Blood donation adverse reactions and events

Annual report 2021

Denmark

Danish Hemovigilance Committee 2021

Bitten Aagaard (chair), North Denmark Region
Betina Sørensen, North Denmark Region
Sys Hasslund, Central Denmark Region
Louise Ørnskov Pedersen, Central Denmark Region
Mie Topholm Bruun. Region of Southern Denmark
Rune Larsen, Region Zealand
Christina Mikkelsen, Capital Region

Index

Blood donation adverse reactions and events 1
Annual report 2021 1
Denmark 1
Introduction 3
Definitions: 4
Blood donations in Denmark 5
Summary of ARE by type of blood donation 5
ARE divided by severity grade and imputability 7
AREs divided by gender, blood donation type and donor status 7
ARE and type of blood donations 9
Whole Blood **9**
Plasmapheresis **11**
Platelet apheresis **13**
Vasovagal reaction in relation to blood donation 15
Conclusion 17
Appendix 18
Description of registration in blood bank IT system **18**
TABLE 11 (translated from Danish): Categories **20**
TABLE 12 (translated from Danish): Severity **24**
TABLE 13 (translated from Danish): Imputability **25**

Introduction

Hemovigilance is an important part of the transfusion quality systems covering all aspects of the transfusion chain (vein-to-vein process). The goal of hemovigilance is continuously quality improvement of the transfusion chain through corrective and preventive actions to improve donor and patient safety.

Data for the 2021 report was extracted in August 2022 to include potential severity upgrades to grade 4, which includes symptom duration >6 months.

It is important to underline, that blood donation is a safe procedure. Both national and international data show that blood donation is safe with very low rates of both serious and non-serious adverse reactions or events (SARE/ARE)[1]. Even so, it is still important to monitor these. First and foremost, they must be monitored as donation is a purely altruistic gesture with no personal gain for the donor. Second, blood establishments are obliged to monitor donor safety to ensure that the risk of (S)ARE is kept on a minimal level. This is also the case when new procedures are introduced. Here, the monitoring both serves to provide a baseline risk-level for comparison but can also be used to ensure that the new procedure does not increase the risk-level.

Blood donation is an invasive procedure and involves a phlebotomy; therefore, donation-related discomfort and (S)ARE are unavoidable. Collection of data can be a tool to know more about the incidence and background of (S)ARE.

From January 1st, 2020 a national Danish donor vigilance registration was commenced to monitor adverse reactions and events in blood donors. Until 2020, only the most severe adverse reactions and events in blood donors have been monitored in Denmark on a national level and reported to the competent authorities and the EU Commission.

The overall goal of this initiative was to establish a national system to monitor *all* adverse reactions in blood donation and at the same time, to develop an easy-to-use on-site registration that could be applied to the different IT-systems used in Denmark. In addition, it was considered essential that the new system used international definitions to ease comparison to other countries and allow for international collaboration.

This registration builds on three parameters. First, the type of ARE as defined in the ISBT guideline[2]. Second, a rating of the severity from 1 (mild) to 5 (death) as defined by AABB[3]. Third, a rating of imputability, the likelihood of the donation as the dominant cause of the ARE. Here, definitions from the EU directive[4] from excluded to certain was applied. The full description of the

[1] Crocco I et al. Adverse reactions in blood and apheresis donors: Experience from two Italian transfusion centres. Blood Transfus. 2009. Burkhardt T et al. Donor vigilance data of a blood transfusion service: A multicenter analysis. Transfus Apher Sci. 2015;53:180-184. Riga A et al. Blood donors - Serious adverse reactions (SAR) 2010-2014 EFS Châteauroux, France. Transfus Clin Biol. 2015;22:62-65. Sorensen BS et al. Complications related to blood donation: A population-based study. Vox Sang. 2008;94:132-137. Mikkelsen C et al. Putting the spotlight on donation-related risks and donor safety - are we succeeding in protecting donors? Vox Sang. 2021 Mar;116(3):313-323.

[2] modified according to Standard for Surveillance of Complications Related to Blood Donation, ISBT, IHN, AABB, 2014

[3] Modified according to Grading Severity of Blood Donor Adverse Events Tool, AABB 2018

[4] COMMISSION DIRECTIVE 2005/61/EC of 30 September 2005 implementing Directive 2002/98/EC of the European Parliament and of the Council as regards traceability requirements and notification of serious adverse reactions and events

system is available in Danish: Guideline registration of adverse reactions and events. The table of ARE categories, severity and imputability has been translated to English and can be found in the appendix. A more detailed description of the registration in the Danish Blood bank IT systems are also available in the appendix.

This is the second report on a national system that relies on a simple electronic registration that combines the current international definitions. This report presents all registered AREs regardless of severity or imputability. All AREs with a severity of 2 or more, were also reported to Blood Donors in Demark, an independent organization who manage follow-up and a potential contact to the Danish Patient Compensation Association. All reactions with a severity of 3 or more were defined as severe (SAREs) and must be reported to the Danish Patient Safety Authority, who reports to the EU.

Definitions:
Adverse reaction and event (ARE): The term is in this report used to describe complications of blood donation and describes unwanted symptoms in donor during or after donation. There is no international consensus regarding the use of the terms adverse reaction (ARE) and adverse event (AE). The use of AE in the EU directives is discrepant from clinical trials and pharmacovigilance; whereas the ISBT-IHN Standard speaks of adverse events for all complications of blood donation and of reactions when they are generalized, without additional clarification.
ARE rate: The number of AREs per 100,000 donations of comparable types of donation

Blood donations in Denmark

A total of 296.161blood donations were registered. The details are presented in table 1.
In comparison to 2020[i], the number of whole blood donations and platelet apheresis have remained stable, while the number of plasmapheresis has slightly increased.

