

# Management of a National Blood Inventory in Peace and Disasters - The Israeli Experience

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**Blood Services director**  
**Magen David Adom**  
**Israel**



# Magen David Adom (MDA)

- ✧ A civil, statutory, non-for profit organization, founded by volunteers in 1930, and operates under "MDA law" (The Israeli Knesset, 1950)
- ✧ The Israeli National Society, a member of the RC/RC movement
- ✧ Provides first-aid and pre-hospital EMS for the population
- ✧ Operates Israel's central blood services
- ✧ Additional activities (1<sup>st</sup> aid training, Humanitarian activities, etc)



# Israel

**Area: 20,770 Square Km**

**Population: 7,037,500**



**Total national donations 2007:  
311,000 whole blood units (4.4%)**

**Blood collection by MDA:289,000**

**MDA 2 components laboratories:**

**Tel Hashomer: 80% of production**

**Haifa: 20% of production**

**MDA 1 testing laboratory**

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**MDA Blood Services**



# MDA Blood Services

- ✧ **Collection of 95% of all blood units needed nationwide, from non-remunerated donors (289,000 units in 2007)**
- ✧ **Preparation of routine and modified blood components**

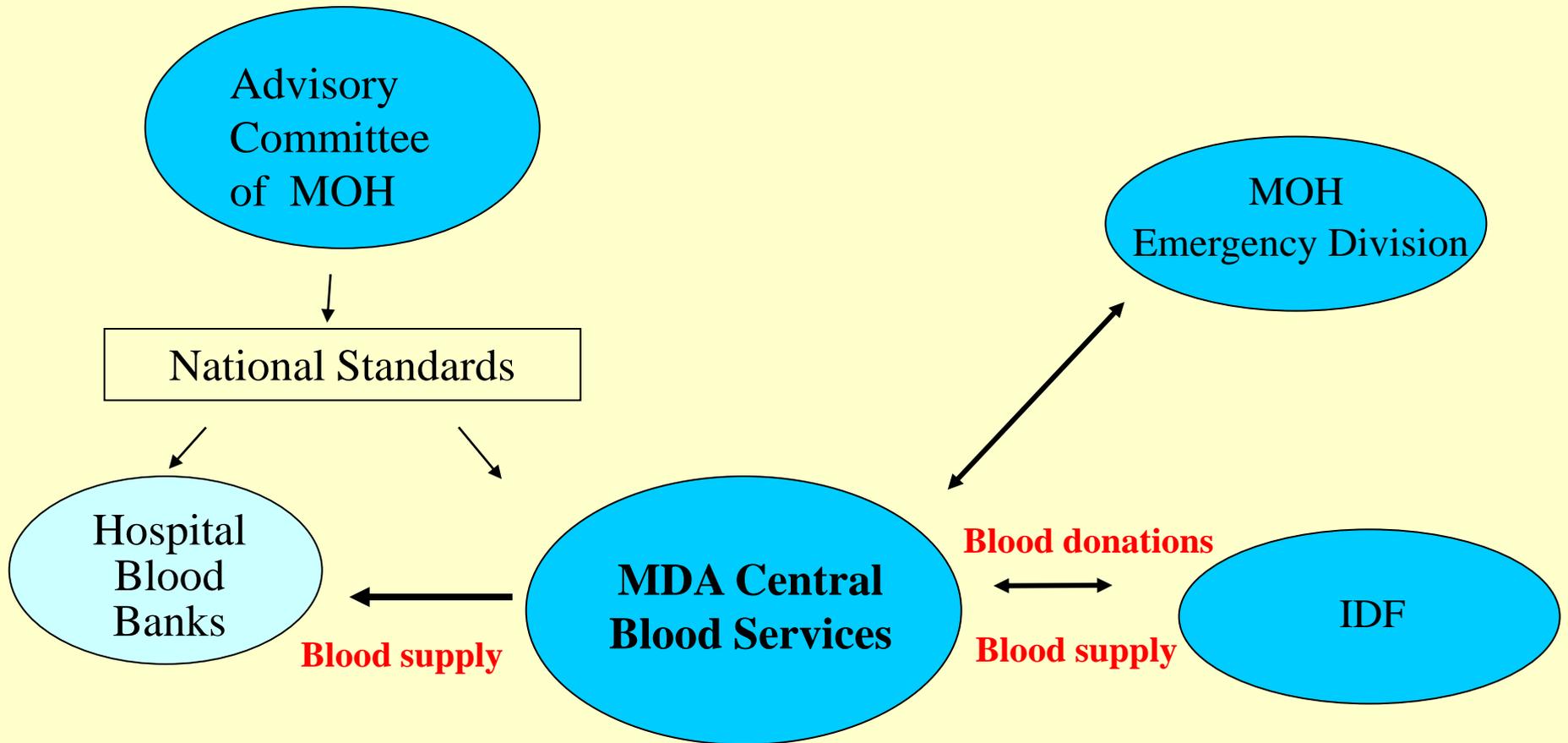


- ✧ **Testing for blood groups, RBC antibody screening and infectious disease markers**
- ✧ **Storage and management of the country's blood inventory**
- ✧ **Daily shipments to hospital blood banks and clinics**
- ✧ **Supply of all the military blood needs**

# Blood requirements in mass casualties/war- the Israeli experience

- Description of the Israeli national blood program
- Management of the national blood inventory and supply in peace, and during disasters
- Estimated requirements for blood units and components in Mass Casualties (MC)/War
- Donor recruitment and management following MC events.

