



FIGURES FROM THE ANNUAL SHOT REPORT 2024

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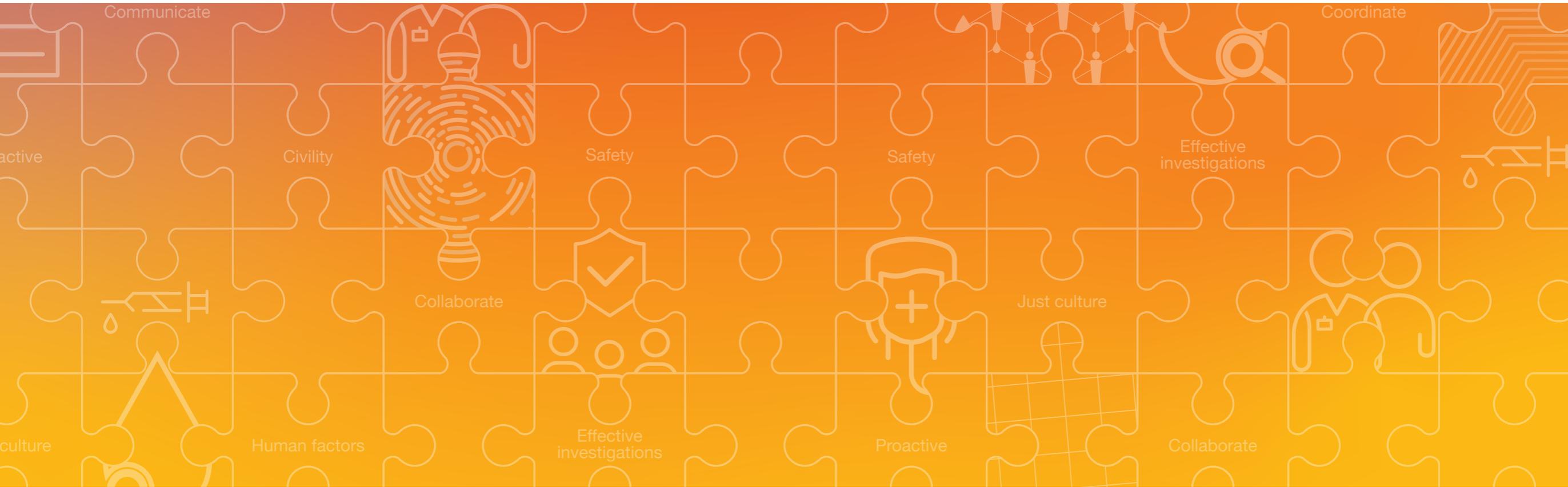


Figure 2.1: Haemovigilance reports submitted by year with reports per 1,000 blood components issued 2010-2024

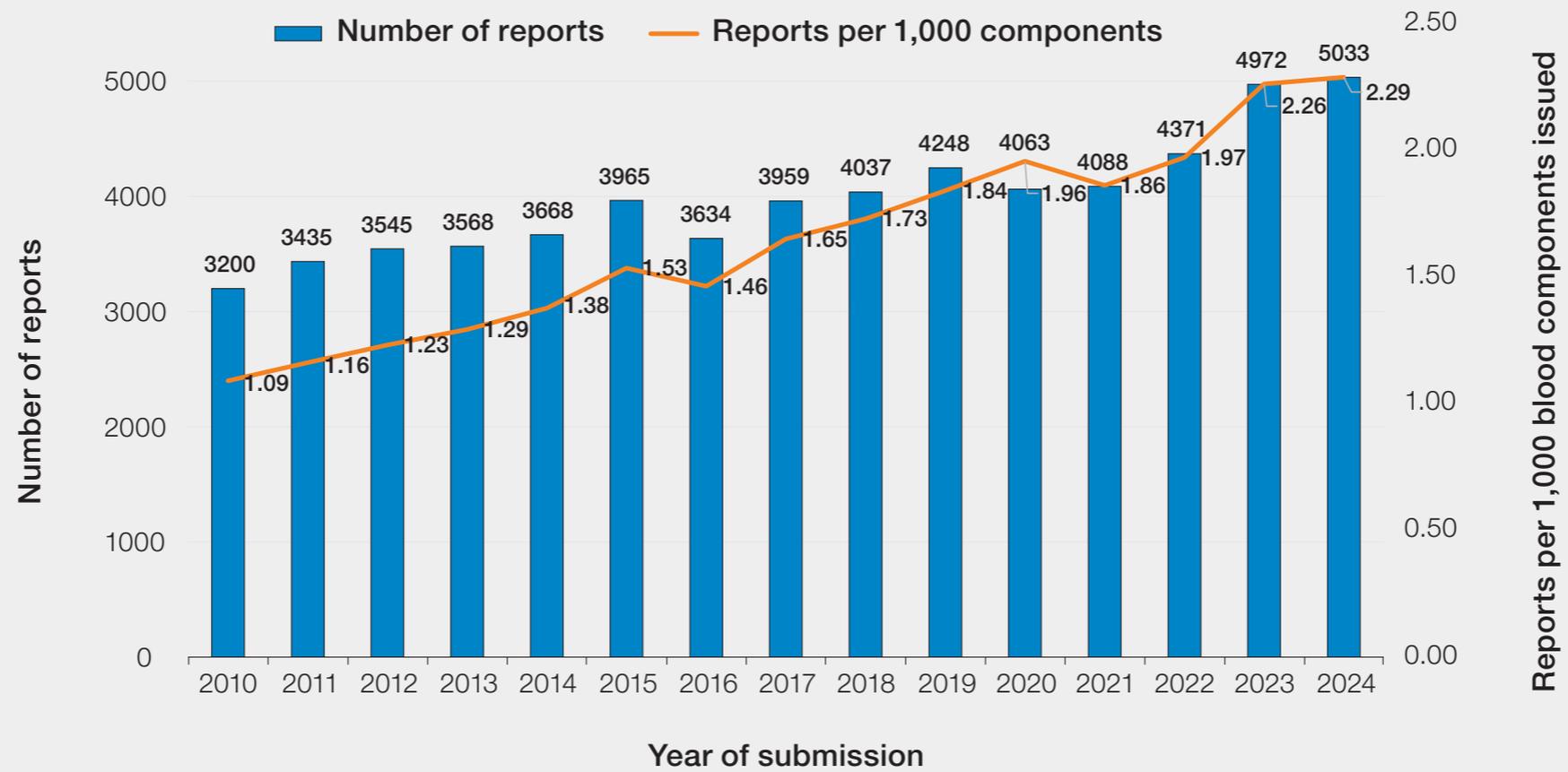
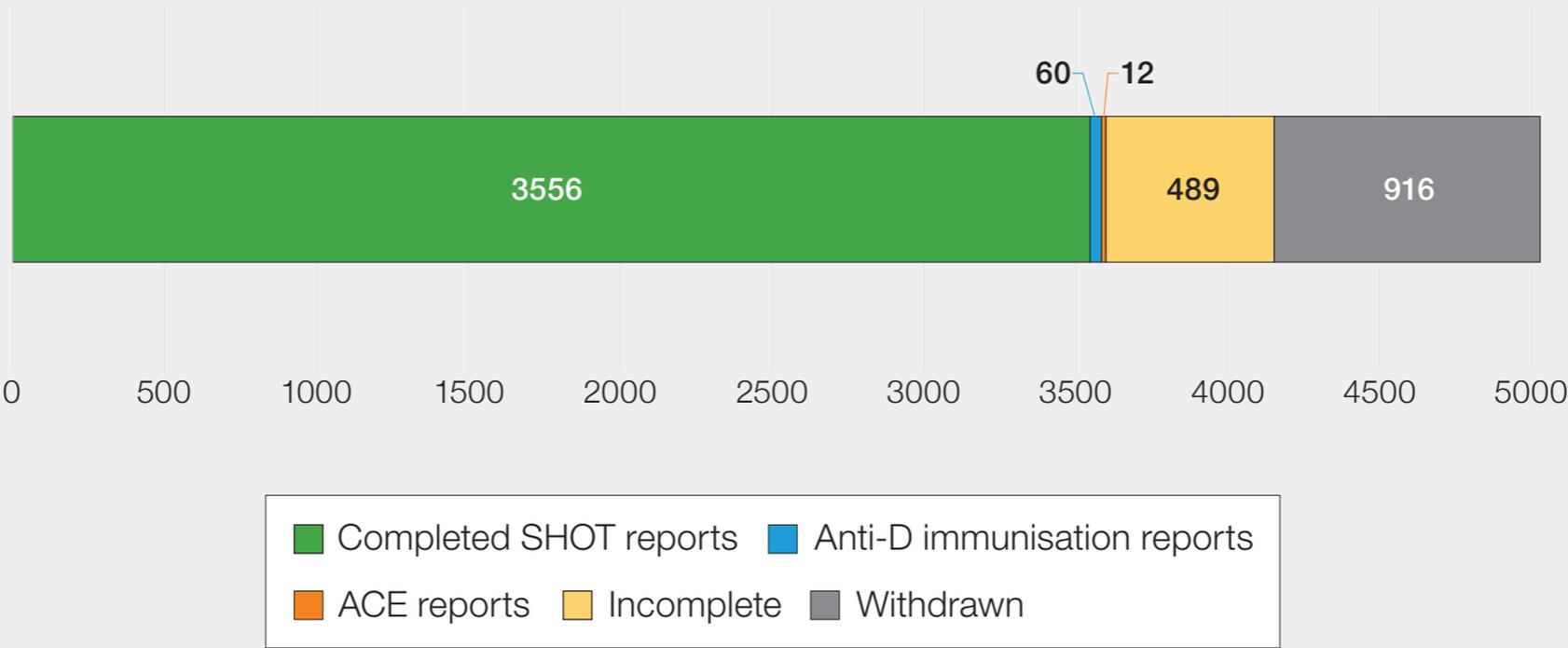
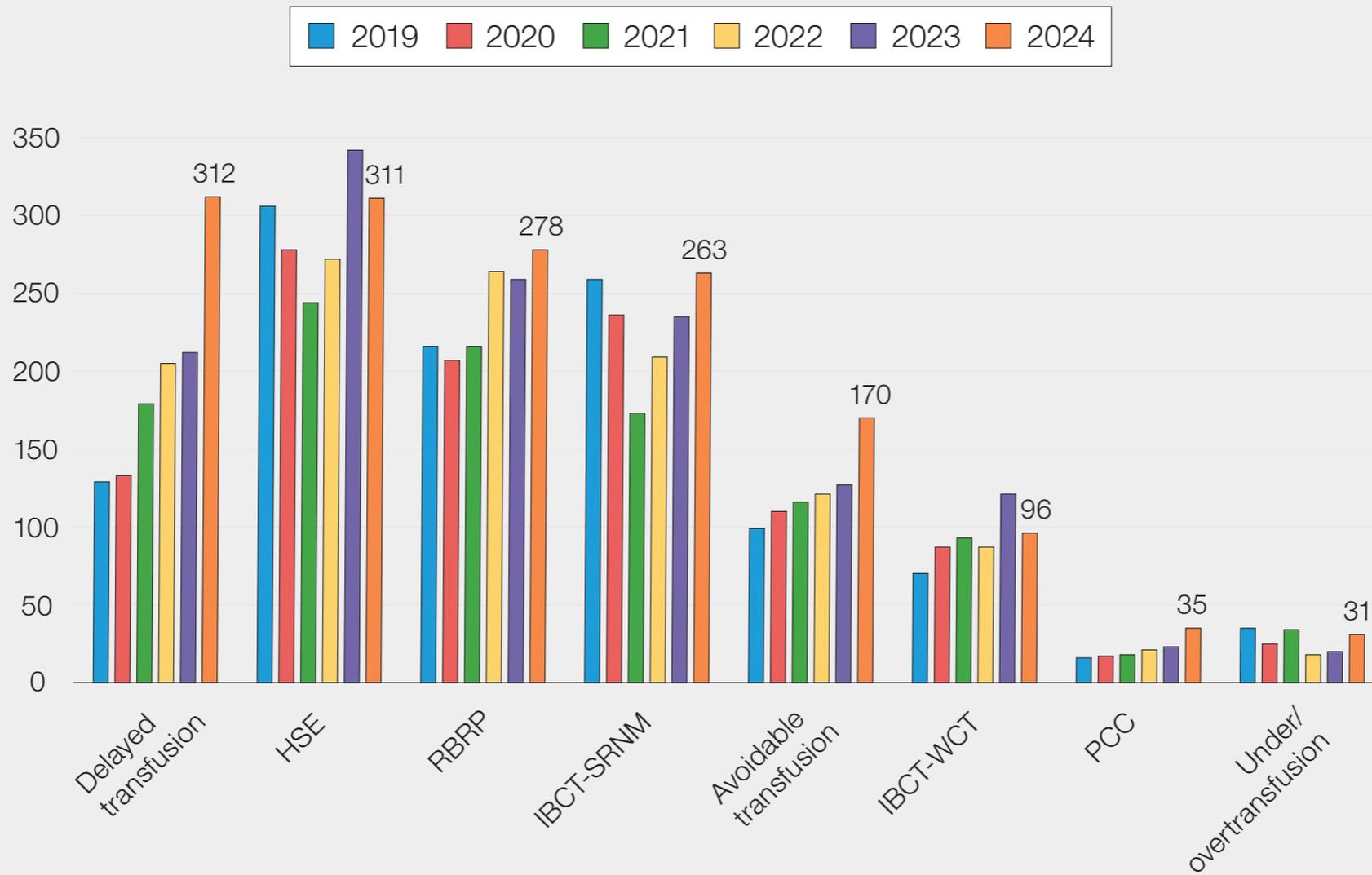


Figure 2.2: The status of reports submitted to SHOT in 2024 (n=5033)



ACE=acknowledging continuing excellence. Note: One case submitted and completed in 2024 was a possible transfusion-transmitted infection (TTI) from 2023. This has not been included in this year's Annual SHOT Report numbers, but was discussed in the 2023 Annual SHOT Report (Narayan, et al., 2024)

Figure 2.3: Number of reports by SHOT error category, 2019 to 2024



HSE=handling and storage errors; RBRP=right blood right patient; IBCT-SRNM=incorrect blood component transfused-specific requirements not met; IBCT-WCT=IBCT-wrong component transfused; PCC=prothrombin complex concentrates

Figure 2.4: Number of reports by NHS reporting organisation and component usage level in 2024

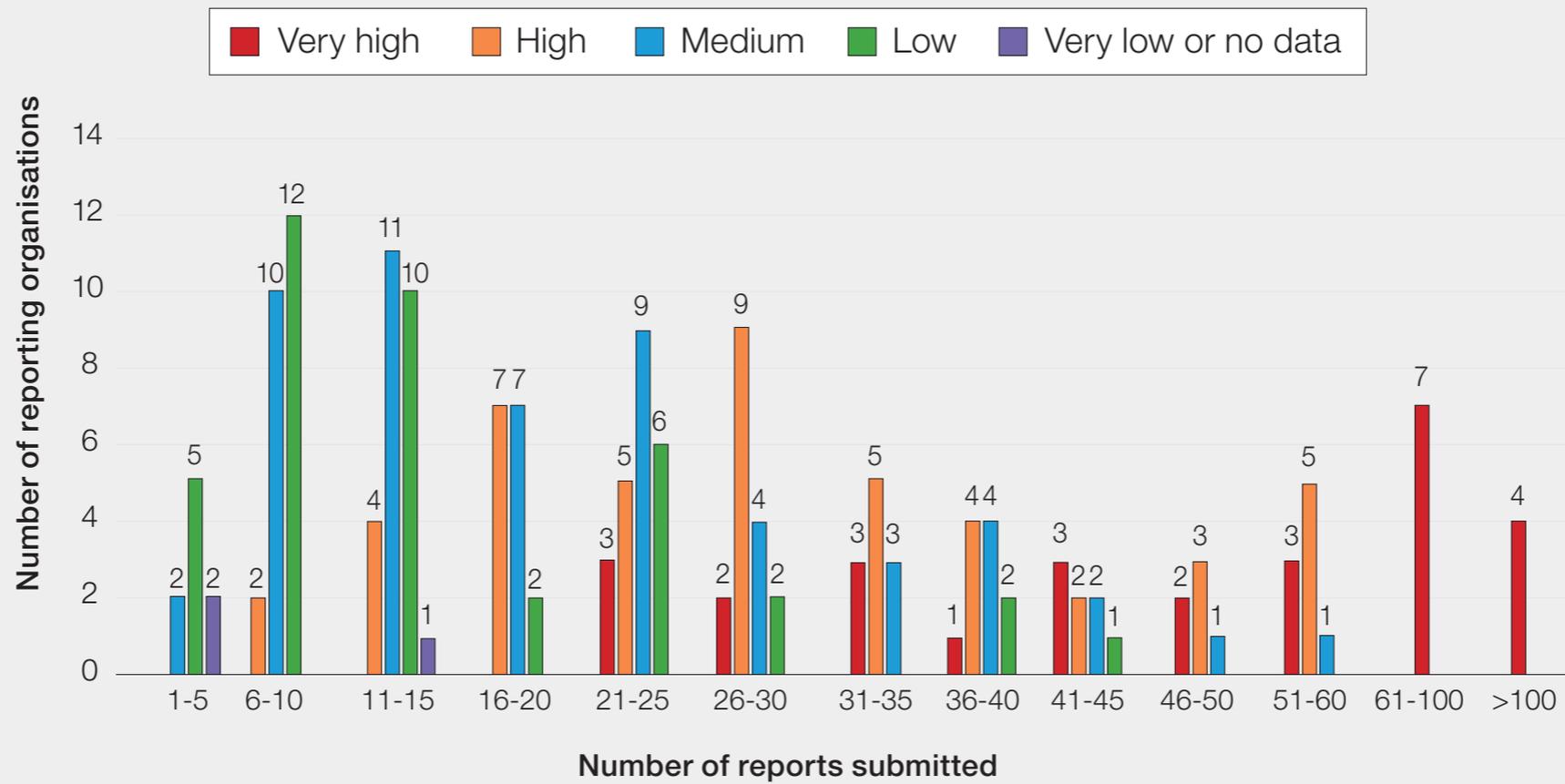


Figure 2.5: Survey responses for ease of use of the new SHOT database user interface in July 2024

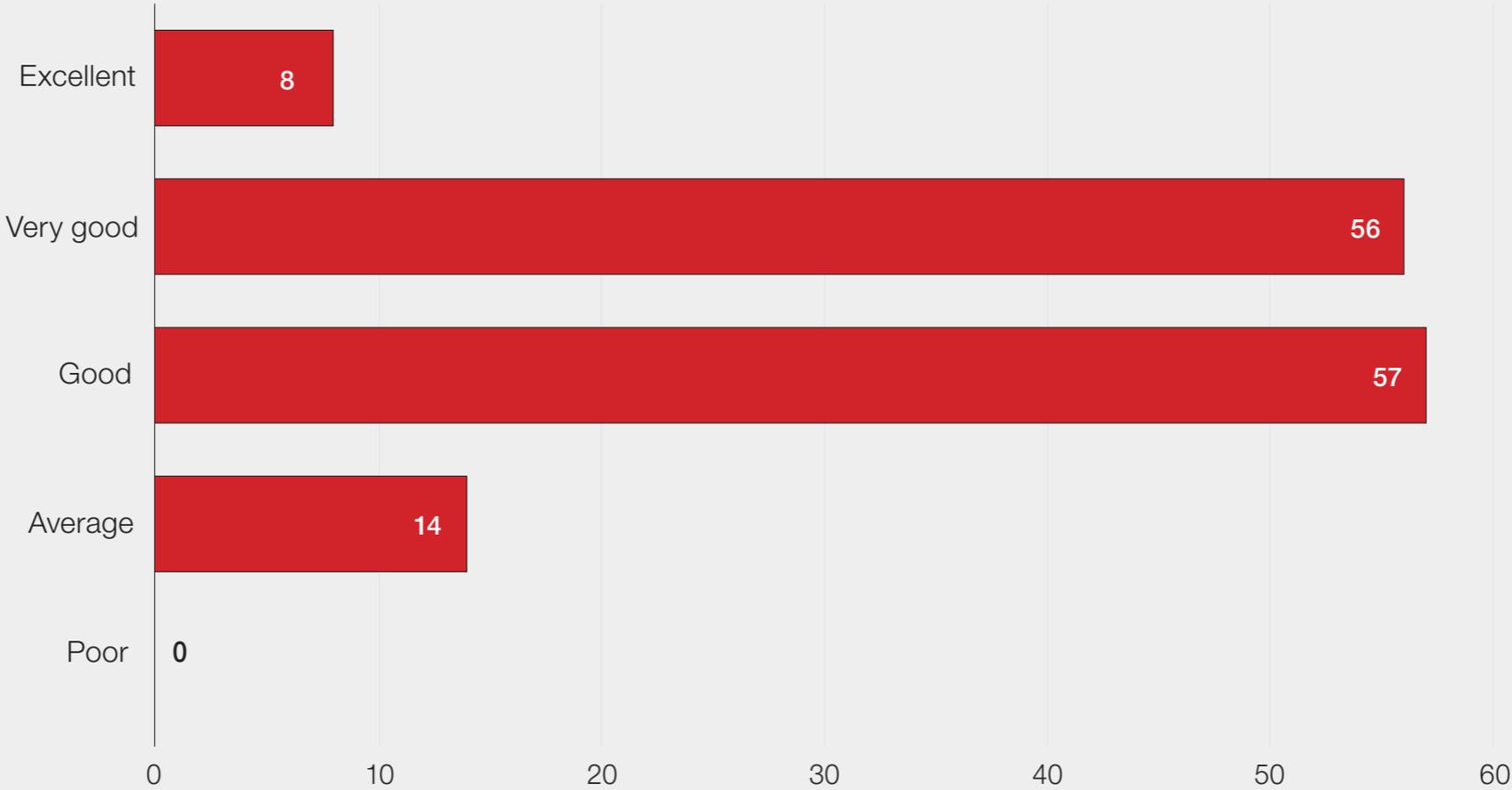


Figure 2.6: Example graphs from the SHOT dashboard

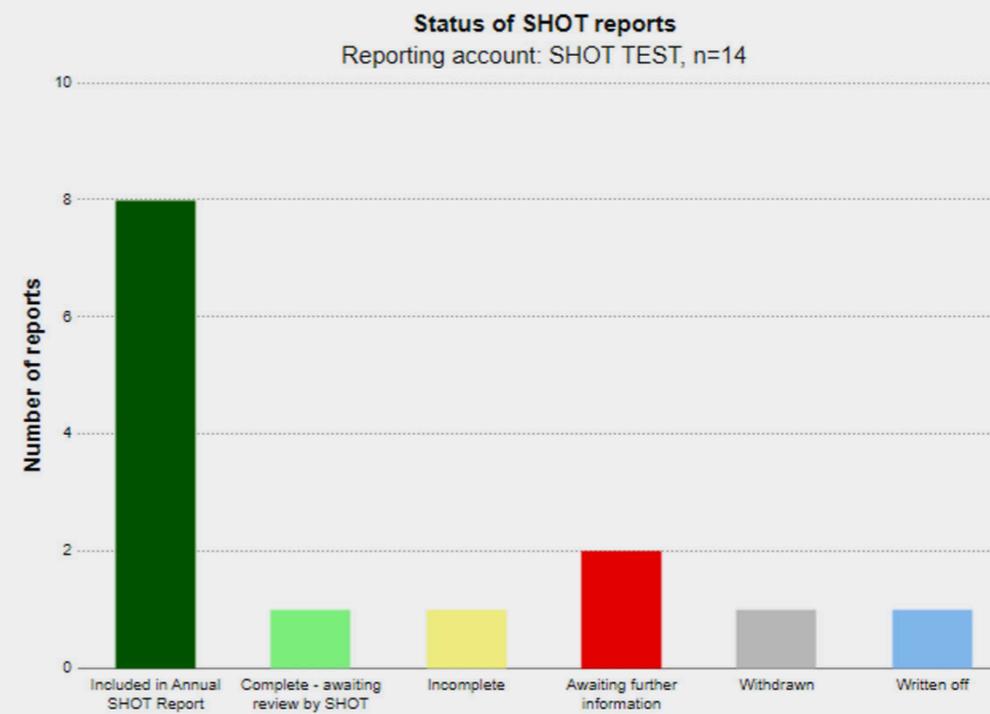
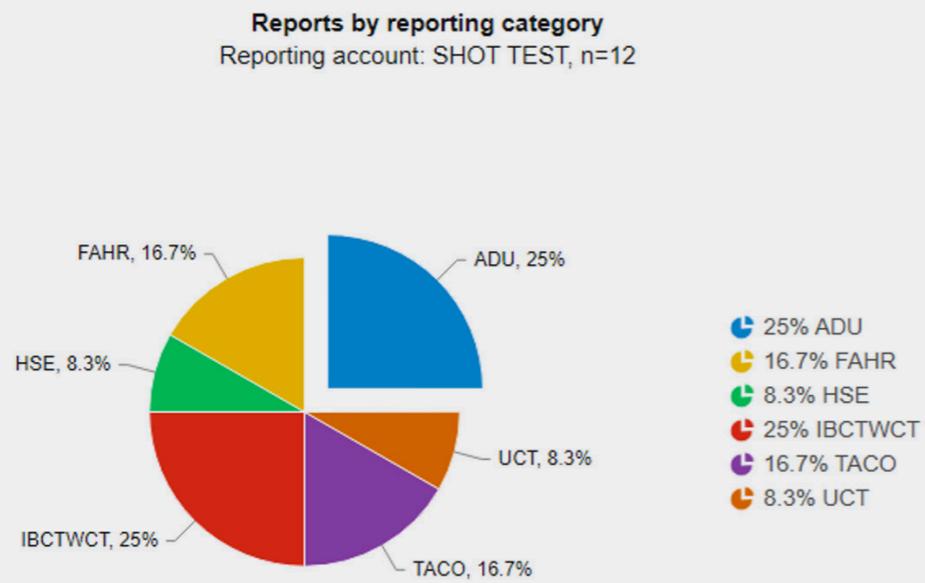


Figure 3.1: Errors account for most reports in 2024 (n=3322/3998)

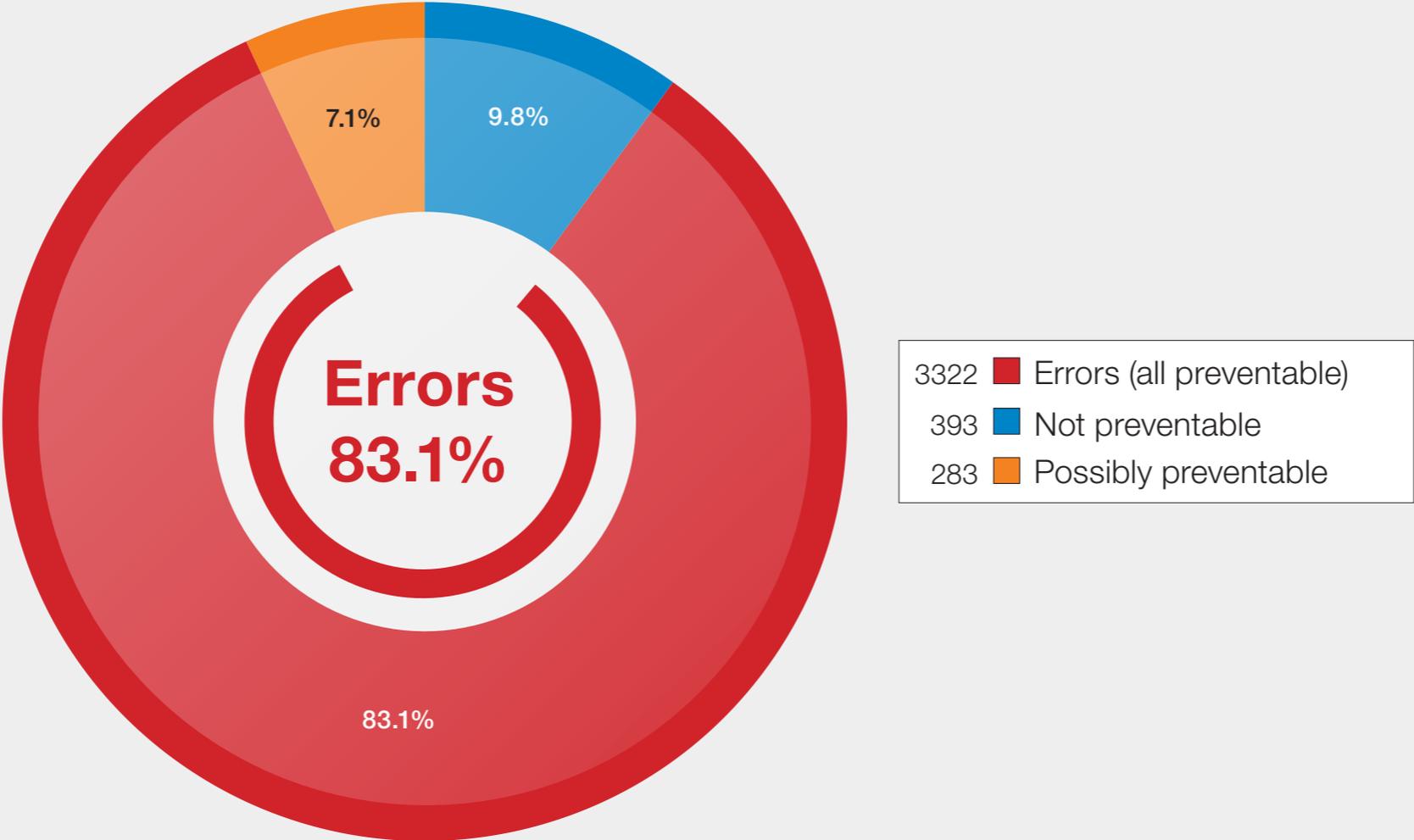
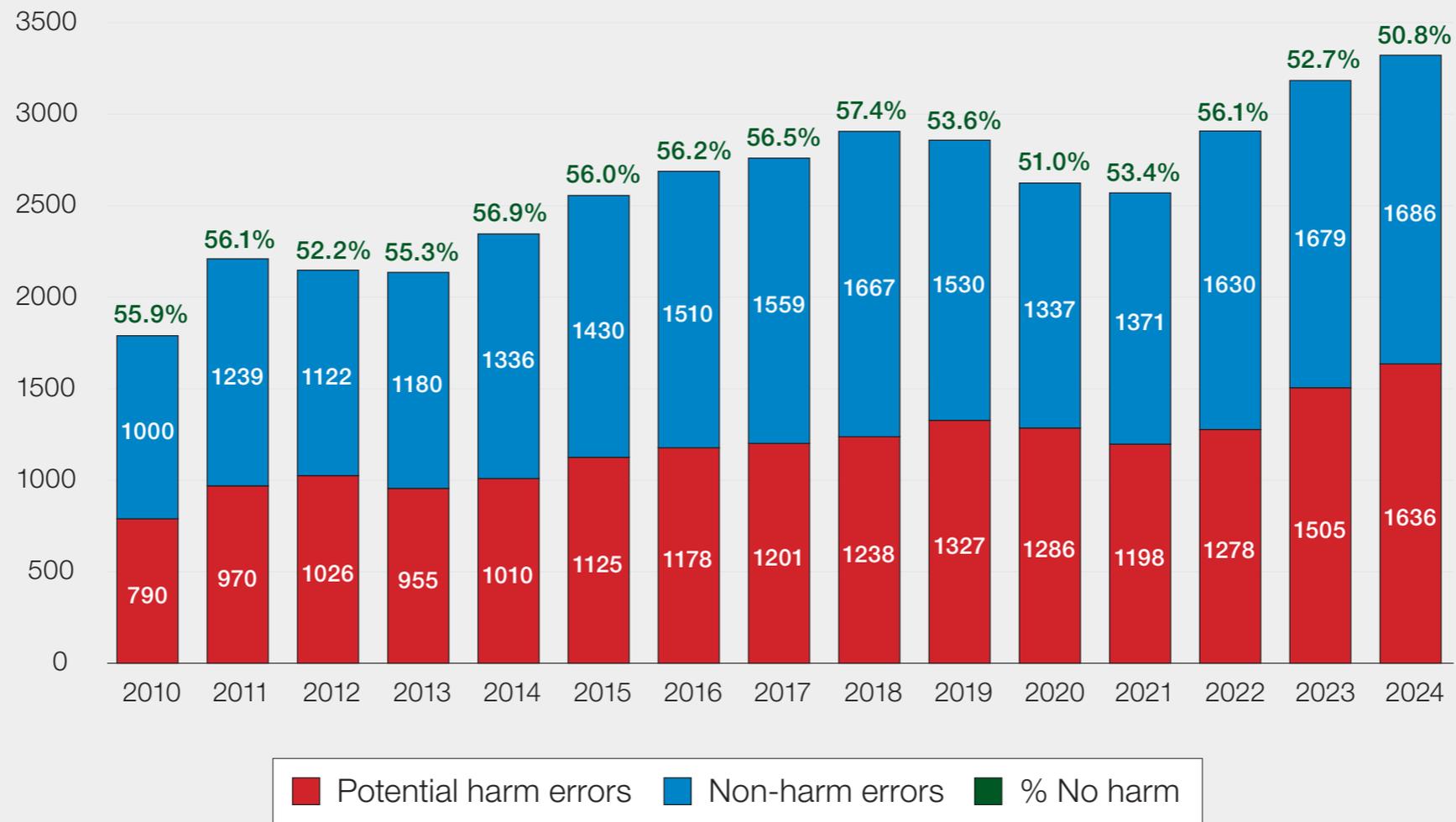
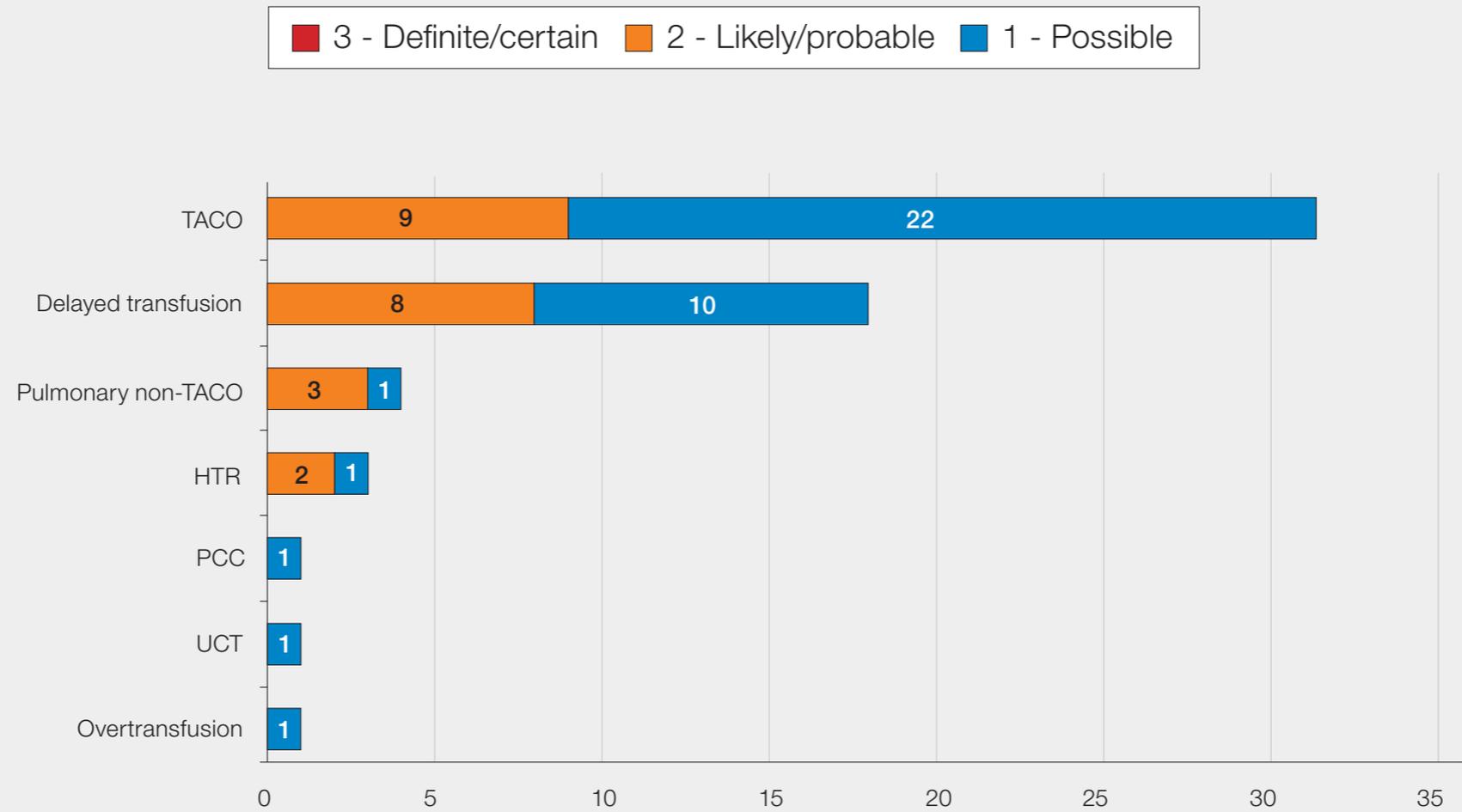


Figure 3.2: No patient-harm and potential patient-harm incidents 2010-2024



Potential harm incidents include incorrect blood component transfused (IBCT) errors, delayed transfusion, avoidable transfusion, under or overtransfusion, incidents related to prothrombin complex concentrates, handling and storage errors (HSE) and errors related to anti-D immunoglobulin administration. Non-harm incidents include near miss (NM) and right blood right patient (RBRP) errors

Figure 3.3: Deaths related to transfusion with imputability reported in 2024 (n=59)



HTR=haemolytic transfusion reactions; PCC=prothrombin complex concentrates; TACO=transfusion-associated circulatory overload; UCT=uncommon complications of transfusion

Figure 3.4: Deaths related to transfusion with imputability reported 2010-2024 (n=379)

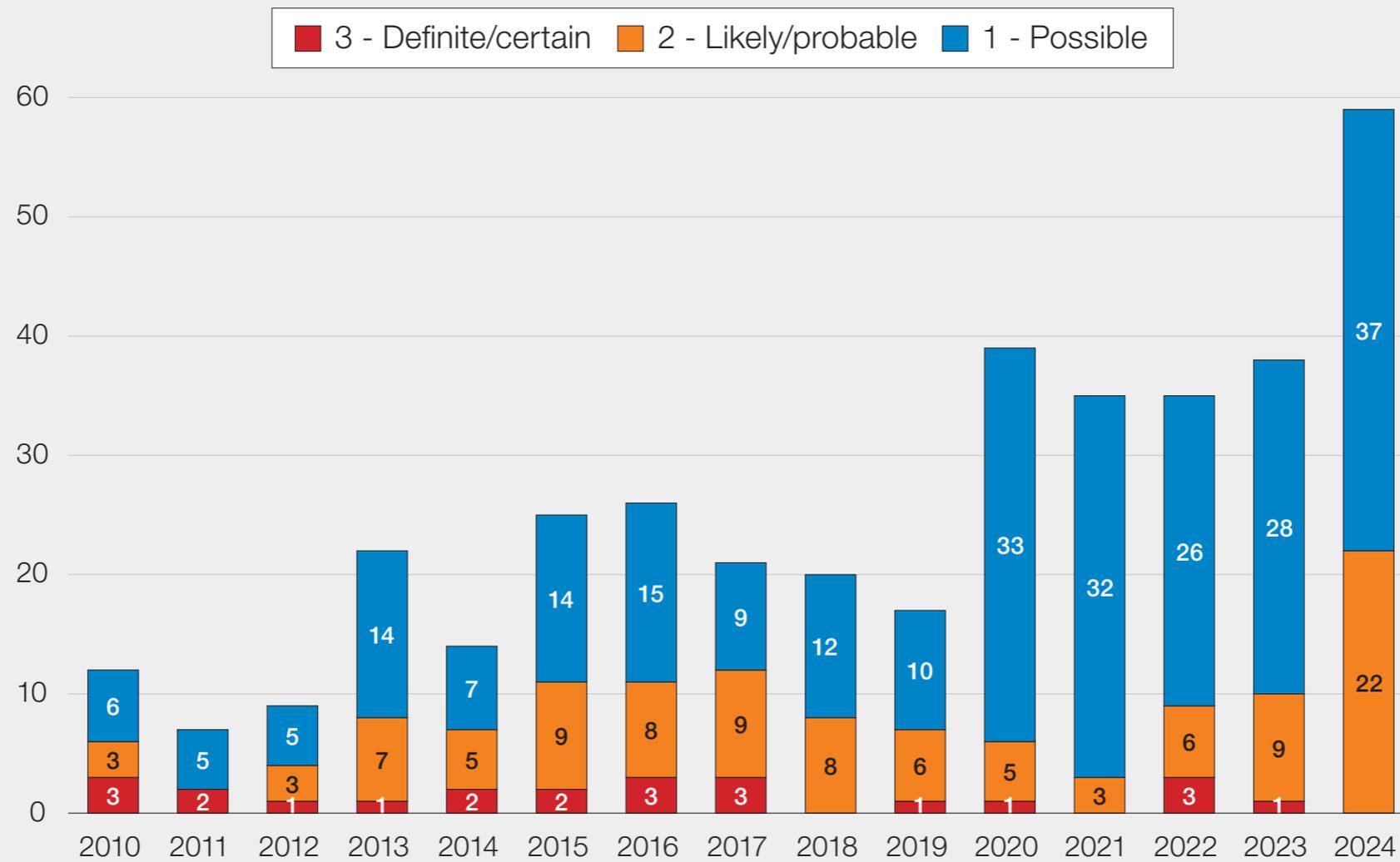


Figure 3.5: Transfusion-related deaths by SHOT category, 2010 to 2024 (n=379)

