

# **The method of the Blood Crisis Policy in the Czech Republic**



**LtCol. Miloš Bohoněk, M.D., Ph.D.\***

**Dana Hlaváčková, M.D.\*\***

**Ing.Jaroslava Hejdová \*\***

**\* Central Military Hospital Prague**

**\*\* Ministry of Health Czech Republic**



**ÚVN**



## Introduction - 1

Blood substitution and blood supply are the permanent strategic and logistical problems of the military medical services armies everywhere in the world because **BLOOD**:

- is a biological drug
- needs special transport and storage conditions
- has a limited shelf life





**ÚVN**



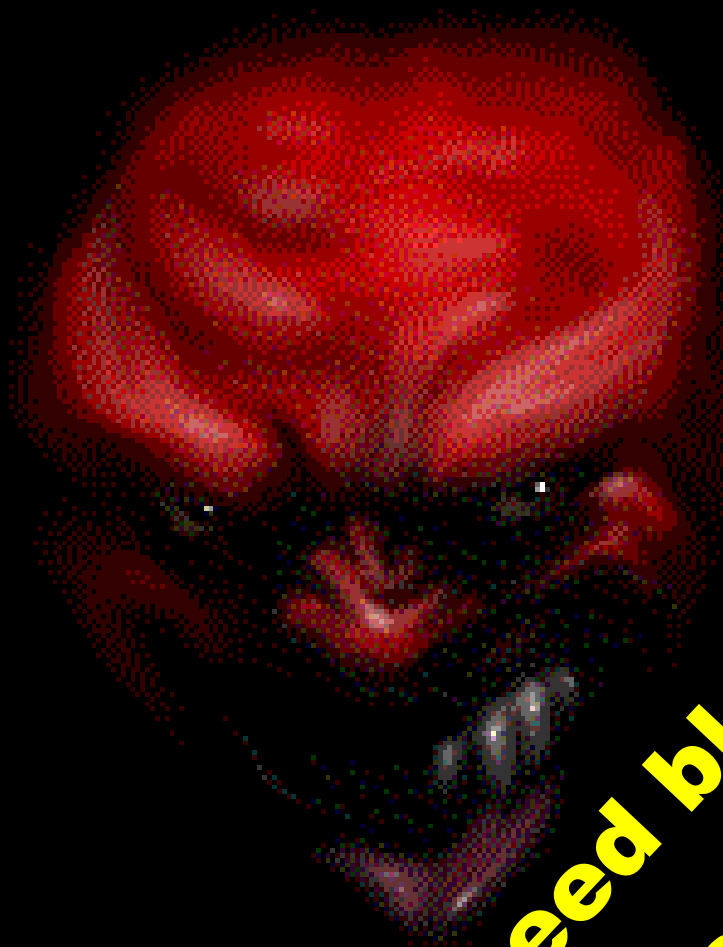
## Introduction - 2

The same problem is solved by the so called

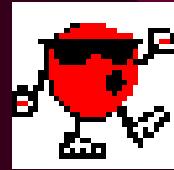
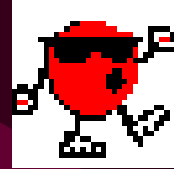
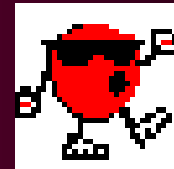
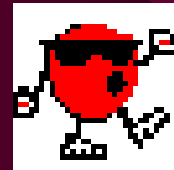
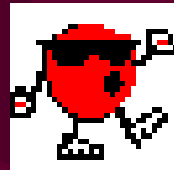
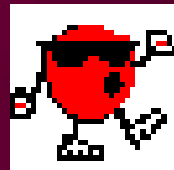
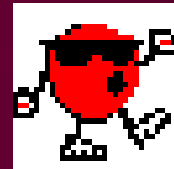
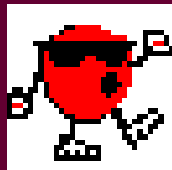
### “state blood crisis policy”

Especially in cases when at one place and one time a huge amount of blood is of utmost importance:

- disaster
- terrorist attack
- war



**We need blood urgently !  
Right now !**





**ÚVN**



## Crisis / disaster states „bloodless“

A lot of casualties, but

– blood demand is not extensive

huge and no regulated blood drives leads to large blood expiry

(USA Sept.11, 2001, natural disasters – floods, earthquake, hurricanes, etc.)

