

**24: HOURS**

L I F E   F L O W S

Day after day, the rhythm of our life is determined by a 24-hour time circle. Each time, a new, empty sheet unfolds before us giving us the opportunity to depict ourselves in our own way, with laughter, silence or crying. However, it often happens that images and words from yesterday occupy their place on the new sheet of today.

While we design our reality, time goes by and changes everything that was depicted and written into the story of our life.

But unpleasant moments might sneak up even into the most wonderful story, irrespective of the time and place. Therefore, a parallel story is written by the transfusion service, with people dedicating their time to providing conditions for saving lives. Their purpose is to make more stories safer within the next 24 hours.

24: HOURS

L I F E   F L O W S

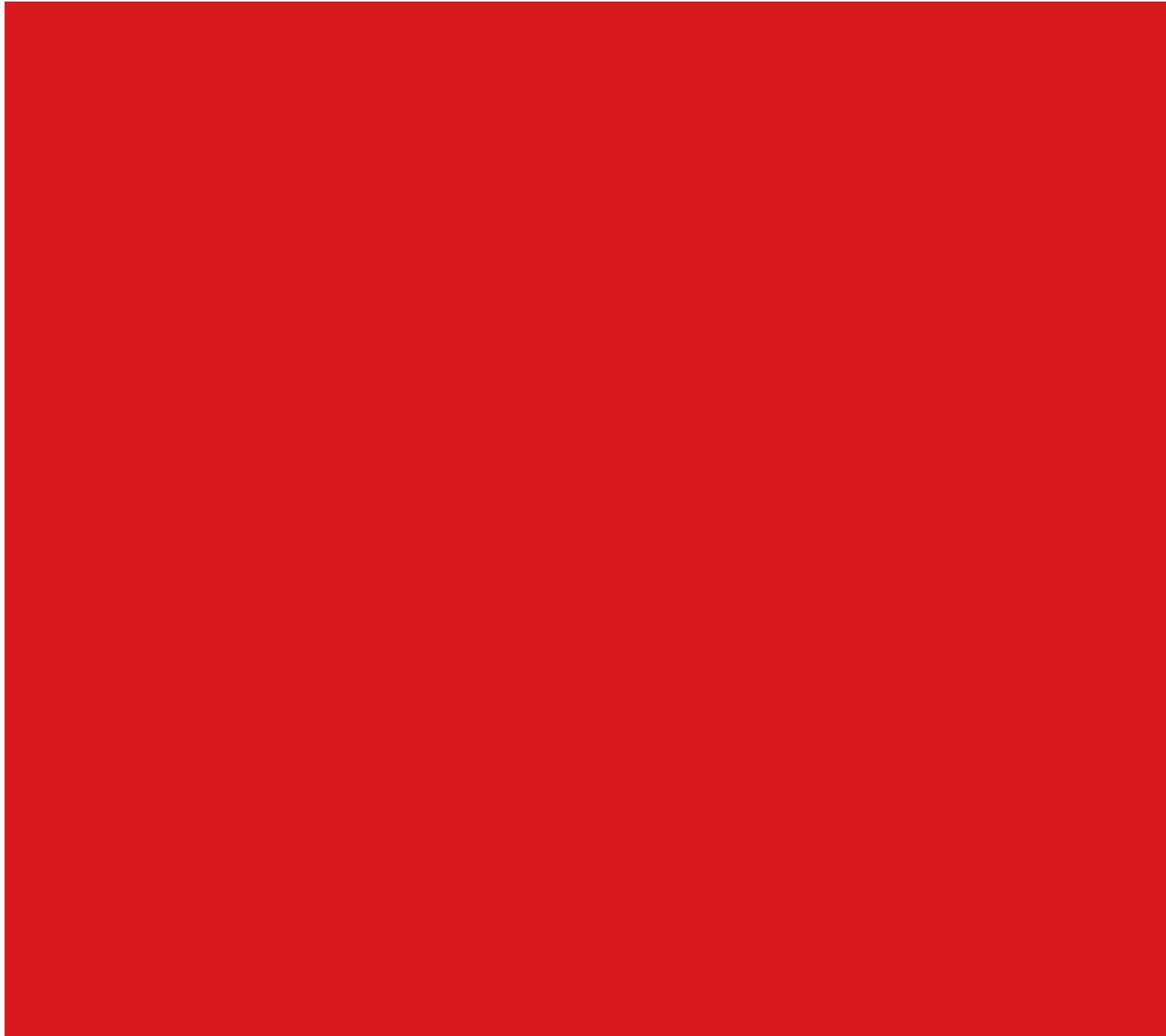
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# 2010 IN NUMBERS