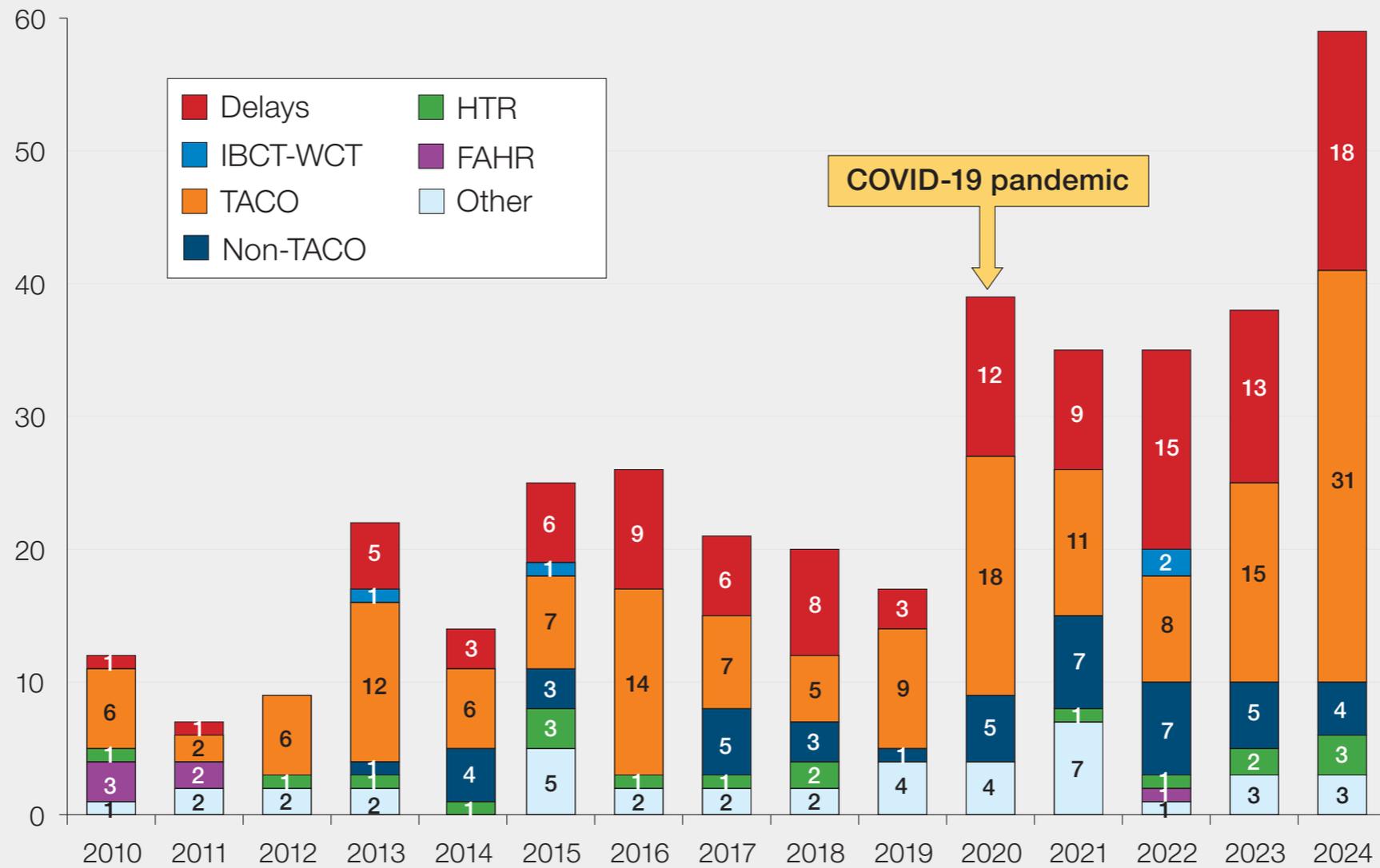
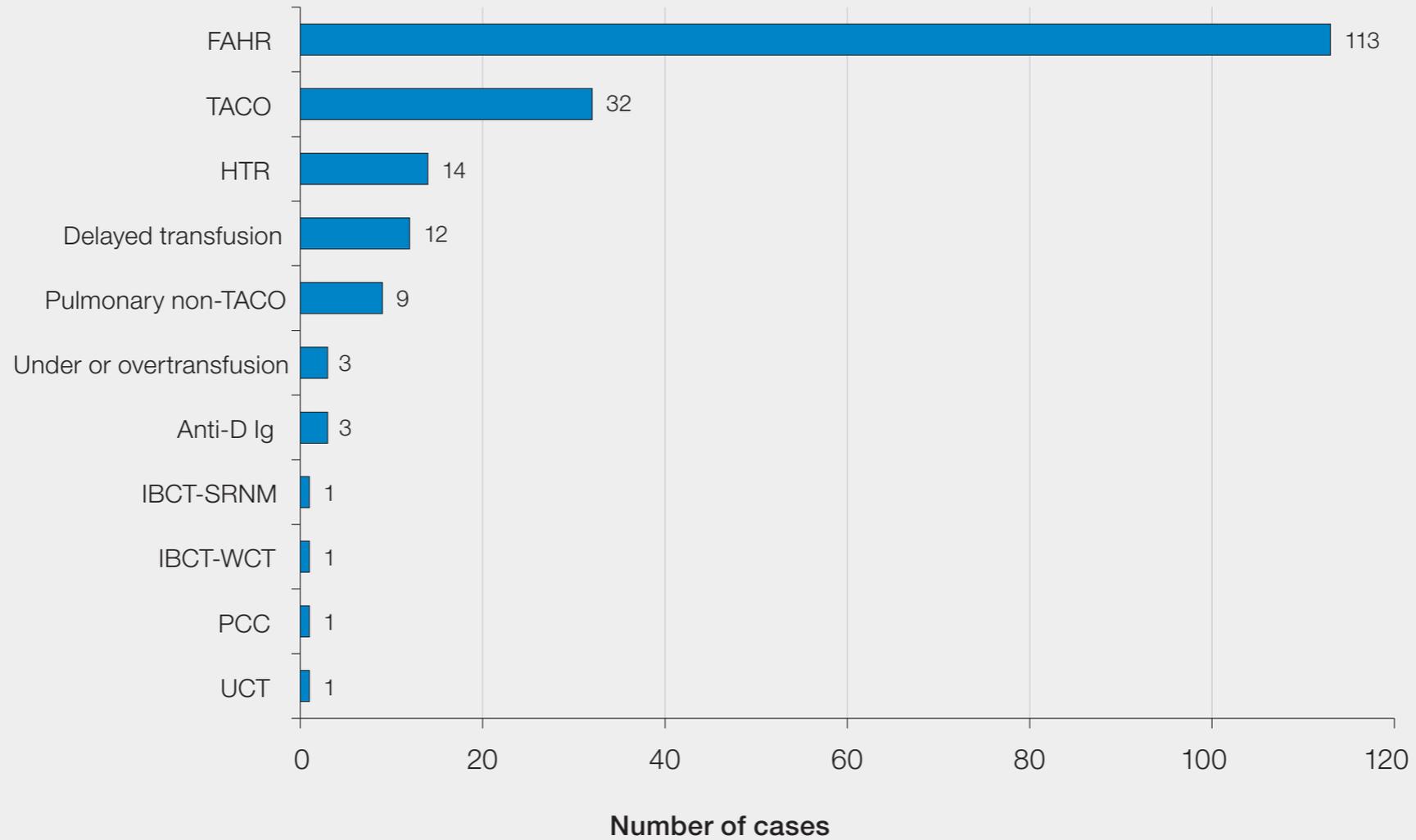


Figure 3.6: Ranking of categories to show number of serious reactions in 2024 (n=190)



FAHR=febrile, allergic, and hypotensive reactions; HTR=haemolytic transfusion reactions; IBCT-SRNM=incorrect blood component transfused-specific requirements not met; IBCT-WCT=IBCT-wrong component transfused; Ig=immunoglobulin; PCC=prothrombin complex concentrates; TACO=transfusion-associated circulatory overload; UCT=uncommon complications of transfusion

Figure 3.7: Summary data for 2024, all categories (includes RBRP and NM) (n=3998)

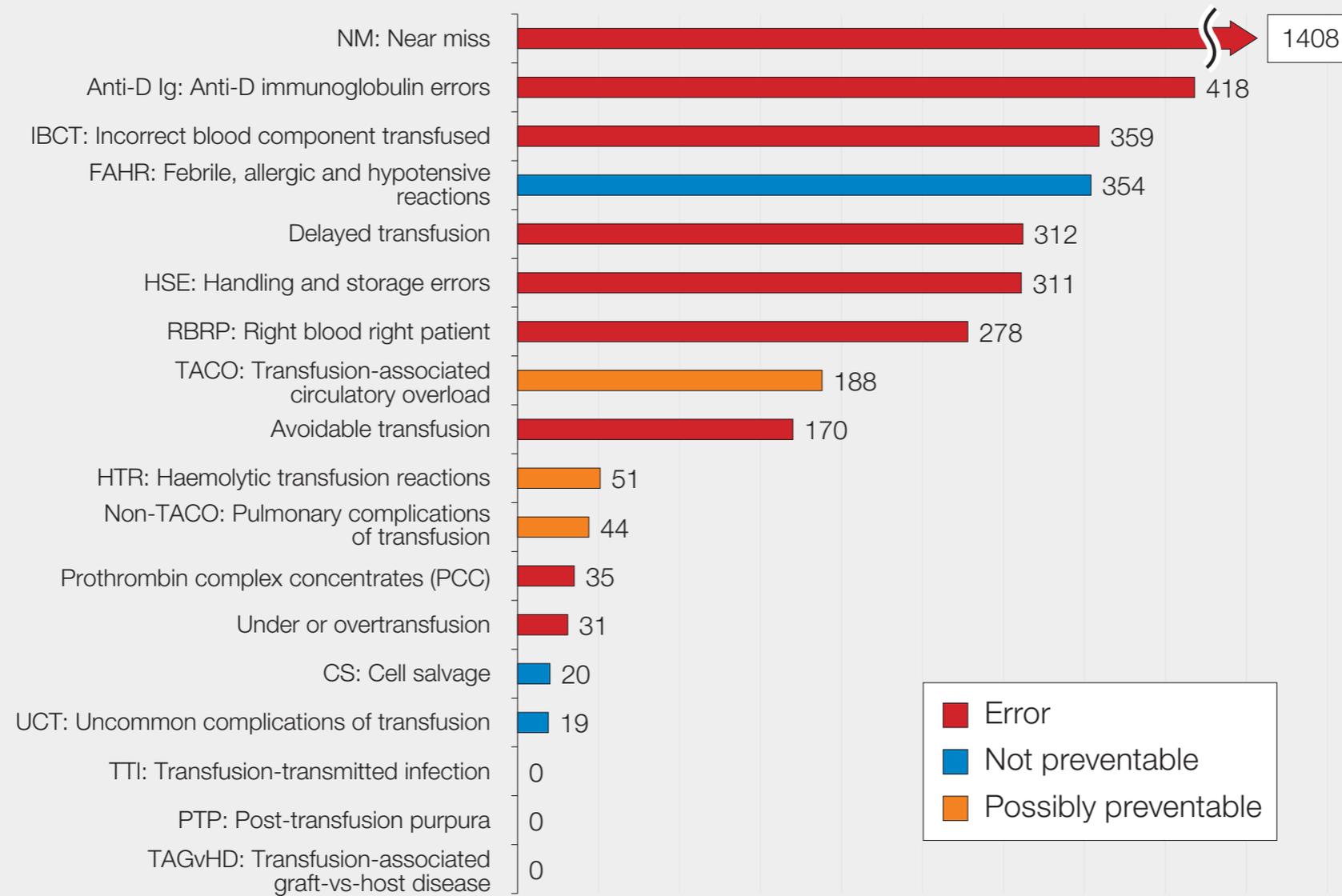
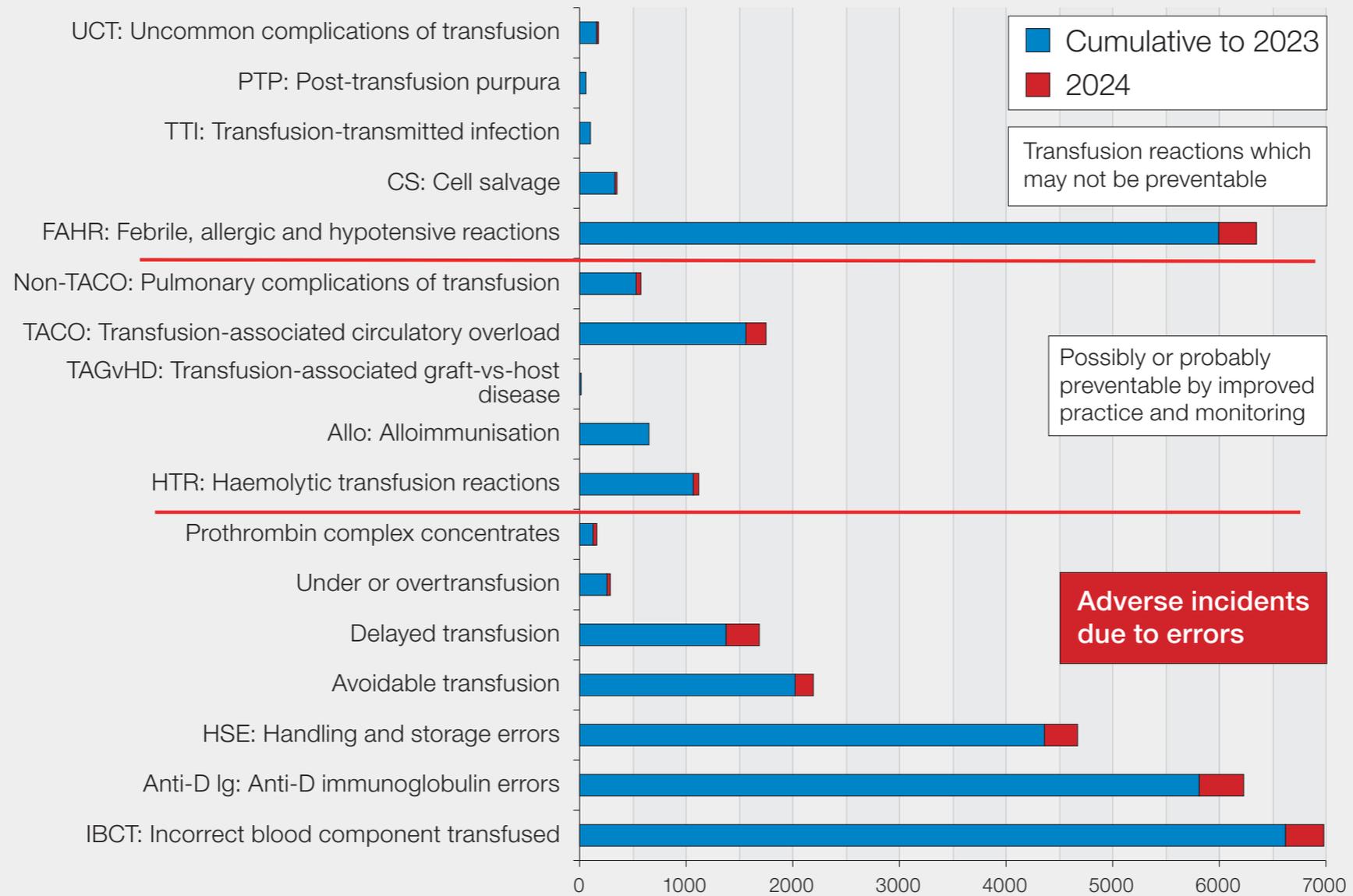


Figure 3.8: Cumulative data for SHOT categories 1996-2024 (n=33343)



Data on alloimmunisation has not been collected by SHOT since 2015

Figure 3.9: Number of ABO-incompatible (ABOi) transfusions 2015-2024

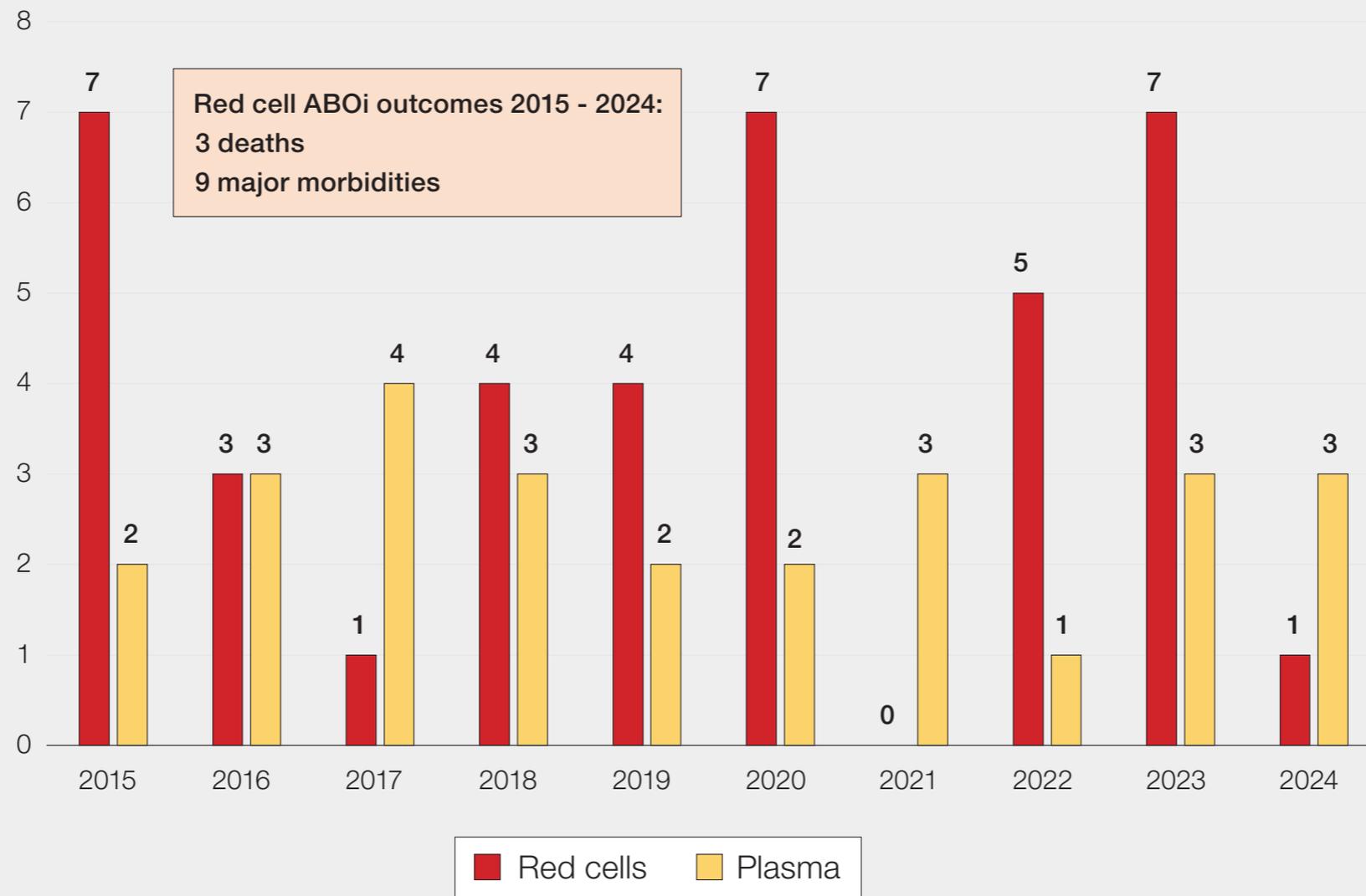


Figure 3.10: ABO-incompatible red cell transfusions by step in the transfusion process 2015-2024 (n=39)

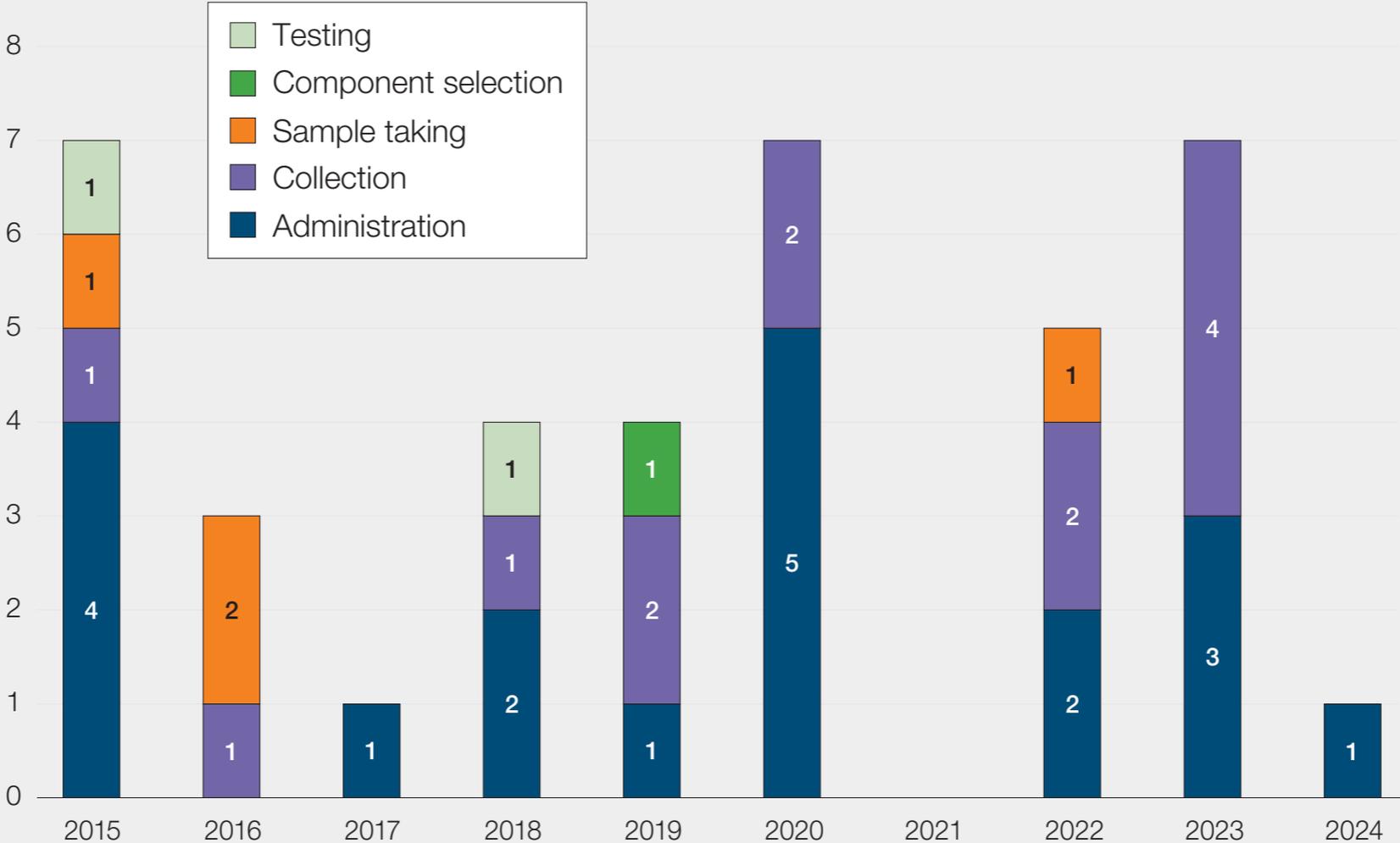


Figure 3.11: ABO-incompatible red cell transfusions 2016-2024: few events (n=32) but many near misses (n=2593)

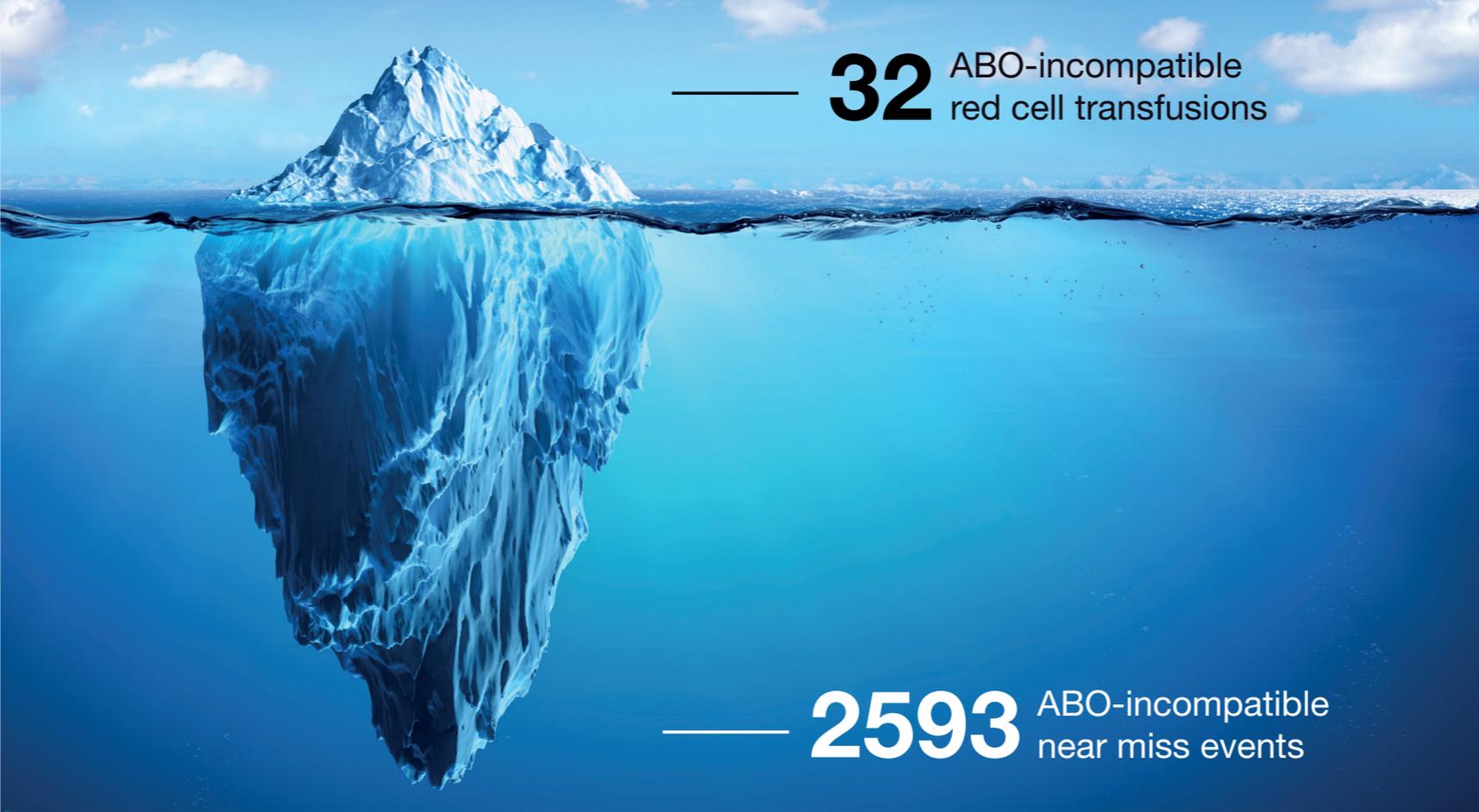
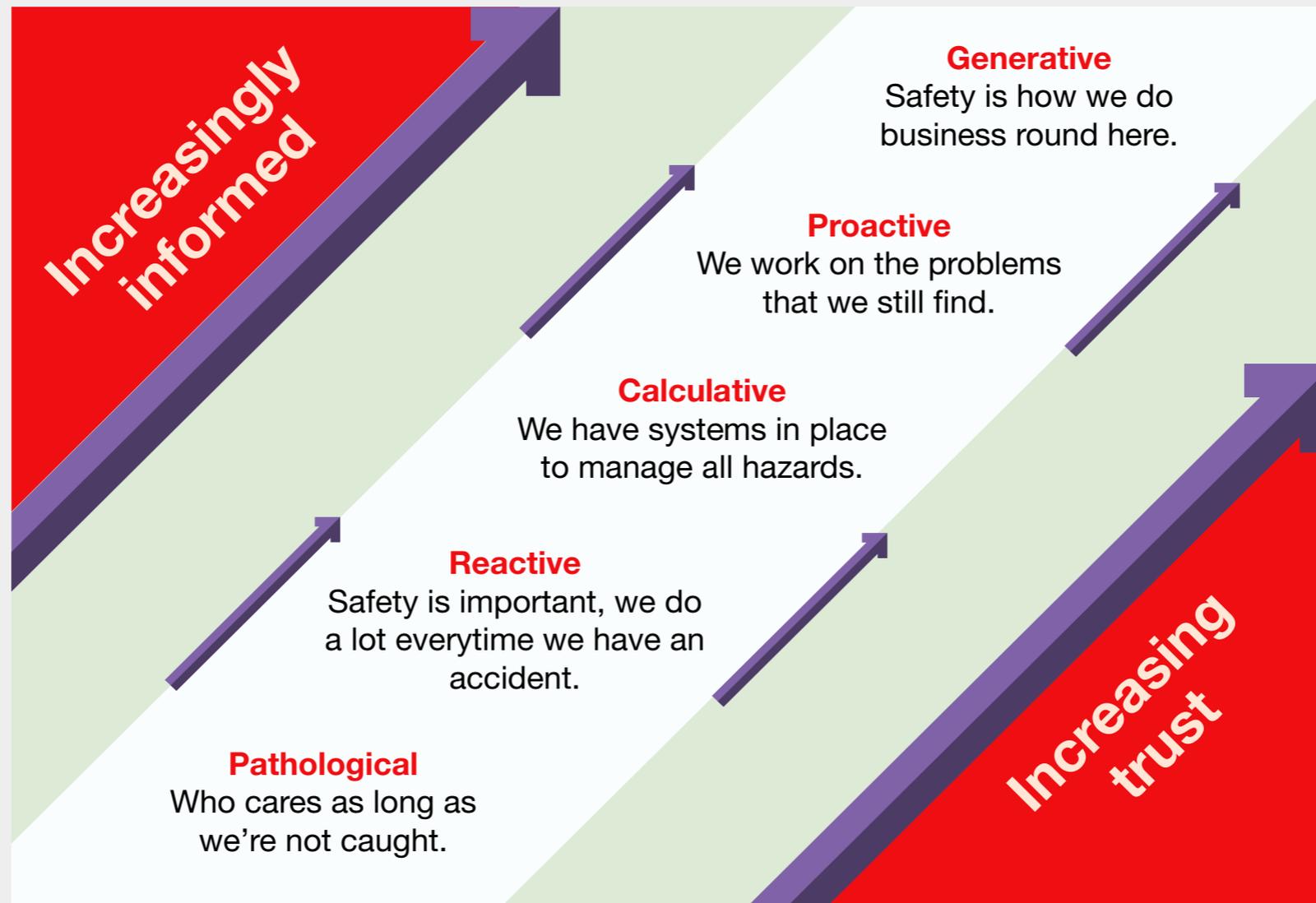


Figure 4.1: Patient Safety Principles set out by the Patient Safety Commissioner, England



Figure 4.2: The evolution of a safety culture



Adapted from Hudson, P., 2001. Safety culture: The ultimate goal. Flight Safety Australia, pp. 29-31.

Figure 5.1: Framework to transfer IDEAS of excellence into practice

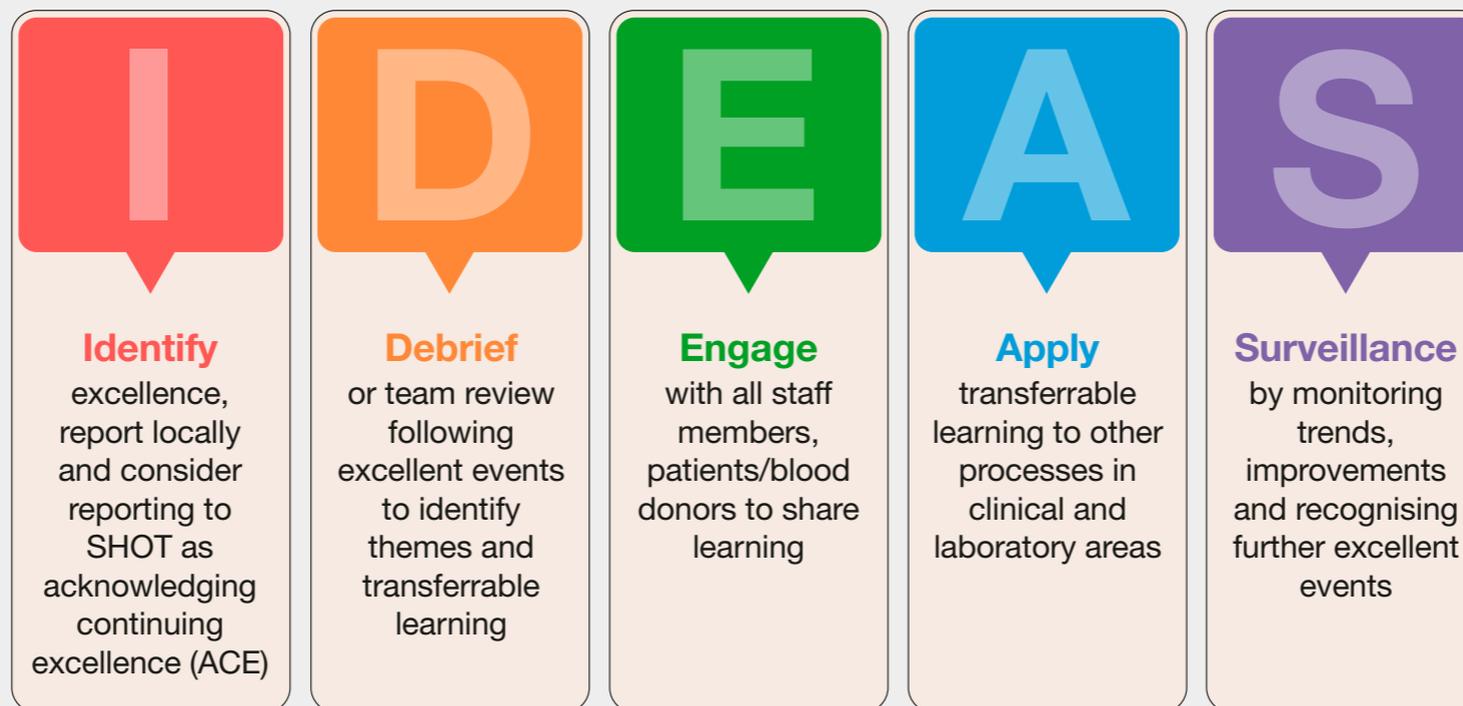
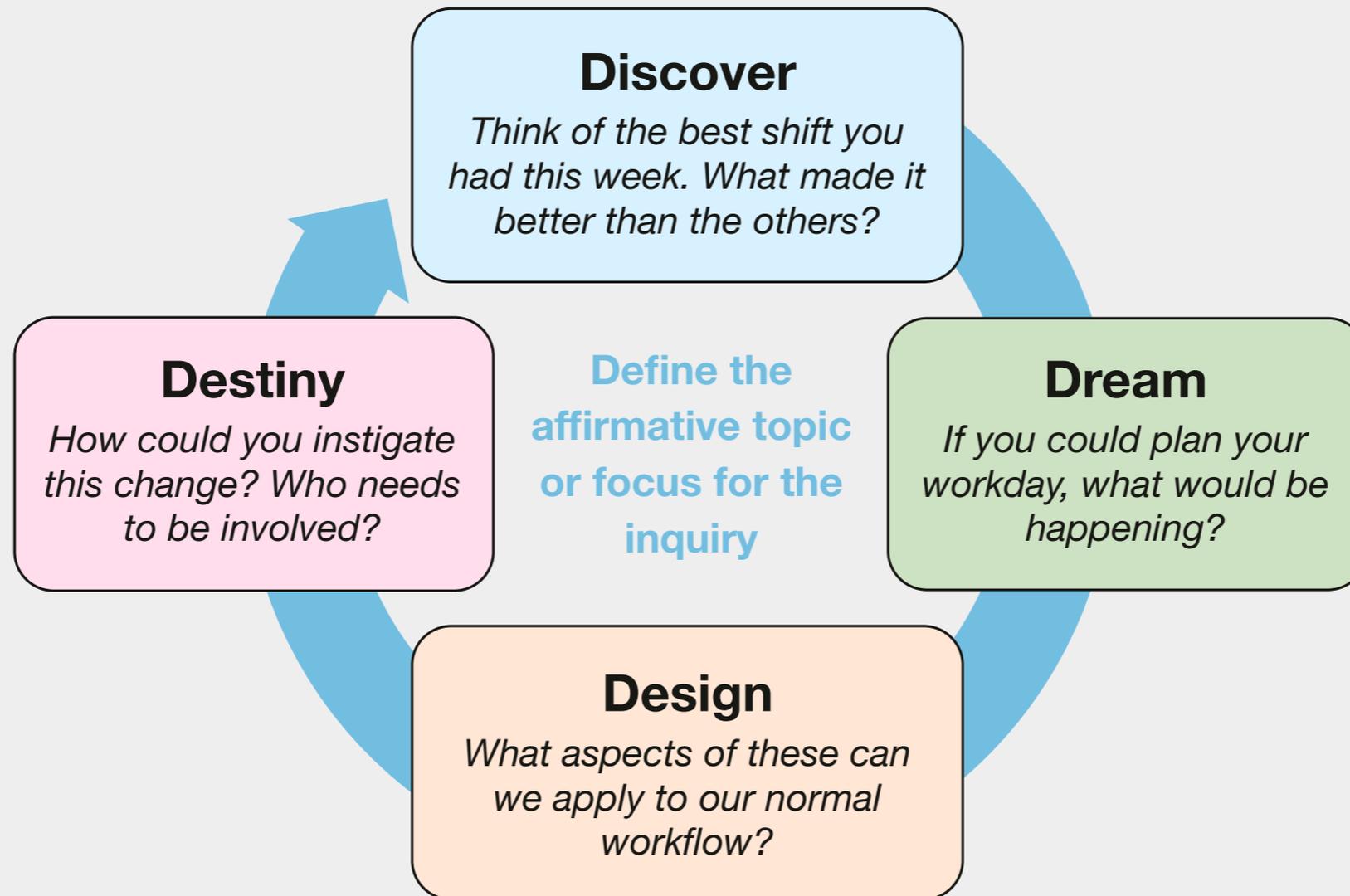


Figure 5.2: Appreciative Inquiry process with example questions



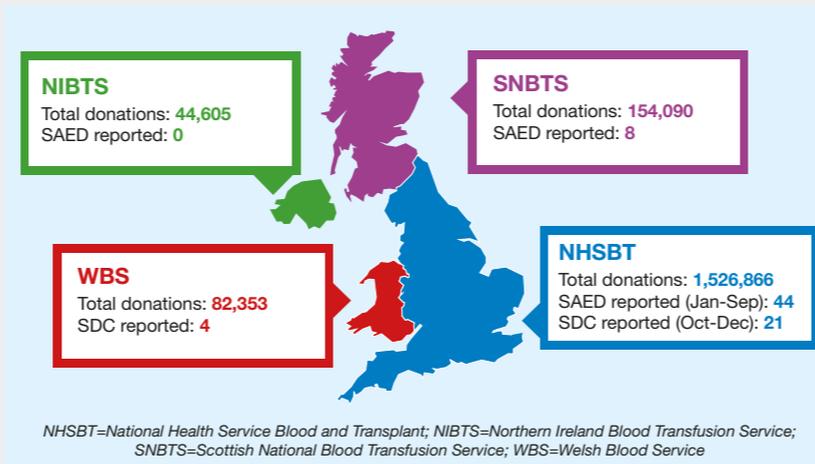
This figure shows the '4D cycle' for appreciative inquiry on a mutually agreed affirmative topic (Cooperrider & Whitney, 2005) with questions from the NHS England introductory module on appreciative inquiry (Russo, 2022)

Serious adverse events following blood donation reported to the UK Blood Services in 2024



Serious adverse events following blood donation reported to the UK Blood Services in 2024

2024 has seen the gradual transition of the UK Blood Services away from serious adverse events of donation (SAED) which focused on grouping based on category to serious donor complications (SDC) which focuses on impact to the donor based on severity. The introduction of donor severity grading for adverse events also allows for a benchmarking via a uniform standard for all UK Blood Services and internationally.



