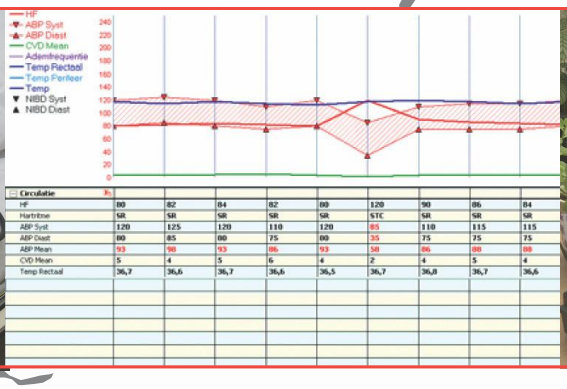
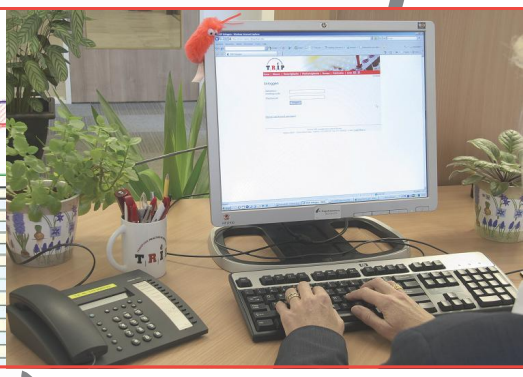
TRANSFUSIE REACTIES IN PATIËNTEN

TRIP

TRIP annual report 2009
Hemovigilance



Circulatie									
HF	80	82	84	82	80	120	90	86	84
Hartritme	SR	SR	SR	SR	SR	STC	SR	SR	SR
ABP Syst	120	125	120	110	120	85	110	115	115
ABP Diast	80	85	80	75	80	35	75	75	75
ABP Mean	93	98	93	86	93	58	86	88	88
CVD Mean	5	4	5	6	4	2	4	5	4
Temp Rectaal	36,7	36,6	36,7	36,6	36,5	36,7	36,8	36,7	36,6



TRIP – Transfusion Reactions In Patients

TRIP annual report 2009
Hemovigilance

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The TRIP annual report 2009 concerning hemovigilance reports in the Netherlands in 2009 is published under editorial responsibility of the TRIP Foundation (Transfusion Reactions In Patients). The board of TRIP Foundation includes representatives of the various professional bodies involved in blood transfusion..

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Foreword

This is the TRIP annual report 2009. There are two versions of the TRIP hemovigilance report 2009: a standard version and an extended version. The extended version includes – among other things – detailed discussions of the various categories of reports and is particularly aimed at hemovigilance officers and hemovigilance assistants. Since last year, a separate report has been published concerning tissue vigilance in the Netherlands.

A number of remarks on important conclusions and recommendations of the report: the number of serious reactions has decreased, in part due to a decrease in the number of reports of TRALI (transfusion-related acute lung injury) and severe anaphylactic reactions. The decrease in the number of reports of TRALI is probably the result of the measure implemented by Sanquin, that of supplying hospitals with plasma obtained exclusively from male donors.

Anaphylactic reactions are the most common serious reaction and it is good to emphasise that these reactions cannot be prevented by hospital employees, but that rapid detection and adequate treatment are a matter of life and death in this case.

There were only two reports of suspected transmission of infections via blood components: one bacterial infection and one viral infection, both in the imputability category probable. Therefore, the labile blood components supplied by Sanquin are very safe.

The number of errors made in the hospital when requesting blood components, processing the requests and administering blood components has not decreased. Therefore, I want to emphasise the first recommendation once more: “Measures to make the identification procedures more robust are required. This could include electronic systems to support the procedures.”

Finally, I wish to draw your attention specifically to Recommendation 5: “It would be sensible to record data about the transfusion chain in a standardised manner, so that comparisons of transfusion practice and outcomes becomes possible. The revised CBO guideline could form a starting point for this.” The revised CBO Guidelines for Blood Transfusion will be published during 2011 and TRIP will lead a pilot project, in which the listed quality indicators will be evaluated.

Hemovigilance is an international activity. We can learn a lot from the experiences and data from other countries. Therefore, I am pleased to invite you to attend the 13th International Hemovigilance Seminar, which will take place in Amsterdam from 9 to 11 February 2011. For more information and registration, please visit www.ihn-org.net.

