

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

Prof. Eilat Shinar
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 (1st 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

Shinar



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**

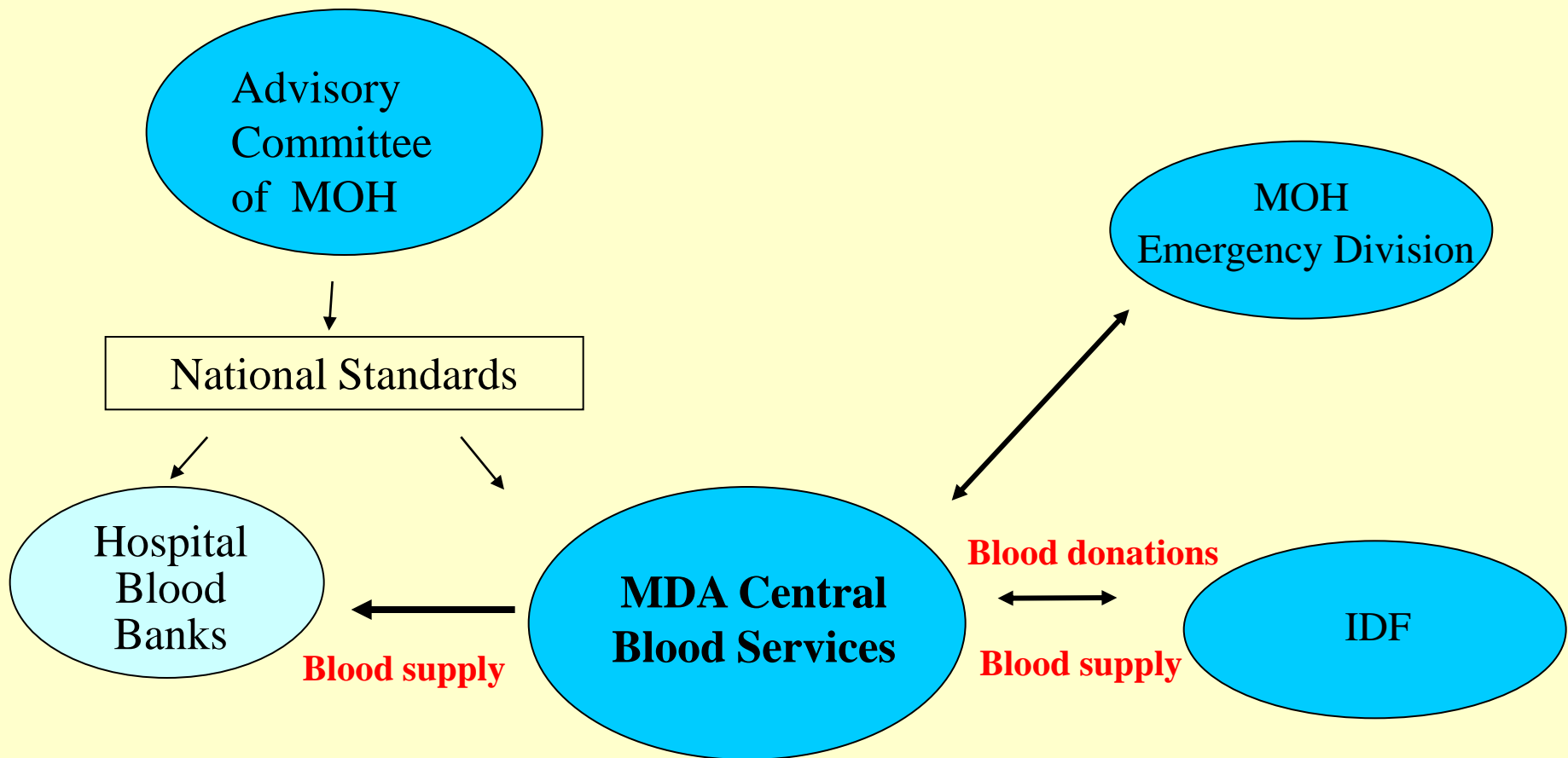


- ✧ **Testing for blood groups, RBC antibody screening and infectious disease markers**
- ✧ **Storage and management of the country's blood inventory**
- ✧ **Daily shipments to hospital blood banks and clinics**
- ✧ **Supply of all the military blood needs**