**TABLE 2. BLOOD USE AFTER SEPTEMBER 11, 2001.**

CITY	VICTIMS		BLOOD		
	KILLED	HOSPI- TALIZED	ON HAND	COLLECTED NATIONWIDE	TRANS- FUSED
	no.		units*		
New York City	Approximately 3000	139	NA		224†
Washington, D.C.	189	61	12,000		34‡
Total				>475,000	258

\*Values are units of red cells. Other blood components are not listed. NA denotes not available.

†The number was provided by the New York State Department of Health (Linden JV: personal communication).

‡The number was provided by the American Red Cross, Greater Chesapeake and Potomac Region (Gibble JW: personal communication).



**ÚVN**



## Crisis / disaster states „bloody“

A lot of casualties, with

– extensive blood demand

can leads to the casual blood deficit,  
but, as well as, paradoxically, to the overflow  
(bomb attacks – Madrid 2004, war conflict)





**UVN**



## Madrid Bombing – March 11, 2004

- **191 deaths**
- **more than 2000 injured**

Products	Total # of Product Transfused	Total # Serious Patients*	Average # of Units per Patient
RBC	1,290	273	4.7
Platelets	157	273	0.6
FFP	455	273	1.7

\* Unknown the number of patients that were transfused. Average is based only on the number of serious patients seen.



**ÚVN**



## The solution of the Blood Crisis policy in CZ

- **2003 – 2006:**

Research work in the field of freezing red blood cells and building of the Strategic Blood Bank in the Central Military Hospital of Prague

- **2006 – 2008:**

The **Method** - an elaborate plan of how to handle our blood supply during a crisis situation in the state (issued by the task of The Security State Council)



**ÚVN**



## The Czech Republic

- over 10.000.000 inhabitants
- 78.866 km<sup>2</sup>
  - max. length W-E 480 km , max. wide N-S 300 km
- 430.000 RBC units/year are collected and transfused
- blood collection and processing are performed in a relatively similar way at 65 blood centres, with 2.500 – 30.000 collections of whole blood units annually
- the blood banks are part and parcel of the regional or university hospital – the specialised department



## Principles of the “Blood Crisis Policy”:

- The guarantee and accessibility of blood products and blood derivatives. In an extreme situation, such as war in the Czech territory, it is estimated that casualties at 2% would demand 3000 units RBCs / day
- The state accounts for the blood supply
- The system was designed in agreement with our needs of defense and health care. This guarantees a unified organization and management of blood and blood derivatives supply



## Organization

The system ensures 7 state “blood crisis centers” (BCC), (1 military and 6 civilian)

“The Central Informative and Logistic Centre” (CILC) is:

Department of Hematology, Biochemistry and Blood Transfusion of The Central Military Hospital of Prague



**ÚVN**



## Crisis blood centers

1. Oddělení hematologie, biochemie a krevní transfúze, ÚVN Praha 6
2. Fakultní transfúzní oddělení, FN Královské Vinohrady, Praha 2
3. Fakultní transfúzní oddělení FN Plzeň
4. Fakultní transfúzní oddělení FN Hradec Králové
5. Fakultní transfúzní oddělení FN Brno
6. Fakultní transfúzní oddělení FN Olomouc
7. Krevní centrum, FN Ostrava



# SPADOVÁ ÚZEMÍ KRIZOVÝCH TRANSFUZNÍCH CENTER ČR





ÚVN



## Tasks of BCCs

- **responsibility for supplying the defined territory.**  
BCC must have own system of contracts with local blood banks.
- **responsibility for transport.** In case of troubles, BCCs can ask the Ministry of Health for help with the transport coordination.
- **to keep at least 200 RBCs and 200 plasma units and 2000 g of human albumin at disposal** for the national crisis policy program
- must have **the emergency stocks for blood collection** (blood bags, tubes) and blood testing: 2000 – 2500 sets, depending on BCC territory



