FIGURES FROM THE ANNUAL SHOT REPORT 2021

You are free to use these slides in your teaching material or other presentations,
but please do not alter the details as the copyright to this material belongs to SHOT.

SHOT Serious Hazards of Transfusion

Figure 2.1: SHOT reporting by month during 2020 and 2021

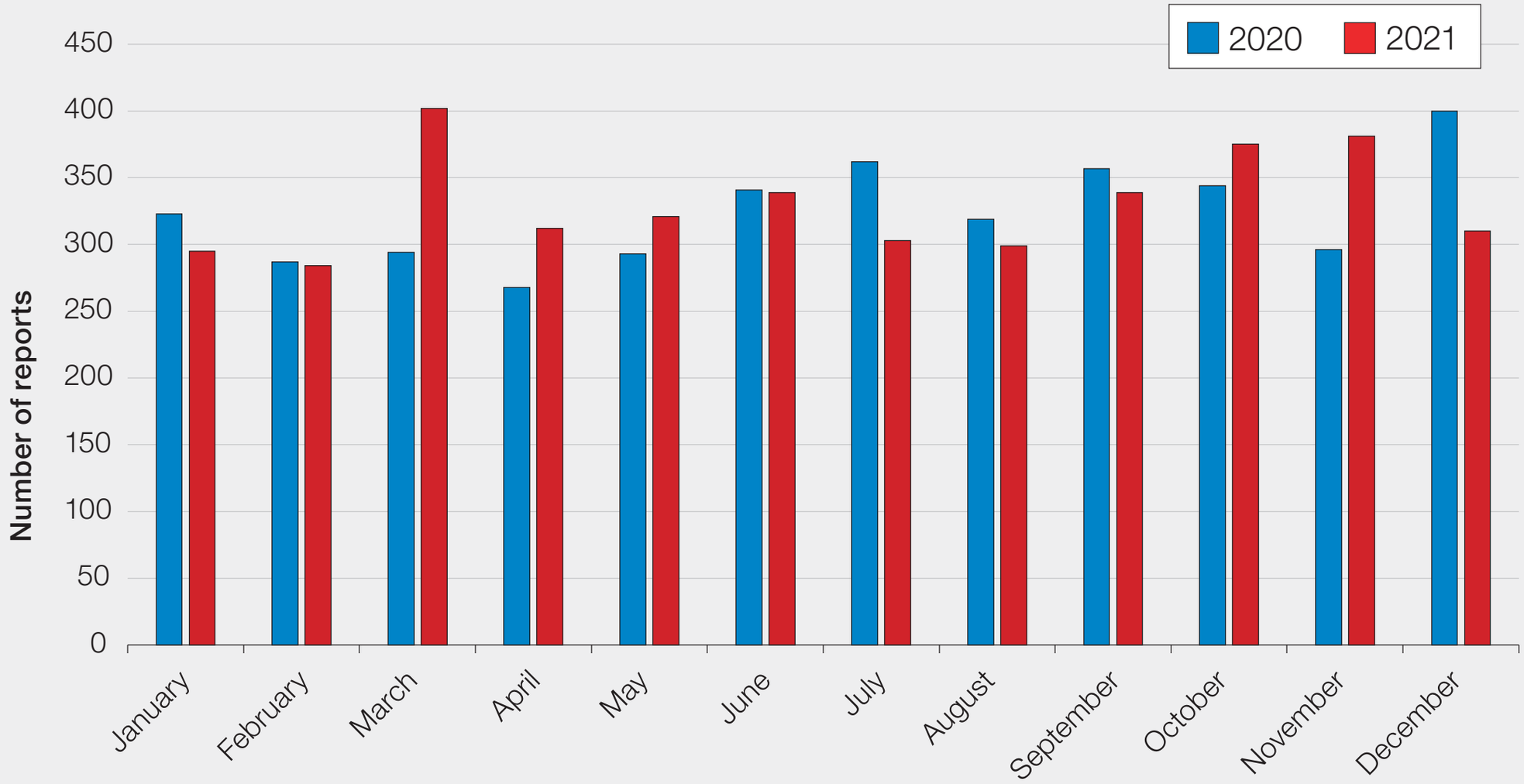


Figure 2.2: Reports submitted to SHOT and the MHRA in the calendar year 2021 (n=4088)

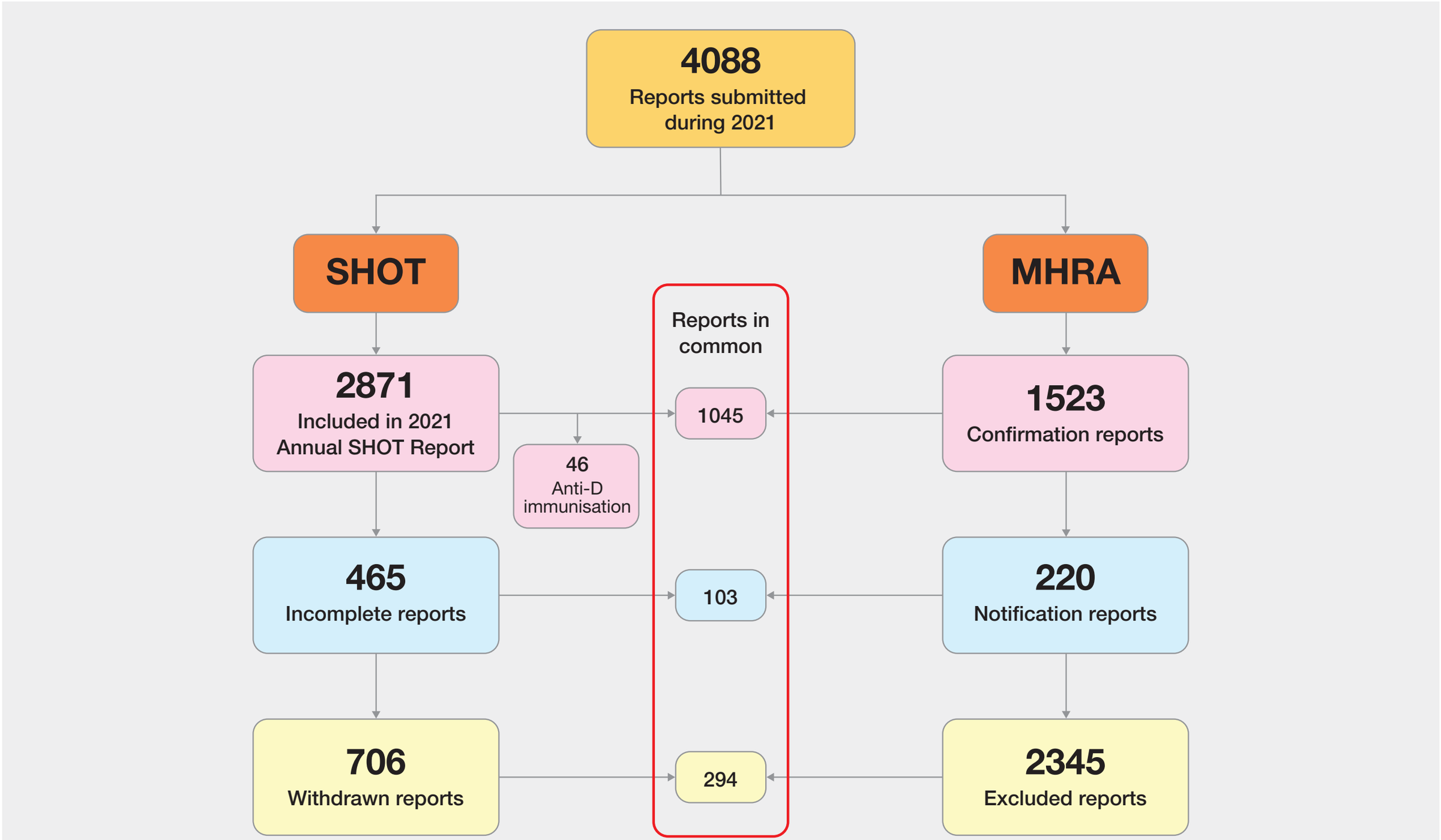


Figure 2.3: Number of NHS Trusts/Health Boards submitting reports by reporting category included in the2021 Annual SHOT Report

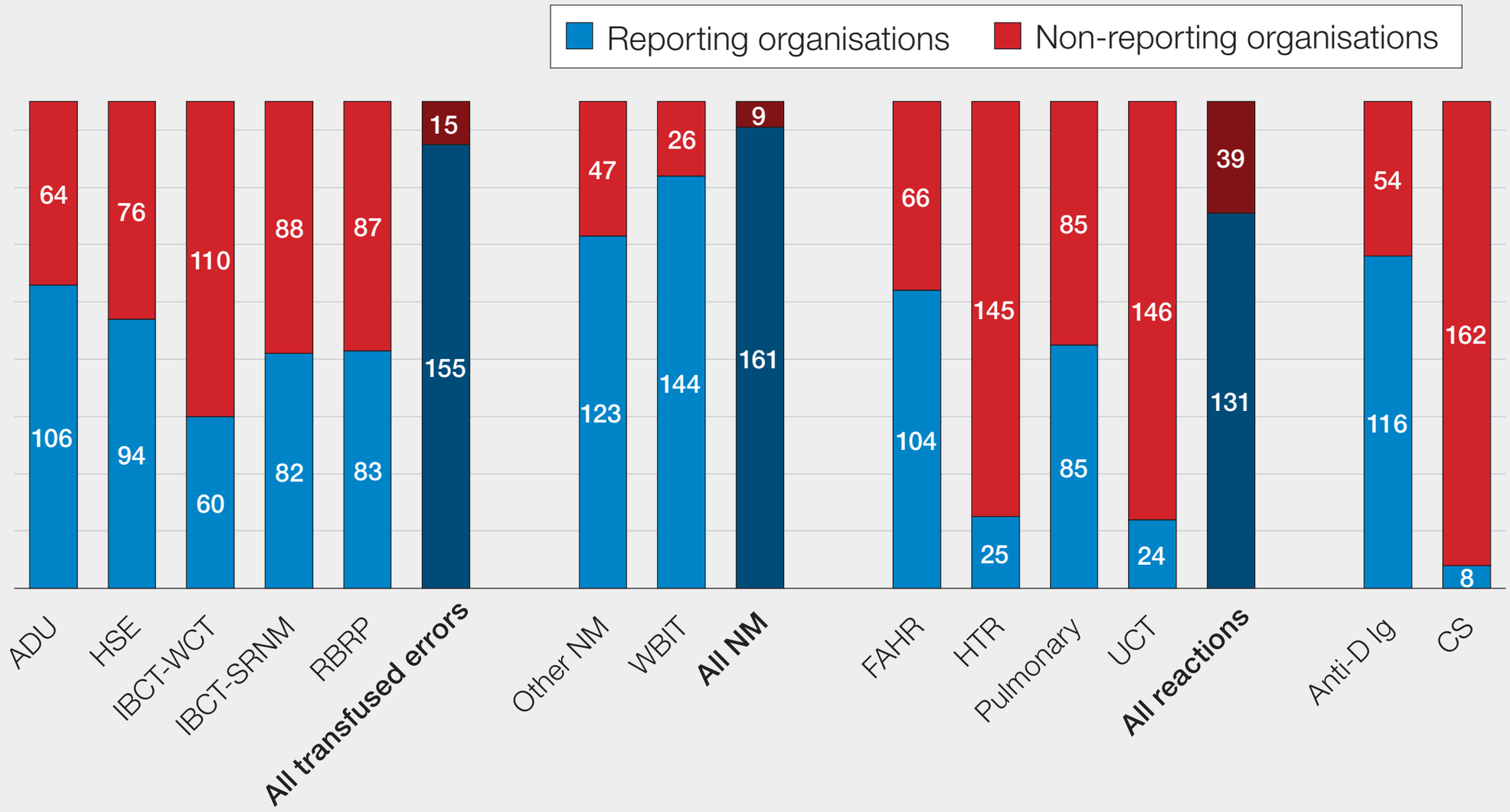


Figure 2.4: Participation in haemovigilance reporting from active SABRE accounts

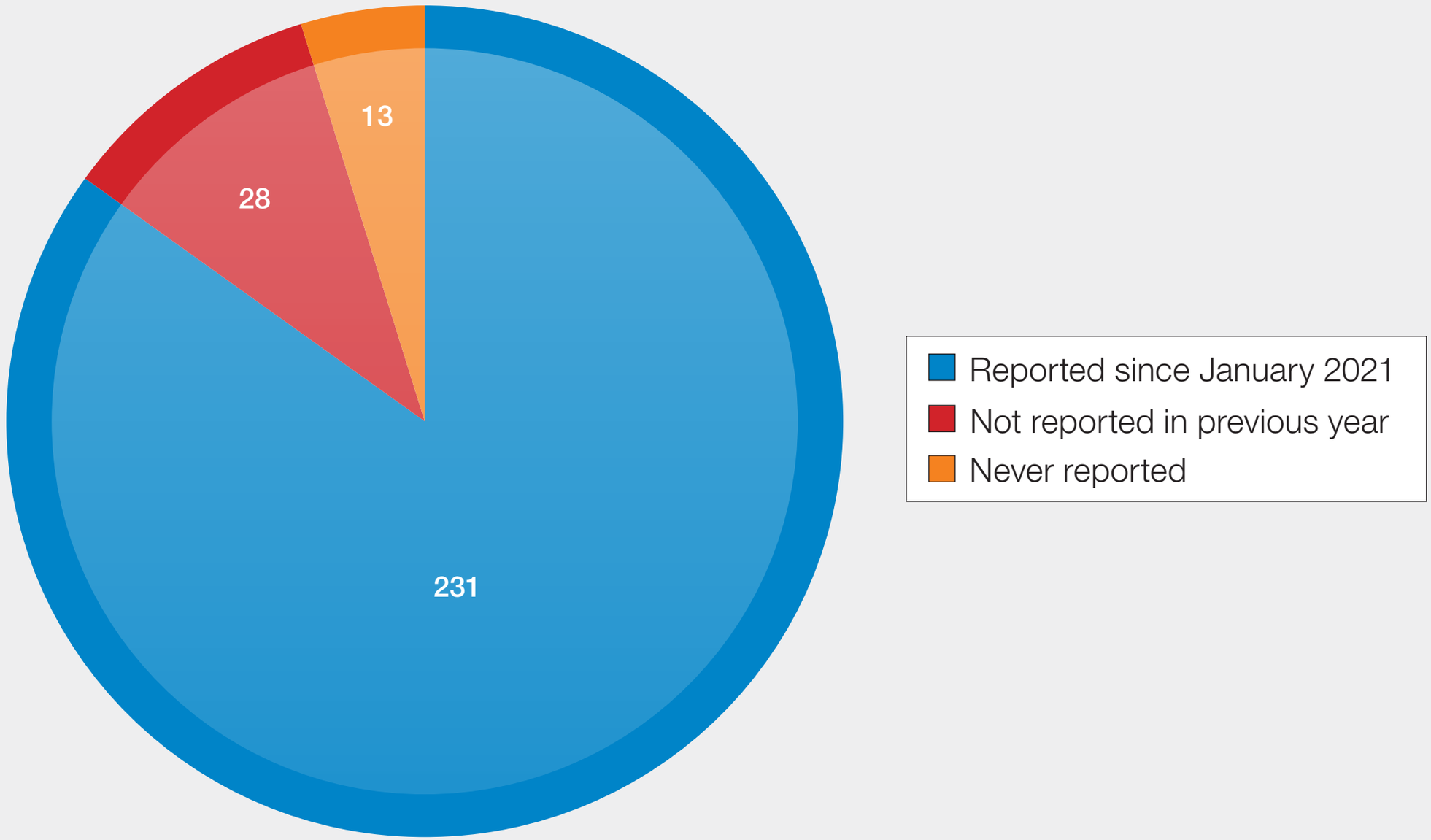


Figure 2.5a: Blood component issue data in the UK 2011-2021

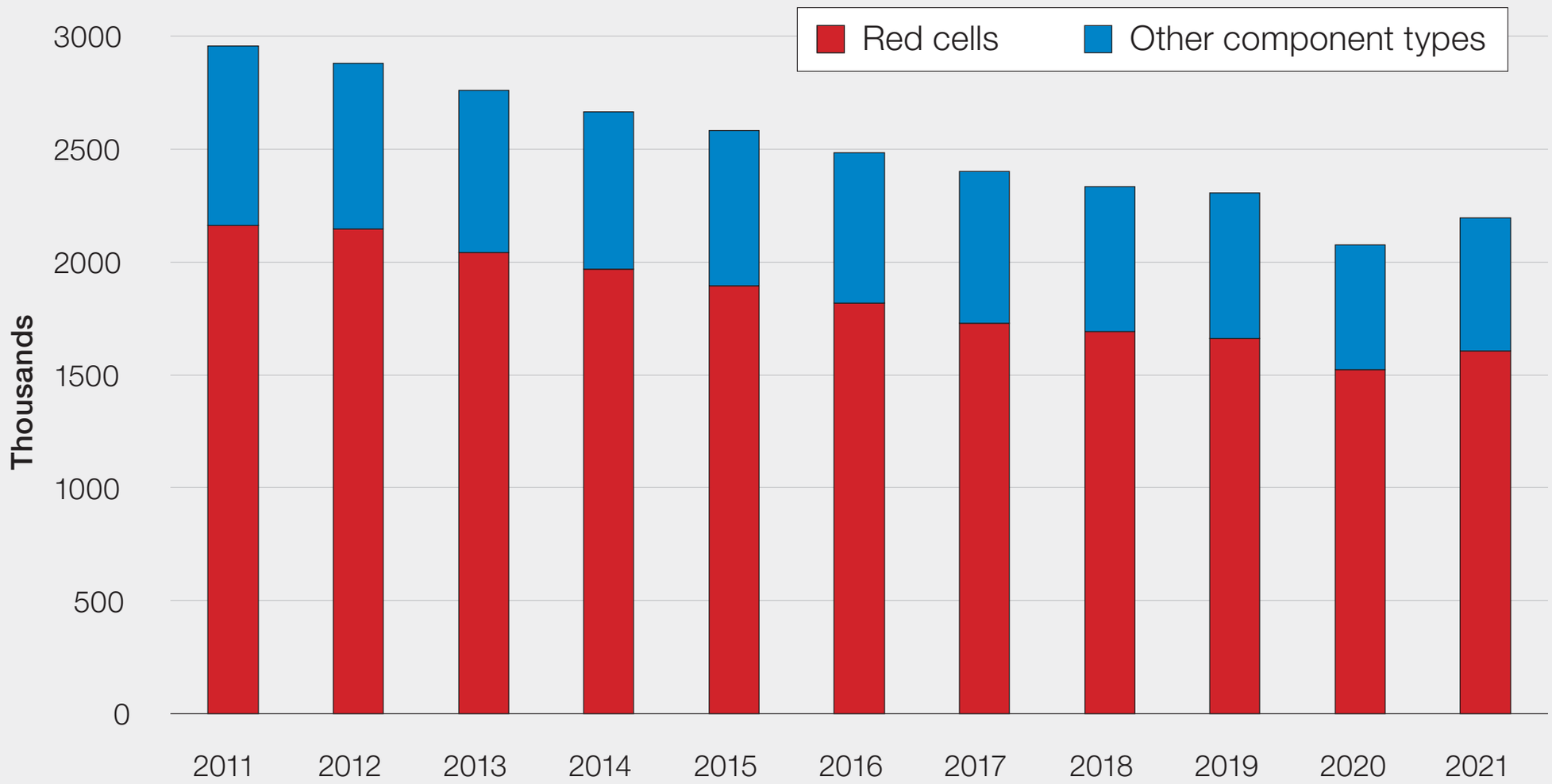
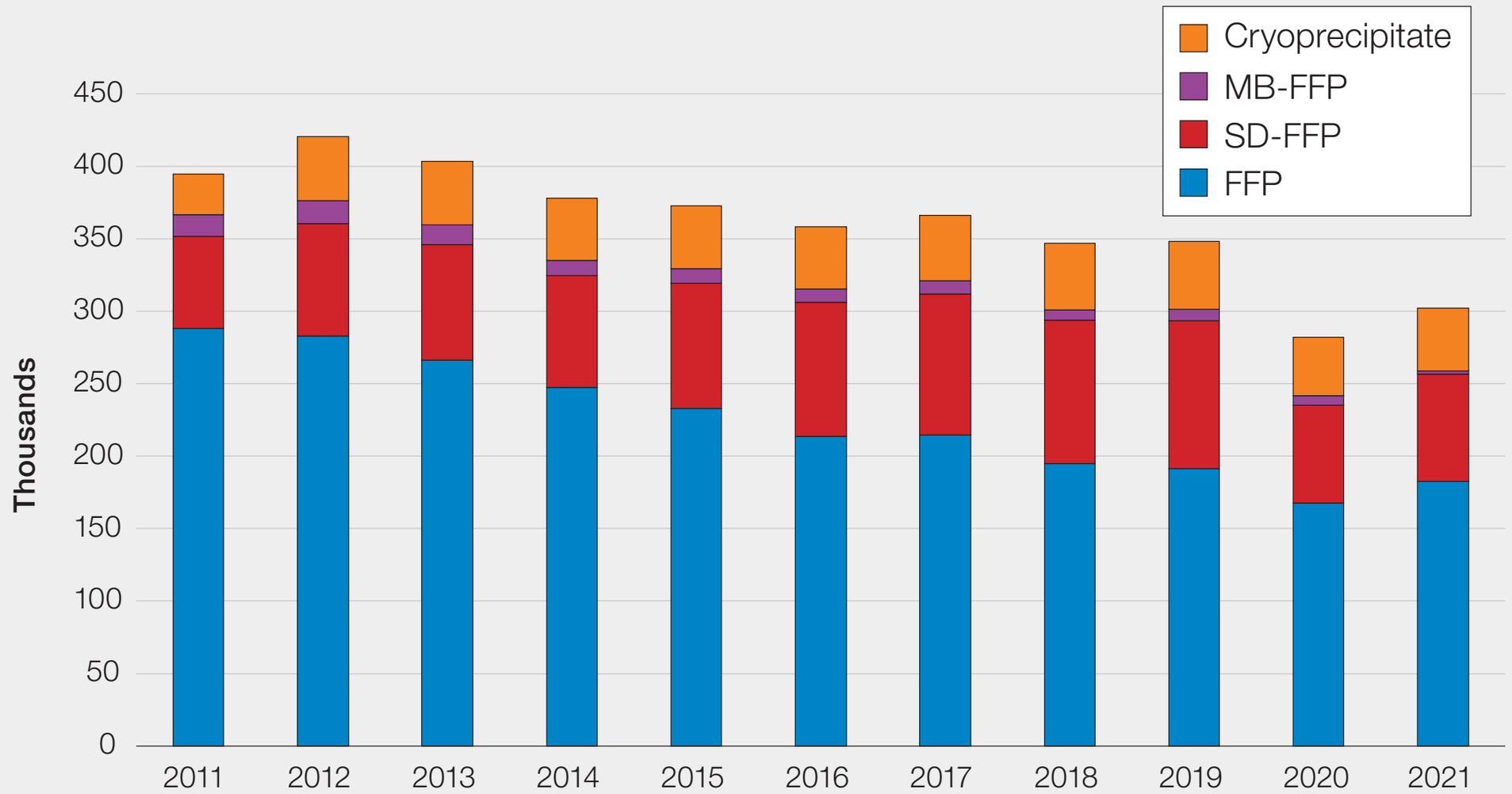


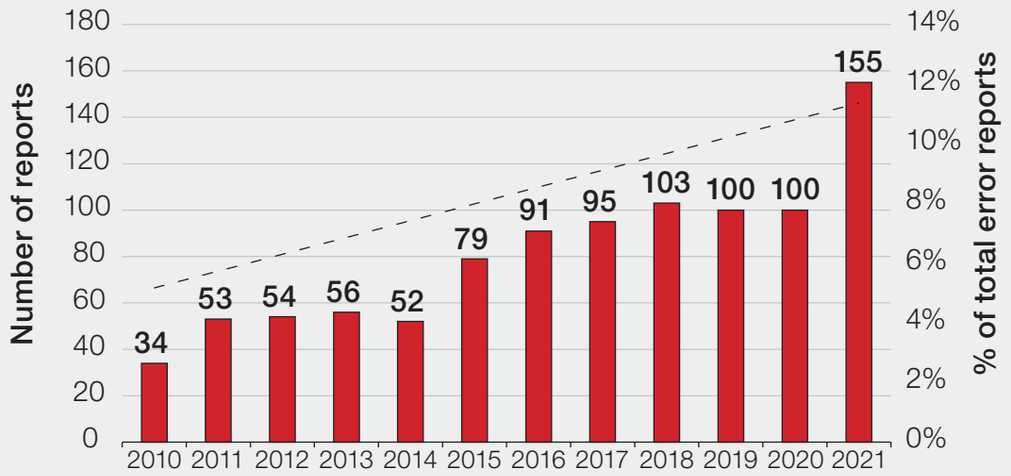
Figure 2.5b: Non red cell component issue data in the UK 2011-2021



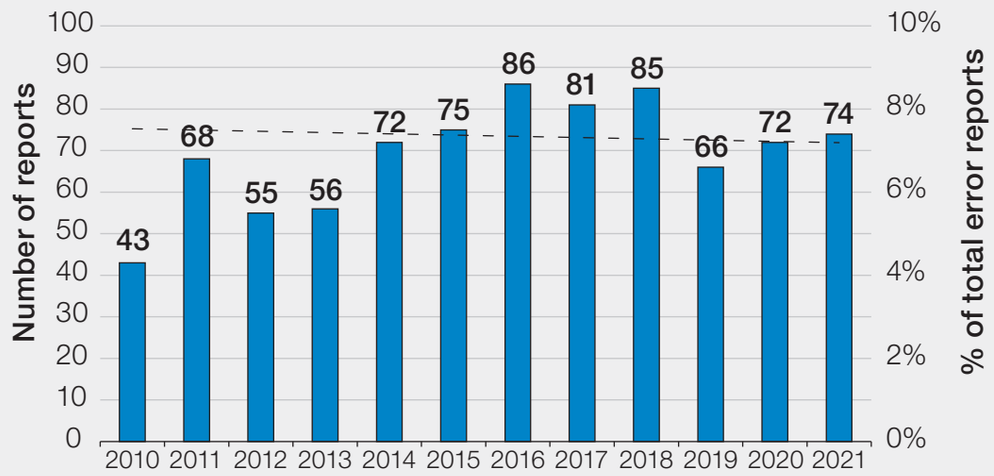
MB=methylene blue; SD=solvent detergent-treated; FFP=fresh frozen plasma