# The Israeli National Blood Program



# Responsibilities & Operations

## ✧ **MDA Central blood services:**

Collection, component preparation, testing and distribution, nationwide

## ✧ **Hospital blood banks:**

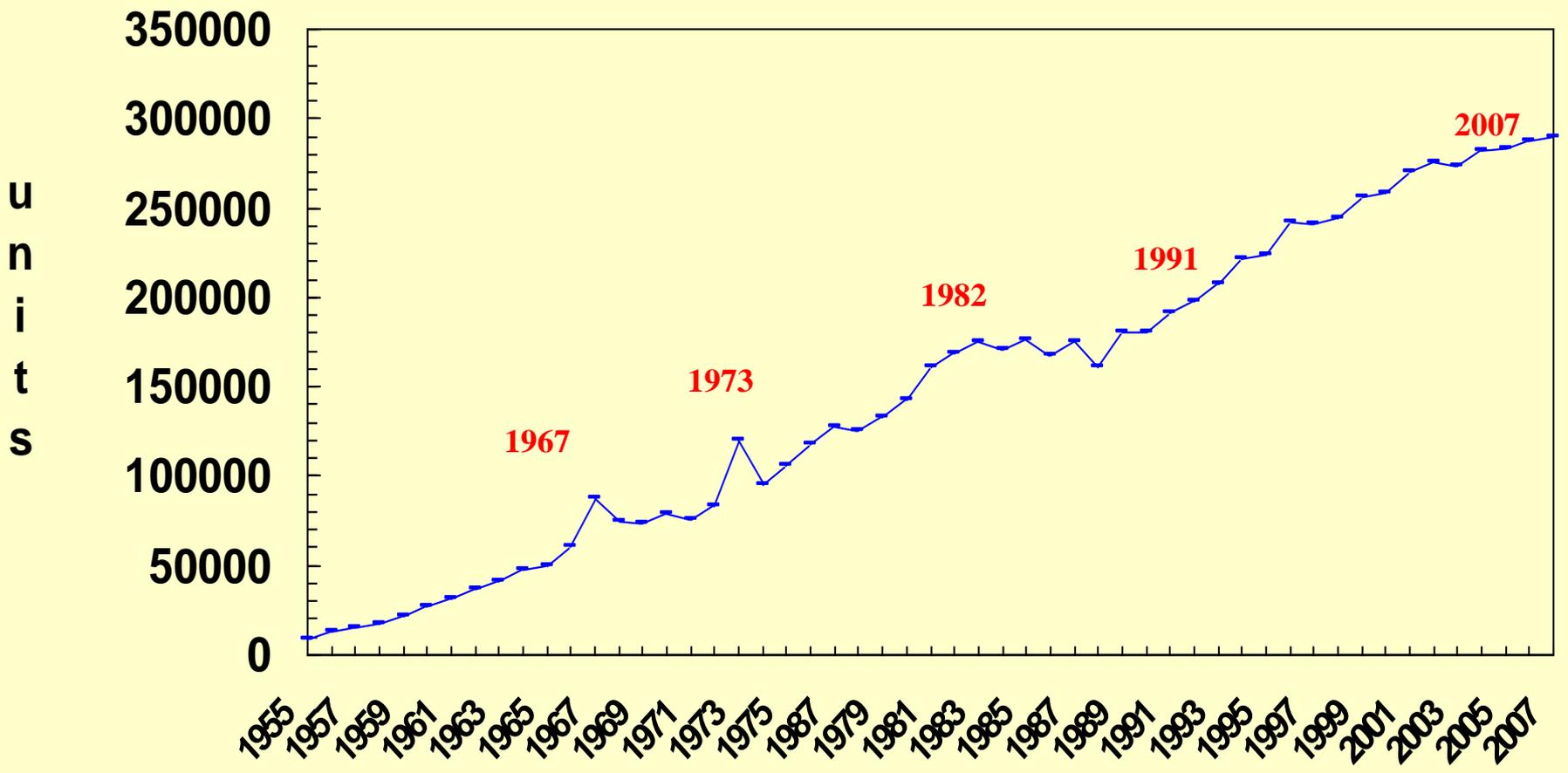
Preparation of units for transfusion