I would like to thank all the staff of the TRIP Office, the members of the Expert Committee who checked all the reports and the members of the TRIP Governing Board who commented critically on this report.

Finally: I warmly recommend this report to you and hope that reading it will contribute to the further improvement of the quality and safety of blood transfusion in the Netherlands.

Prof. René R.P. de Vries
President, TRIP Foundation

1. Introduction

The TRIP (Transfusion Reactions in Patients) Dutch National Hemovigilance Office – set up as an initiative by blood transfusion professionals – has managed the registration of transfusion reactions (TR) and incidents in the transfusion chain in the Netherlands since 2003. In European directive 2002/98/EC it is laid down that there is an obligation to report serious adverse reactions and incidents that may be associated with the quality and/or safety of blood components. TRIP provides analysis and the annual overview of these serious (grade 2 or higher)* reactions on behalf of the competent authority, the Healthcare Inspectorate (Inspectie voor de Gezondheidszorg, IGZ). The reporting hospital is still responsible for submitting the report to the IGZ. Reporting to TRIP is seen as the professional standard by the IGZ as well as in the national CBO Blood Transfusion Guidelines. An Expert Committee, appointed from the TRIP Governing Board, assesses all submitted reports.

2. Hemovigilance in 2009

2.1 Participation

In 2009, 99 of the 103 (94 %) hospitals participated in the registration. Of these, 92 hospitals reported transfusion reactions and seven hospitals indicated that there were no transfusion reactions in the TRIP categories to report. The closing date for the report was 1 March 2010.

Figure 1 shows the level of participation over the years 2002 (baseline measurement) up to and including 2009.

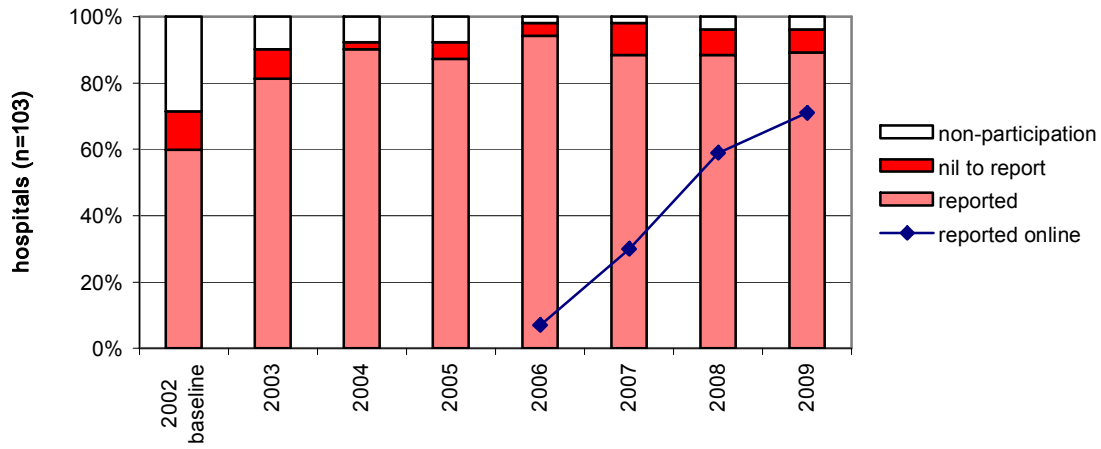

Figure 1 Participation per year

***Severity grades of transfusion reactions**

Severity grade	*Definition*
0	*No morbidity*
1	*Minor morbidity, not life-threatening*
2	*Moderate to serious morbidity, may or may not be life-threatening; or leading to hospitalisation or prolongation of illness; or associated with chronic disability or incapacity*
3	*Serious morbidity, directly life-threatening*
4	*Mortality following a transfusion reaction*

Severity grade 2 or higher corresponds to the European description "serious".

2.2 Summary of data regarding the reports for 2009

In total, 2384 reports were received in 2009 (2008: 2052 including late reports), an increase of 16%. The number of serious reports with imputability possible, probable or certain was 98, which is lower than in the reporting years 2006 – 2008 when the annual average was 116. The total is divided into 2109 reports of transfusion reactions and 275 incidents. A transfusion reaction was reported as a subsidiary category for 25 incidents. Of all the reports, 2019 were submitted electronically (85%, from 71 hospitals). The number of reports per category in the years 2003 up to and including 2009 are presented in *Table 1* and *Table 2*.