# Přehled aktuálních strategických zásob krve v ČR k 05.09.2008

Přihlášený uživatel: **upir** Odhlásit [administrace](#)

OHBKT ÚVN Praha	Ery O-	Ery O+	Ery A-	Ery A+	Ery B-	Ery B+	Ery AB-	Ery AB+	P O	P A	P B	P AB
celkem po skupinách:	52	26	19	90	12	66	14	36	66	64	59	21
CELKEM po přípravcích:	315								210			
FTO Praha 10 Královské Vinohrady	Ery O-	Ery O+	Ery A-	Ery A+	Ery B-	Ery B+	Ery AB-	Ery AB+	P O	P A	P B	P AB
celkem po skupinách:	14	42	15	60	16	46	8	60	130	80	80	32
CELKEM po přípravcích:	261								322			
FTO Plzeň	Ery O-	Ery O+	Ery A-	Ery A+	Ery B-	Ery B+	Ery AB-	Ery AB+	P O	P A	P B	P AB
celkem po skupinách:	4	17	9	21	3	13	2	6	10	2	14	2
CELKEM po přípravcích:	75								28			
FTO Hradec Králové	Ery O-	Ery O+	Ery A-	Ery A+	Ery B-	Ery B+	Ery AB-	Ery AB+	P O	P A	P B	P AB
celkem po skupinách:	17	17	17	17	17	17	17	17	17	17	17	17
CELKEM po přípravcích:	136								68			
FTO Brno	Ery O-	Ery O+	Ery A-	Ery A+	Ery B-	Ery B+	Ery AB-	Ery AB+	P O	P A	P B	P AB
celkem po skupinách:	4	15	7	23	7	16	2	6	45	23	33	12
CELKEM po přípravcích:	80								113			
FTO Olomouc	Ery O-	Ery O+	Ery A-	Ery A+	Ery B-	Ery B+	Ery AB-	Ery AB+	P O	P A	P B	P AB
celkem po skupinách:	6	19	8	38	7	66	9	15	55	45	48	26
CELKEM po přípravcích:	168								174			
Krevní centrum Ostrava	Ery O-	Ery O+	Ery A-	Ery A+	Ery B-	Ery B+	Ery AB-	Ery AB+	P O	P A	P B	P AB
celkem po skupinách:	66	308	45	226	22	126	12	126	64	195	275	356
CELKEM po přípravcích:	931								890			
Vše celkem po skupinách:	163	444	120	475	84	350	64	266	387	426	526	466
Vše CELKEM po přípravcích:	1966								1805			

# Přehled aktuálních strategických zásob krve v ČR k 05.09.2008

Přihlášený uživatel: **upir**   Odhlásit   [administrace](#)

OHBKT ÚVN Praha	Ery O-	Ery O+	Ery A-	Ery A+	Ery B-	Ery B+	Ery AB-	Ery AB+	P O	P A	P B	P AB
ÚVN Praha	45	12	6	15	9	12	8	7	4	9	11	5
Příbram	1	2	2	5	0	6	1	2	10	5	23	2
Kladno	2	6	0	15	0	5	2	1	10	25	14	5
Ústí n.L.	2	5	10	50	1	40	0	20	30	20	5	5
Most	2	1	1	5	2	3	3	6	12	5	6	4
celkem po skupinách:	52	26	19	90	12	66	14	36	66	64	59	21
CELKEM po přípravcích:	315								210			
FTO Praha 10 Královské Vinohrady	Ery O-	Ery O+	Ery A-	Ery A+	Ery B-	Ery B+	Ery AB-	Ery AB+	P O	P A	P B	P AB
celkem po skupinách:	14	42	15	60	16	46	8	60	130	80	80	32
CELKEM po přípravcích:	261								322			