Table 1: Blood donations divided by gender, type of blood donation, status, and age

			Total	
	Female	Male	N	%
Type of donation				
Whole blood	102,829	93,811	196,640	66
Plasmapheresis	37,024	61,321	98,345	33
Platelet apheresis	256	920	1,176	0
Donor status				
First time donor	9,423	6,168	15,591	5
Repeat donor	130,686	149,884	280,570	95
Age group				
17-18	1,897	871	2,768	0.9
19-22	11,772	6,066	17,838	6.0
23-29	27,130	22,552	49,682	16.8
≥30	99,310	126,563	225,873	76.3
Total	140,109	156,052	296,161	100

Summary of ARE by type of blood donation

Table 2 shows the number of AREs by type of blood donation. As expected, the overall rate of ARE is low and comparable to the 2020 data (figure 1). The rates of AREs remain markedly higher for apheresis procedures. Especially platelet apheresis, however as shown in figure 2, this is still due to a high number of registrations in the Capital Region. The Capital Region had registered a high number of citrate reactions during platelet apheresis compared to other regions, figure 5.

Table 2: AREs by type of blood donation in Denmark

	Number of ARE	Number of blood donations	ARE proportion	ARE rate per 100,000 donations
Whole blood	2,033	196,640	1	1,034
Plasmapheresis	3,624	98,345	4	3,685
Platelet apheresis	243	1,176	21	20,663
Other	26	0	0	0
All types of donations	5,926	296,161	2	2,001

Figure 1: ARE rate 2020-2021

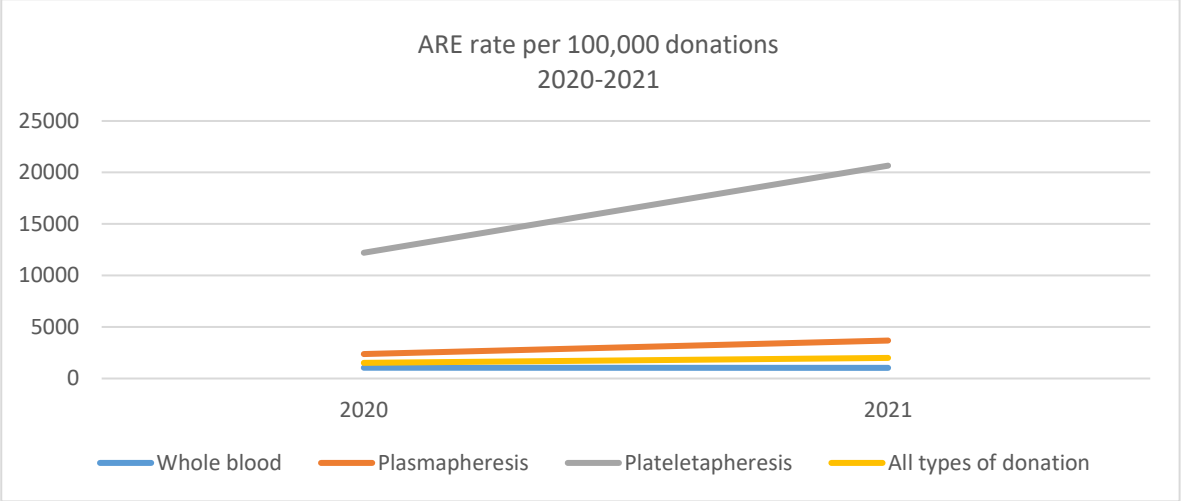
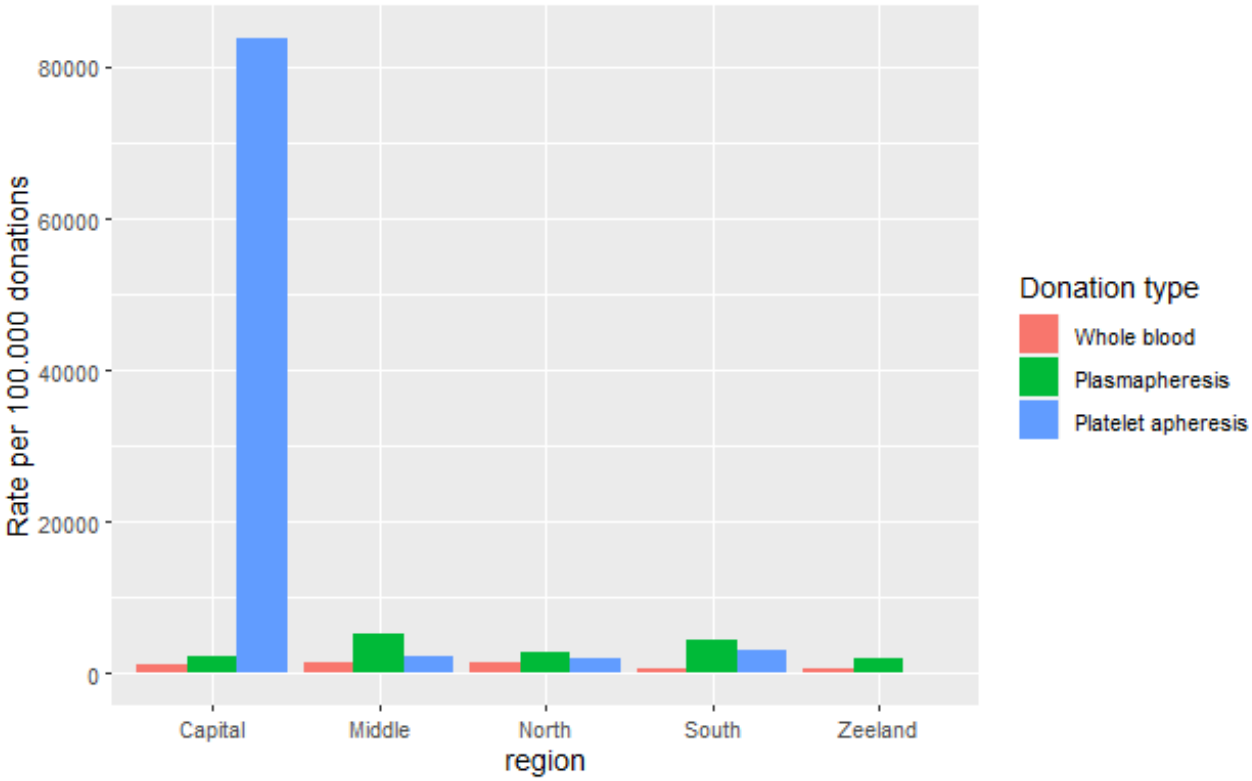