Table 1 Transfusion reactions reported to TRIP, 2003–2009

Reaction	2003	2004	2005	2006	2007	2008	2009	Grade 2 or higher #	No. hospitals with reports in 2009
NHTR	318	345	435	490	452	453	485	15	79
Mild febrile reaction	326	341	375	363	328	275	357	4	68
AHTR	8	14	9	19	11	18	18	6	16
DHTR	19	14	12	14	11	18	8	3	8
TRALI	7	9	17	25	31	21	12	12	10
Anaphylactic reaction	8	21	26	19	54	65	69	19	31
Other allergic reaction	132	171	219	222	202	171	180	0	48
Circulatory overload	7	6	27	34	31	39	41	14	22
Post-transfusion purpura	0	0	0	0	0	1	0	0	0
TA-GVHD	0	0	0	0	0	1	0	0	0
Hemosiderosis	0	0	3	5	3	5	2	0	1
New allo-antibody	244	428	571	607	601	607	753	2	60
Other reaction	54	64	67	61	55	101	132	15	45
Post-tf bacteremia / sepsis§	9	5	10	7	19	37	50	0	34
Post-tf viral infection	5	7	8	7	7	7	2	0	2
Total TR	**1137**	**1425**	**1779**	**1873**	**1805**	**1819**	**2109**	**90**	**92**
Total reports*	**1268**	**1547**	**1984**	**2130**	**2081**	**2052**	**2384**	**98 ***	**92**

imputability certain, probable or possible
§ up to and including 2007: bacterial contamination; see definitions on www.tripnet.nl
* Total transfusion reactions and incidents

Table 2 Incidents per year, 2003–2009

Incident	2003	2004	2005	2006	2007	2008	2009	No. hospitals with reports in 2009
Incorrect bc transfused	34	36	60	64	64	59	60	32
Near miss	31	62	79	77	74	55	72	19
Other incident	5	12	51	86	100	83	110	22
Look-back (info reported by hospital to TRIP)		2	2	1	4	9	6	4
Virally infected component				2	0	2	1	0
Positive bacterial screen[$]	61	10	13	27	29	2	4	4
Bacterial contamination[$]					5	23	22	11
Total	**131**	**122**	**205**	**257**	**276**	**233**	**275**	**48**

[$] Amended definitions as of 2008, see www.tripnet.nl
bc = blood component

The increase in 2009 was caused mainly by the increase in reported febrile reactions, reports of newly formed antibodies and reports of other incidents. There was also an increase in the category other reaction. There are several reports of hypotension and breathing difficulties following transfusion in the category other reaction, for which there is currently no specific TRIP reporting category.

Number of reports in relationship to the number of blood components supplied

In 2009, Sanquin supplied a total of 699,720 blood components to hospitals, excluding special products such as lymphocytes and granulocytes. The total number of reports for 2009 was 2384. This is an average of 3.41 reports per 1000 blood components distributed nationally. The number of reports per 1000 units has remained stable at around 2.9 since the reporting year 2005. The number of reports per type of blood component is presented in *Table 3*.

Table 3 Number of reports per type of blood component in 2008 and 2009

Type of blood component (bc)	2008 Number of bc supplied	2008 Reports; number	2008 Reports; number per 1000 bc	2008 Serious reports[#]; number	2008 Serious reports[#]; number per 1000 bc	2009 Number of bc supplied	2009 Reports; number	2009 Reports; number per 1000 bc	2009 Serious reports[#]; number	2009 Serious reports[#]; number per 1000 bc
Red blood cell concentrate	559,372	1518	2.71	79	0.14	559,976	1812	3.24	63	0.11
Platelet concentrate	50,784	262	5.16	26	0.51	49,354	302	6.12	18	0.36
Fresh frozen plasma	96,622	81	0.84	11	0.11	90,390	99	1.10	8	0.09
Autologous (RBCs, pre-deposit)	110 dona-tions	1		0		No info	1		0	
Cell-saver and drain blood		24		1			32		3	
Other products		4		0			0		0	
Combinations		95		14			70		6	
Not stated		79		1			68		0	
Total	**706,868**	**2053**	**2.90**	**132**	**0.19**	**699,720**	**2384**	**3.41**	**98**	**0.14**

[#] Imputability certain, probable, possible

2.3 Transfusion-associated acute lung injury (TRALI)

A total of 12 TRALIs were reported in 2009 (all with imputability certain, probable or possible) in comparison to 21 reports in 2008 (19 certain, probable or possible). The number of reports of TRALI increased from 2003 to 2007, probably due to increased national and international focus on this transfusion reaction. At the end of 2006, Sanquin implemented the measure that only plasma from male, never-transfused donors can be used for the preparation of quarantine fresh frozen plasma for transfusion purposes. Due to the quarantine period, the measure all plasma distributed from the middle of 2007. Since that time, there have been fewer reports of TRALI after administration of plasma. An additional analysis calculated that the implementation of the measure resulted in the total number of annual TRALI reports decreasing by approximately one third (JC Wiersum-Osselton et al., Transfusion, in press).