## ✧ **Pre-hospital system:**

Use of “O” PC units only



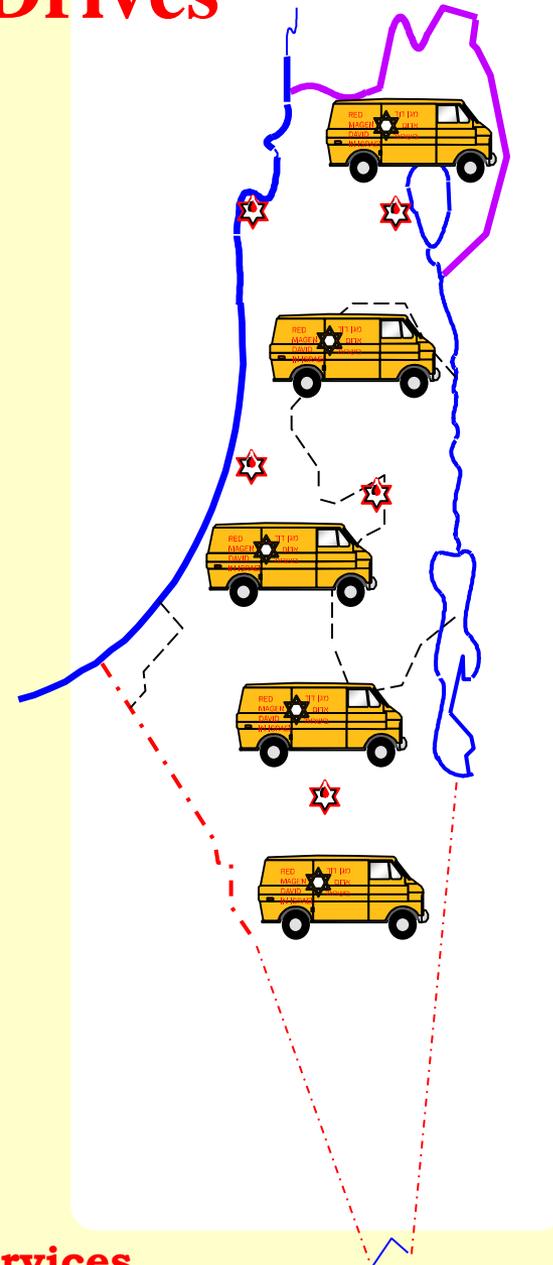
# Blood Donations in Israel 1955-2007



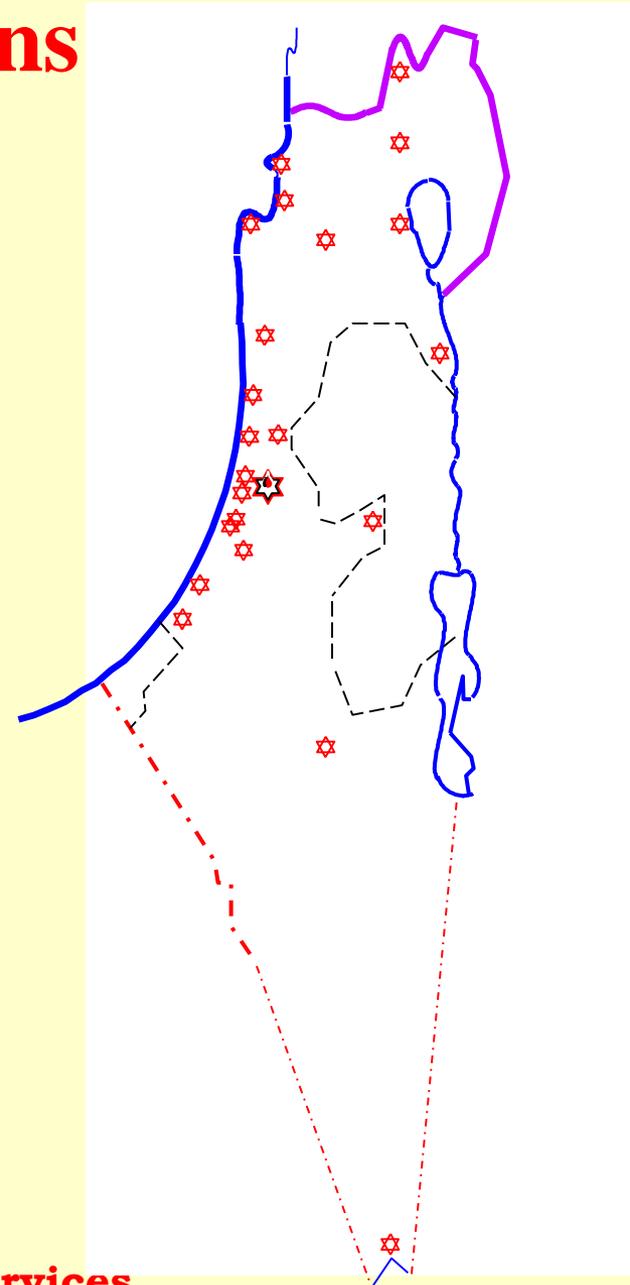
# Mobile Blood Drives



**90%** of all units are collected in mobile blood drives, conducted daily, nationwide using 24 mobiles and 12 self-contained units