110,497	registered blood donors
12,503	registered new blood donors
60,820	blood donors; 60% donated the blood once, 28% twice, 10% three times, 2% four times
98,302	blood collections
1180	blood donation sessions
380	mobile blood donation sessions
199,667	prepared blood components
3,601	therapeutic services
more than 1.5 million	laboratory tests
15,773	registered bone marrow donors (1,765 new ones)
561	stored units of umbilical cord blood in the public bank (270 new ones)
8,880	telemedicine services

On average, Slovenia needs 350 to 400 blood donors per day to provide patients with the required amount of blood. Blood donation and blood donors make up an important segment of the health system, which is based on the applicable legislation, while the legislation is based on expert evidence. Blood donation is one of the noblest ways to help another person. The number of its blood donors puts Slovenia into the European average, but the most important is that we are self-sufficient in blood supply. This means that we cover all the needs of our healthcare system for blood. We can also mention our well-developed blood donation, long and successful tradition, well-established blood donation system, sufficient number of blood donors and willingness of people to donate blood.





# INTRODUCTION

The transfusion service performs a series of activities in transfusion medicine and every one of them deserves to be presented. In this, seventh report, mobile blood donation sessions are presented in more detail, since as much as 45 per cent of all blood is collected in this way. These sessions are carried out throughout Slovenia, in smaller and bigger cities, towns, villages, in urban or rural environment, and even in the most distant areas, once or several times per year. This enables blood donors from places without transfusion service in the proximity to participate in providing sufficient of blood supply.

Simultaneously with mobile sessions, regular blood collections and all other activities within the scope of transfusion work are carried out in transfusion institutions.

This report is dedicated to the process of a mobile blood donation session. We would like to underline the interesting and unselfish work of the mobile team while presenting the nature and contents of the work, which begins before the session starts and continues after the session ends. Field shots were taken in the mobile session in Trebnje, so we would like to kindly thank all blood donors, representatives of the Regional Red Cross Association of Trebnje and the BTCS for their willingness and cooperation in preparing the transfusion service annual report.

*Igor Velušček, Director of the BTCS*

A handwritten signature in black ink, appearing to read "Igor Velušček". The signature is fluid and expressive, with varying line thicknesses and ink saturation.

## BLOOD TRANSFUSION SERVICE IN SLOVENIA

The **transfusion service** in Slovenia is comprised of the Blood Transfusion Centre of Slovenia (BTCS) with the associated Novo mesto, Trbovlje, Slovenj Gradec, Izola and Jesenice Units of Transfusion Medicine; the Centre of Transfusion Medicine Maribor (CTM), with associated units in Ptuj and Murska Sobota; the Centre of Transfusion Medicine Celje (CTM) and the Department of Transfusion Medicine of Nova Gorica Hospital.

The transfusion service is responsible for collection, processing, testing and supply of blood and blood products. The task of the transfusion service is to provide sufficient amount of safe and suitable blood in order to provide the blood recipients with the best possible blood therapy.

The entire transfusion service performs the activity of blood collection. The processing of blood into components is performed at the Blood Transfusion Centre of Slovenia in Ljubljana, the Centre of Transfusion Medicine Maribor and the Centre of Transfusion Medicine Celje. The processed blood is returned to the units according to their needs and the plan.

Blood testing is performed at the Blood Transfusion Centre of Slovenia in Ljubljana and the Centre of Transfusion Medicine Maribor. A part of blood testing is only performed at the BTCS.