Figure 2: ARE by type of blood donation in Danish Regions



ARE divided by severity grade and imputability

The majority (96 %) of registrations have an imputability of definite or probable (table 3). The majority (92.8 %) are registered as grade 1 severity (symptoms < 2 weeks and no medical intervention). Only 1.6 % are registered as grade 2 severity (symptoms > 2 weeks or medical intervention). In total 8 donors (2.2 %) had an ARE with severity 3-5 classified as serious (SARE) and of these, 7 had an imputability of definite or probable. No grade 5 severity was registered. For definitions of severity and imputability, see appendix, table 12 and table 13, respectively.

Table 3: AREs divided by severity and imputability

	Severity						
imputability	Grade 1	Grade 2	Grade 3	Grade 4	Grade not defined*	Total, N	Total,%
Probable	384	40	5	0	6	435	7.3
Definite	5,103	106	2	1	56	5,268	88.9
Possible	64	15	4	0	2	85	1.43
Unlikely	3	0	0	0	0	3	0.1
Not defined	45	0	0	0	88	133	2.2
Not assessable	2	0	0	0	0	2	0.0
Total, N	5,601	161	11	1	152	5,926	100
Total, %	94.5	2.7	0.2	0.0	2.6	100	

***** In 1 of the 5 regions, the 3 codes are registered individually due to constraints of their IT system, consequently for some AREs only the category, but not the grade and/or imputability are registered.

AREs divided by gender, blood donation type and donor status

Tables 4-6 show that the ARE rate is higher in female donors regardless of donor status, age, or donation type. Data also shows that the ARE rate is higher in first-time donors and young donors, regardless of gender. The latter is probably biased because a large proportion of young donors are first-time donors.

These results are in accordance with published literature[5] and the 2020 report.

[5] Burkhardt T et al. Donor vigilance data of a blood transfusion service: A multicenter analysis. Transfus Apher Sci. 2015;53:180-184.

Table 4: ARE divided by gender and donor status

				ARE rate		
Donor status	Female	Male	Total, N	Female[§]	Male[#]	Total[*]
First time donor	431	273	704	4,574	4,426	4,515
Repeat donor	2,614	2,608	5,222	2,000	1,740	1,861
Total	3,045	2,881	5,926	2,173	1,846	2,001

§ rate per 100,000 blood donations from female donors according to age group
# rate per 100,000 blood donations from male donors according to age group
* rate per 100,000 blood donations according to age group

Table 5: AREs divided by gender and age

				ARE rate		
Age	Female	Male	Total, N	Female[§]	Male[#]	Total[*]
17-18	100	36	136	5,271	4,133	4,913
19-22	487	211	698	4,137	3,478	3,913
23-29	861	664	1,525	3,174	2,944	3,070
30	1,597	1,970	3,567	1,608	1,557	1,579
Total	3,045	2,881	5,926	2,173	1,846	2,001

§ rate per 100,000 blood donations from female donors according to age group
# rate per 100,000 blood donations from male donors according to age group
* rate per 100,000 blood donations according to age group

Table 6: AREs divided by blood donation type and gender

				ARE rate		
Donation Type	Female	Male	Total, N	Female[§]	Male[#]	Total[*]
Whole blood	1,317	716	2,033	1,281	763	1,034
Plasmapheresis	1,618	2,006	3,624	4,370	3,271	3,685
Platelet apheresis	97	146	243	37,891	15,870	20,663
Total	3,032	2,868	5,900	2,164	1,838	1,992

§ rate per 100,000 blood donations from female donors according to blood donation type
# rate per 100,000 blood donations from male donors according to blood donation type
* rate per 100,000 blood donations according to blood donation type

ARE and type of blood donations

Categories with no registrations have been omitted from the tables and figures. For a total overview of all possible categories, please see appendix, table 11.

Whole Blood

Figure 3 and Table 7 show the ARE in whole blood. The most common ARE was on-site vasovagal reactions without loss of consciousness (LOC) followed by hematoma, together accounting for nearly 80 % of registered ARE and all with a severity of 2 or less. No severe ARE (grade 4) was recorded. The ARE category distribution-pattern for all ARE in all five regions is shown in figure 3. Especially, the categories with a high proportion of mild severity are distributed unequally (hematoma, on-site vasovagal reaction without LOC). The unequal distribution could most likely be explained by differences in interpretation of the definitions of categories and different threshold for registration. In 2020 we saw a similar picture and asked the five regions about their registration practice and threshold for these AREs. The response supported that the differences could be explained by local differences in registration practice. Consequently, we revised the definitions trying to make them clearer when to register. This seems not to have had any benefit, as we expect this to be the case also in 2021.