Figure 2.6: Trend of error reports from different departments

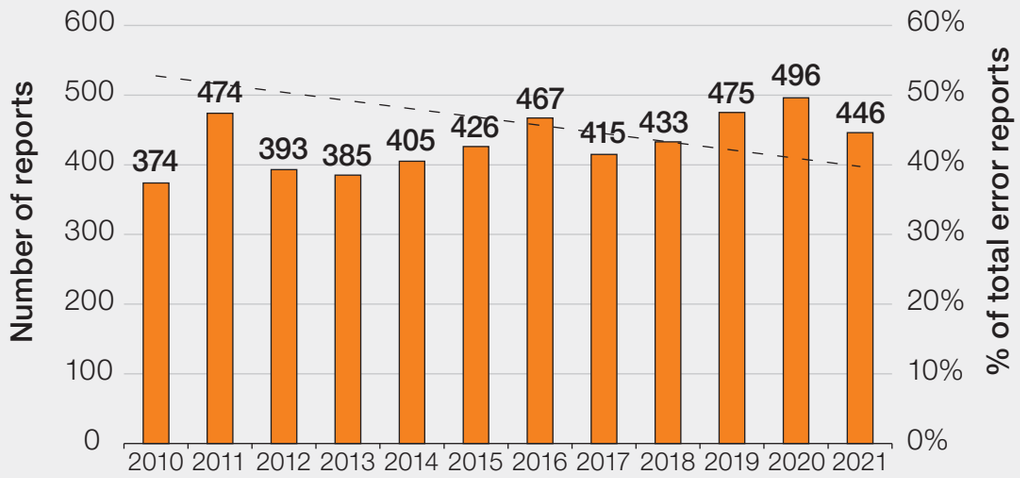
a. Emergency departments



b. Theatres



c. General wards



d. Adult critical care

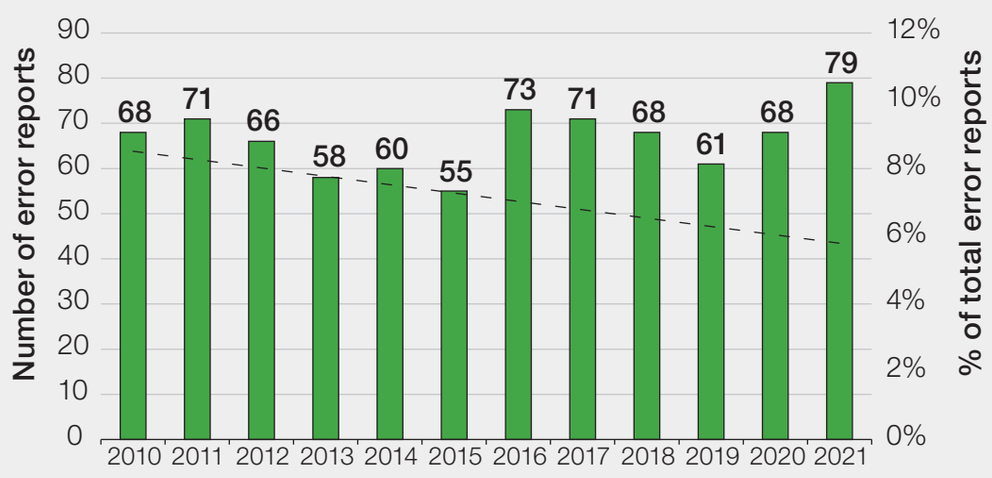


Figure 2.7: Using SHOT participation benchmarking data to drive improvements

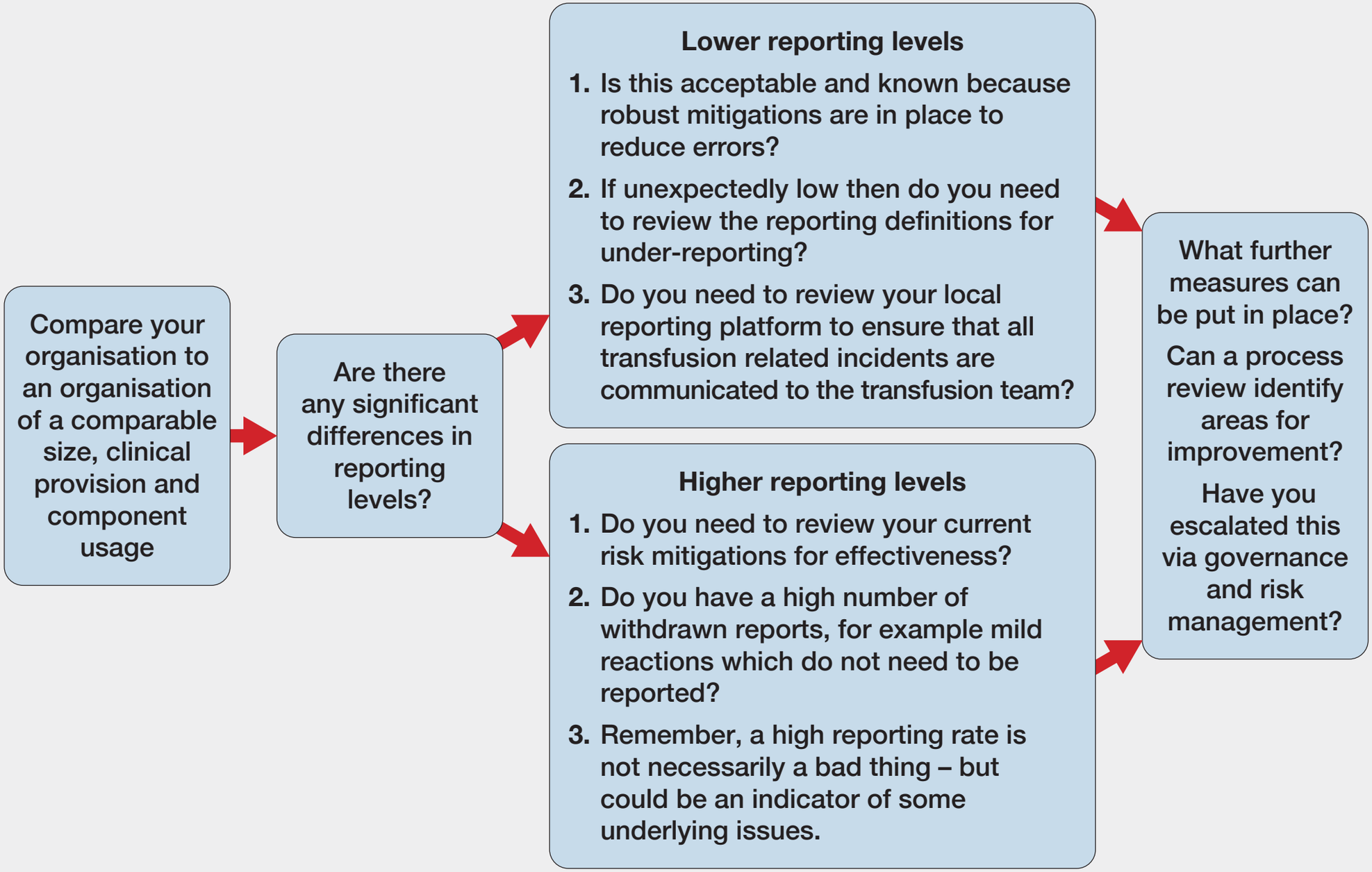


Figure 3.1: Errors account for most reports: 2569/3161

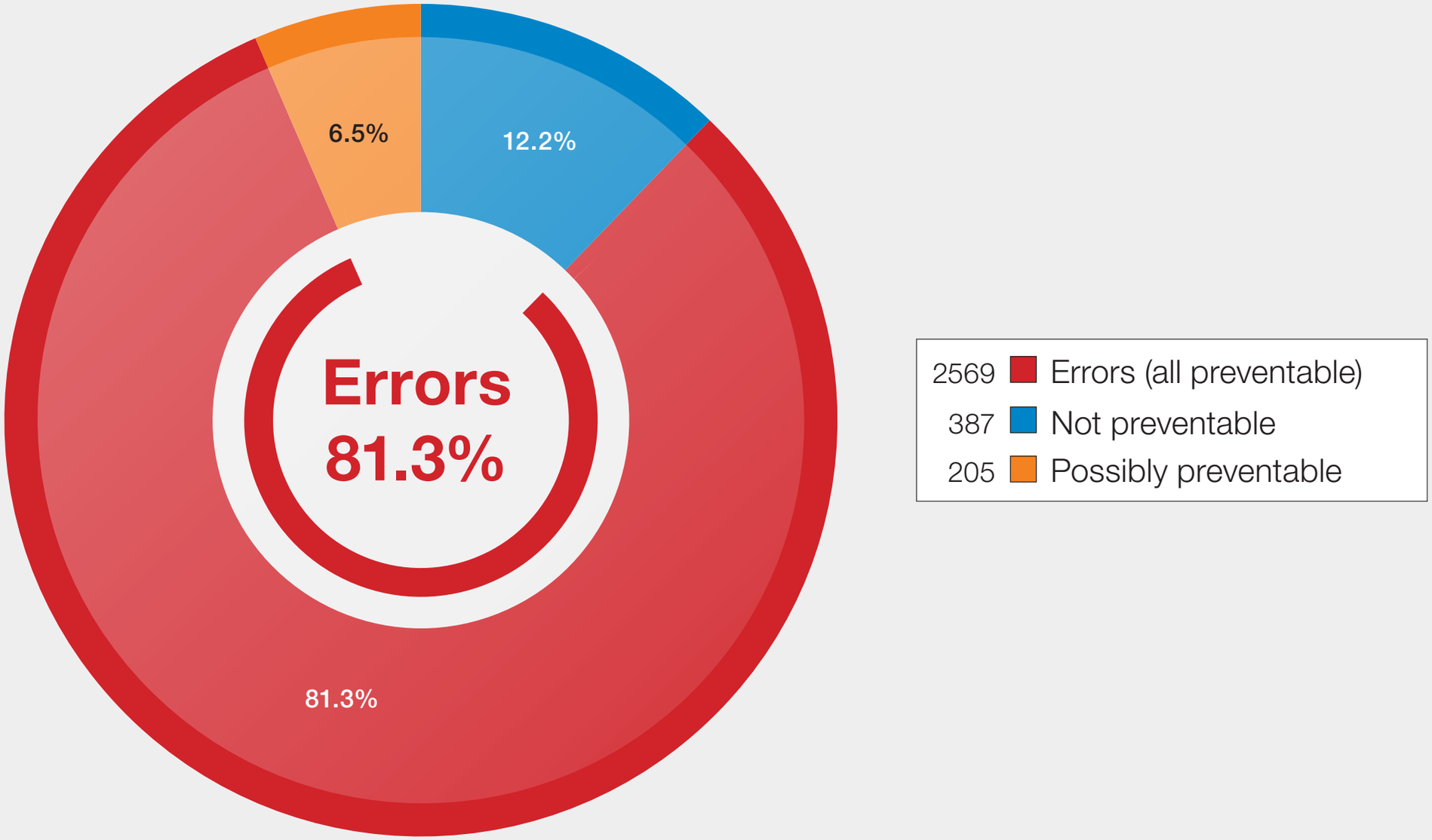


Figure 3.2: Errors as a percentage of total reports 2014-2021

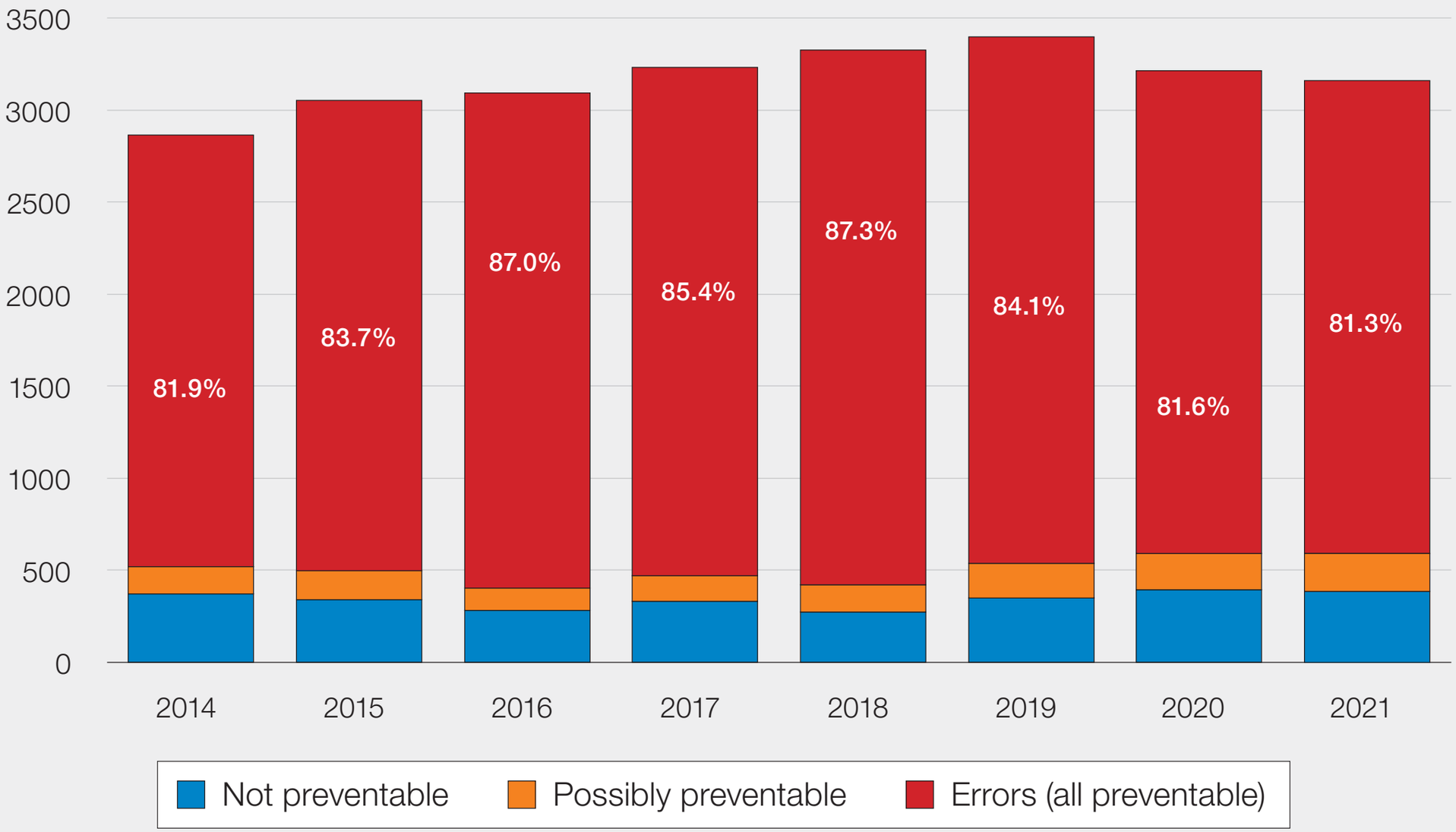
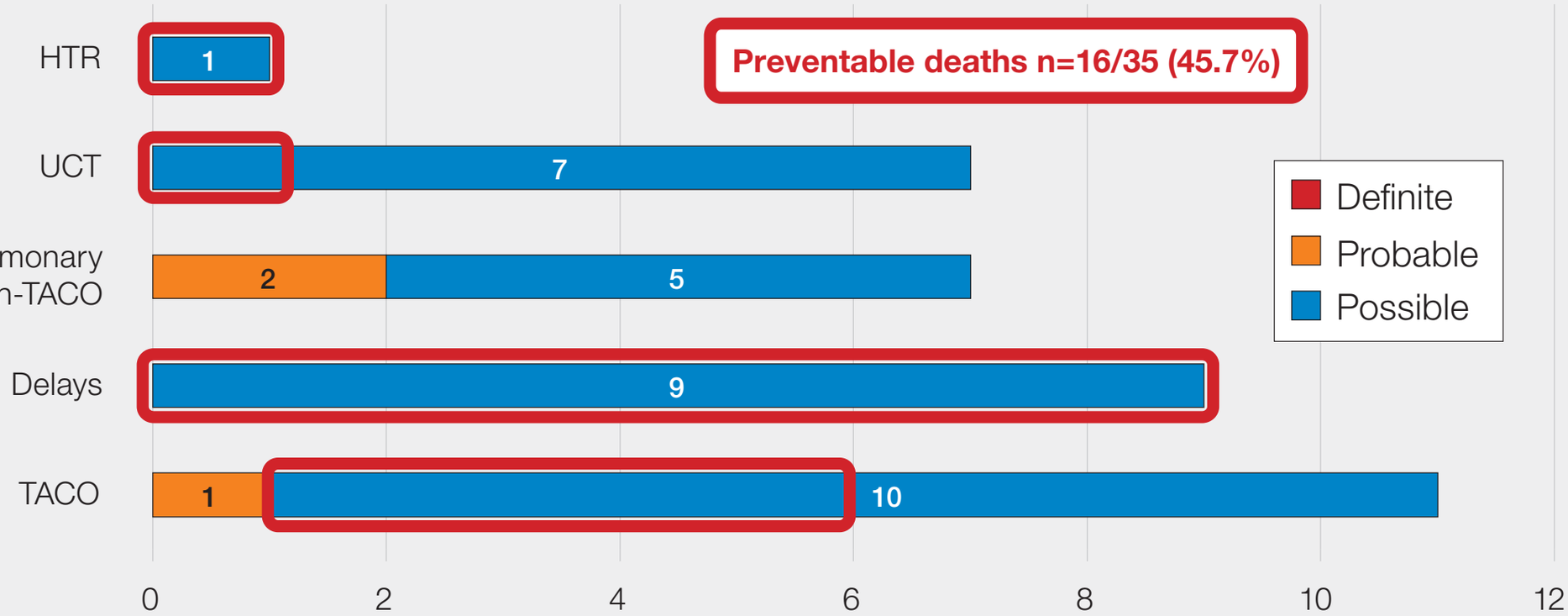
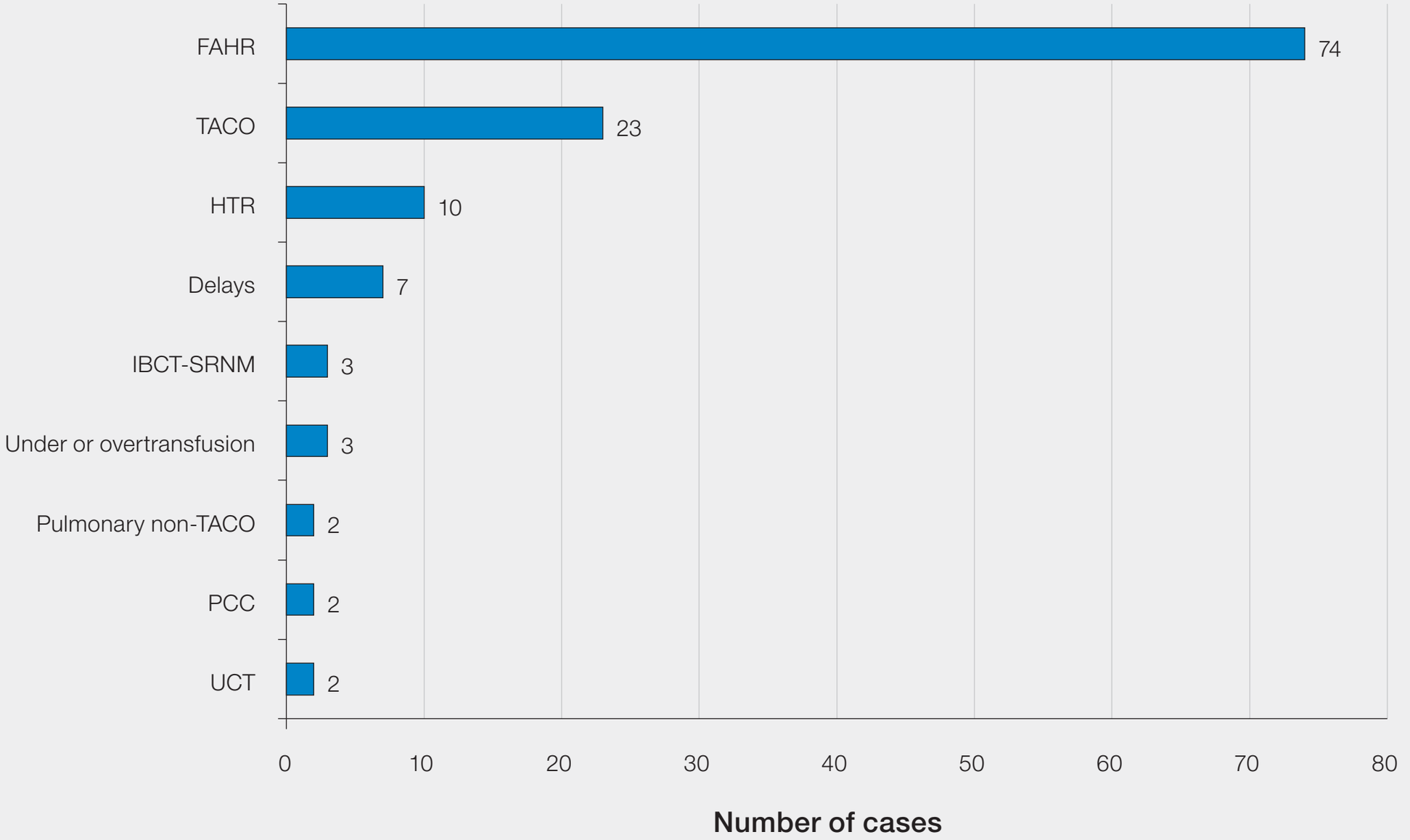


Figure 3.3: Deaths related to transfusion (with imputability) reported in 2021 n=35



HTR=haemolytic transfusion reactions; UCT=uncommon complications of transfusion; TACO=transfusion-associated circulatory overload

Figure 3.4: Ranking of categories to show number of serious reactions in 2021 n=126



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

Figure 3.5: Summary data for 2021, all categories (includes RBRP and NM) n=3161

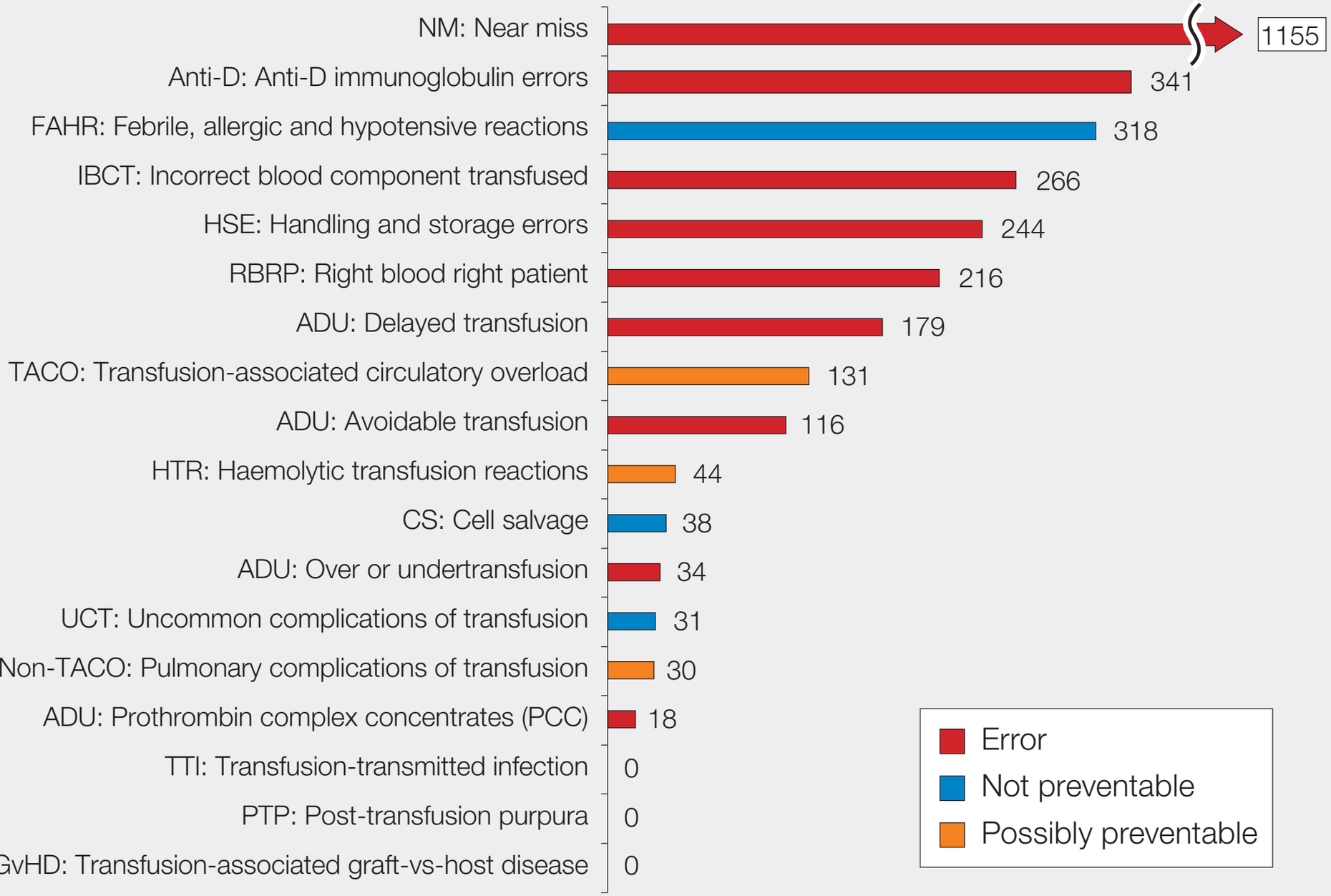
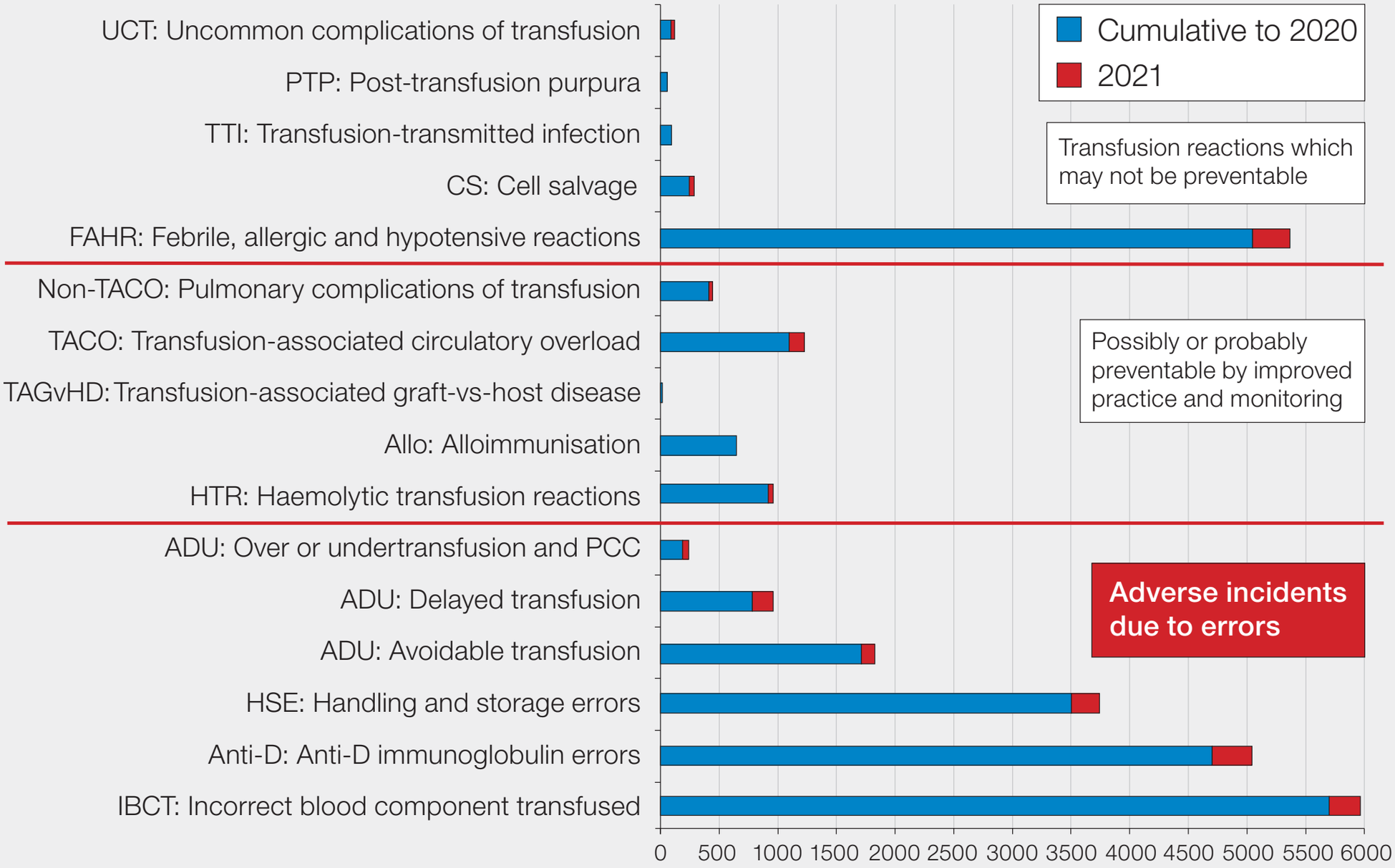
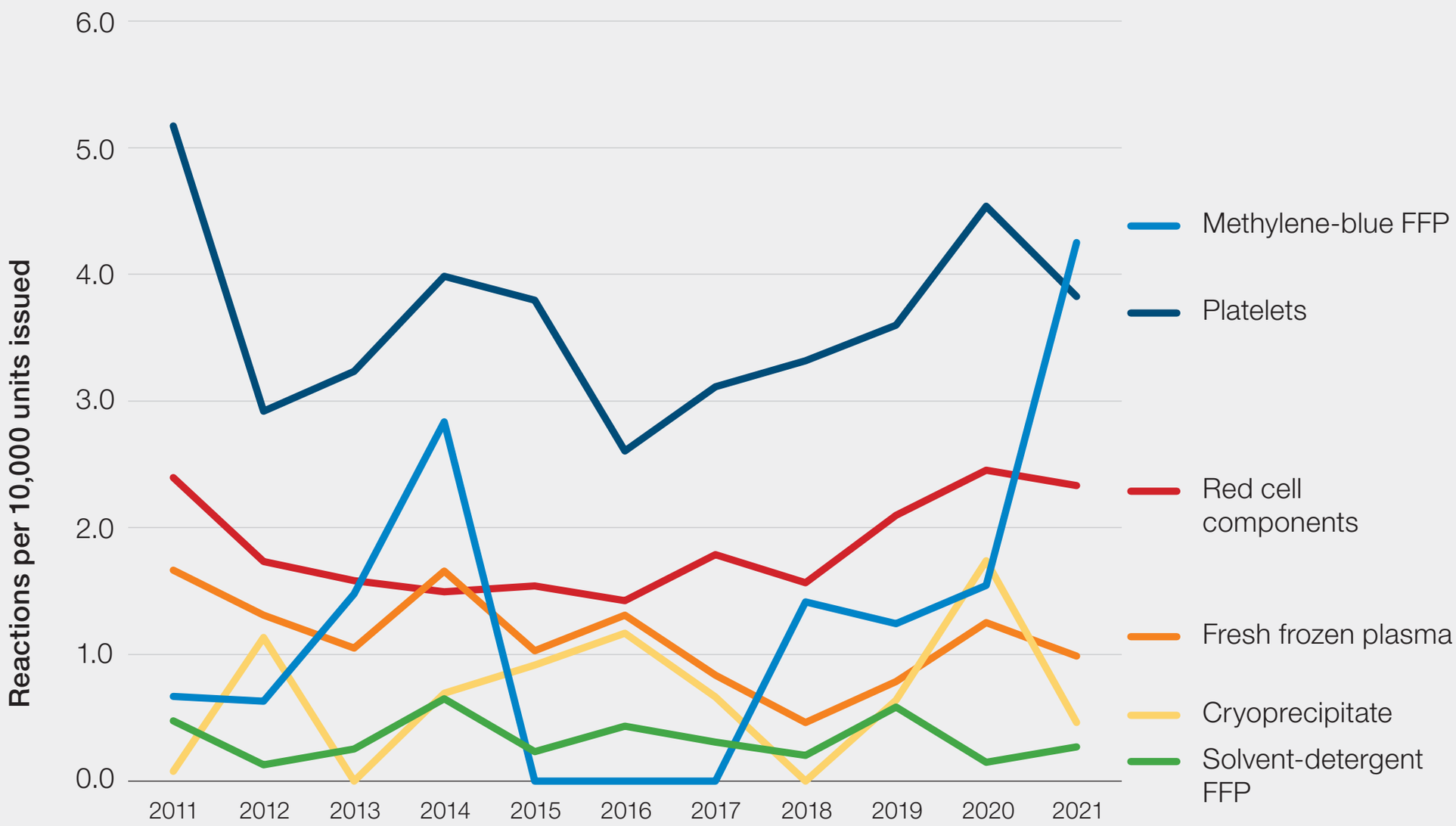


Figure 3.6: Cumulative data for SHOT categories 1996-2021 n=27009



**Data on alloimmunisation is no longer collected by SHOT since 2015*

Figure 3.7: Reactions per 10,000 components, by component type 2011-2021



*Not including convalescent plasma

Figure 3.8: Number of ABO-incompatible red cell transfusions 1996-2021

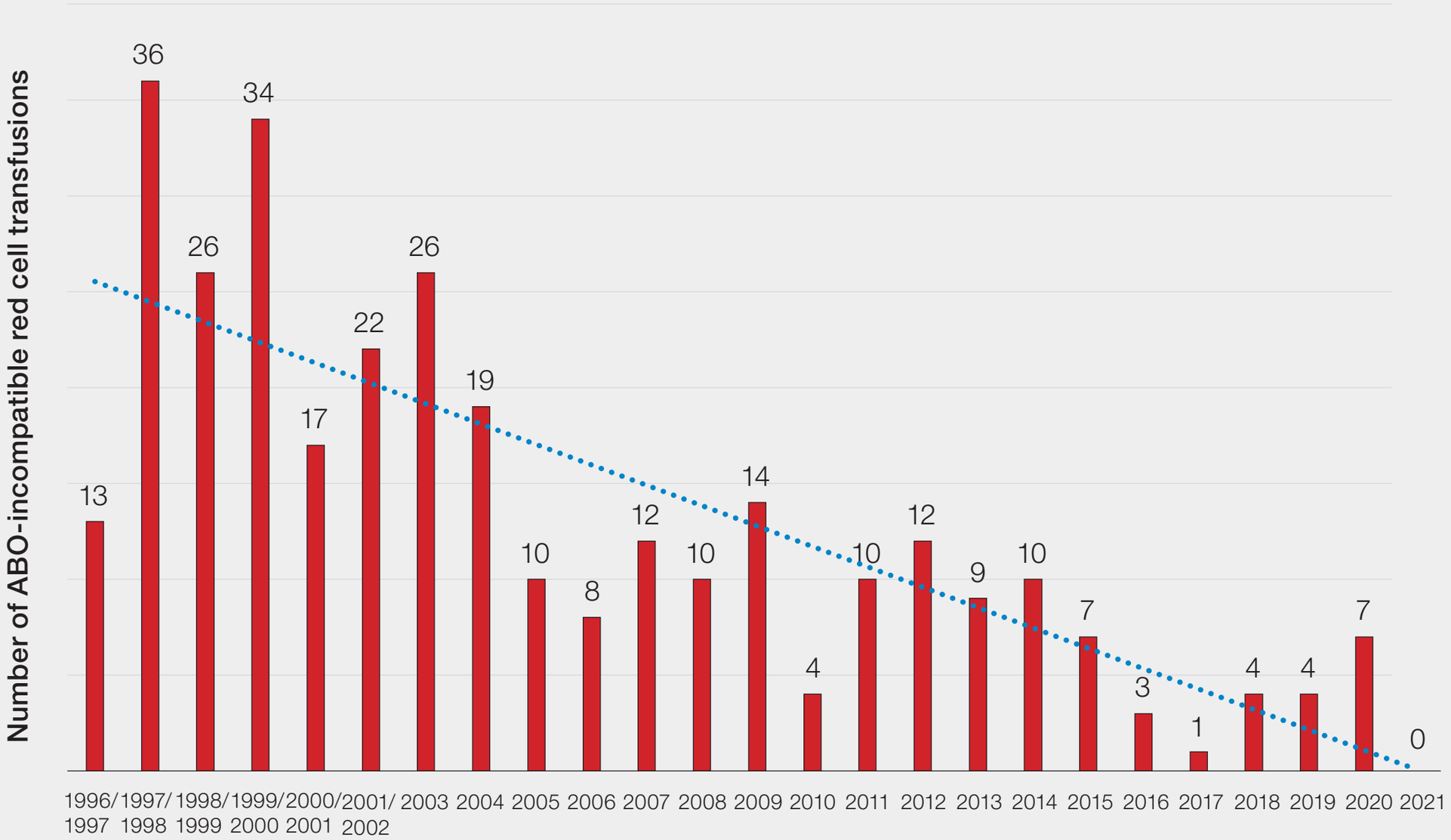
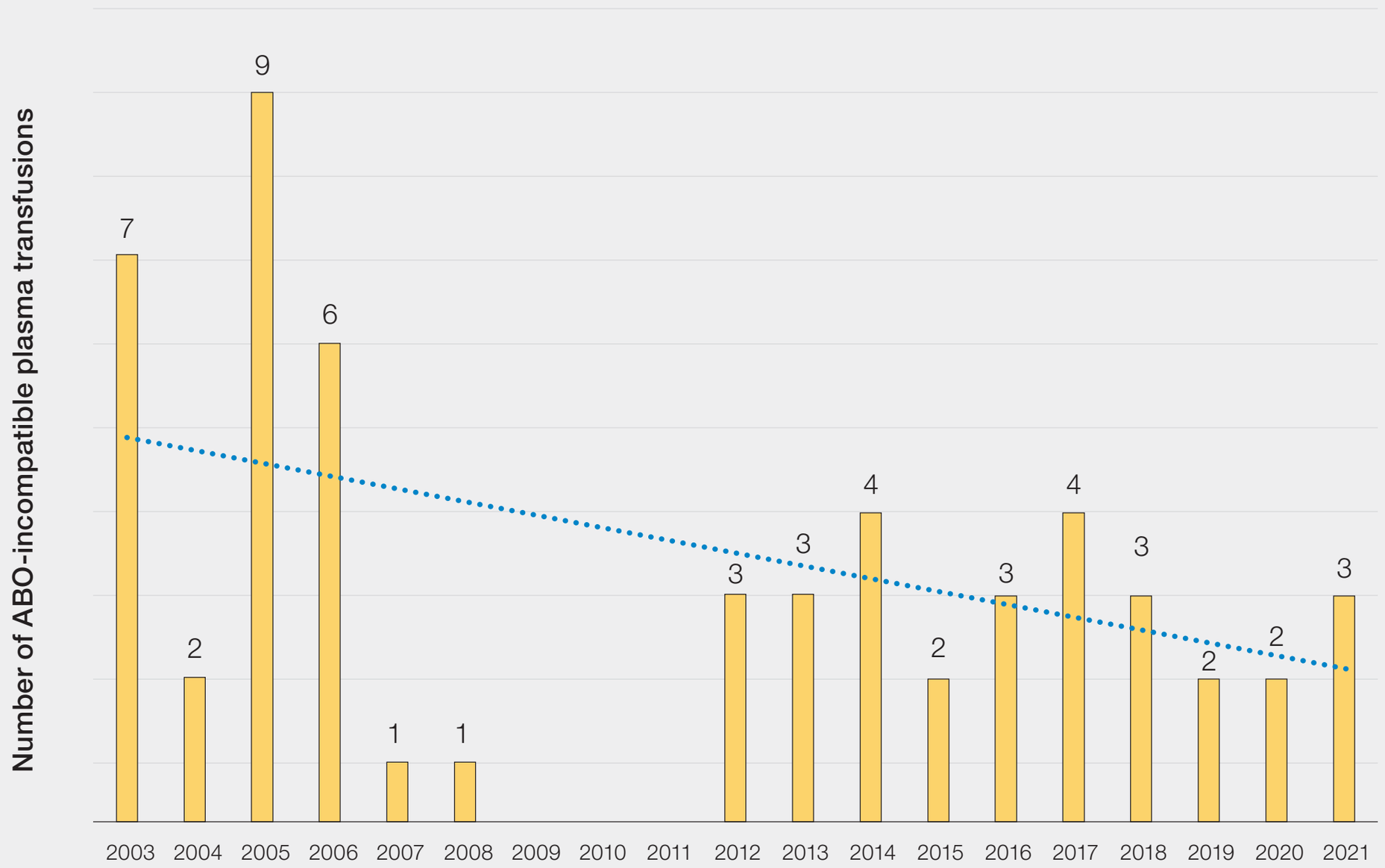
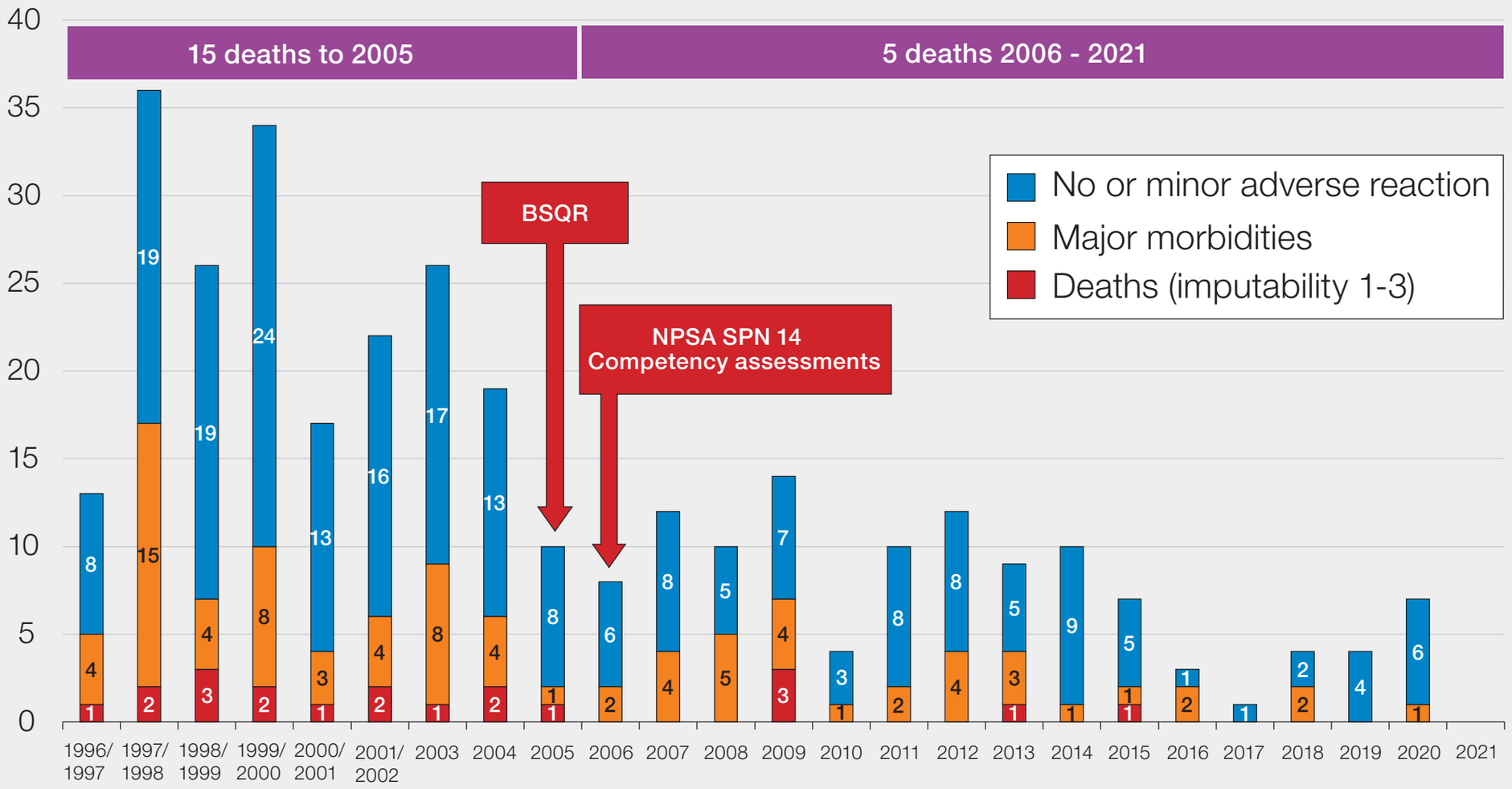


Figure 3.9: Number of ABO-incompatible plasma transfusions 2003-2021



Cryoprecipitate ABOi reports in 2018 and 2021 (n=1); COVID-19 convalescent plasma ABOi in 2020 and 2021 (n=1)

Figure 3.10: Outcome of ABO-incompatible red cell transfusions in 25 years of SHOT reporting



BSQR=Blood Safety and Quality Regulations; NPSA=National Patient Safety Agency; SPN=safer practice notice

Figure 3.11: ABO-incompatible transfusions 2016-2021: few events (n=19) but many near misses (n=1778)

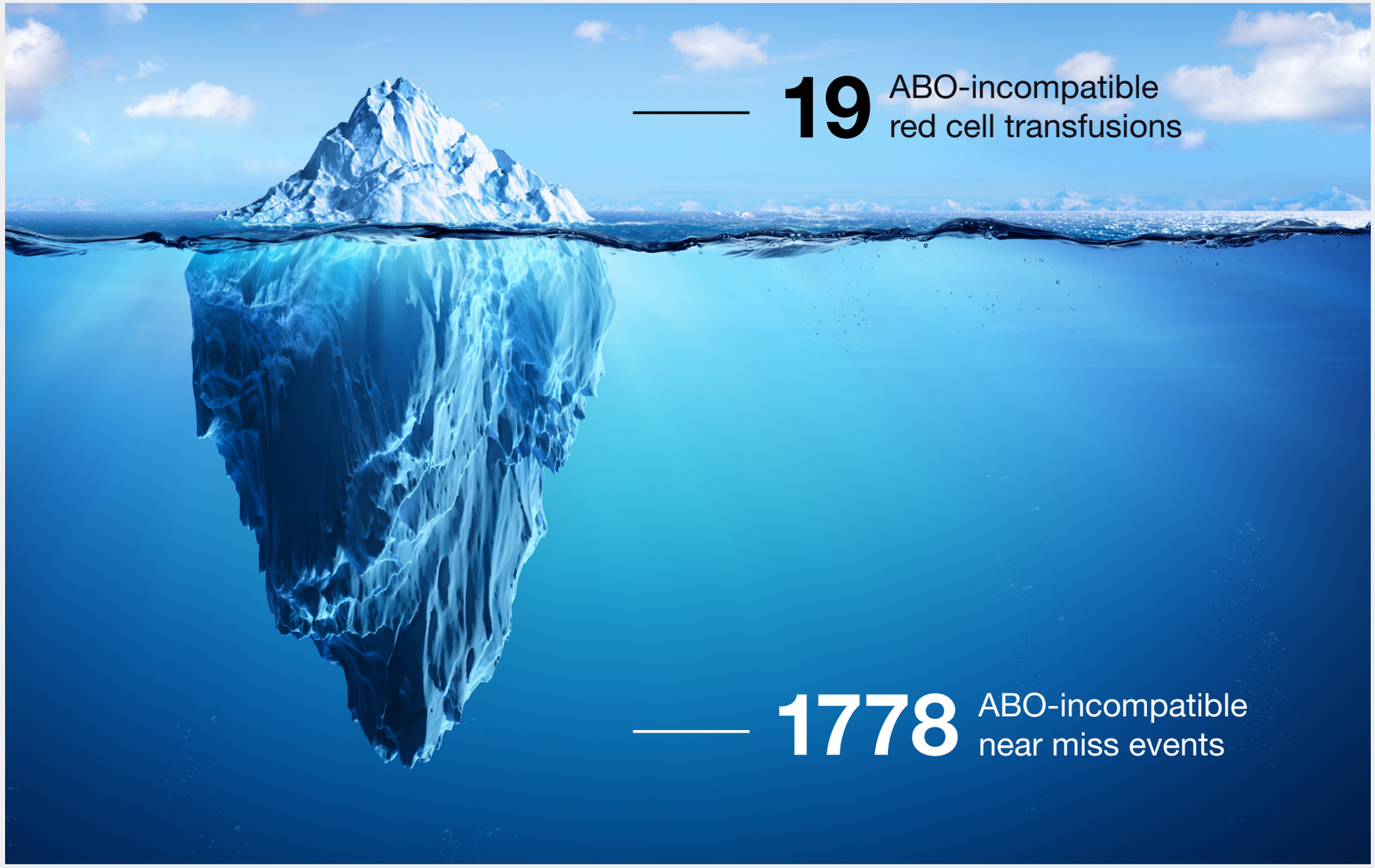


Figure 3.12: IBCT-SRNM errors by year of Annual SHOT Report 1996-2021

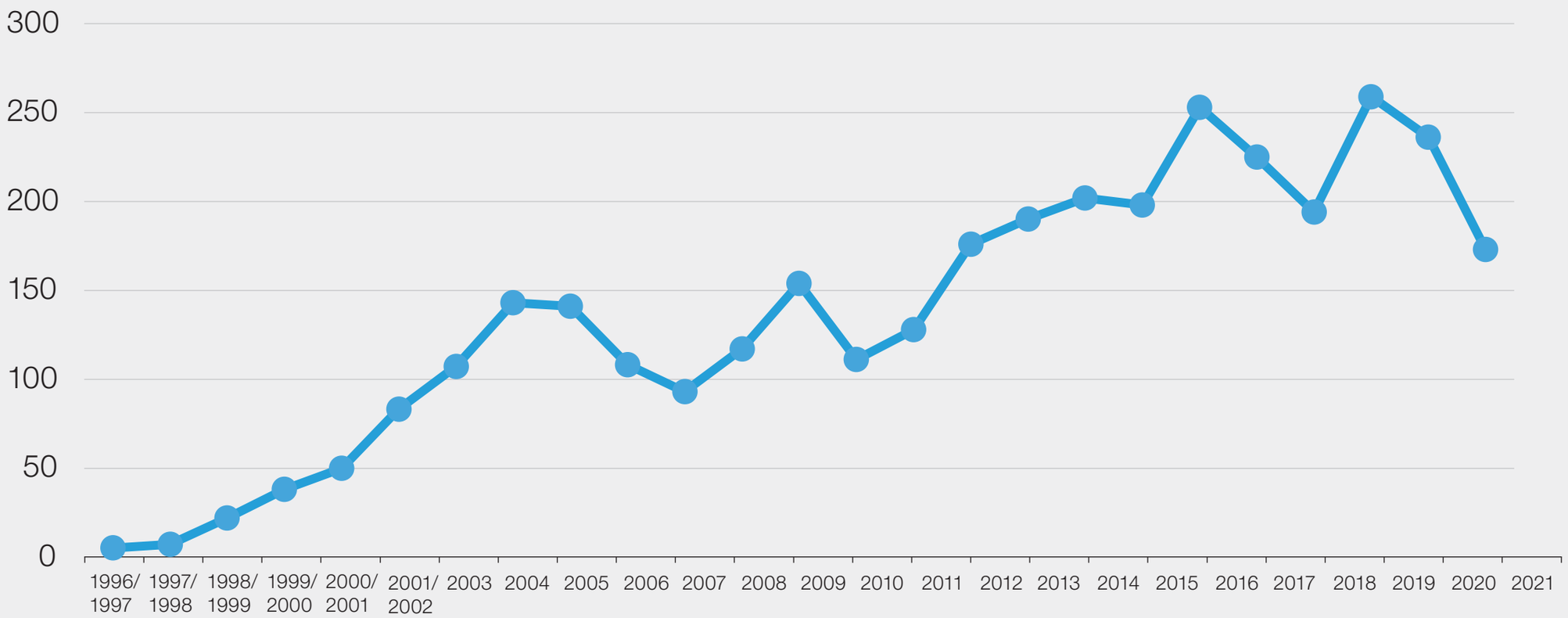


Figure 4.1: Transfusion safety

Figure 4.2: Six simple rules for safe transfusions

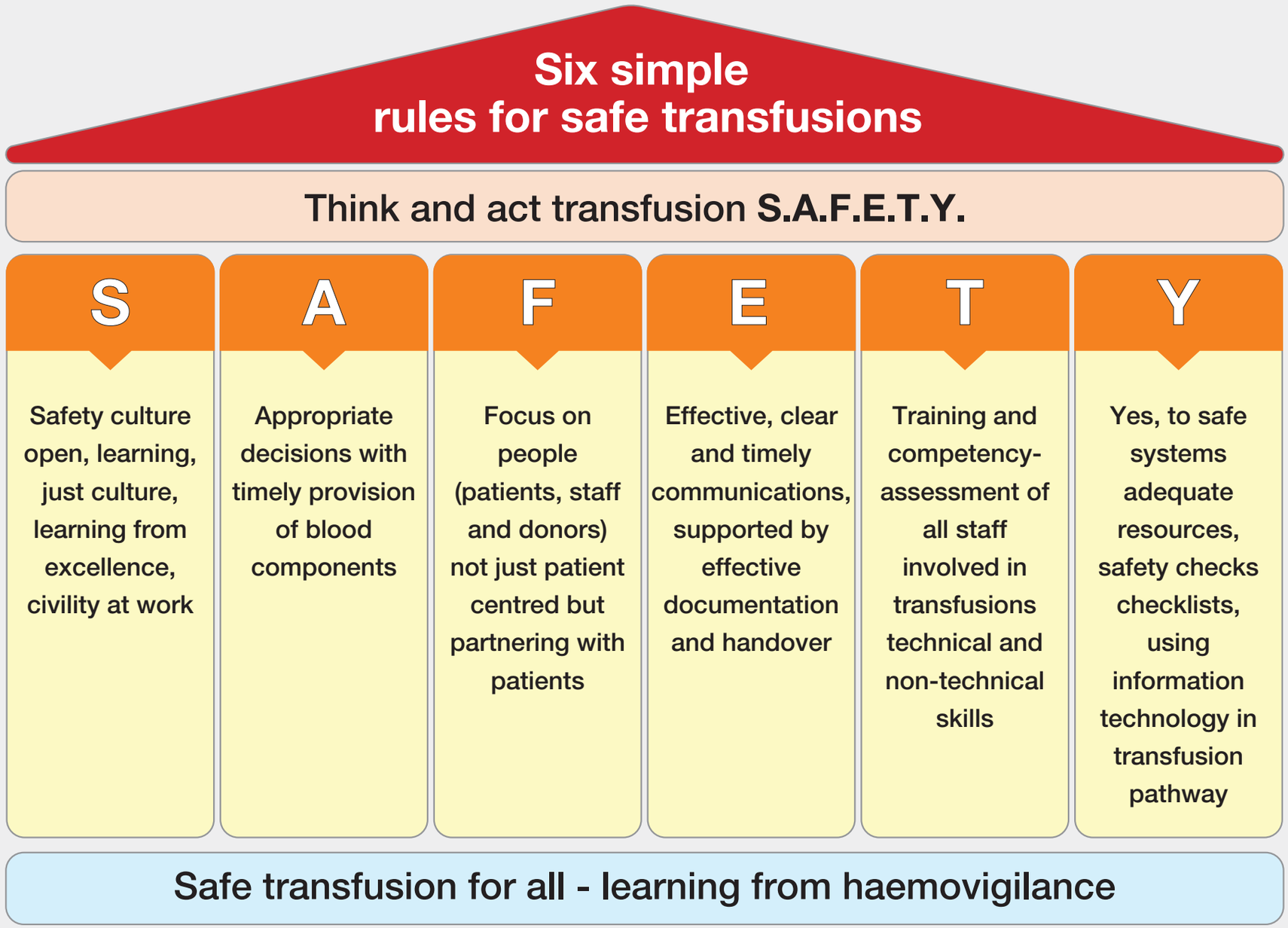
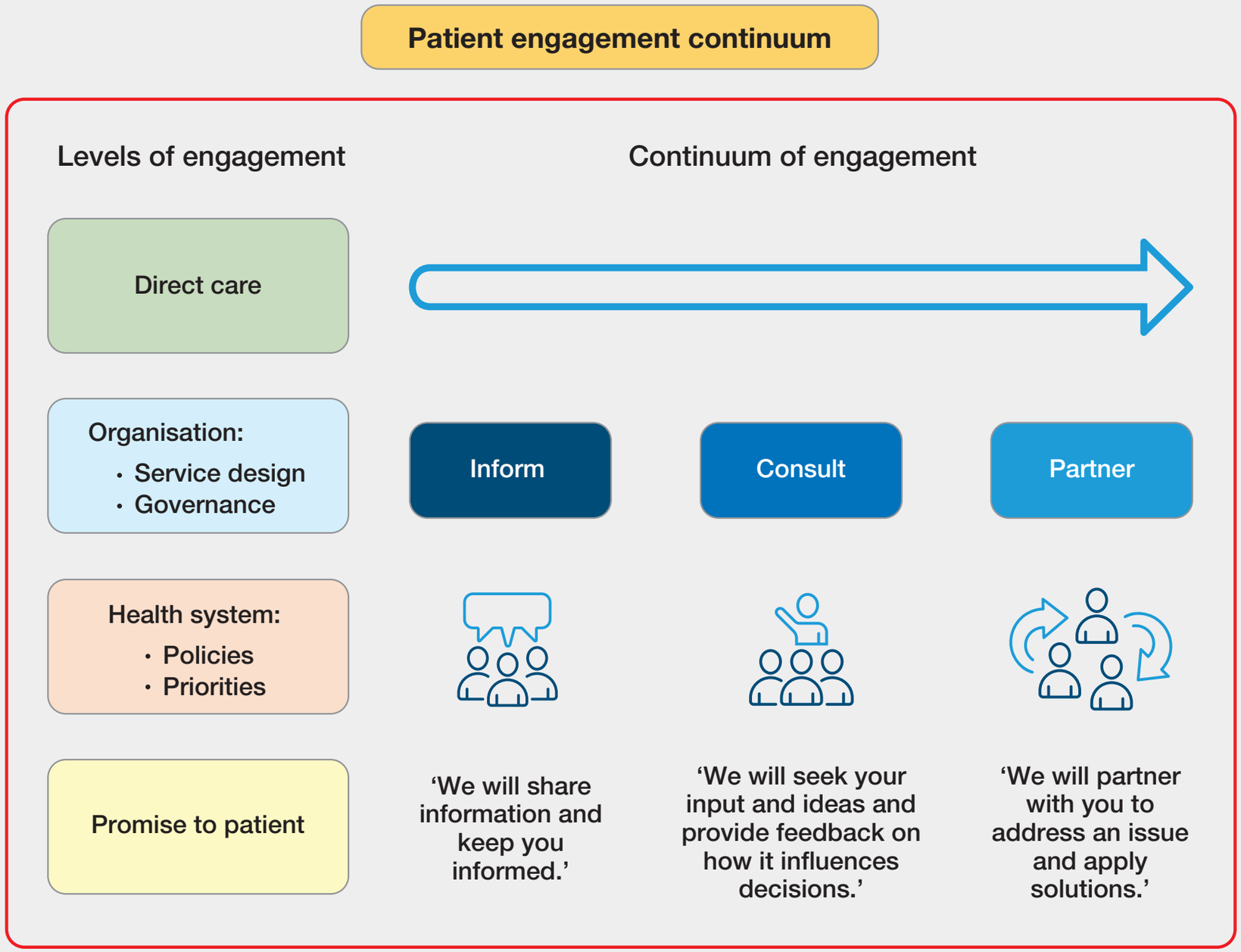