**Blood supply** is performed in accordance with the principles of self-sufficiency and safe blood transfusion. Metaphorically speaking, blood supply goes from the donor's vein to the recipient's vein and encompasses three inseparable and connected areas: the area of blood donor management, the area of blood collection, processing and testing, and the area of clinical blood use. On the basis of the abovementioned areas, work of the responsible operators is also intertwined: Slovenian Red Cross with its regional associations, transfusion service and users – physicians and patients.

The basic principle of blood supply is safe blood transfusion. Safe blood is provided by voluntary, non-remunerated blood donors, adequate selection of blood donors and blood testing for the agents of infectious diseases. The above principle is specified in more detail by the International Code of Ethics (Montreal,

1980) and explains that blood donation should be voluntary in all circumstances and no pressure should be exerted on the blood donor; cash profit should not be a motivation neither for the donor nor for the people responsible for blood collection. Anonymity between the blood donor and the recipient should be respected. For every blood donor, it must be ascertained that blood collection will not harm their health and that the blood will not harm the recipient.

The first condition for adequate blood supply is a sufficient number of blood donors. Slovenian Red Cross, which is also the national organiser of blood donation sessions, is responsible for recruitment and provision of the sufficient number of blood donors and, based on this, for provision of sufficient amount of collected blood. Slovenian Red Cross carries out this task using a network of 56 Red Cross Regional Associations throughout Slovenia and performs all activities of organising, informing, motivating, recruiting and educating blood donors for the purpose of national blood supply..

**Blood stock adjustment** is a complex task, therefore constant monitoring and action by the transfusion service is required. Blood stock does not depend only on blood donors and the collected blood, but also on blood consumption. Blood consumption is unpredictable, both in terms of the required amounts of blood components and blood groups. If bigger amounts of blood are necessary, additional blood donation sessions are organised in addition to the regular ones; we also directly call the donors (e.g. according to the lack of certain blood group), and as a last resort, we invite donors through the media. For the transfusion service, lack of blood is not the only problem; excessive stock is also problematic, since blood components have a certain shelf life. In such case, we reduce the planned blood donation sessions and only accept a limited number of blood donors or postpone the session to a more favourable date.

All this requires a firm structure and coordination of all participants in organising blood donation, which promptly adapts to the needs for blood (both in terms of the amount and blood groups), since this is the only way to avoid extreme measures and non-uniform supply of blood and blood products to the healthcare system.



DARUJ KRI ZA ŽIVLJENJE

Rdeči križ Slovenije vas vladno vabi na odvzem krvi.

3., 4. IN 5. MAJ 2011  
7. - 13.30 URE  
TOFBNJE



The basic form of organising blood donors are regular blood donation sessions, which are planned for a year in advance, for the entire Slovenia, in accordance with the expected needs of the healthcare system for blood. The plan for regular blood donation sessions providing the necessary number of donors is prepared together by Red Cross and the transfusion service each year. In planning regular blood donation sessions, local particularities should be taken into account in addition to the needs and the interval between the sessions (the minimum interval between whole blood donations is three months for men

and four months for women). Unbelievable as it might seem, success of the session can be influenced by seasonal field work, harder accessibility of the place due to weather conditions, local particularities, celebrations, collective annual leaves of major local companies or school vacations when blood donation session is to be performed on the school premises. A well-prepared plan of blood donation sessions is the first condition for providing a sufficient number of donors and therefore the optimum blood stock.



## MOBILE BLOOD DONATION SESSIONS

In respect of performing blood collection, or site of blood collection, respectively, collections in Slovenia are classified to blood collections in transfusion institutions (fixed site) and mobile blood collections with a special mobile team. All transfusion institutions perform blood collection on their premises. In addition to the BTCS, mobile sessions are also performed by CTM Maribor and CTM Celje. BTCS performed 262 blood donation session, of which 216 (more than 80%) by mobile sessions throughout Slovenia; CTM Maribor carried out 112 and CTM Celje 52 mobile blood donation sessions. In total, 380 mobile sessions were performed in 2010. In the last five years, the BTCS increased the number of mobile blood donation sessions by more than 20%, and CTM Maribor also continues to increase the number. By mobile blood donation sessions, the BTCS collects over 60% of all blood, CTM Maribor more than a half and CTM Celje approximately 40%. Therefore, 45% of all collected blood in Slovenia is collected by mobile sessions. The BTCS carries out mobile blood donation sessions throughout Slovenia, while CTM Maribor and CTM Celje only perform mobile blood collection within their respective regions.