# Tasks of CLIC

- **activates next CLCs** based on information from Ministry of Health
- **coordinates the distribution of blood**
- If necessary, calls the Ministry of Health to coordinate transportation
- is **the administrator of the unitary informal database of free blood units**, supervises the daily supply
- **collects actual information from each BCC** about available blood and plasma units. This information is updated daily in the morning.
- **checks** how the system functions





# System activation

The blood distribution system will be activated by:

- a) a extraordinary incident and declaration of the 2nd or highest alarm level according to the alarm plan of the Integrated Rescue System. And, if necessary, to resolve the issue of mass casualties
- b) declaration of a “crisis state” accompanied by mass casualties
- c) a state of emergency or a state of war

Each Blood Crisis Centre can call for the system activation based on an evaluated, concrete situation. Following this, the system is activated by Central Information and Logistic Centre.



**ÚVN**



# Frozen Blood

- The Central Military Hospital of Prague plays an important role in regards to the frozen stock of RBCs
- 3 blood supply lines during a crisis:
  1. common RBCs (0 neg.) are available in stock
  2. thawed / reconstituted RBCs (0 neg.)
  3. fresh, newly collected RBCs
- 8 pcs. Haemonetics ACP-215 machines = theoretical capacity of 96 reconstituted RBCs units / 24 hour.



**ÚVN**



## Blood freezing – method:

- in 40% glycerol, freeze at  $-80^{\circ}\text{C}$ , storage at  $-65^{\circ}\text{C}$
- collected by double erythrocytapheresis
- glycerolization, deglycerolization performed with the Haemonetics ACP 215 machine by closed system
- resuspension in Nutricel (AS-3)
- shelf life after reconstitution: 21 days













**ÚVN**



# Transport

The transport of blood to the targeted territory is the responsibility of the BCC

In case of state-wide activation of system, the transport will be coordinated by the CLIC and the Ministry of Health











# Agreements / Contracts

a/ the agreement between the Ministry of Health and the Ministry of Defense

b/ 2 levels of contracts for CBCs

- § cooperative agreement between CBCs and CLIC
- § contracts between CBCs and sub-suppliers of blood in their territory



**ÚVN**



## 1. trial

The humanitarian supply of blood to  
Georgia –  
13.8.2008.



➤ 8.8. the conflict in Georgia – South Osetia broke out

➤ 9.8. Russia intervention into conflict

➤ 10.8. Georgia called in the international community, including NATO, about the humanitarian relief

