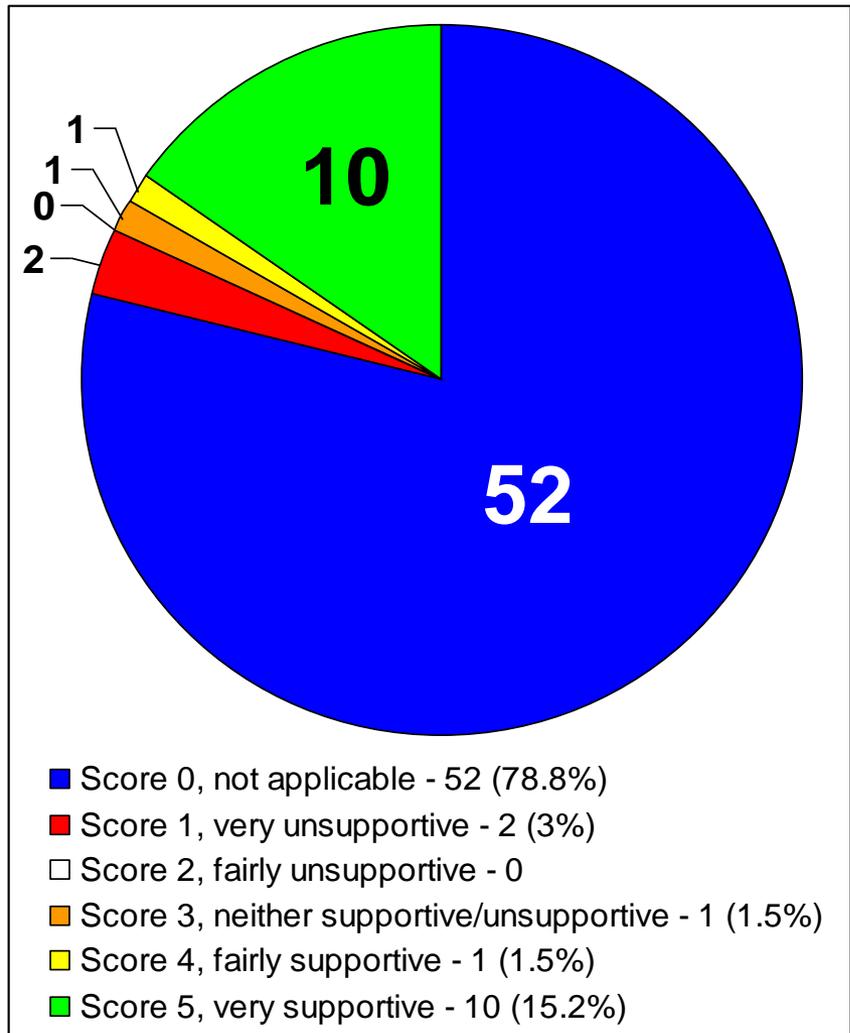
Graded:

5 - very supportive
1 - very unsupportive
N/A – not applicable

Outcome:

N/A n=52, 78.8%

Adaptations often made without approval from management or colleagues



Further developments

- The HFIT will remain in use for incident reports and be further analysed/developed over time
- Further self-learning resources have been published to encourage better analysis for incident reporters completing the HFIT
- The resilience/adaptation question will continue to be asked in an ongoing National Comparative Audit (NCA) of transfusion
- Longer term it may be possible to develop tools for hospital staff to assess their own resilience

Many thanks for your attention



“There is always a well-known solution to every human problem - neat, plausible and ...
WRONG”

H. L. Mencken (September 12, 1880 – January 29, 1956)

American columnist, essayist, magazine editor and acerbic critic of life and culture