Key messages:

- 1 The rate of serious donor complications in the UK is one SAED/SDC per 23,479 donations
- 2 Arm pain from needle insertion and vasovagal reactions remain the most common complications reported
- 3 Donor complications can occur despite best care, and some may have serious impact on donors
- 4 Improving donor experience with measures to reduce risk of complications related to blood donation along with prompt recognition and management of complications is vital
- 5 Blood Services must ensure that all donors are aware of the importance of reporting all adverse events of donation so the donor can be appropriately managed, and the adverse events can be recorded, monitored and appropriate actions taken to improve donor safety

Figure 7.1: HFIT questions for reporters to rank main actions against their effectiveness category

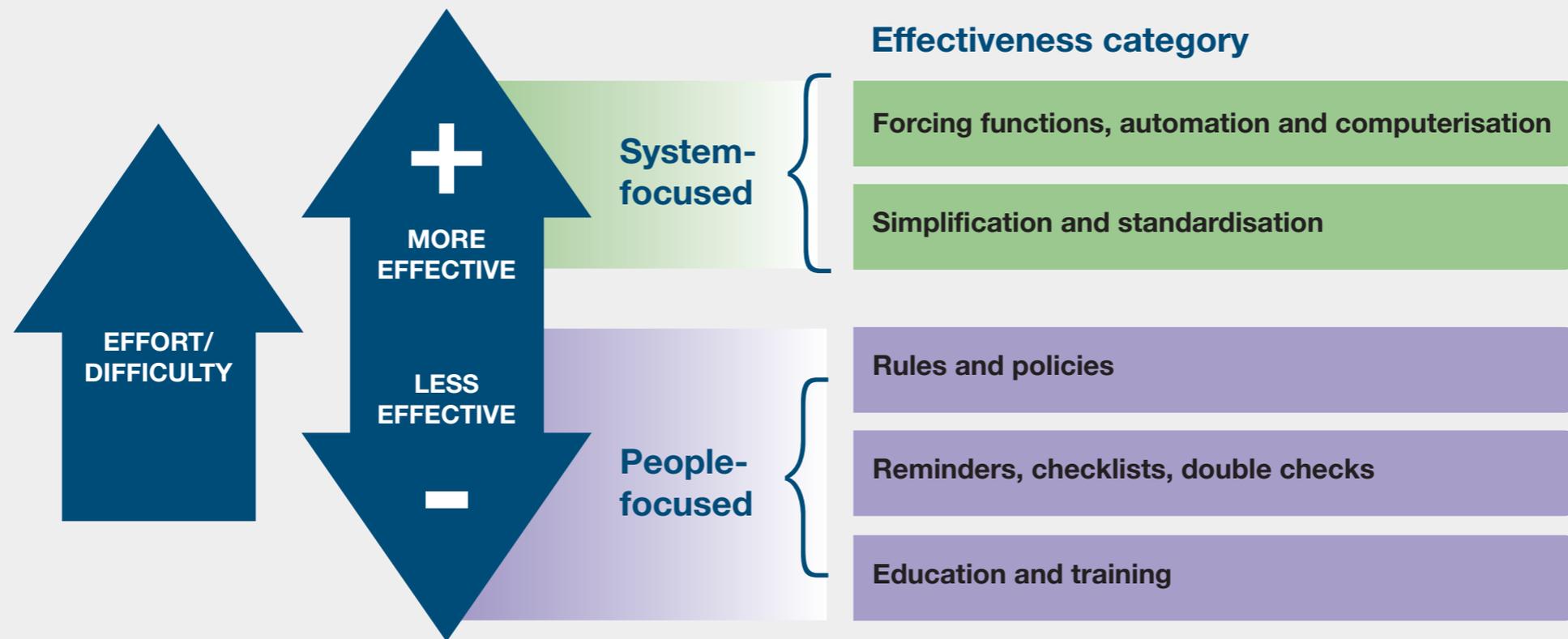


Figure 7.2: A comparison of HFIT categories assigned by SHOT reporters in 2022, 2023 and 2024

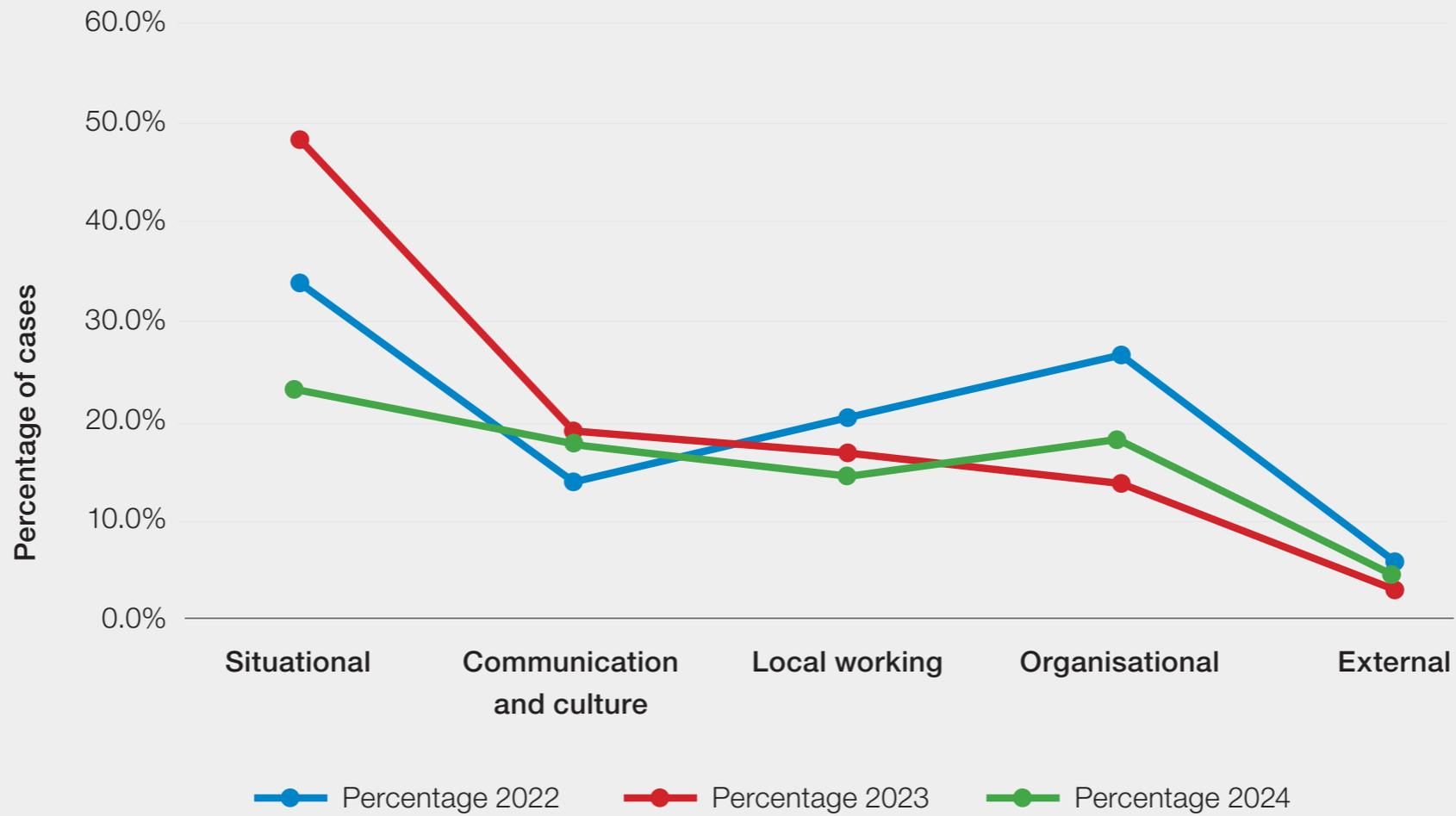


Figure 7.3: Percentage of cases investigated using HFE principles or framework 2021-2024

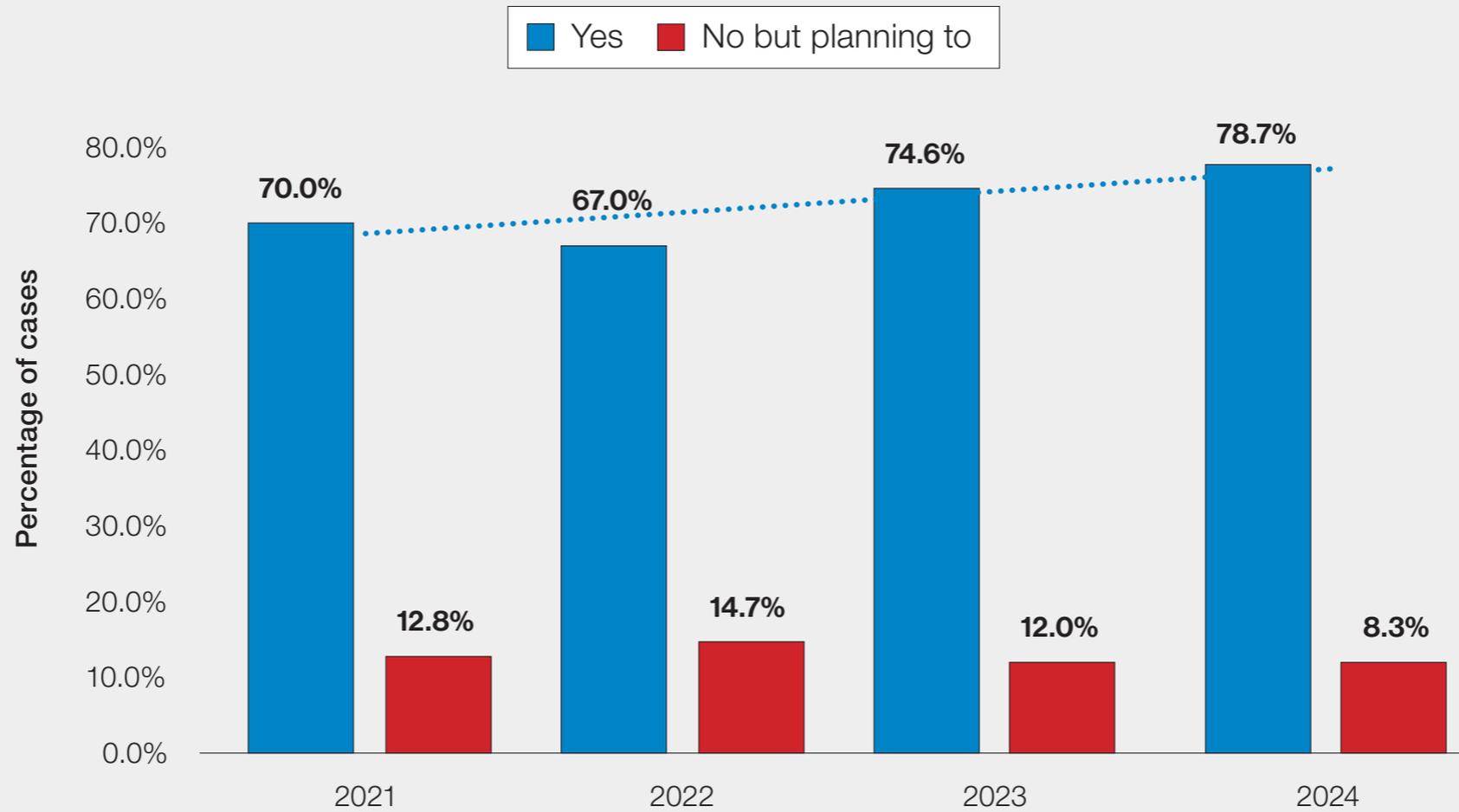


Figure 8.1: Distribution of anti-D immunoglobulin (Ig) related error reports in 2024 (n=418)

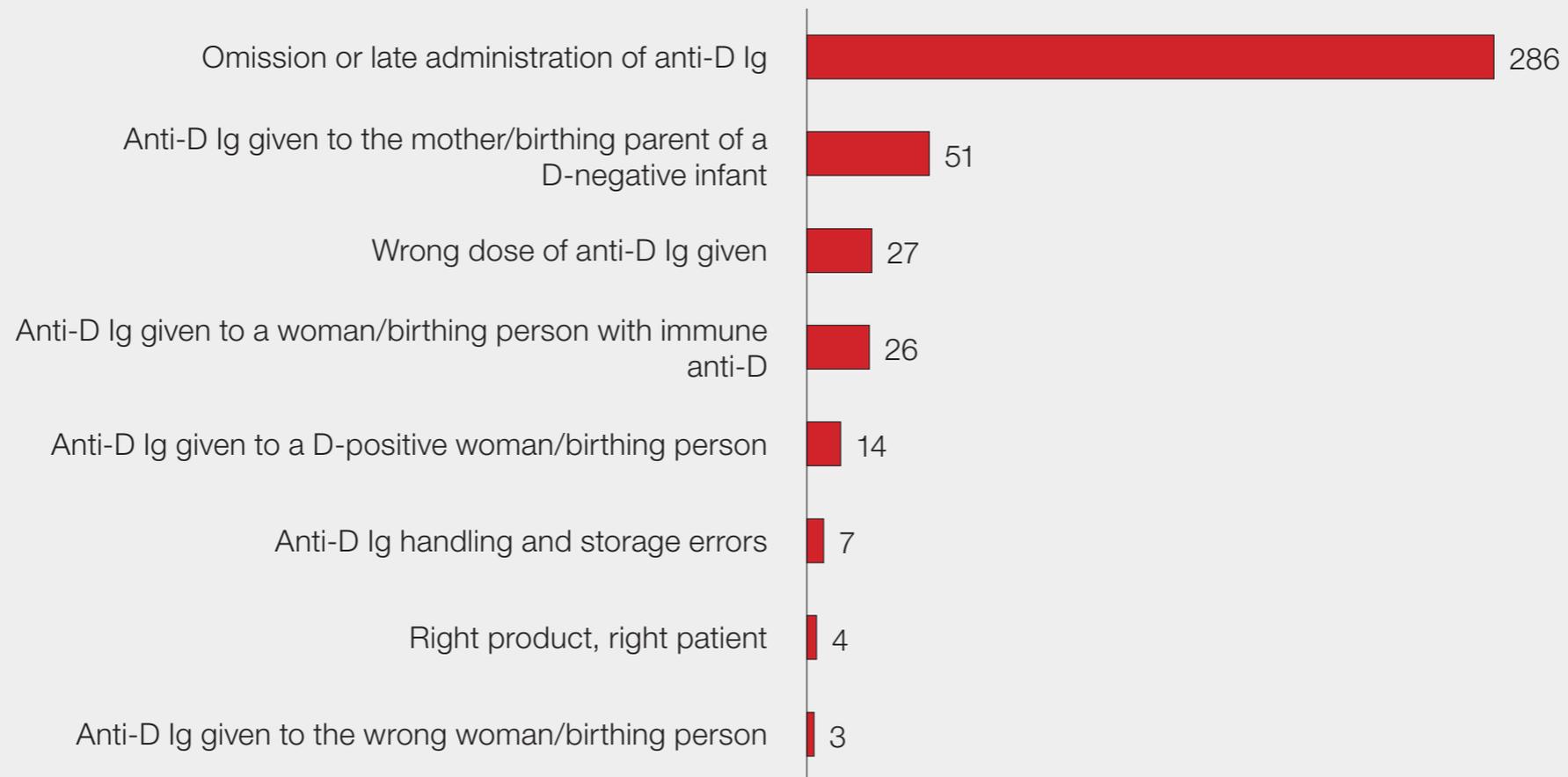
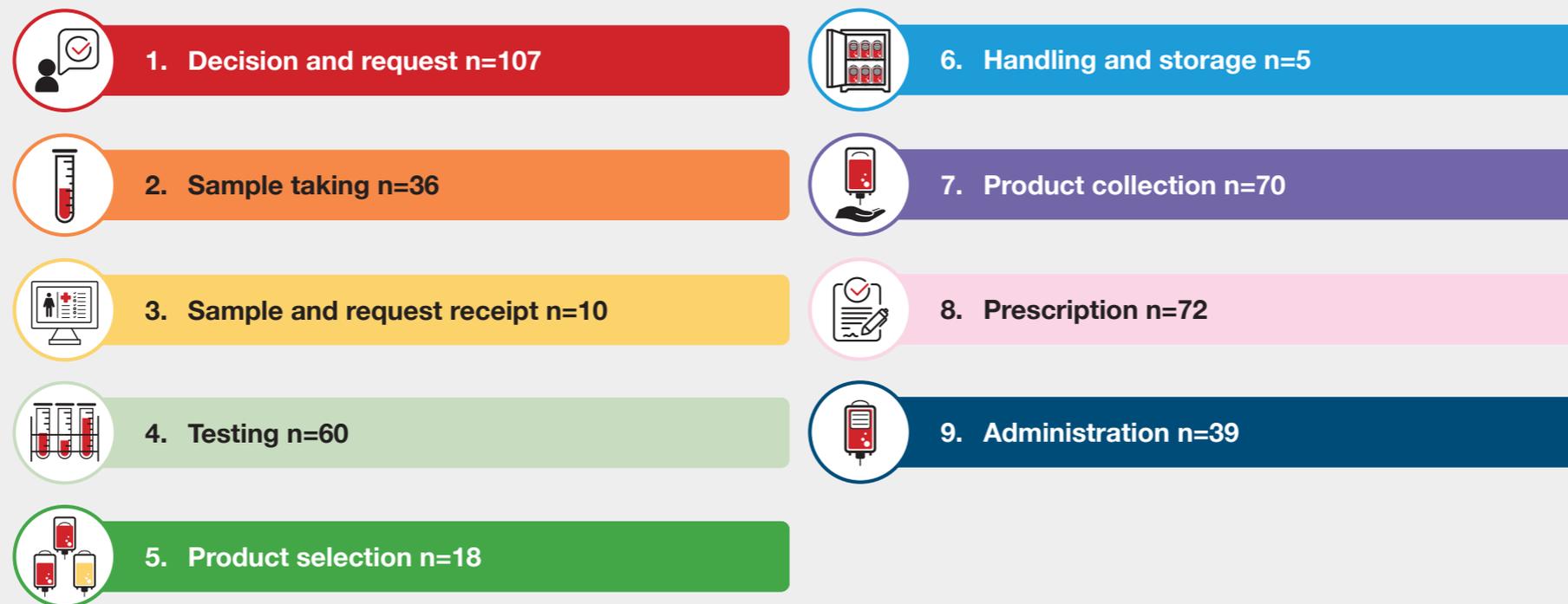


Figure 8.2: Steps in the transfusion pathway when the anti-D Ig errors occurred in 2024



In 1 miscellaneous case (not included in Figure 8.1) there were two missed RAADP appointments, however it was not confirmed whether the woman had been thoroughly informed of the potential consequences of not receiving anti-D Ig in a timely manner

Figure 9.1: Overview of reports where an incorrect blood component was transfused in 2024 (n=359)

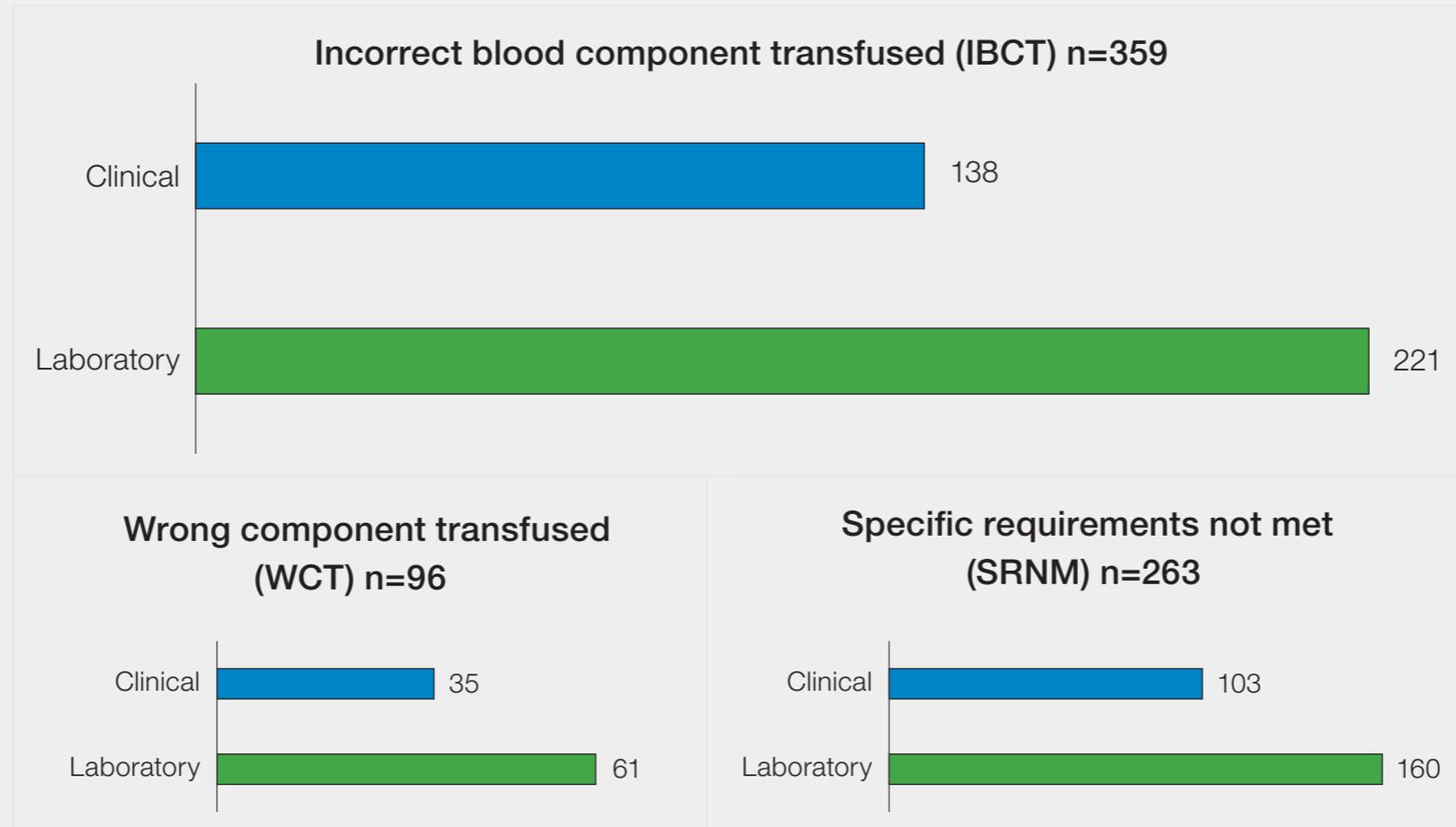
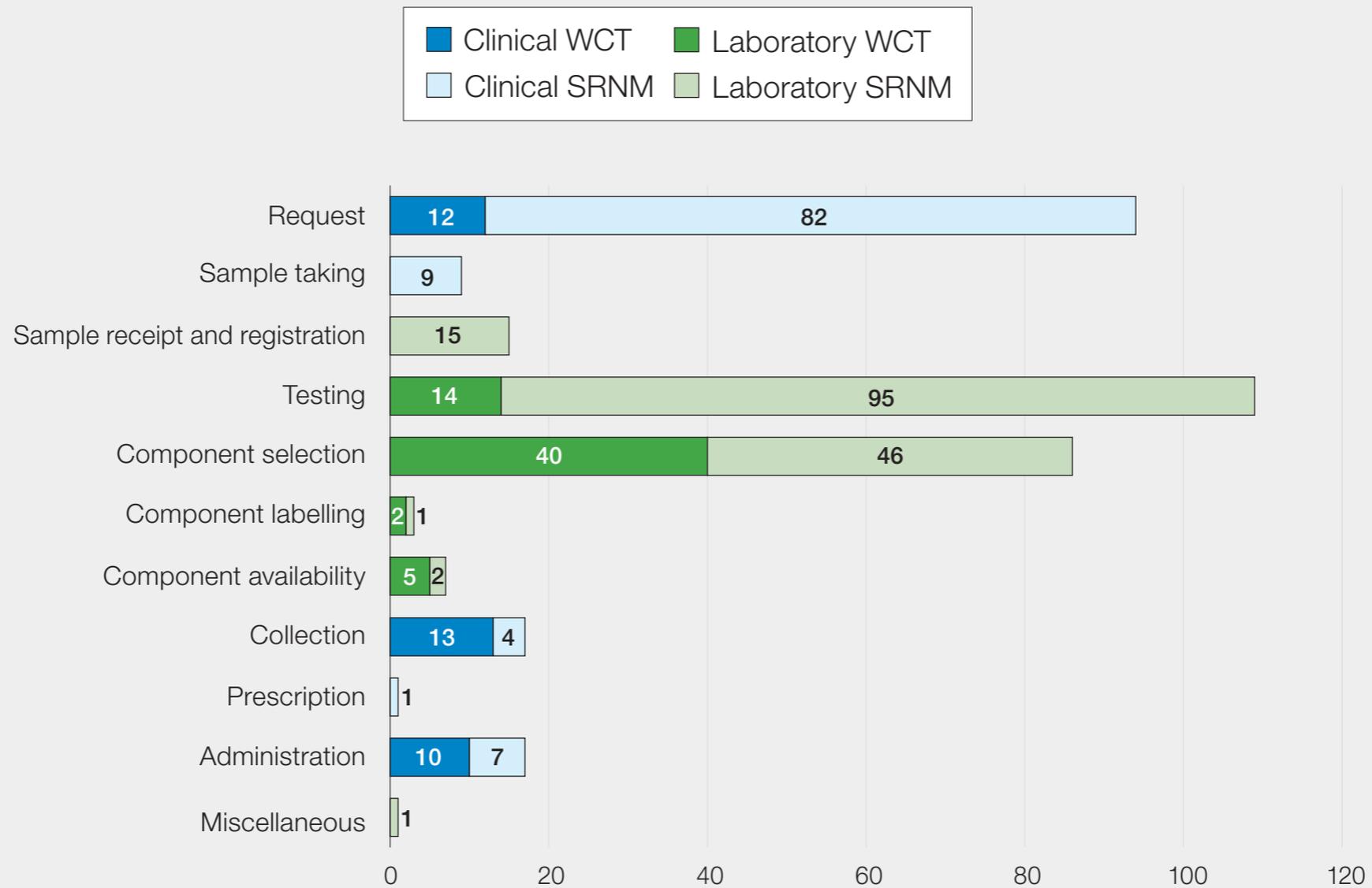


Figure 9.2: Total IBCT errors in 2024 categorised by the step in the transfusion process where the primary error occurred (n=359)



WCT=wrong component transfused; SRNM=specific requirements not met

Figure 9.3: Clinical IBCT-WCT errors and transfusion step where the error occurred in 2024 (n=35)

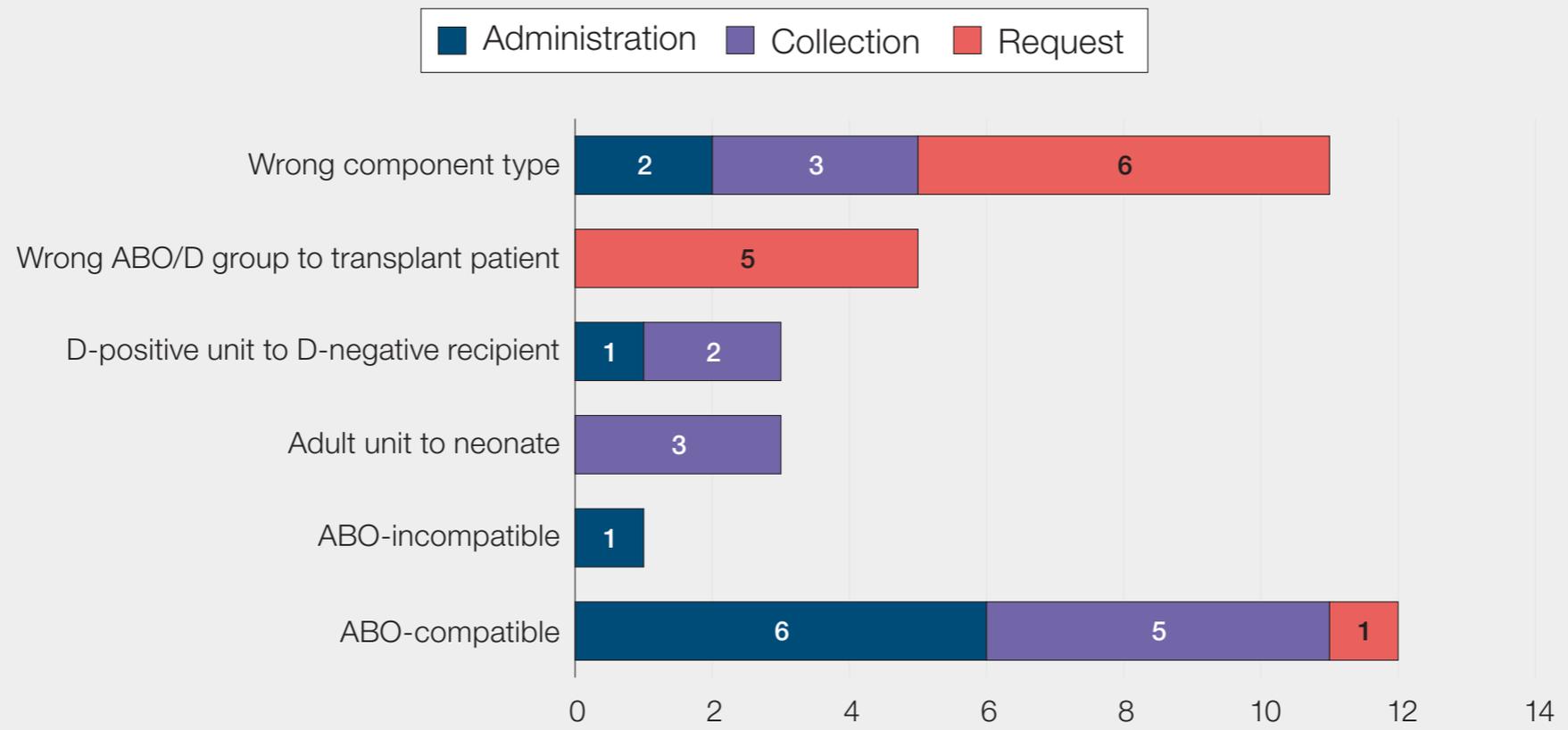
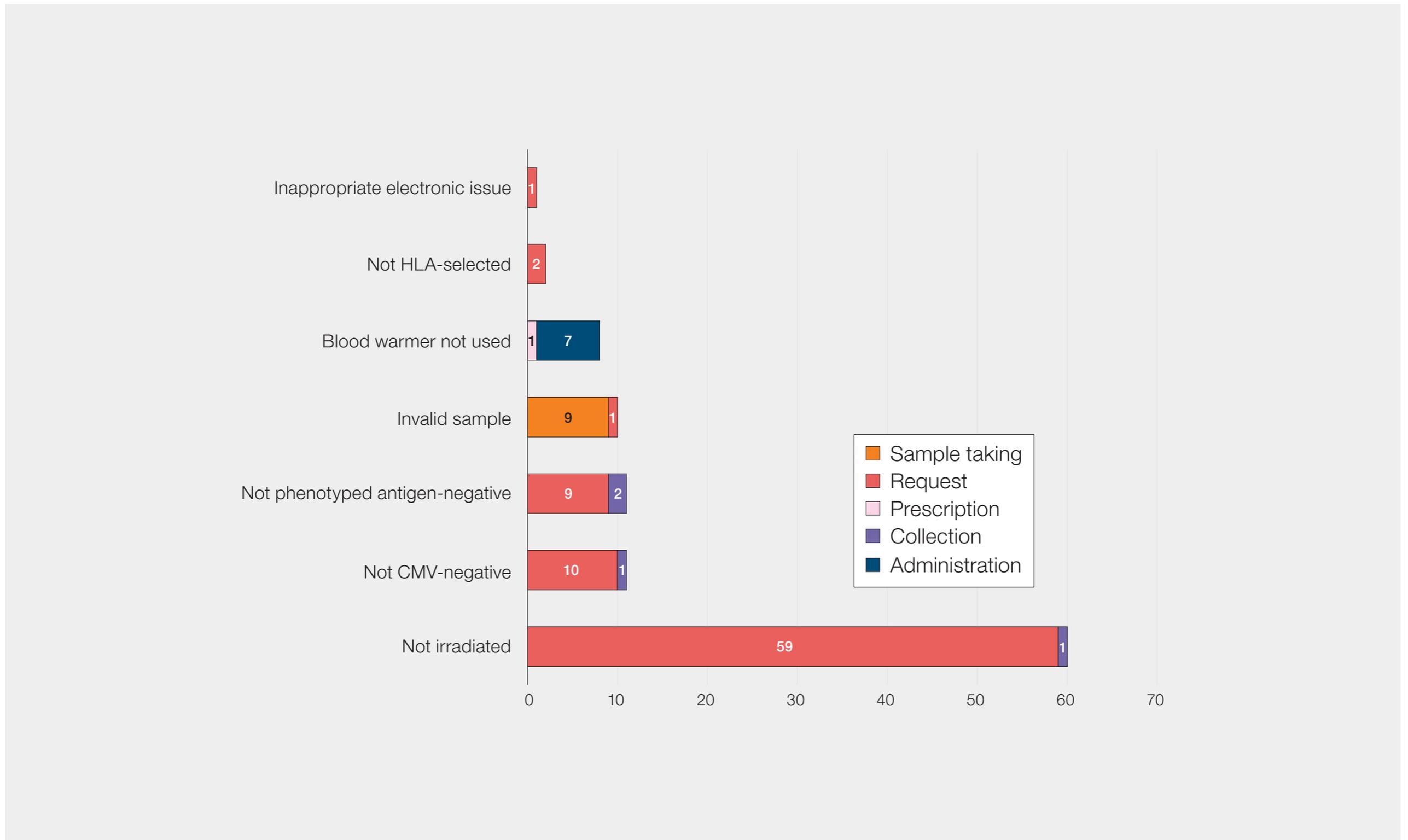


Figure 9.4: Clinical IBCT-SRNM errors and transfusion step where the error occurred in 2024 (n=103)



HLA=human leucocyte antigen; CMV=cytomegalovirus

Figure 9.5: Causal and contributory factors for IBCT clinical errors in 2024

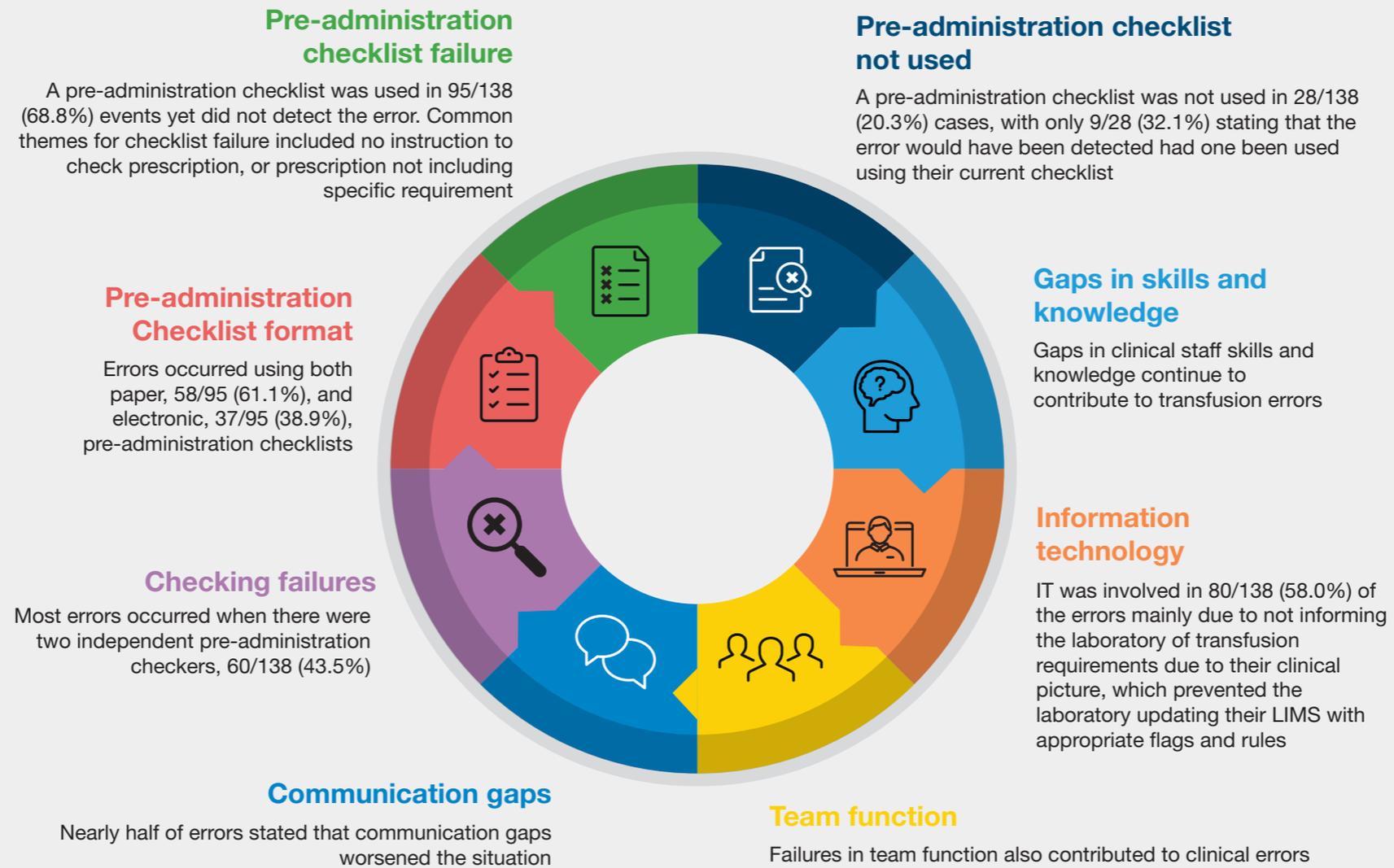


Figure 9.6: Laboratory IBCT-WCT errors by transfusion step in 2024 (n=61)