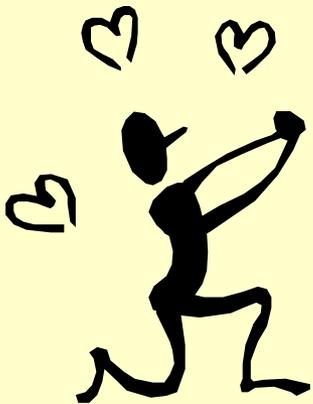
# Fix-site donations



**10%** of the units are collected in fixed-sites donor rooms, located in MDA first-aid stations.

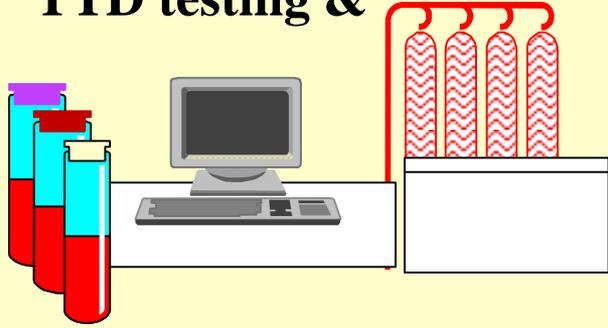
# Who are our donors?

☆ Age:	17-40y	75%
☆ Gender:	Male	72%
☆ Origin:	Israeli Born	78%
☆ Site:	Mobiles	90%
☆ Donation:	1st Time	27%
☆ Status:	Civilians	75%

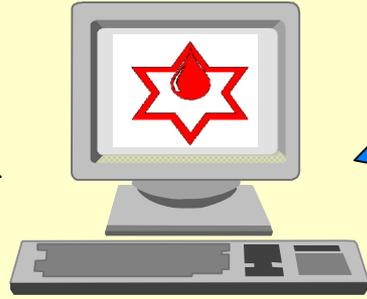
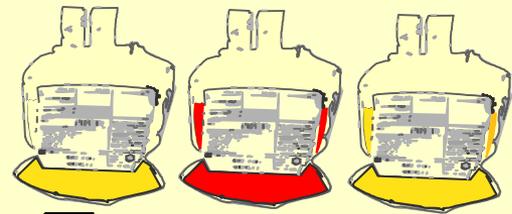