The most distant area for the BTCS is Lendava, 212 km from Ljubljana. The mobile team from Ljubljana sets off there at 3.30 a.m. We observe some more early departures for blood collections in e.g. Tolmin, Bovec, Metlika, Ormož, Semič, Črnomelj... Normally, the BTCS mobile team sets off to the field between four and five a.m. Teams from Maribor and Celje set off somewhat later due to more close collection sites. Early departures to the mobile session are related to the preparation of workplace and equipment for the execution of the session; therefore, the mobile team must arrive to the site before the beginning of the session.

The mobile team uses organised in-house transport to arrive at the blood donation session. They bring all necessary for the preparation of the workplace for blood donation and the required material to perform blood collection (beds, scales for blood collection, blood pressure meters, computers, blood collection bags, test tubes, cooler bags...), altogether more than a ton of equipment and material.



» Previously, when cars were not self-evident and it was difficult to arrive at the BTCS in the early, even night hours of departure, the institute had a room for the mobile team to spend the night and wait for the departure.

05:14 / 04.05.2011 gathering of personnel



06:57 arrival at the location of a blood donation session



## MOBILE TEAM

With the expected number of 200 blood donors, the BTCS mobile team has 20 to 22 members. The team is composed of registered nurses and nurses, laboratory technicians, a physician, administrative personnel and drivers, sometimes even cooks. The number of mobile team members is adapted to the expected number of blood donors participating in the session, thus the team can be bigger or smaller. There are also sessions when more than 350 donors per day are observed. The CTM Maribor mobile team has 10 to 15 members and the CTM Celje team has 8 to 11 members; this also depends on the expected number of blood donors. Compared to the BTCS, they usually carry out smaller sessions, rarely bigger; Celje with up to 140 and Maribor with even up to 200 or more donors. On average, the BTCS has 150 blood donors per mobile session, CTM Maribor 100 and CTM Celje 80.

Work of the mobile team is strenuous. Before the team members start to collect blood, they already prepared for the departure, drove to the collection location, prepared for the collection ...., and when they finish their work at the blood donation session, they have to carry out the activities in the reverse order than in the morning. Such method of work is almost normal for the mobile team, as many sessions are performed in the field. The beauty of this work is, according to the employees, in meeting new faces. There are only few professions which have to do with so many cordial people who give a part of themselves to help others.

## PREPARATION OF WORKPLACE

Mobile collections are mostly organised on the premises of primary schools, fire stations, local communities, health care centres provided by the organiser – the local Red Cross. Mobile workplaces are not like rooms at transfusion institutions, but mobile sessions enable blood donors not to lose so much time with blood collection. We know that the time spent for blood collection is one of the important factors influencing the next decision to participate in the session.

Rooms where mobile blood donation sessions are performed must fulfil conditions specified in the Rules on the Requirements for the Organisation and Carrying out of Blood Donation Sessions. The workplace is arranged in such a way to follow the logic course of the donor; sometimes the rooms must be divided by mobile walls and sometimes certain donor "stations" are located in another floor or even in another building due to spatial limitations. It is also very important that the rooms are airy and warm in the winter, and adequately cooled in the summer.

*There is a lot to be done before blood donors come*





» In distant fields with sessions lasting for several days, the mobile team used to spend the nights on the location and in the rooms where blood donation session was being carried out approximately until 1970. They slept on the so-called "feldbetts" – folding beds. In the distant fields, e.g. in Tolmin, Bovec, Kobarid, Metlika, Lendava, Ormož, this could last for the entire work week.