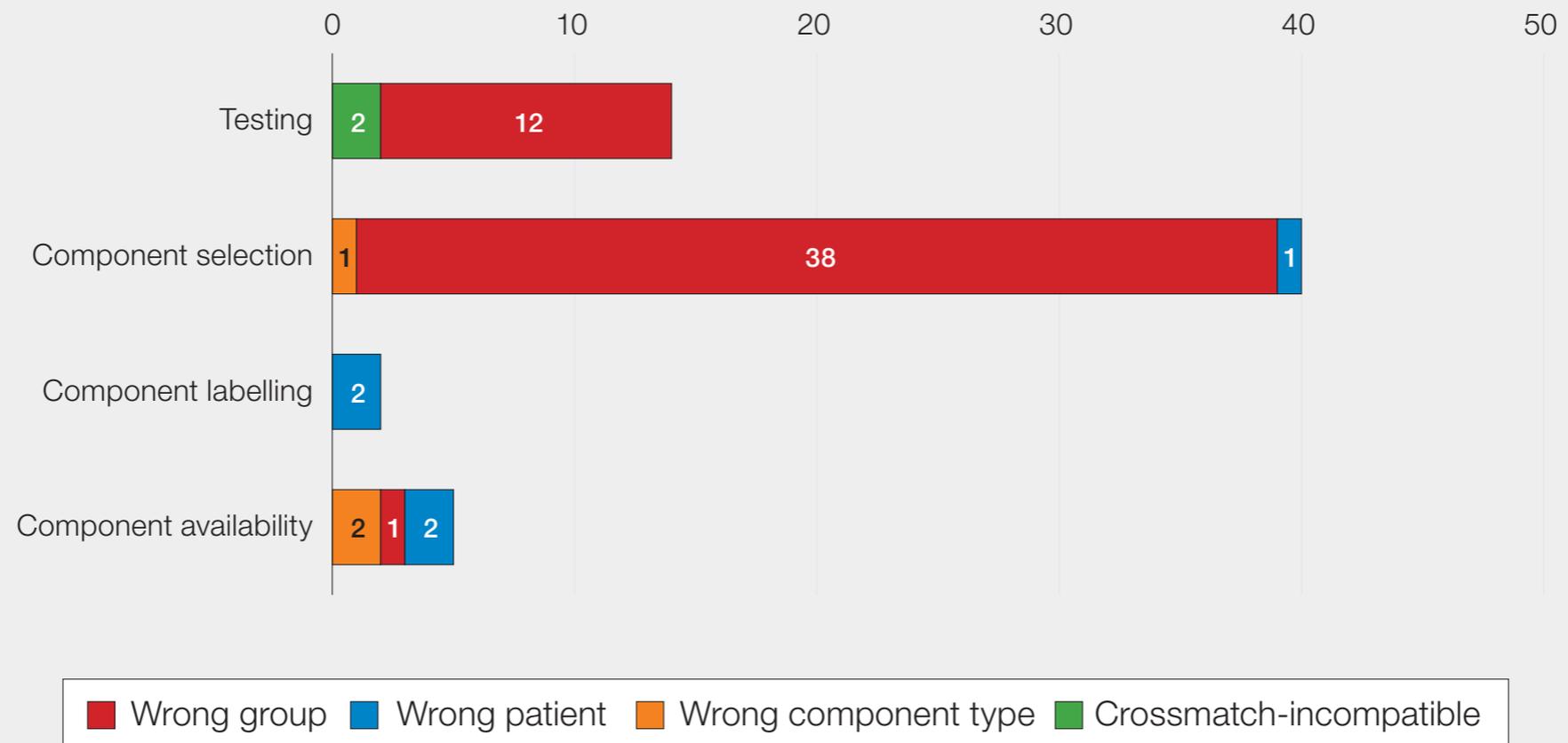


Figure 9.7: Laboratory IBCT-WCT error by category in 2024 (n=61)

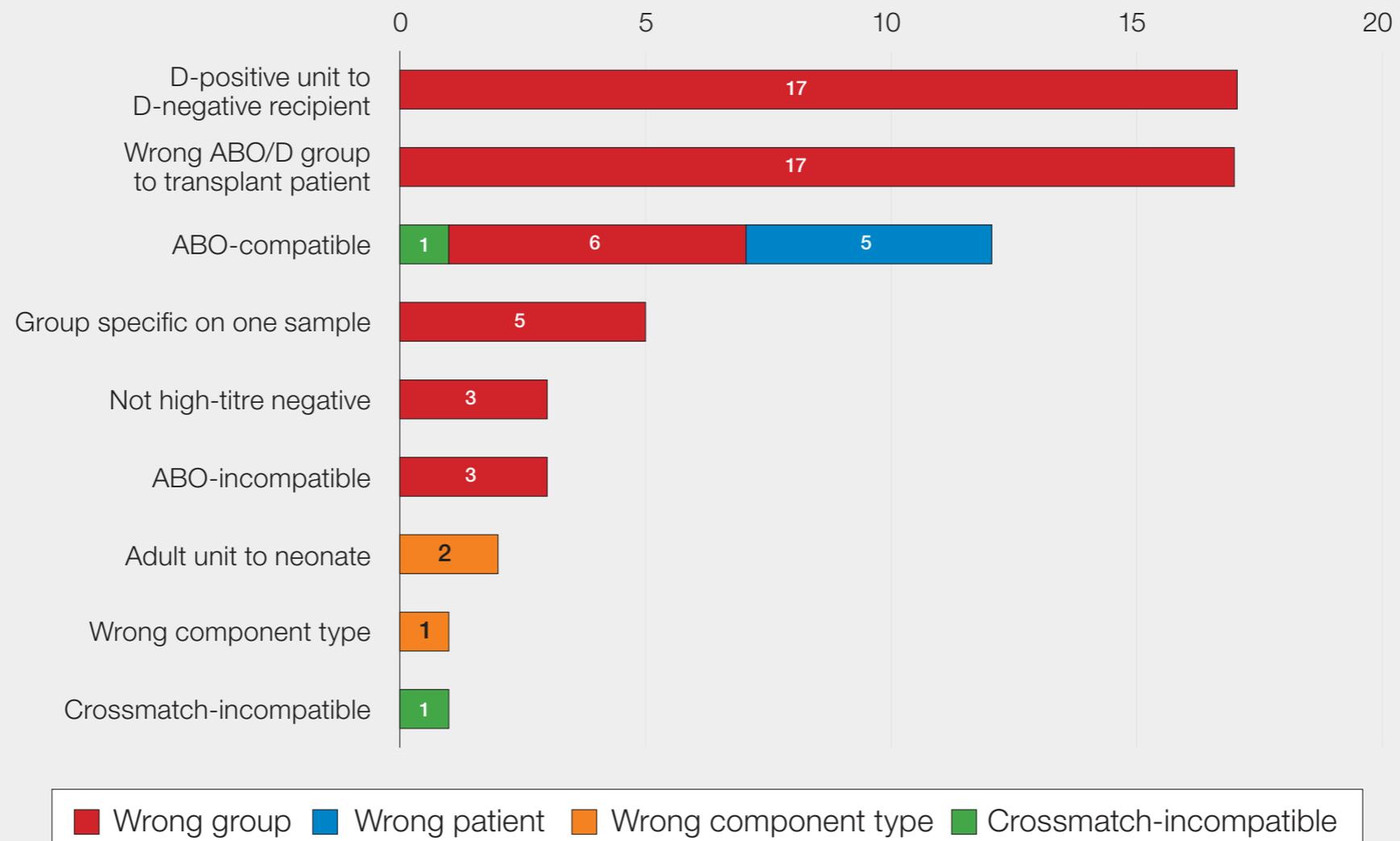
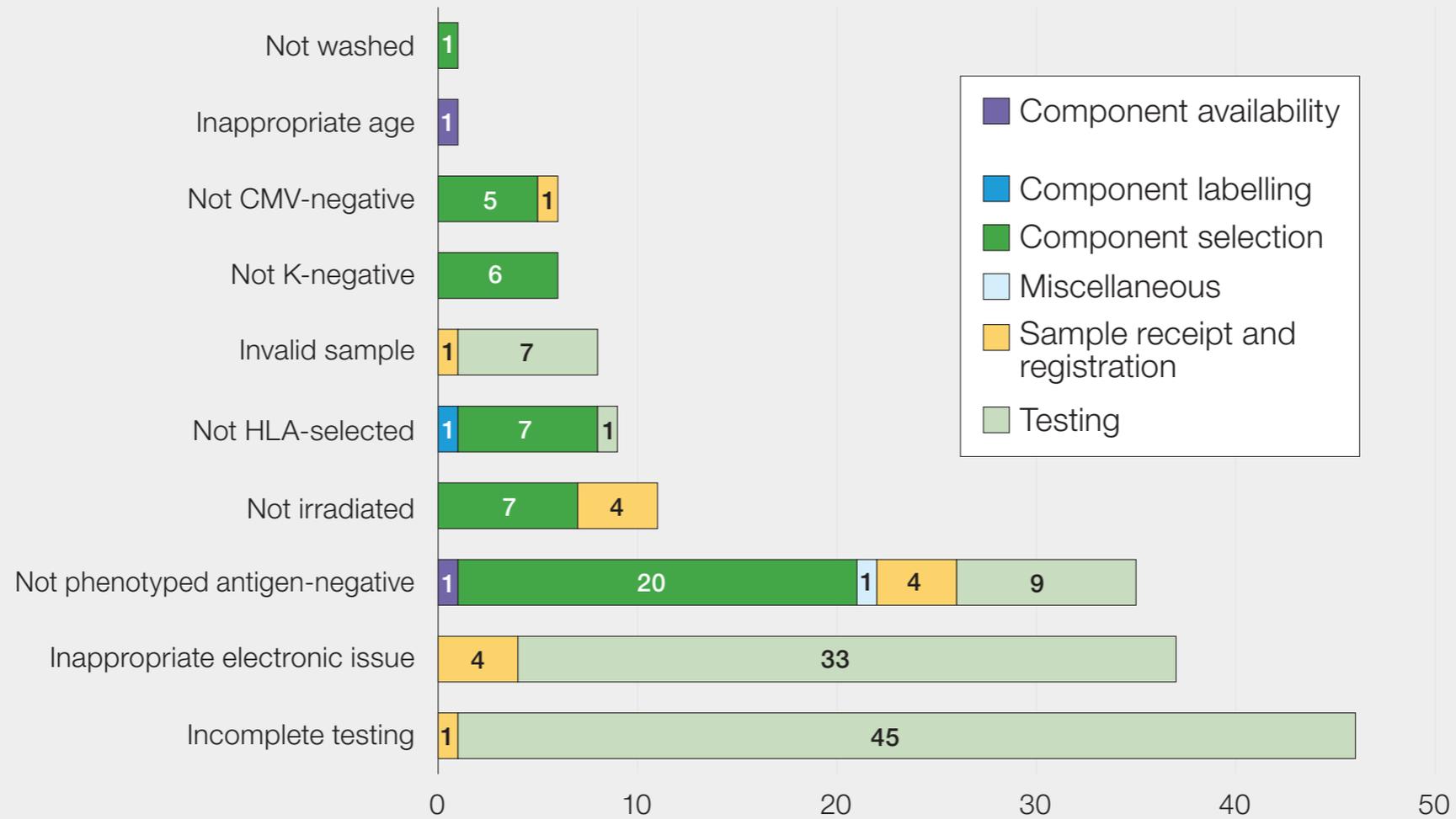


Figure 9.8: Laboratory IBCT-SRNM errors by transfusion step in 2024 (n=160)



HLA=human leucocyte antigen; CMV=cytomegalovirus

Figure 9.9: Causal and contributory factors to IBCT laboratory errors in 2024



Figure 10.1: Breakdown of 2024 handling and storage error (HSE) reports (n=311)

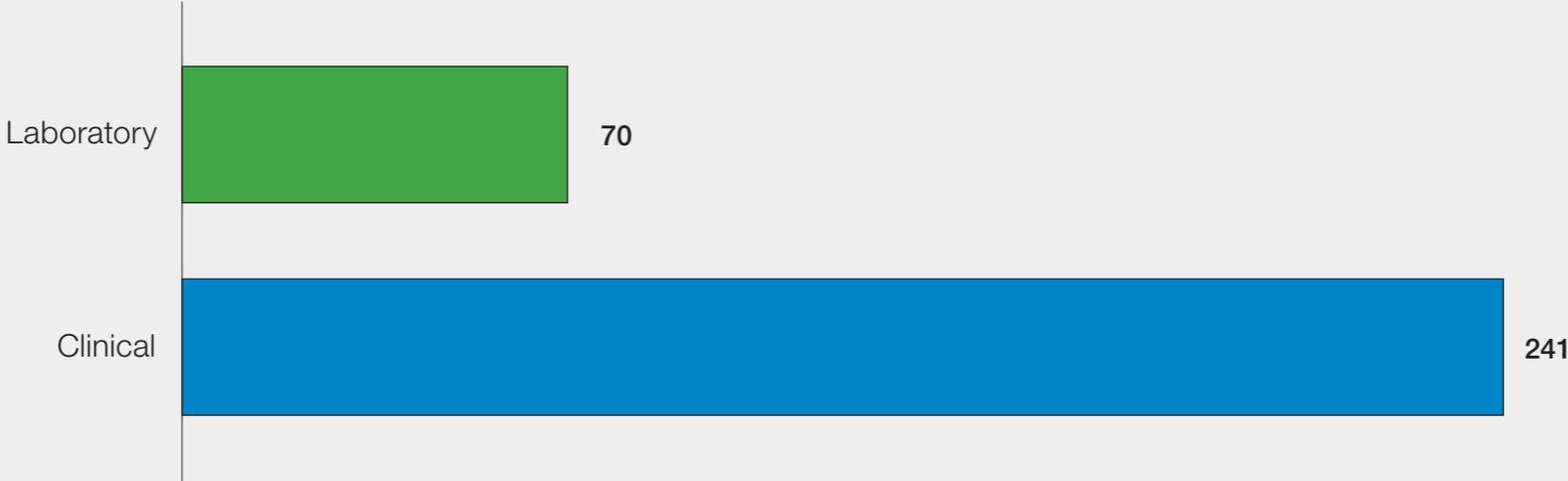


Figure 10.2: Breakdown of clinical HSE by category in 2024 (n=241)

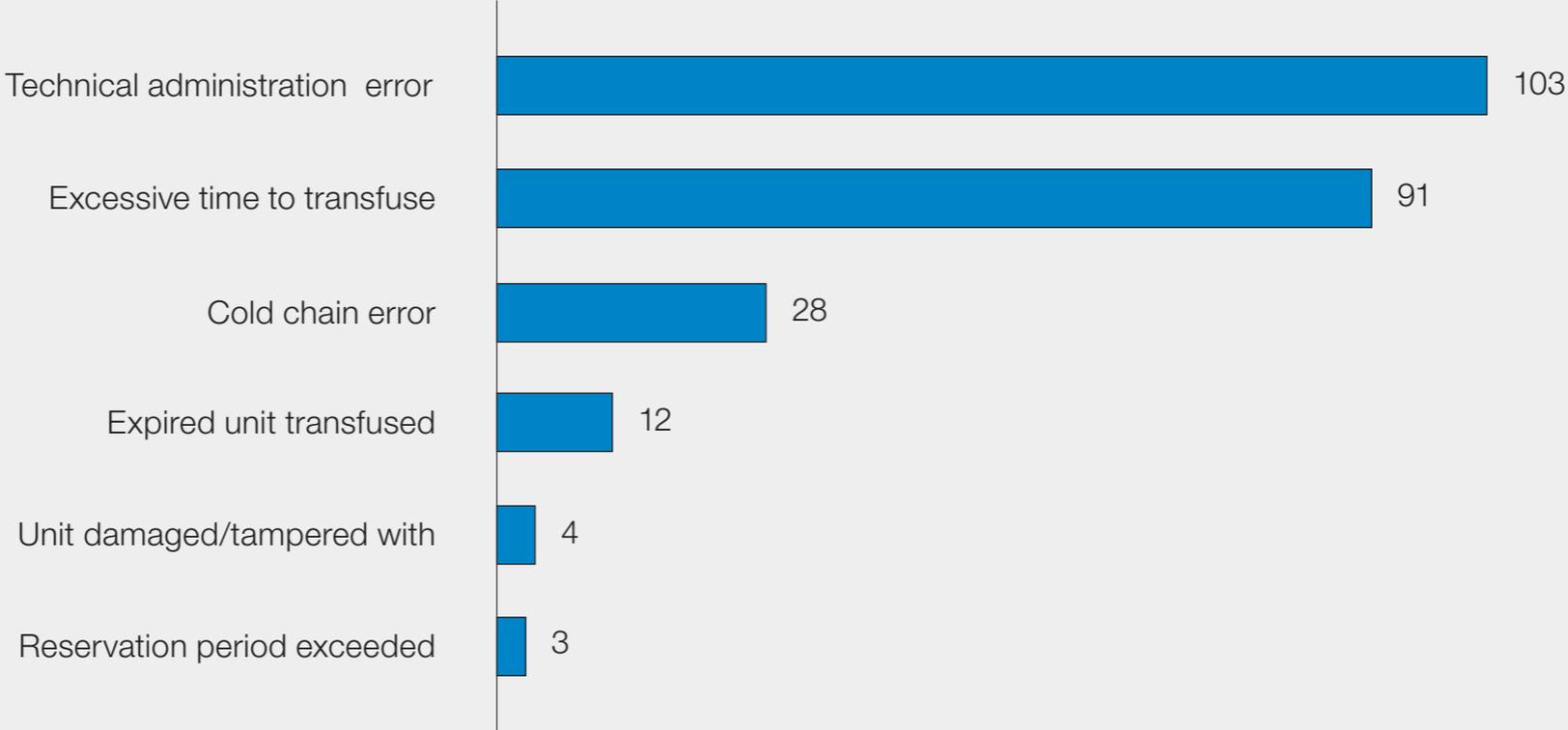


Figure 10.3: Breakdown of laboratory HSE by category in 2024 (n=70)

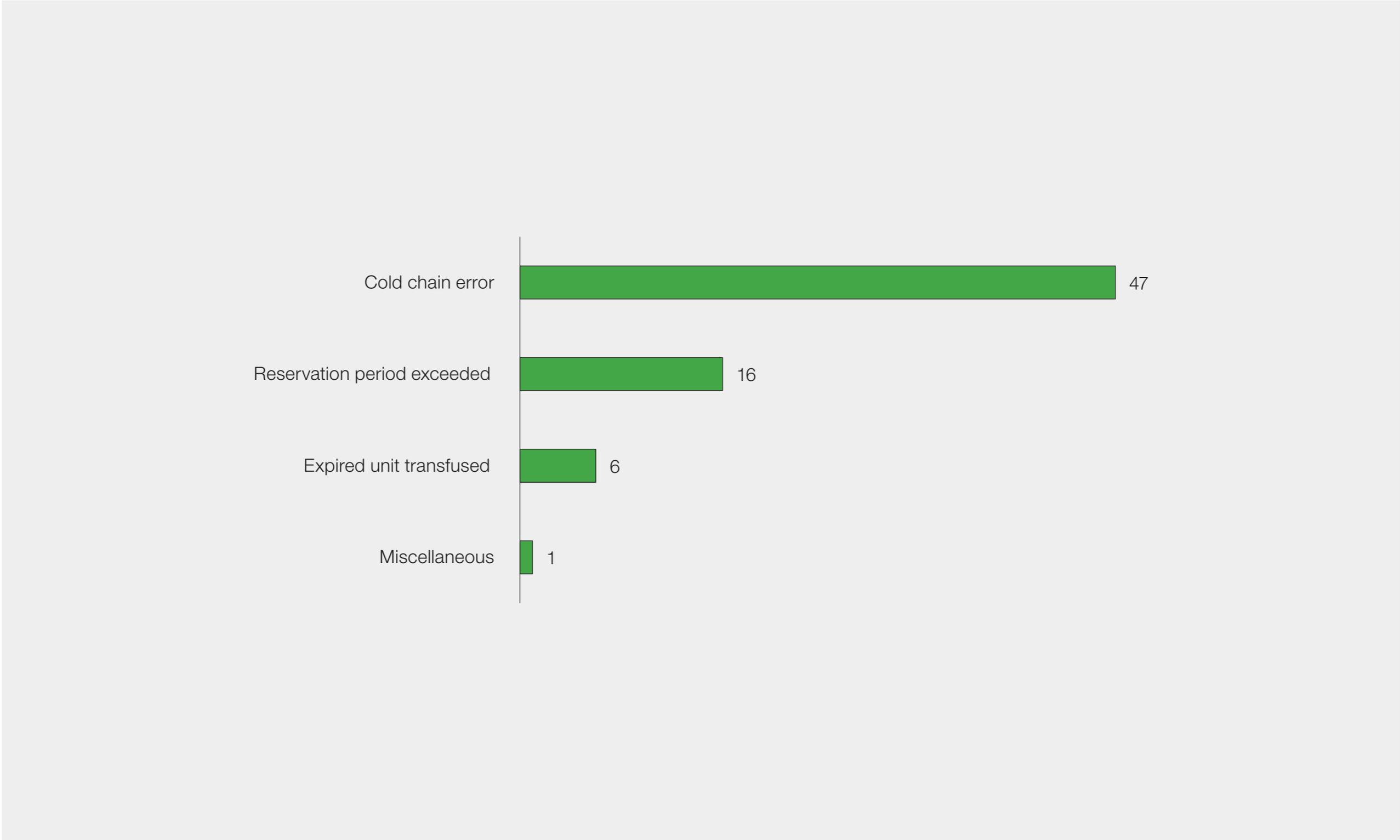


Figure 11.1: Delayed transfusions by year 2011-2024

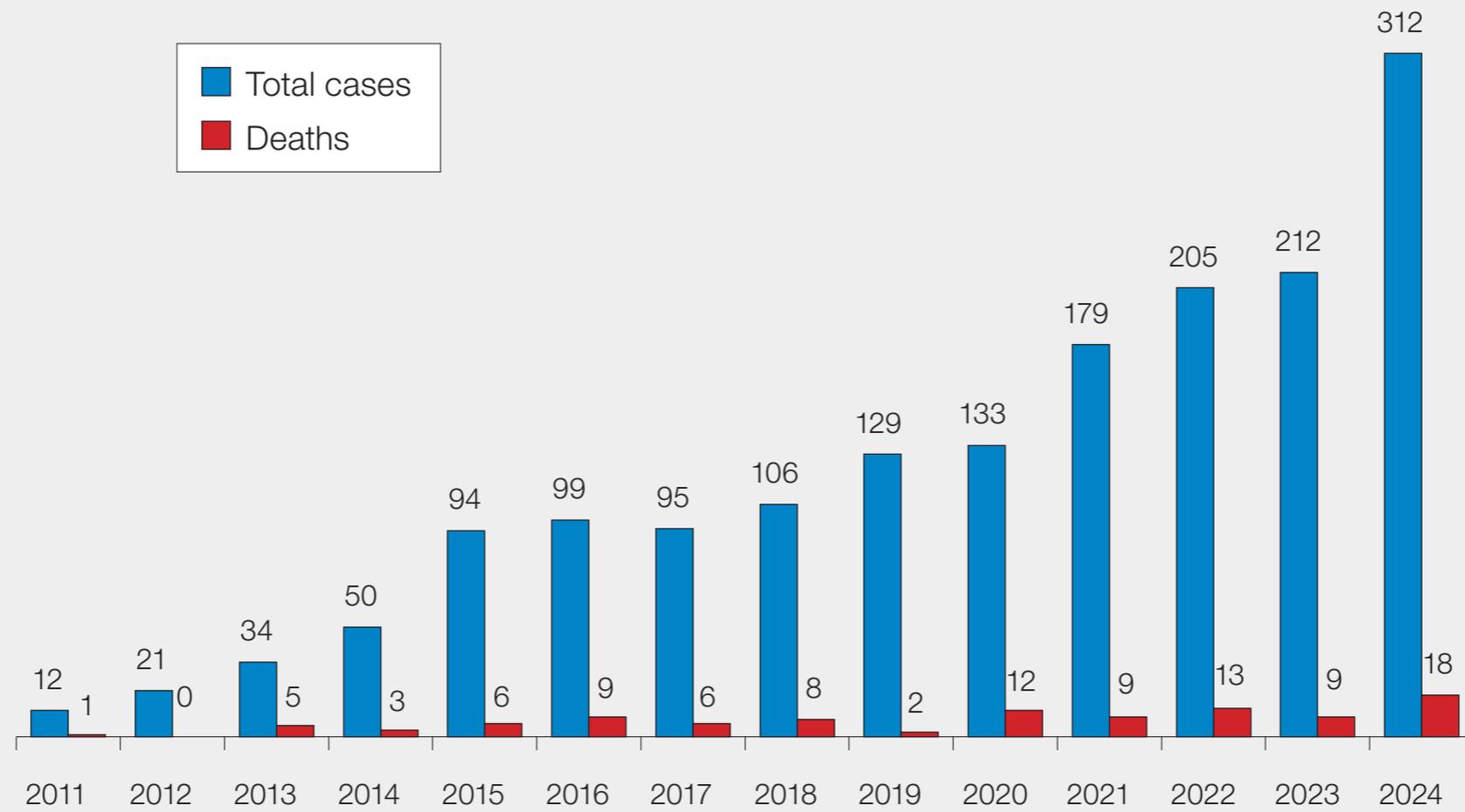


Figure 11.2: Transfusion process step where laboratory errors occurred resulting in transfusion delays in 2024 (n=120)

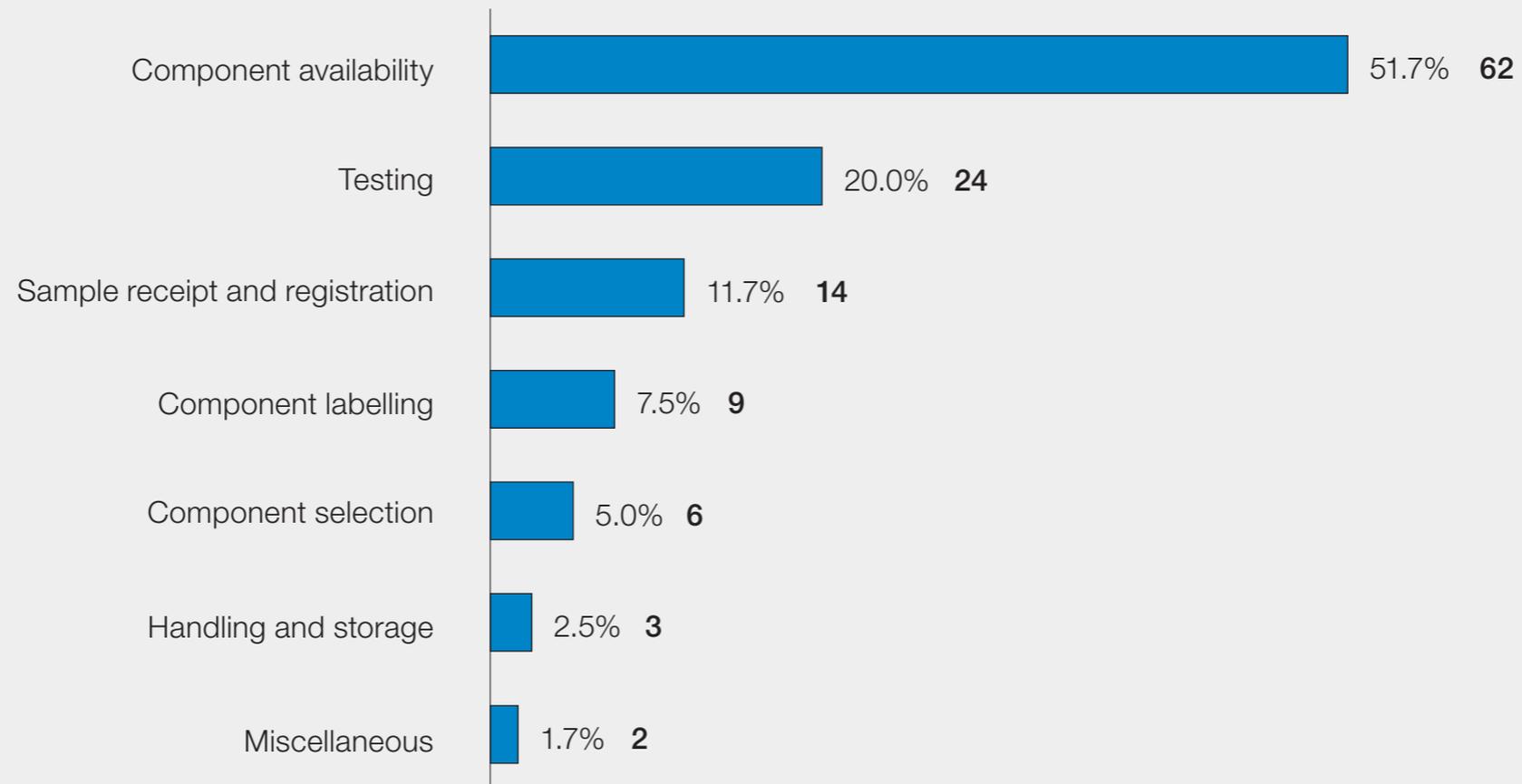


Figure 11.3: Trend in Blood Service-related errors 2019-2024

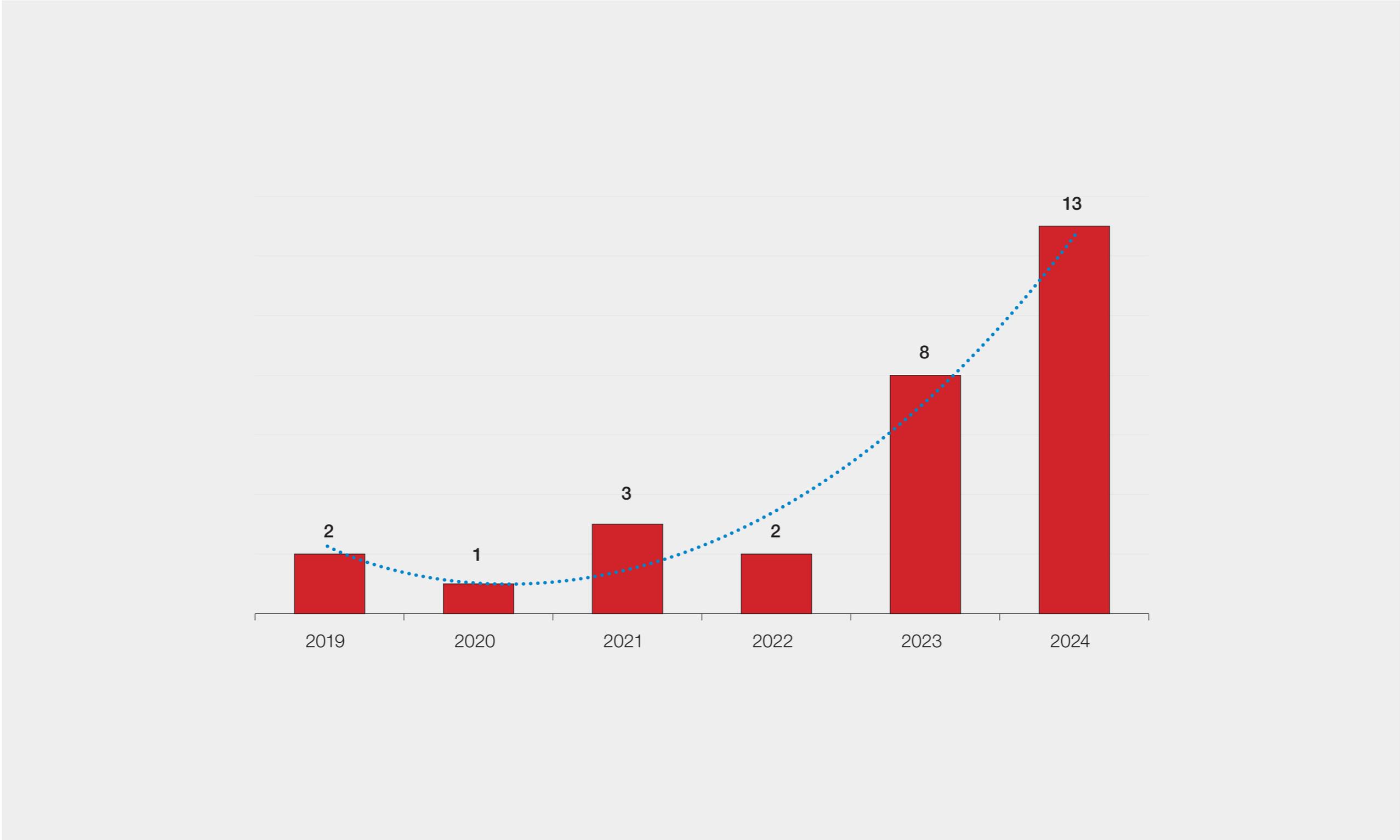


Figure 11.4: Delays associated with MHP 2016-2024

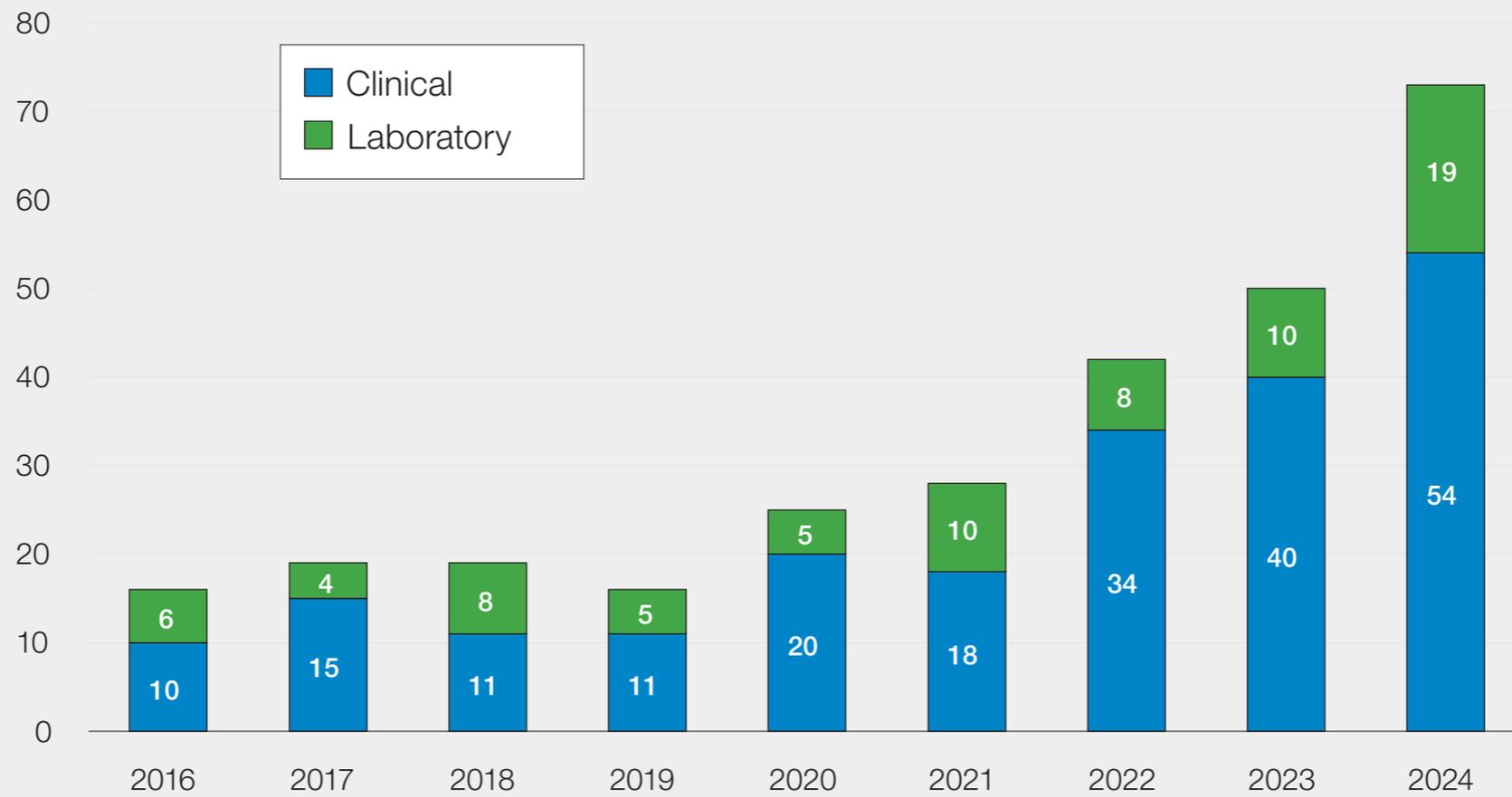
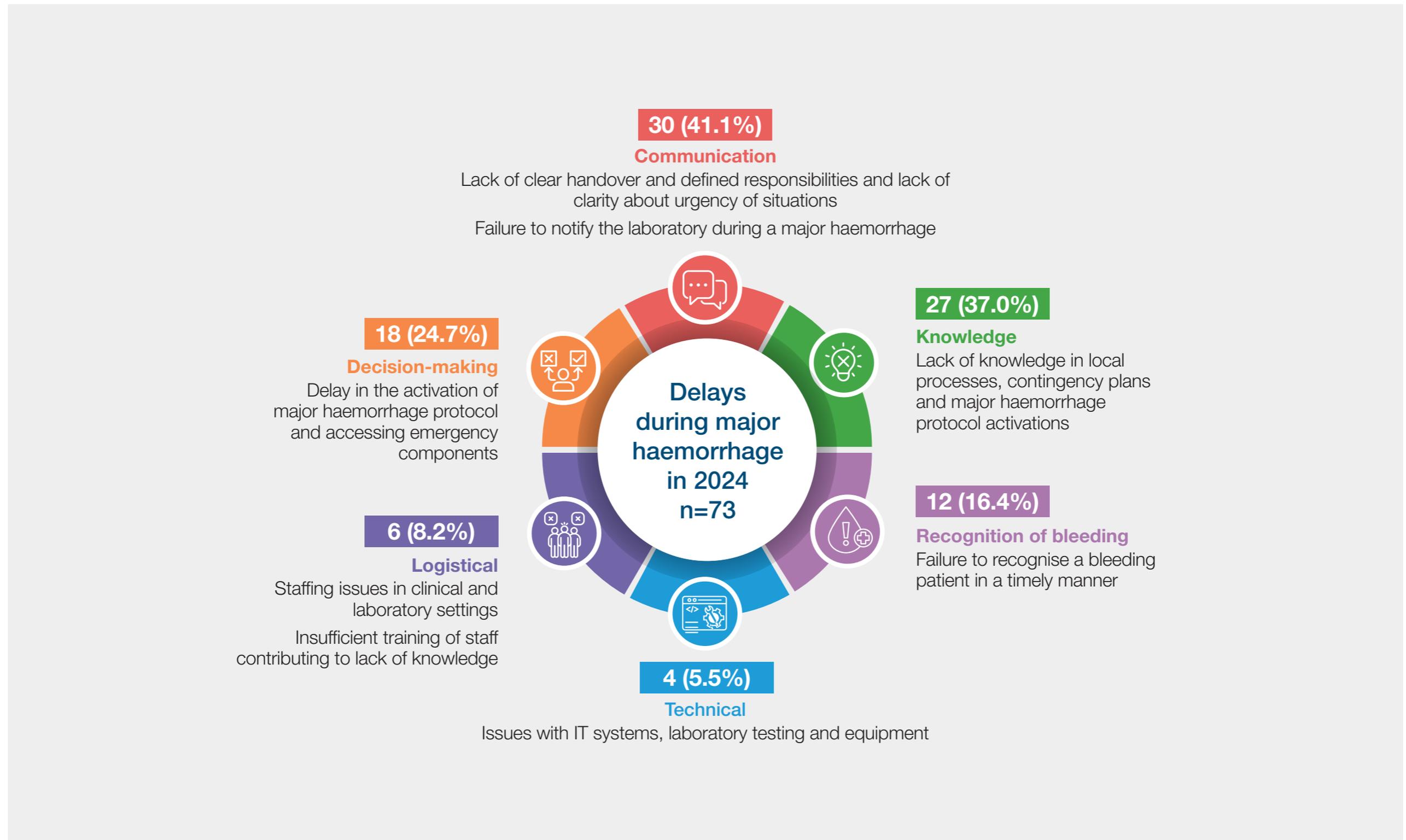
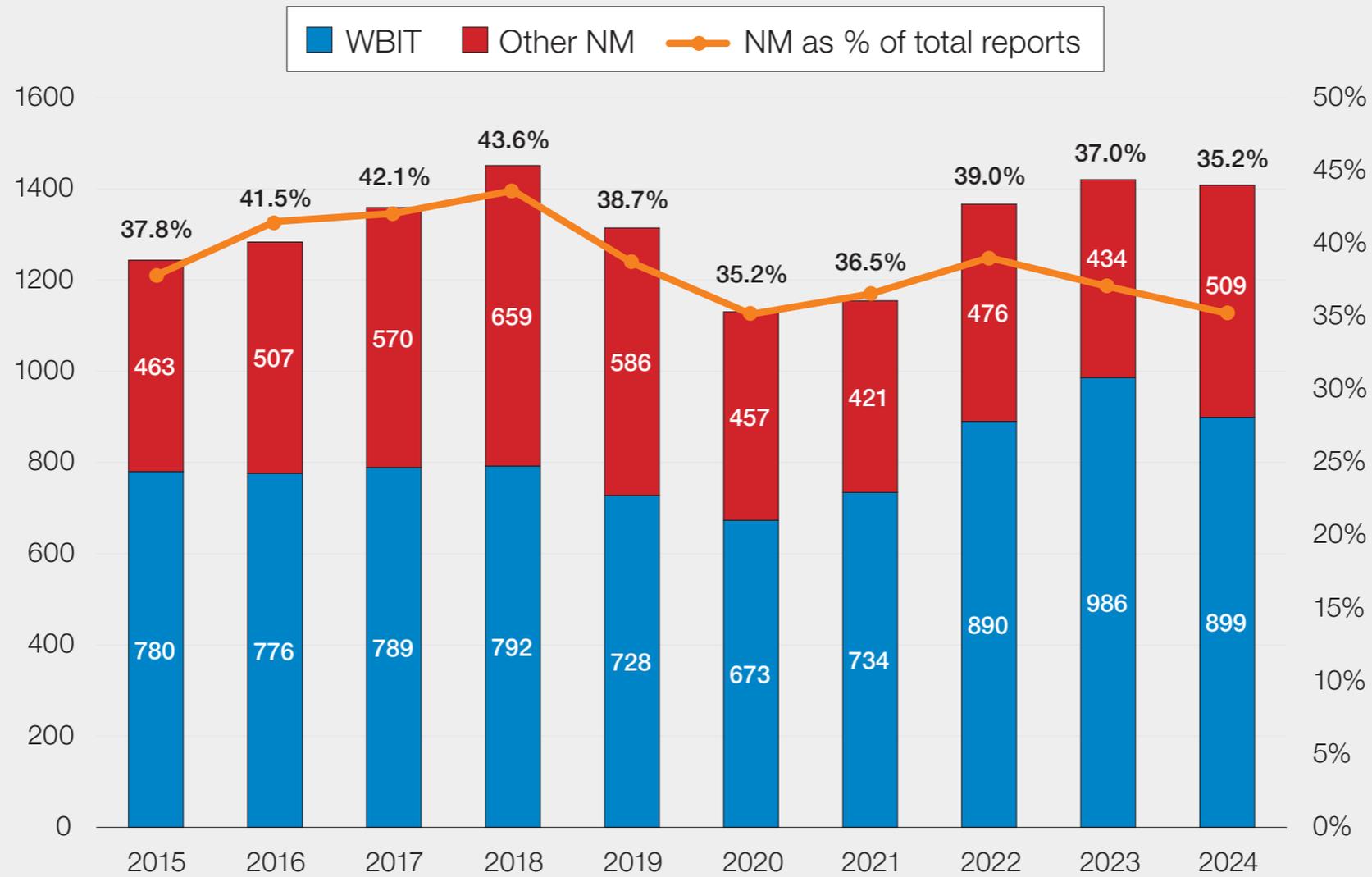