Figure 4.3: Patient engagement continuum



Taken from: Engaging Patients in Patient Safety – a Canadian Guide (Patient Engagement Action Team 2017)

Figure 4.4: Critical elements of a safety culture

Figure 5.1: Event probability and safety focus (Hollnagel et al. 2015)

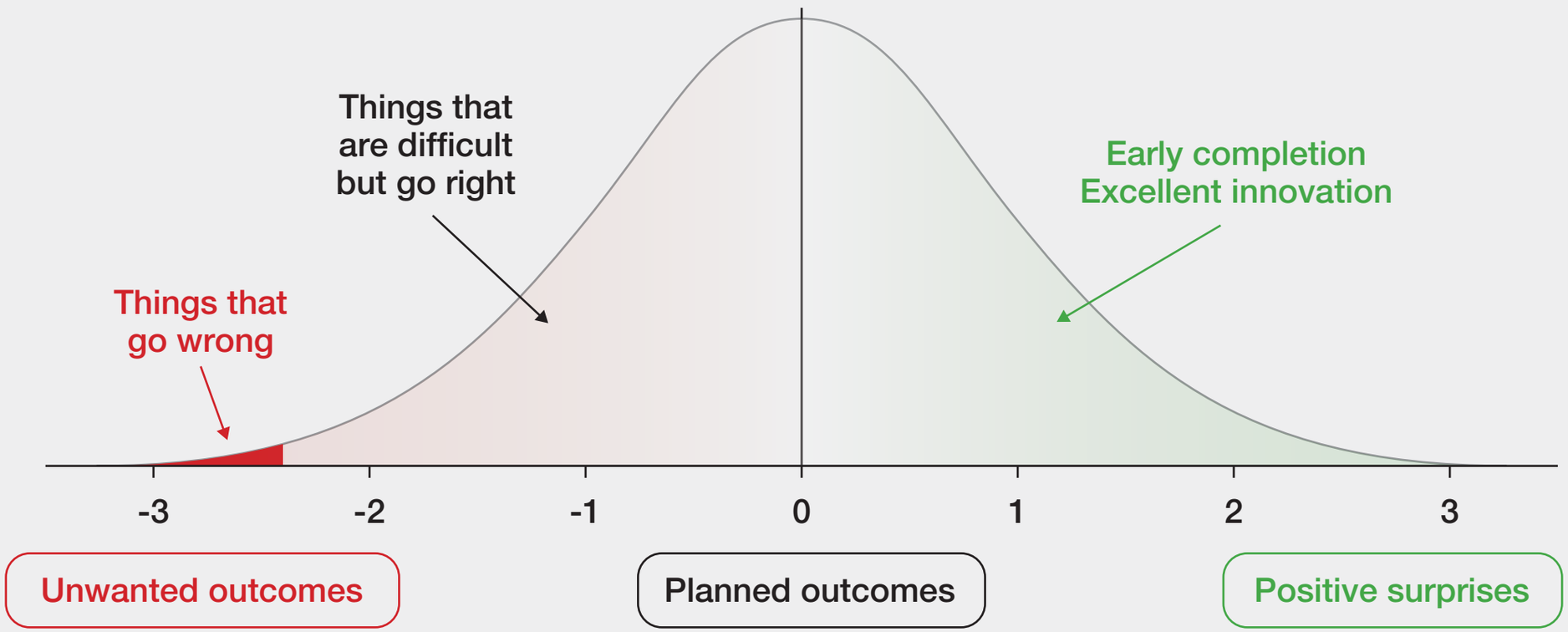
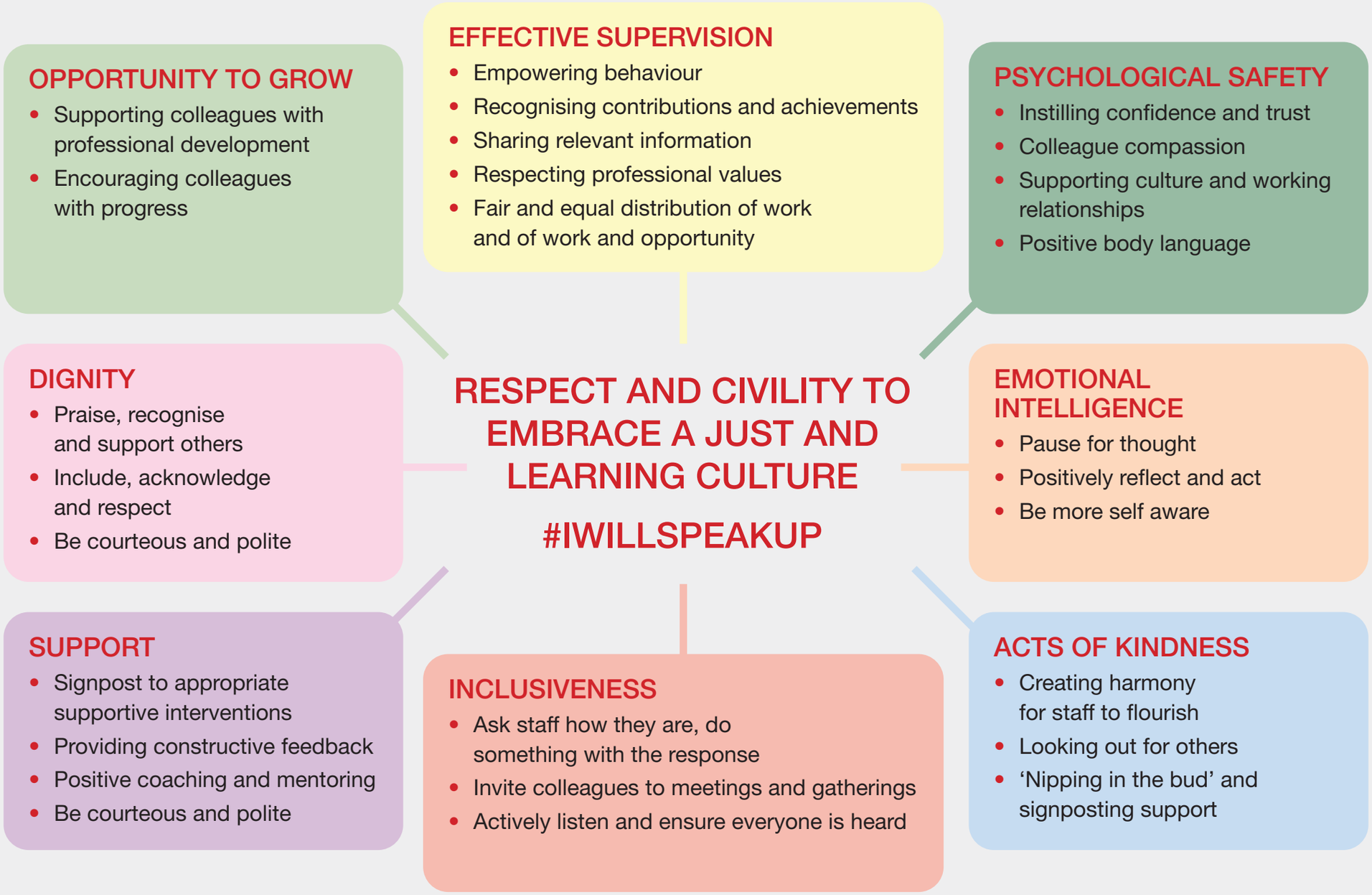


Figure 5.2: Respect and civility



Based on the infographic from Cheshire & Merseyside Health and Care Partnership https://www.cheshireandmerseysidepartnership.co.uk/civility-respect-and-the-importance-of-bystander-accountability/

Figure 5.3: The 4D cycle

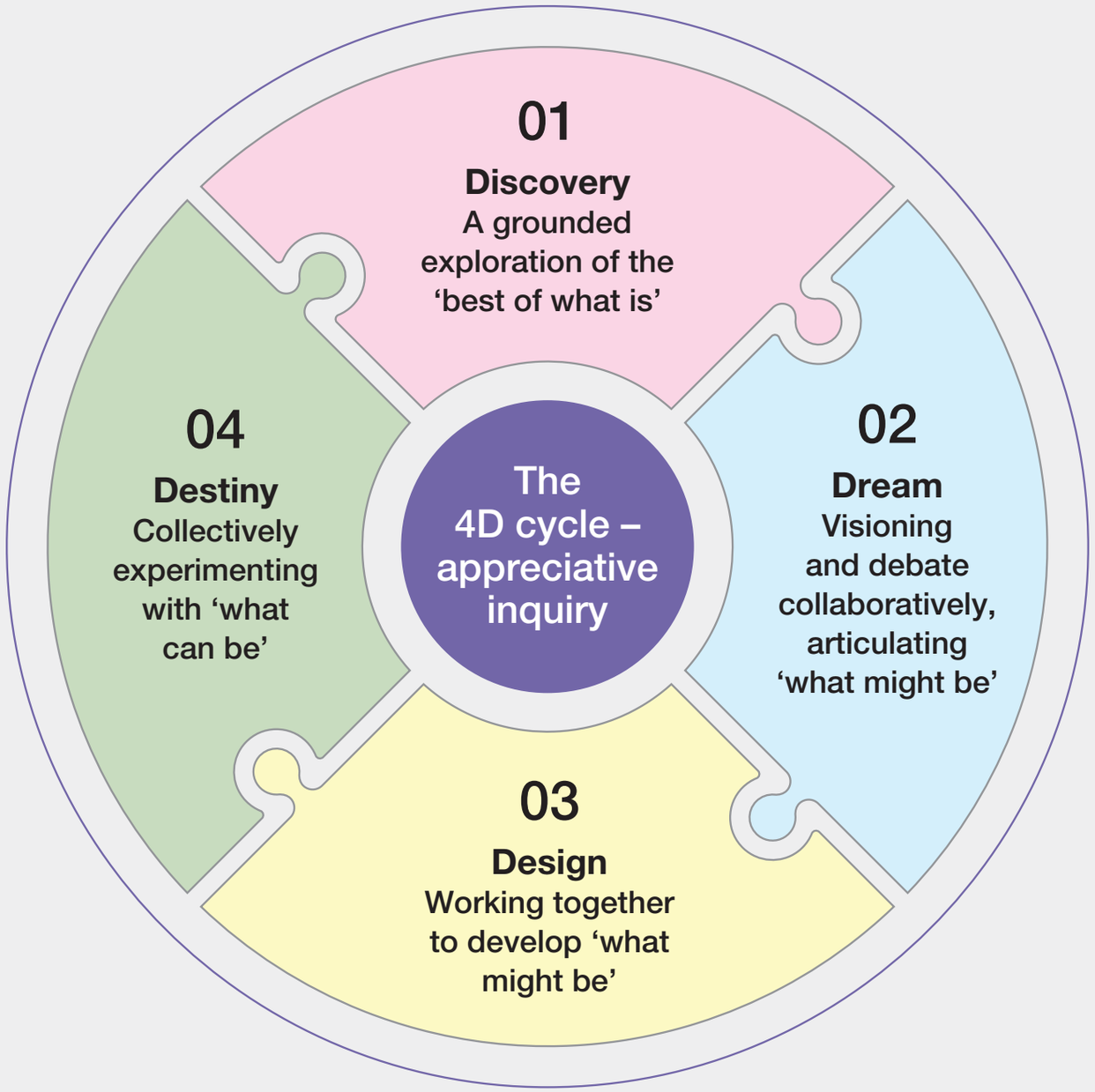


Figure 6.1: Rate of SAED reported per 10,000 donations in the UK from 2015-2021

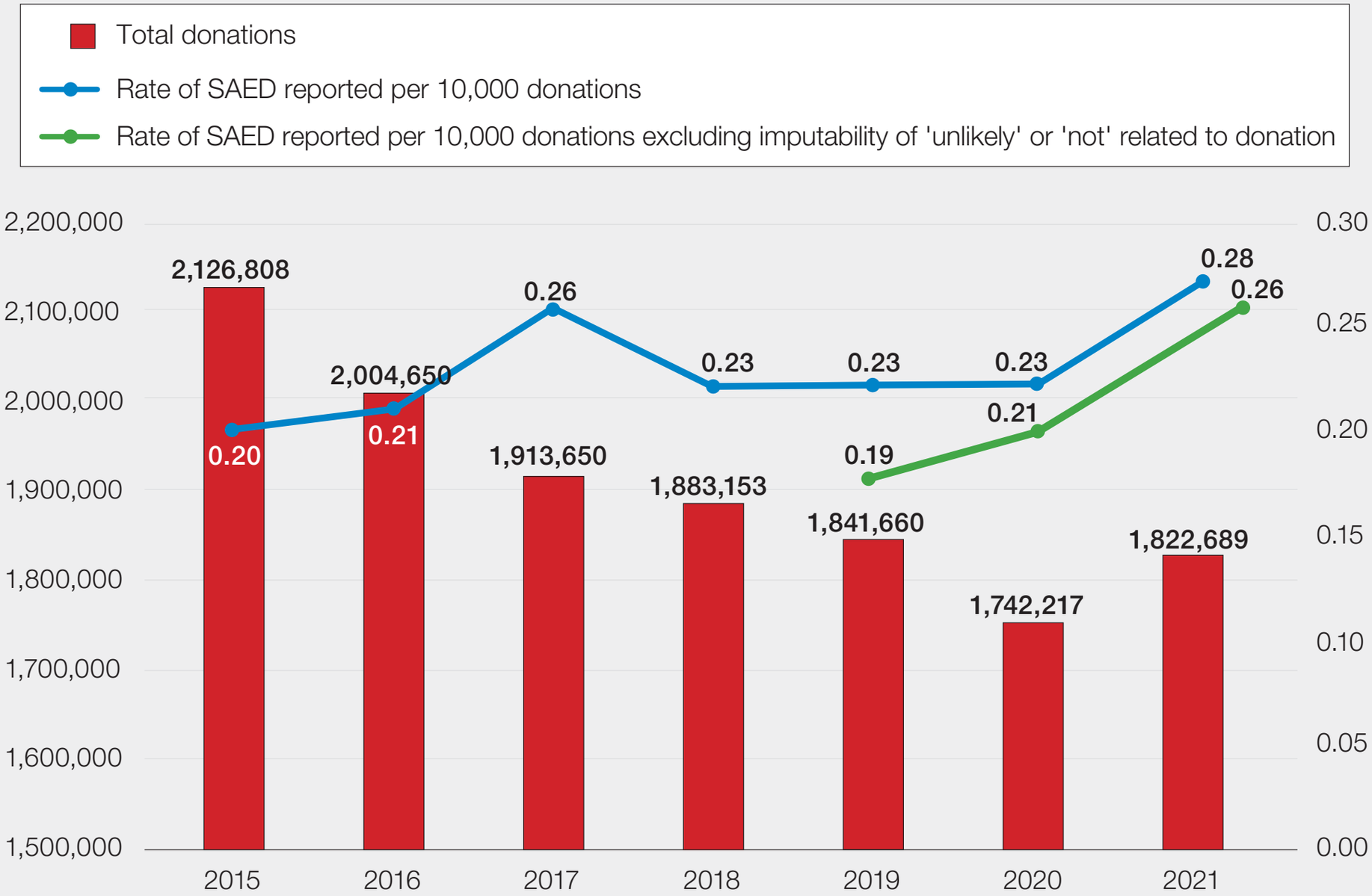
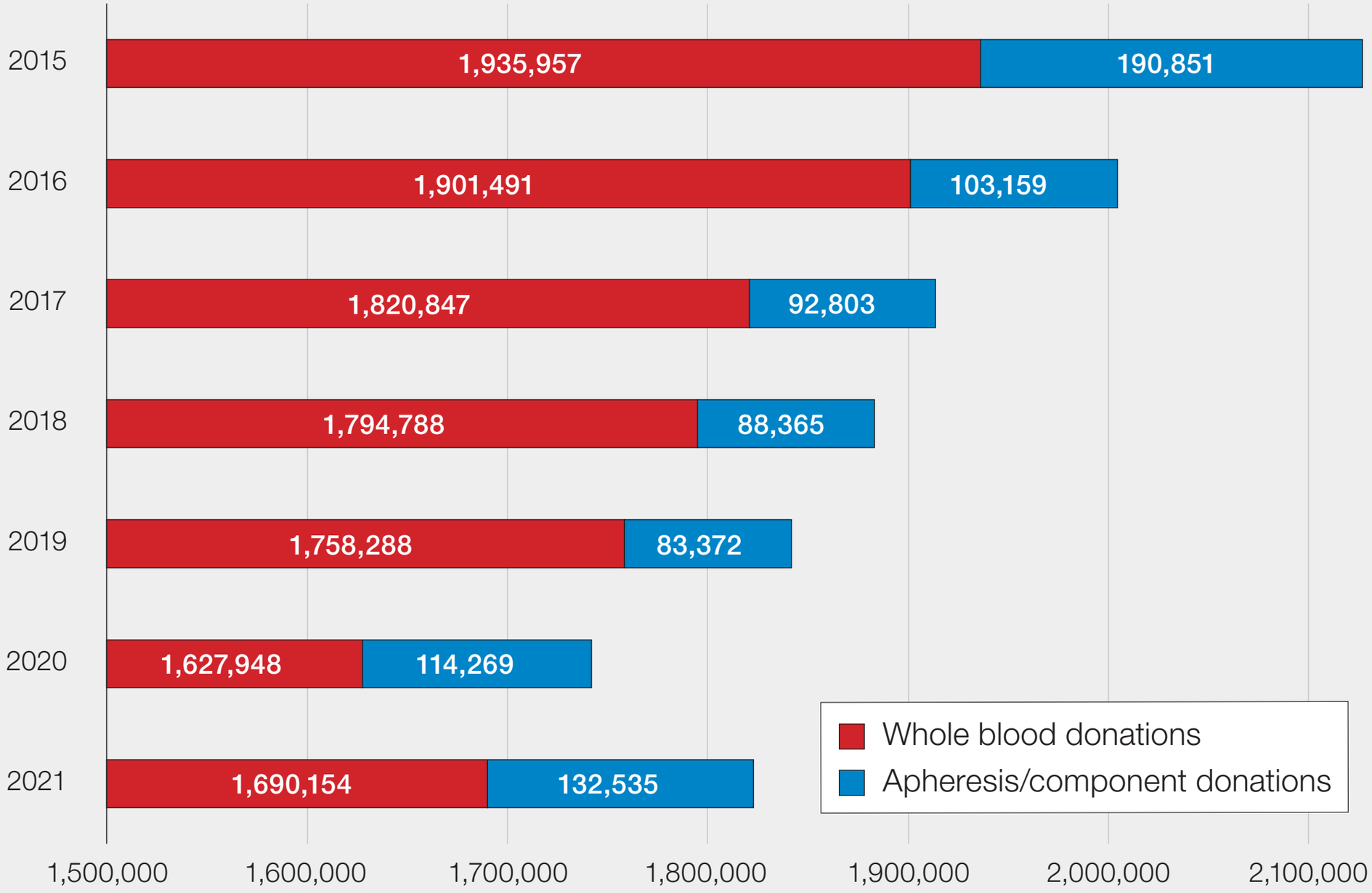
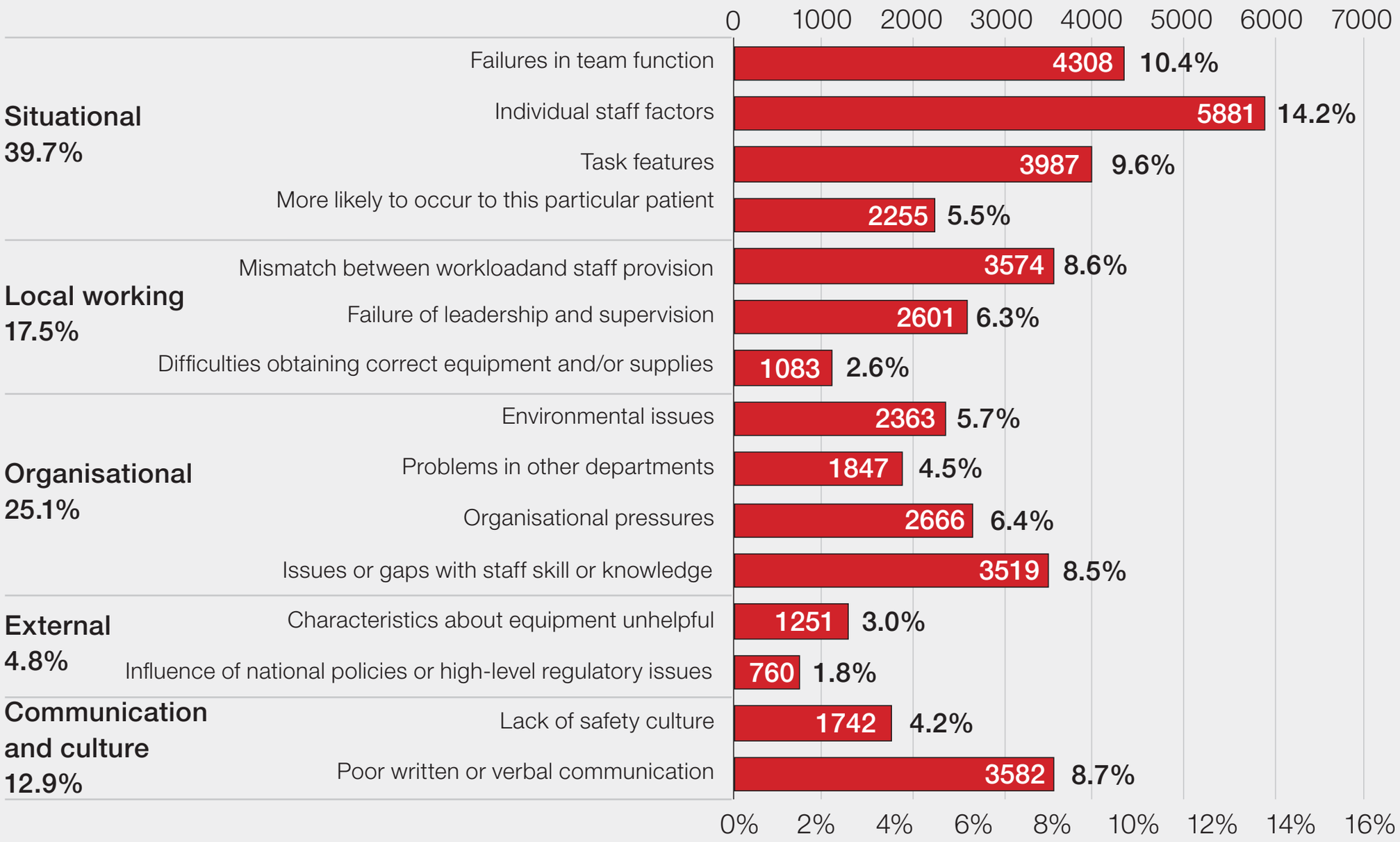


Figure 6.2: Trends in the number of donations collected across the UK 2015-2021



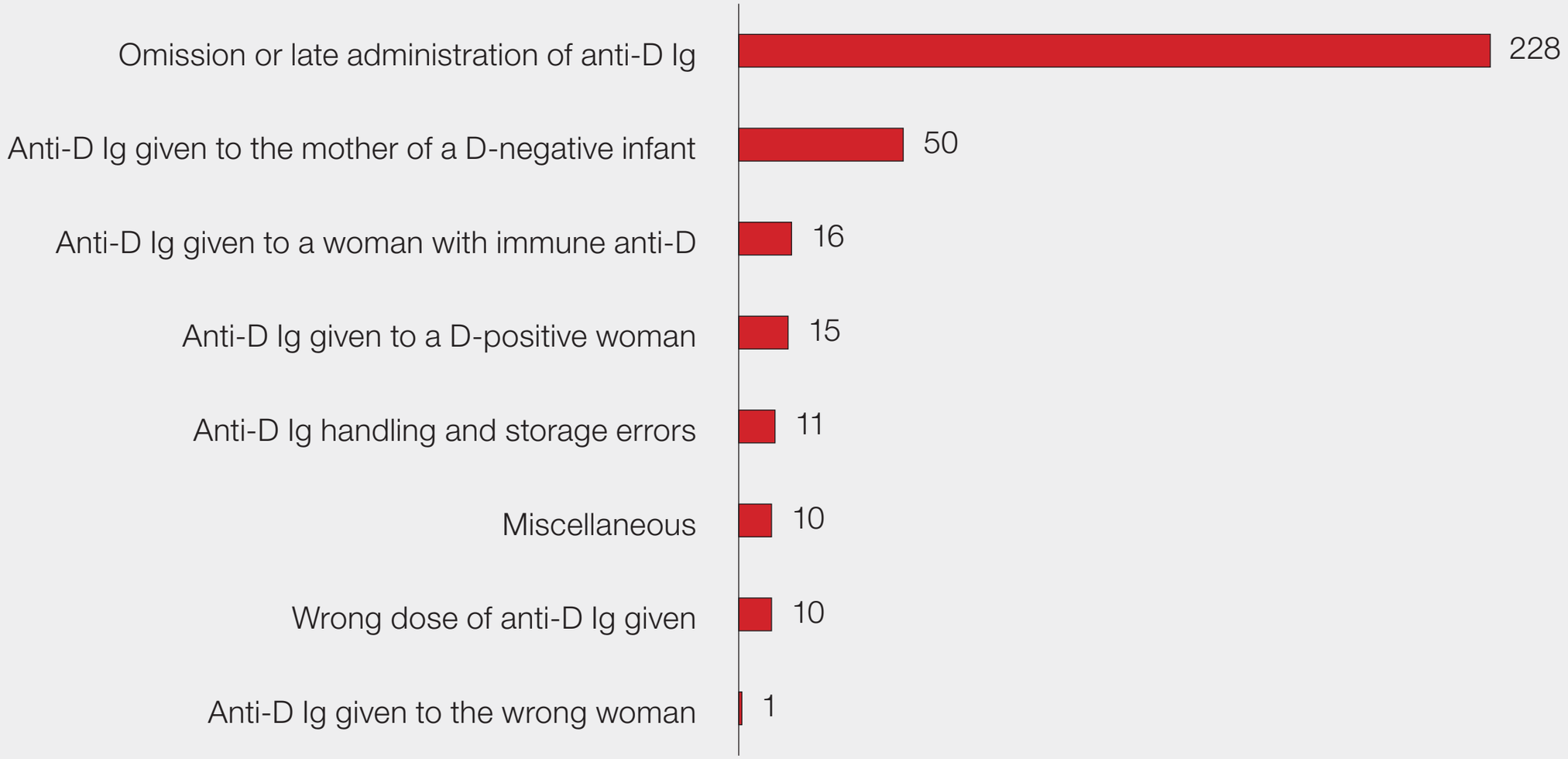
These numbers include COVID-19 convalescent plasma donations

Figure 7.1: Comparative scores assigned for different system factors



The expanded HFIT introduced in 2021 reveals a greater breadth of factors that contribute to adverse incidents, so investigators can identify areas for system and organisational improvement

Figure 8.1: Distribution of anti-D Ig related error reports in 2021 (n=341)



Note: Miscellaneous cases included 4 failures to complete follow up post FMH greater than 4mL, and 6 failures in sample taking or testing processes

Figure 9.1: Overview of reports where an incorrect blood component was transfused in 2021 n=266

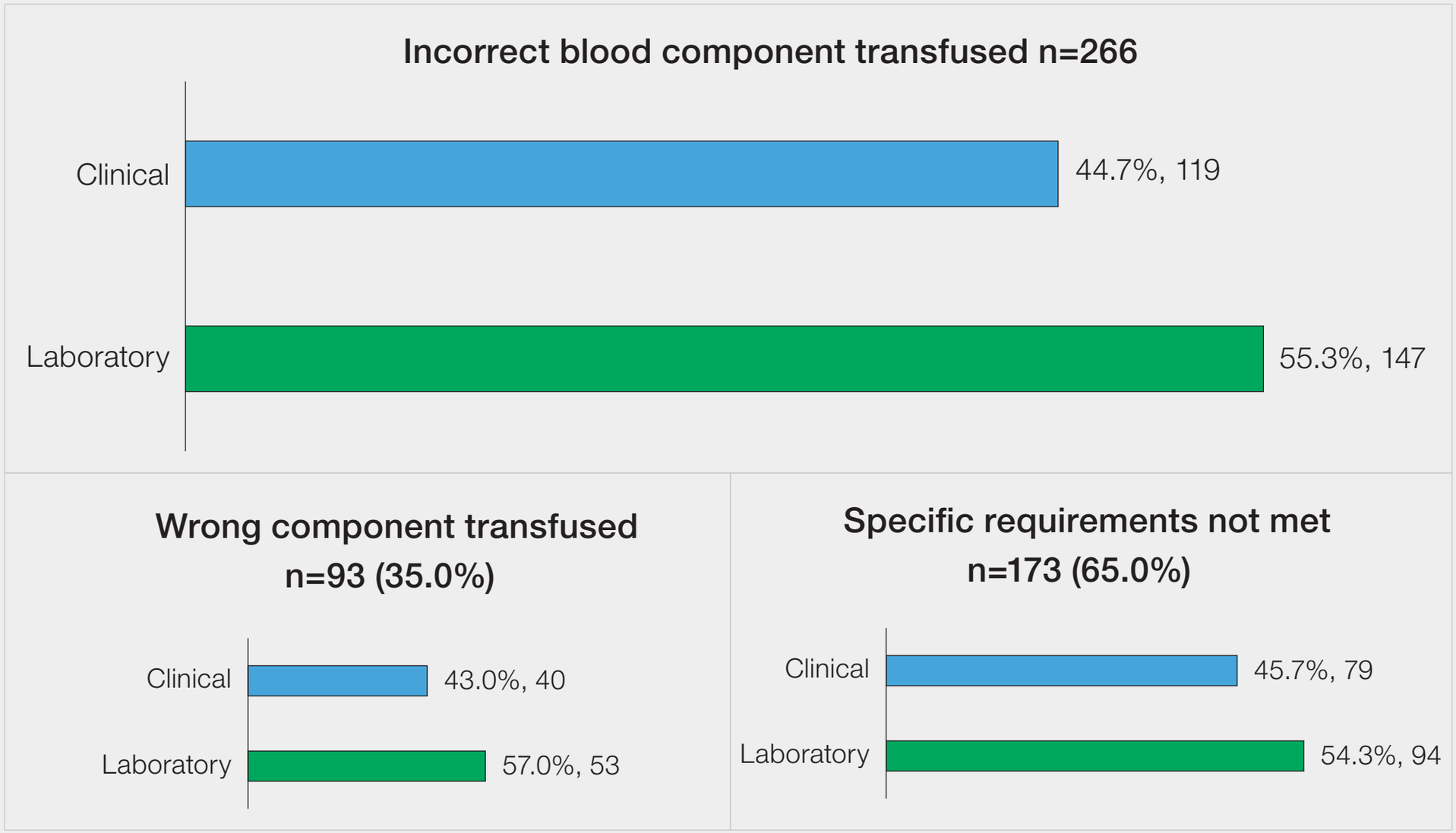
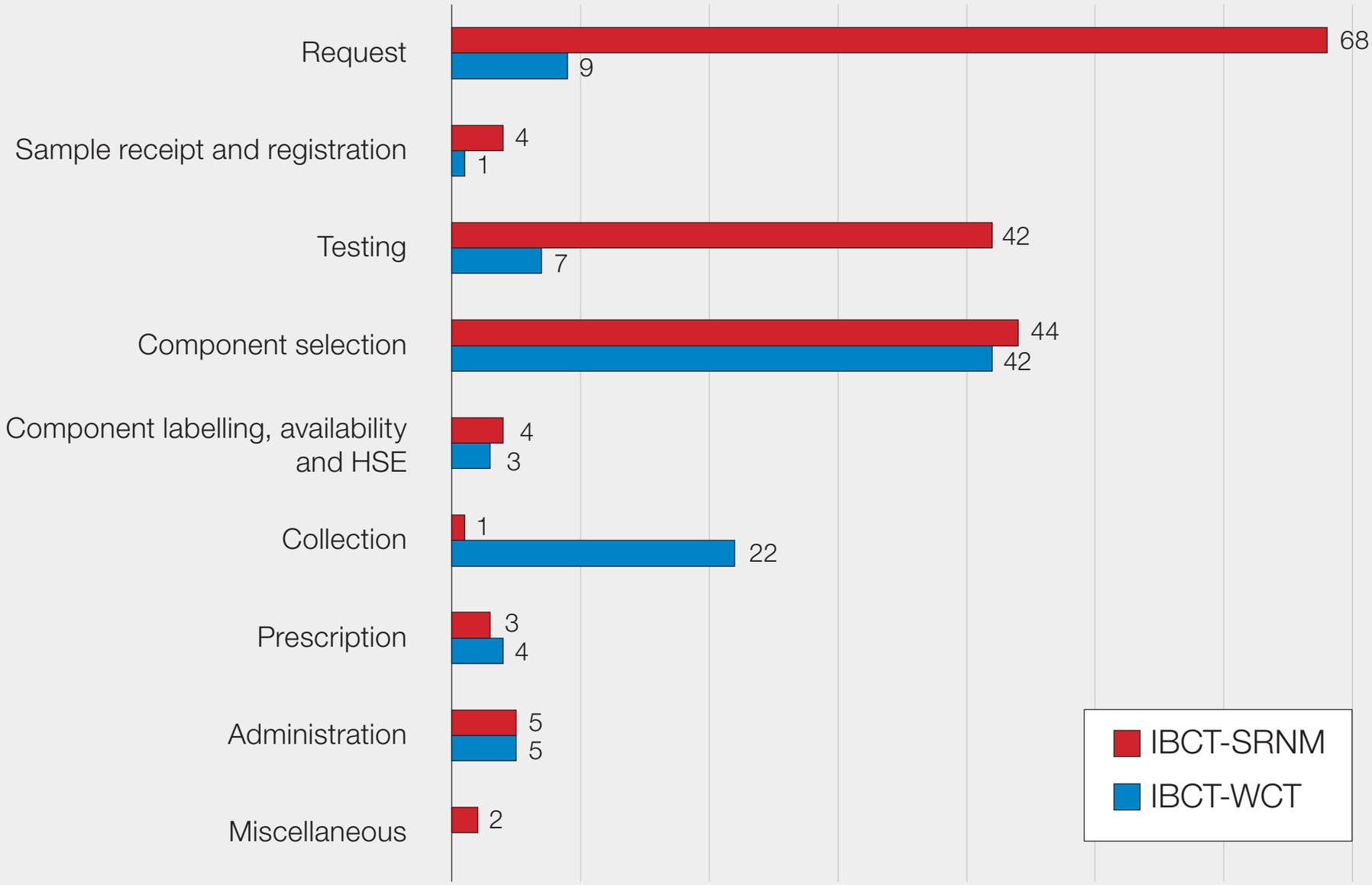


Figure 9.2: Total IBCT errors categorised by the step where the error occurred n=266



IBCT-WCT=incorrect blood component transfused-wrong component transfused; IBCT-SRNM=IBCT-specific requirements not met; HSE=handling and storage errors

Figure 9.3: Categorisation of clinical IBCT-WCT errors by transfusion step where the primary error occurred (n=40)