07:55 preparation for the registration of blood donors



08:00 arrival of the first blood donors



*Standard procedure before the collection*



## WORKING TIME

Blood donors come to the blood collection alone or by organised transport. Majority of mobile collections are performed on work days in the morning, rarely the sessions are also carried out in the afternoon or during weekends. We try to adjust the work hours to the wishes and needs of blood donors, since we would like to do everything to minimise complications for the donors related to blood collection to make them return with pleasure.

Irrespective of the difficulty of mobile blood donation sessions have a special charm. The place is revived, because the session is a social event where fellows villagers, colleagues and groups of friends meet and gather twice to three times per year. Acquaintances with our employees are also usual, as some blood donors have been participating in the sessions for a number of years. Mobile team members know Slovenia, its people and particularities very well.

Although mobile blood donation session is temporary and performed in an adapted environment, blood collection is from the expert perspective carried out correctly and all processes comply with quality standards.



» Since mobile blood donation sessions have been introduced in 1953, no mobile team was late for the session despite poor roads, hard winters, floods or accidents. Finally, blood donation sessions were carried out regularly and according to the plans even during the war for Slovenia (1991), when we drove to the field past the barricades and blockades.

08:20 *blood pressure measuring*



08:35 *medical examination*



Blood collection





## BLOOD COLLECTION

Blood collection procedure in transfusion institutions and in the field is identical. After registration at the reception office, a blood donor first goes to the laboratory where AB0 blood group and haemoglobin level are determined. This is followed by filling out a medical questionnaire, measuring blood pressure and, if necessary, a check-up by the physician. Based on the laboratory results, questionnaire and medical check-up, the donor is advised to donate the blood or against it. Blood collection is performed on a comfortable chair and the blood is collected in the plastic bag system. All material used for the collection is sterile and for single use, so there is no possibility of infection during blood collection. Usually, 450 ml of blood are collected from a donor, which accounts for a maximum of 13% of the entire blood volume. This volume complies with professional standards and does not pose a threat to the donor's health or well-being and enables further processing to components so that one blood donor can help several patients simultaneously. Blood collection takes approximately 5 to 10 minutes, with constant presence and monitoring by a nurse. After the collection has been finished, the puncture site is covered and bandaged to prevent subcutaneous haemorrhage. After the collection, the donor is invited to rest and have a snack with a refreshing drink.

*08:48 refreshment after the collection*



» It used to happen that somebody was forgotten in the field, so counting of mobile team members upon departure is something usual.

## THE COLLECTED BLOOD IS PROCESSED AND TESTED

Blood collected in the field is delivered to the place where it will be processed. From the distant places, it is delivered already during the session, as it must be processed within six hours from collection. The collected whole blood unit is separated into its individual elements or blood components. This is performed by means of physical methods such as centrifugation and filtration. This is how we obtain the same amount of cells, for example erythrocytes or thrombocytes, in a smaller volume of a particular component than there are in a bag of whole blood. Different blood components have a different rate of degradation after collection, therefore the blood must be processed as quickly as possible. Because of different characteristics and survival times of individual blood cells and plasma components, different temperatures, different centrifugation speeds and different further procedures for component preparation (pooling, inactivation, irradiation) are used in blood processing. The prepared blood components, the shelf life of which varies from component to component, are also stored under different conditions:

### **concentrated erythrocytes**

temperature: +2°C to +6°C

shelf life: 35–42 days

### **concentrated thrombocytes/inactivated**

temperature: +20°C to +24°C

shelf life: up to 7 days with constant stirring in a shaker

### **fresh frozen plasma**

temperature: below -25°C

shelf life: 2 years

10:30 transport of blood – "Lučka" on its way to Ljubljana



*The collected blood is ready for the transport*





ODVZEM

149



ZAVOD REPUBLIKE  
SLOVENIJE ZA  
TRANSFUZIJSKO MEDICINO  
Šlajmerjeva 6, LJUBLJANA  
Tel.: 01/54-38-100

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ZAVOD REPUBLIKE  
SLOVENIJE ZA  
TRANSFUZIJSKO MEDICINO  
Šlajmerjeva 6, LJUBLJANA  
Tel.: 01/54-38-100

Blood processing





Simultaneously with blood processing, each unit of collected blood is tested for infection markers by means of indirect serological tests and direct determination of viral nucleic acids (NAT methods), namely for four blood-borne agents of infectious diseases: hepatitis B and C virus, HIV virus and syphilis.