Figure 11.5: An image depicting the multiple contributing factors that resulted in delays during major haemorrhage in 2024 (n=73)



IT=information technology; MH=major haemorrhage; MHP=major haemorrhage protocol

Figure 15.1: A decade of NM (other) and WBIT reports (2015-2024)



NM=near miss; WBIT=wrong blood in tube

Figure 15.2: Point in the process where the error was detected in NM events, excluding NM-WBIT reported in 2024 (n=509)

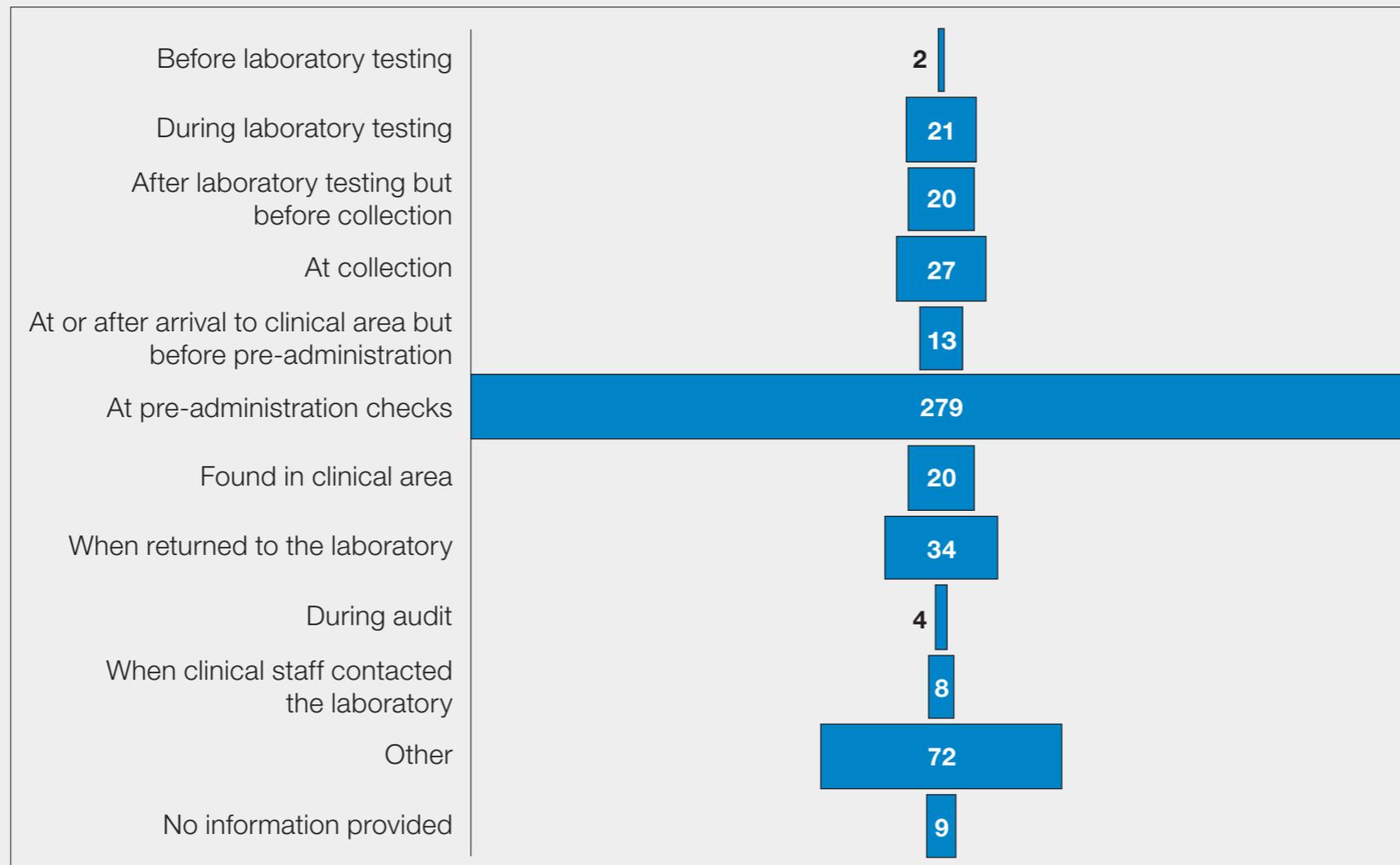


Figure 15a.1: Primary errors leading to WBIT in 2024 (n=899)

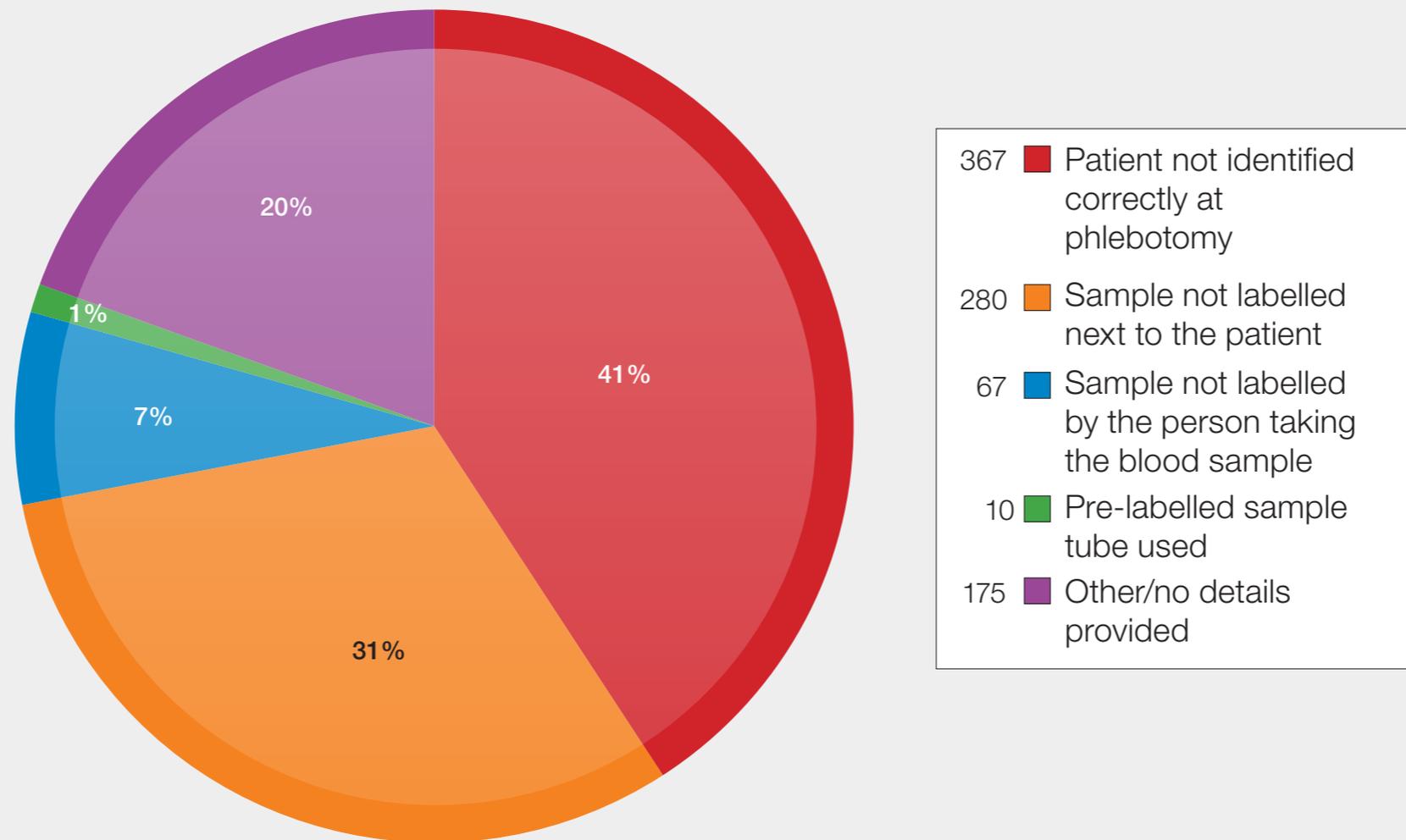


Figure 15a.2: Point in the process where the error was detected in WBIT reported in 2024 (n=899)

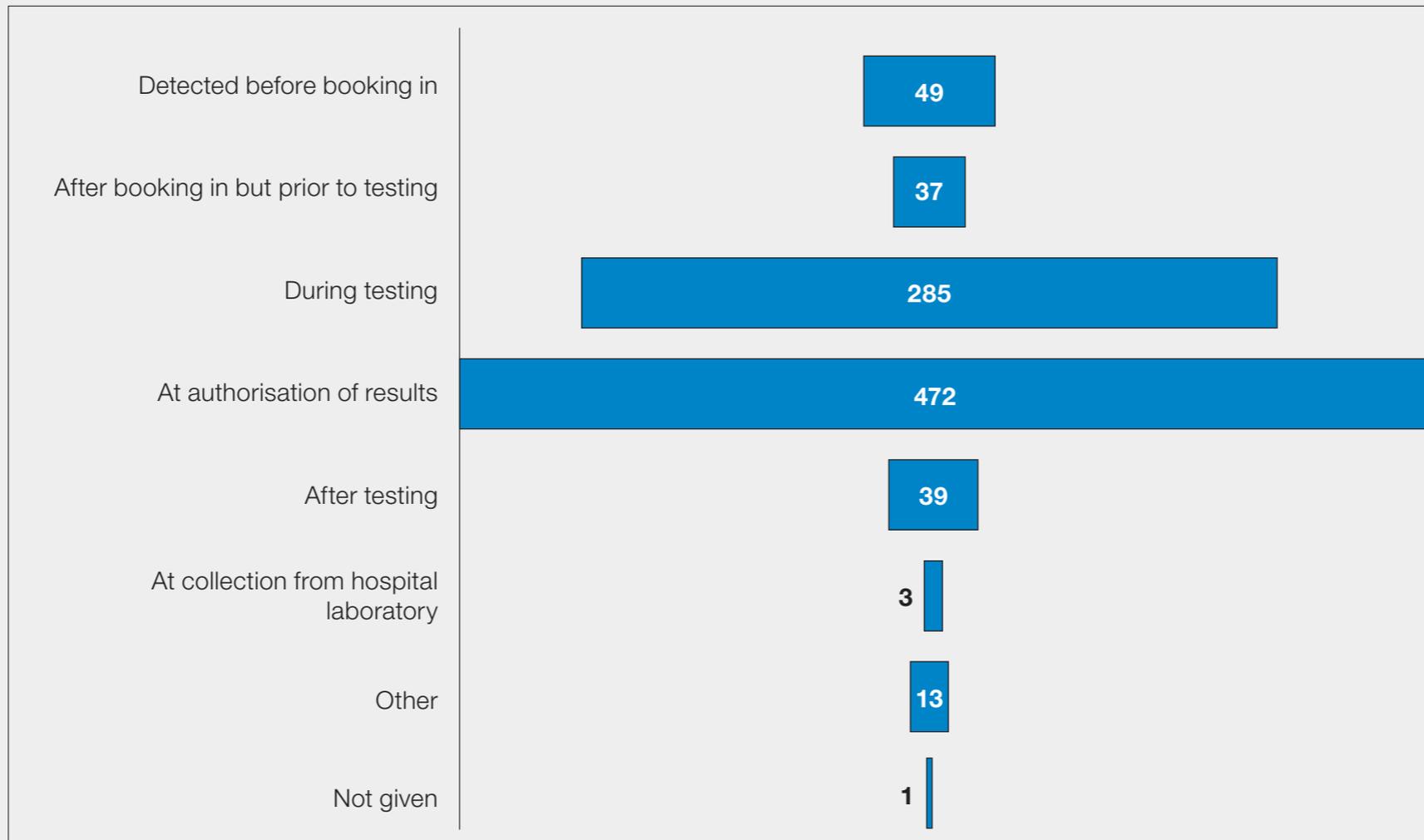


Figure 16.1: RBRP classified by the step in the transfusion process where the primary error occurred in 2024 (n=278)

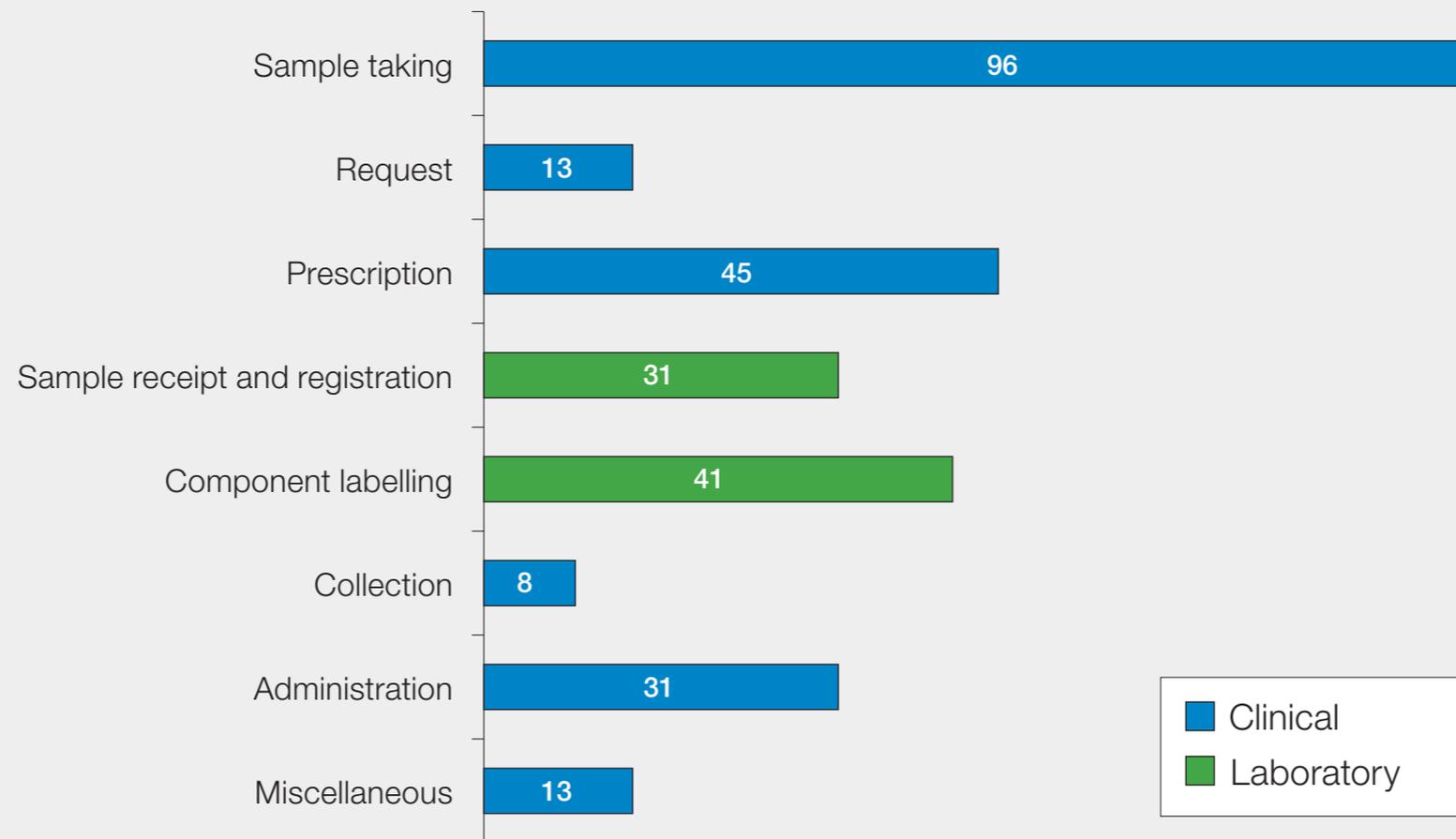


Figure 16.2: Contributory factors in RBRP errors reported in 2024

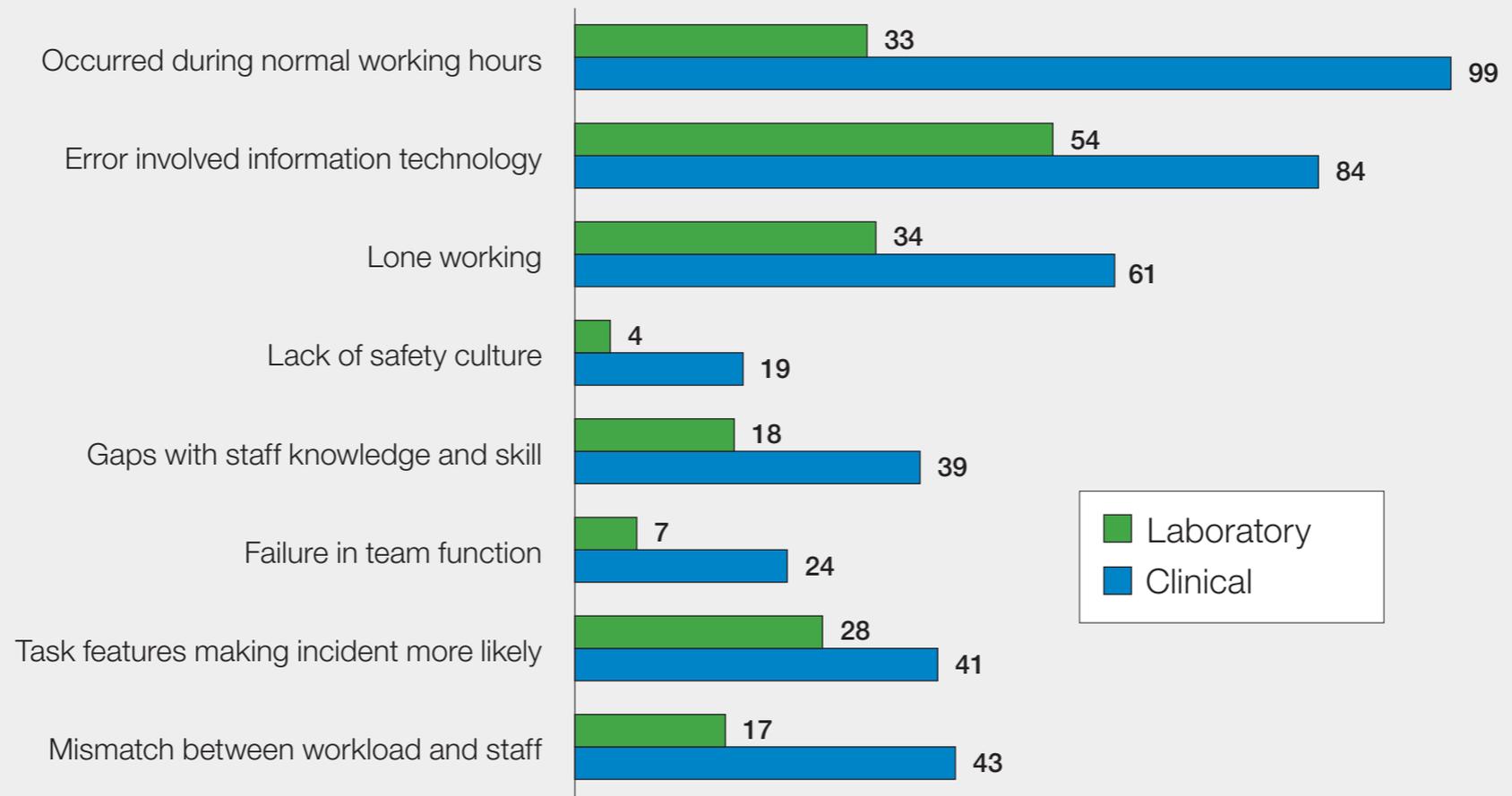
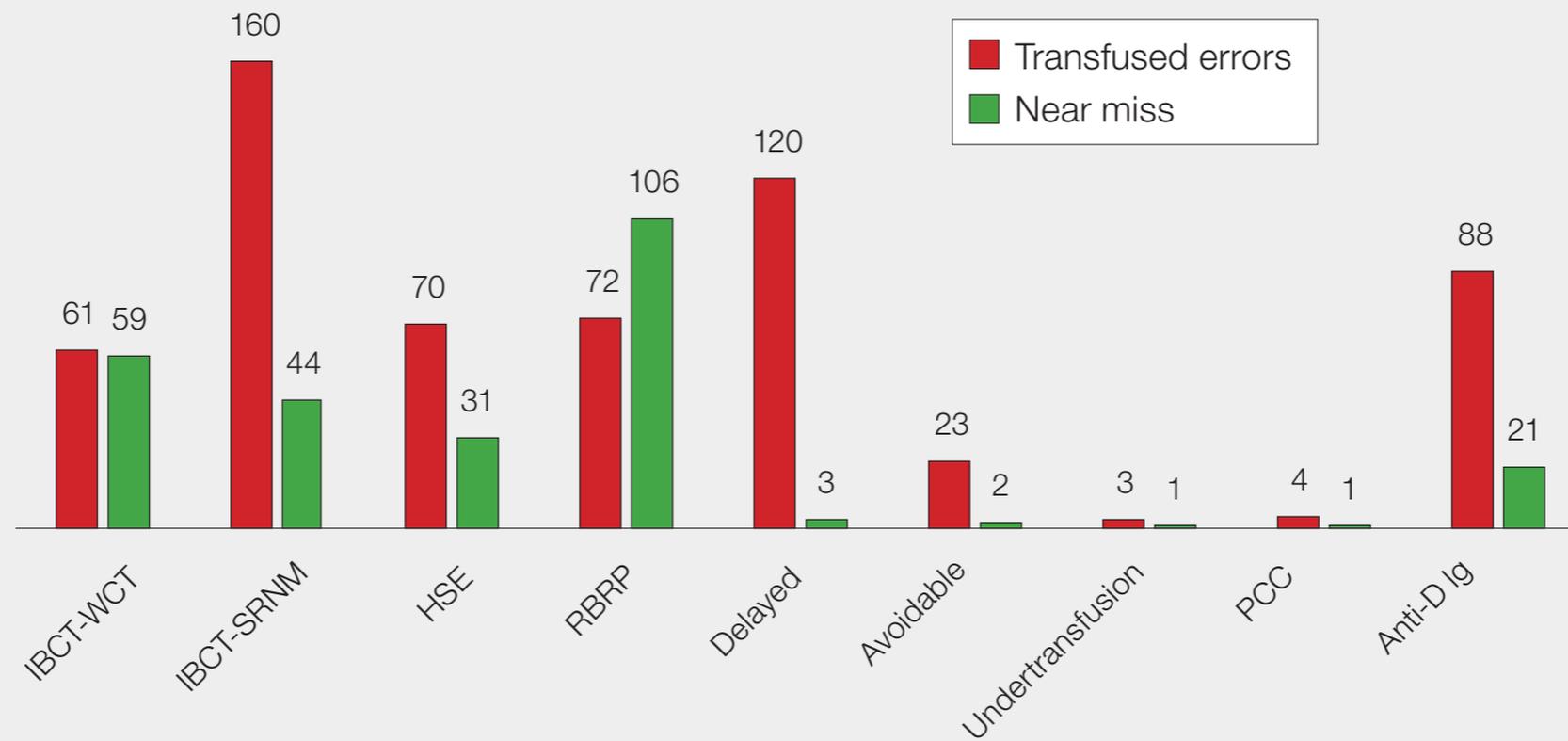
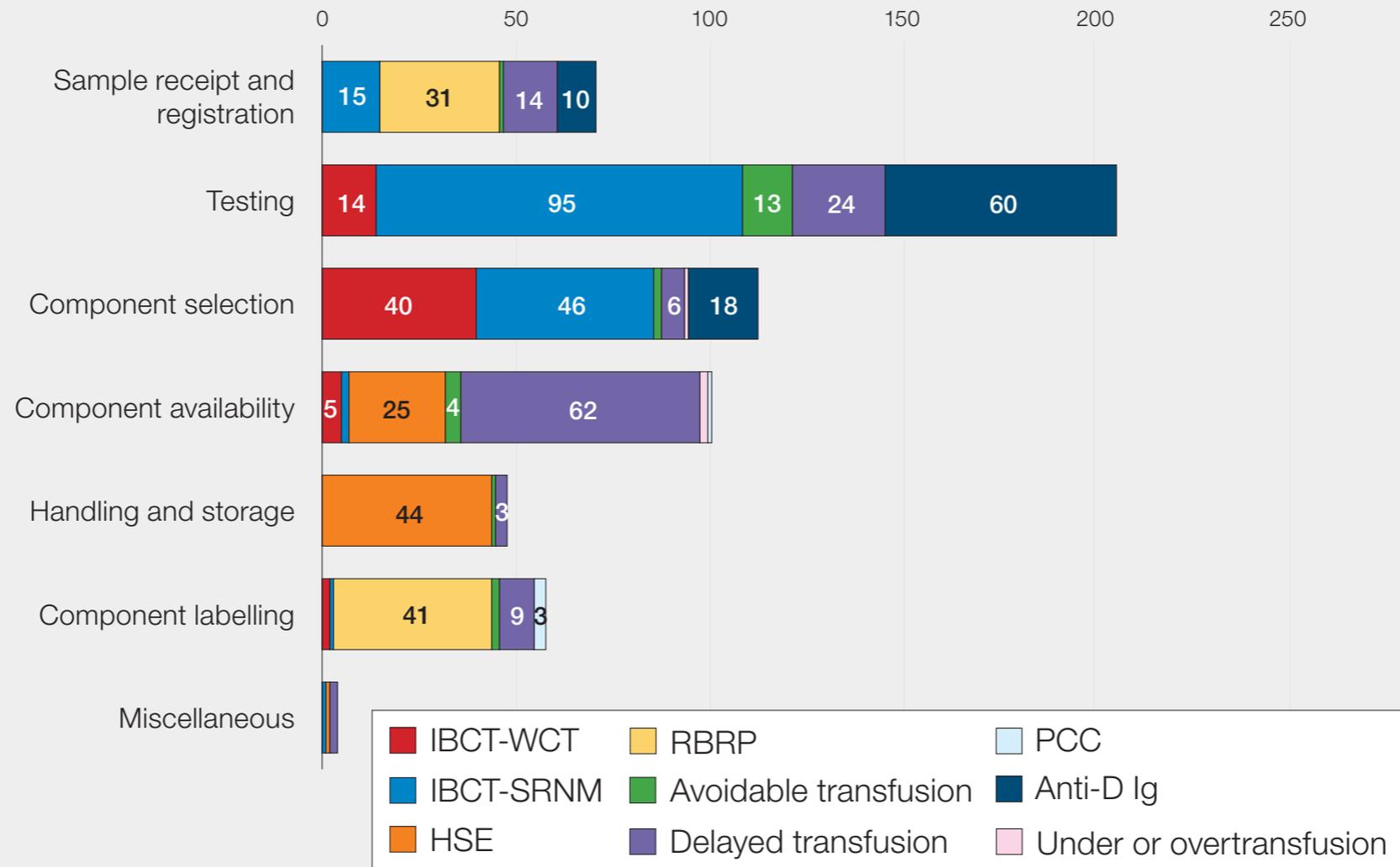


Figure 17.1: Laboratory errors and near misses in 2024 (n=869)



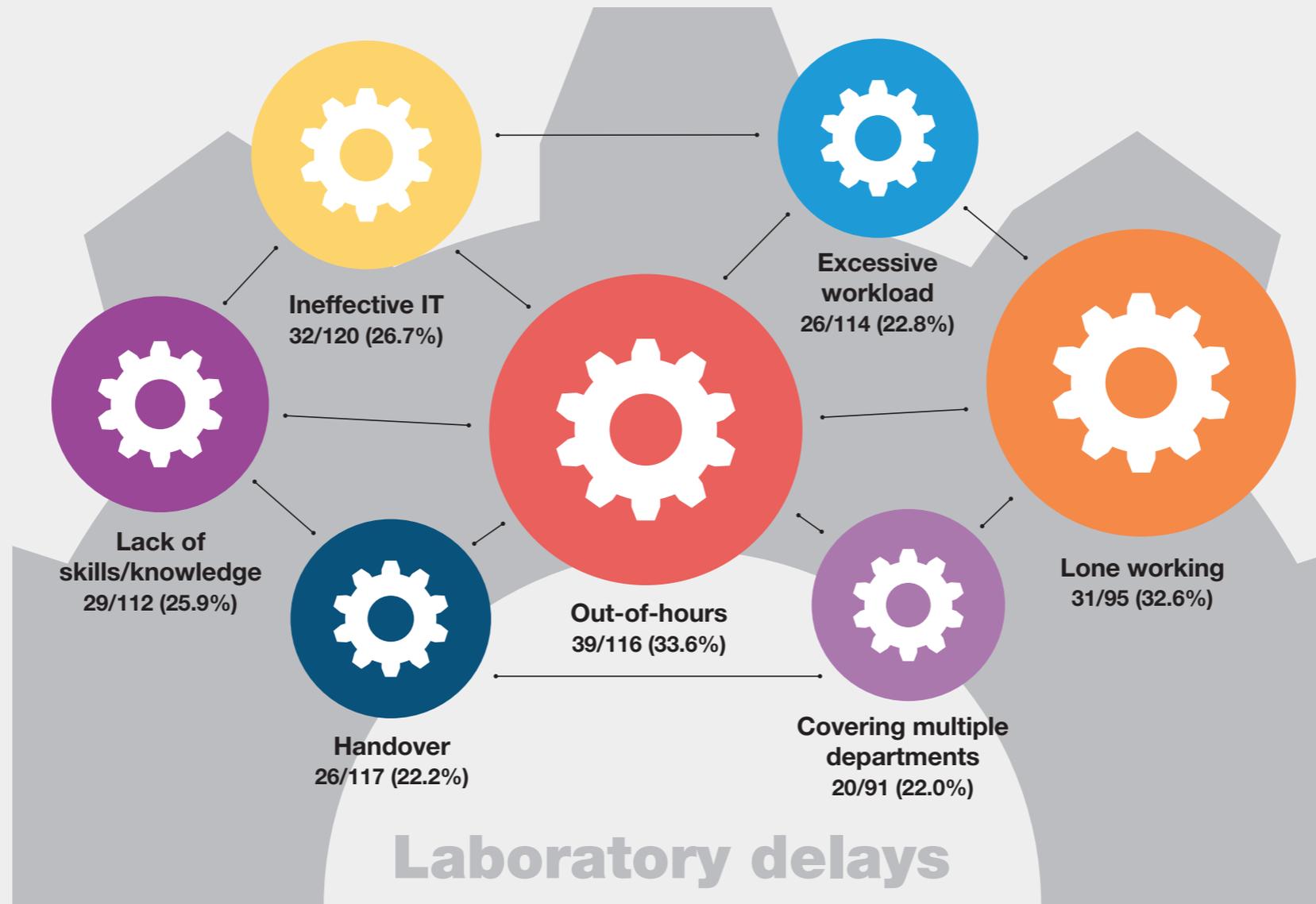
IBCT-WCT=incorrect blood component transfused-wrong component transfused; IBCT-SRNM=IBCT-specific requirements not met; HSE=handling and storage errors; RBRP=right blood right patient; PCC=prothrombin complex concentrates; Ig=immunoglobulin

Figure 17.2: Laboratory errors in 2024, classified by the transfusion step where the primary error occurred (n=601)



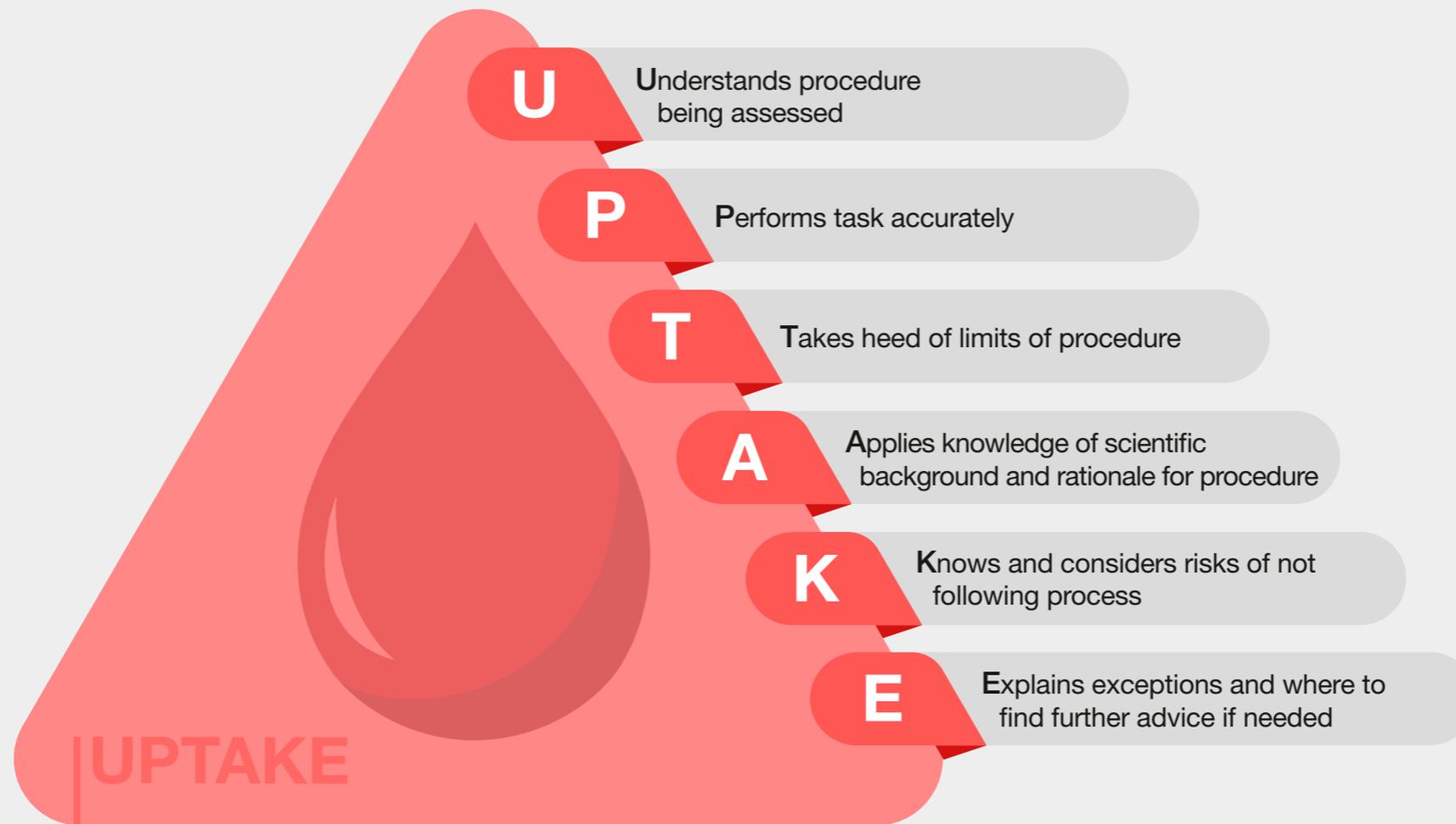
IBCT-WCT=incorrect blood component transfused-wrong component transfused; IBCT-SRNM=IBCT-specific requirements not met; HSE=handling and storage errors; RBRP=right blood right patient; PCC=prothrombin complex concentrates; Ig=immunoglobulin. Note: numbers <3 are too small to be annotated on the figure

Figure 17.3: Factors interacting to contribute to laboratory delays in 2024



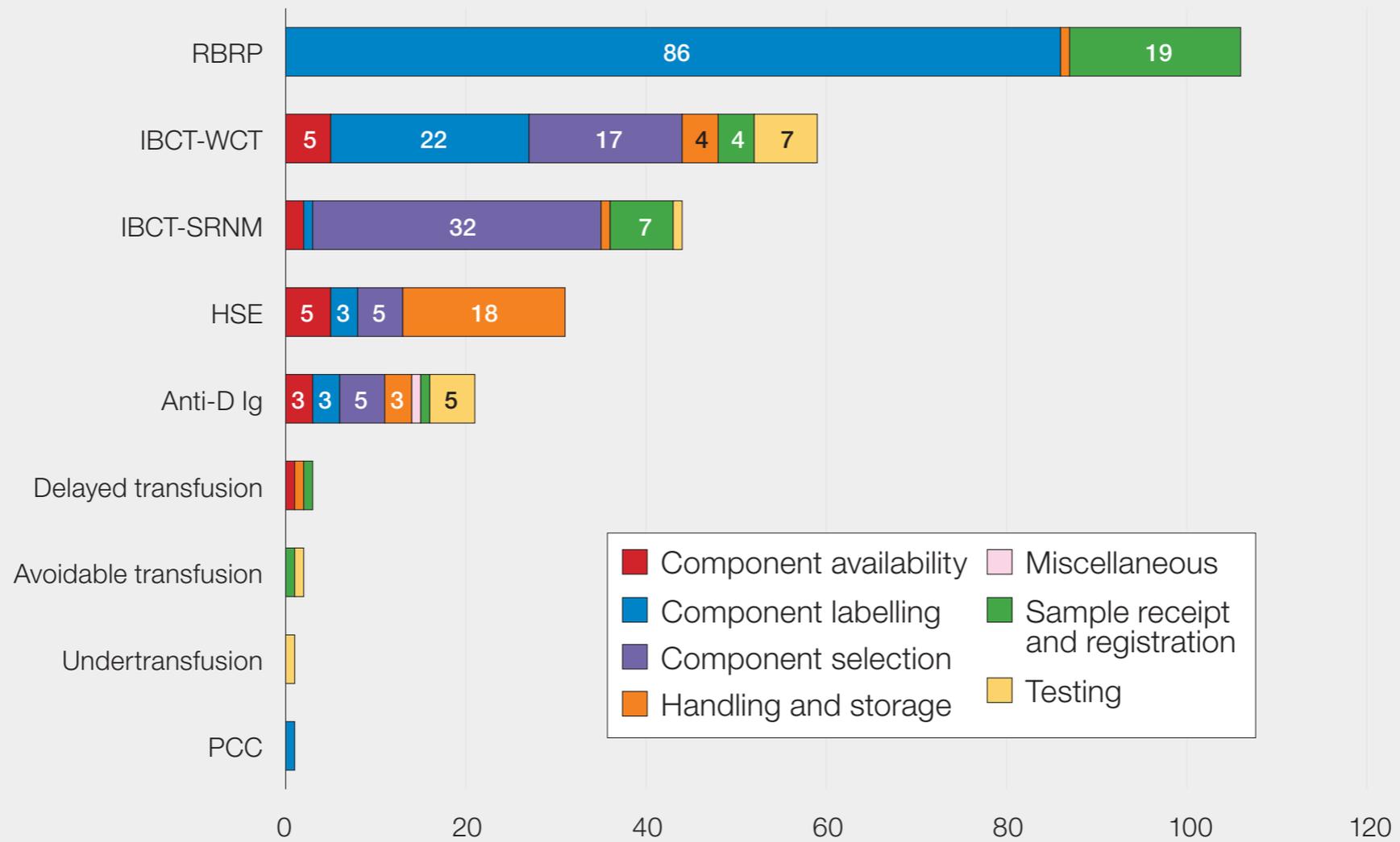
IT=information technology

Figure 17.4: UPTAKE competency assessment model



<https://www.shotuk.org/resources/uptake-competency-assessment/>

Figure 17.5: Laboratory NM classified by the transfusion step where the primary error occurred in 2024 (n=268)