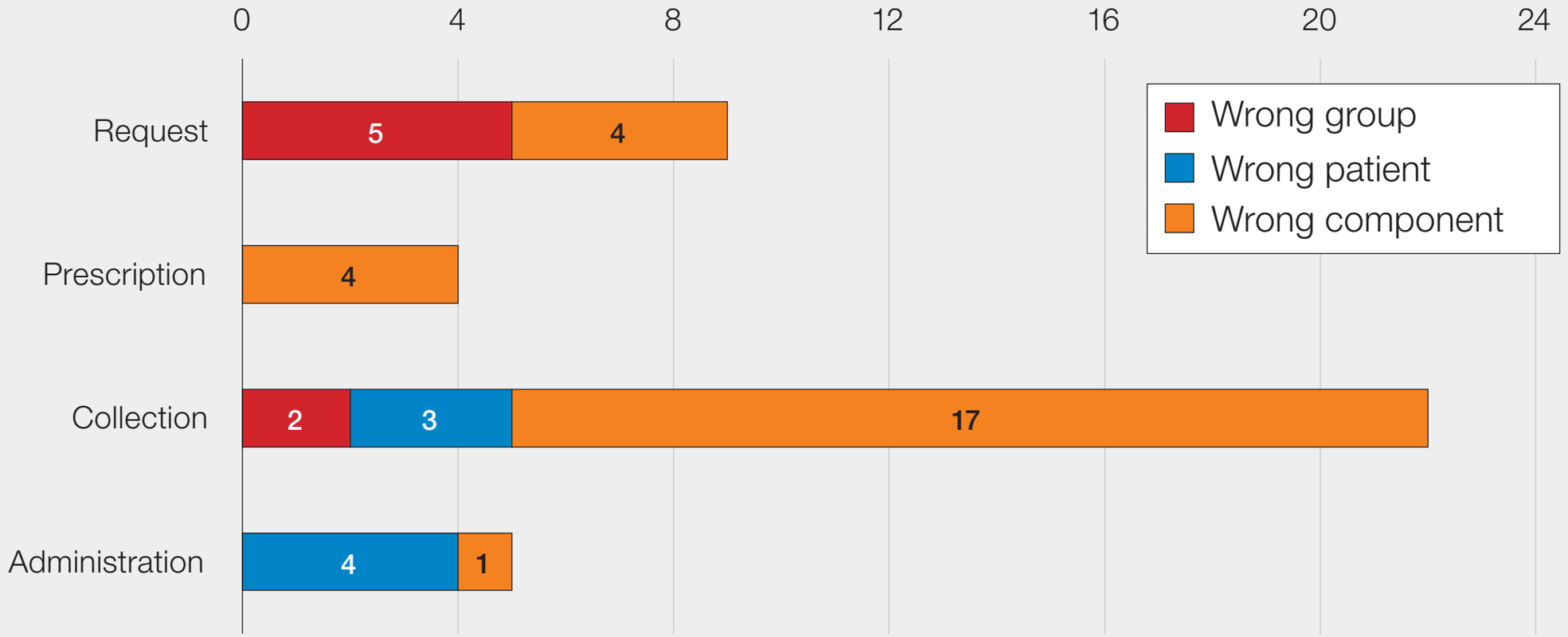
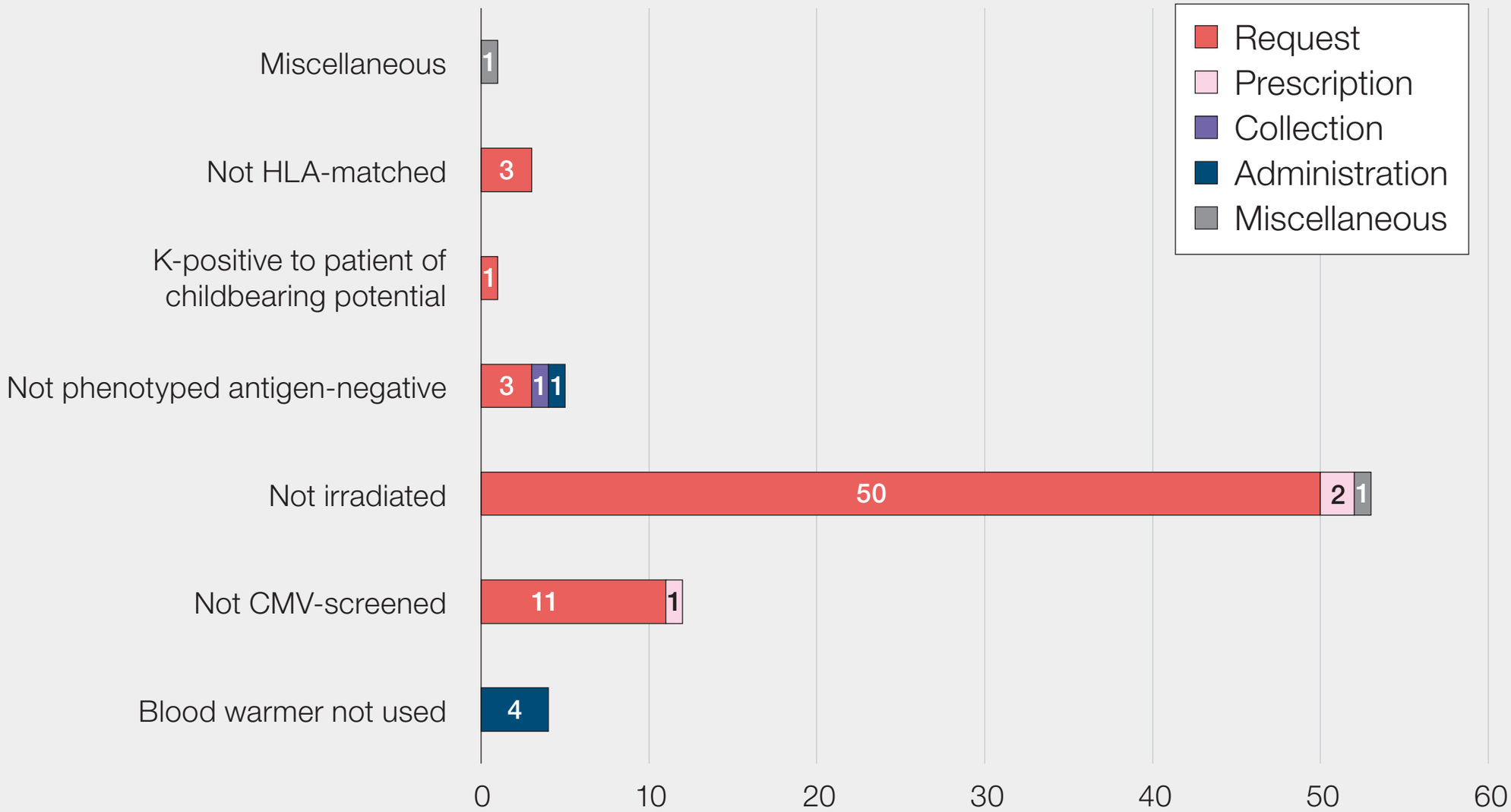


Figure 9.4: Clinical IBCT-SRNM errors and transfusion step where the primary error occurred (n=79)



HLA=human leucocyte antigen; CMV=cytomegalovirus

Figure 9.5: Laboratory WCT errors by transfusion step (n=53)

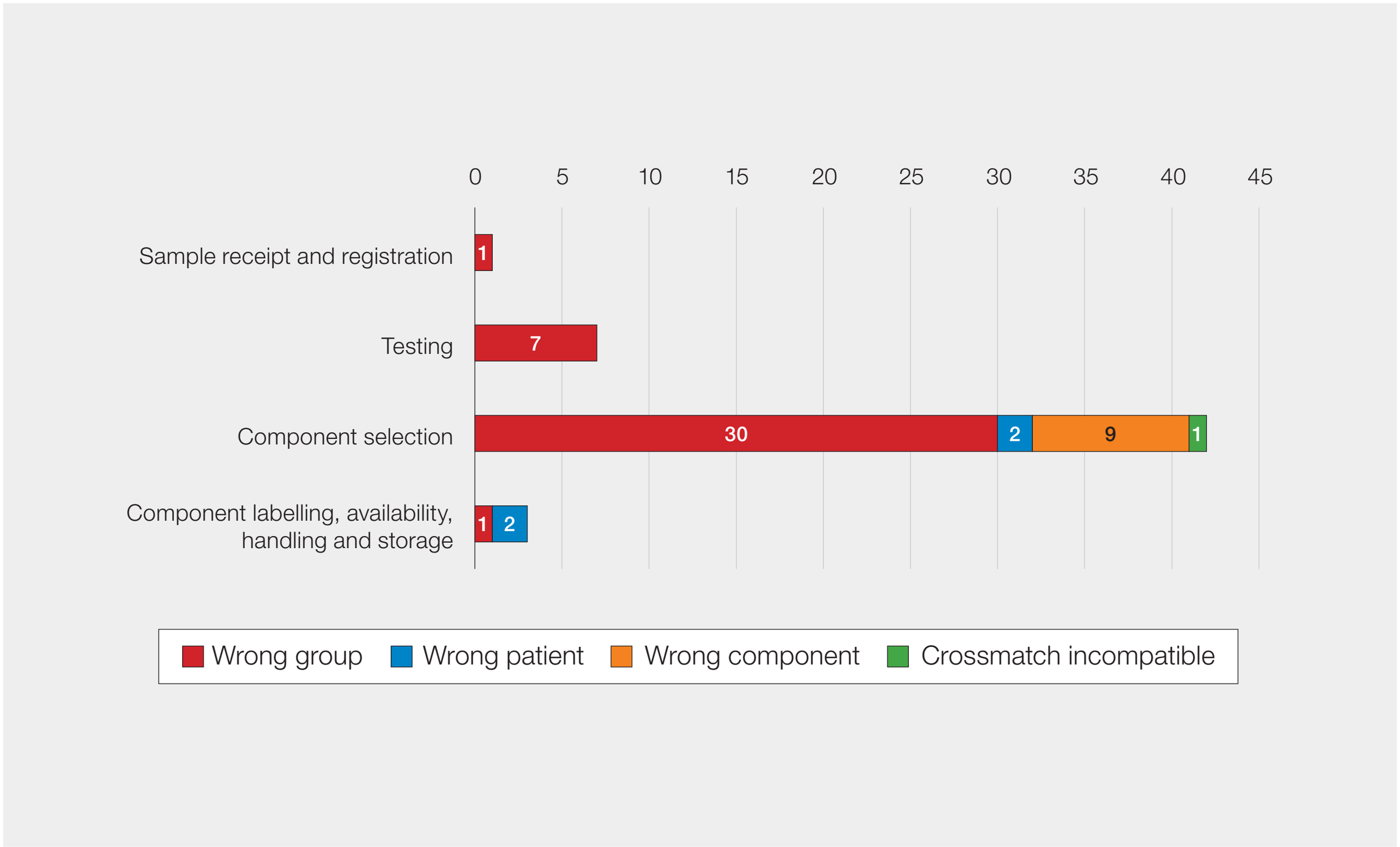


Figure 9.6: Laboratory WCT errors by category (n=53)

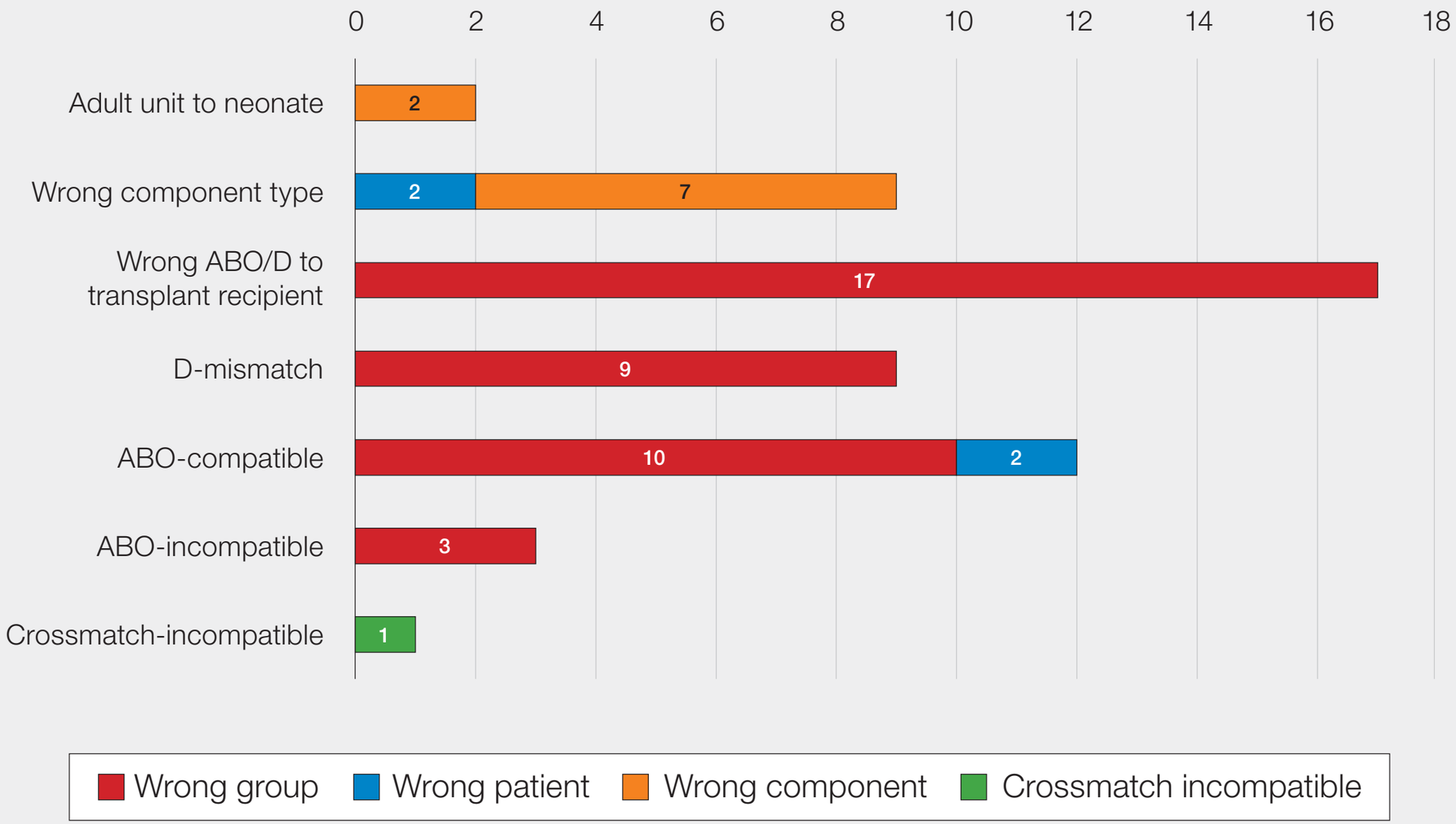
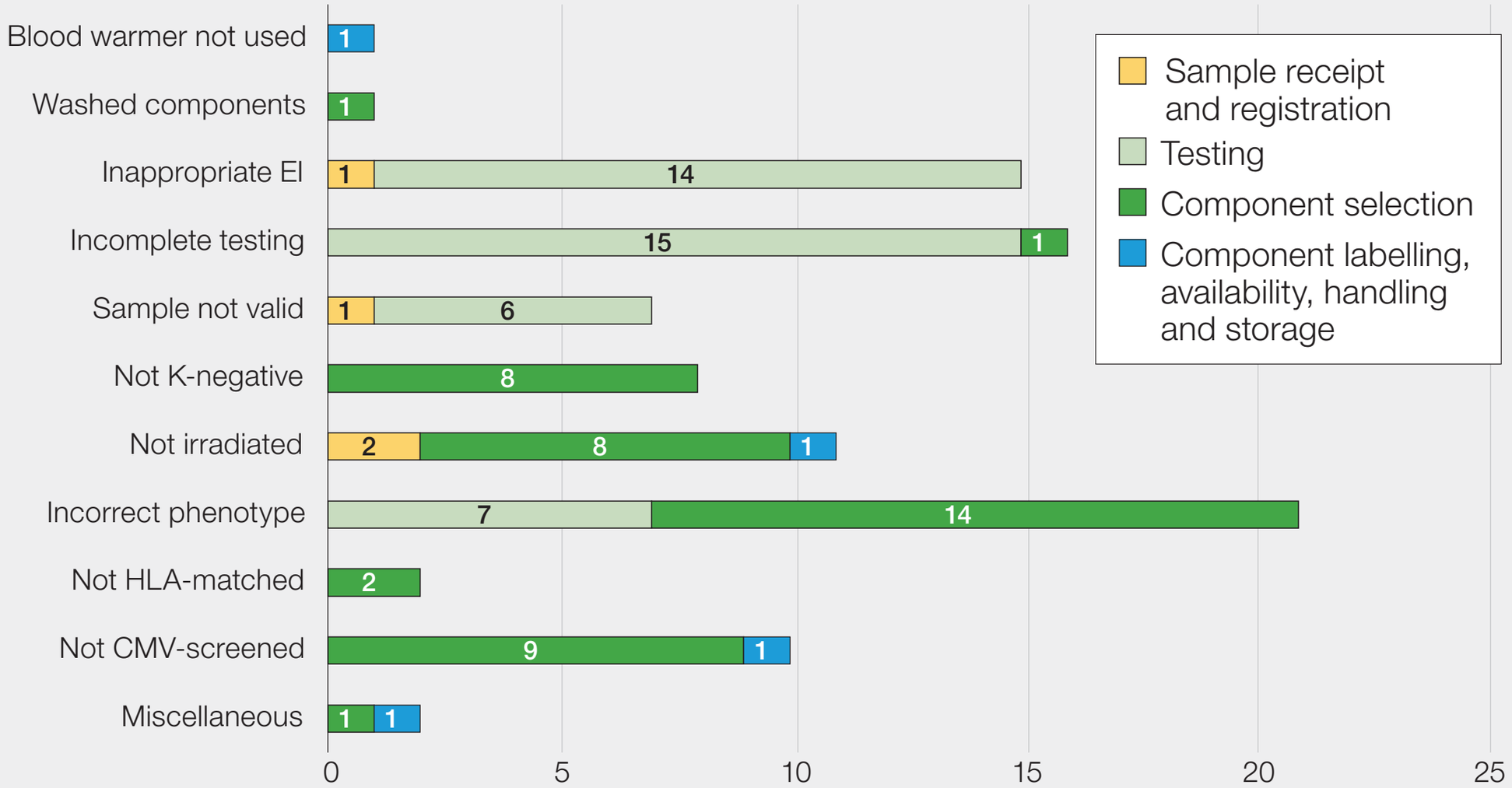


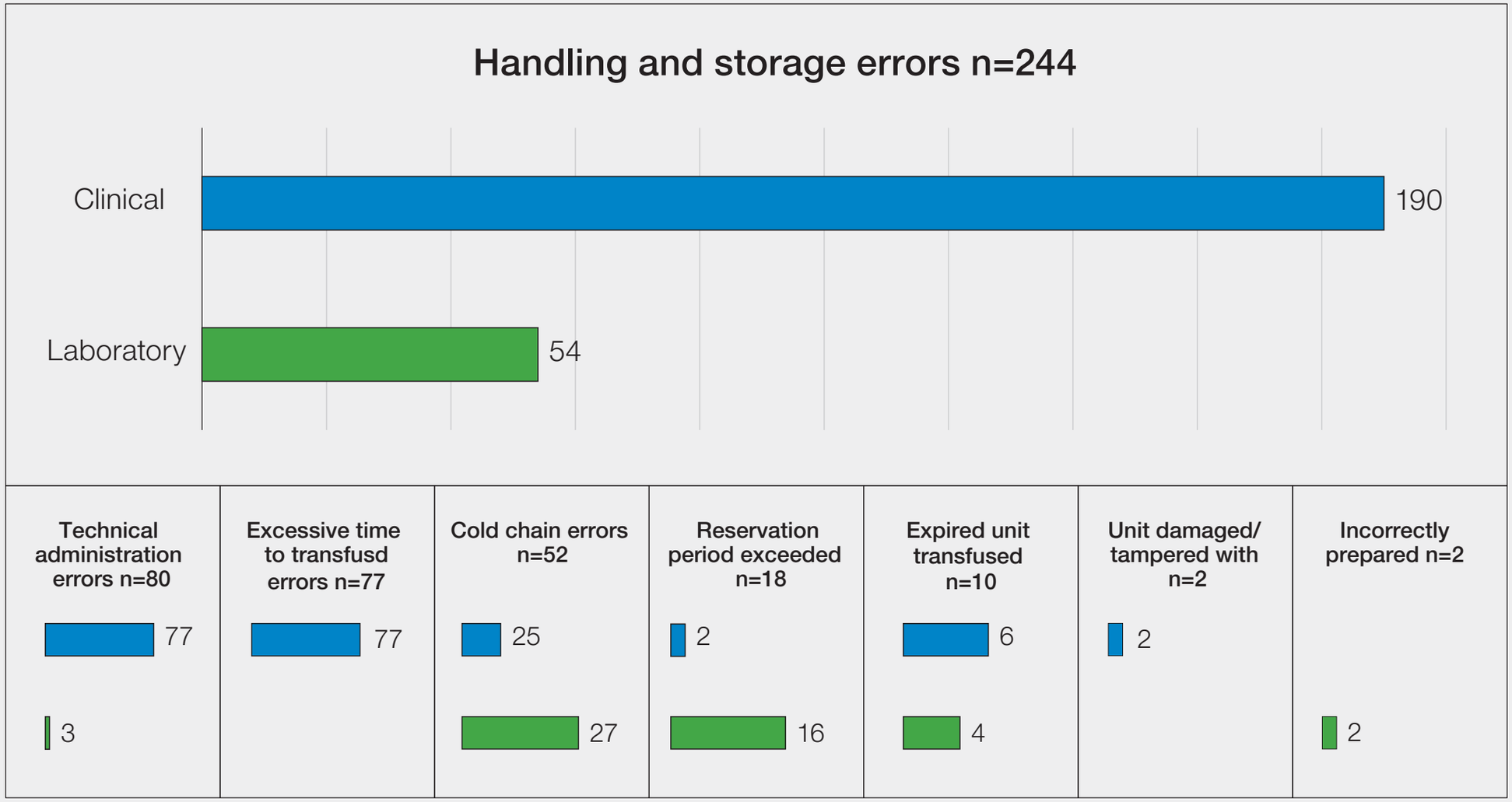
Figure 9.7: Laboratory errors resulting in SRNM (n=94)



Footnote: Where the blood warmer was not used, transfusion laboratory knew patient had cold agglutinins and would normally add a sticker to unit if warmer is needed. Clinical staff should have been informed before collection of unit as they would need to source warmer pre transfusion EI=electronic issue; HLA=human leucocyte antigen; CMV=cytomegalovirus

Incidents have been grouped based on the specific requirement that has not been met

Figure 10.1: Breakdown of 2021 handling and storage error (HSE) reports (n=244)



3 cases were categorised as 'miscellaneous' (1 clinical error, 2 laboratory errors)

Figure 11a.1: Delayed transfusion reports and deaths by year 2011 to 2021 (n=952, deaths n=61)

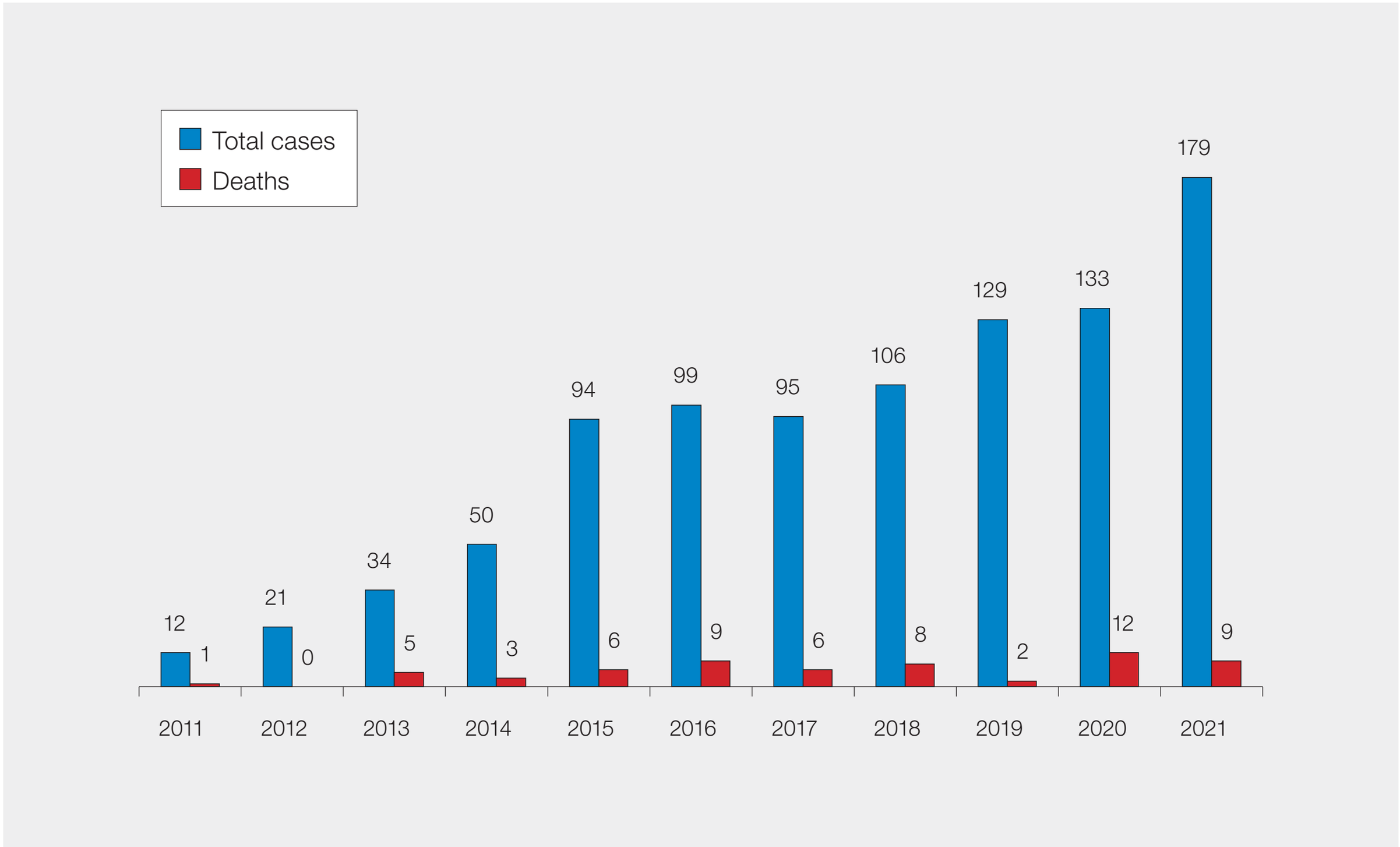
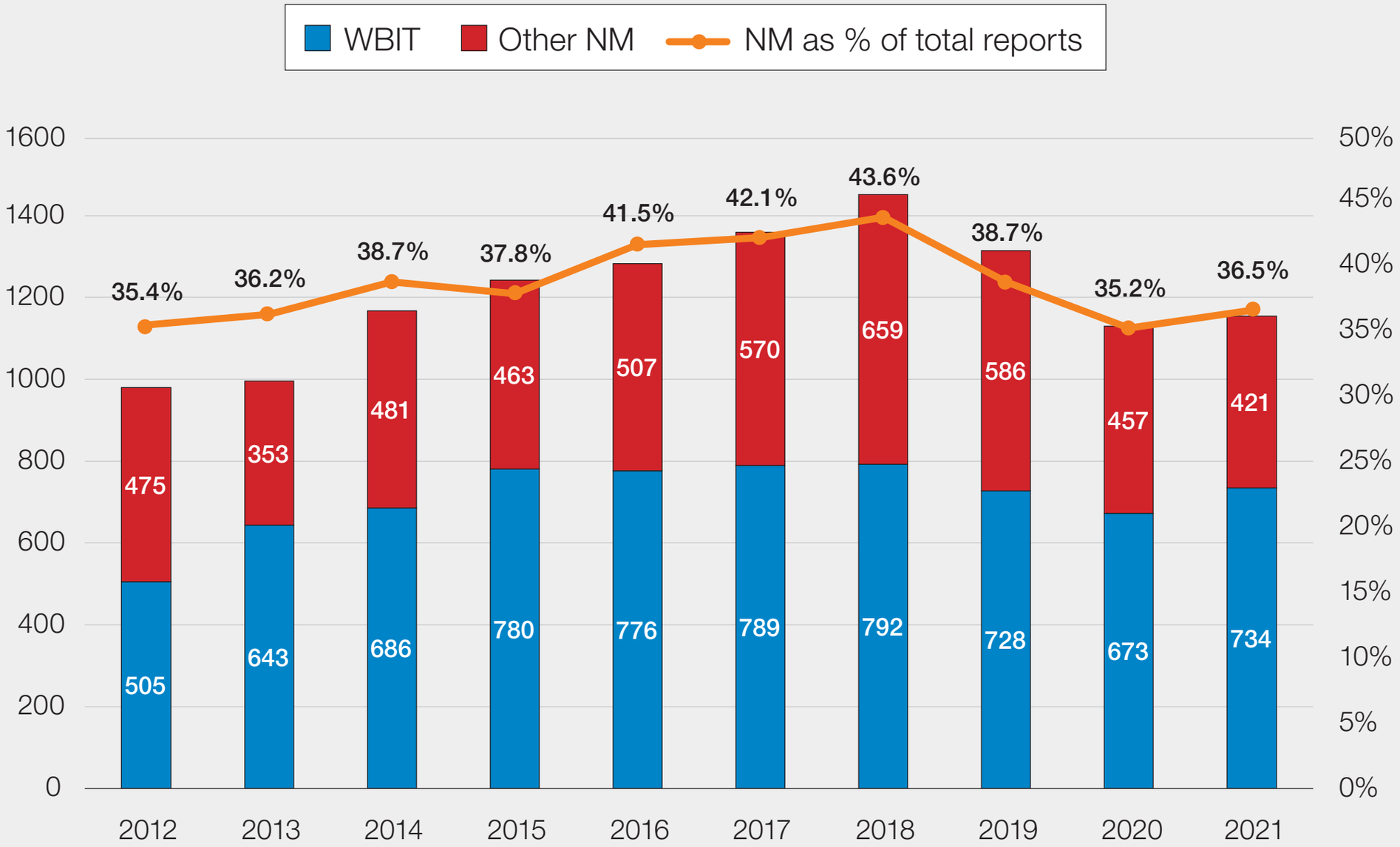


Figure 12.1: A decade of near miss and WBIT reports 2012-2021



WBIT=wrong blood in tube; NM=near miss

Figure 12a.1 The sample circle

All samples must be labelled at the bedside from the wristband details.
Unlabelled blood samples MUST NOT leave the SAMPLE CIRCLE.

Unlabelled blood samples outside the circle should be disposed of.

Figure 12a.2: Primary errors leading to WBIT (n=734)

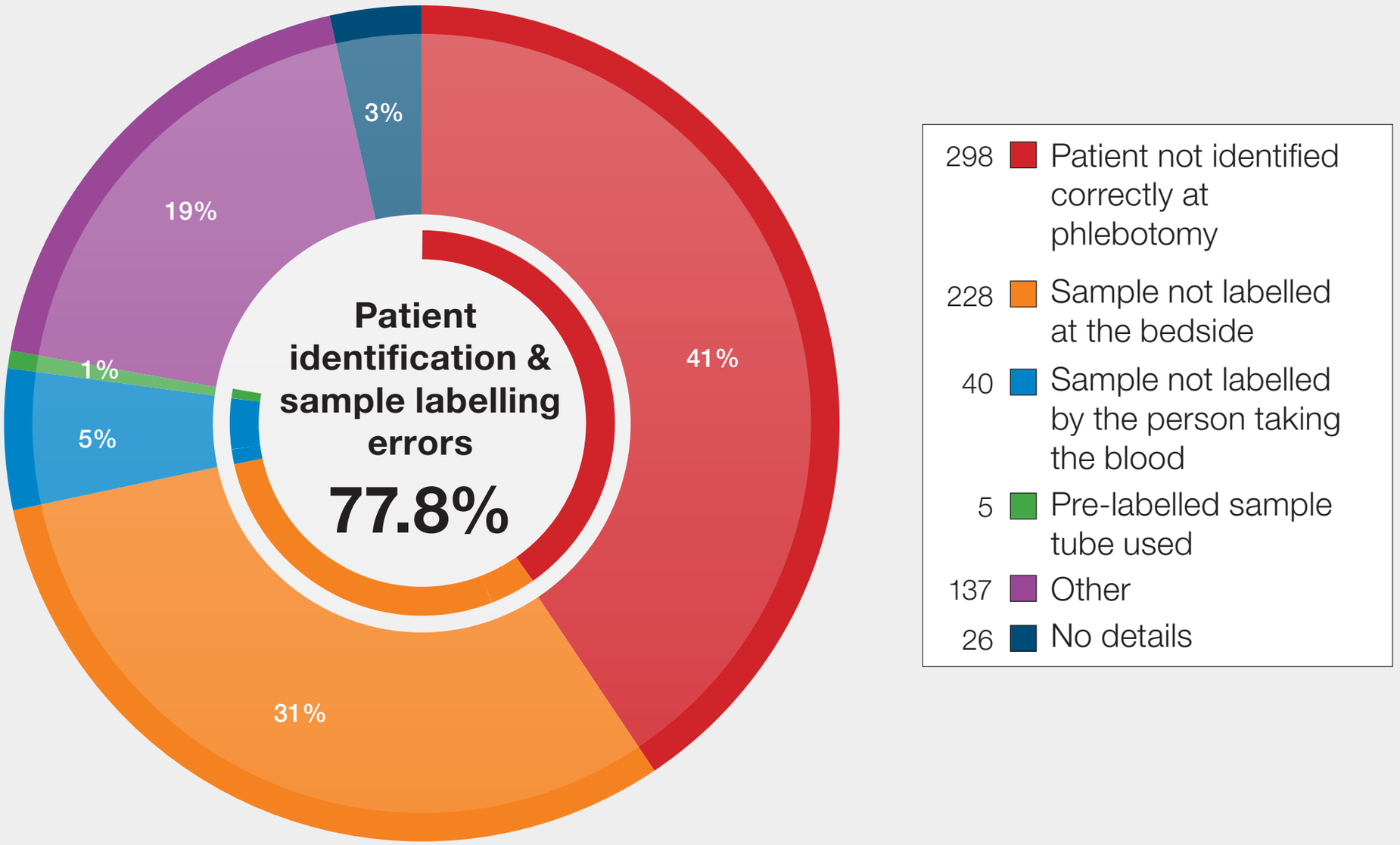
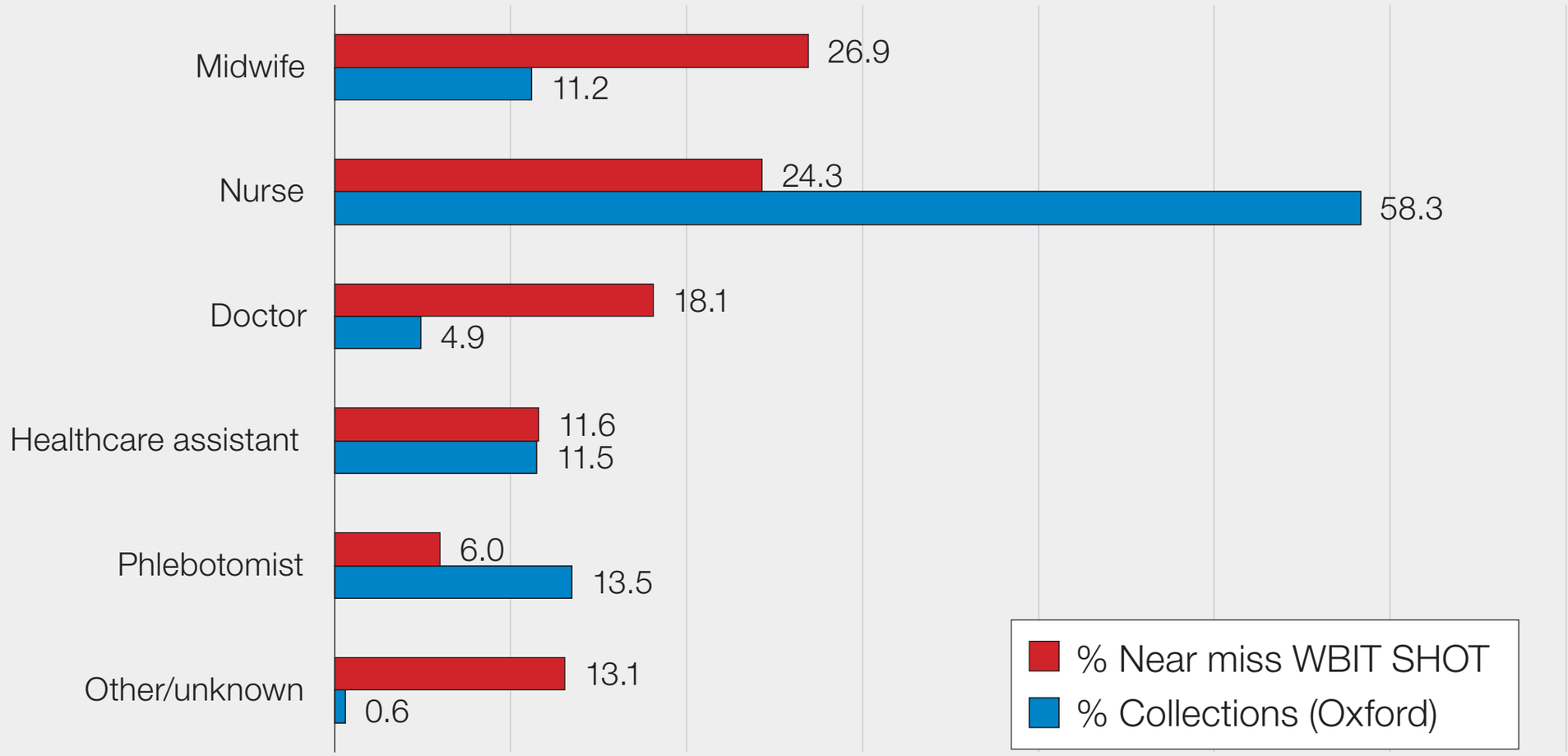


Figure 12a.3: Percentage of different healthcare professionals who took blood samples



WBIT=wrong blood in tube

Figure 13.1: Breakdown of 2021 RBRP reports (n=216)

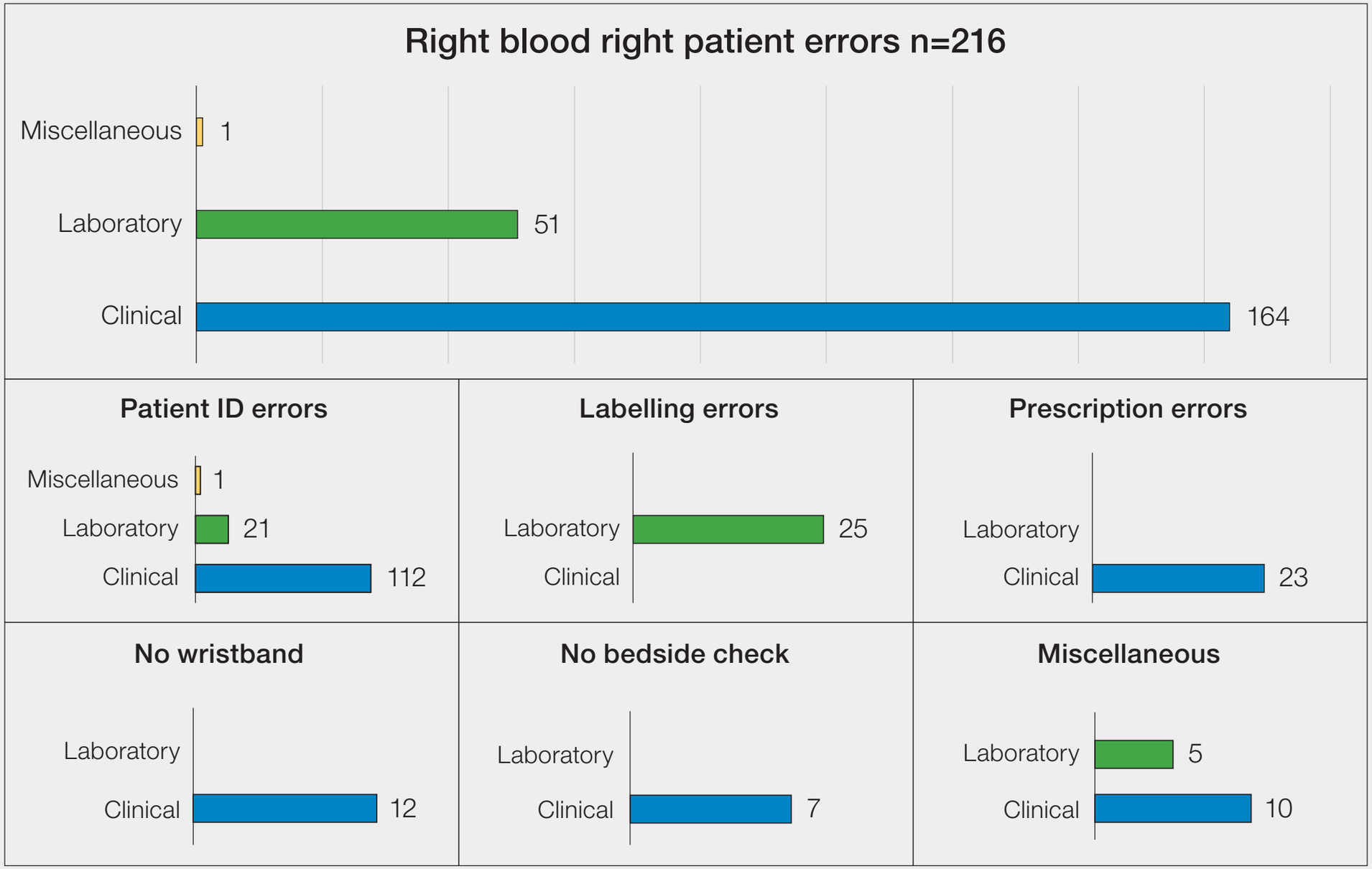
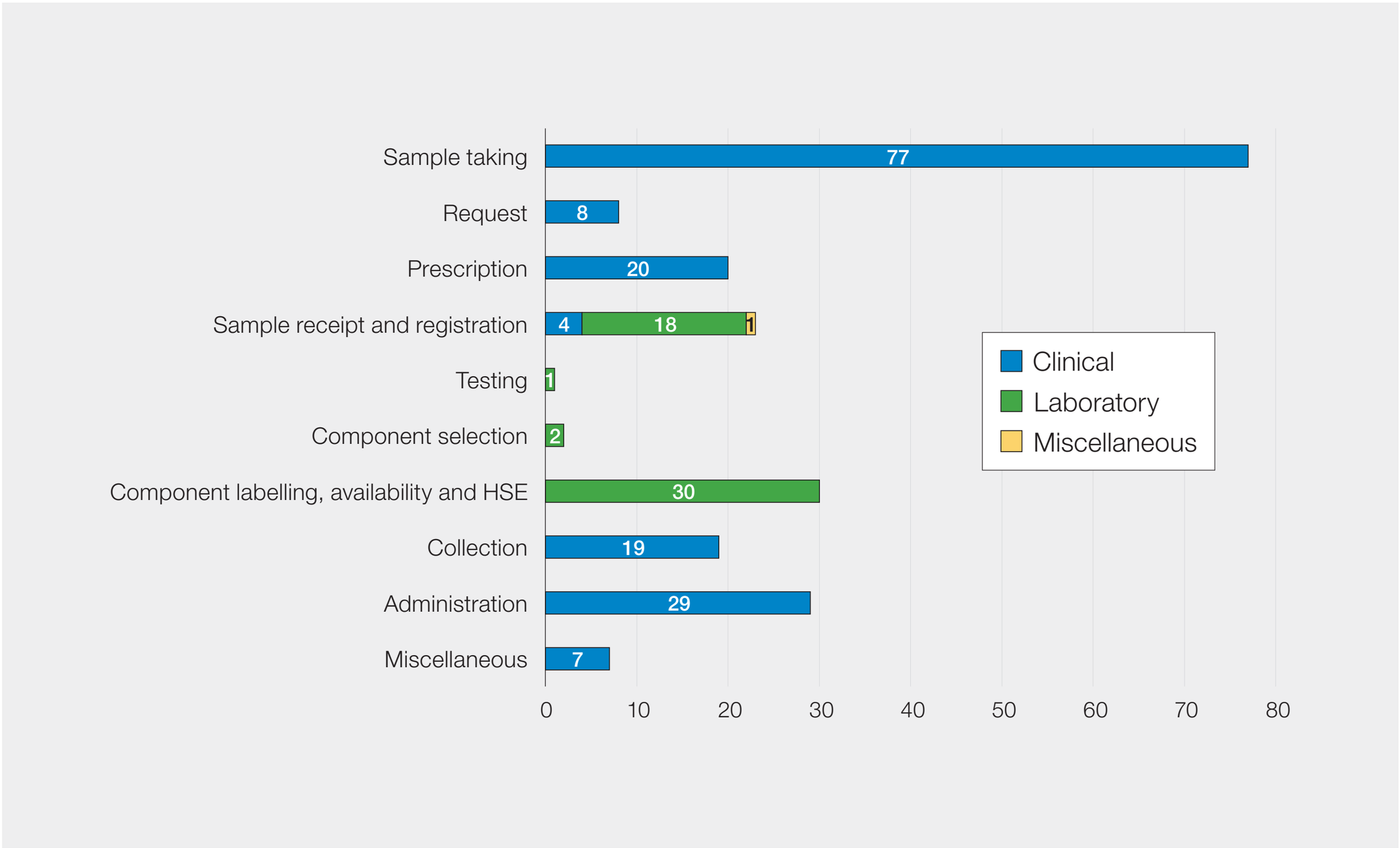