2.4 Infectious transfusion complications

In 2009, the Sanquin Blood Bank received one report in the category viral contamination of a blood component. A look-back investigation was performed on previous donations by a donor who – upon implementation of an additional, more sensitive test (a nucleic acid amplification test) for that virus – was found to be a carrier of occult hepatitis B infection. One recipient of a blood component that had been screened as negative prior to its release had had a hepatitis B infection. This was registered as a post-transfusion viral infection, imputability probable.

Out of 55 reports of post-transfusion bacteremia/sepsis and 43 reports of bacterial contamination of a blood component as a main category or subsidiary category, a single report describes clinical symptoms with plausible evidence that they result transfusion of a bacterially contaminated blood component. In the reports from hospitals following look-back investigations by the blood service, which included three reports relating to Q fever, there was no evidence for the transmission of infection by blood transfusion.

2.5 Deceased patients and transfusion reactions (grade 4)

There were three grade 4 reports in 2009 (2008: four). In one case the transfusion reaction may have contributed to the death of the patient: transfusion of an un-cross-matched O negative RBC concentrate in an emergency situation resulted in an acute hemolytic transfusion reaction based on a previously unknown allo-antibody (anti-K). The patient, with a history of ischemic cardiac problems, stabilised after the administration was stopped and received supportive treatment, but died within 12 hours from cardiac problems. A second grade 4 report concerns a TRALI with imputability possible that occurred in a woman undergoing chemotherapy, who also had a history of respiratory problems. The third report registered as grade 4 had a low imputability: a patient with a malignancy and a urinary tract infection developed a fever following a blood transfusion. A positive blood culture result was ascertained, but the unit was not cultured. The patient died of sepsis two days later.

2.6 Incidents in the transfusion chain

There were 60 reports in the category incorrect blood component transfused in 2009. The number of reports of IBCT remained stable compared to previous years. There was a marked increase in the number of reports in the categories other incident and near miss. The number of other incidents (110) increased by 33 % compared to 2008 (83).

For 30 of the reports of IBCT, transfusion of the wrong patient or the wrong blood unit created a risk of ABO incompatible blood transfusion. Identification errors in various steps of the transfusion chain are by far the most frequent direct cause of this type of incident. By coincidence, an ABO compatible blood component was administered in 16 of these cases. Despite the ABO compatibility, there was one case of acute hemolytic transfusion reaction (AHTR) in a patient with several irregular antibodies. Seven reactions (five serious) were reported in the cases of IBCT with ABO incompatible units (13): six AHTR and one other reaction. Special circumstances such as massive blood loss or very rapid detection of the error probably contributed to the lack of reaction in the other incompatible transfusions.

In total, a transfusion reaction occurred in 13 of the 60 reports of IBCT and the reaction was serious in five cases. Symptoms were observed in the patient in seven of the other incidents. There was one case of serious (grade 2) circulatory overload in an other incident: the infusion speed for a transfusion was too fast in a patient with cardiac problems. Over 10 % of the reports of other incident concerned incidents in the use of blood management techniques.

2.7 Blood management techniques (BMT)

In 2009, 33 reports were received of transfusion reactions (20) and incidents (13) with the use of blood management techniques. These reports were made by six hospitals, with a significantly large variation in the number of reports per hospital noted (1 to 22 per facility). The reactions occurred with re-infusion of drain blood (14), cell-saver blood (4), a unit from pre-operative autologous donation (PAD) and one case involving both drain blood and PAD. There were three reports (anaphylactic reaction: 1, circulatory overload: 1, other reaction: 1) of severity grade 2.

Only a small number of hospitals were able to inform TRIP about the number of times that these techniques were used in 2009. Focus by blood transfusion committees on protocolling and vigilance of BMT is urgently required.

2.8 Overview of the obligatory reports of serious adverse events in the transfusion chain

In accordance with European Directives 2002/98/EC and 2005/61/EC, every member state must submit an annual overview of serious reactions to the European Commission. *Table 4* shows the data on serious adverse events for 2008 and 2009. In accordance with the directives, this table only includes reports with imputability possible, probable or certain. Reactions that occurred after administration of an incorrect blood component or other incident have been included here in the relevant categories.