IBCT-WCT=incorrect blood component transfused-wrong component transfused; IBCT-SRNM=IBCT-specific requirements not met; HSE=handling and storage errors; RBRP=right blood right patient; PCC=prothrombin complex concentrates; Ig=immunoglobulin. Note: numbers <3 are too small to be annotated on the figure

Figure 18.1: RBRP IT-related errors according to the step in the transfusion process in 2024 (n=138)

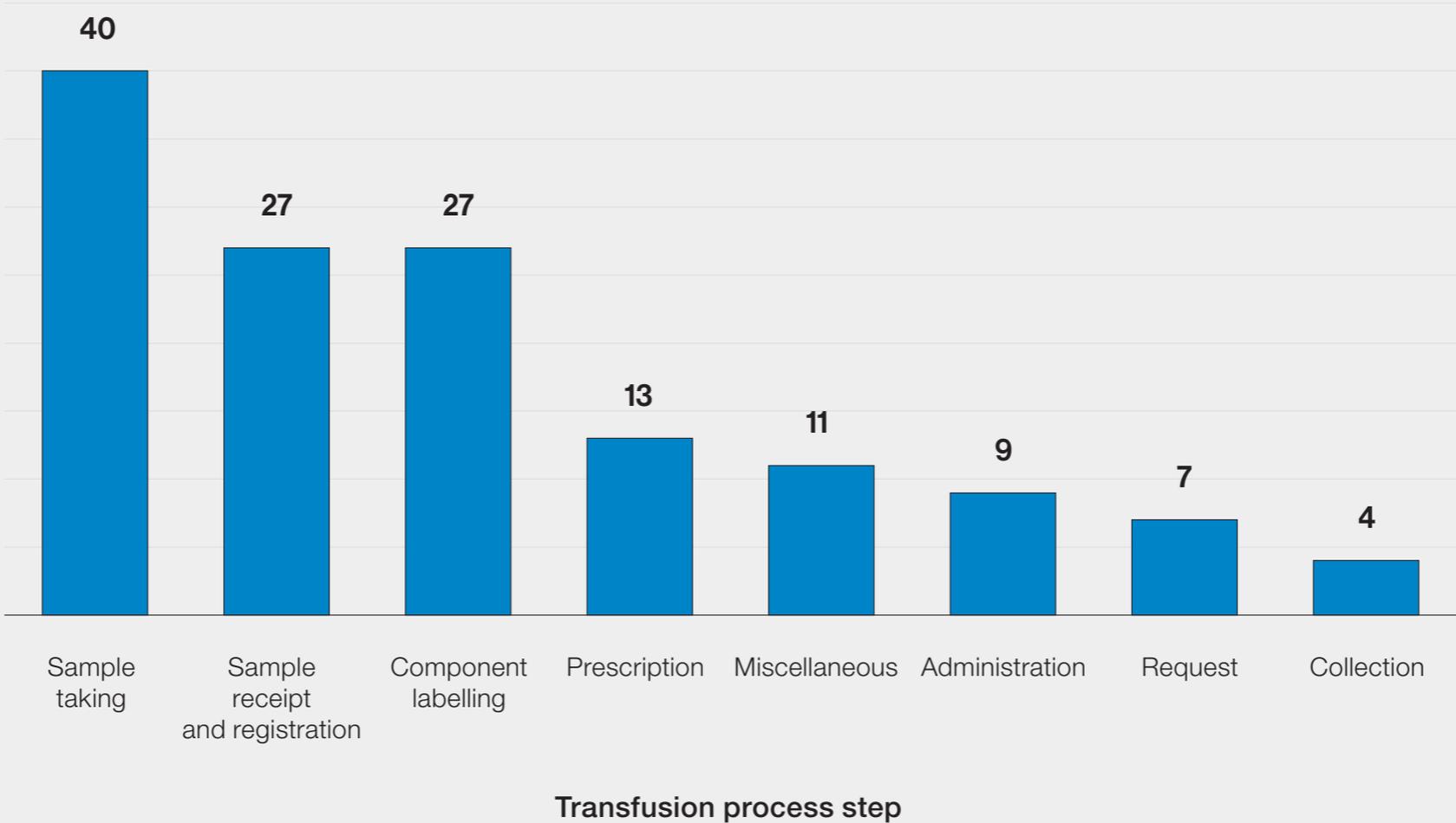
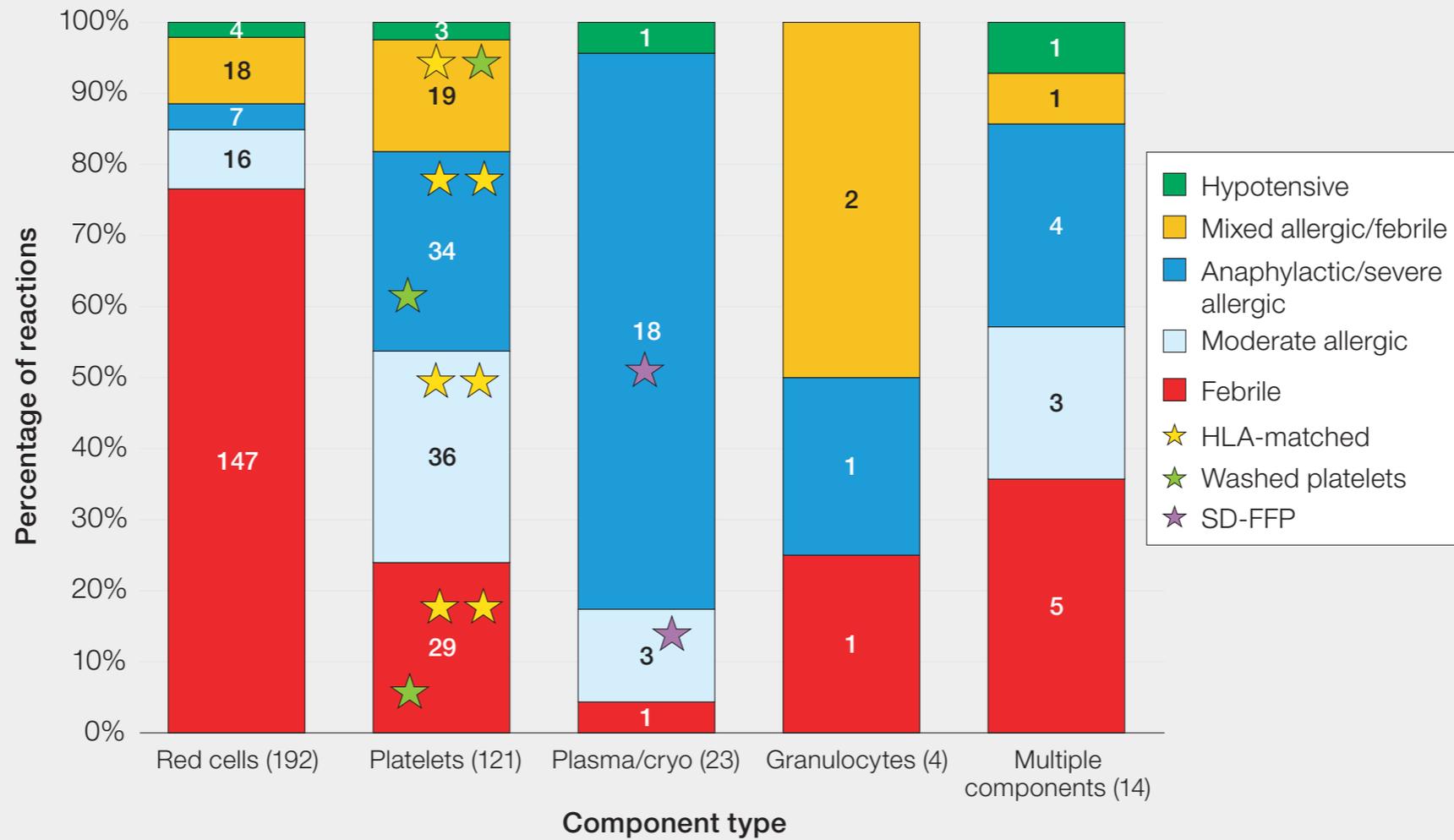


Figure 19.1: FAHR reactions by component type in 2024 (n=354)



HLA=human leucocyte antigen; cryo=cryoprecipitate; SD-FFP=solvent detergent-treated fresh frozen plasma

Figure 19.2: Incidence of platelet reactions as a percentage of units issued 2023-2024

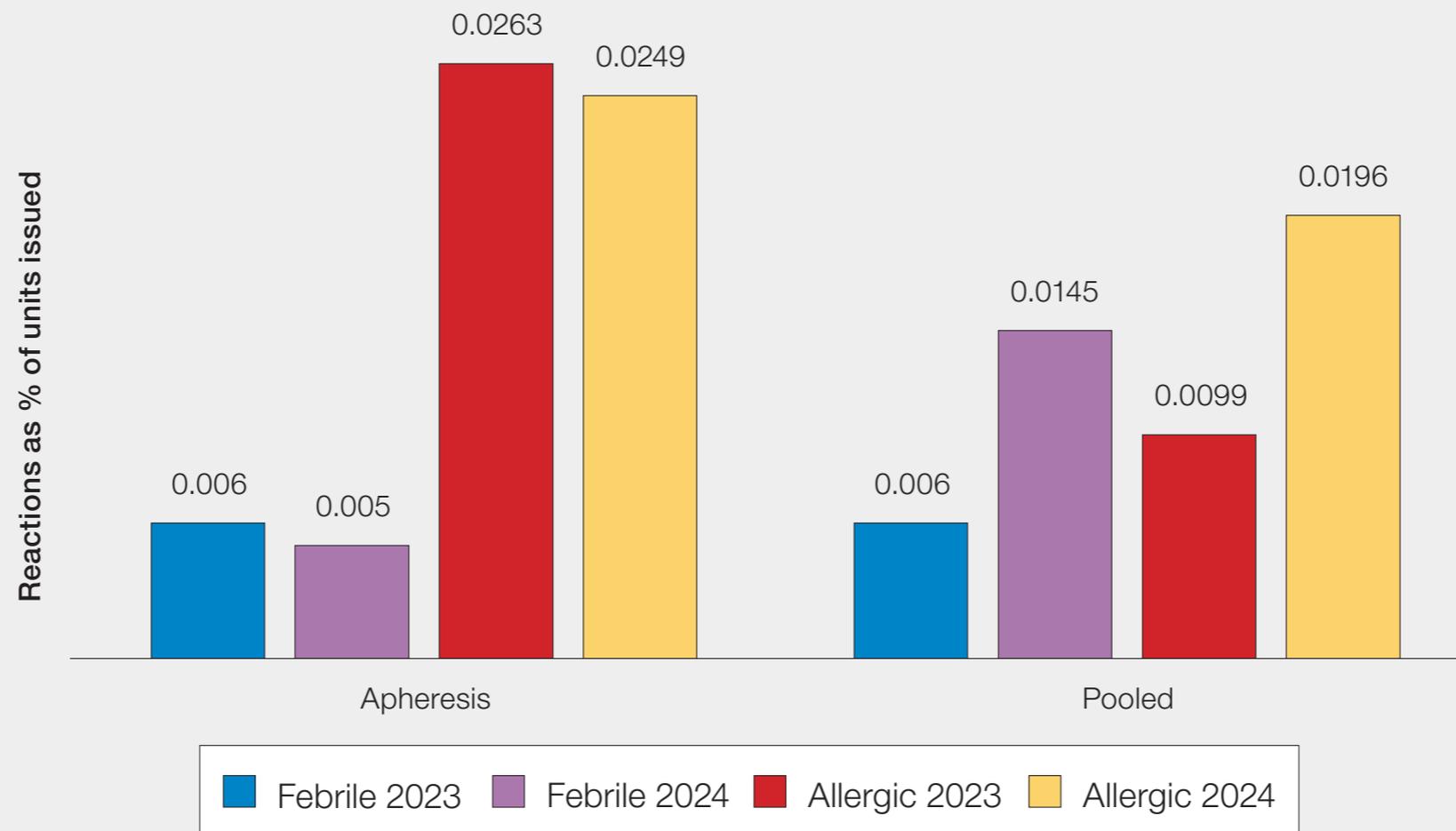


Figure 20a.1: Updated TACO pre-transfusion risk assessment

TACO Risk Assessment		YES	NO
	Does the patient have any of the following?: diagnosis of 'heart failure', congestive cardiac failure (CCF), left ventricular dysfunction, aortic stenosis, or any other heart valve disease		
	Is the patient on a regular diuretic?		
	Does the patient have severe anaemia?		
	Is the patient known to have pulmonary oedema?		
	Does the patient have respiratory symptoms of undiagnosed cause?		
	Is the fluid balance clinically significantly positive?		
	Is the patient receiving intravenous fluids (or received them in the previous 24 hours)?		
	Is there any peripheral oedema?		
	Does the patient have a low serum albumin level?		
	Does the patient have significant renal impairment?		
If risks identified		YES	NO
Review the need for transfusion (do the benefits outweigh the risks)?			
Can the transfusion be safely deferred until the issue is investigated, treated or resolved?			
If proceeding with red cell transfusion: ensure appropriate indication and volume is prescribed (adults)			
Indication code for transfusion	Target Hb	Dosing advice	
Acute anaemia (R2)	Post-transfusion target Hb 70 - 90g/L	Body weight dosing (max 2 units)	
Acute anaemia (R3: with acute MI/ACS)	Post-transfusion target Hb 80 - 100g/L	Body weight dosing (max 2 units)	
Severe symptomatic chronic anaemia (R7)	No target Hb - minimum transfusion	Usually single unit only	
Regular transfusion programme (R4)	Individualised target Hb	Body weight dosing (max 2 units)	
Other measures to mitigate TACO: ASSIGN ACTION AS APPROPRIATE			TICK
Review patient after each unit (red cells) and review symptoms of anaemia. Is further transfusion necessary?			
Measure the fluid balance			
Consider a prophylactic diuretic (where appropriate/not contraindicated)			
Monitor the vital signs closely, including oxygen saturation			
Name (PRINT):		<p>Due to the differences in adult and neonatal physiology, babies may have a different risk for TACO. Calculate the dose by weight and observe the notes above.</p>	
Role:			
Date:	Time (24hr):		
Signature:			

TACO=transfusion-associated circulatory overload; MI=myocardial infarction; ACS=acute coronary syndrome; Hb=haemoglobin

Figure 20a.2: TACO-related deaths with imputability, 2015 to 2024 (n=125)

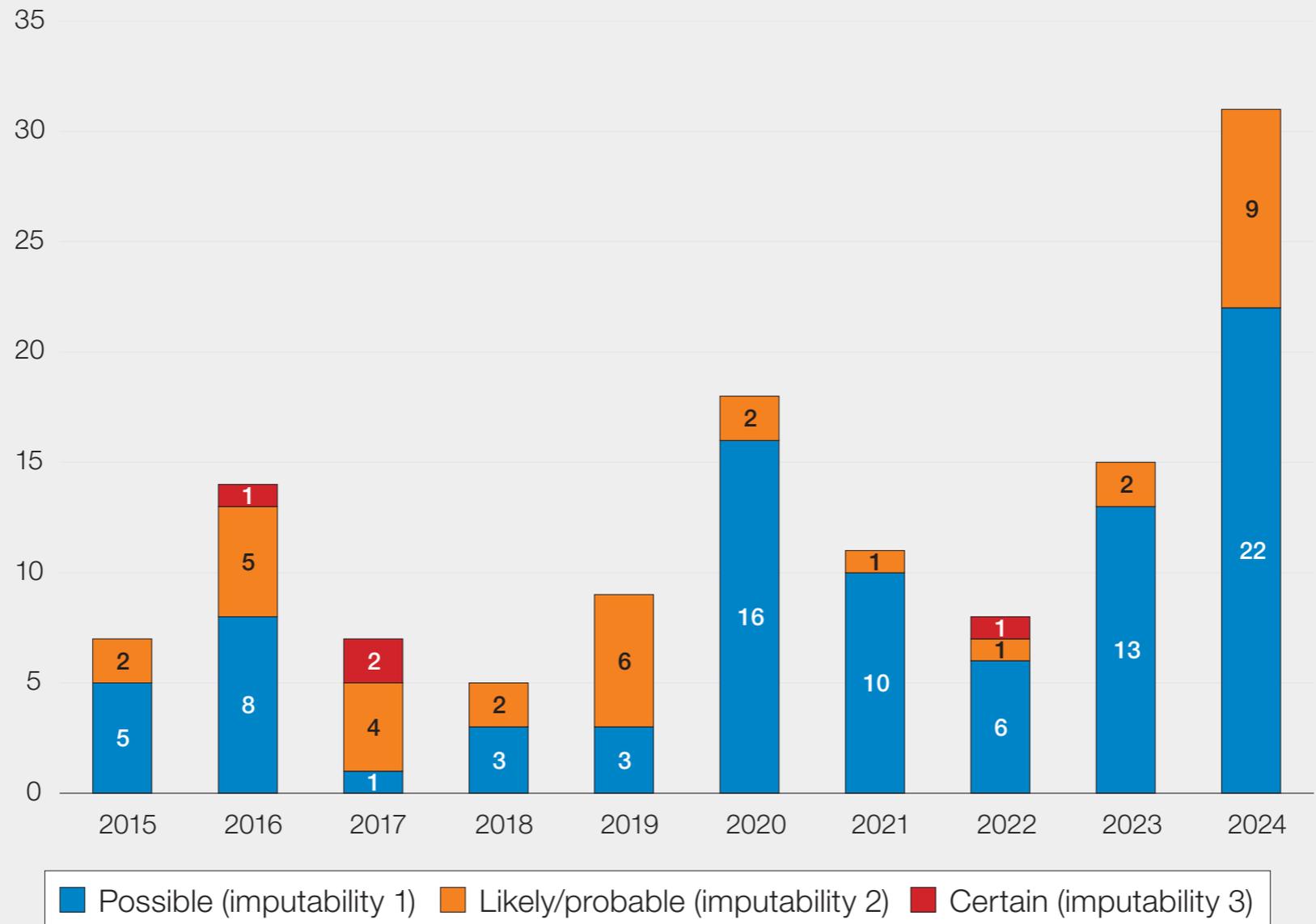
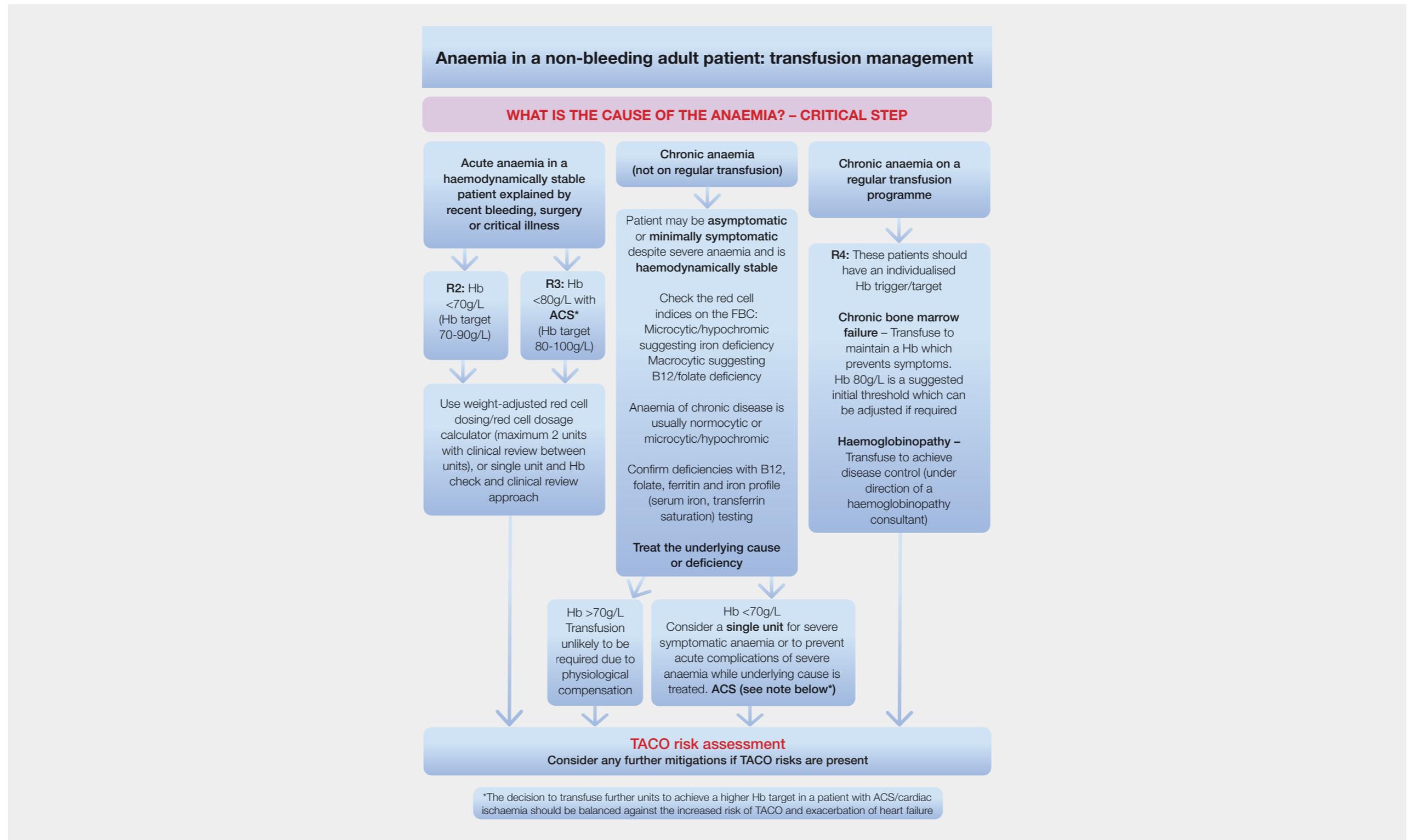


Figure 20a.3: Transfusion management of a non-bleeding adult patient – identification of the cause of anaemia



ACS=acute coronary syndrome; FBC=full blood count; Hb=haemoglobin; TACO=transfusion-associated circulatory overload

Figure 21.1: Age range in males and females experiencing a HTR in 2024

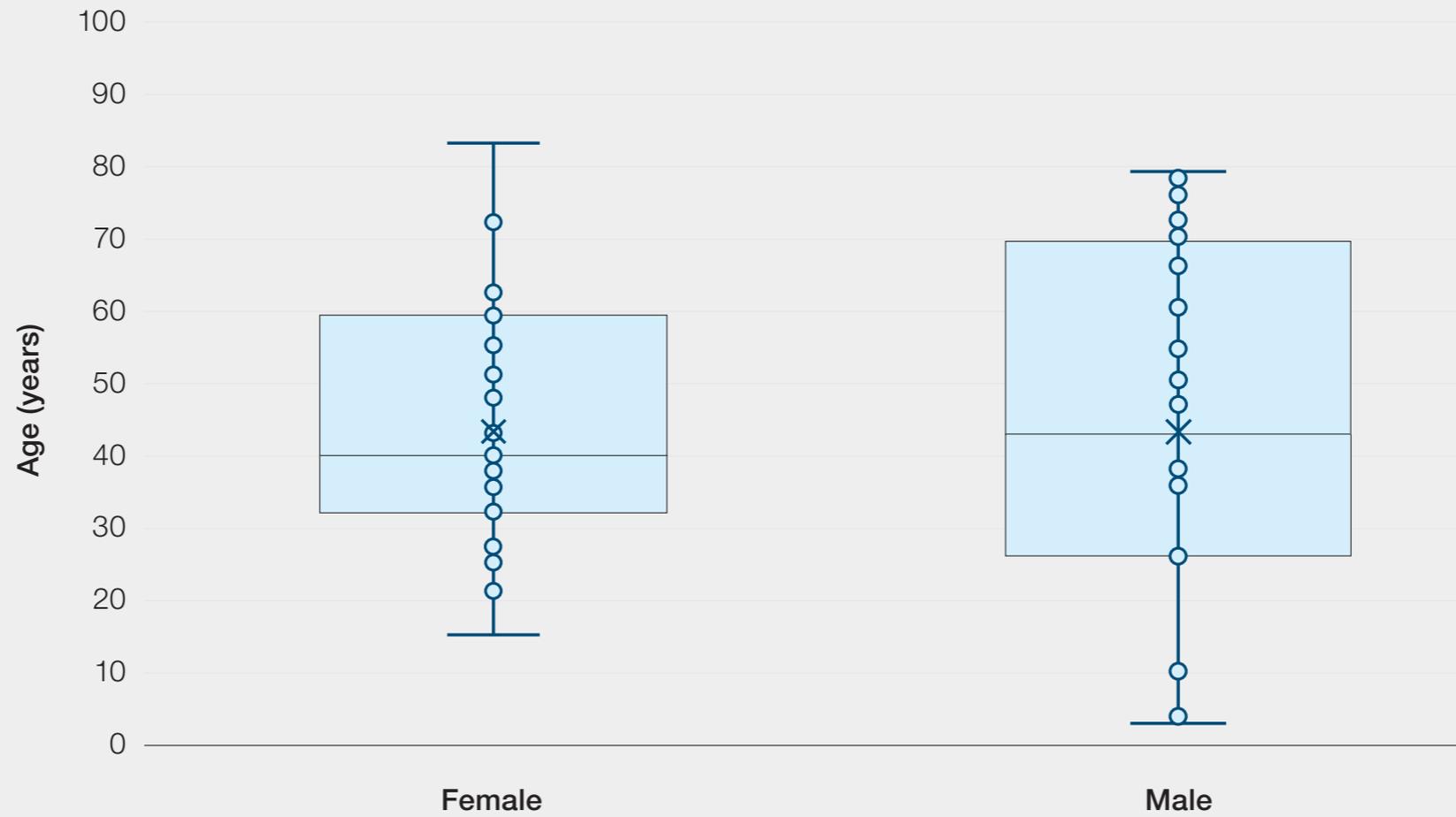


Figure 21.1 is a box and whisker diagram showing the median age and the age range of patients experiencing a HTR reported to SHOT separated by gender. The middle bar in the shaded box indicates the median age, the outer bars of the box represent the upper and lower quartiles. The lines extending from the boxes (whiskers) indicate the lowest and highest values.

Figure 21.2: Treatments used to manage hyperhaemolysis (2020-2024)

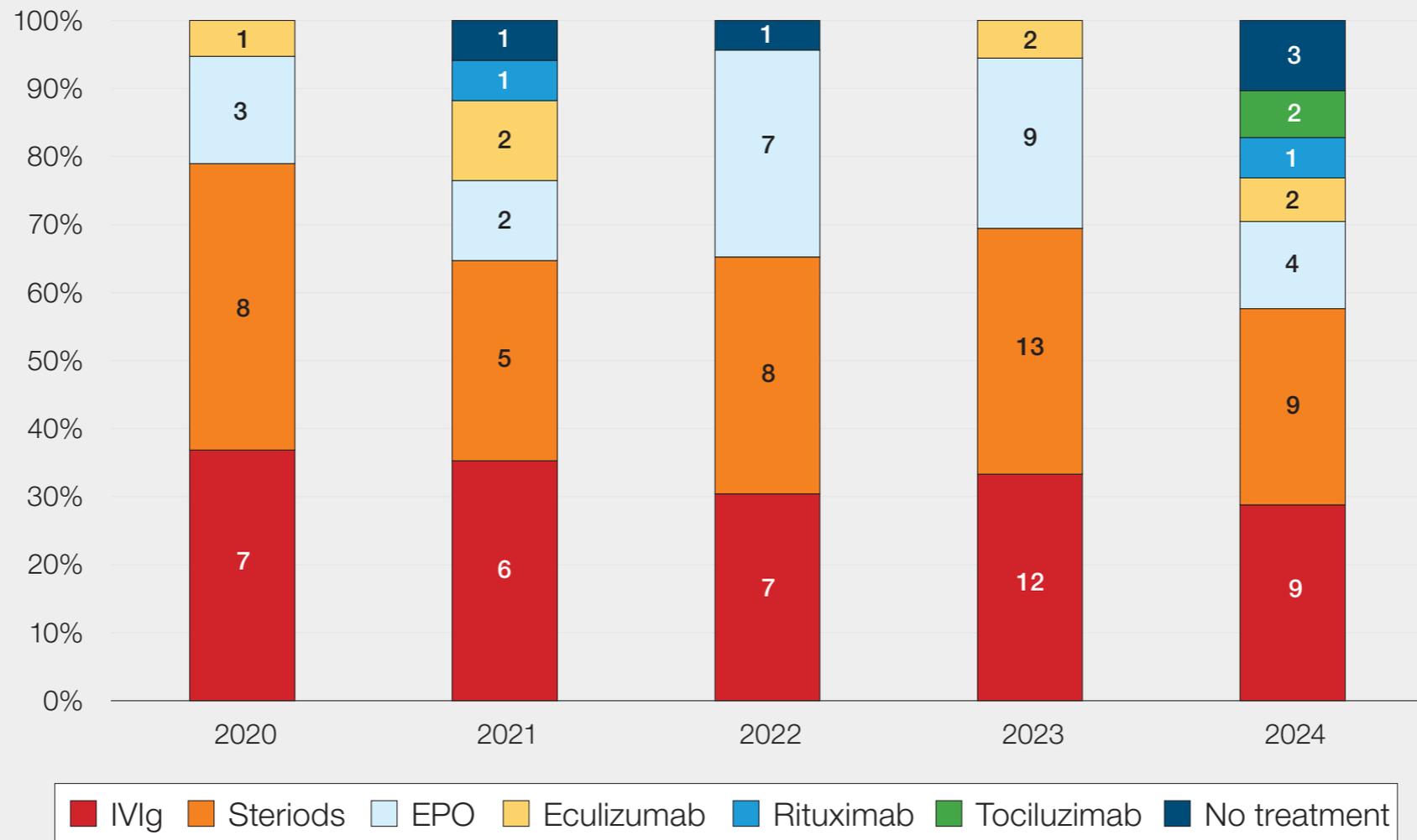


Figure 21.3: Antibodies implicated in AHTR in 2024

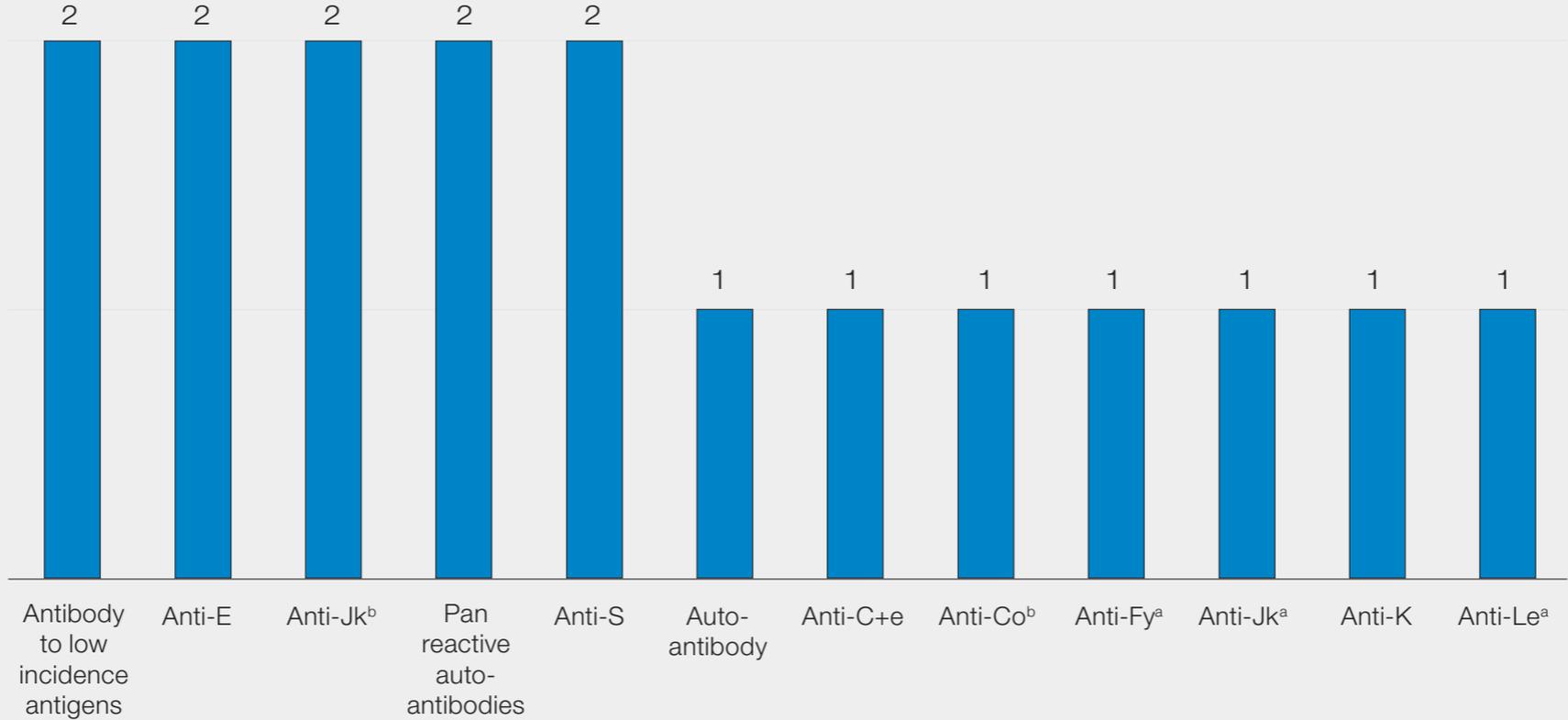


Figure 23.1: Outcomes of suspected TTI investigated in 2024 and reported to NHSBT/UKHSA Epidemiology Unit for England, Northern Ireland, Scotland, and Wales

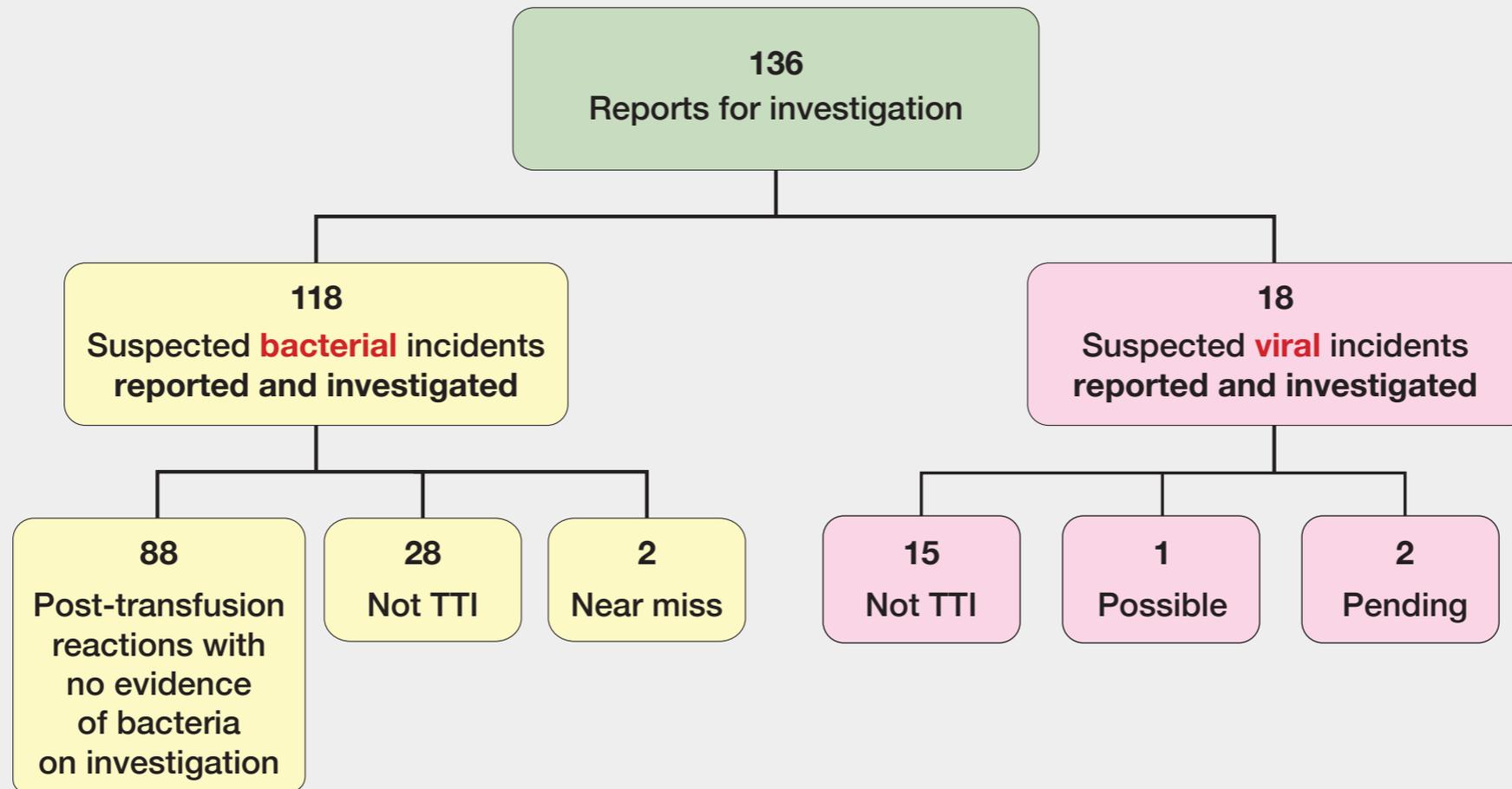


Figure 25.1: Trends in paediatric reports 2015-2024

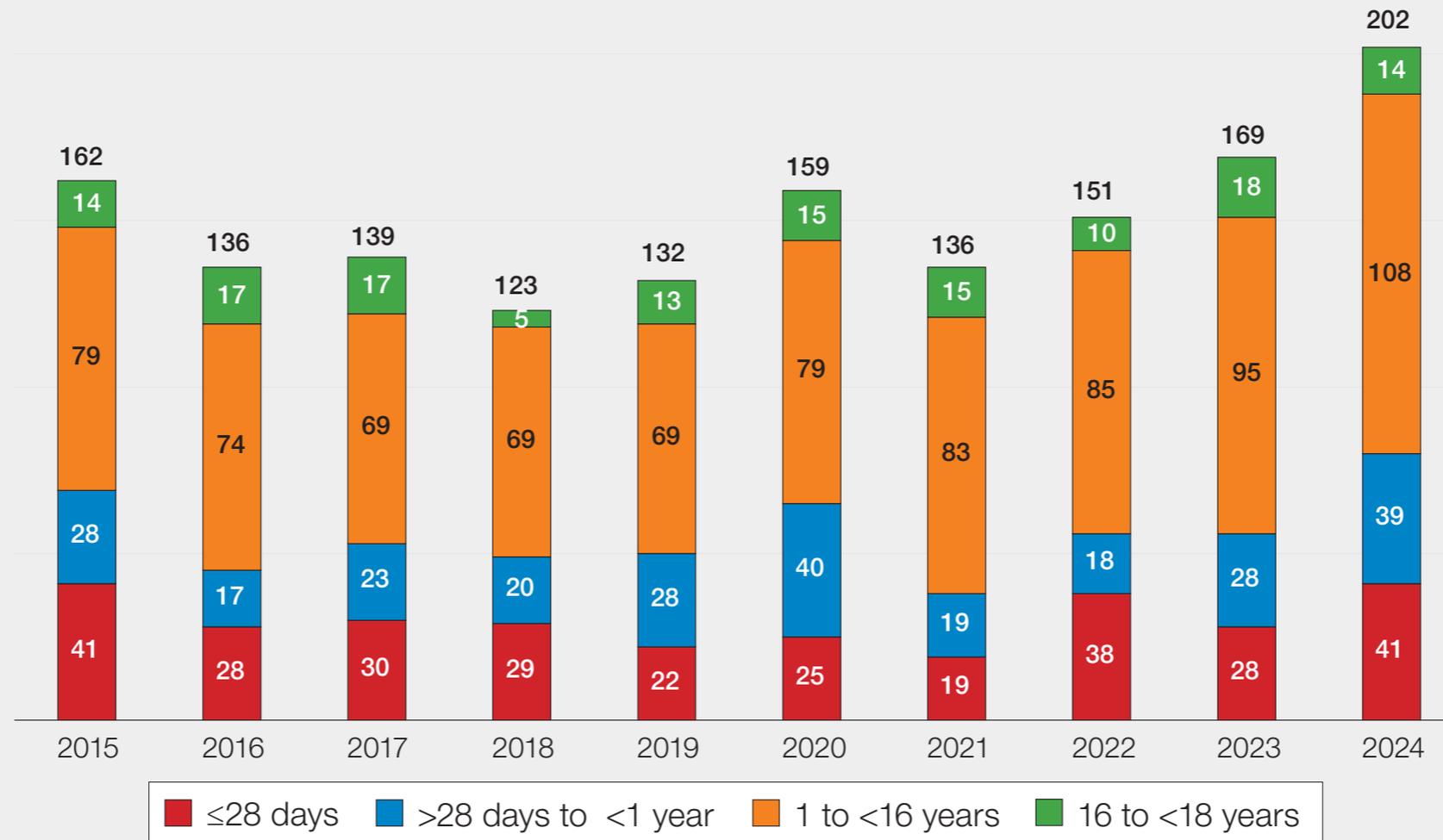


Figure 25.2: Summary of paediatric cases by category and age in 2024 (n=202)