Figure 13.2: RBRP classified by the stage when the primary error occurred in 2021 (n=216)



HSE=handling and storage errors

Figure 13.3: Details of patient identification errors (n=134)

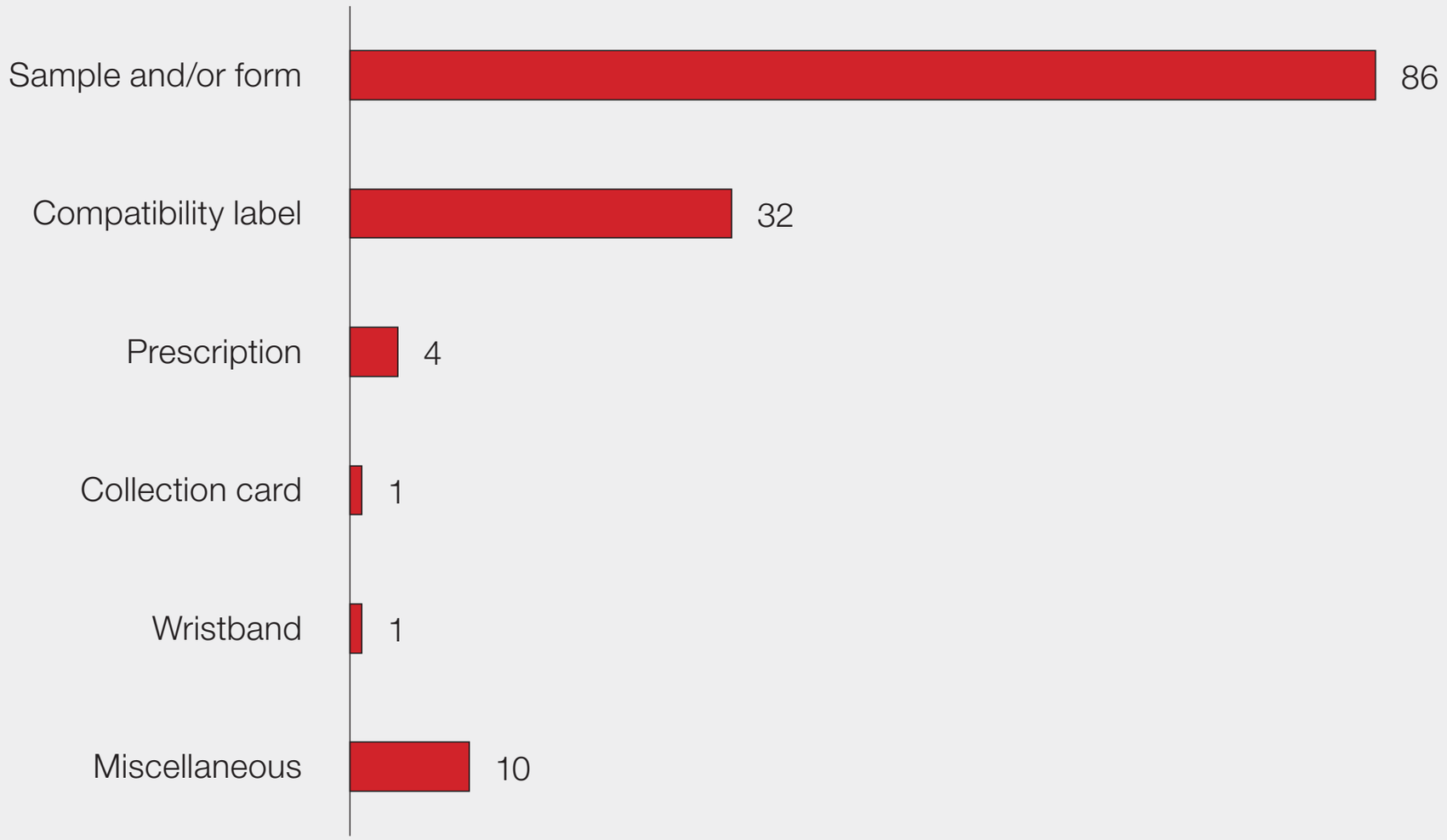


Figure 13.4: The presence of a pre-administration check, and type of check in RBRP errors

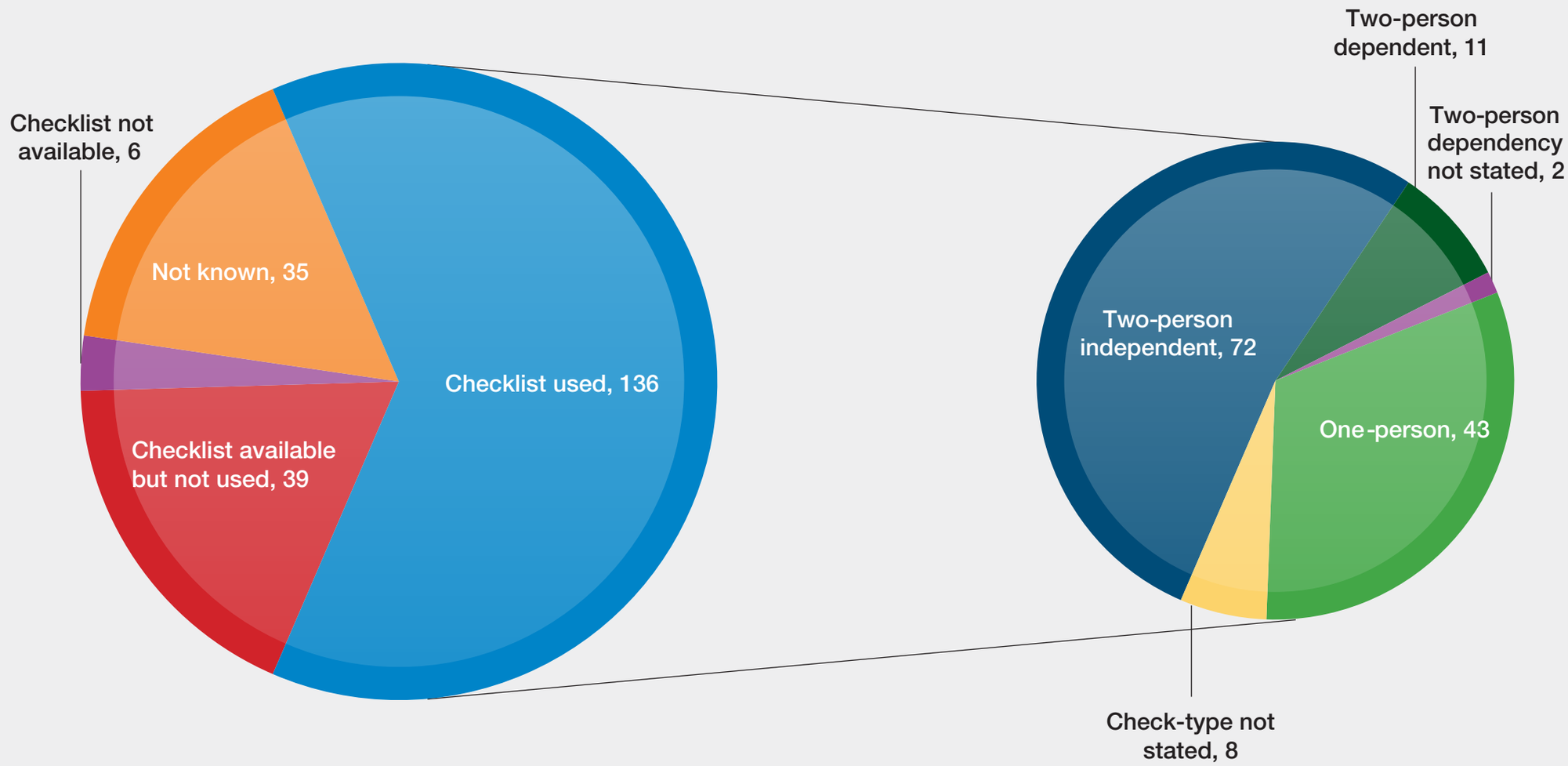
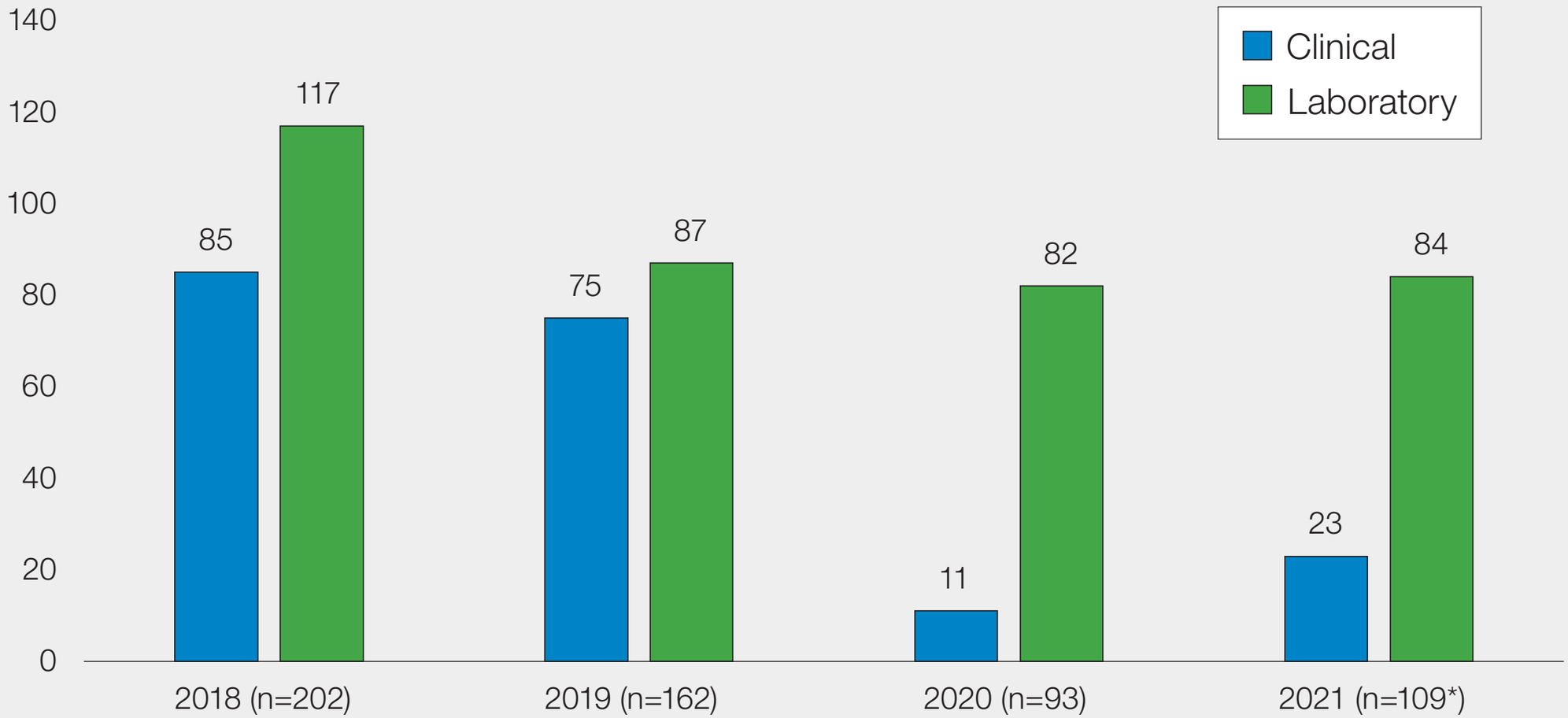


Figure 13.5: RBRP near misses 2018-2021



*Total includes 2 miscellaneous cases not reflected on the figure

Figure 14.1: Laboratory errors (events and NM) related to the 10 steps

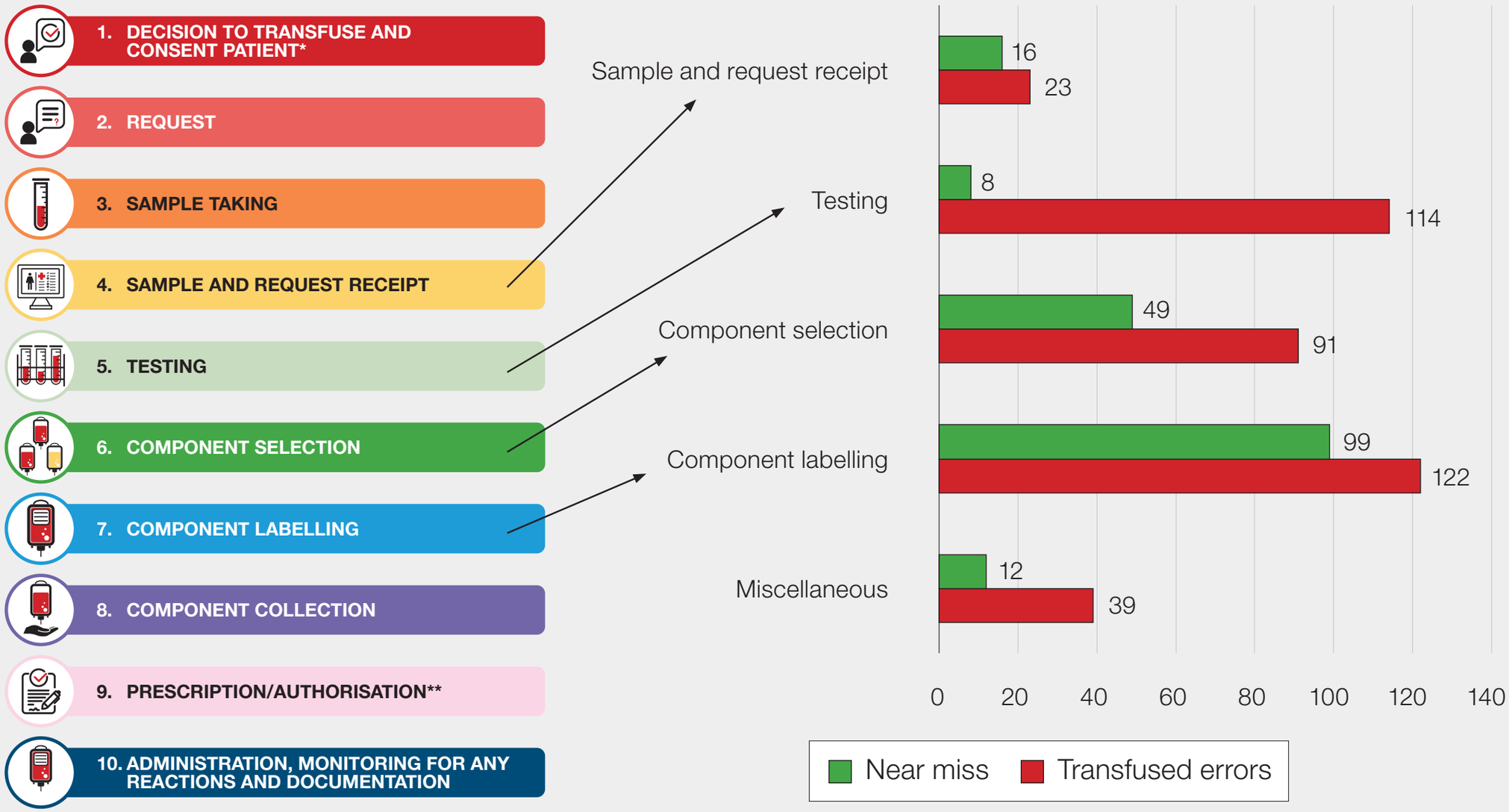


Figure 14.2: Laboratory errors 2017–2021 categorised by step where the error occurred

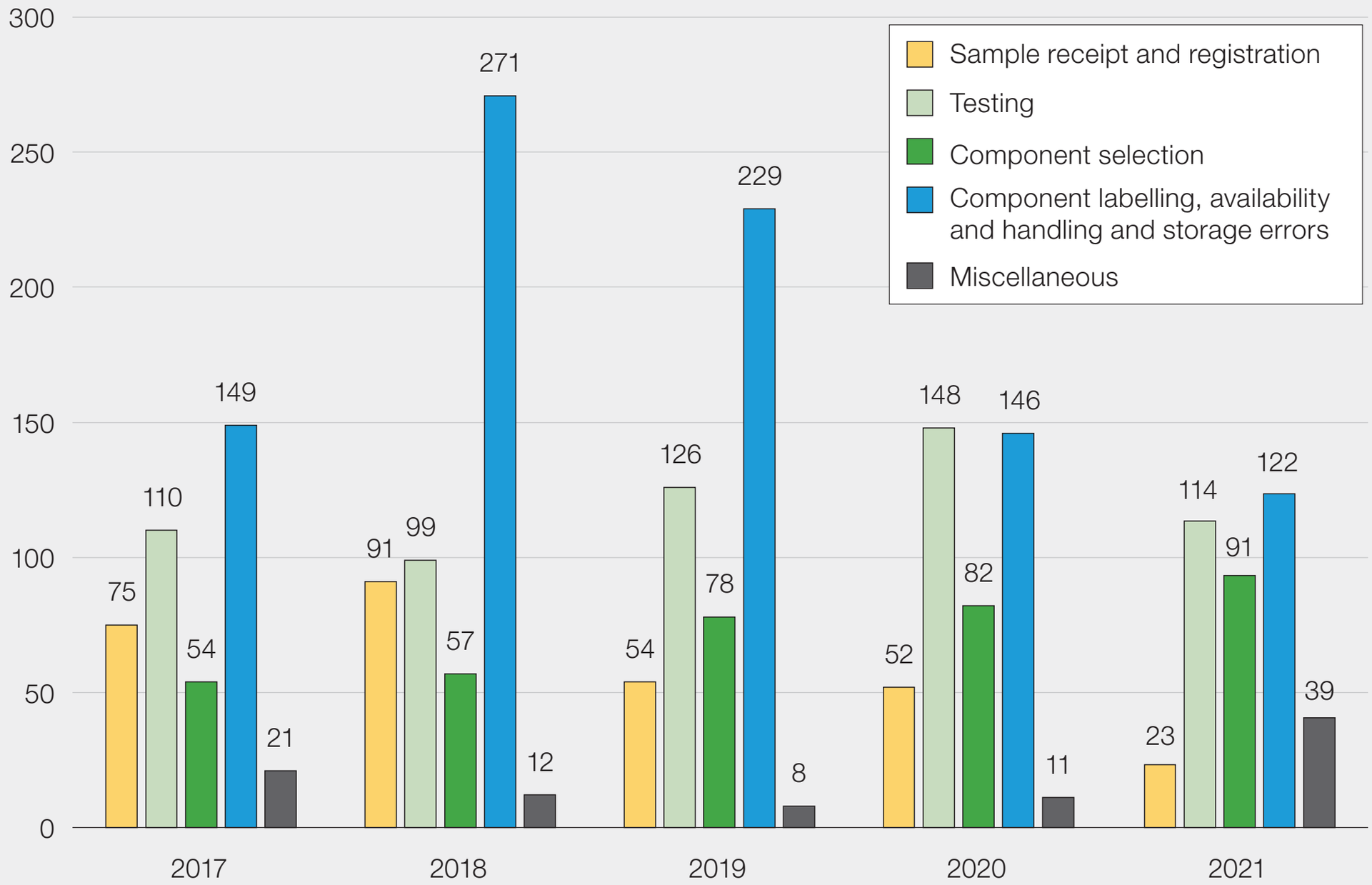
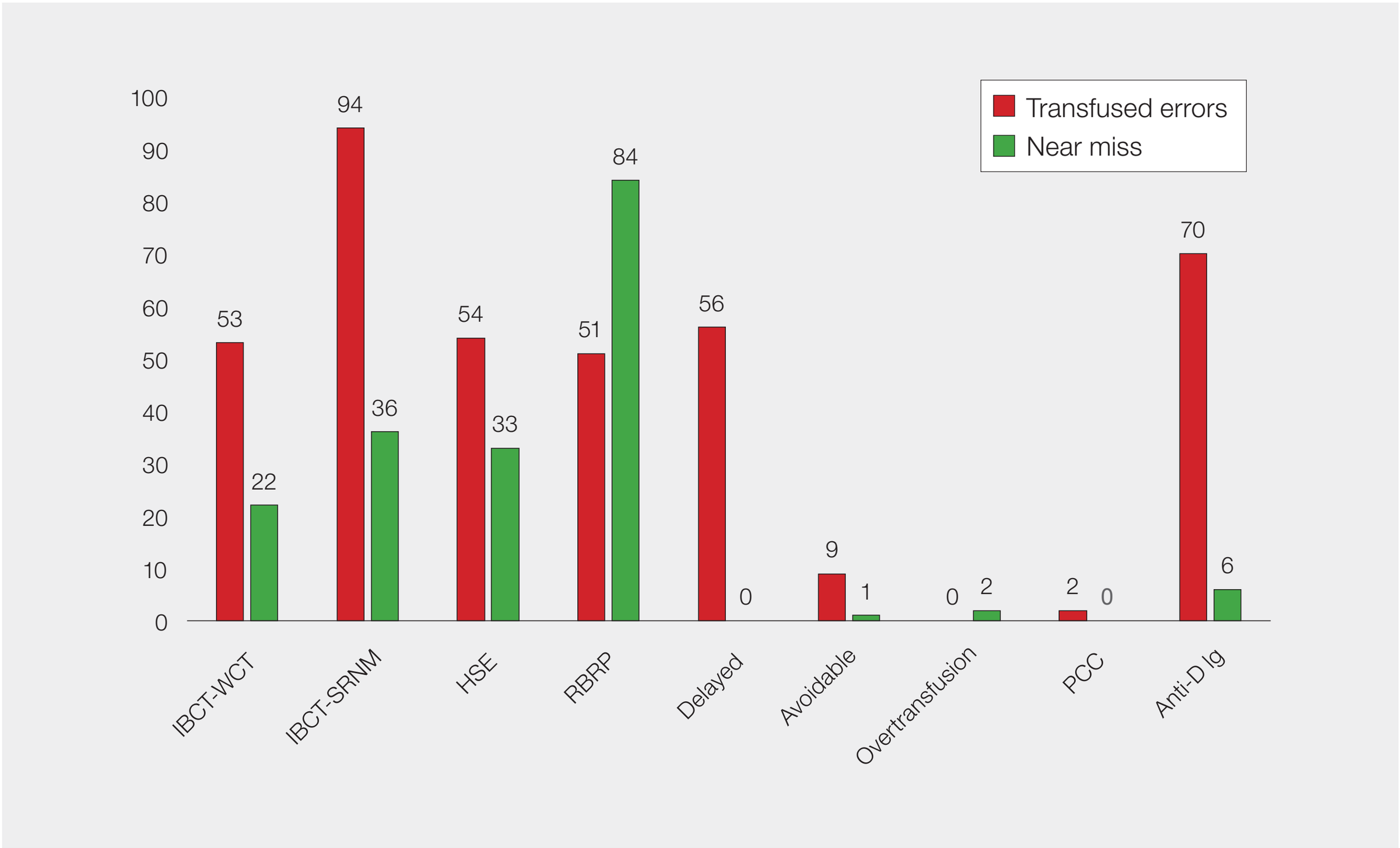
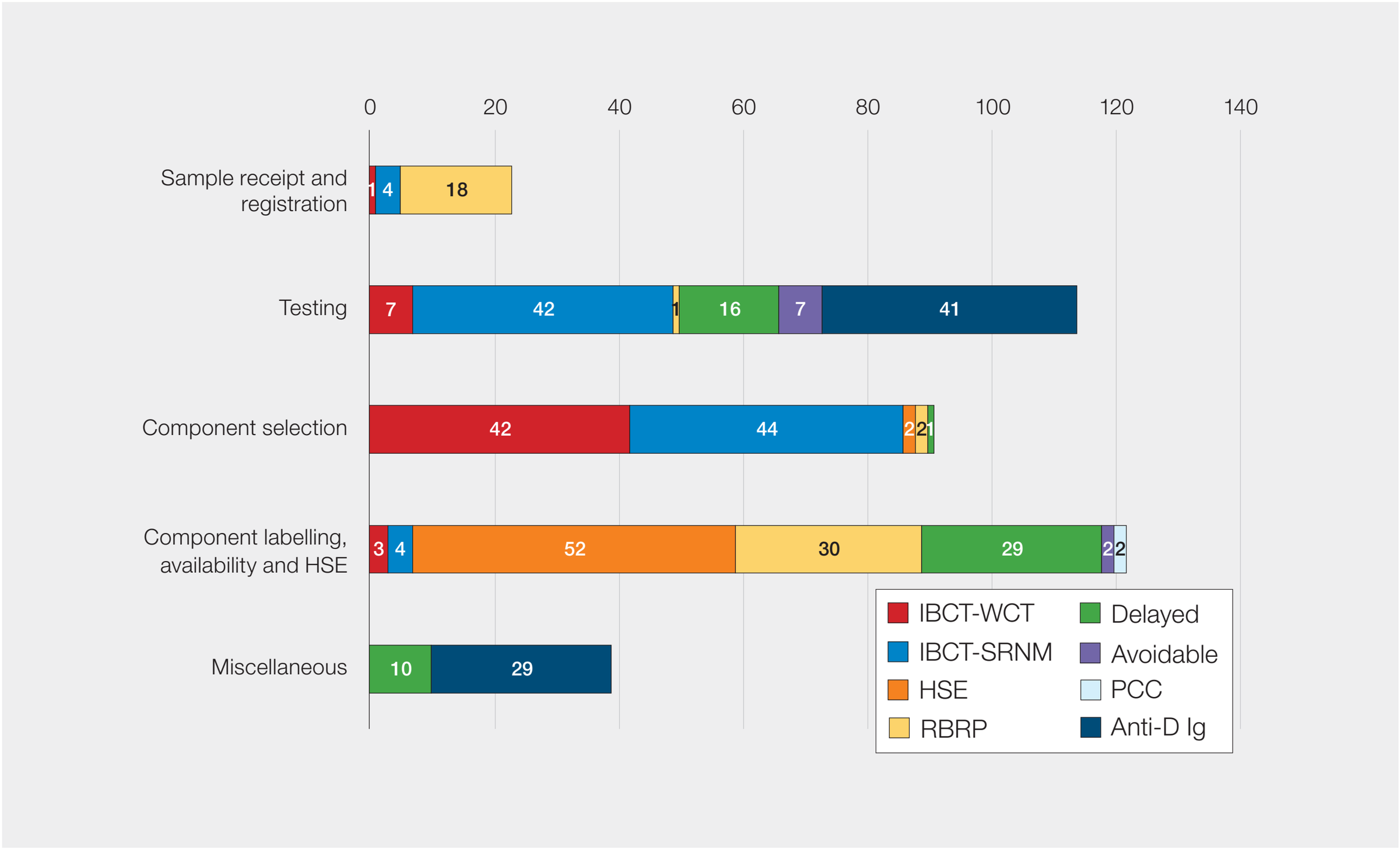


Figure 14.3: Laboratory incidents and near misses by category of outcome (n=573)



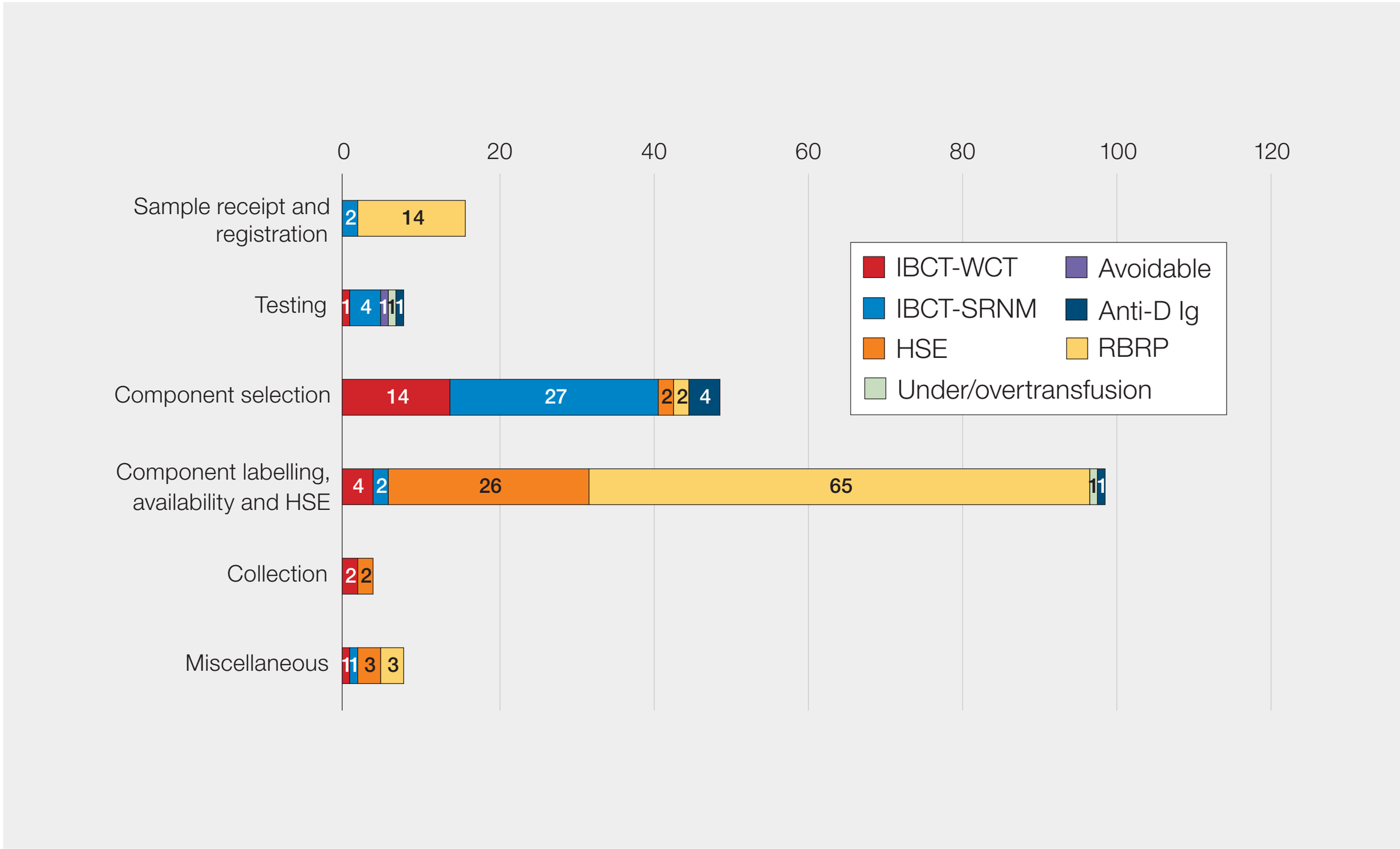
IBCT-WCT=incorrect blood component transfused-wrong component transfused; IBCT-SRNM=IBCT-specific requirements not met; HSE=handling and storage errors; RBRP=right blood right patient; PCC=prothrombin complex concentrate; Ig=immunoglobulin

Figure 14.4: SHOT laboratory data showing at which stage in the transfusion process the primary error occurred (n=389)–



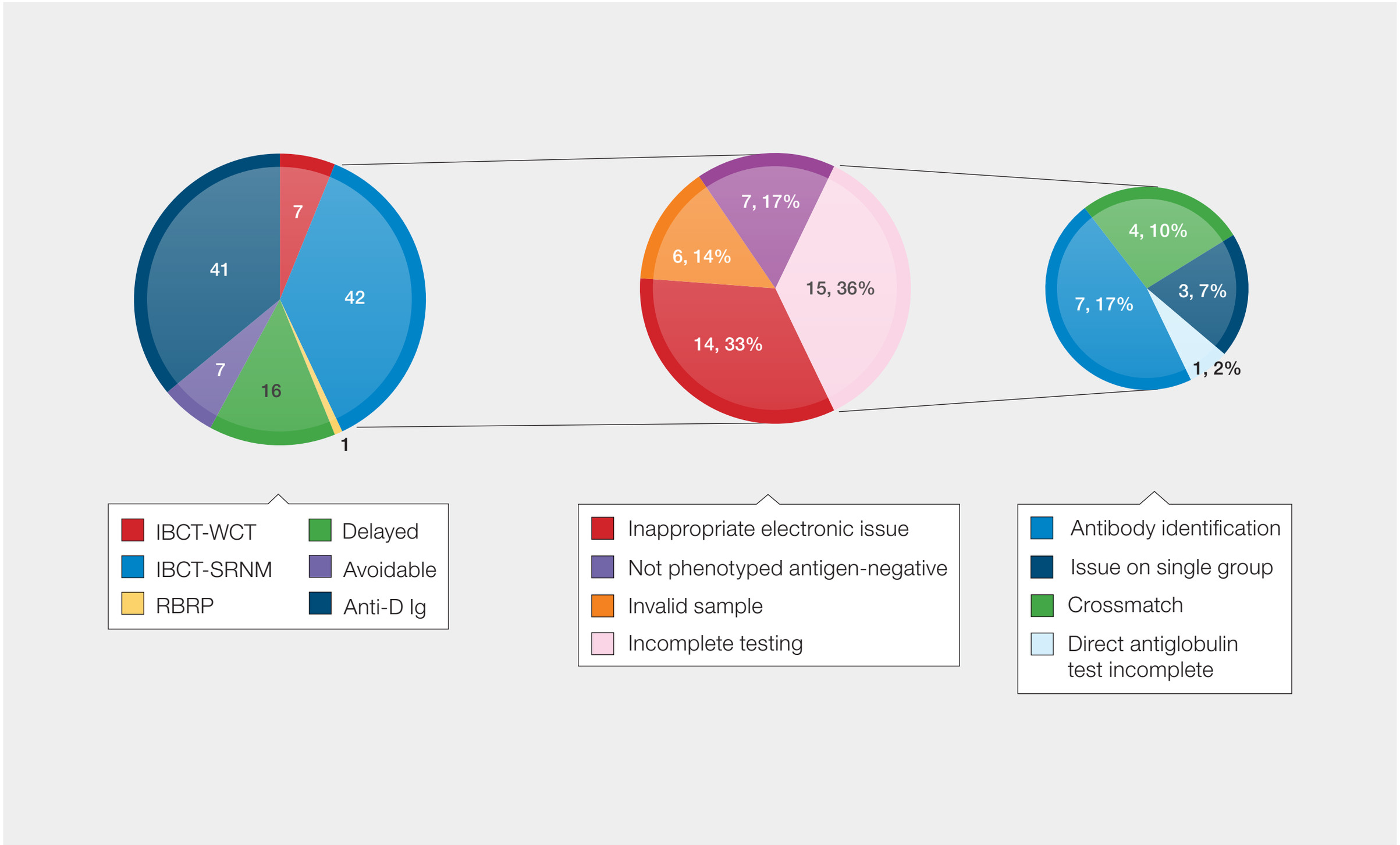
IBCT-WCT=incorrect blood component transfused-wrong component transfused; IBCT-SRNM=IBCT-specific requirements not met; HSE=handling and storage errors; RBRP=right blood right patient; Ig=immunoglobulin

Figure 14.5: SHOT near miss laboratory errors showing at which stage in the transfusion process the primary error occurred with outcome n=184



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 concentrate; Ig=immunoglobulin

Figure 14.6: Laboratory testing errors by reporting category (n=114) and SRNM testing errors by subcategory (n=42)



IBCT-WCT=incorrect blood component transfused-wrong component transfused; IBCT-SRNM=IBCT-specific requirements not met; RBRP=right blood right patient; Ig=immunoglobulin

PAUSE:

P

PATIENT IDENTIFICATION

Are all the details correct and match on sample/form/label/LIMS?

A

AUTHORISED

Have all required tests been completed and authorised,
including antibody investigation?

U

UNIT NUMBER

Does the unit number match the compatibility label?

S

SELECTION OF COMPONENT

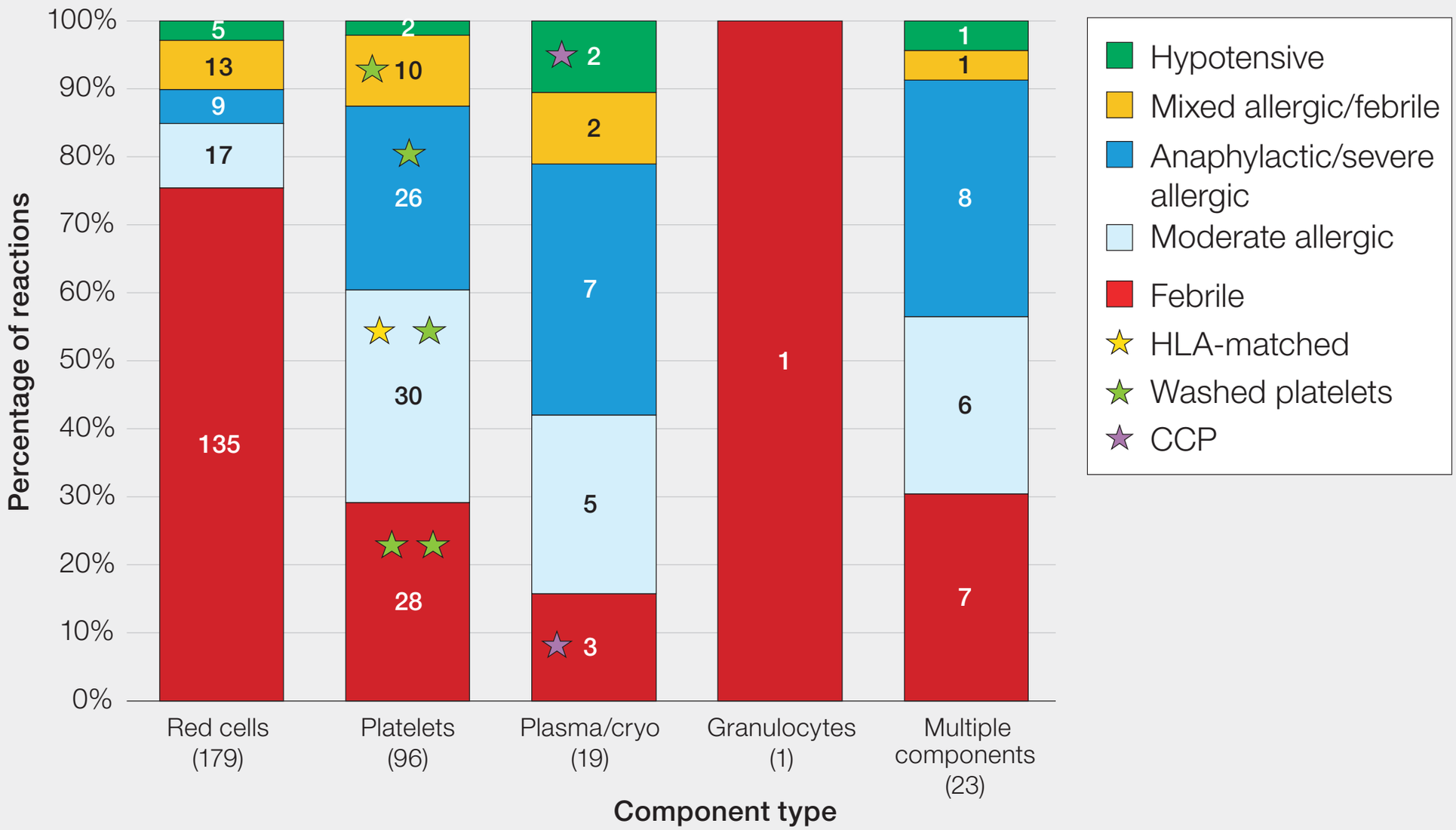
Is it as requested? Is it ABO AND D compatible?
Does it meet all specific requirements?