**Donor Questionnaire**  
**Discrete interview**

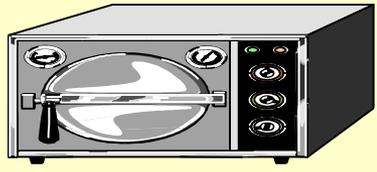
**Blood typing**  
**TTD testing &**



**Component preparation**



**Not for Transfusion**

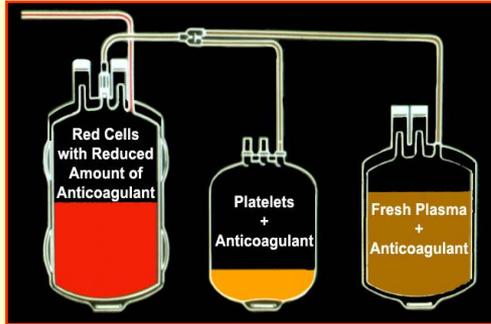


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**O.K.**



# Blood component preparation and supply (2007)



**Whole blood**  
289 600

**RBC**  
95%

**Platelets**  
52%

**Fresh Frozen Plasma**  
25%

**Plasma for Fractionation**  
37,000 liters

**cryodepleted Plasma**

**Cryo**  
11%

**Biological glue**

**IVIg**

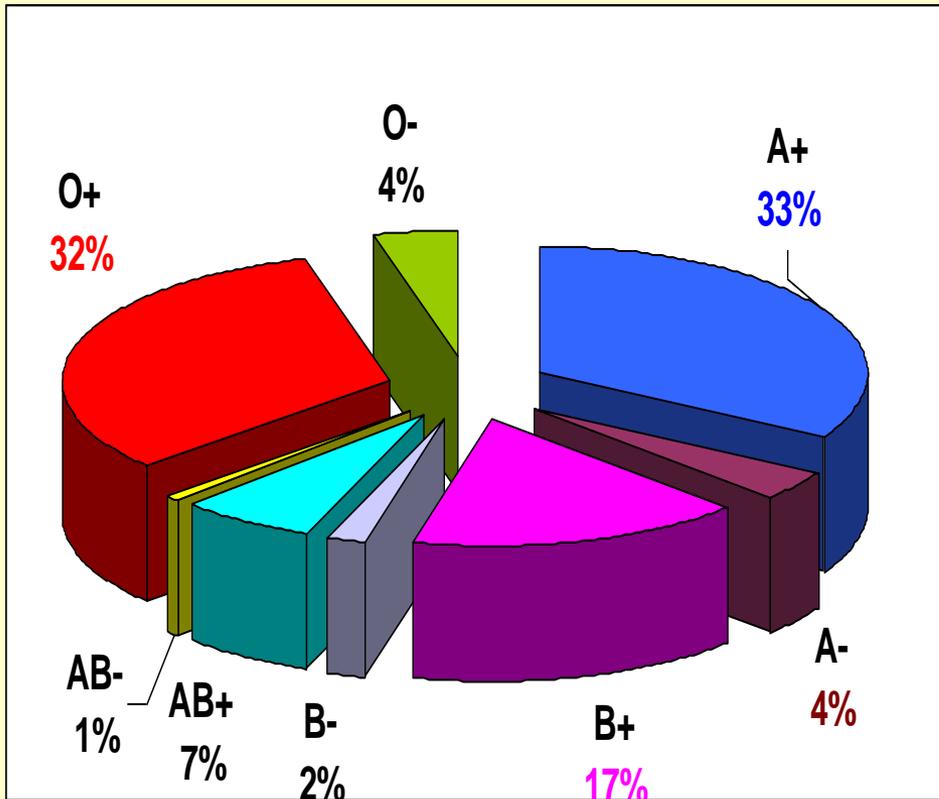
**Coagulation factors**

**Albumin**



# Blood Typing

## Blood types in Israel



ABO

Rh

RBC antibody screening



# Testing for TTD in Israel-2008

<u>Agent</u>	<u>Year</u>	<u>% in Blood Donors</u>
• HBV	1970	0.12
• HCV	1991	0.1
• <del>HCV Ag</del>	2004	0.0004
• HIV	1986	0.002
• HTLV	1995	0.0016
• Syphilis	1970	0.07
• <del>ALT</del>	1992	0.7
• NAT	2008	



# Frozen Inventory



Category	Internat. donors	Frozen UK	Frozen CE	MDA donors	Frozen MDA
pp	74	2	38	8	47
Lu(a+b-)	323	32	49	50	98
Lu: -6				3	4
Kp(a+b-)	145	37	39	60	152
K: -22				2	
Fy(a-b-)	563	69	75	90	121
I-	93	12		1	6
Yt(a-)	230	17	107	100	240
Vel-	236	30	120	2	9
Ge-	26		22	10	14
Lan-	15		2	2	
JMH-	16			6	60
Dr(a-)				7	20



**Glycerol is added to fresh RBC**



**Units are kept frozen at – c for > 10 years**



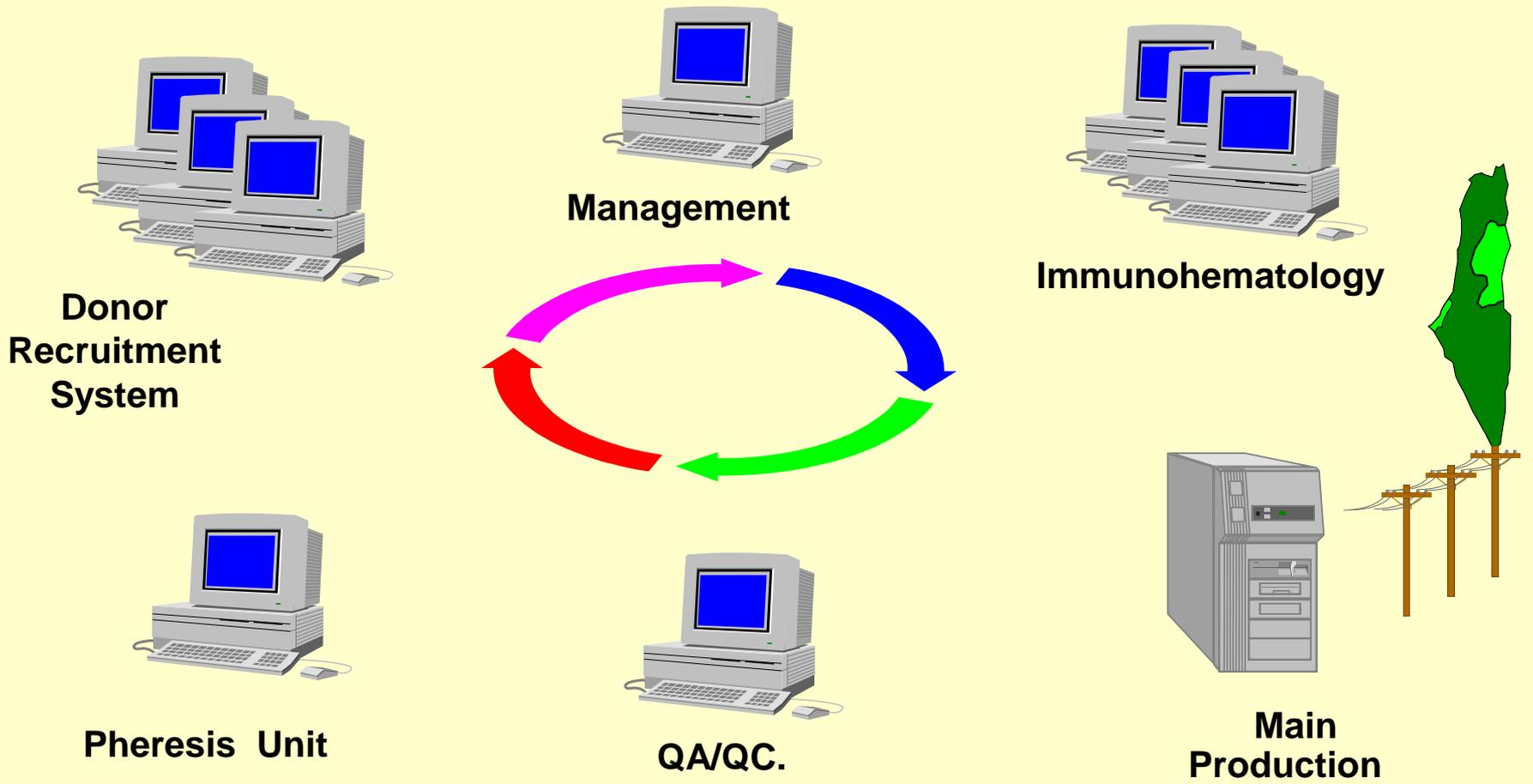
**Procedure performed only on rare blood units**