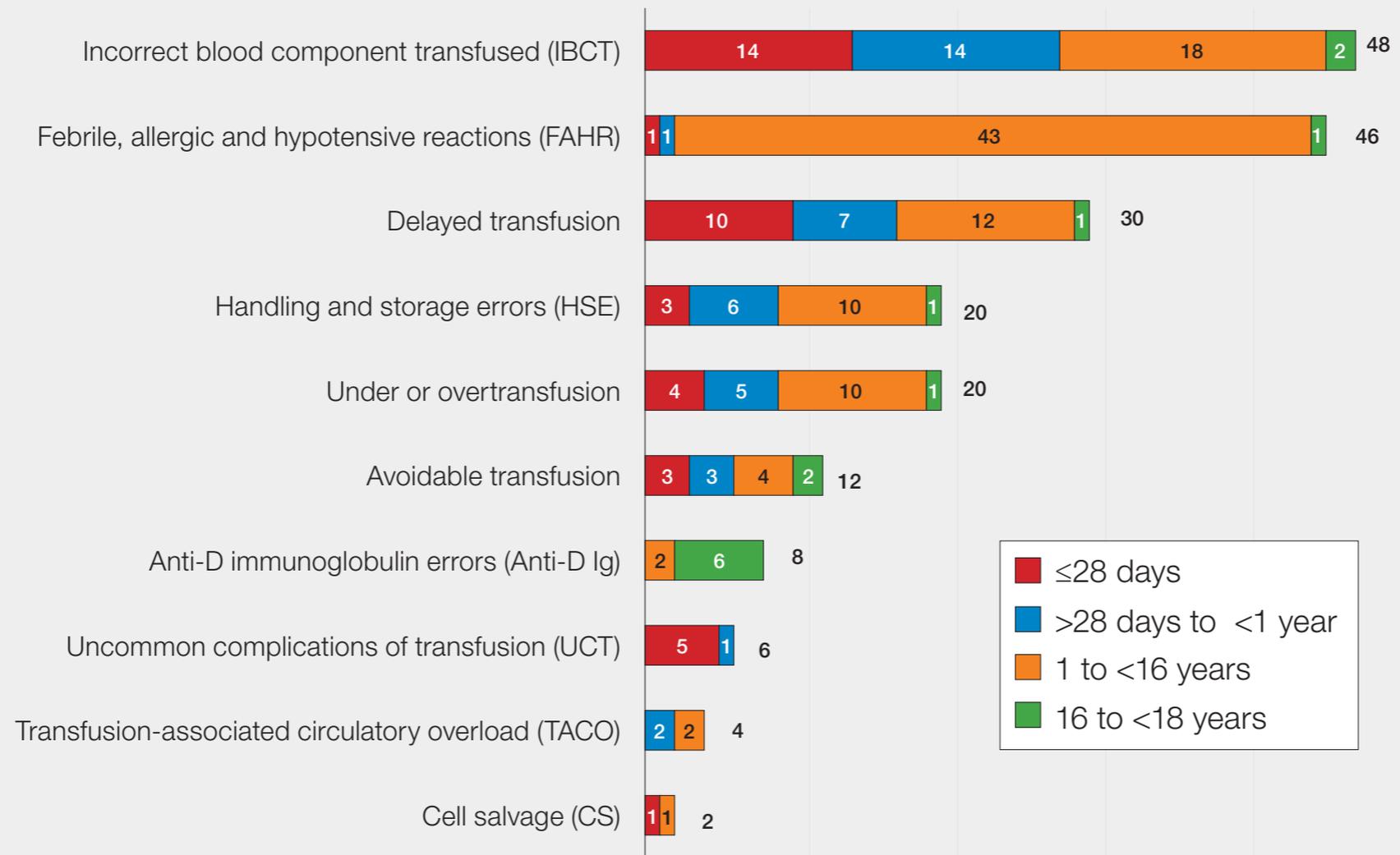
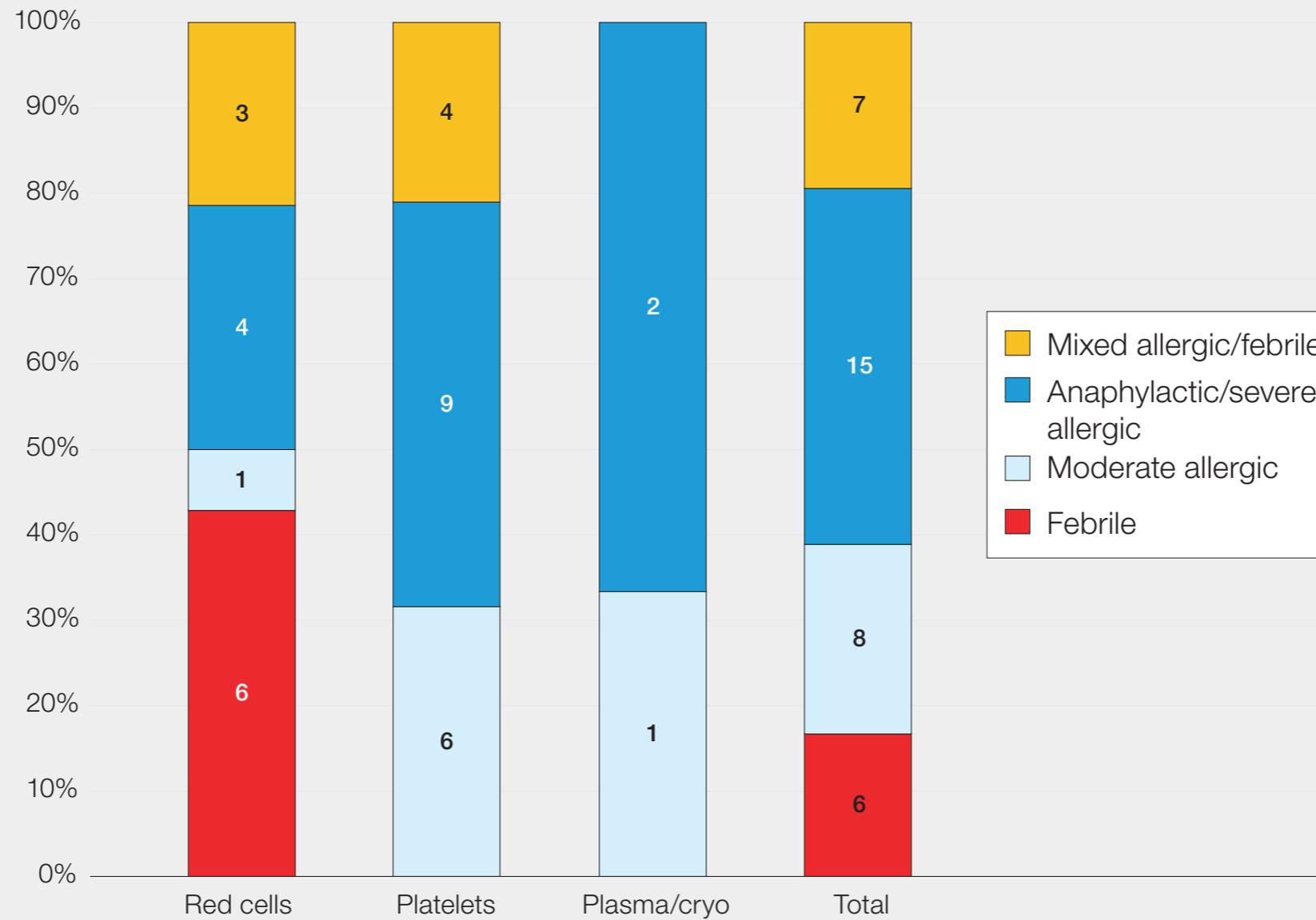


Figure 25.3: Percentages of paediatric and total reports in each category in 2024 (n=202)



CS=cell salvage; FAHR=febrile allergic and hypotensive reactions; HSE=handling and storage errors; HTR=haemolytic transfusion reactions; IBCT-SRNM=incorrect blood component transfused-specific requirements not met; IBCT-WCT=IBCT-wrong component transfusion; Ig=immunoglobulin; TACO=transfusion-associated circulatory overload; TAD=transfusion-associated dyspnoea; TRALI=transfusion-related acute lung injury; TTI=transfusion-transmitted infection; UCT=uncommon complications of transfusion

Figure 25.4: Summary of paediatric FAHR reports by component from 2015-2024

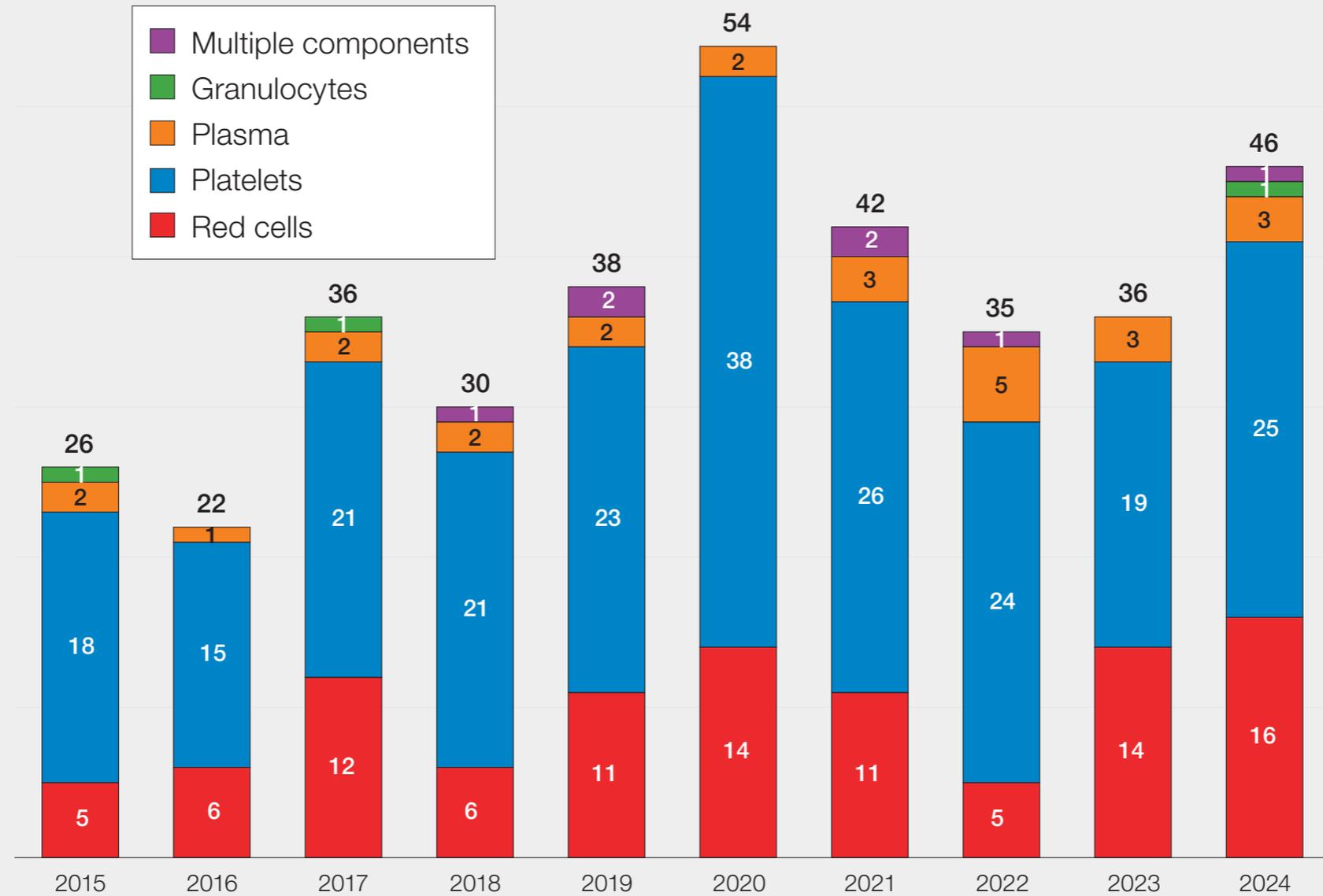


Figure 25.5: Paediatric FAHR reports in 2024 (n=46)

a: Comparison of proportions of adult and paediatric reports by component types

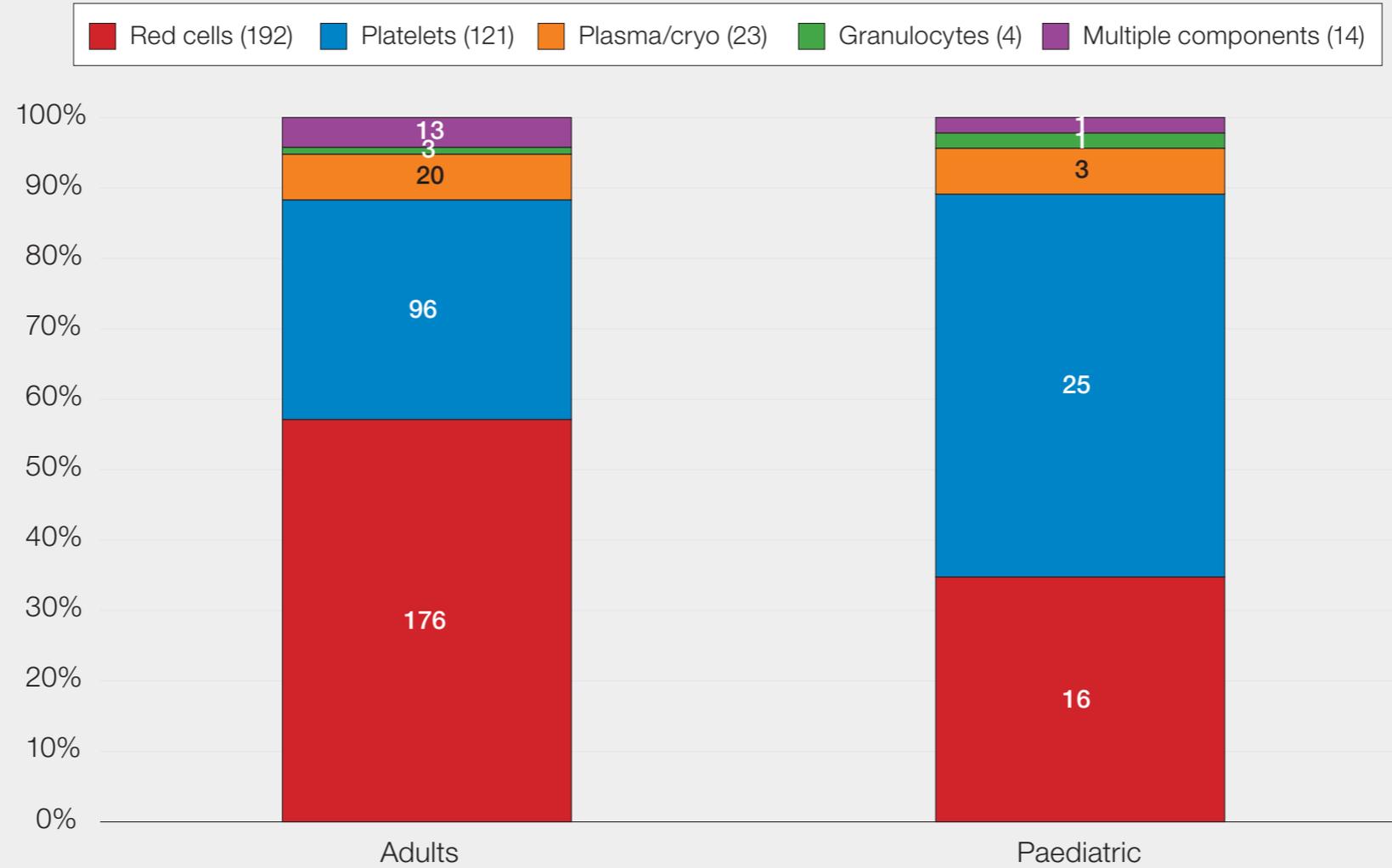


Figure 25.5: Paediatric FAHR reports in 2024 (n=46)

b: Percentages of reaction types in paediatric FAHR related to different component types

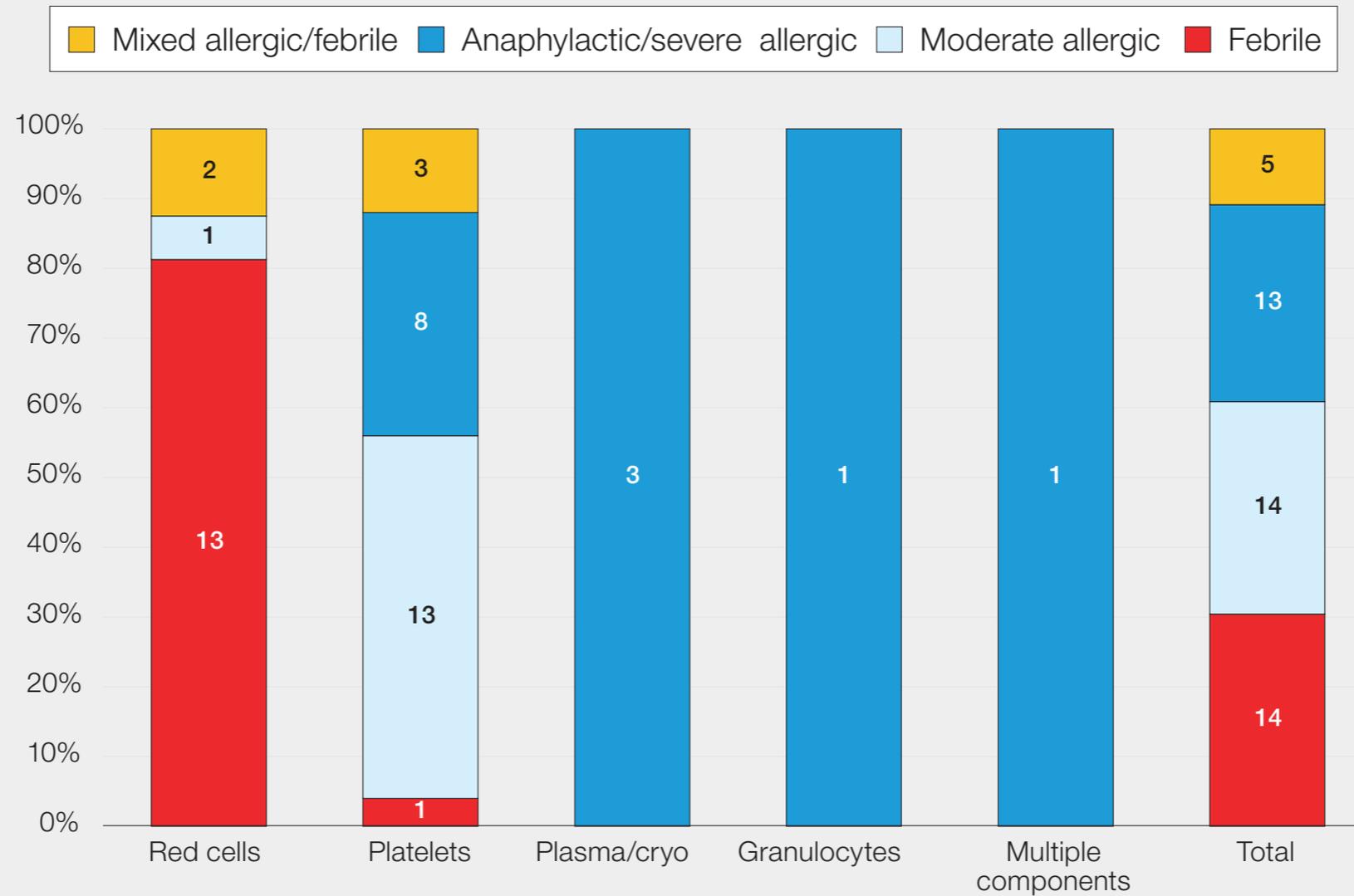
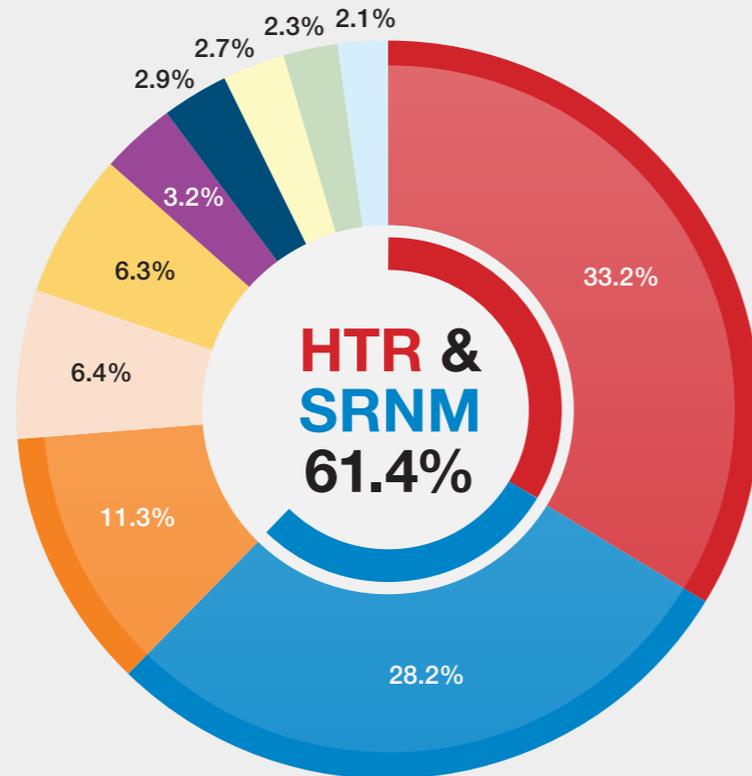


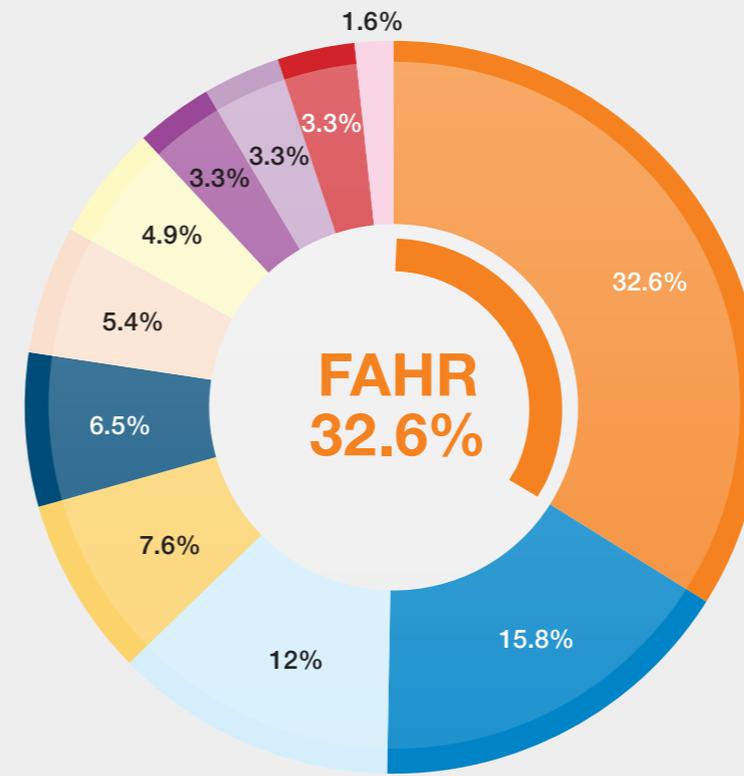
Figure 26.1: Cumulative data for adverse transfusion events in patients with haemoglobin disorders 2010 to 2024

a. Sickle cell disease (n=560)

b. Thalassaemia (n=184)



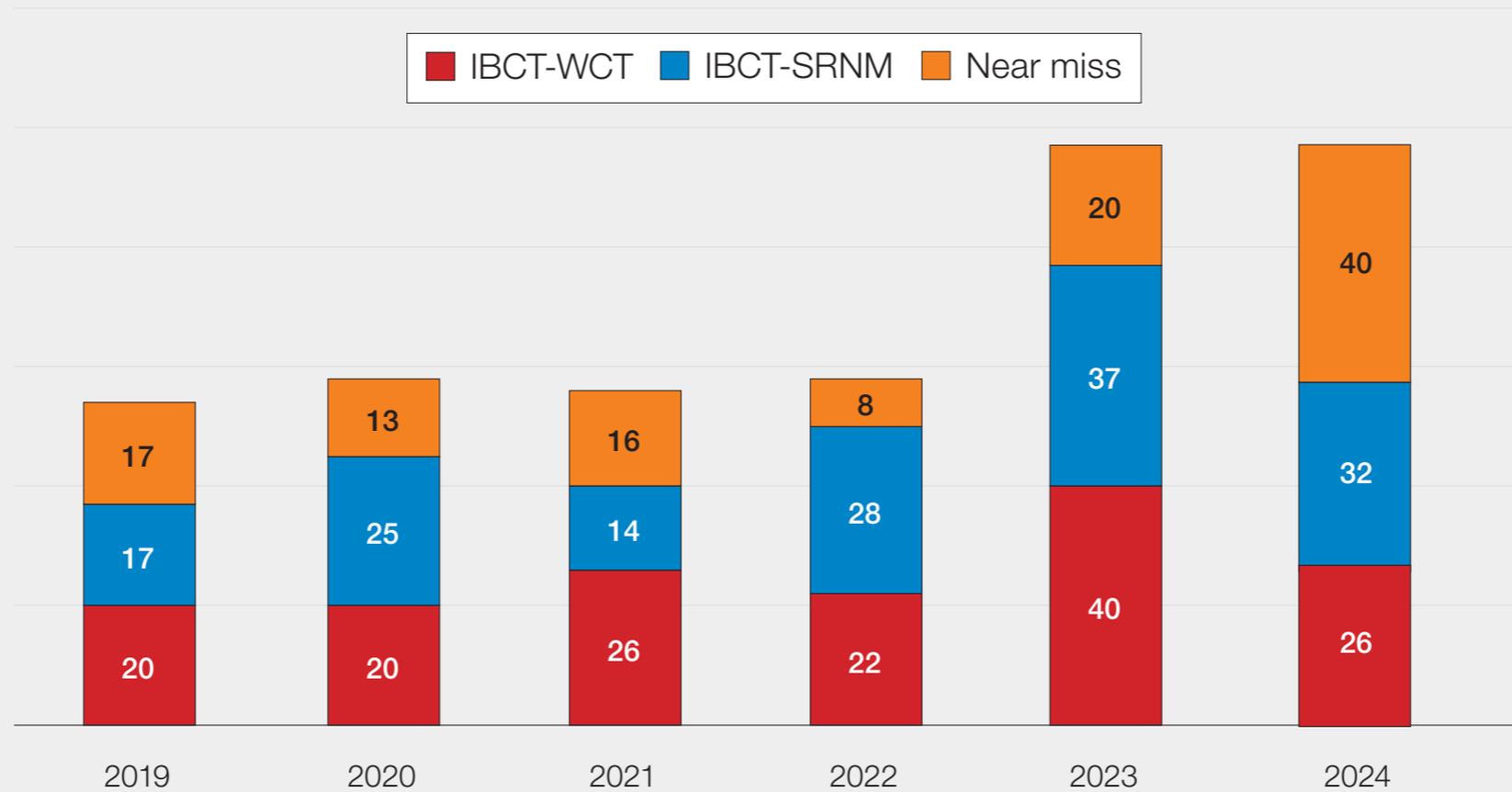
(186)	HTR	(16)	RBRP
(158)	IBCT-SRNM	(15)	Under or overtransfusion
(63)	FAHR	(13)	Avoidable transfusion
(36)	Delayed transfusion	(12)	HSE
(35)	NM		
(18)	IBCT-WCT		



(60)	FAHR	(12)	RBRP	(6)	UCT
(29)	IBCT-SRNM	(10)	Delayed transfusion	(6)	HTR
(22)	HSE	(9)	Under or overtransfusion		
(14)	NM	(6)	IBCT-WCT	(3)	ALLO

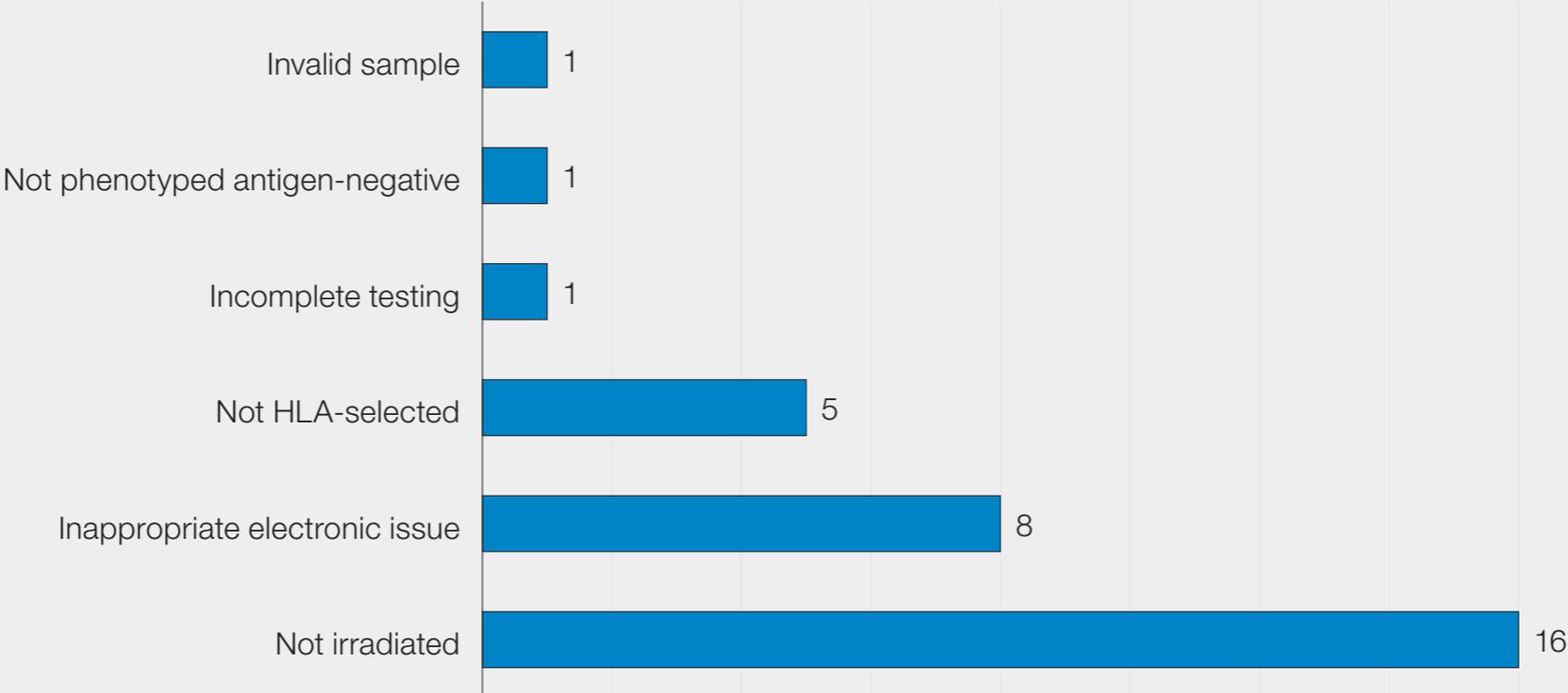
ALLO=alloimmunisation; FAHR=febrile, allergic or hypotensive reactions; HSE=handling and storage errors; HTR=haemolytic transfusion reactions; IBCT=incorrect blood component transfused; NM=near miss; RBRP=right blood right patient; SRNM=specific requirements not met; TACO=transfusion-associated circulatory overload; TTI=transfusion-transmitted infection; UCT=uncommon complications of transfusion; WCT=wrong component transfused. Categories with 2 or fewer reports are not included in the figures

Figure 27.1: Number of transplant-related reports (HSCT and SOT) from 2019 to 2024



IBCT-SRNM=incorrect blood component transfused-specific requirements not met; IBCT-WCT=IBCT-wrong component transfused

Figure 27.2: Errors related to specific requirements not met in transplant recipients in 2024 (n=32)



HLA=human leucocyte antigen

Figure 28.1: Number of SHOT reports of D immunisation by year, 2012-2024

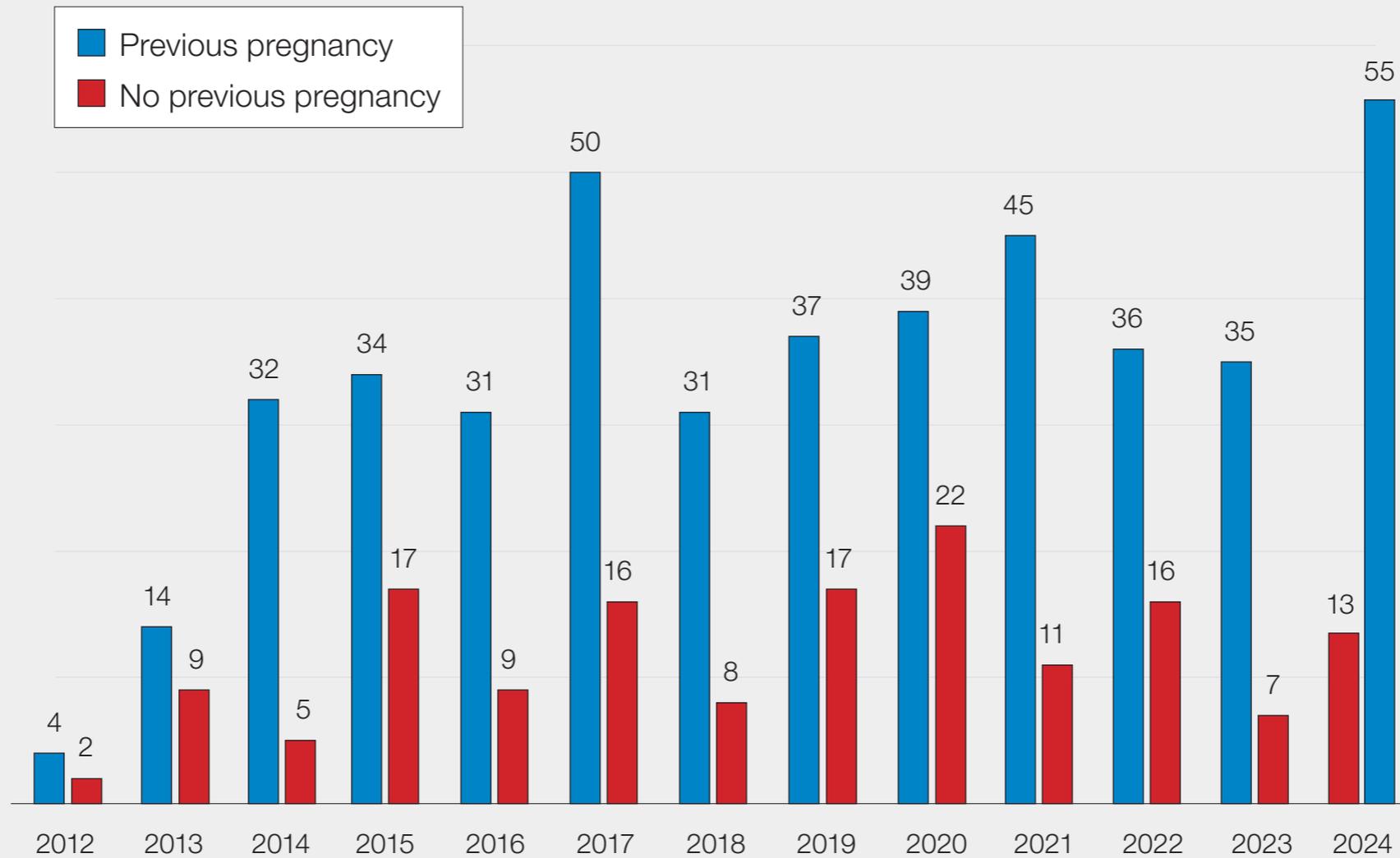
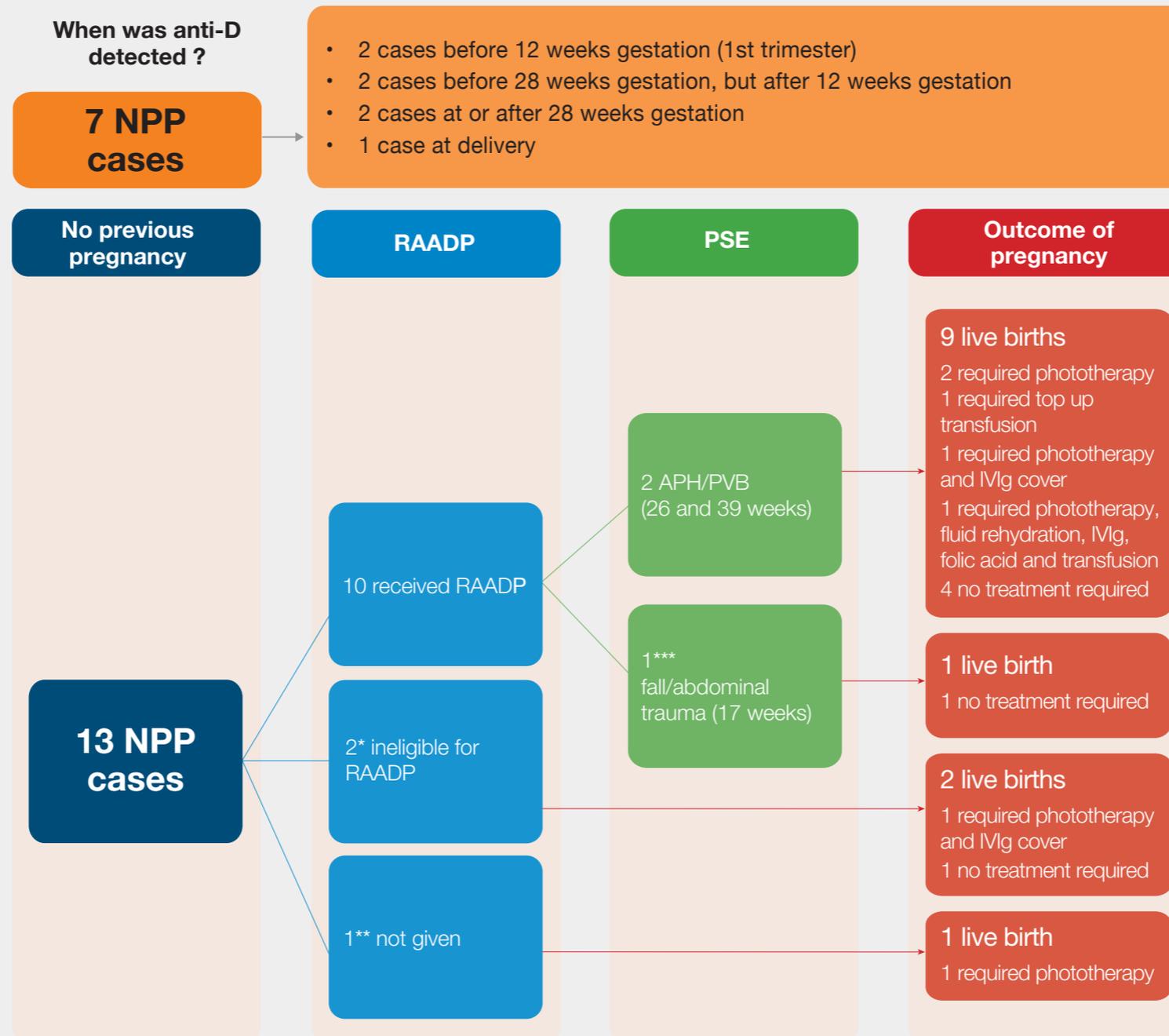


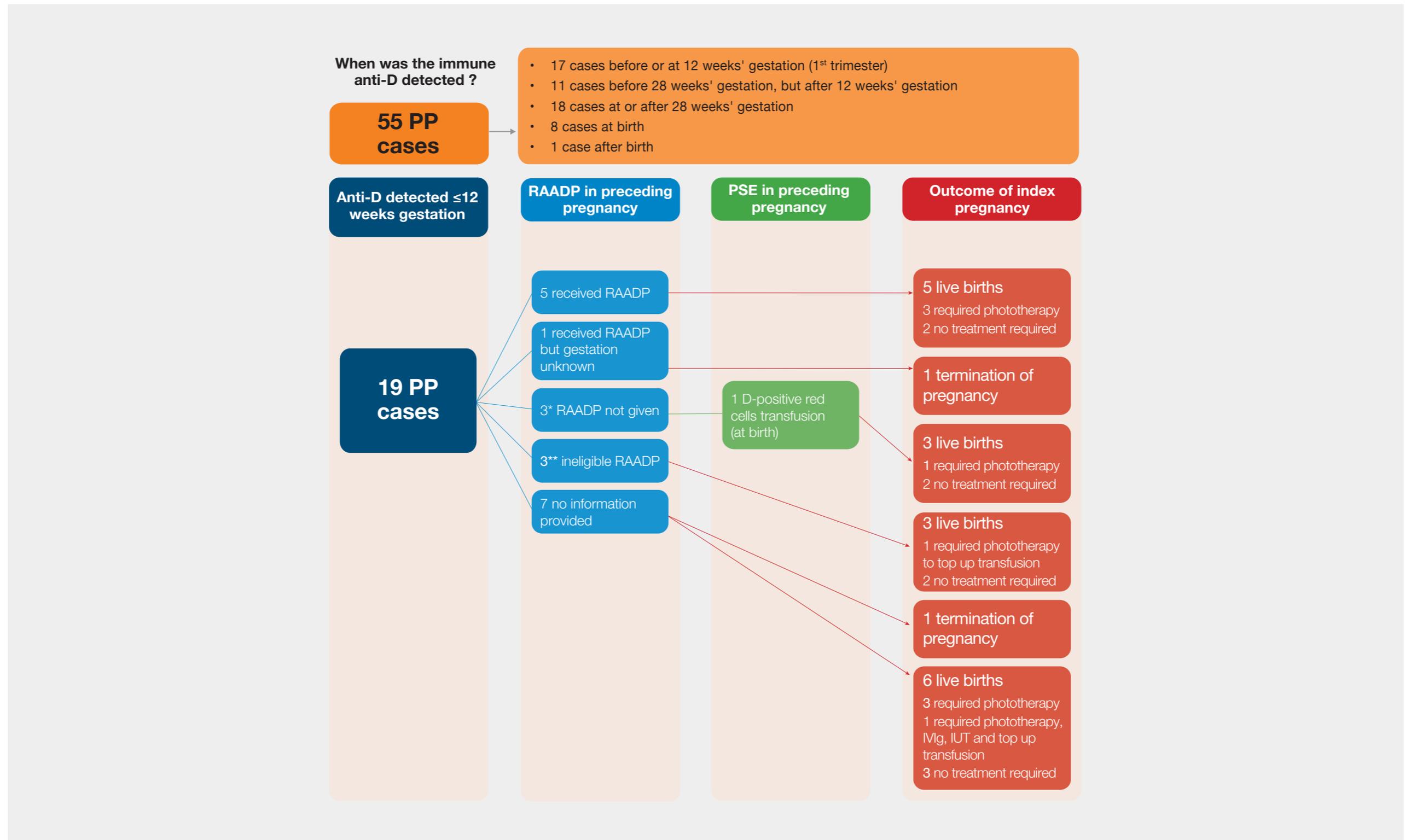
Figure 28.2: Summary of the 2024 NPP data (n=13)



APH=antepartum haemorrhage; IVIg=intravenous immunoglobulin; NPP=no previous pregnancy; PSE=potentially sensitising event; PVB=per vaginal bleeding; RAADP=routine antenatal anti-D Ig prophylaxis

*Immune anti-D detected before 28 weeks gestation (at 12+4- and 27-weeks' gestation) **Woman concealed pregnancy until 37 weeks gestation ***PSE at 17+5 weeks, anti-D Ig given beyond 72 hours post PSE. Anti-D and anti-C detected at birth.