Figure 3: Distribution of ARE in relation to whole blood donation in Danish Regions

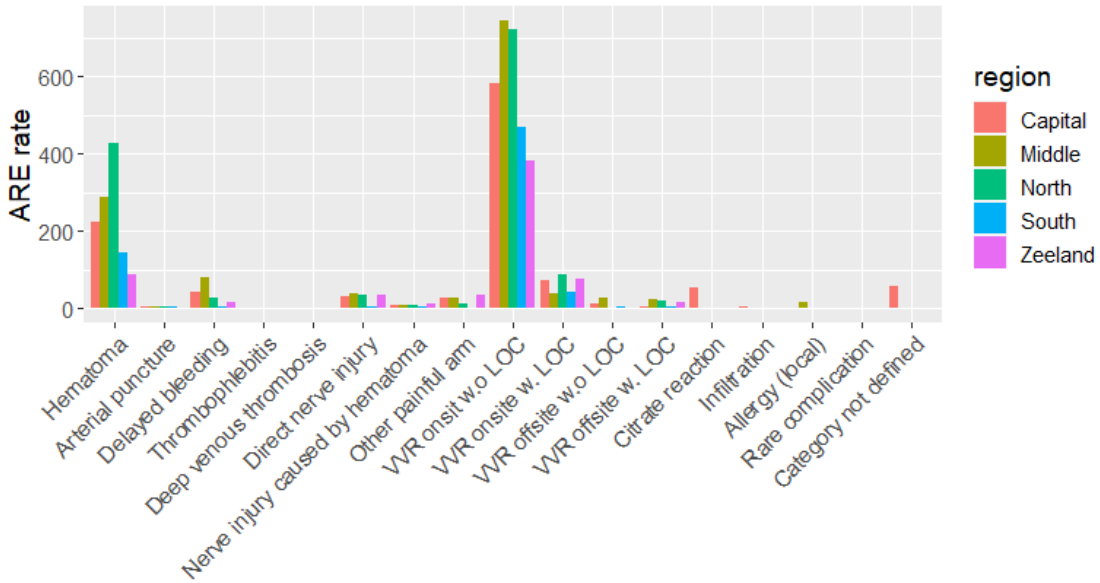


Table 7: Whole blood donations

	Severity					Total		
Category	Grade 1	Grade 2	Grade 3	Grade 4	Grade not defined	N	%	Rate per 100,000 whole blood donations
Vessel injury								
Hematoma	417	9	0	0	17	443	21.8	225
Arterial puncture	5	3	0	0	0	8	0.4	4
Delayed bleeding	66	1	0	0	6	73	3.6	37
Thrombophlebitis	1	0	0	0	0	1	0	1
Deep venous thrombosis	0	1	0	0	0	1	0	1
Pain								
Direct nerve injury	42	6	1	0	5	54	2.7	27
Nerve injury caused by hematoma	6	6	1	0	2	15	0.7	8
Other painful arm	31	5	0	0	5	41	2	21
Vasovagal reaction								
VVR onsit w.o LOC	1,119	5	0	0	20	1144	56.3	582
VVR onsite w. LOC	113	4	0	0	5	122	6	62
VVR offsite w.o LOC	19	3	0	0	1	23	1.1	12
VVR offsite w. LOC	14	8	2	0	0	24	1.2	12
Apheresis								
Citrate reaction	34	0	0	0	1	35	1.7	18
Infiltration	2	0	0	0	0	2	0.1	1
Allergic reaction								
Allergy (local)	7	0	0	0	1	8	0.4	4
Miscellaneous								
Rare complication	1	0	0	0	0	1	0	1
Category not defined	24	1	0	0	13	38	1.9	19
Total	1,901	52	4	0	76	2033	100	1,034

Plasmapheresis

Like the ARE distribution recorded in relation to whole blood donations, hematoma and on-site vasovagal reactions without loss of consciousness accounted for the majority (72%) of the registered ARE in relation to plasmapheresis donations (Figure 4 and Table 8). The ARE category distribution-pattern for all five regions is shown in figure 4. Again, local differences in distribution are noted and being even more pronounced than for AREs in relation to whole blood donations. Also, we find the same trend, that unequal distribution primarily is related to the categories with a high proportion of AREs with a mild severity. Especially hematoma, delayed bleeding and VVR without LOC show an unequal distribution. The unequal distribution could most likely be explained by differences in interpretation of the definitions of categories and different threshold for registration. We saw the same pattern in 2020, where we asked the five regions about their registration practices and thresholds for these AREs. The response supported that the differences could be explained by local differences in registration practice. We do not expect this to be different in 2021. Consequently, we revised the categories in 2021, but this seems not to have had any impact.