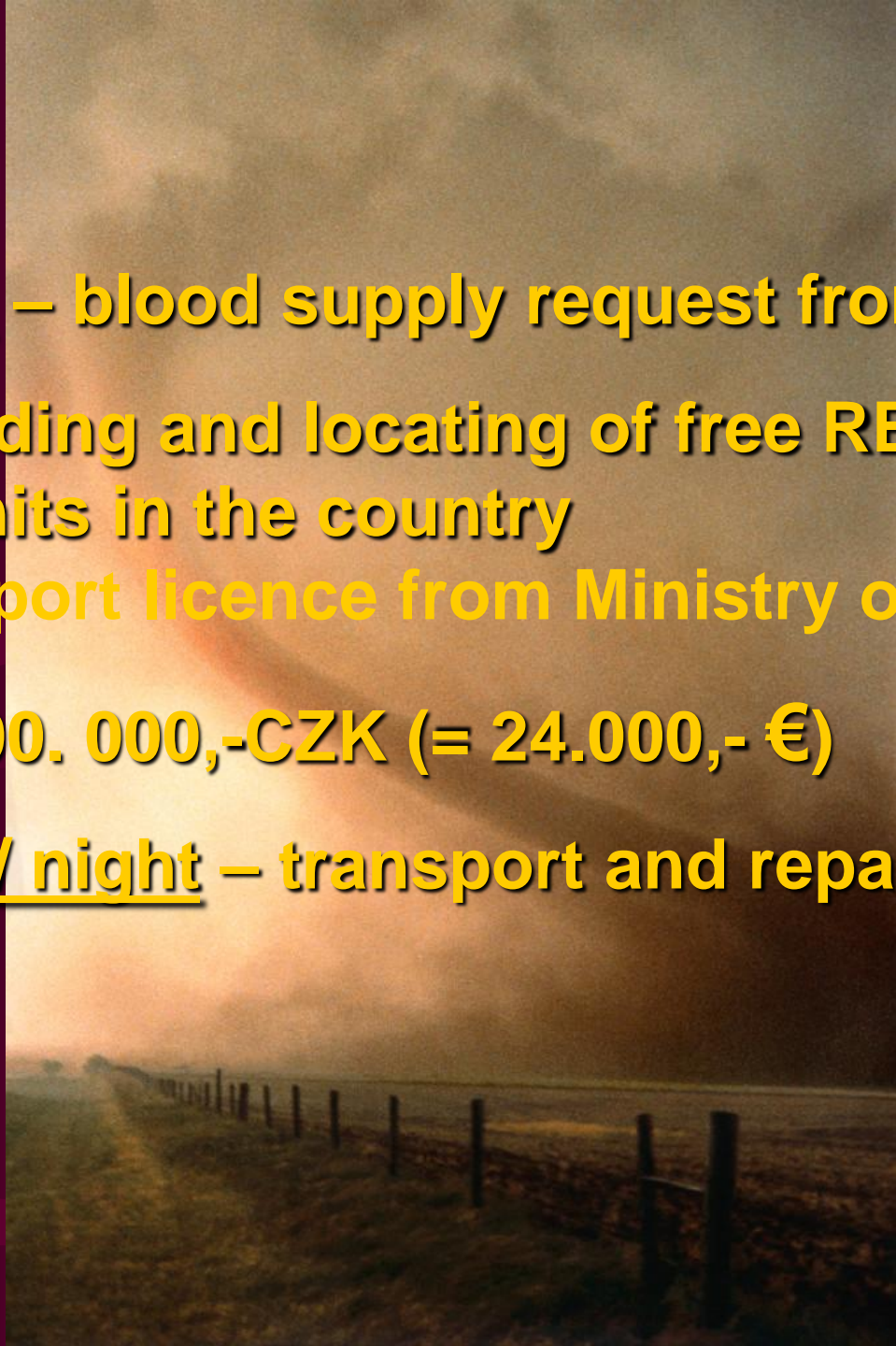


11.8. the Czech Republic started humanitarian relief



## ➤ 12.8. :

- morning – blood supply request from Georgia
- day – finding and locating of free RBCs and plasma units in the country
  - export licence from Ministry of Health
- limit – 600. 000,-CZK (= 24.000,- €)
- evening / night – transport and repack



	RBCs (TU)								Plasma (TU)			
	<i>A+</i>	<i>A-</i>	<i>B+</i>	<i>B-</i>	<i>AB+</i>	<i>AB-</i>	<i>O+</i>	<i>O-</i>	<i>A</i>	<i>B</i>	<i>AB</i>	<i>O</i>
FN Brno	20	5	30	5	5	2	20	5	30	50	10	50
FN Hradec Králové	30	0	10	0	10	0	30	0	0	0	0	0
Ostrava	100	0	0	0	0	0	100	0	0	100	0	0
Plzeň	20	10	10	0	8	3	15	0	0	300	0	500
Klatovy	12	0	7	0	2	0	0	0	0	0	0	0
Karl.Vary	0	0	0	0	0	0	0	0	30	20	5	30
Cheb	15	0	3	0	5	0	4	5	0	100	0	200
Sokolov	15	5	10	3	5	2	5	5	20	10	5	70
Teplice	0	0	0	0	0	0	0	0	70	70	0	65
UVN	0	0	0	0	0	0	0	0	0	0	0	200
Pelhřimov	0	0	0	0	0	0	0	0	100			
Frýdek Místek	0	0	0	0	7	0	0	0	20	0	0	0
Třinec	0	0	0	0	0	0	30	0	10	10	10	50
FNKV	0	0	0	0	0	0	0	0	0	0	0	0
Σ	212	20	70	8	42	7	174	15	280	660	30	1165
	548								2135			
	963 384,- Kč								1 772 050,- Kč			