E

EXPIRY

Will the unit expire before required date/time?
Will sample expire before required date/time?

Figure 16.1: Reactions by component type



HLA=human leucocyte antigen; CCP=COVID-19 convalescent plasma; cryo=cryoprecipitate

Figure 16.2: Incidence of reactions as a percentage of platelet units issued

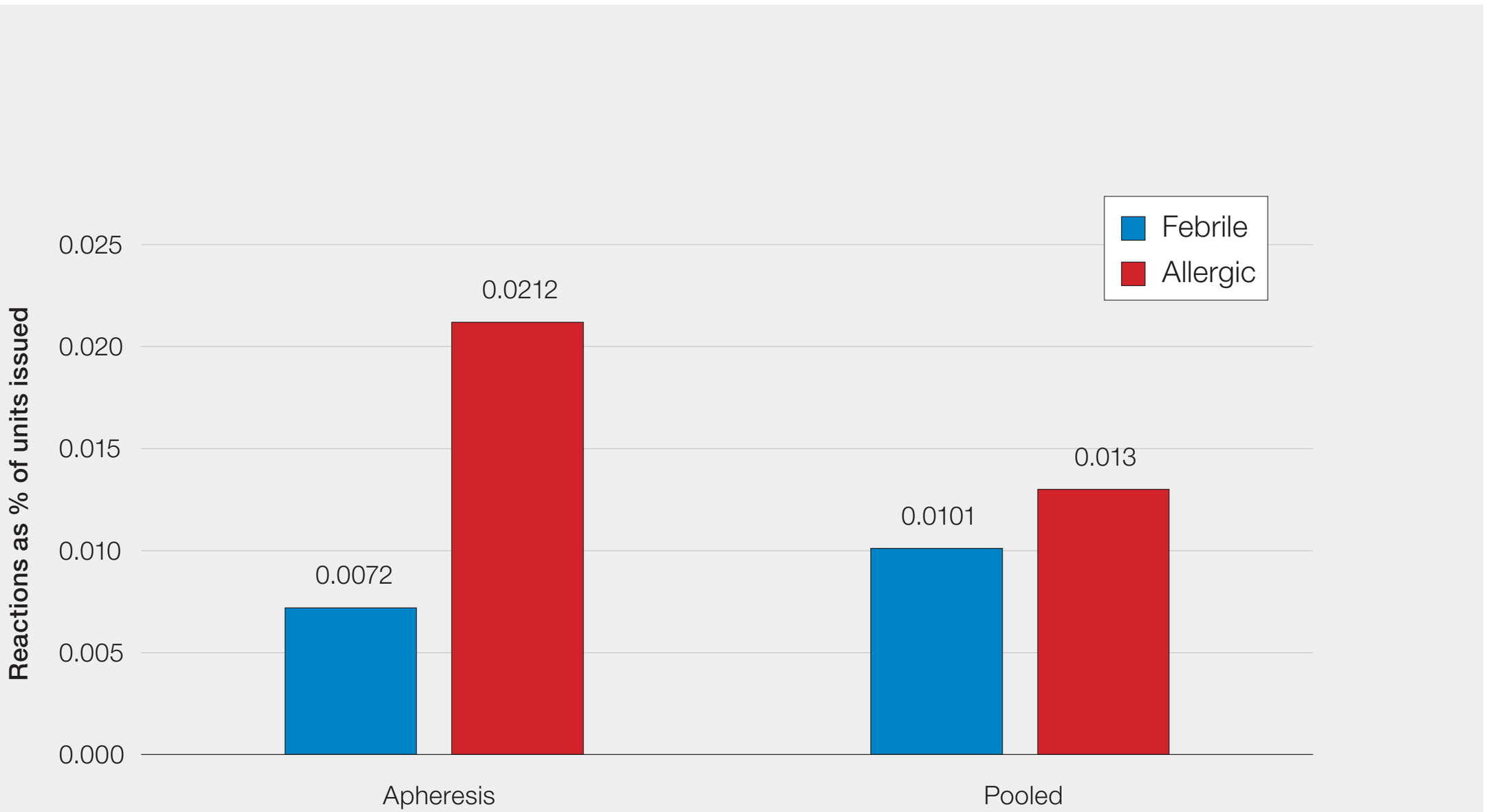


Figure 16.3: Algorithm for classification and management of febrile and allergic reactions

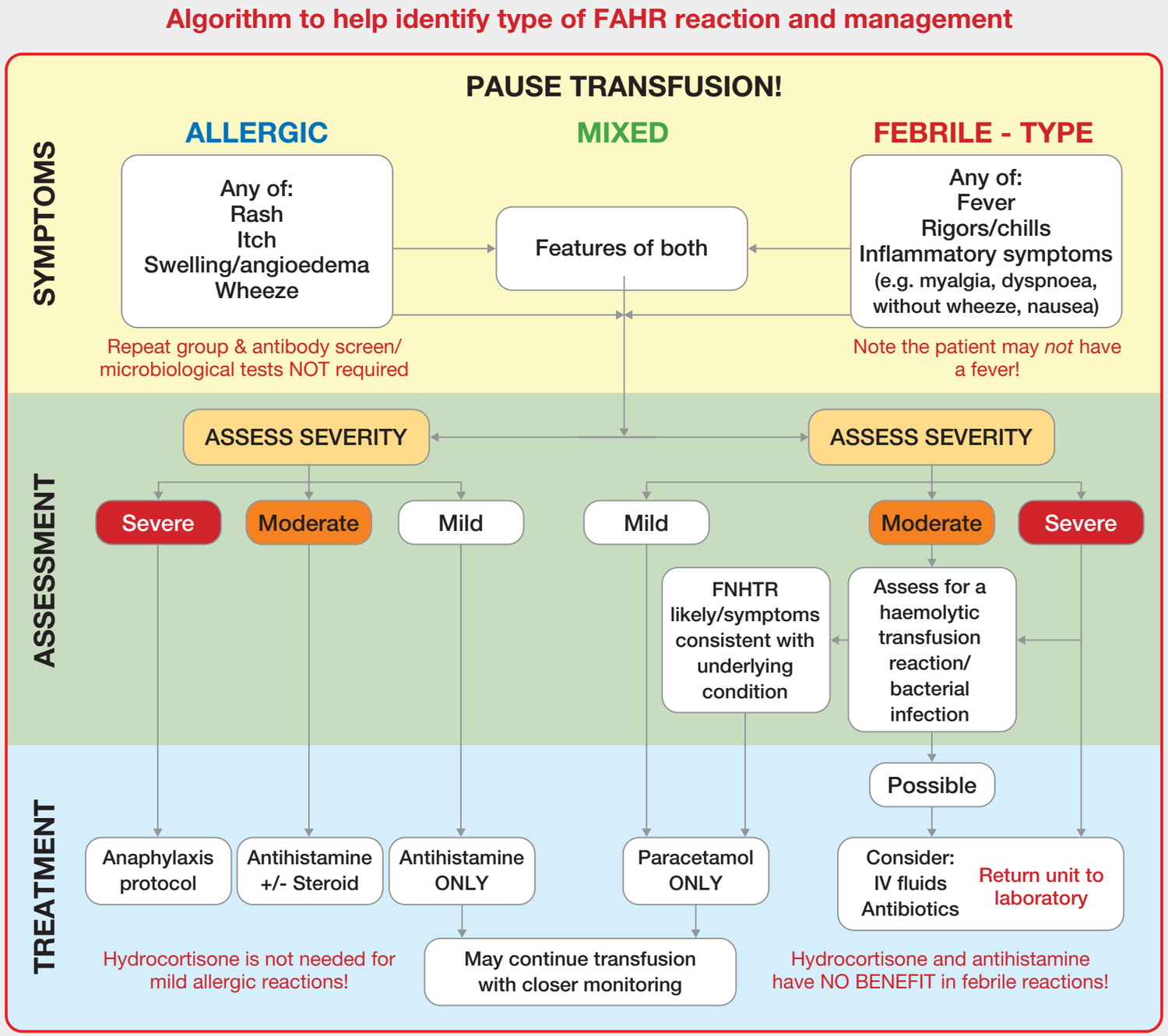
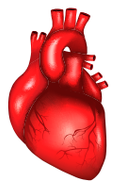


Figure 17a.1: TACO pre-transfusion checklist

TACO Checklist	Patient Risk Assessment	TICK
	Does the patient have a diagnosis of 'heart failure' congestive cardiac failure (CCF), severe aortic stenosis, or moderate to severe left ventricular dysfunction?	
	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 hypoalbuminaemia?	
	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 can be investigated, treated or resolved?		

If Proceeding with Transfusion: Assign Actions	TICK
Body weight dosing for red cells	
Transfuse a single unit (red cells) and review symptoms	
Measure fluid balance	
Prophylactic diuretic prescribed	
Monitor vital signs closely, including oxygen saturation	

Name (PRINT):	
Role:	
Date:	**Time (24hr):**
Signature:	

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.

TACO=transfusion-associated circulatory overload

Figure 17a.2: Number of surveillance criteria versus number of accepted TACO cases

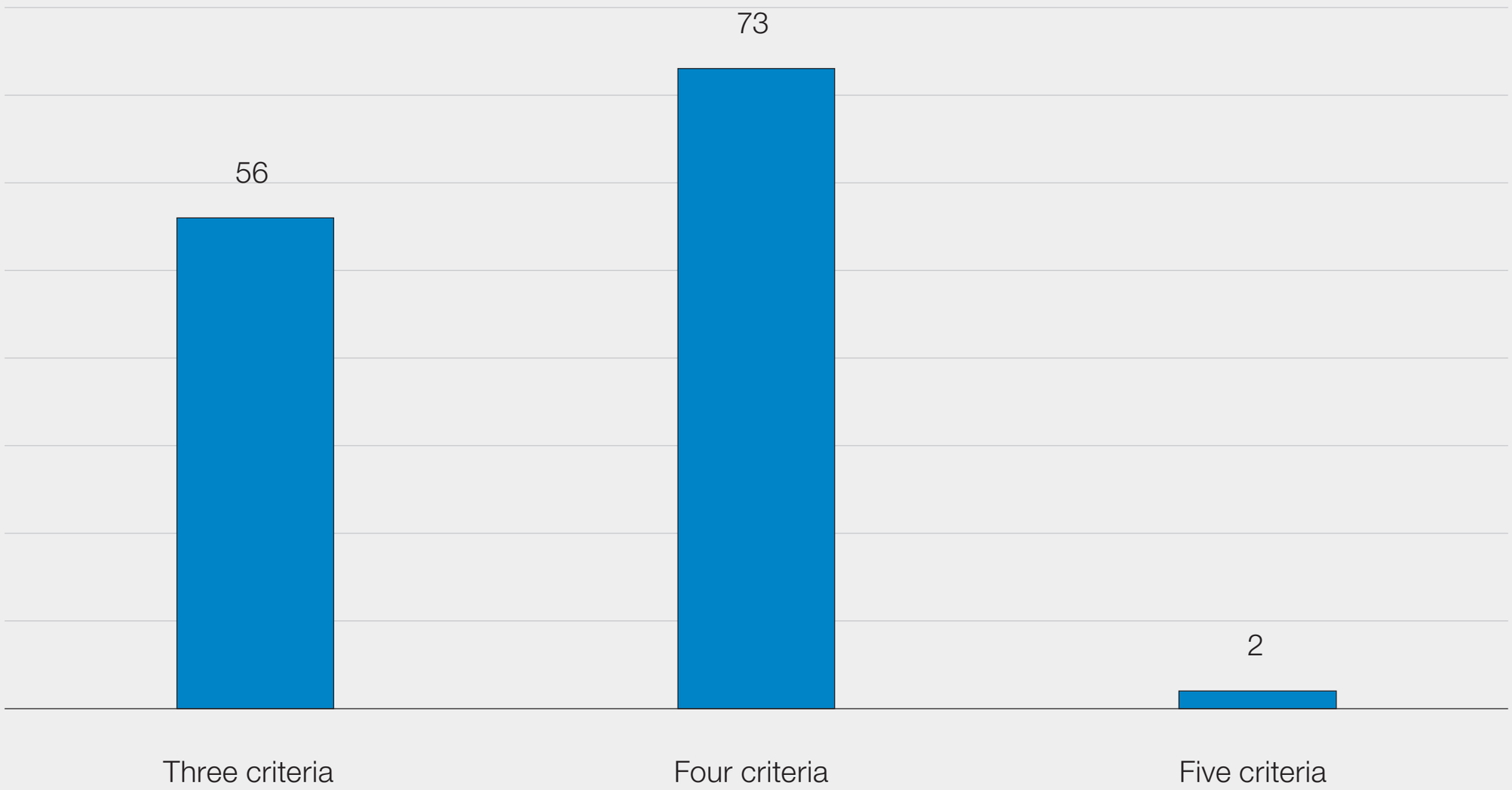
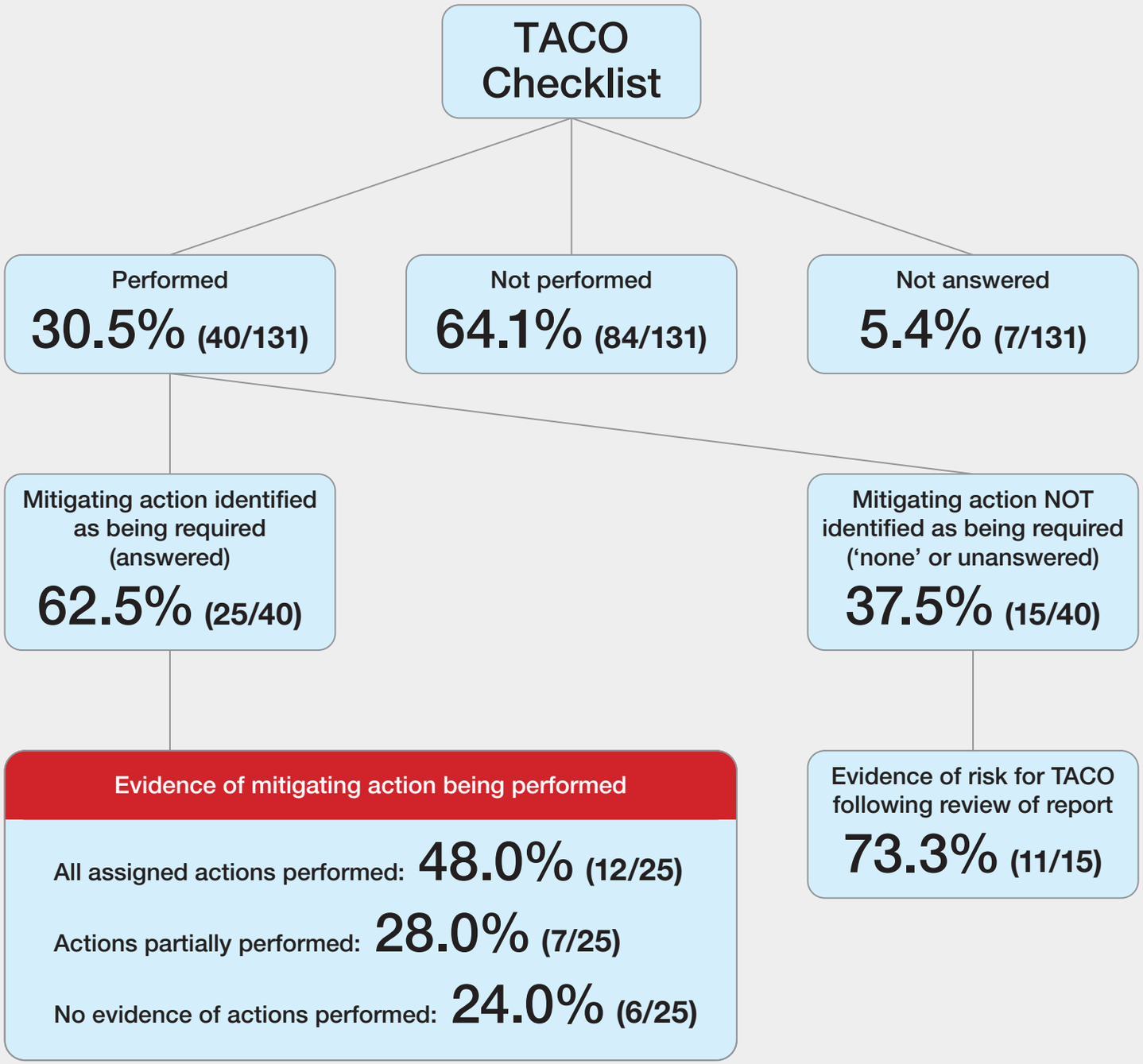
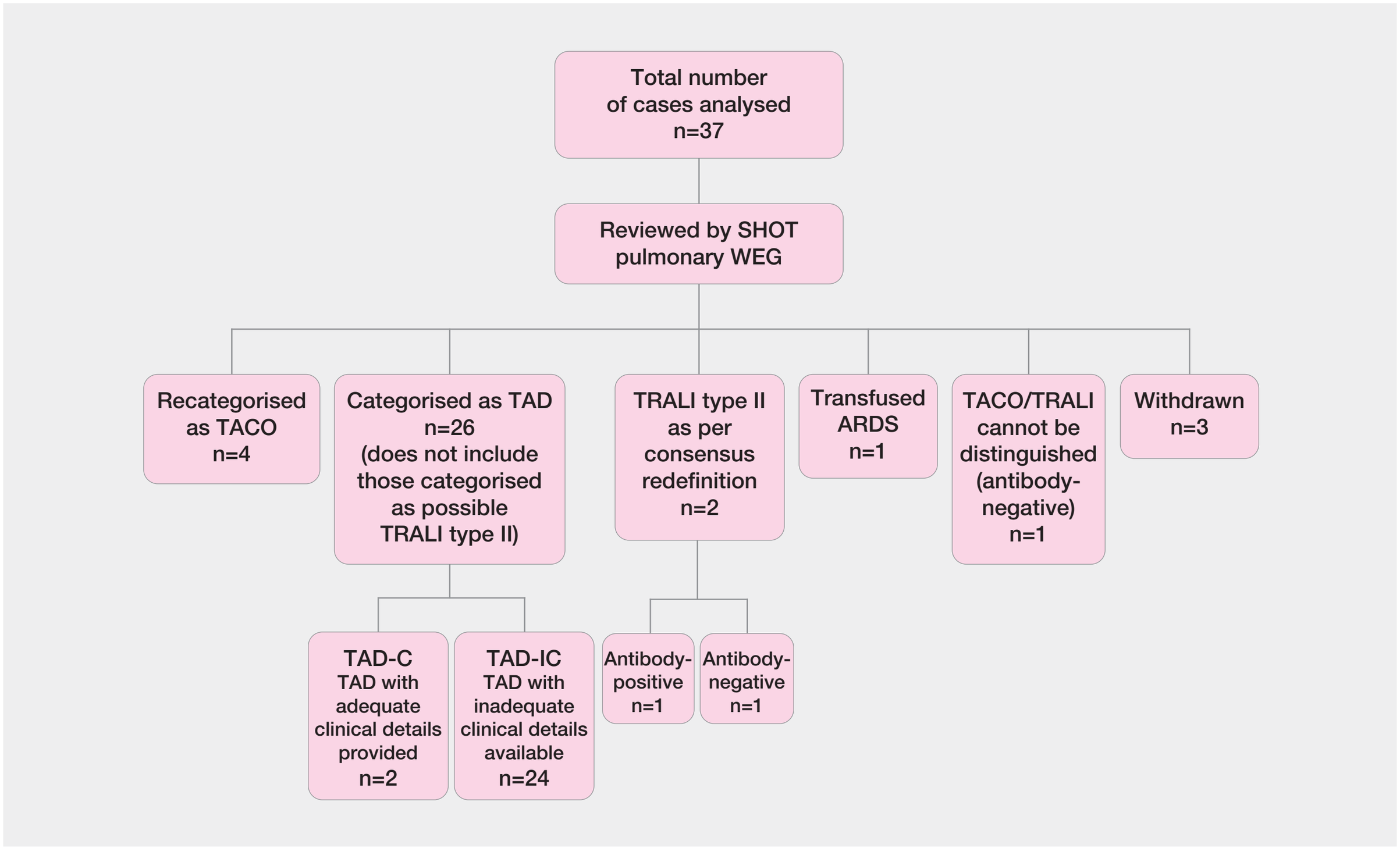


Figure 17a.3: Use of the checklist to identify patients at risk of TACO and implementation of mitigating actions



TACO=transfusion-associated circulatory overload

Figure 17b.1: Summary of transfers and categorisation of cases included under TAD



WEG=working expert group; TACO=transfusion-associated circulatory overload; TAD=transfusion-associated dyspnoea; TRALI=transfusion-related acute lung injury; ARDS=acute respiratory distress syndrome

Figure 17b.2: Summary of possible explanatory factors for non-TACO pulmonary complications

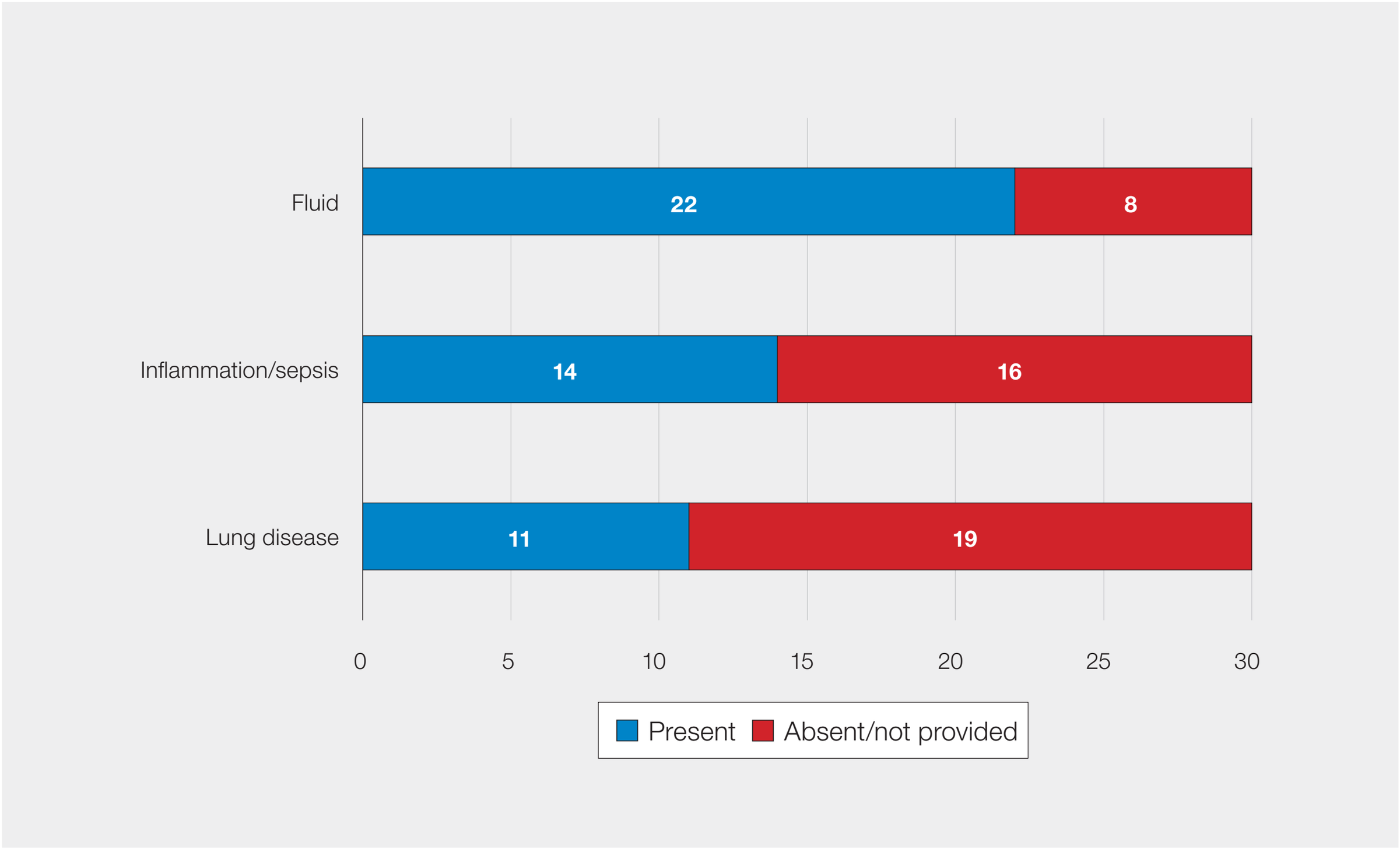


Figure 17b.3: Summary of imaging findings for non-TACO pulmonary complications

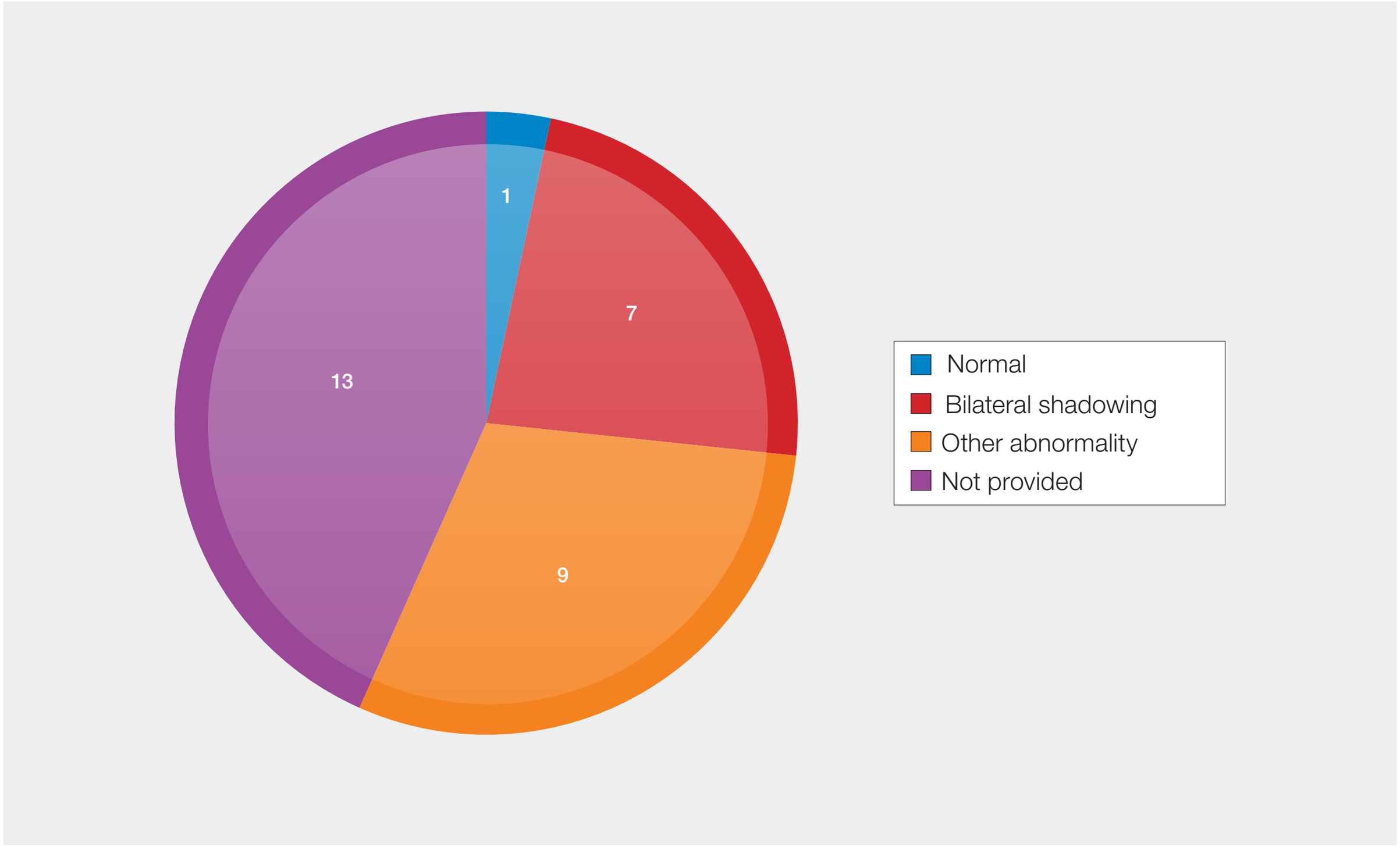


Figure 18.1: Age range in males and females experiencing an HTR

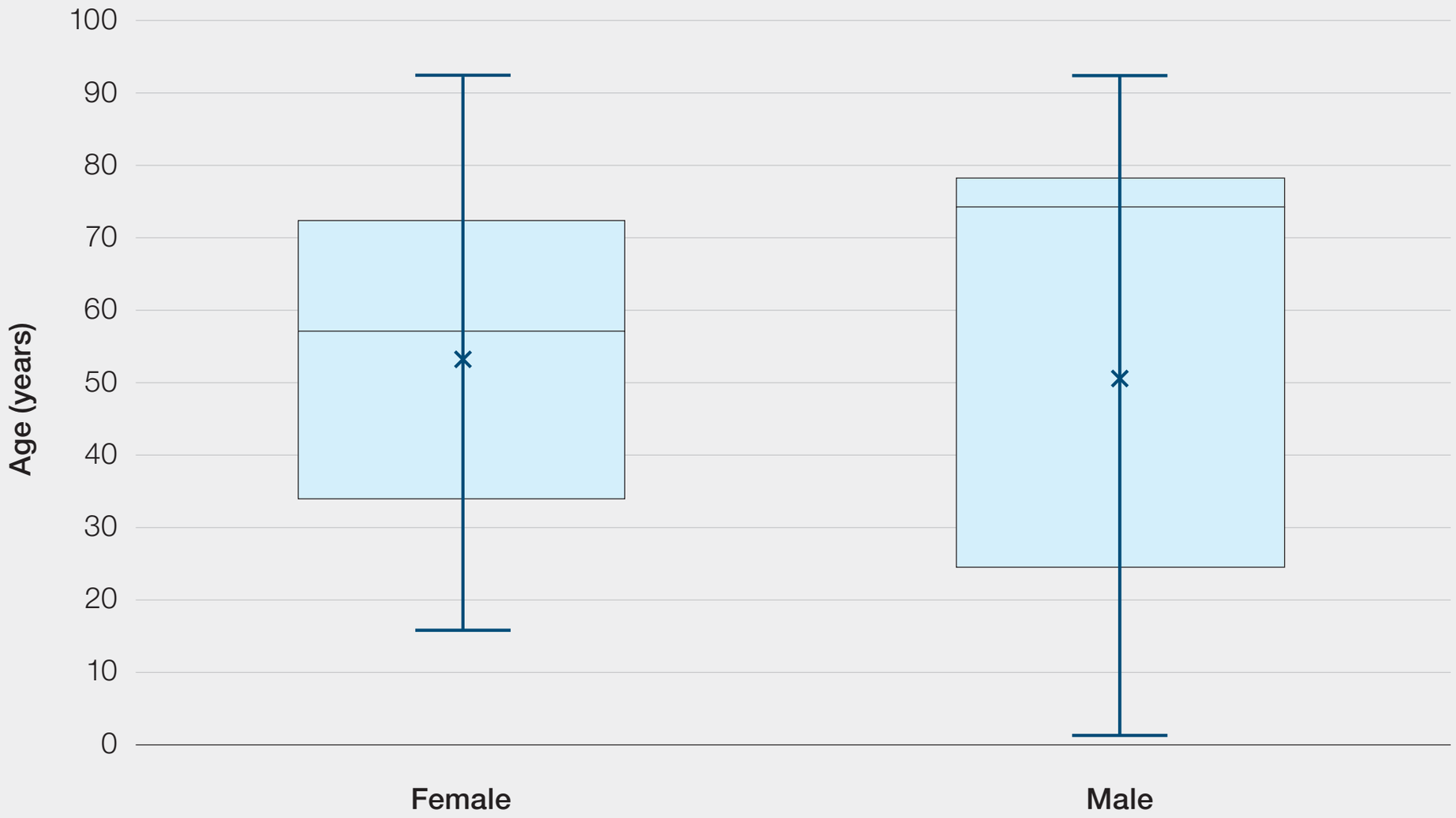


Figure 18.2: Alloantibodies reported in AHTR in 2021

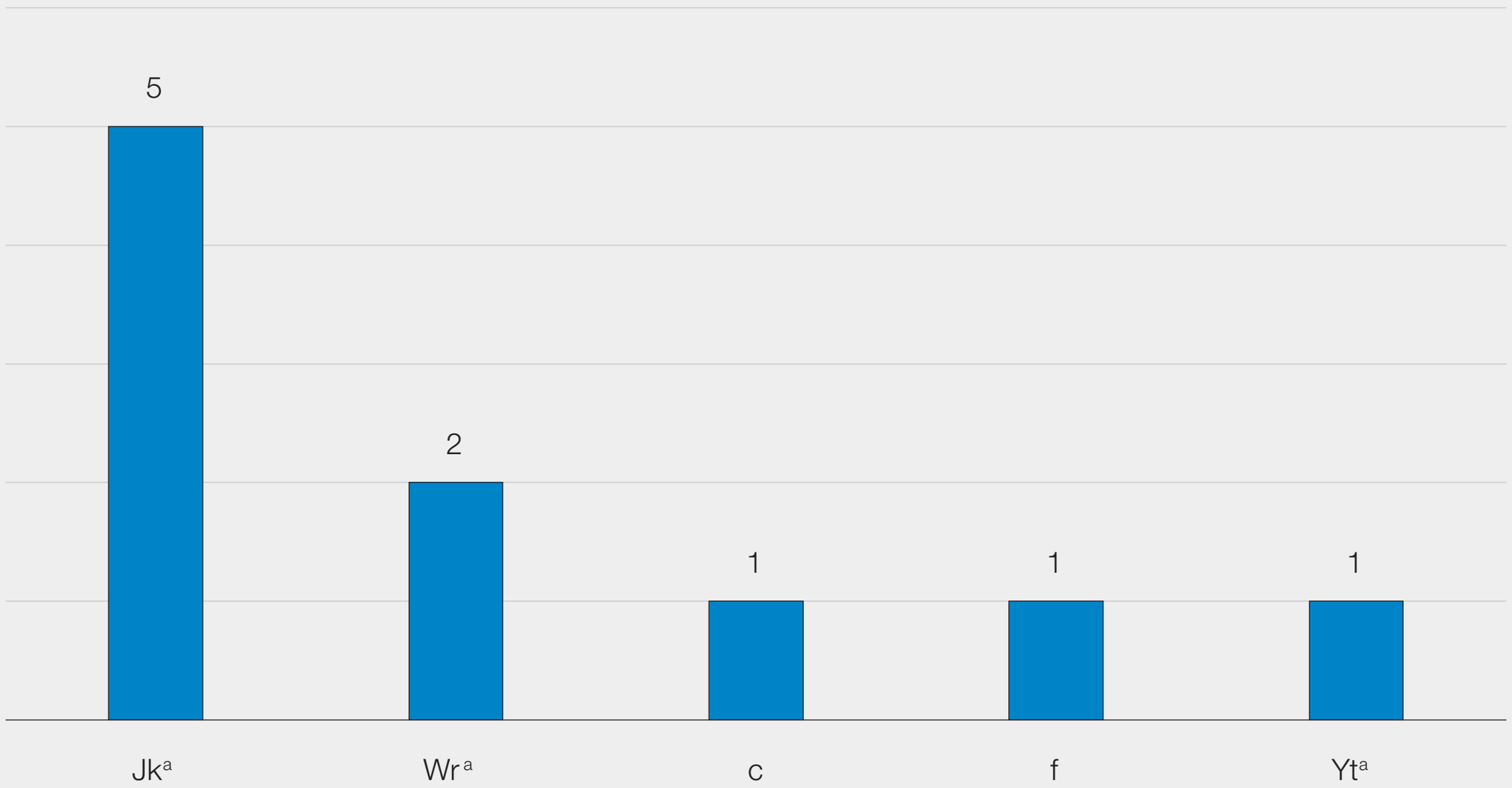


Figure 18.3: Antibody specificities implicated in HTR

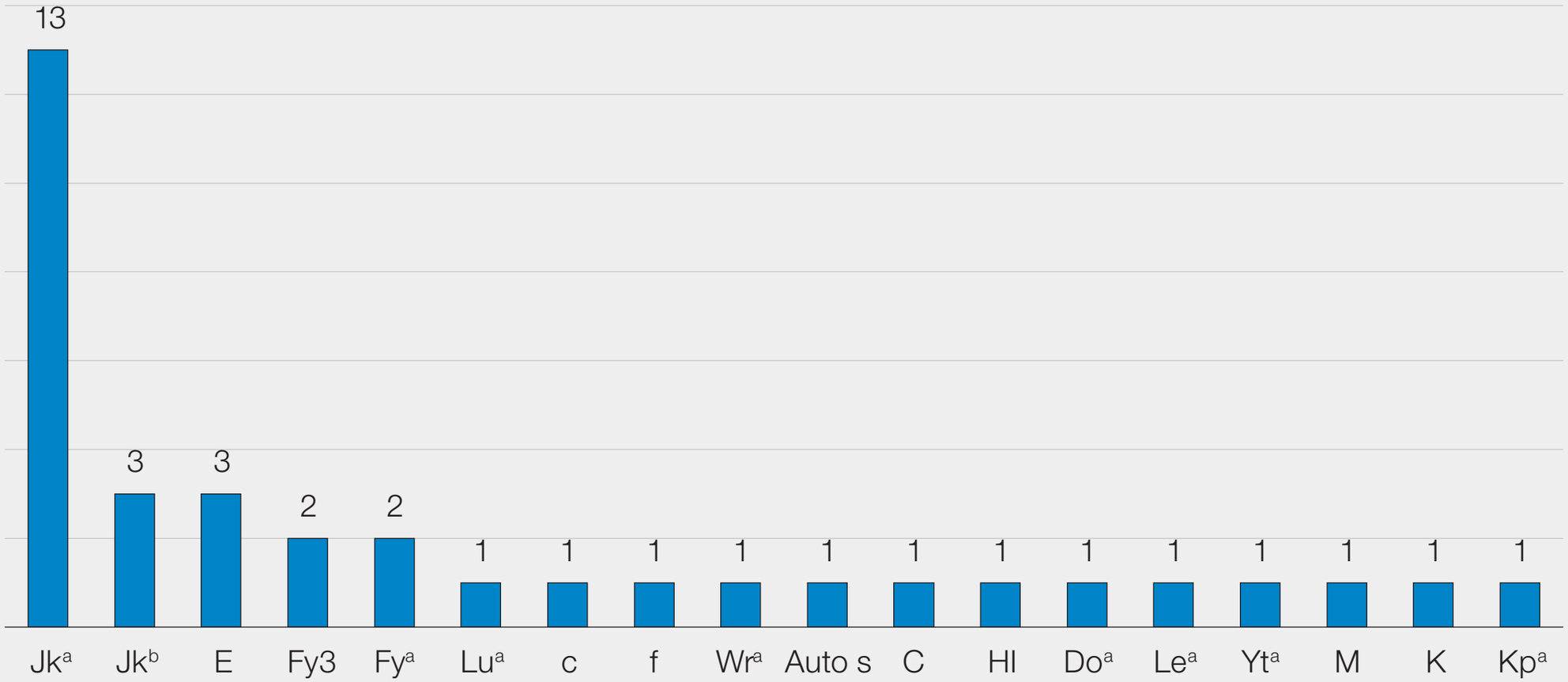
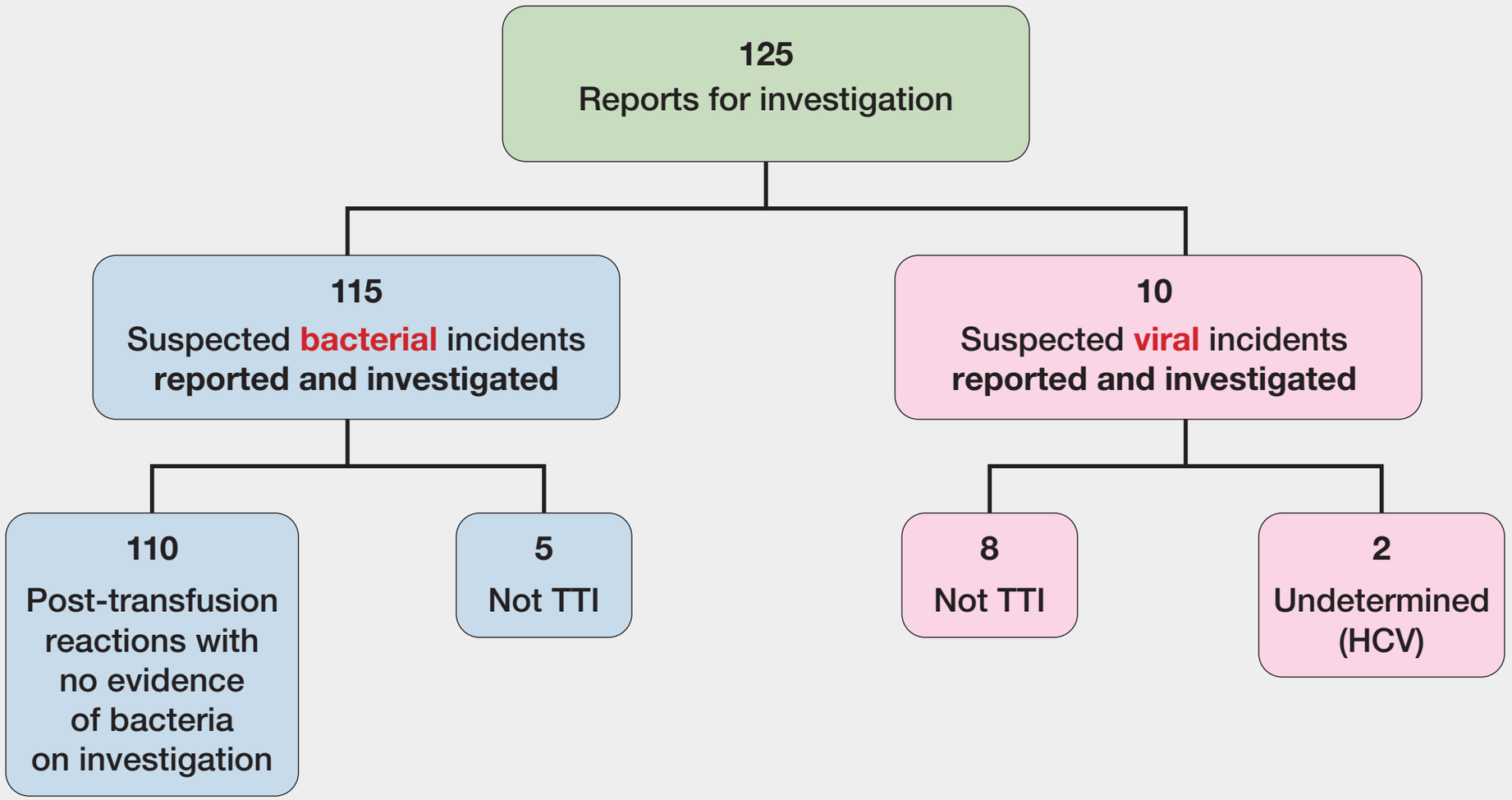