Figure 4: Distribution of AREs in relation to plasmapheresis in Danish Regions

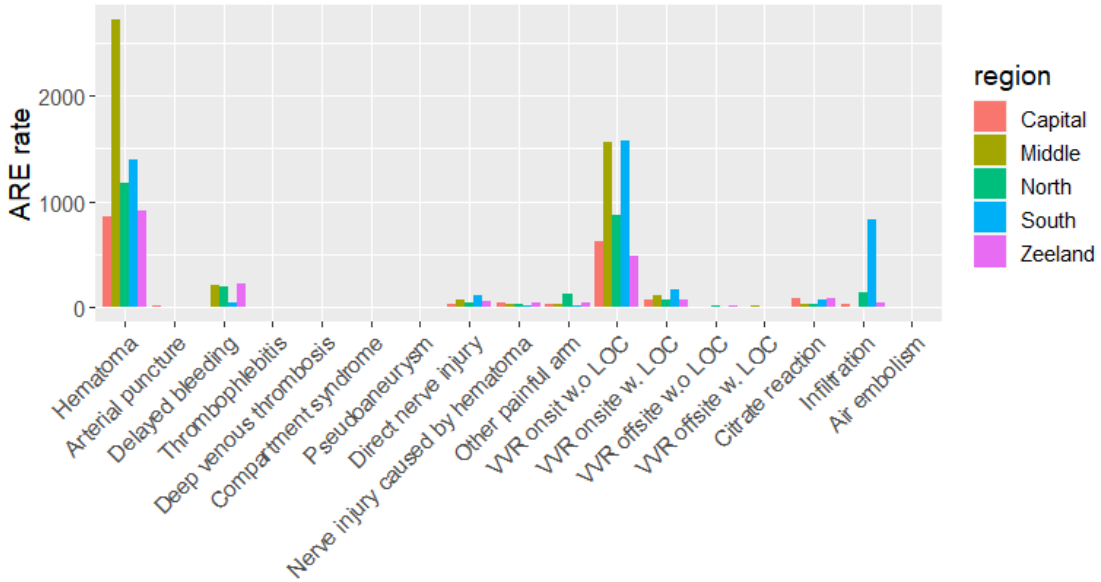


Table 8: Plasmapheresis

	Severity					Total		
Category	Grade 1	Grade 2	Grade 3	Grade 4	Grade not defined	N	%	Rate per 100,000 plasmapheresis
Vessel injury								
Hematoma	1,409	10	1	0	44	1,464	40.4	1,489
Arterial puncture	5	0	0	0	0	5	0.1	5
Delayed bleeding	116	0	0	0	1	117	3.2	119
Thrombophlebitis	1	0	0	0	0	1	0	1
Deep venous thrombosis	0	2	0	0	0	2	0.1	2
Compartment syndrome	1	0	0	0	0	1	0	1
Pseudoaneurysm	2	0	0	0	0	2	0.1	2
Pain								
Direct nerve injury	67	5	1	0	1	74	2	75
Nerve injury caused by hematoma	16	8	0	0	3	27	0.7	27
Other painful arm	34	2	0	0	2	38	1	39
Vasovagal reaction								
VVR onsit w.o LOC	1,142	2	1	0	5	1,150	31.7	1,169
VVR onsite w. LOC	106	6	1	0	0	113	3.1%	115
VVR offsite w.o LOC	7	2	0	0	0	9	0.2	9
VVR offsite w. LOC	3	1	1	0	0	5	0.1	5
Apheresis								
Citrate reaction	50	4	1	1	2	58	1.6	59
Infiltration	316	2	0	0	0	318	8.8	323
Air embolism	0	1	0	0	0	1	0	1
Allergic reaction								
Allergy (local)	18	0	0	0	3	21	0.6	21
Miscellanous								
Rare complication	3	2	1	0	0	6	0.2	6
Category not defined	138	62	0	0	12	212	5.8	216
Total	3,434	109	7	1	73	3,624	100%	3,685

Platelet apheresis

Figure 5 and Table 9 shows the AREs recorded in relation to platelet apheresis. For platelet apheresis, the registration was dominated by the reports of citrate reactions in one region as in 2020. The ARE category distribution-pattern for all ARE in all five regions is shown in figure 5. The distribution is even more unequal than for the other two types of donations. The unequal distribution could most likely be explained by differences in interpretation of the definitions of categories and different thresholds for registration. The same pattern was seen in 2020, where we asked the five regions about their registration practices and thresholds for these AREs. The response supported that the differences could be explained by local differences in registration practice. We do not expect this to be different in 2021. Consequently, we revised the categories in 2021, but this seems not to have had any impact.

Figure 5: Distribution of AREs in relation to platelet apheresis in Danish Regions