Blood with positive results is destroyed and the blood donor is notified thereof and referred to adequate treatment.

**Detected infections in 2010 in the screening of collected blood units:**

- 18 hepatitis B positive units
- 1 hepatitis C positive unit,
- 2 HIV positive units (AIDS),
- 14 anti-Treponema Pallidum positive units (syphilis).

After processing, adequate storage of blood components and performed tests, the blood is prepared for patients who need it for their treatment. **All transfusion institutions provide 24-hour (24/7) supply of blood components.**

*11.15 delivery of blood for processing and testing*



» The van which transports the blood to Ljubljana for processing is still called "Lučka" (the Lamp). The name was preserved since the first van equipped with cooling (before 1960) which had a blue lamp on the roof indicating priority ride. Since then, many vans were exchanged, but the name remains even after 40 years. For us, "Lučka" transports blood.

### *Blood testing*

## TRANSFUSION TESTS

Before blood is issued upon the request of the treating physician, the so-called pretransfusion tests must be carried out. In ideal circumstances, a patient receives blood identical to their own in all erythrocyte antigens. Due to the large number of antigens and their possible combinations, we strive to transfuse blood units that match as closely as possible. Compatibility between the patient and the donor is examined with a compatibility test. Antigens of AB0 and RhD blood groups are thus determined for each collected blood unit. In the first two blood collections in every blood donor, other antigens of Rh (C, c, E, e) and Kell systems are also determined. In order to prevent the transmission and harmful action of unexpected erythrocyte antibodies, the units in which they are detected are not used.

Pretransfusion tests are also performed at a distance with so-called teleconsultations, with the aim of replacing the physician on duty at transfusion institutions and provide the same service quality throughout Slovenia.

In addition to blood collection, processing and testing, we also perform a number of other activities, the so-called immunohaematologic tests which allow safe blood transfusion, organ and tissue transplants and prevent some adverse immune reactions after transfusion, transplantation and during pregnancy.

We also carry out therapeutic procedures for supportive treatment, where in relation to the nature of the disease, whole blood, cells or plasma are withdrawn from the patient with the apheresis procedure.

At the BTCS, we successfully keep a register of bone marrow donors and a public cord blood bank, provide supply of and trade in blood medicinal products and perform a haemovigilance system to monitor and prevent adverse reactions of blood transfusion. All information submitted within the framework of haemovigilance contribute to improving safety of transfusion, explain the risks of adverse reactions in transfusion and how to reduce the risks by implementing additional measures.

We are also included in scientific and research projects and perform educational activity.



15:33 processed blood





# BLOOD TRANSFUSION SERVICE IN NUMBERS / 2010

## Number of registered blood donors, collections and deferrals by the transfusion service in 2010

Transfusion service	No. of registrations	No. of collections	No. of deferrals
BTCS Ljubljana	52,400	44,835	7,565
Izola	6,383	5,991	392
Jesenice	2,254	2,050	204
Novo mesto	6,041	5,592	449
Slovenj Gradec	3,379	3,148	231
Trbovlje	1,360	1,316	44
<b>BTCS total</b>	<b>71,817</b>	<b>62,932</b>	<b>8,885</b>
CTM Maribor	15,121	13,530	1,591
Murska Sobota	4,642	4,333	309
Ptuj	4,203	3,831	372
<b>CTM Maribor total</b>	<b>23,966</b>	<b>21,694</b>	<b>2,272</b>
CTM Celje	11,051	10,240	811
TD Nova Gorica	3,663	3,436	227
<b>Slovenia</b>	<b>110,497</b>	<b>98,302</b>	<b>12,195</b>

## Number of performed collections of whole blood, plasmaphereses and thrombocytaphereses by the transfusion service in 2010