Figure 20.1: Outcome of reports of suspected TTI made to the NHSBT/UKHSA Epidemiology Unit in 2021 update



TTI=transfusion-transmitted infection; HCV=hepatitis C virus

Figure 22.1: Trends in paediatric reports 2012-2021

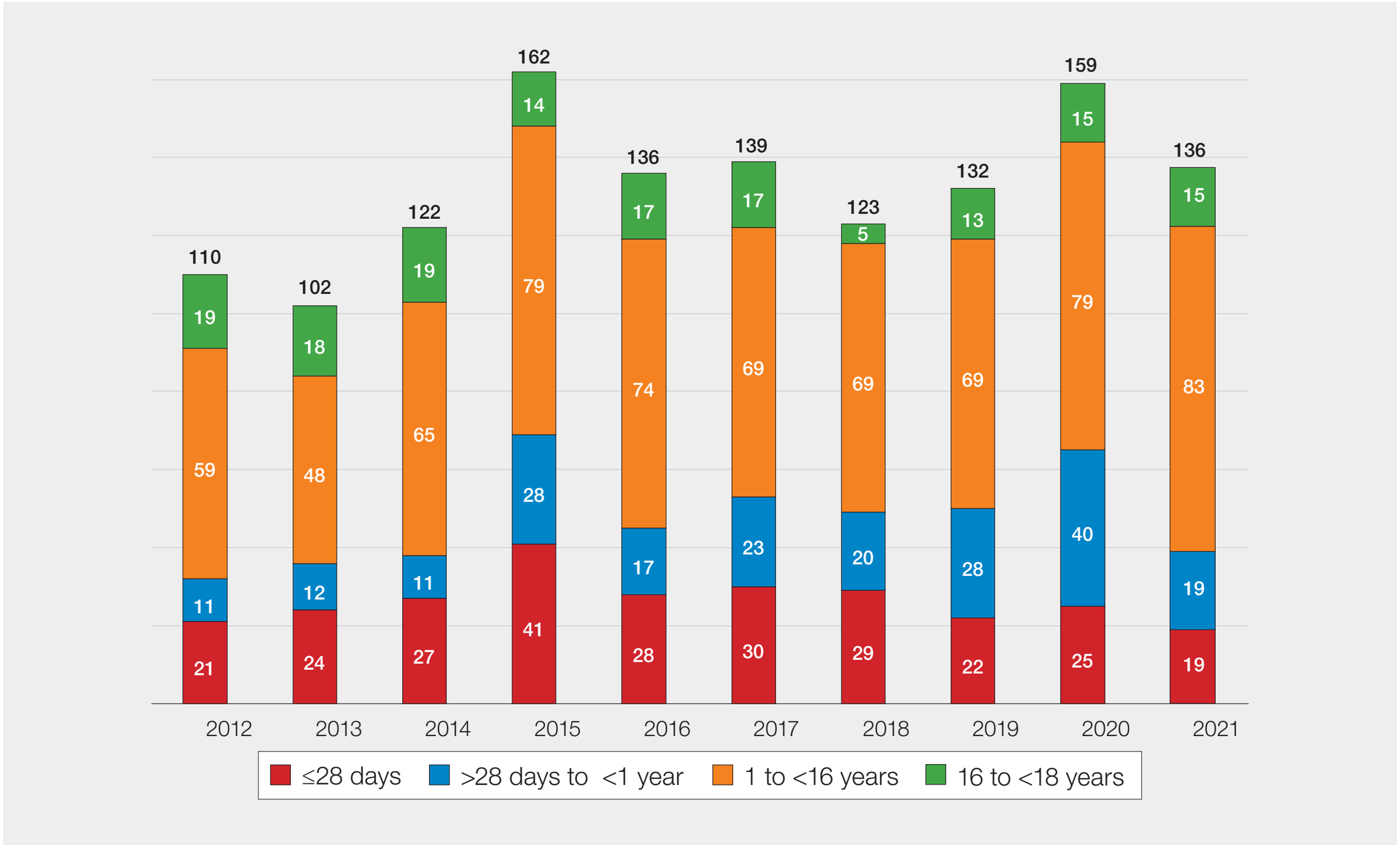
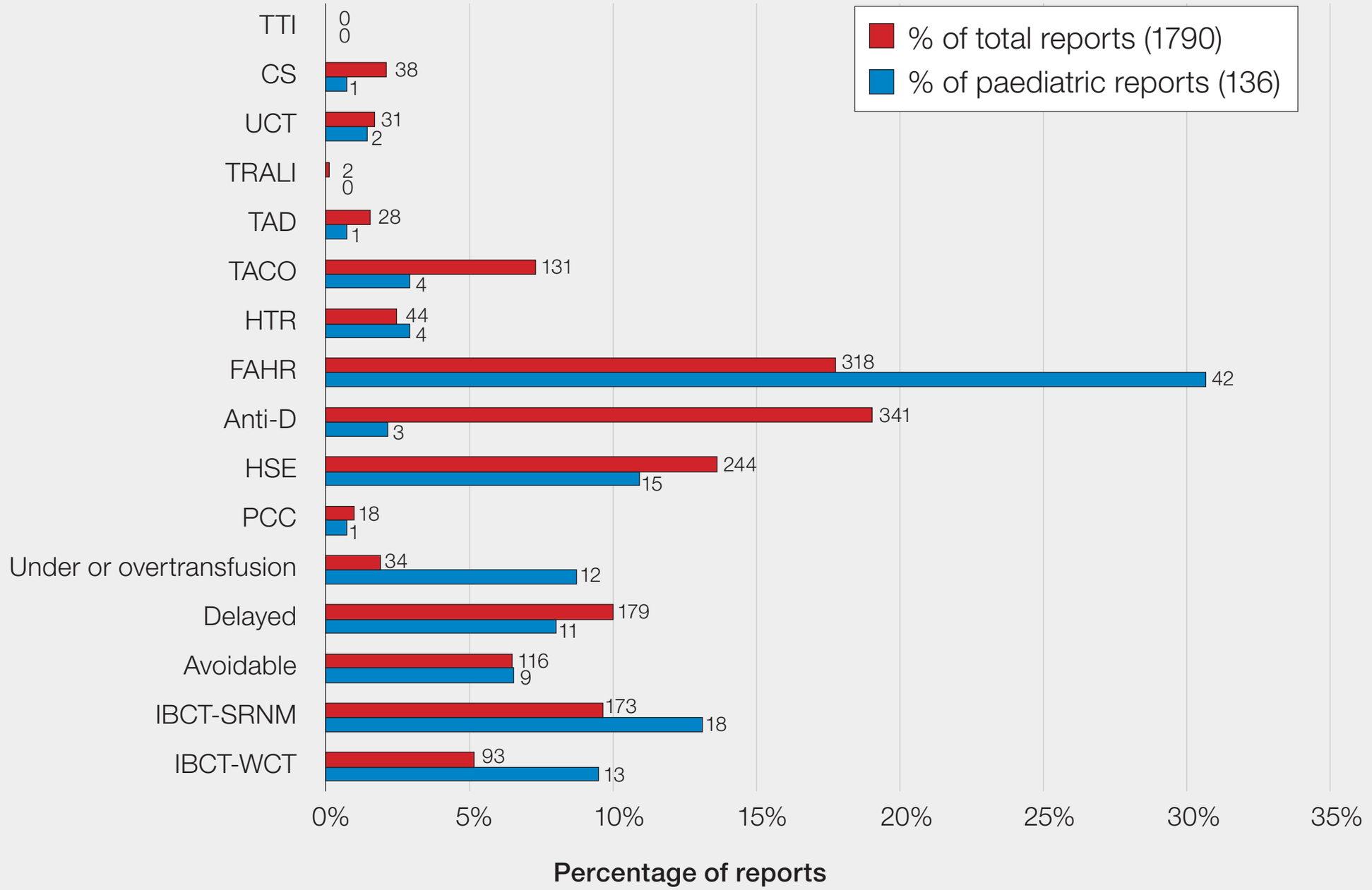


Figure 22.2: Percentages of paediatric and total reports in each category



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

Figure 22.3: Summary of paediatric cases by category and age 2021

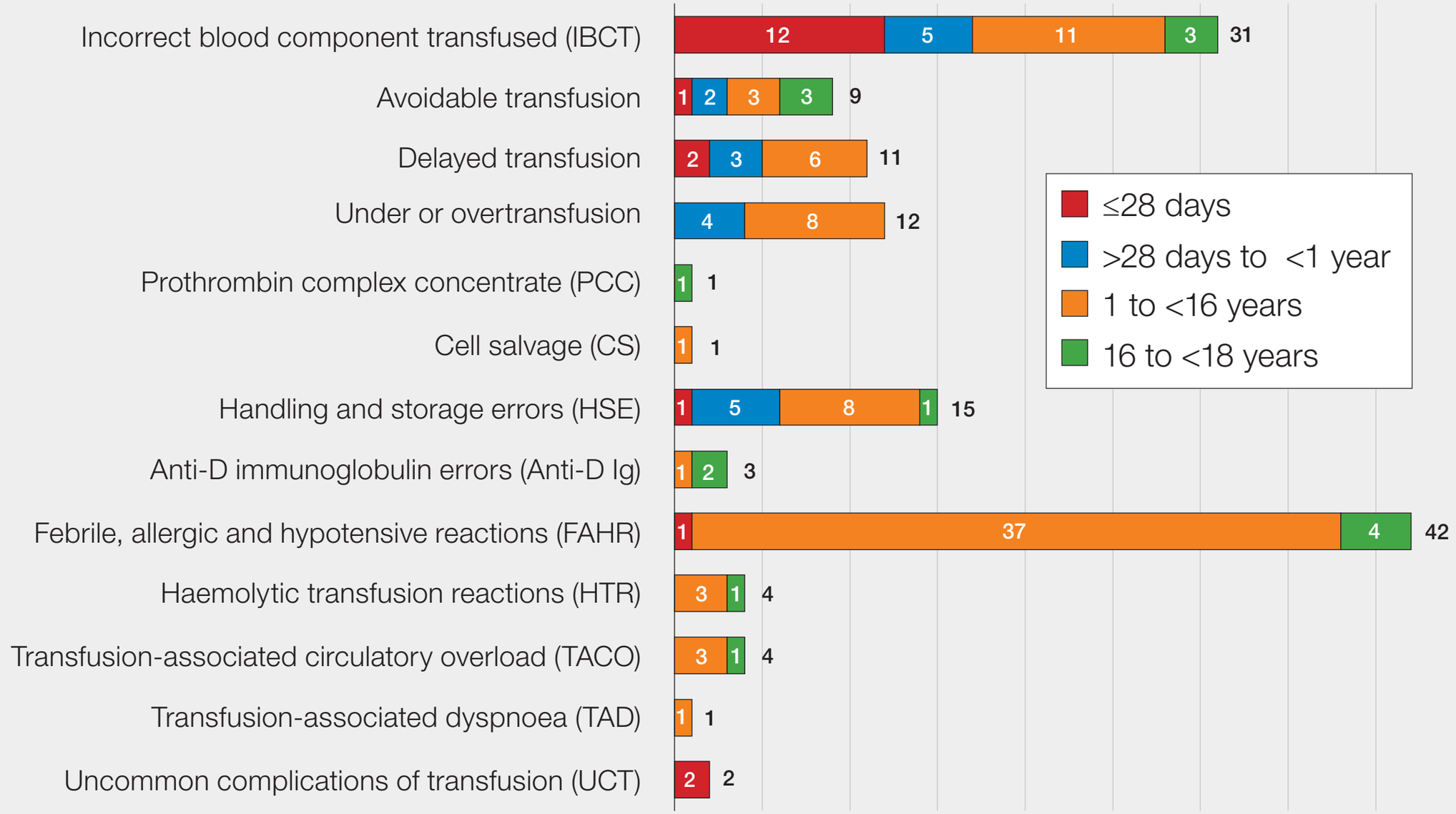
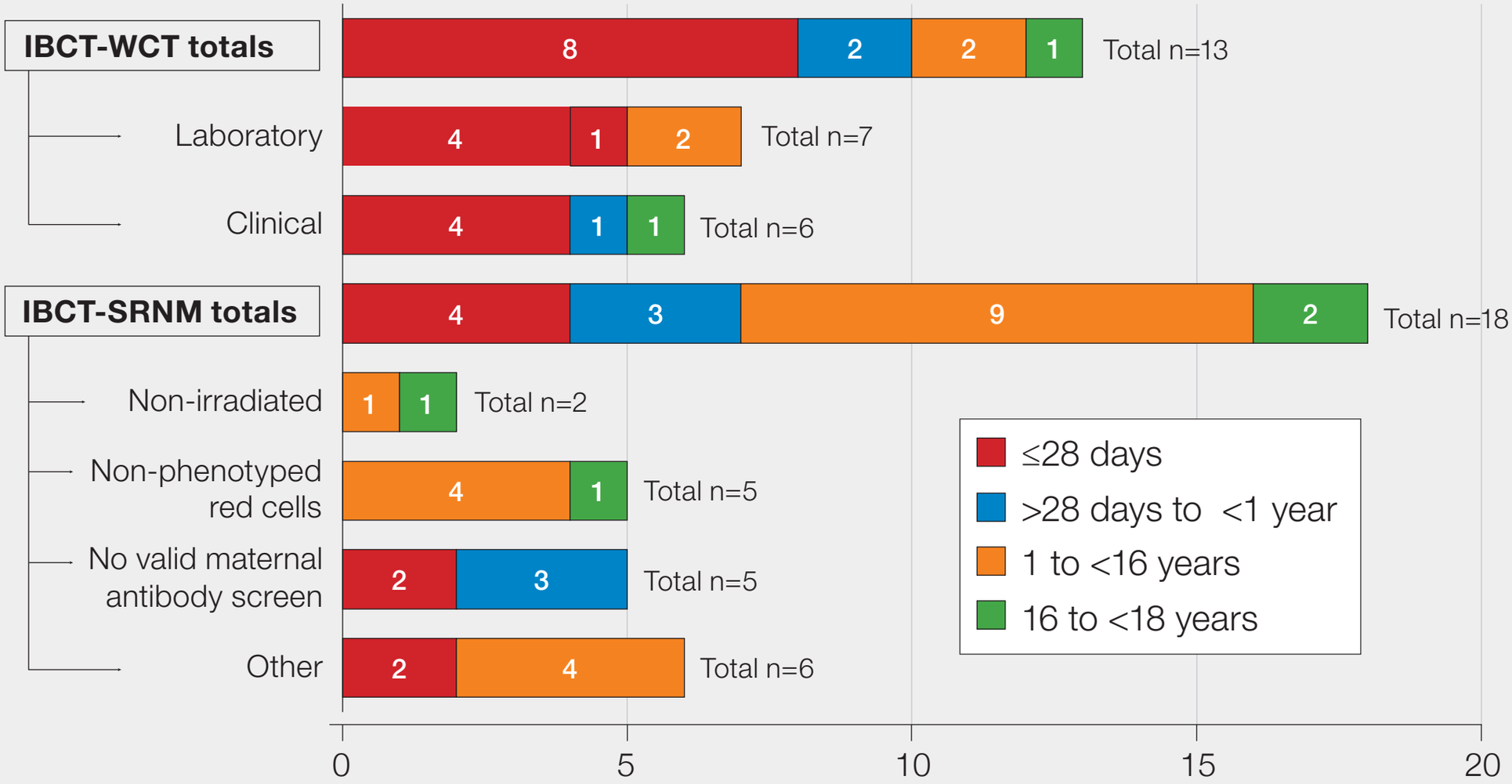


Figure 22.4: Breakdown of incorrect blood component transfused reports



Other includes incomplete testing (n=3), invalid time-expired sample (n=1), failure to provide CMV-negative (n=1) and inappropriate D-positive component (n=1)
IBCT-WCT=incorrect blood component transfused-wrong component transfused; IBCT-SRNM=IBCT-specific requirements not met; CMV=cytomegalovirus

Figure 22.5 Summary of FAHR reports by component type from 2012 to 2021

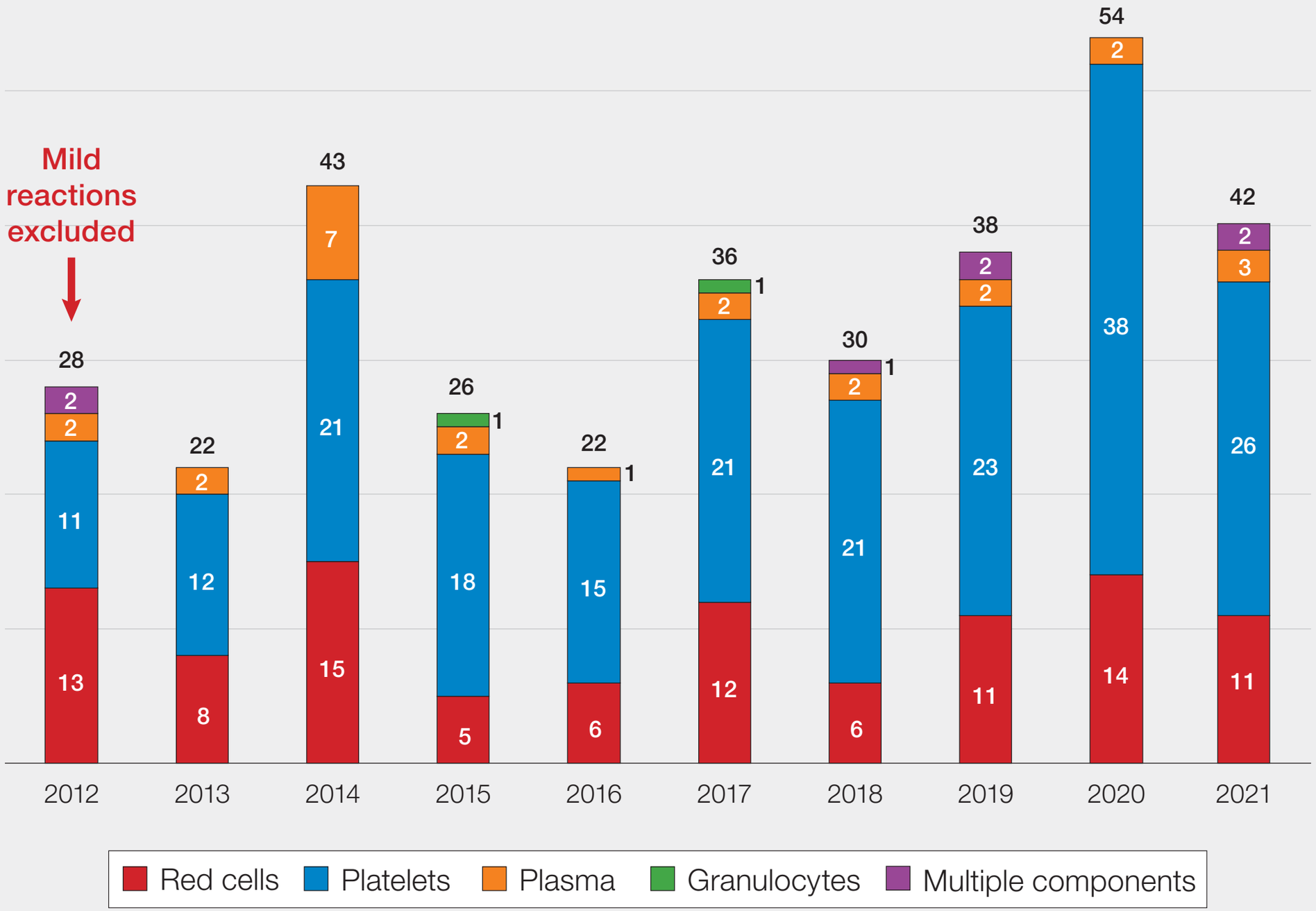


Figure 22.6: Paediatric FAHR reports
a. Comparison of proportions of adult and paediatric FAHR related to different components

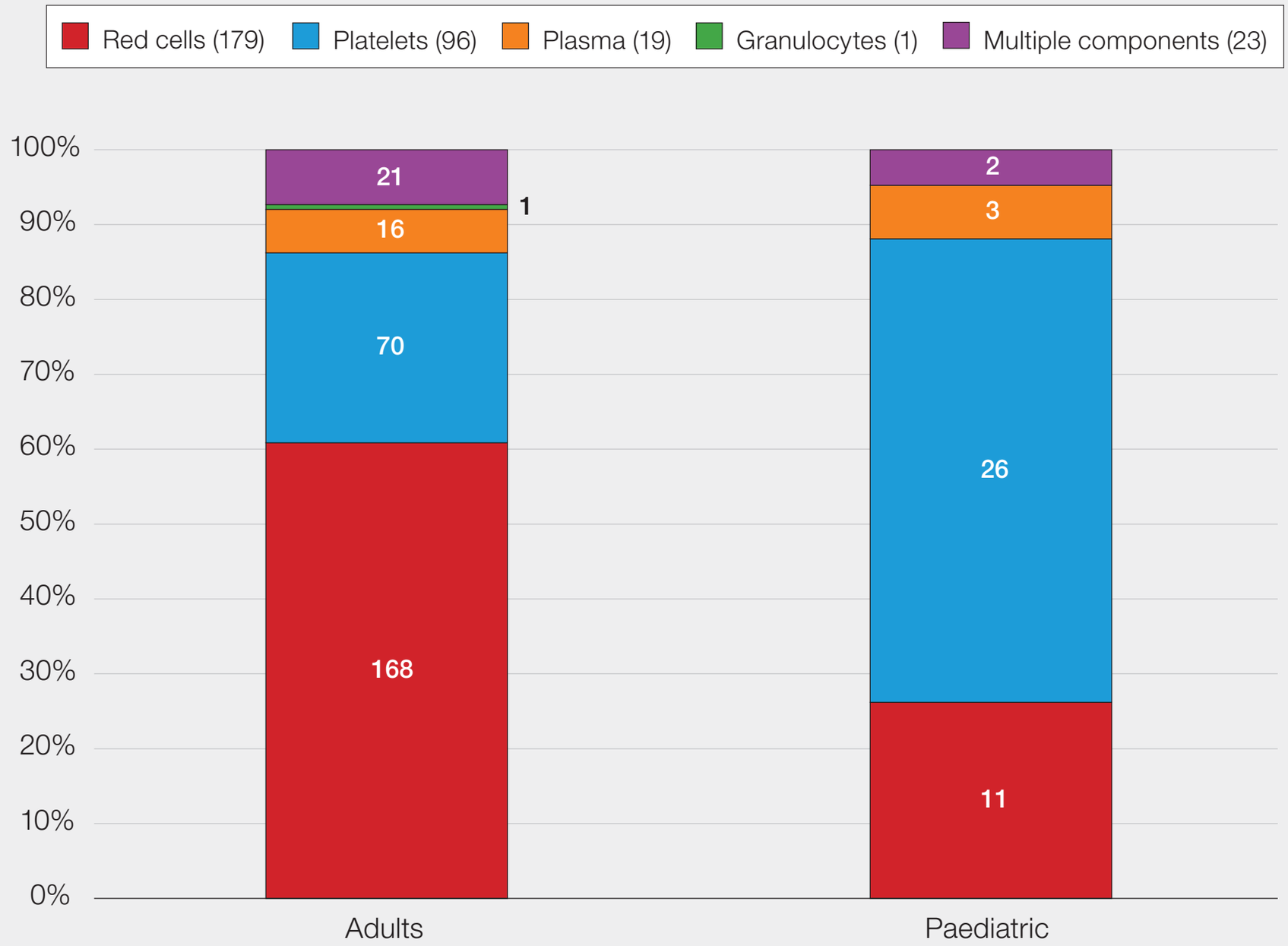


Figure 22.6: Paediatric FAHR reports
b. Percentages of reaction types of each component for paediatric reports

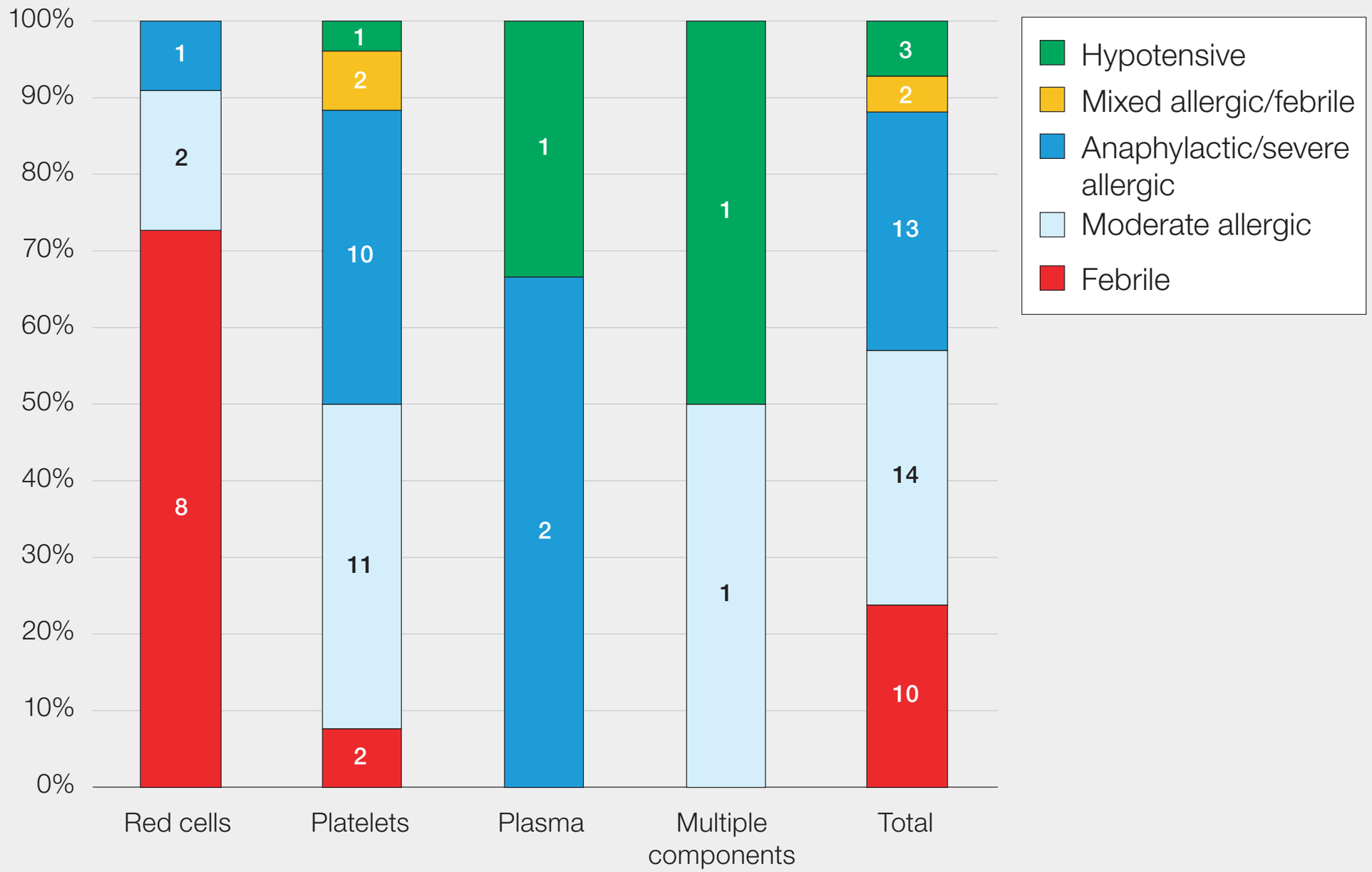


Figure 22.7: Pulmonary complications in children and neonates 2012-2021

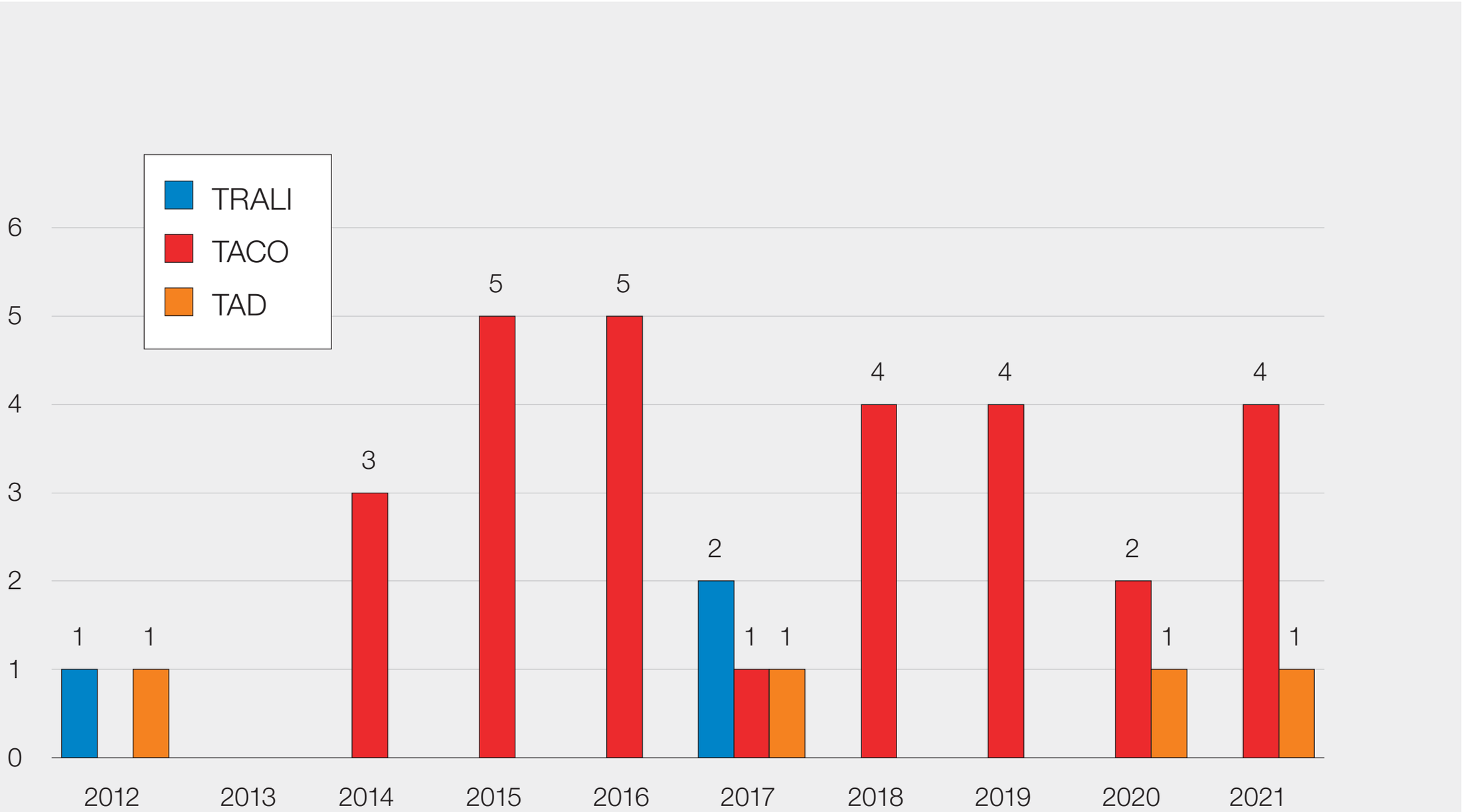
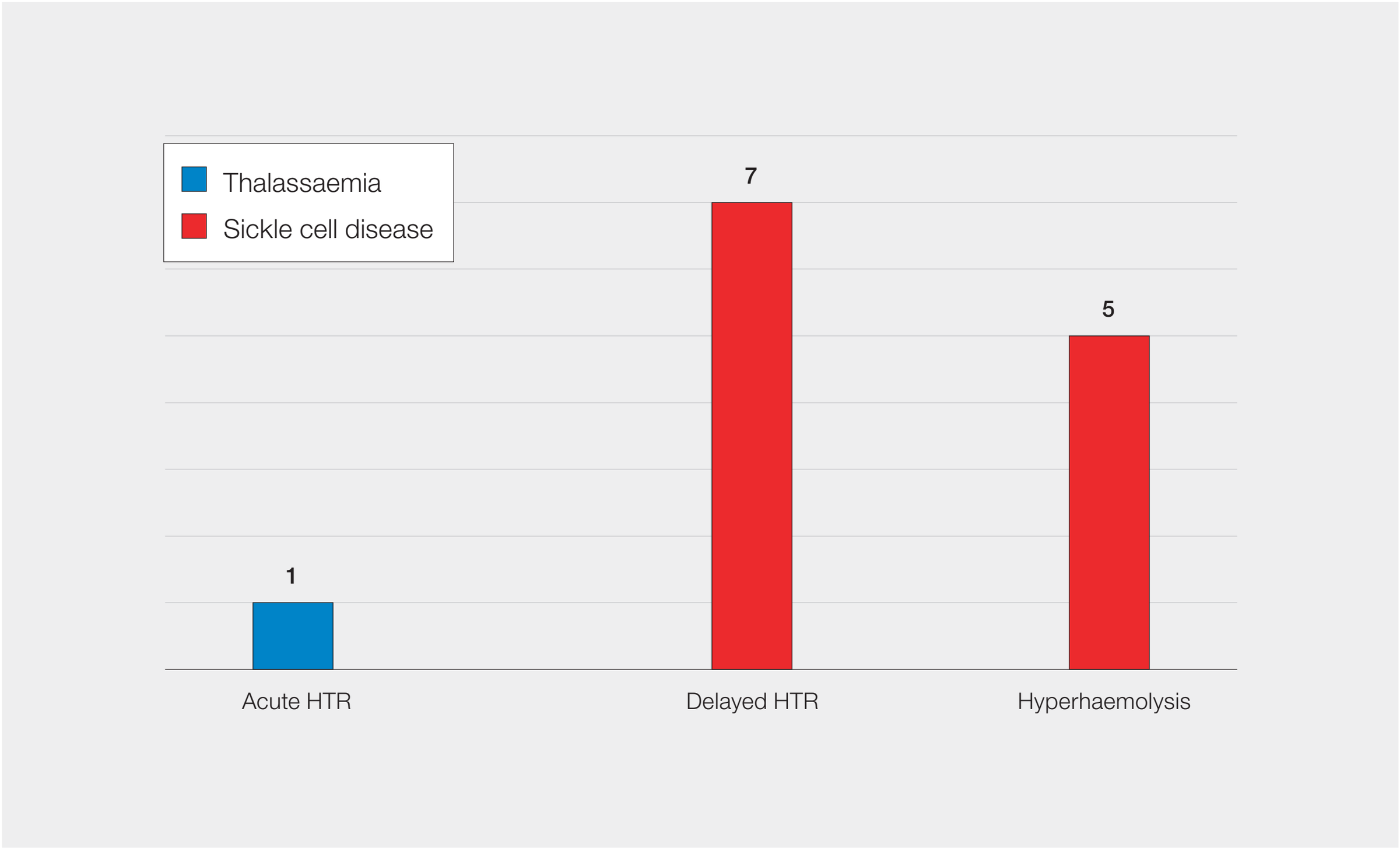
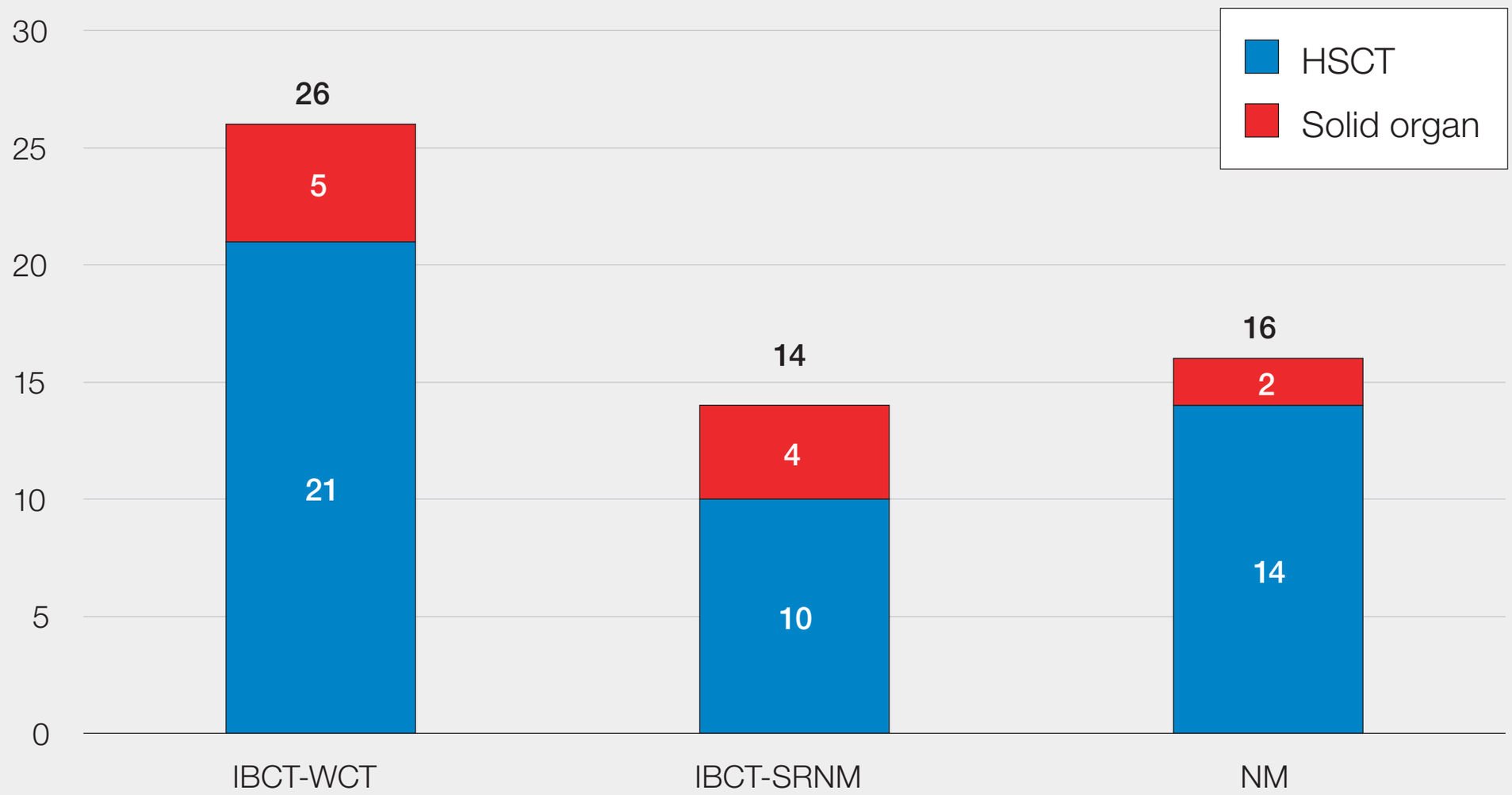