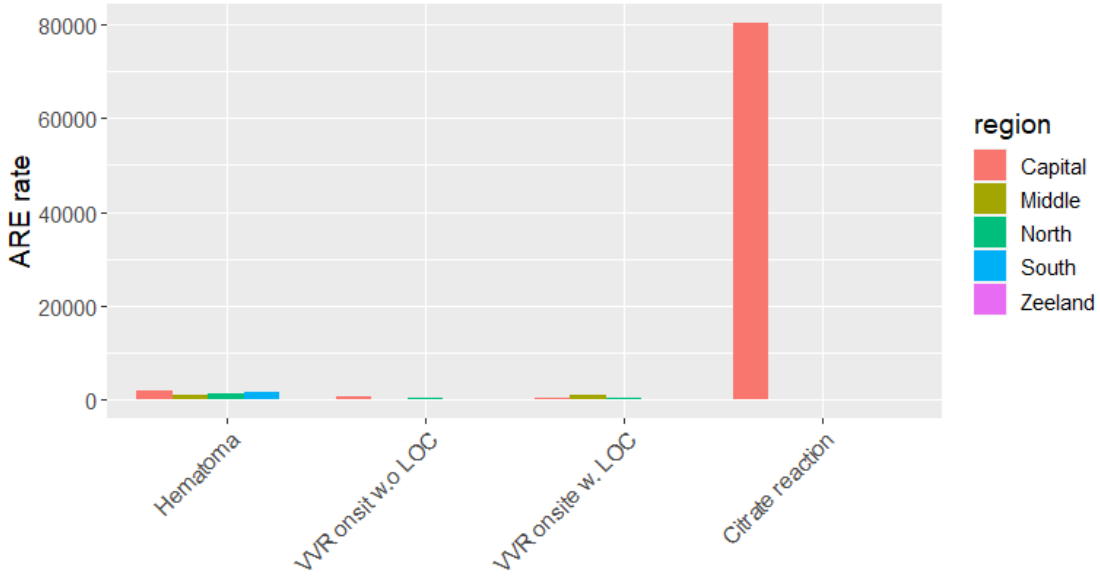


Table 9: Platelet apheresis

	Severity					Total		
Category	Grade 1	Grade 2	Grade 3	Grade 4	Grade not defined	N	%	Rate per 100,000 platelet apheresis
Hematoma	13	0	0	0	0	13	5.3	1,105
VVR onsite w.o LOC	3	0	0	0	0	3	1.2	255
VVR onsite w. LOC	3	0	0	0	0	3	1.2	255
Citrate reaction	218	0	0	0	1	219	90.1	18,622
Infiltration	2	0	0	0	0	2	0.8	170
Category not defined	1	0	0	0	2	3	1.2	255
Total	240	0	0	0	3	243	100%	20,663

Vasovagal reaction in relation to blood donation

As the most common ARE, vasovagal reactions were of particular interest. Data on vasovagal reactions divided by severity, donation type, gender, age, and donor status are shown in table 10. Overall, across all blood donation types, vasovagal reactions were found to be in general mild (96 % grade 1). Vasovagal reactions after leaving the blood bank have a potential for severe consequences, due to the risk of accidents and therefore one of the most feared ARE. Data shows that only 3 % (N=63) of all vasovagal reactions happen after the donor has left the donation site. In our data, vasovagal reactions remain clearly associated with younger age, female gender and first-time donors, corresponding to what is already described in the literature[6] and our 2020 report. Also, the rate of vasovagal reaction was highest in plasmapheresis donors. This contrasts with a previous report[7], but the data in the referenced report is also very heterogenic.

[6] Gillet P et al. First-time whole blood donation: A critical step for donor safety and retention on first three donations. Transfus Clin Biol. 2015 Oct-Dec;22(5-6):312-7. Wiersum-Osselton, J.C. et al. Risk factors for complications in donors at first and repeat whole blood donation: a cohort study with assessment of the impact on donor return. Blood Transfusion 2014, 12 (Suppl. 1), s28–s36. Bravo, M. et al. Factors associated with fainting: before, during and after whole blood donation. Vox Sanguinis 2011, 101, 303–312. Tondon, R. et al. vasovagal reactions in 'at risk' donors: a univariate analysis of effect of age and weight on the grade of donor reactions. Transfusion and Apheresis Science 2008, 39, 95–99.

[7] Wiersum-Osselton, J.C. et al. Complications of blood donation reported to haemovigilance systems: analysis of eleven years of international surveillance. Vox Sang. 2020 Dec 5..

Table 10: Vasovagal reactions divided by severity, blood donation type, gender, age, and donor status

	On-site		After leaving the blood bank		Total		
	N	%	N	%	N	%	ARE rate
Severity							
Grade 1	2,507	96	44	2	2,551	97	861
Grade 2	17	1	14	1	31	1	10
Grade 3	2	0	3	0	5	0	2
Grade not defined	30	1	1	0	31	1	10
Type of blood donation							
Whole blood	1,266	49	47	2	1,313	51	668
Plasmapheresis	1,263	49	14	1	1,277	49	1,298
Platelet apheresis	6	0	0	0	6	0	510
Gender							
Female	1,452	55	46	2	1,498	57	1,069
Male	1,104	42	16	1	1,120	43	718
Blood donation type and gender							
Female							
Whole blood	841	32	39	1	880	34	856
Plasmapheresis	601	23	6	0	607	23	1,639
Male							
Whole blood	425	16	8	0	433	17	462
Plasmapheresis	662	25	8	0	670	26	1,093
Platelet apheresis	6	0	0	0	6	0	652
Age and gender							
Female							
17-18	78	3	0	0	78	3	4,112
19-22	338	13	11	0	349	13	2,965
23-29	440	17	7	0	447	17	1,648
≥30	596	23	28	1	624	24	628
Male							
17-18	25	1	1	0	26	17	2,985
19-22	126	5	1	0	127	24	2,094
23-29	344	13	5	0	349	3	1,548
≥30	609	23	9	0	618	13	488
Donor status							
Repeat donor	2,004	77	54	2	2,058	79	734
First time donor	552	21	8	0	560	21	3,592
Total	2,556	98	62	2	2,618	100	0

* ARE rate is calculated as per 100,000 donations in the same category as the corresponding ARE

Conclusion

The 2021 data largely follows the same trends displayed in the 2020 report. It is safe to donate blood in Denmark. The majority of AREs are mild (grade 1 severity). In line with other international reports, hematoma and vasovagal reactions were the most common ARE regardless of donation type. ARE is most frequent in female donors and in first-time donors.

The rate of citrate reactions in platelet apheresis in the Capital region remains very high. This is due to a preventive, early administration of calcium tablets with the slightest indication of a citrate reaction. It is planned to look deeper into this practice whether or not it improves the donation experience and donor retention.