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**MDA Blood Services**

# Blood Services Computer System: “Progesa” - MAK LIMS - Nautilus



# Quality Assurance & Control

## Israeli Standards:

Blood Services Laboratories

✓ **ISO 9001:2000**

✓ **ISO/ IEC17025**

**2003**

✓ **ISO 9001:2000 Pheresis unit &CBB:**

Donor Recruitment System

✓ **ISO 9001:2000**

**2008**

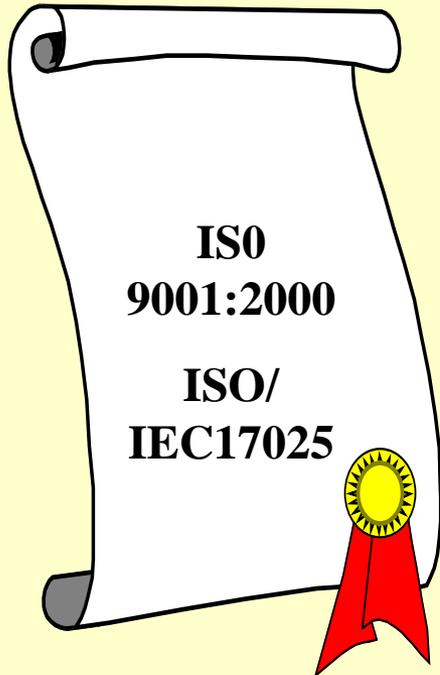
## International Standards:

**EMEA Accreditation**

**2008**

**FACT/NetCord for CBB**

**2008/9**



# National Blood Inventory Management

# National Blood Inventory Management



## MDA Blood Services:

- ✧ Maintain an inventory of 3 days' work
- ✧ Receive daily report from hospitals, upon placement of their blood order
- ✧ Coordinate and supply blood units/ components to all hospitals
- ✧ Supply all needs of the IDF medical corps
- ✧ Conduct public appeals when shortage is expected

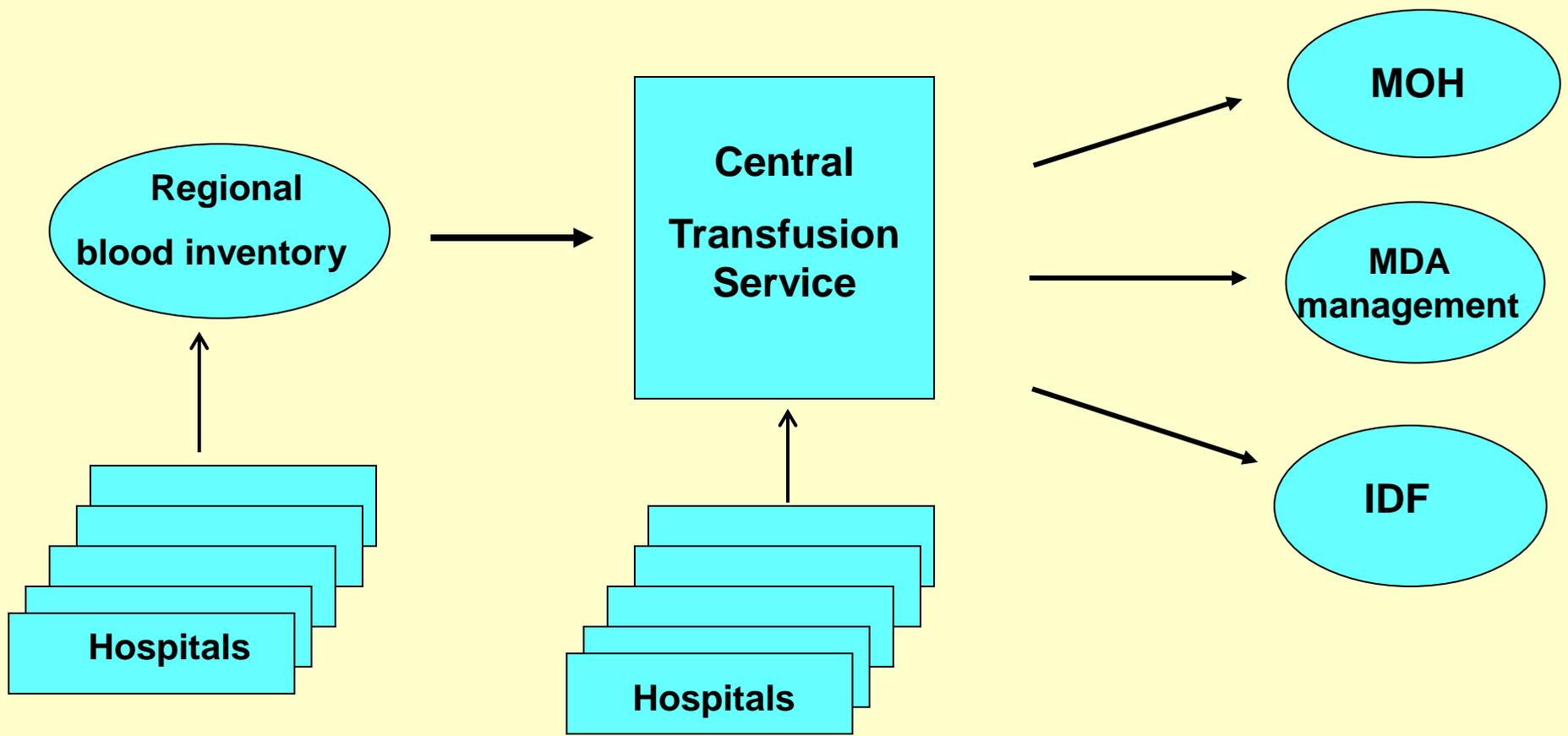
## Hospitals:

- ✧ Maintain an inventory of 3 or 5 days' work (depending on hospital size, activities and geographical distance from MDA repositories)





# Central Control of the National Blood Inventory



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**MDA Blood Services**

# How much blood is needed?

# Blood & Components Supplied /Casualty

Event	year	Total casualties*	PRBC	FFP	random Platelets	Cryo	Total components
Lebanon I	1982	657	2.8	1.1	0.11	0.27	1.5
“Intifadas”	2000-05	7,497	1.3				0.9
Lebanon II	2006	1,923	2.7	1.0	1.7	0.4	3.1
		<b>Blood requiring casualties*</b>					
Lebanon I	1982	224 (34%)	8.2	3.4	0.34	0.8	4.5
“Intifadas”	2000-05	1,512(21%)	6.7				4.5
Lebanon II	2006	120(6.2%)	8.0	4.2	2.4	3.0	9.7

\*Injury Severity Score-as evaluated by the “triaging” EMS teams on the scene



# Blood Services SOPs in a Nutshell

- ✧ Receive notification, ASAP, from MDA (EMS ) central dispatch, regarding:
  - ✧ Extent and type of the event
  - ✧ Total number of casualties, gender, ISS and the admitting medical centers
- ✧ Asses the national blood inventory
- ✧ “Calculate” **2.7** blood units, **3.1** component /casualty  
or **8** blood units, **9.7** component /severe & moderate
- ✧ Contact the receiving hospitals for update and needs
- ✧ Supply needed blood (ground or air transportation)
- ✧ Evaluate the need for a public appeal



# Blood Donors Recruitment and Management

- ✧ The decision to go on a public appeal should be taken by the blood services management
- ✧ Public appeal should be conducted only if severe shortage is expected
- ✧ Blood donors would react with devotion and empathy, either spontaneously or in response to the public appeals