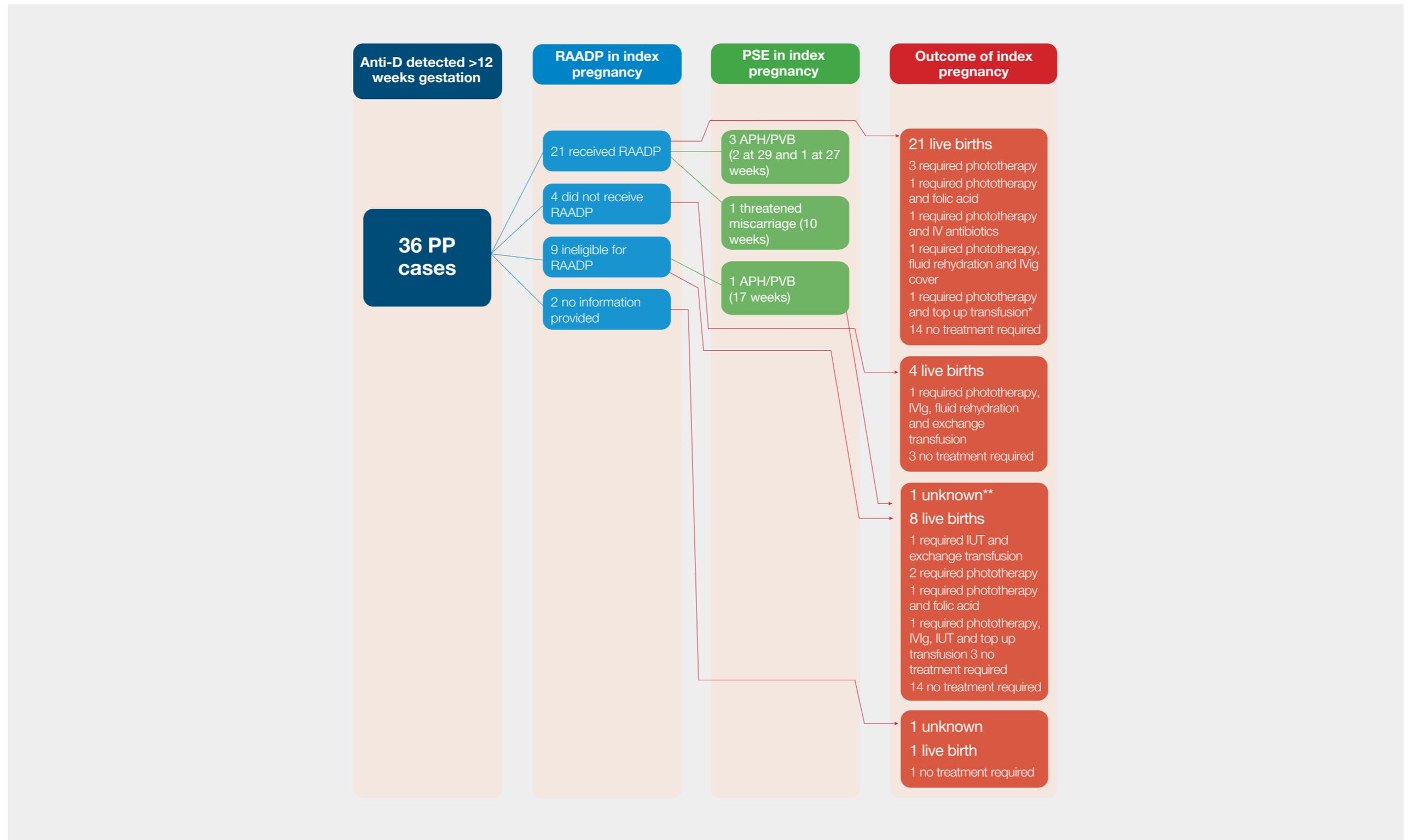
Figure 28.3a: Summary of the 2024 PP data (n=55) where anti-D was detected ≤12 weeks gestation (n=19)



IUT=intrauterine transfusion; IVIg=intravenous immunoglobulin; PP=previous pregnancy; PSE=potentially sensitising event; RAADP=routine antenatal anti-D Ig prophylaxis

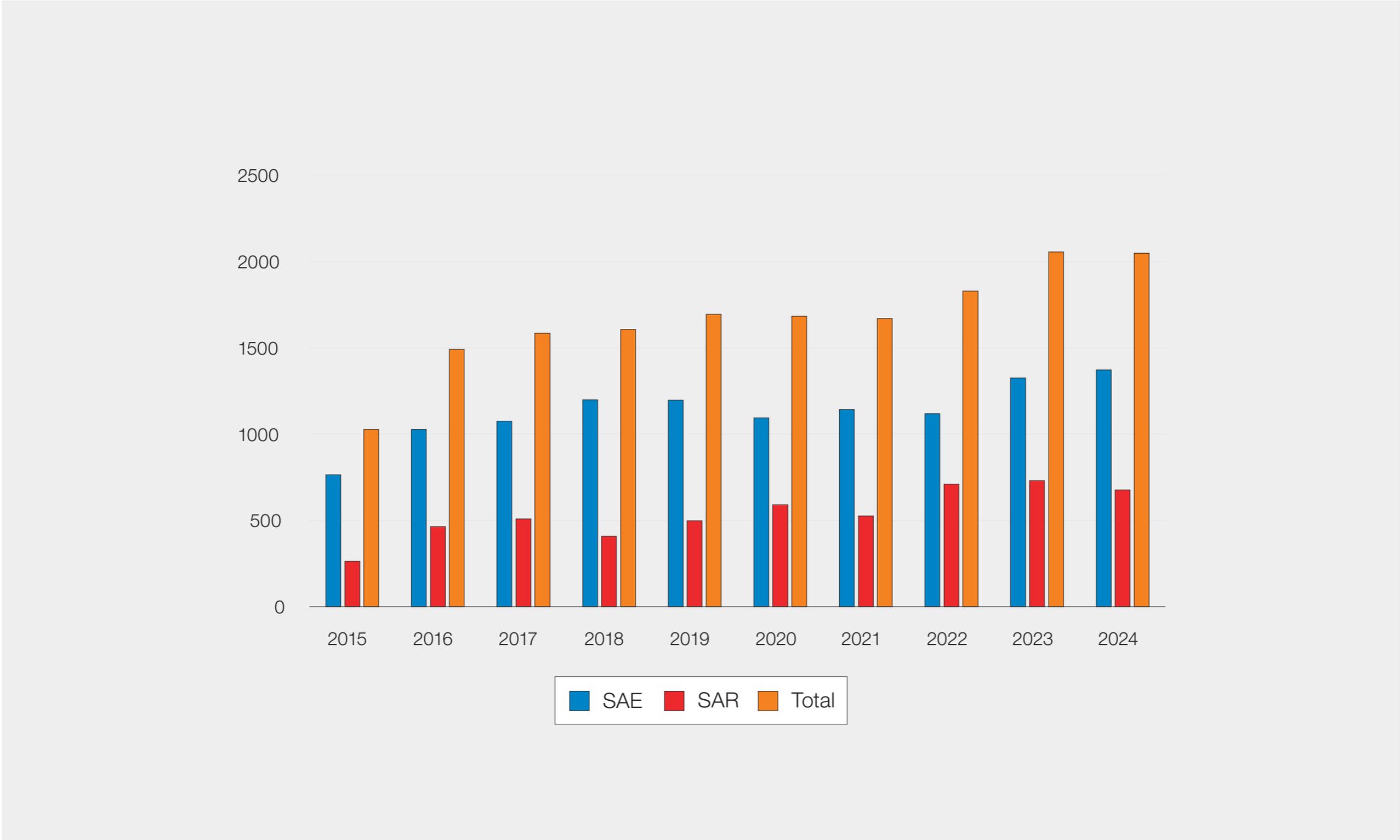
*1 case RAADP was not part of the policy, 1 case D-variant woman treated as D-positive **2 cases of miscarriage <12 weeks gestation and 1 case immune anti-D already present

Figure 28.3b: Summary of the 2024 PP data where anti-D was detected >12 weeks gestation (n=36)



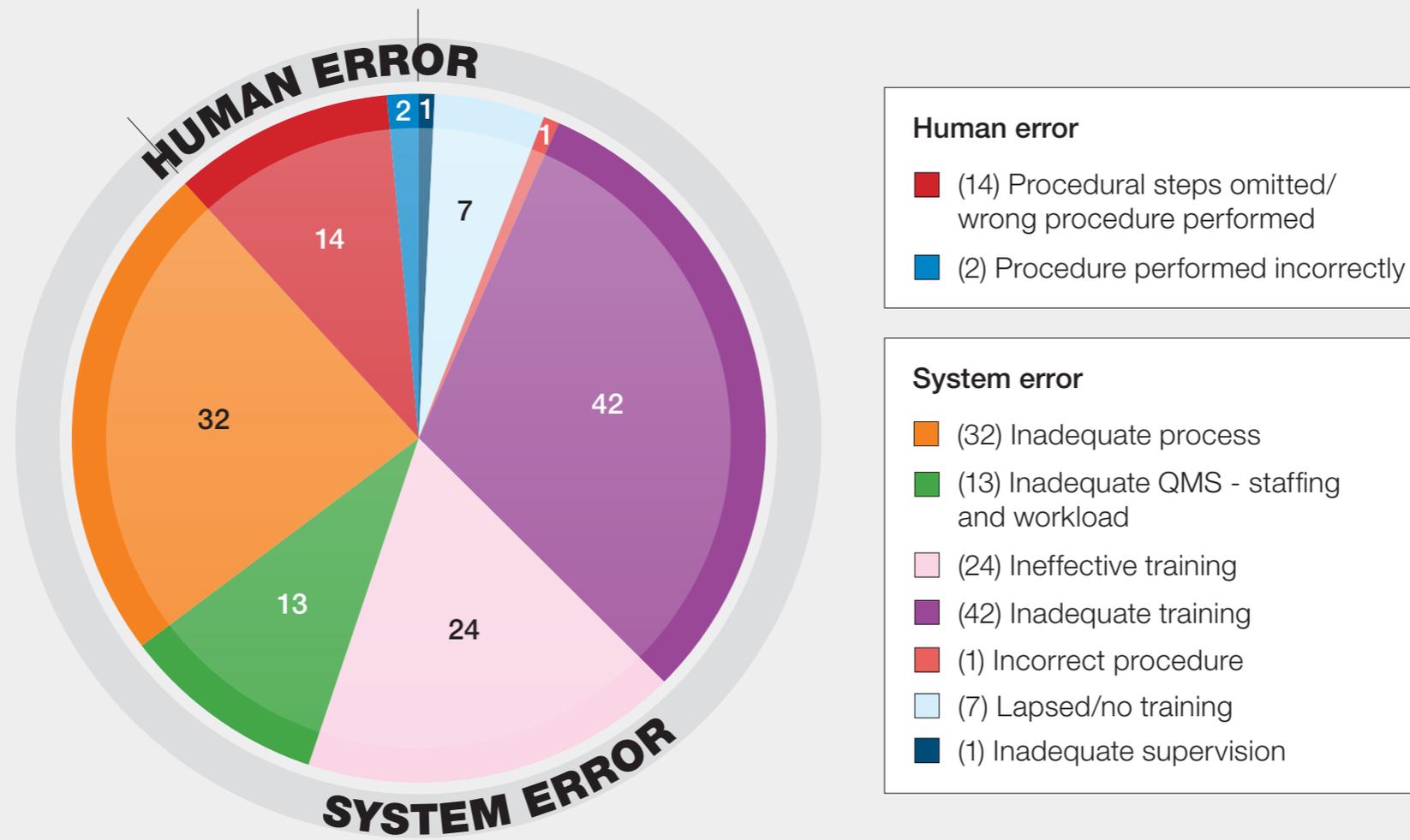
APH=antepartum haemorrhage; IUT=intrauterine transfusion; IV=intravenous; IVig=IV immunoglobulin; PP=previous pregnancy; PSE=potentially sensitising event; PVB=per vaginal bleeding; RAADP=routine antenatal anti-D Ig prophylaxis
 *Twin pregnancy, one of the twins required transfusion as well as phototherapy ** 1 case pregnant woman moved abroad no information available including birth

Figure 29.1: Submitted confirmation reports 2015-2024



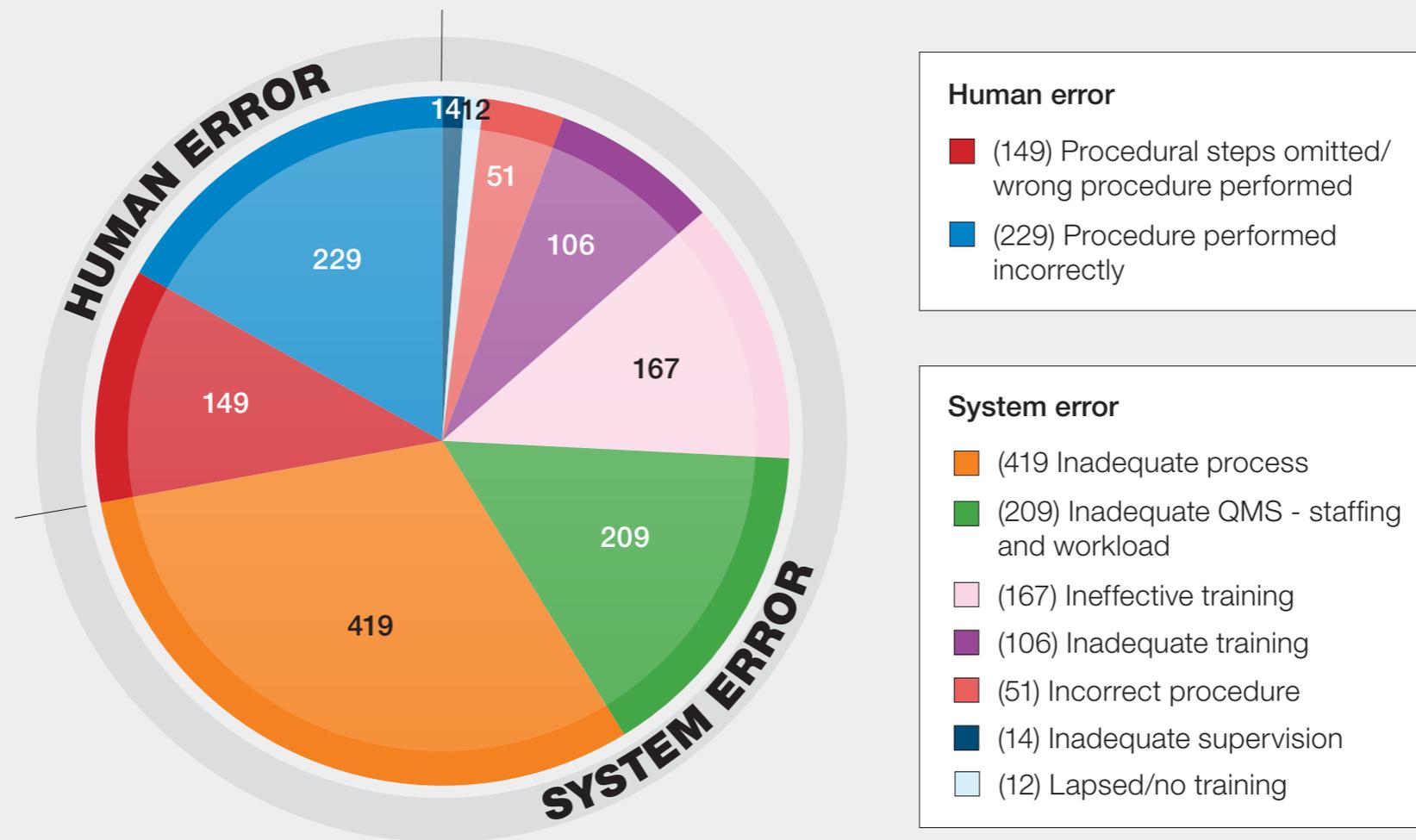
SAE=serious adverse event; SAR=serious adverse reaction

Figure 29.2: Root causes of incorrect storage of components sub-category (n=136)



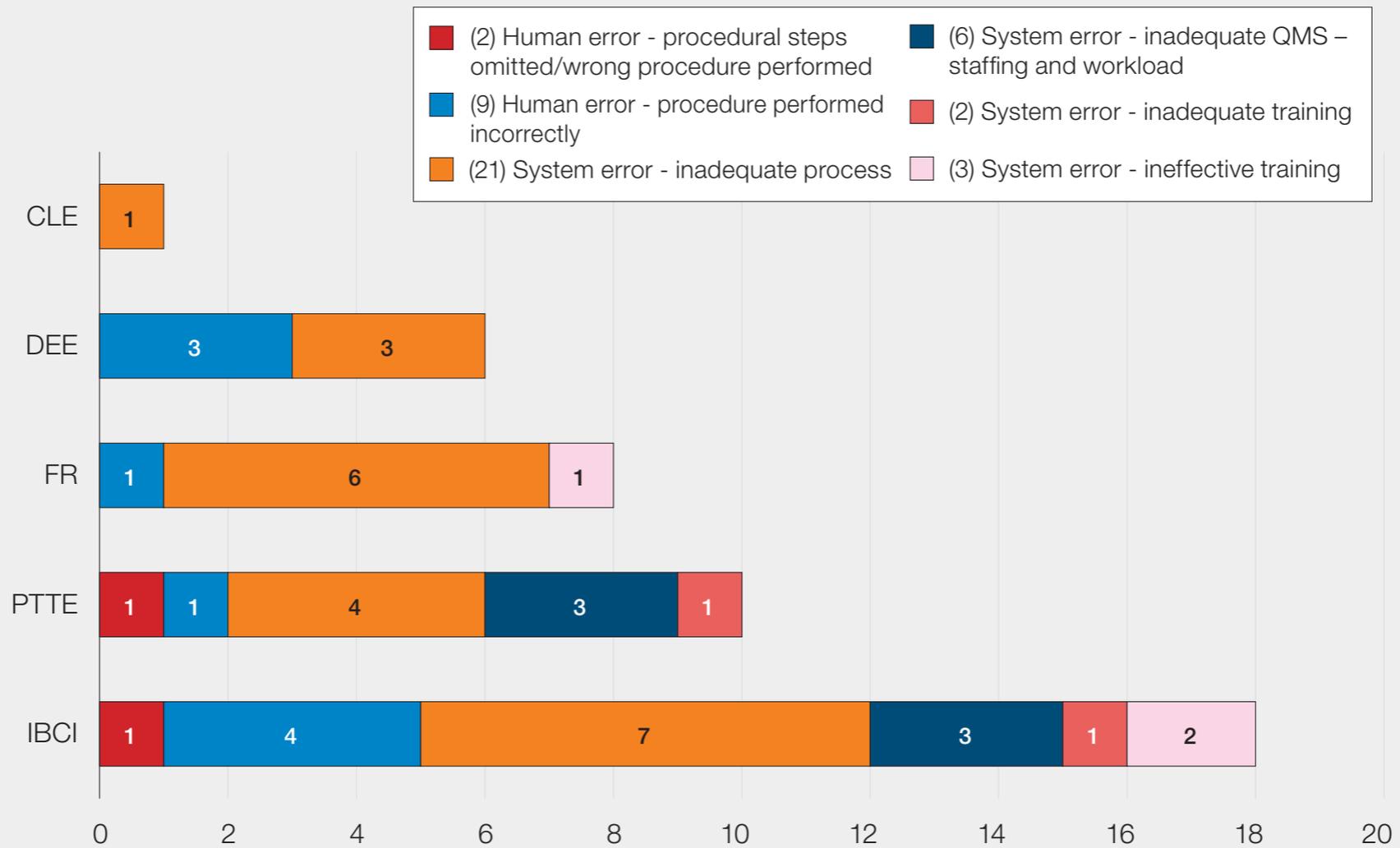
QMS=quality management system

Figure 29.3: Human/system error sub-categories (n=1356)



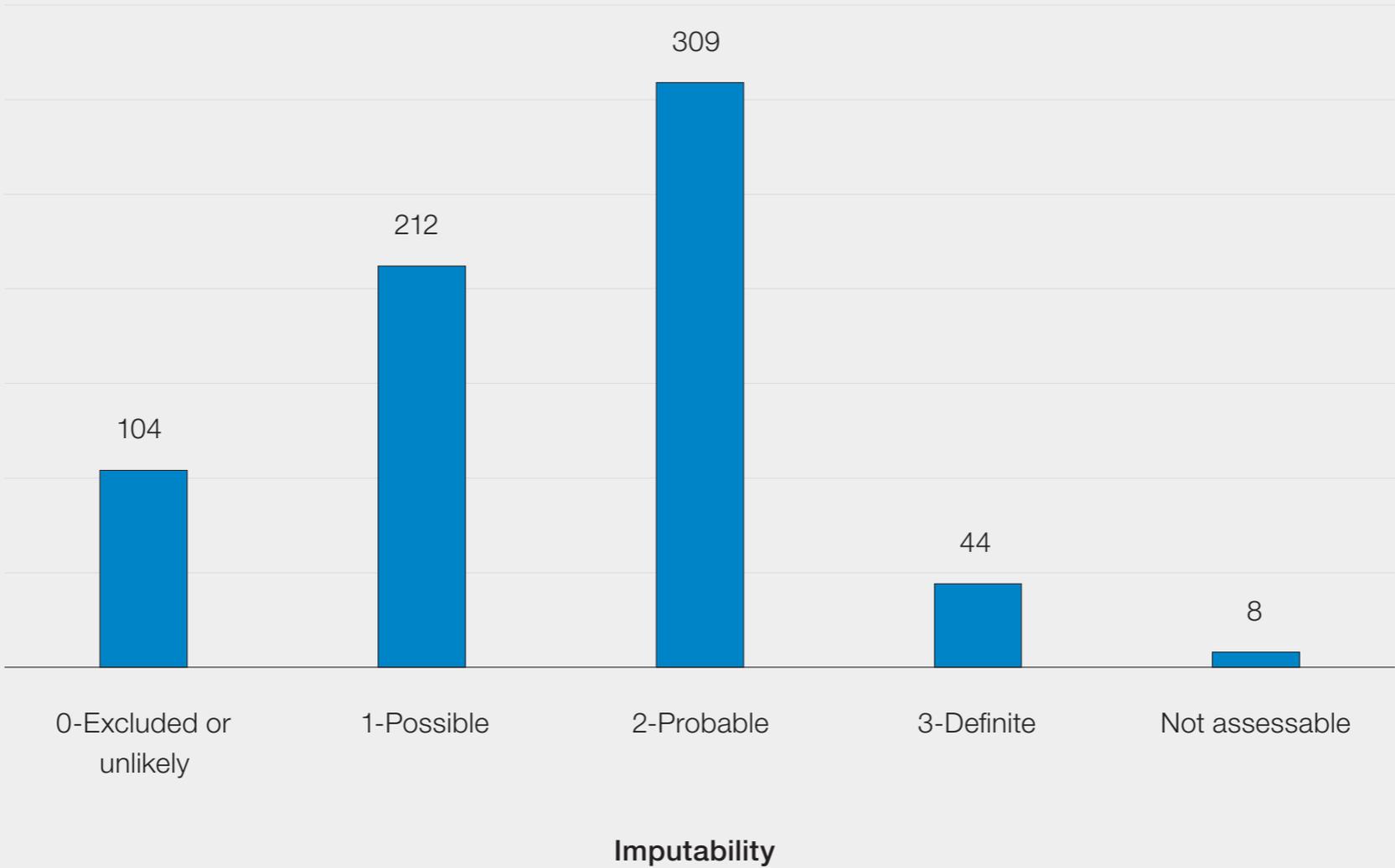
QMS=quality management system

Figure 29.5: BE reports in 'other' category (n=43)

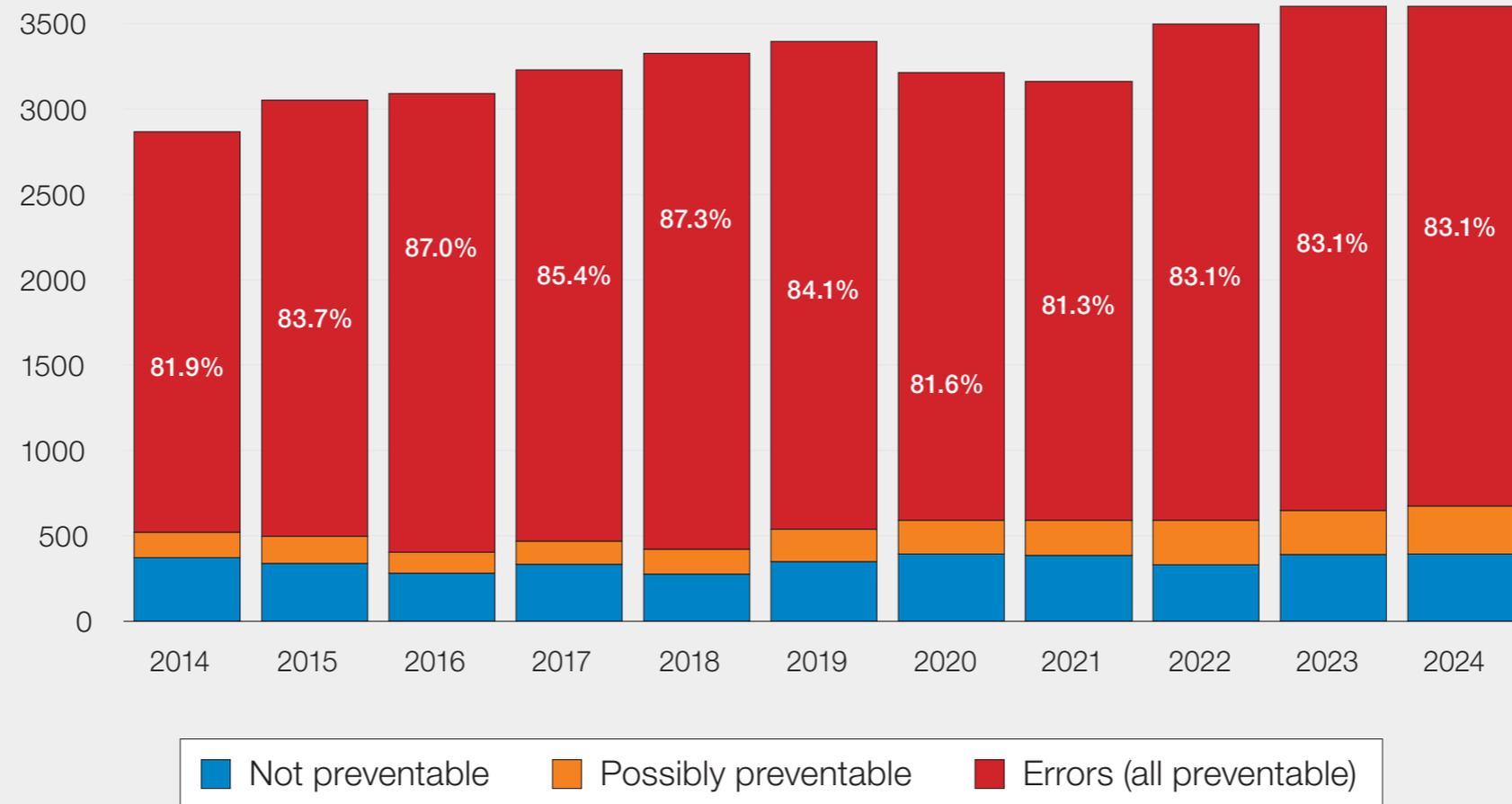


See Appendix 2 for key to category abbreviations
 QMS=quality management system

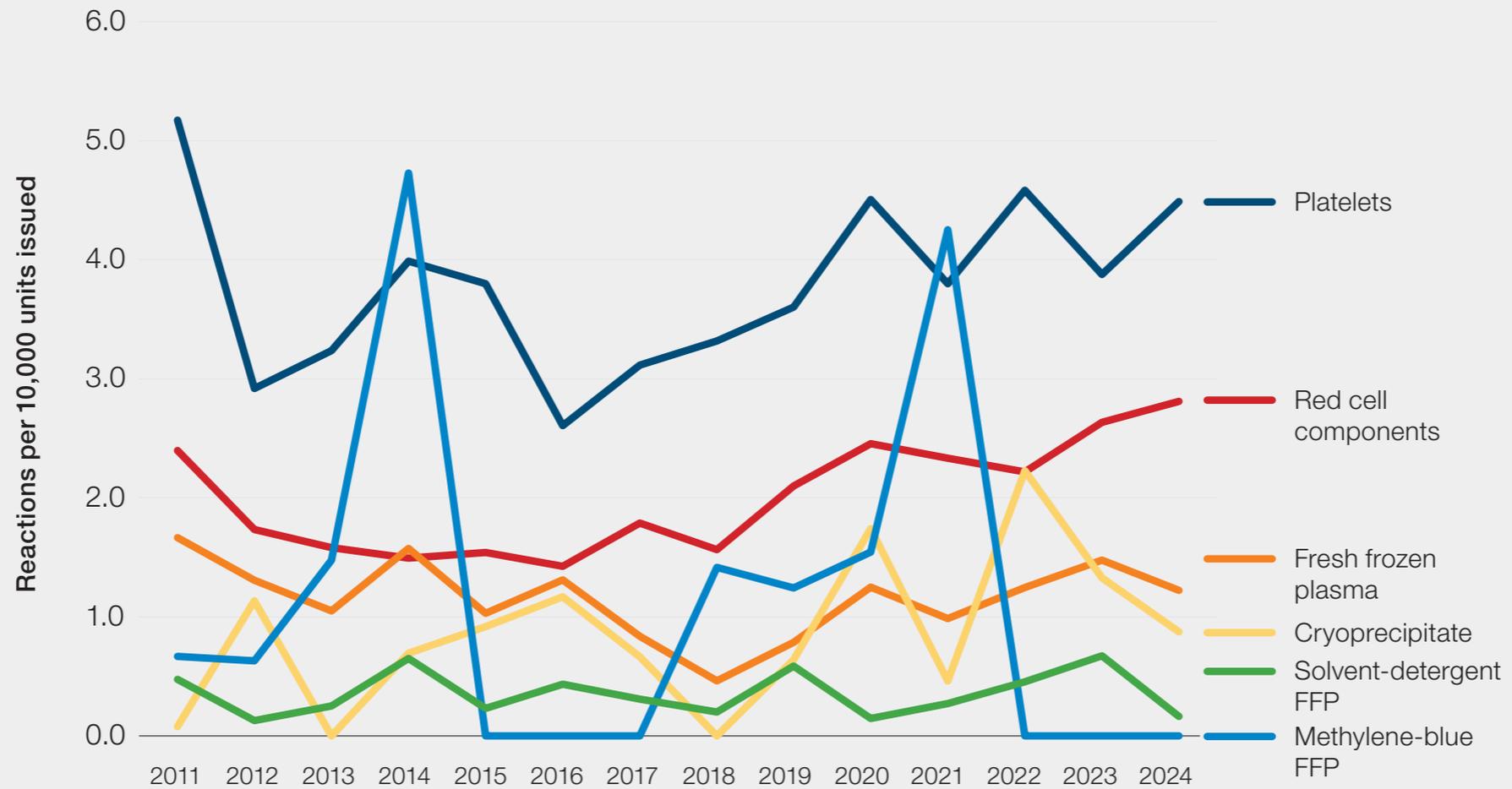
Figure 29.6: SAR reports, by imputability, reported to SABRE in 2024 (n=677)



Errors as a percentage of total reports 2014-2024



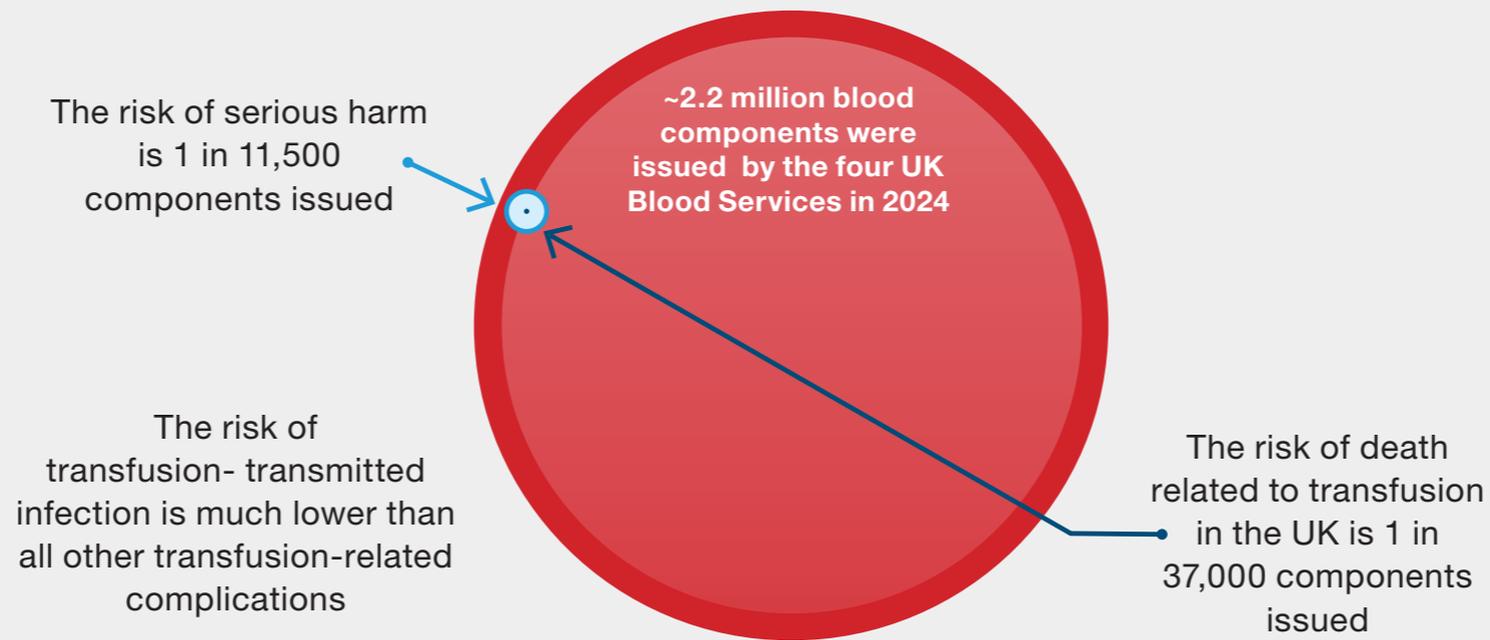
Reactions per 10,000 components, by component type 2011-2024



Note: Not including convalescent plasma

Risk of death and serious harm relating to transfusions in the UK in 2024

The risk estimation is based on all incidents reported to SHOT including the process-based error reports received. This covers deaths with possible, probable and definite imputability.



*Note: This is a representative image and not accurate to scale
The estimated risks include risks of harm from errors in the transfusion pathway.*