Due to the regional differences in reporting hematomas, delayed bleeding, vasovagal reaction onsite without LOC, we revised the definitions of these categories in beginning of 2021. This has not shown to have any effect of the registration. We observe same unequal pattern in the reporting of these categories.

Appendix

Description of registration in blood bank IT system

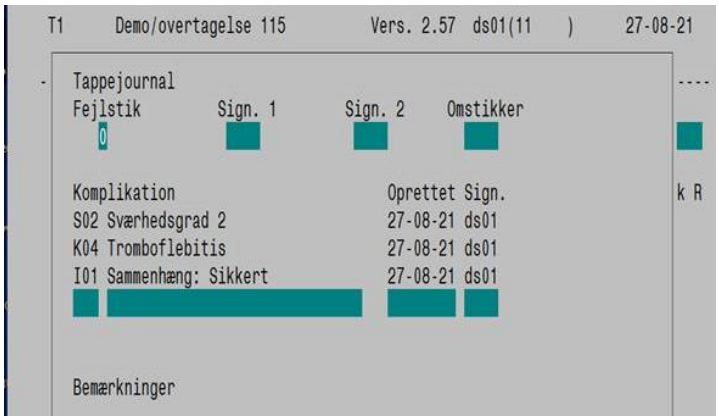
The registration ensures that the following information can be exported from the system:
Nominator:
Type of donation (whole blood, plasmapheresis, platelet apheresis)
Gender and age of donor
First-time donation or repeat donation
If plasmapheresis, volume collected
Category of complication, severity grade and imputability
Denominator:
Total number of donations (whole blood, plasmapheresis, platelet apheresis)
Total number of donations in relation to gender, first-time donations/repeat donations
Total number of donations divided on age groups (17-18, 19-22, 23-29, 30-69, >70 år)

In Denmark, 2 blood bank IT systems are used (Prosang and Blodflödet). The registration can be done on-site when the reaction is noticed, days/months after the donation when donor informs the blood bank. The registration can be updated at every time e.g. at follow-up.

Prosang:
The blood bank staff register a clinical value on donor ("medicinsk værdi"). A clinical value is set up in the system dedicated for registration of donor complication and named "bivirk". The registration consists of 3 values, the unique personal identification number of the donor (cpr.no), the date of the donation, and the 3-digit code of the ARE. By using the personal identification number, we can in the export of data, get all information related to the donor, e.g. age, gender, number of donations etc. The date is set to the date of the respective donation and in this way we can in the export combine data on the actual donation with the adverse reaction. The 3-digit combination is the combination of category, severity and imputability ref. table 11-13. The system only accepts a 3-digit combination. A barcode is made of all combinations that can be scanned and used instead of manually entering the 3 digits. If more complications are registered on the same donation, the clinical values "bivirk2" and "bivirk3" must be used and the registration is performed in the same way as "bivirk". When a follow-up is done and the registration should be changed, a new clinical value is registered. This clinical value is named "bivirk opfolg". The registration is again done the same way. It is possible to export data related to the clinical value and the result on the clinical value is searchable. If more than one clinical value is registered on the donation, then the followup clinical value and the primary clinical value must be in concordance, e.g. if "bivirk2" is registered then "bivirk opfolg2" must be used.

Blodflödet:
The blood bank staff register the ARE in the donation-charts ("tappejournal"). A clinical value is set up in the system dedicated for registration of donor complication and named "Komplikation". The

registration consists of three separate registrations. A K-code (Category), an S-code (severity) and I-code (Imputability) as illustrated in table 11-13. The date is set to the date of the respective



donation and in this way we can in the export combine data on the actual donation with the adverse reaction. The system is not able to detect if one or more codes are missing and the user is responsible for ensuring correct registration themselves. If more ARE are registered, then they are added to the same list. When a follow-up is done and the registration should be changed, a new clinical value is registered. An example of registration is shown below.

TABLE 11 (translated from Danish): Categories[8]

Categories AREs (the code is used as first element in the registration)				
Code		**Category**	**subcategory**	**Symptoms**
Prosang	Blodflödet	Injury to vessel		
A	K01		Hematoma (bruise)	Bruising, discolouration, swelling and local pain
B	K02		Arterial puncture	A lighter red colour than usual of the collected blood can be seen. The needle and tubing may appear to pulsate; the blood bag fills very quickly. Local pain
C	K03		Delayed bleeding	Spontaneous recommencement of bleeding from the venepuncture site, after pressure has been applied and the initial dressing has been removed, or leaking through the dressing
D	K04		Thrombophlebitis	Redness, swelling, and tenderness extend along the course of the vein
E	K05		Deep venous thrombosis (DVT)	Swelling and pain in the upper arm. May be accompanied by symptoms of superficial inflammation and thrombosis.
F	K06		Compartment syndrome	Painful arm, particularly on movement; swelling, paresthesias and partial paralysis.
G	K07		Pseudoaneurysm	Pulsating mass in the arm. May be accompanied by pain and paraesthesias.
H	K08		Arteriovenous fistula	Pulsating mass with a palpable thrill and associated bruit. The affected area may be warm, and the distal part of the arm may be