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:

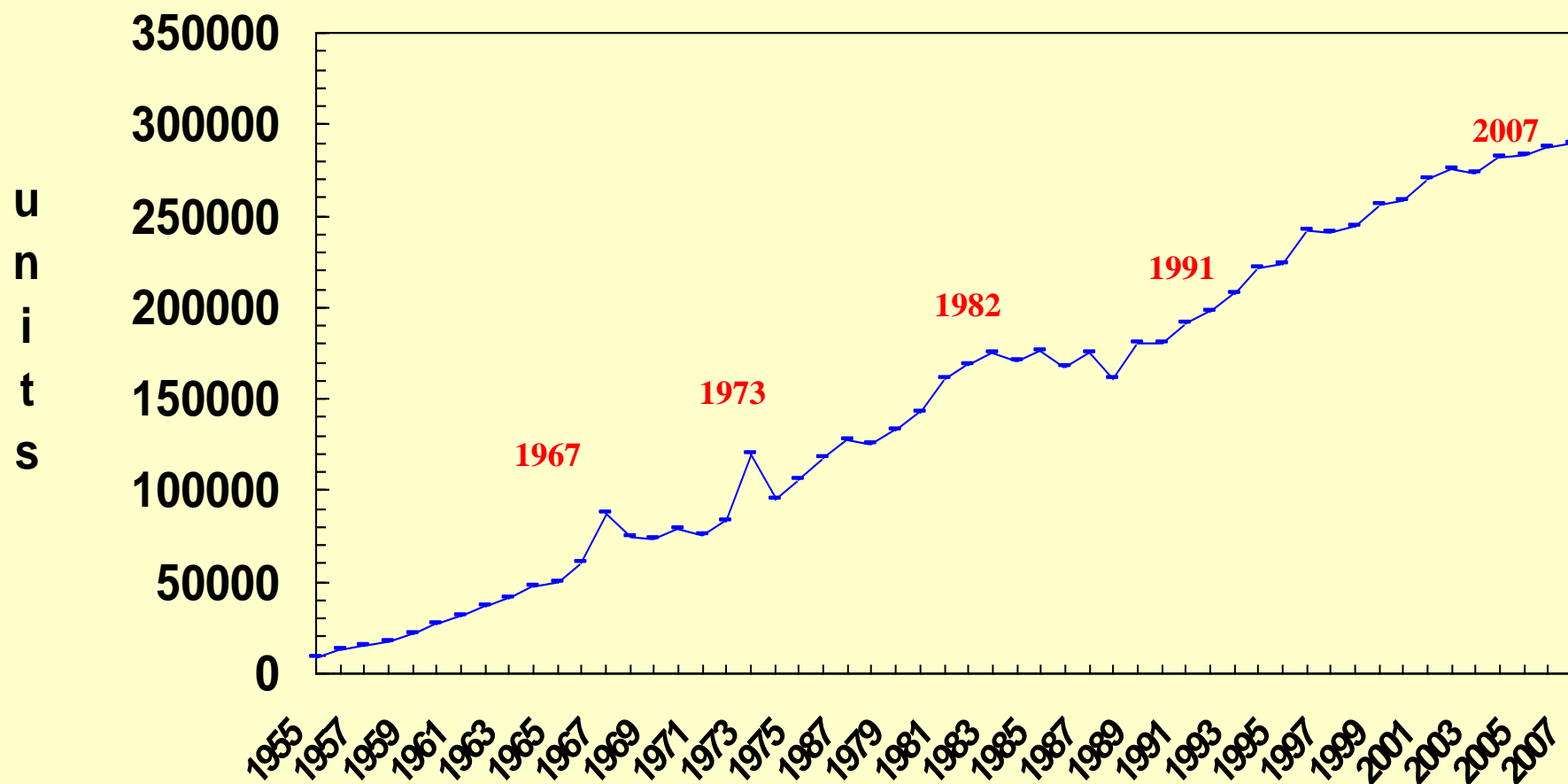
Preparation of units for transfusion

✧ Pre-hospital system:

Use of “O” PC units only



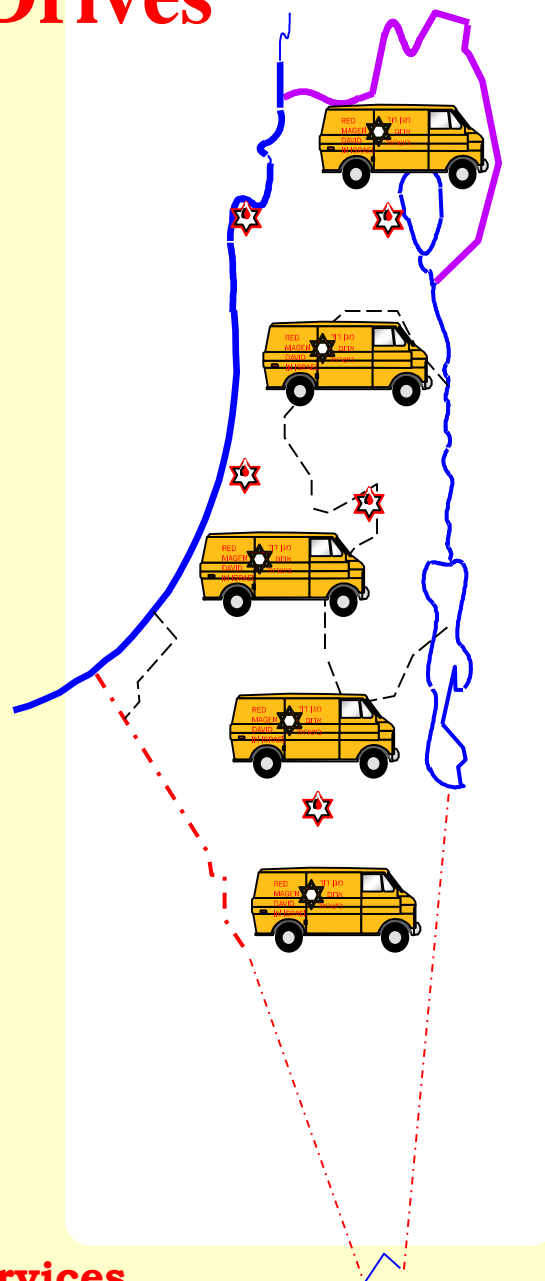
Blood Donations in Israel 1955-2007



Mobile Blood Drives



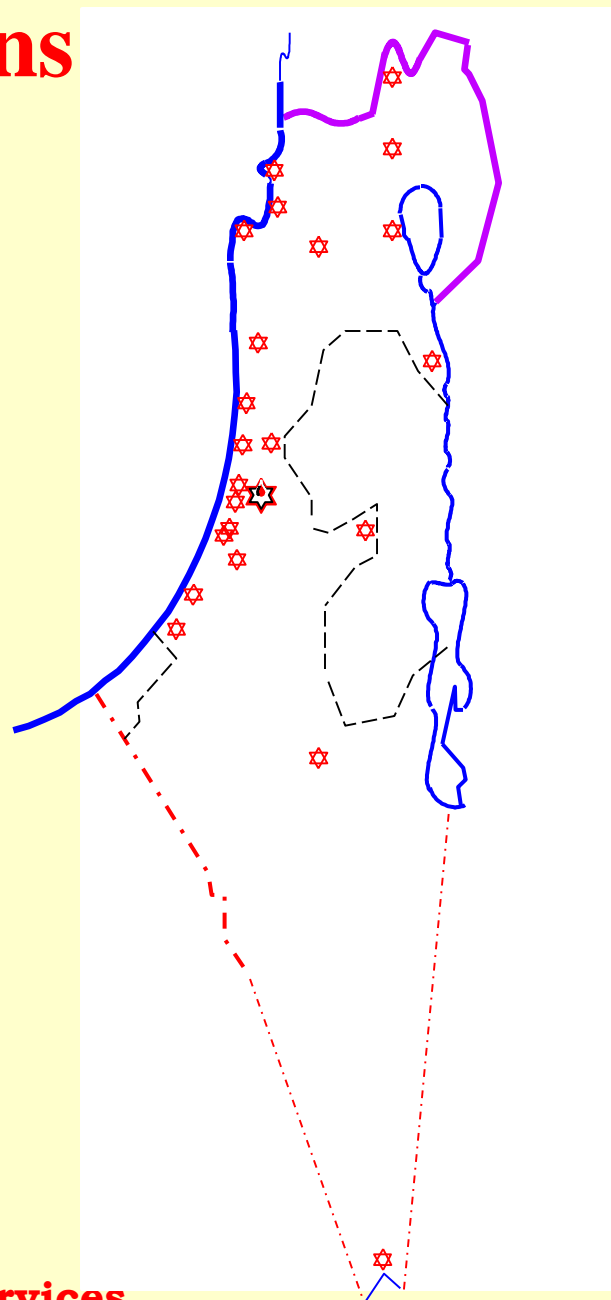
90% of all units are collected in mobile blood drives, conducted daily, nationwide using 24 mobiles and 12 self-contained units



Fix-site donations