Figure 23.1: HTR in haemoglobinopathy patients in 2021 (n=13)



HTR=haemolytic transfusion reactions

Figure 24.1: Transplant cases by reporting category and type of transplant in 2021 (n=56)



HSCT=haemopoietic stem cell transplant; IBCT-WCT=incorrect blood component transfused-wrong component transfused; IBCT-SRNM=IBCT-specific requirements not met; NM=near miss

Figure 25.1: Number of reports of anti-D immunisation in pregnancy by year, 2012-2021

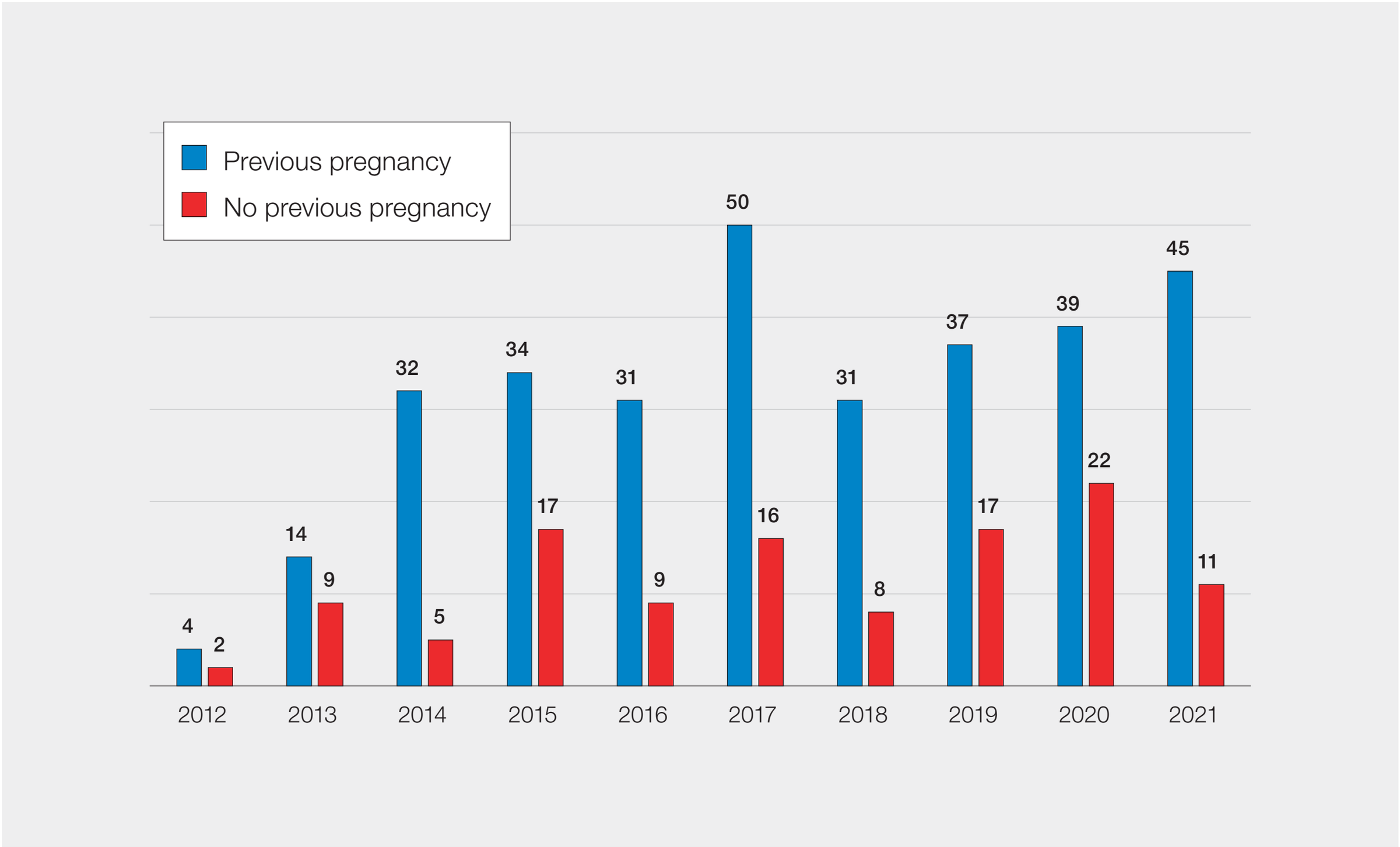
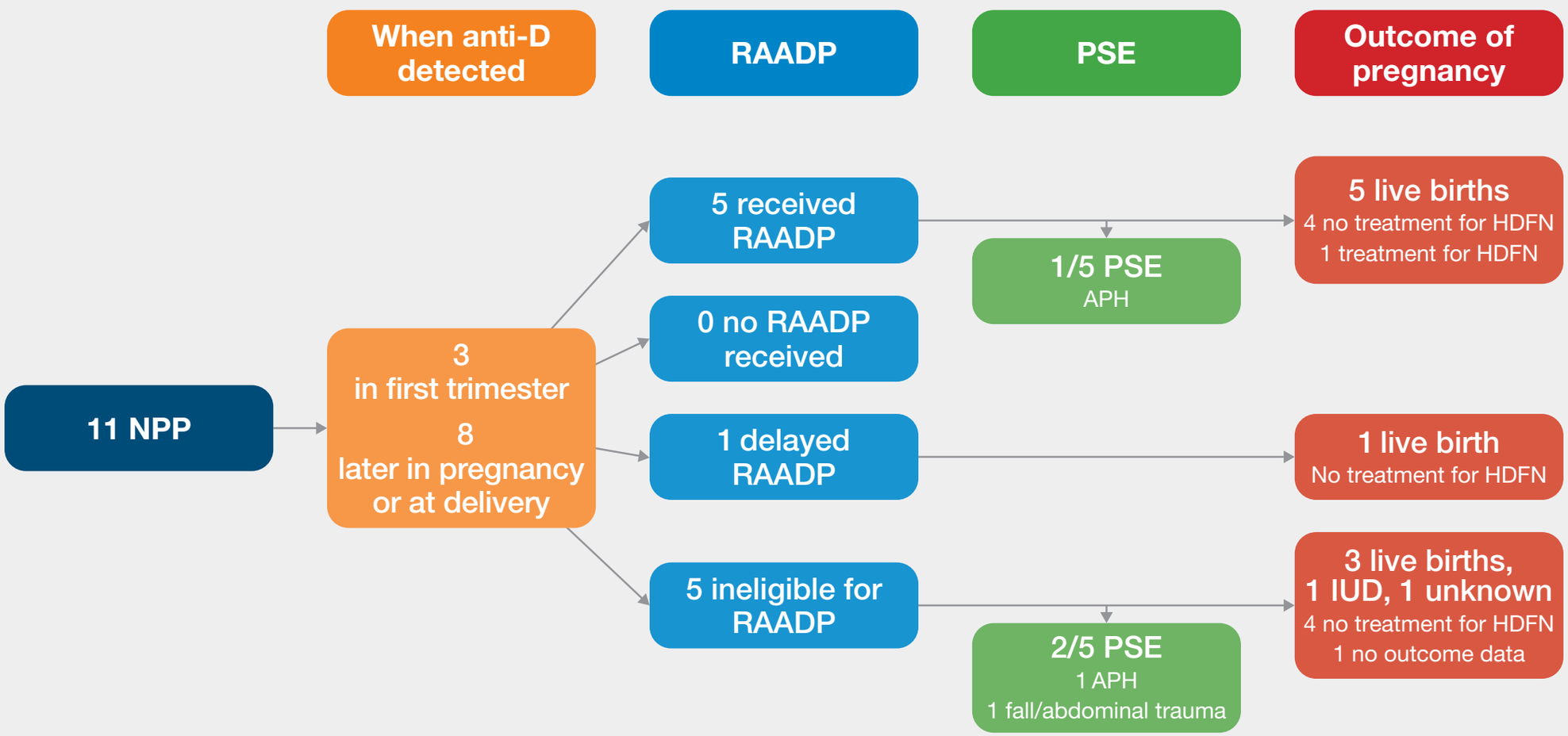
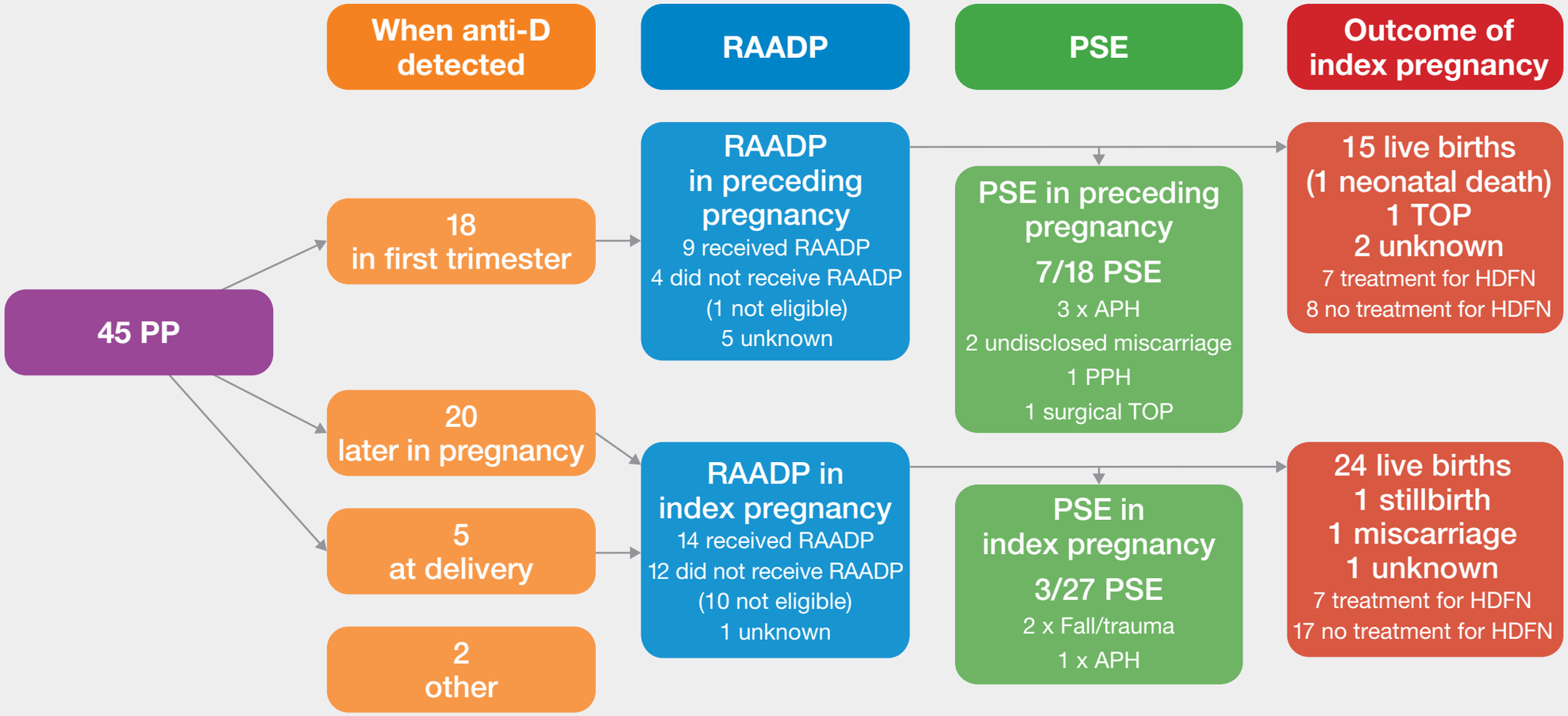


Figure 25.2: Summary of 2021 NPP data (n=11)



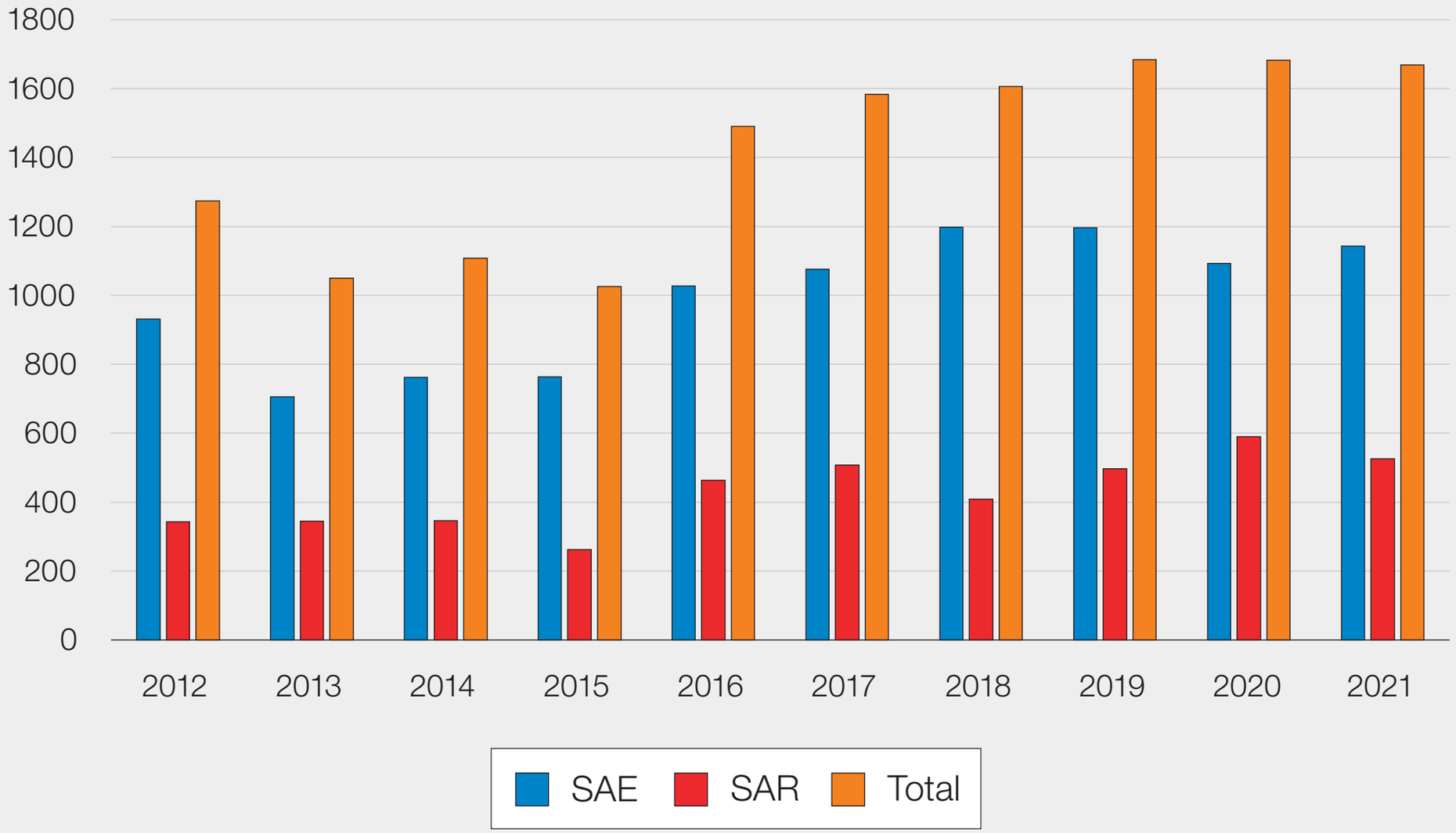
NPP=no previous pregnancy; RAADP=routine antenatal anti-D Ig prophylaxis; PSE=potentially sensitising event; APH=antepartum haemorrhage; IUD=intrauterine death; HDFN=haemolytic disease of the fetus and newborn

Figure 25.3: Summary of 2021 PP data (n=45)



PP=previous pregnancy; RAADP=routine antenatal anti-D immunoglobulin prophylaxis; PSE=potentially sensitising event; APH=antepartum haemorrhage; PPH=postpartum haemorrhage; TOP=termination of pregnancy; HDFN=haemolytic disease of the fetus and newborn

Figure 26.1: Submitted confirmation reports 2012-2021



SAE=serious adverse event; SAR=serious adverse reaction

Figure 26.2: Incorrect storage of component by specification 2021

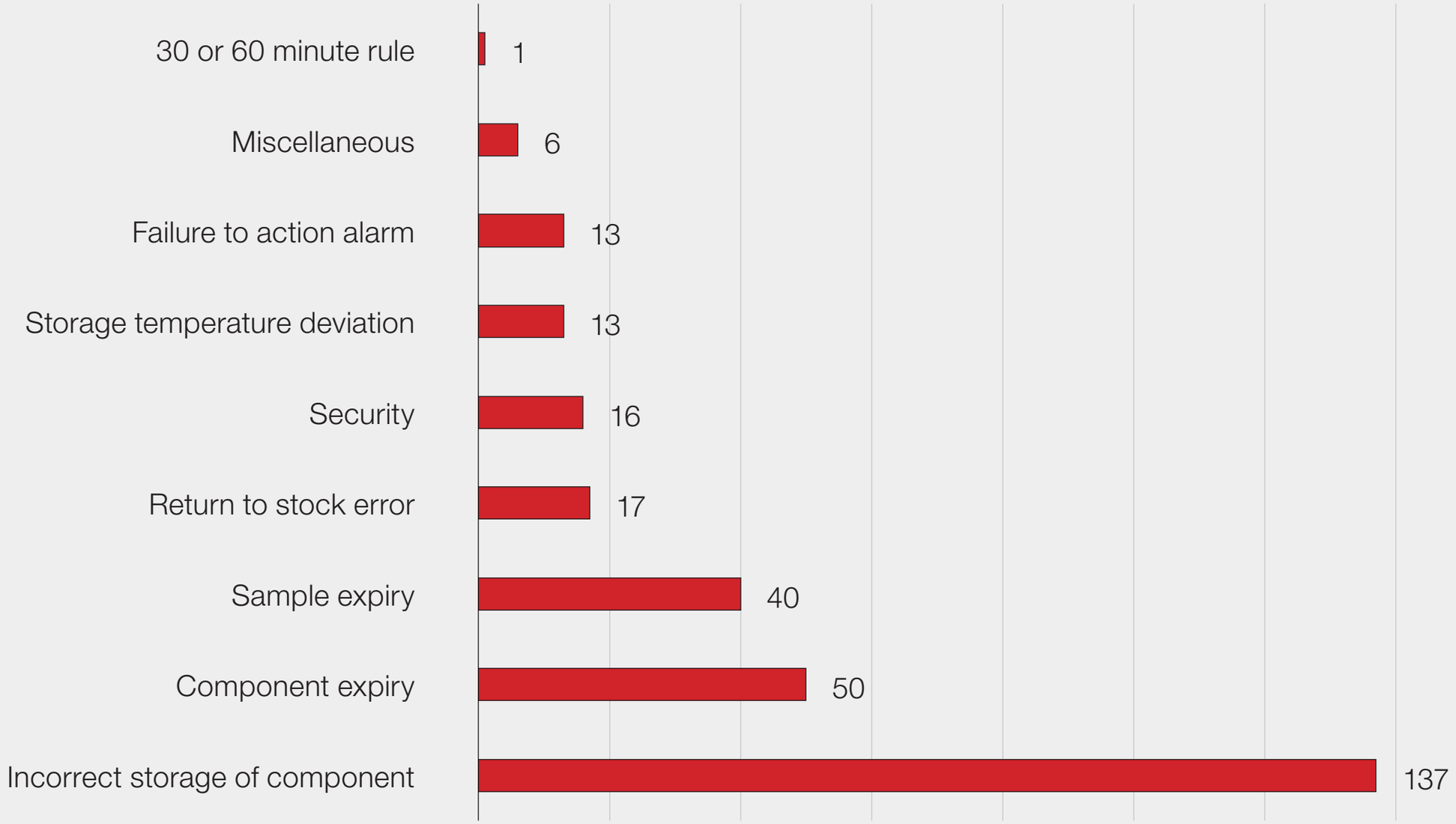
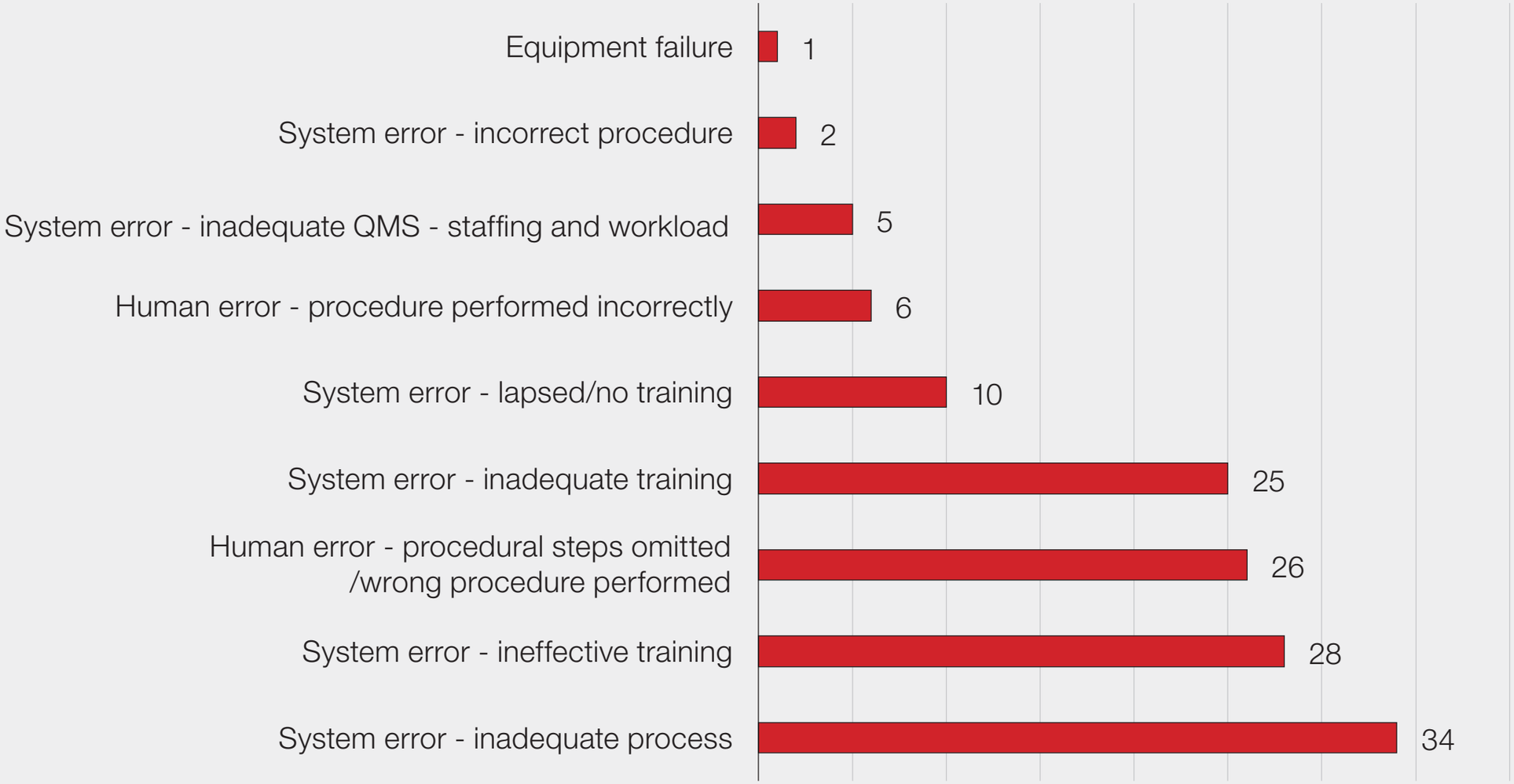
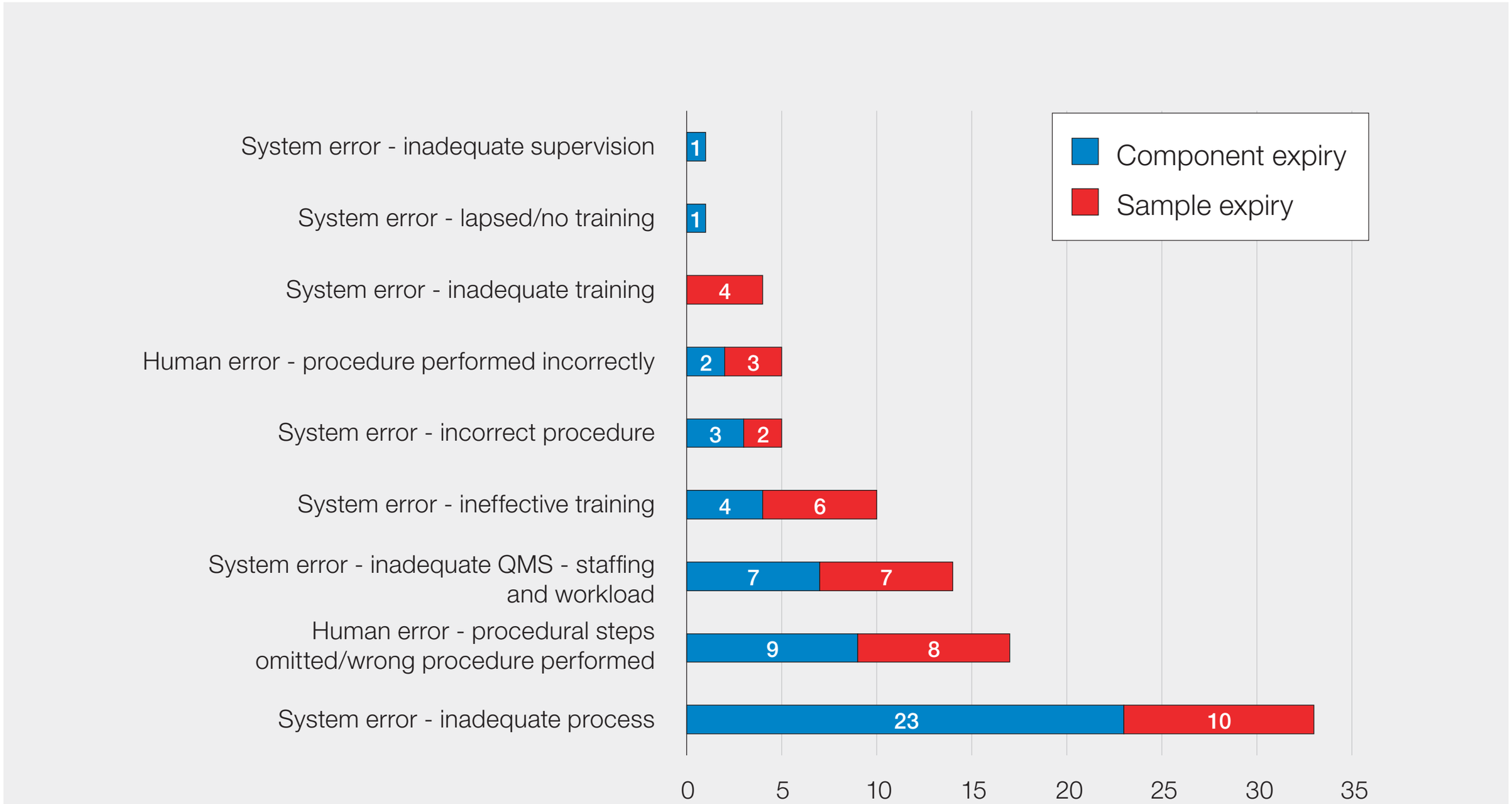


Figure 26.3: Root causes of the incorrect storage of components subcategory



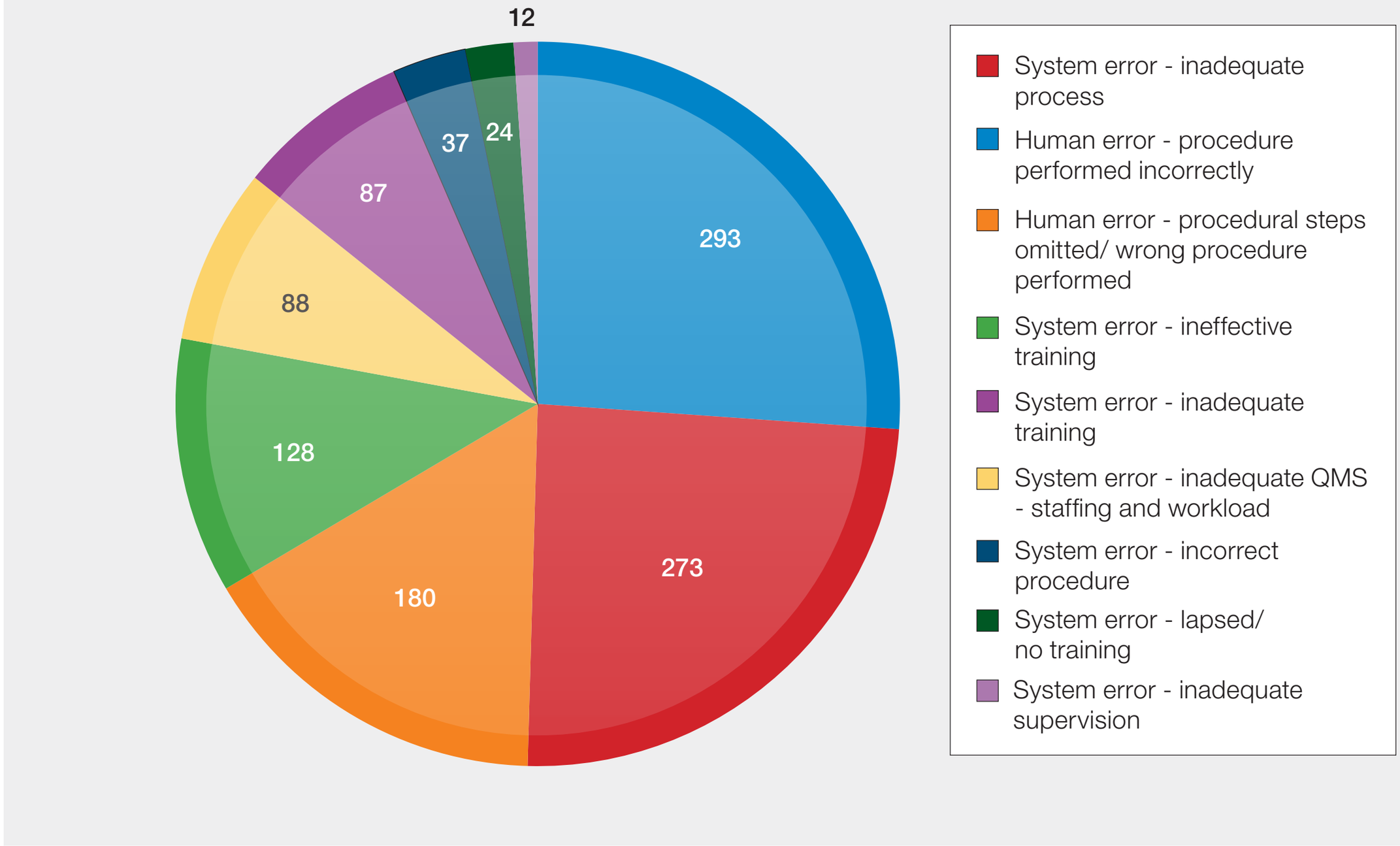
QMS=quality management system

Figure 26.4: Root causes of the combined component and sample expiry subcategories



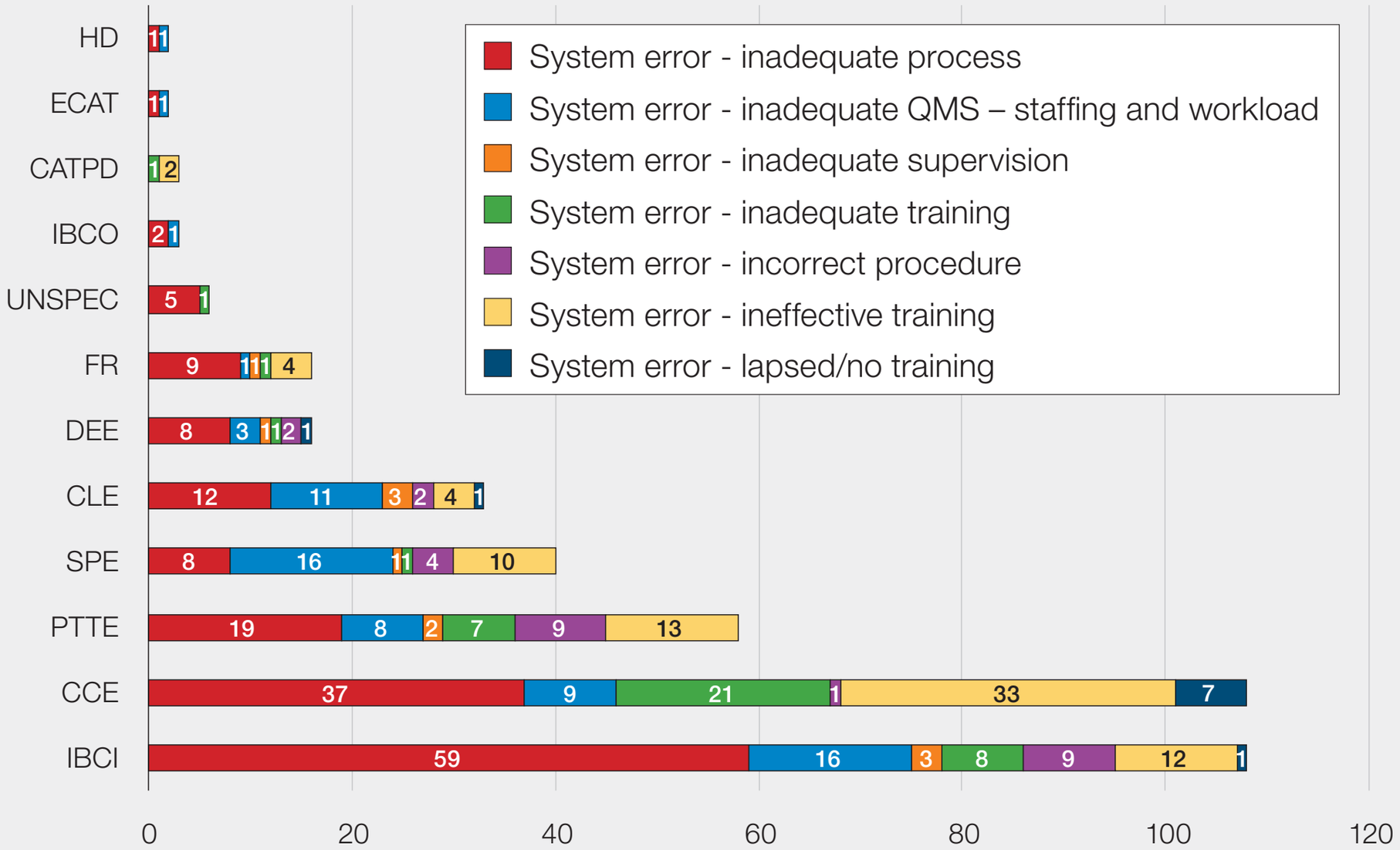
QMS=quality management system

Figure 26.5: Human/system error subcategories



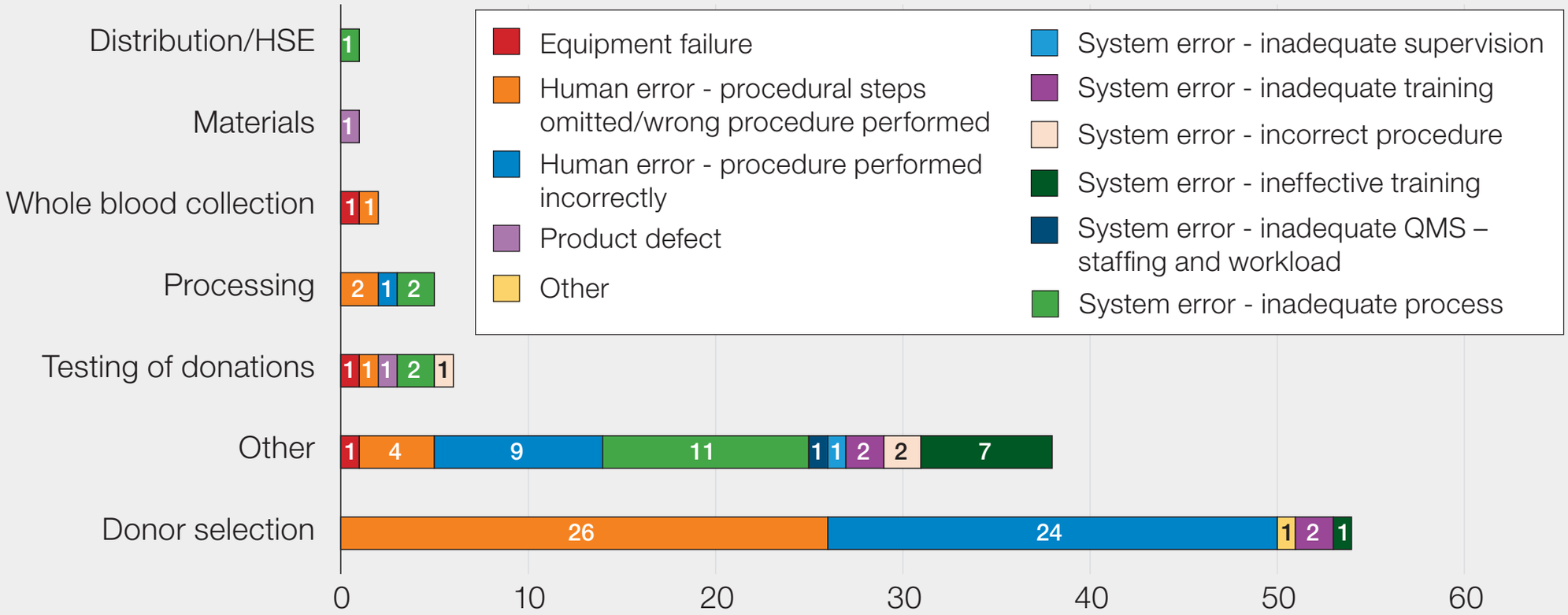
NOTE: These numbers should be used as guidance only. The quality of this data is limited by a number of factors
QMS=quality management system

Figure 26.6 Other subcategory and system error



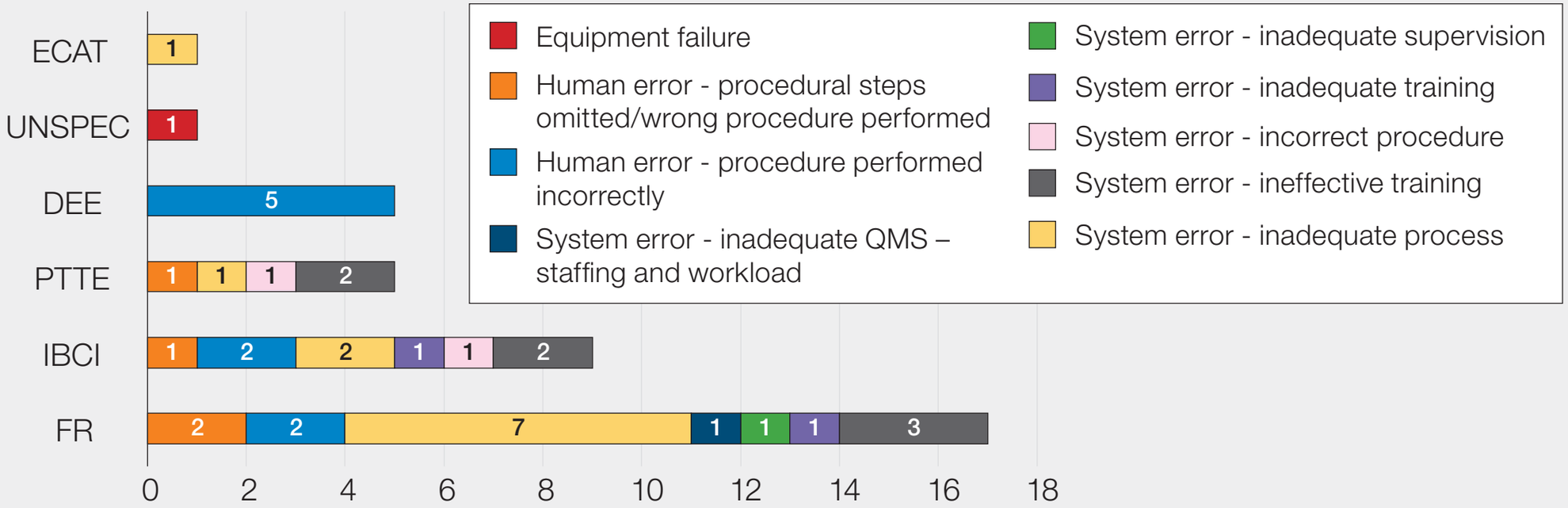
See Appendix 2 for key to category abbreviations. QMS=quality management system

Figure 26.7: Blood establishment SAE event category by specification



QMS=quality management system; HSE=handling and storage error

Figure 26.8: BE reports in ‘other’ category



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

Figure 26.9: SAR reports, by imputability, reported to SABRE in 2021