Table 4 – Number and imputability of reports of grade 2 or higher in 2008 and 2009

Type of reaction	Number of serious reports		Possible		Probable		Certain	
	2008	2009	2008	2009	2008	2009	2008	2009
Acute hemolytic TR	10	11	1	3	4	1	5	7
Delayed hemolytic TR	4	3	-	-	1	1	3	2
TRALI	18	12	6	5	9	5	3	2
Anaphylactic reaction	29	19	10	7	15	11	4	1
Other allergic reaction	5	-	4	-	-	-	1	-
Circulatory overload	17	15	9	5	6	7	2	3
Post-transfusion bacteremia*	4	1	3	-	-	1	1	-
Post-transfusion purpura	-	-	-	-	-		-	-
Post-transfusion viral infection	2	1	1	-	1	1	-	-
Transfusion-associated GvHD	-	-	-	-	-	-	-	-
Other serious reactions	42	36	18[#]	22	18	13	6	1
Total	**131**	**98**	**52**	**42**	**54**	**40**	**25**	**16**

* In 2008, one grade 2 report of bacterial contamination of a blood component was included.
[#] The grade 4 report following an intra-uterine infusion was not included.

3. Conclusions and recommendations

3.1 Conclusions

1. The total number of reports is higher than in previous years. The increase is based on a greater number of non-serious reports, particularly febrile reactions and reports of newly formed irregular antibodies.

2. There has been a decrease in the reports of TRALI associated with transfusion of fresh frozen plasma since the introduction of the male plasma measure.

3. As a result of a decrease in the number of reported TRALIs and anaphylactic reactions, there has been a decrease in the total number of serious (≥ grade 2) reports.

4. Anaphylactic reaction is now the largest category of serious transfusion reaction.

5. There has been no decrease in the number of reports of incidents in which the patient was exposed to a potentially incompatible transfusion. Identification of patients, patient material and blood components remain error-prone processes.

6. Due to the lack of regional differences in allergic reactions following administration of platelet concentrates, any difference in the incidence of reactions between platelets in PAS and platelet concentrates in plasma could not be demonstrated.

7. Reports listing the most important symptom as dyspnoea or hypotension form two important clusters in the category other reaction. Sometimes there is not enough additional research or clinical information available to make an adequate diagnosis of the transfusion reaction. As a result, an increasing number of reactions are labelled other reaction.

8. For one report there was a plausible relationship between post-transfusion bacteremia/sepsis and a bacterial contamination of a blood component.

9. The type of blood management technique (BMT) and the number of times that this technique is used are usually not well known to the hemovigilance officers and assistants. Transfusion reactions and incidents are also observed with blood management techniques.

3.2 Recommendations

A. Recommendations based on the TRIP annual report 2009

1. Measures are required to make identification procedures more robust. This could include electronic systems to support the procedures. This will serve not only the safety of blood transfusions, but also patient safety in other areas.

2. Criteria should be set that allow for the inclusion of new TRIP categories transfusion-associated dyspnoea and hypotensive transfusion reaction in the TRIP database. These categories must be clearly distinguished from the already

existing TRIP categories.

3. The hospital blood transfusion committees should ensure that protocols are in place for the use of blood management techniques, with correct transfusion triggers and a procedure for reporting side effects and incidents.

B. General recommendations

4. TRIP should be able to initiate and conduct research – independently and in cooperation with stakeholders in the field of blood transfusion – directed at improving the safety of blood transfusions.

5. It is useful to record information about the transfusion chain in a standardised manner, so that comparisons of transfusion practice and outcomes can be made. The revised CBO guidelines can form a starting point for this.

4. List of terms and abbreviations

AHTR	acute hemolytic transfusion reaction
BMT	blood management techniques
Bc	blood component
CBO	CBO quality organisation in healthcare
IGZ	Inspectie voor de Gezondheidszorg (Healthcare Inspectorate)
NHTR	non-hemolytic transfusion reaction
RBC	red blood cell concentrate
Sanquin	Sanquin Blood Supply (national blood service of the Netherlands)
Tf	transfusion
TR	transfusion reaction
TRALI	Transfusion-related acute lung injury
TRIP	TRIP Foundation (Transfusion Reactions In Patients)
IBCT	incorrect blood component transfused

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