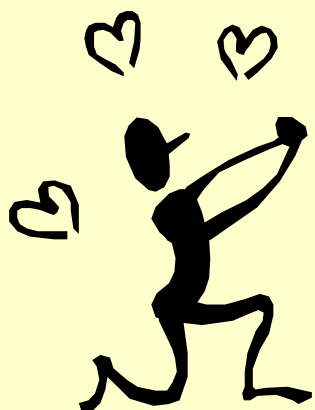


10% of the units are collected in fixed-sites donor rooms, located in MDA first-aid stations.



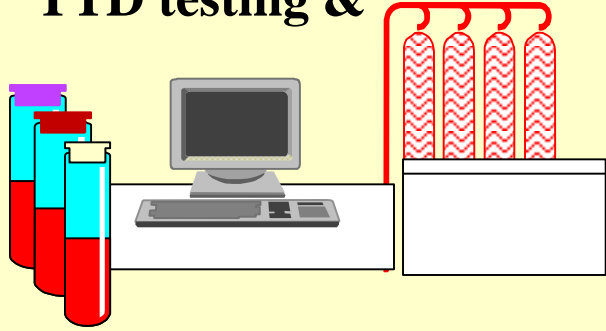
Who are our donors?

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

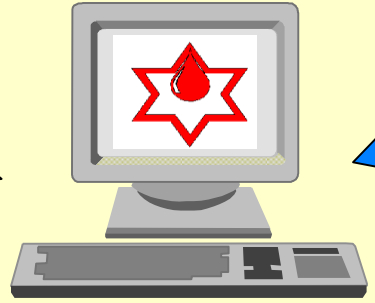
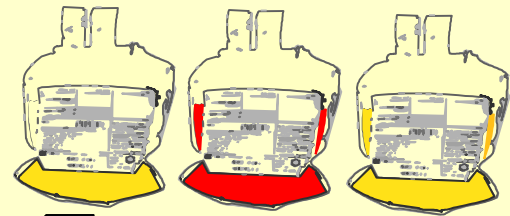