# Blood drive after the terrorist attacks in Sinai 7/10/2004



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**MDA Blood Services**

# Israeli Blood Donor Response to the Sept 11th 2001 Attack

☆ A public appeal was conducted per request of the Israeli MOH

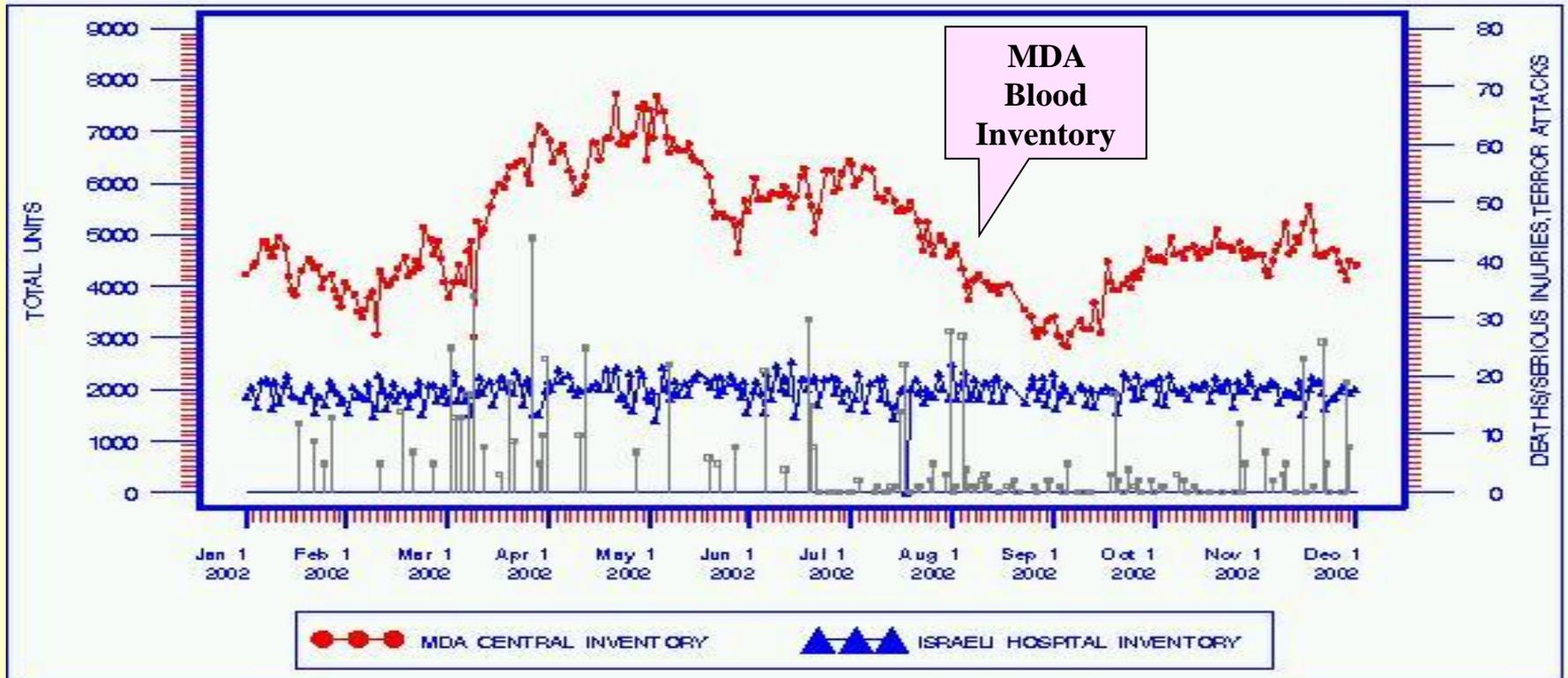
☆ Donor response:

<u>date</u>	<u>planned</u>	<u>collected</u>
11/9	1240	1116
12/9	760	3085
13/9	1253	1626
14/9	492	807
<b>Total:</b>	<b>3745</b>	<b>6634</b>



# Effect of MCEs on the National Blood Inventory (2002)

E.Shinar, V. Yahalom, and BG Silverman, Current Opinion in Hematology 13:452-456, 2006



# Summary (1)

- ✧ The Israeli system is a model of one national blood program, operated by a civil, central organization.
- ✧ The program is responsible for the national blood collection and supply, for both civilian and the military, at all times.
- ✧ The central control of the national blood inventory and distribution, facilitate monitoring and adequate response to unexpected events
- ✧ Daily reports of blood units inventory by all holders (hospitals, regional blood centers, and the national blood services) to the Health Authority/IDF/Home Front Command are done routinely

## Summary (2)

- ✧ Close working relations with the prehospital EMS, including real-time reports from the MCEs scene, enables immediate response of blood supply during regular and emergency situations
- ✧ There is a need for:
  - 3** blood units and **3** components/casualty
  - 8** blood units and **9.7** components/blood recipient
- ✧ Managing a "live" national inventory, prevents the need for an extra national liquid or frozen reserve.
- ✧ Public appeals should be managed meticulously, as blood donors would react with devotion and empathy, either spontaneously or in response to MCE.

# Thanks

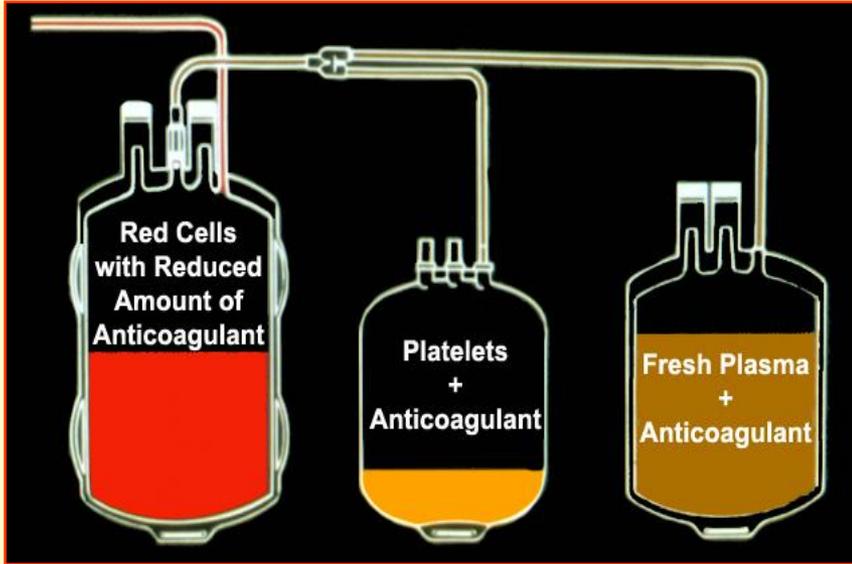
- ✧ MDA Volunteer  
Blood Donors
- ✧ MDA Employees  
and Volunteers
- ✧ You- for your  
attention



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# Blood components production



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