Transfuzní oddělení FN BRNO  
Č. příjmu: C20100801000820  
EBR  
ERYTHROCYTY BEZ BUFLY COATU  
RESUSPENDOVANÉ  
Množství: 300g 200ml 1.TU  
Hemolýza: 0,6% ± 0,7%  
Vysledeno ze 470ml ± 10% krve  
Cílová dávka 83ml CPO  
Resuspendováno v 150ml SAGM  
HbAg: NEG TPHA: NEG  
AntiV: NEG AntiV: NEG  
ALT: VYHOVUJE  
Přijato: 17.09.2008  
Skladujte při teplotě +2°C až +6°C

Transfuzní oddělení FN BRNO  
Č. příjmu: C20100800998620  
EBR  
ERYTHROCYTY BEZ BUFLY COATU  
RESUSPENDOVANÉ  
Množství: 300g 200ml 1.TU  
Hemolýza: 0,6% ± 0,7%  
Vysledeno ze 470ml ± 10% krve  
Cílová dávka 83ml CPO  
Resuspendováno v 150ml SAGM  
HbAg: NEG TPHA: NEG  
AntiV: NEG AntiV: NEG  
ALT: VYHOVUJE  
Přijato: 17.09.2008  
Skladujte při teplotě +2°C až +6°C

Transfuzní oddělení FN BRNO  
Č. příjmu: C20100810573920  
EBR  
ERYTHROCYTY BEZ BUFLY COATU  
RESUSPENDOVANÉ  
Množství: 300g 200ml 1.TU  
Hemolýza: 0,6% ± 0,7%  
Vysledeno ze 470ml ± 10% krve  
Cílová dávka 83ml CPO  
Resuspendováno v 150ml SAGM  
HbAg: NEG TPHA: NEG  
AntiV: NEG AntiV: NEG  
ALT: VYHOVUJE  
Přijato: 12.09.2008  
Skladujte při teplotě +2°C až +6°C

Transfuzní oddělení FN BRNO  
Č. příjmu: C20100800985120  
EBR  
ERYTHROCYTY BEZ BUFLY COATU  
RESUSPENDOVANÉ  
Množství: 300g 200ml 1.TU  
Hemolýza: 0,6% ± 0,7%  
Vysledeno ze 470ml ± 10% krve  
Cílová dávka 83ml CPO  
Resuspendováno v 150ml SAGM  
HbAg: NEG TPHA: NEG  
AntiV: NEG AntiV: NEG  
ALT: VYHOVUJE  
Přijato: 12.09.2008  
Skladujte při teplotě +2°C až +6°C

Transfuzní oddělení FN BRNO  
Č. příjmu: C20100800985120  
EBR  
ERYTHROCYTY BEZ BUFLY COATU  
RESUSPENDOVANÉ  
Množství: 300g 200ml 1.TU  
Hemolýza: 0,6% ± 0,7%  
Vysledeno ze 470ml ± 10% krve  
Cílová dávka 83ml CPO  
Resuspendováno v 150ml SAGM  
HbAg: NEG TPHA: NEG  
AntiV: NEG AntiV: NEG  
ALT: VYHOVUJE  
Přijato: 12.09.2008  
Skladujte při teplotě +2°C až +6°C





**ÚVN**

Central Military Hospital Prague  
Czech Republic

## Red Cells

The human blood product.  
For medical use only !