Donor Questionnaire
Discrete interview

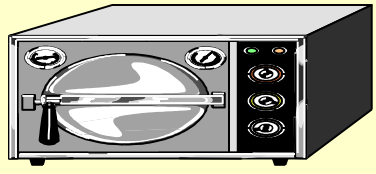
Blood typing
TTD testing &



Component
preparation

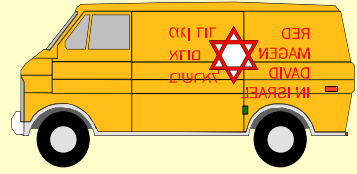
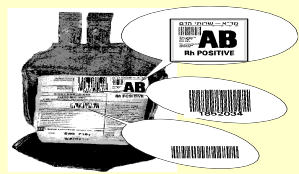


Not for
Transfusion

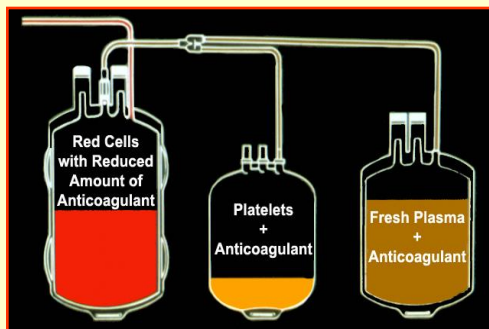


Shinar

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

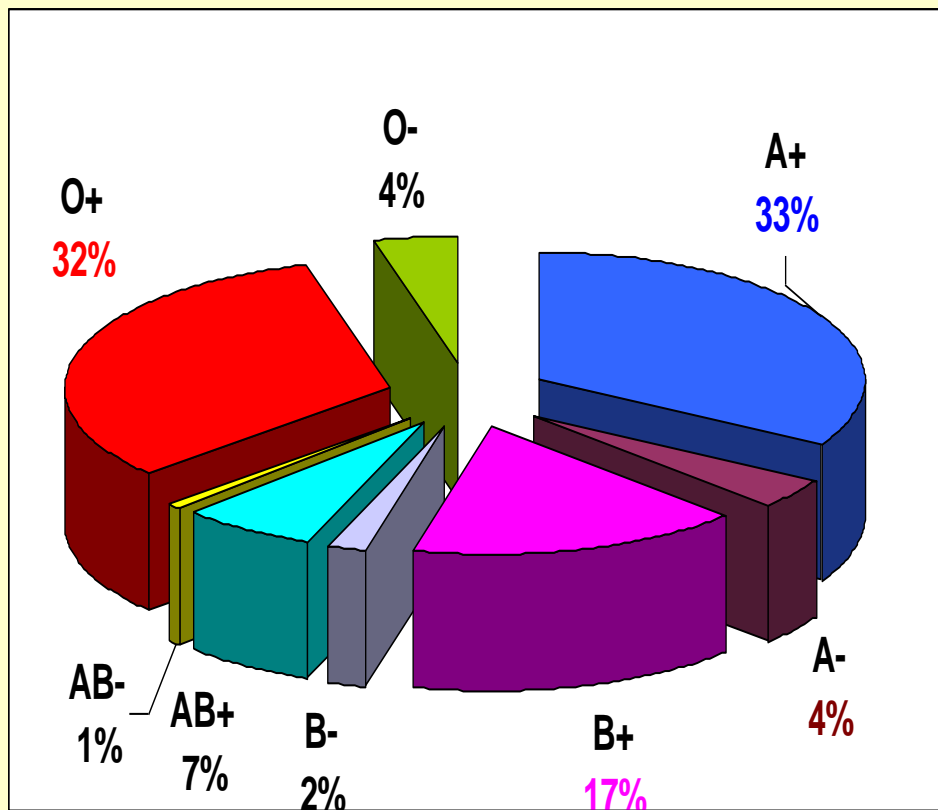
IVIg

**Coagulation
factors**

Albumin

Blood Typing

Blood types in Israel



ABO

Rh

RBC antibody screening

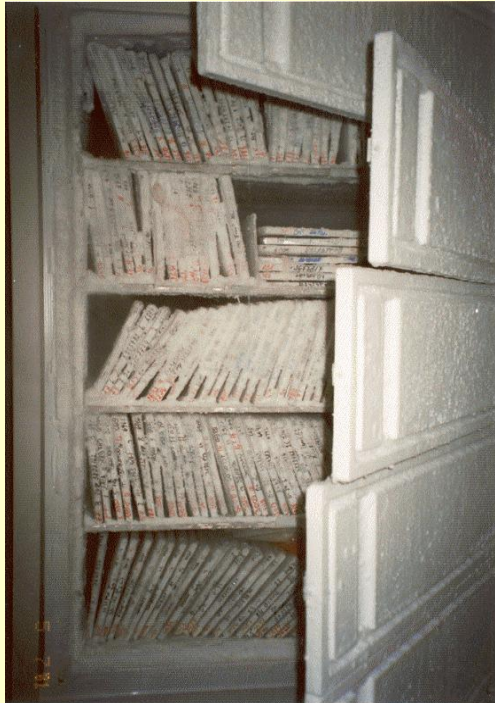


Testing for TTD in Israel-2008

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

Shinar

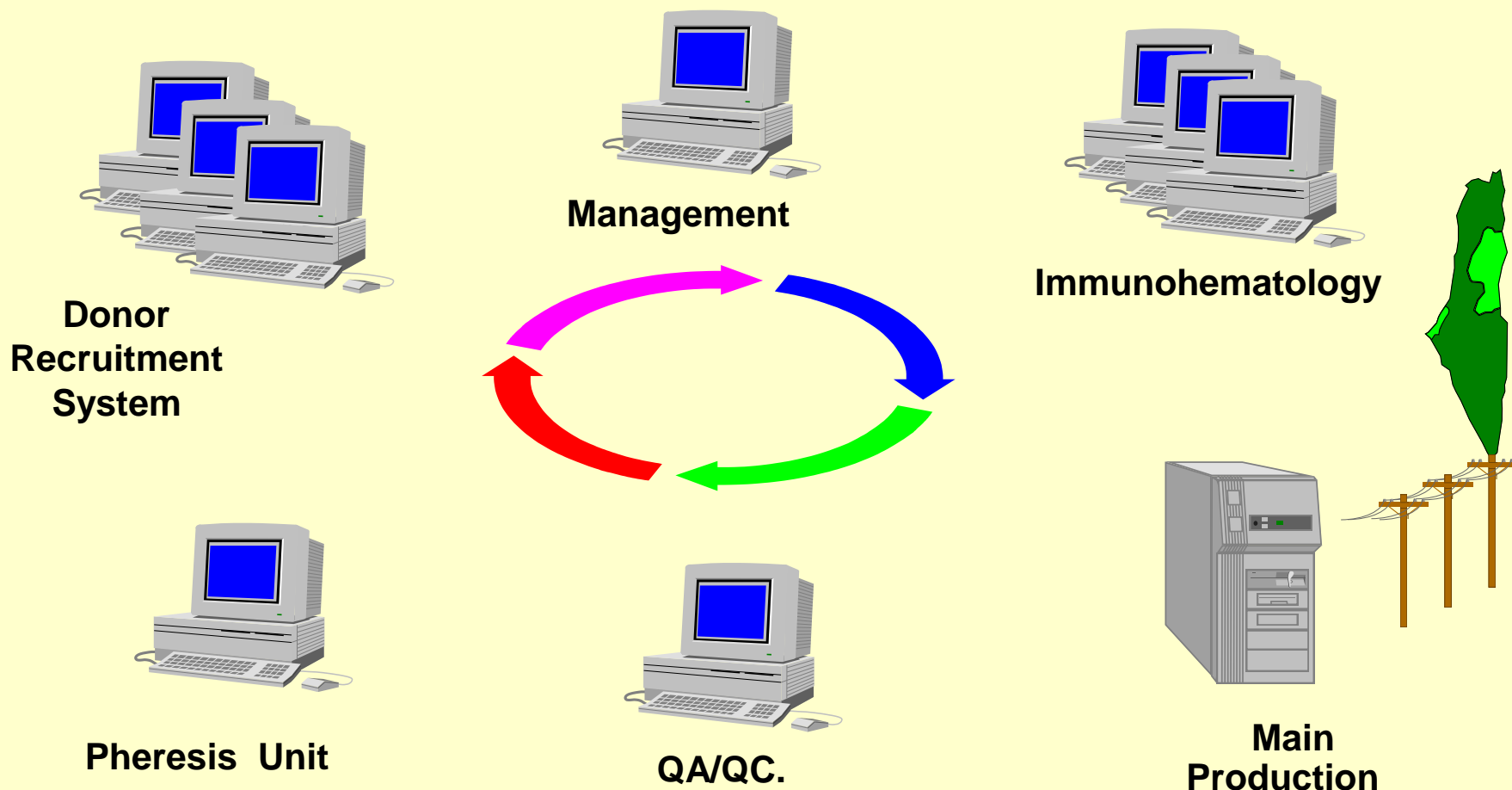


MDA Blood Services

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

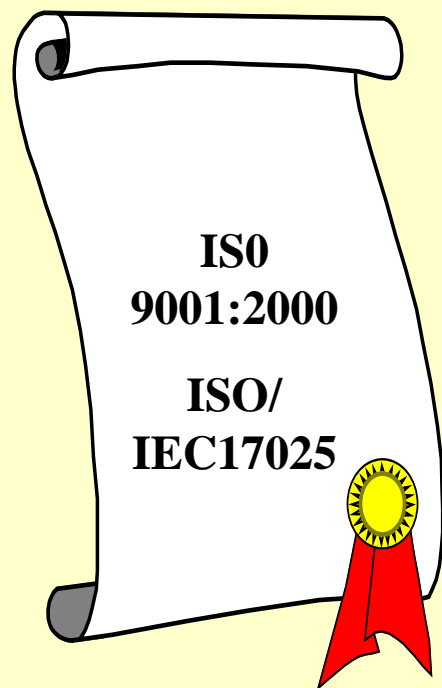
International Standards:

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)

Daily Inventory Report