[8] modified according to Standard for Surveillance of Complications Related to Blood Donation, ISBT, IHN, AABB, 2014

				cool if significant shunting of blood is present. The distal veins may be dilated and may pulsate
		Pain in the arm		
I	K09		Nerve injury/irritation (caused by direct nerve injury)	Symptoms arise **immediately** when the needle is inserted or withdrawn: Radiating, often 'electrical' sharp pain moving away from the venepuncture site, and/or paraesthesias such as tingling, burning sensations in the hand, wrist or shoulder area but away from the venepuncture site. Symptoms may be worse in certain positions or with certain arm motions
J	K10		Nerve injury/irritation (caused by hematoma)	Symptoms arise **after** the needle has been removed: Radiating, often 'electrical' sharp pain moving away from the venepuncture site, and/or paraesthesias such as tingling, burning sensations in the hand, wrist or shoulder area but away from the venepuncture site. Symptoms may be worse in certain positions or with certain arm motions.
K	K11		Other painful arm	Pain in the arm that **canno**t be characterized as: Radiating, often 'electrical' sharp pain and/or paraesthesias such as tingling, burning sensations in the hand, wrist or shoulder area
		Vasovagal reactions/loss		Usually several of the following: discomfort, weakness, anxiety, light-headedness/dizziness,

		of consciousness		nausea, chills, sweating, vomiting, pallor, hyperventilation, rapid or a slow pulse, hypotension, loss of consciousness (LOC), loss of bladder or bowel control or convulsive movements
L	K13		On collection facility, without loss of consciousness	
M	K14		On collection facility, with loss of consciousness	
N	K15		Outside collection facility, without loss of consciousness	
O	K16		Outside collection facility, with loss of consciousness	
		Complications related to apheresis		
P	K17		Citrate reaction	Numbness or tingling of lips, feelings of vibrations, numbness or tingling in the fingers, metallic taste, chills, shivering, light-headedness, feeling of tightness, muscle twitching
Q	K18		Infiltration	Swelling of the tissues at the venipuncture site (fluids enter the surrounding tissues)
R	K19		Air embolism	Bubbling sound or feeling at the venipuncture site. Cough, dyspnea, apprehension, sweating, chest pain, confusion, tachycardia, hypotension, nausea and vomiting.
S	K20		Haemolysis	Pink or red plasma, blood in lines or filter may appear dark. The donor may notice pink or red urine after collection
		Allergic reactions		
T	K21		Allergy (local)	Itching and redness at the venepuncture site, the bandage

				site, or the entire skin disinfection area. In a true allergic reaction, there may be a raised rash or hives in these areas that may expand to cover a larger area of the arm. The reaction may occur soon after donation or in the hours to days post-donation
U	K22		Generalised allergic reaction (anaphylactic reaction)	Apprehension, anxiousness, flushing, swelling of eyes, lips or tongue, cyanosis, cough, wheezing, dyspnea, chest tightness, cramps, nausea, vomiting, diarrhoea, tachycardia, hypotension, and altered mentation.
		Other serious complications		Hjertesymptomer, cerebrovaskulær event, fraktur, involvering i ulykker.
Z	K23		Rare complication	

TABLE 12 (translated from Danish): Severity[9]

Severity of ARE (the code is used as the second element in the registration)			
Code		**Severity**	**Explanation**
Prosang	Blodflödet		
1	S01	Grade 1	Symptoms that resolves with no or minimal intervention in the blood bank **and** do not require Outside Medical Care (OMC) **and** persist ≤ 2 weeks/expected to persist ≤ 2 weeks **and** has no limitation on Activities of Daily Living (ADL) Donor must contact the blood bank if the symptoms persist more than 2 weeks, if any medical care/hospitalization or limitation on activities on daily living.
2	S02	Grade 2	Outside Medical Care (OMC) without hospitalization **or** duration of symptoms more than 2 weeks but less than 6 months **or** limitations on Activities of Daily Living in less than 2 weeks. Outside Medical Care (OMC) without hospitalization: e.g. examination/treatment at GP, physiotherapist, observation in the Emergency Room
3	S03	Grade 3	Hospitalization **or** duration of symptoms more than 6 months **or** limitations on Activities of Daily Living in more than 2 weeks **or** surgery of any kind. *Hospitalization:* inpatient admission to the hospital; does NOT include being seen and discharged from urgent care or hospital emergency department
4	S04	Grade 4	Immediate medical intervention required to prevent death
5	S05	Grade 5	Death
		Definitions:	*limitation on Activities of Daily Living (ADL):* Include everyday household chores, doing necessary business, shopping, going to work or school, or getting around for other purposes. ADL is impacted if the donor • needs the help of other persons with bathing or showering, dressing, eating, getting in or out of bed or chairs, using the toilet, and getting around the home (Self-care ADL) • cannot work, attend school or manage routine personal/family activities because of the Donor Adverse Event (Instrumental ADL).

[9] Modified according to Grading Severity of Blood Donor Adverse Events Tool, AABB 2018

		ARE with severity grade 3, 4 and 5 must also be reported to the Danish Patient Safety Authority *ARE with severity grade 2, 3, 4 and 5 must also be reported to Blood Donors in Denmark. ARE with severity grade 1 is reported to the Blood Donors in Denmark if donor is entitled to reimbursement*

TABLE 13 (translated from Danish): Imputability

Imputability (the code is used as the third element in the registration)			
Code		**Imputability**	**Explanation**
prosang	Blodflódet		
9	I05	Not assessable	When there is insufficient data for causality assessment
0	I04	Unlikely	When the evidence is clearly in favour of attributing the ARE to causes other than the blood or blood components
1	I03	Possible	When the evidence is indeterminate for attributing the ARE to the blood donation or to alternative causes
2	I02	Probable (likely)	When the evidence is clearly in favour of attributing the ARE to the blood donation
3	I01	Definite (certain)	When there is conclusive evidence beyond reasonable doubt for attributing the ARE to the blood donation

[i] blood-donation-adverse-reaction-and-events-annual-report-2020-final.pdf (dski.dk)