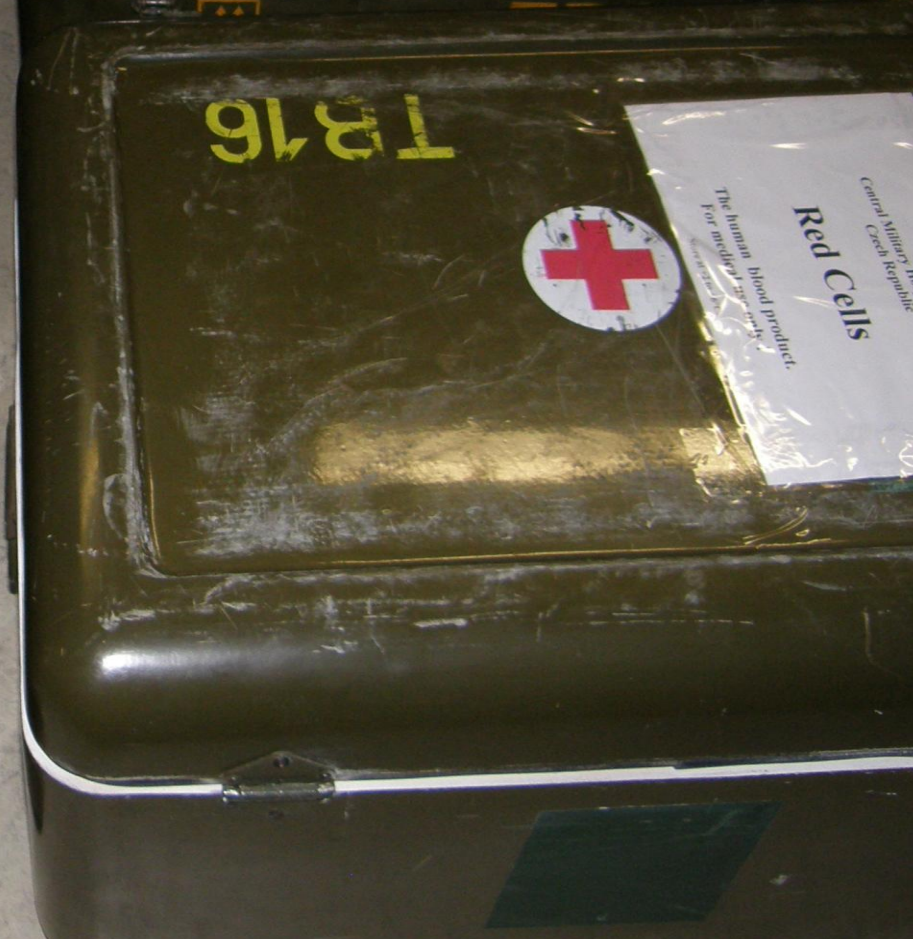
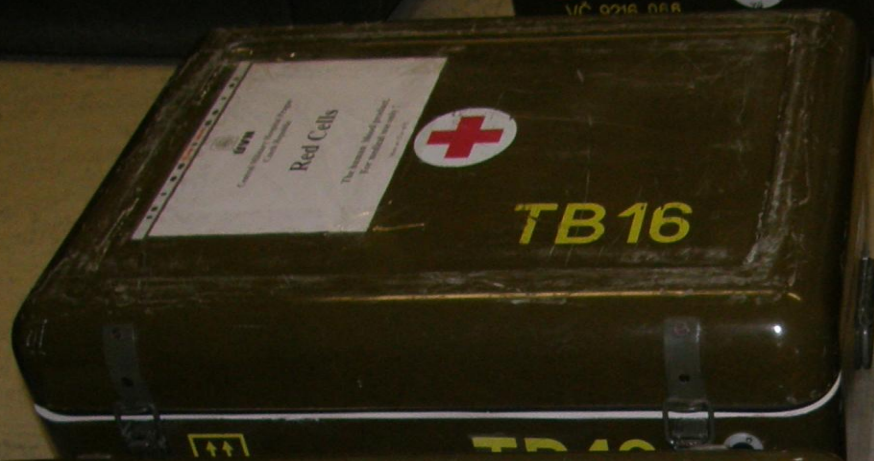
Store at  $-2$  to  $-8^{\circ}\text{C}$ .



**TB16**

**TB16**







41400

KOREB



**ÚVN**

Central Military Hospital Prague  
Czech Republic

# Fresh Frozen Plasma

The human blood product.  
For medical use only !

Store at -25°C and below.















➤ 13.8.:

- 5,00- 6,30 transport to the airport
- 7,00 – 7,30 loading of the aircraft















[www.uvn.cz](http://www.uvn.cz)

[www.transfuze-uvn.cz](http://www.transfuze-uvn.cz)