Transfusion service	No. of whole blood collections	No. of performed plasmaphereses	No. of performed thrombocytaphereses
BTCS Ljubljana	42,491	512	1,611
Izola	5,991	0	0
Jesenice	2,050	0	0
Novo mesto	5,472	0	0
Slovenj Gradec	3,116	0	0
Trbovlje	1,316	0	0
<b>BTCS total</b>	<b>60,436</b>	<b>512</b>	<b>1,611</b>
CTM Maribor	13,325	65	135
Murska Sobota	4,333	0	0
Ptuj	3,831	0	0
<b>CTM Maribor total</b>	<b>21,489</b>	<b>65</b>	<b>135</b>
CTM Celje	10,240	0	0
TD Nova Gorica	3,436	0	0
<b>Slovenia</b>	<b>95,601</b>	<b>577</b>	<b>1,746</b>

## Number of issued blood components by the transfusion service in 2010

Transfusion service	No. of conc. erythrocyte units	No. of conc. platelet units from wholeblood	No. of conc. platelet units from thrombocytaphereses	No. of fresh frozen plasma units
BTCS Ljubljana	41,066	3,739	2,346	14,343
Izola	5,039	75	6	640
Jesenice	2,289	89	0	989
Novo mesto	3,986	412	3	1,073
Slovenj Gradec	2,421	87	0	410
Trbovlje	1,429	42	0	385
<b>BTCS total</b>	<b>56,230</b>	<b>4,444</b>	<b>2,355</b>	<b>17,840</b>
CTM Maribor	15,130	1,531	100	7,567
Murska Sobota	3,795	237	20	689
Ptuj	1,783	48	2	931
<b>CTM Maribor total</b>	<b>20,708</b>	<b>1,816</b>	<b>122</b>	<b>9,187</b>
CTM Celje	7,173	2,081	1	2,097
TD Nova Gorica	3,340	125	0	755
<b>Slovenia</b>	<b>87,451</b>	<b>8,466</b>	<b>2,478</b>	<b>29,879</b>

05:03 / 05.05.2011 the next day – departure to the mobile session



**For immunohaematologic tests for patients in 2010, we performed:**

135,766	compatibility tests
74,898	ABO and RhD blood typing tests
55,994	indirect antiglobulin tests (IAT)
14,299	direct antiglobulin tests (DAT)
1,925	specifications of erythrocyte antibodies
6,624	tests preceding Ig anti-D injection
1,152	platelet tests
59	granulocyte tests
229	molecular biology tests

**For therapeutic services in 2010, we performed:**

2,024	autologous blood collections (autotransfusions)
1,369	therapeutic whole blood collections
147	autologous stem cell collections
25	allogenic stem cell collections
31	granulocytophereses
5	therapeutic aphereses

**Number and type of reported adverse reactions in blood transfusions in Slovenia in 2010**

4	haemolysis
0	graft-versus-host reaction disease
0	transfusion-related acute lung injury
12	circulatory overload
0	post-transfusion purpura
74/1	allergy/anaphylaxis
70	non-haemolytical febrile reaction
1	bacterial infection
0	viral infection
2	hypotension
2	dyspnea
4	other
170	<b>total</b>

**Performed examinations, tests and services related to tissue matching:**

10,565	services supporting organ transplantation
3,187	services supporting bone marrow transplantation
828	services for diagnostics
635	services for the Slovenia Donor Registry

# PUBLICATIONS

## ARTICLES AND OTHER SCIENTIFIC AND PROFESSIONAL CONTRIBUTIONS

### 1.01 Original scientific articles

BRATANIČ, Nevenka, ŠMIGOC SCHWEIGER, Darja, MENDEZ, A., URŠIČ-BRATINA, Nataša, BATTELINO, Tadej, VIDAN-JERAS, Blanka. An influence of HLA-A, B, DR, DQ, and MICA on the occurrence of Celiac disease in patients with type 1 diabetes. *Tissue antigens*, 2010, vol. 76, issue 3, str. 208-215, doi: 10.1111/j.1399-0039.2010.01501.x. [COBISS.SI-ID 27616985]

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