Daily Blood Inventory Report dd/mm/year

Daily Blood Inventory Report dd/mm/year																																				
blood type	MDA Blood Banks		total inventory in MDA	NORTH								CENTER																SOUTH		total in hospitals	total in MDA+ hospitals					
	main facility	haifa		48	38	45	43	52	50	30	19	33	35	24	13	25	45	57	34	5	3		27	32	7	53	23	55	41			11	37	49	8	39
				דן - צפת	נהריה	מוריה - טבריה	העמק - נתניה	רעלי"ם - חיפה	בני ציון - חיפה	ברקל - חיפה	העל יפה - חדרה	ליסאד - נתניה	אזר - נר שבה	ס.ס. - הרצליה	בלינסון - ת"ת	השרון - ת"ת	רמת מרמא - רמת גן	שיבא - תל"ש	מסיני הישועה - ב"ב	אסמא - ת"א	אזילוב - ת"א		וולנסון - חולון	מ.ס. - ראש"צ	אסף הרופא - צריפין	שמאל הרופא - באר יעקב	הר הצופים - ירושלים	שני דק - ירושלים	עין בנים - ירושלים	ביקור חולים - ירושלים	אשכנז לך - ירושלים	קפלן - רחובות	ברדלי - אשקלון	מורקד - באר שבע	מספול - אילת	
A+																																				
O+																																				
B+																																				
AB+																																				
total (+)																																				
A-																																				
O-																																				
B-																																				
AB-																																				
total (-)																																				
units in process																																				
general total																																				
No. of O+ units, tested twice																																				
TOTAL												all types	"O" only																							
TOTAL in MDA (the 2 facilities)																																				
TOTAL in ALL HOSPITALS															דוח לתאריך: 18/04/02																					
GRAND TOTAL (NATIONAL)																																				
															O+ alert																					
															O- alert																					

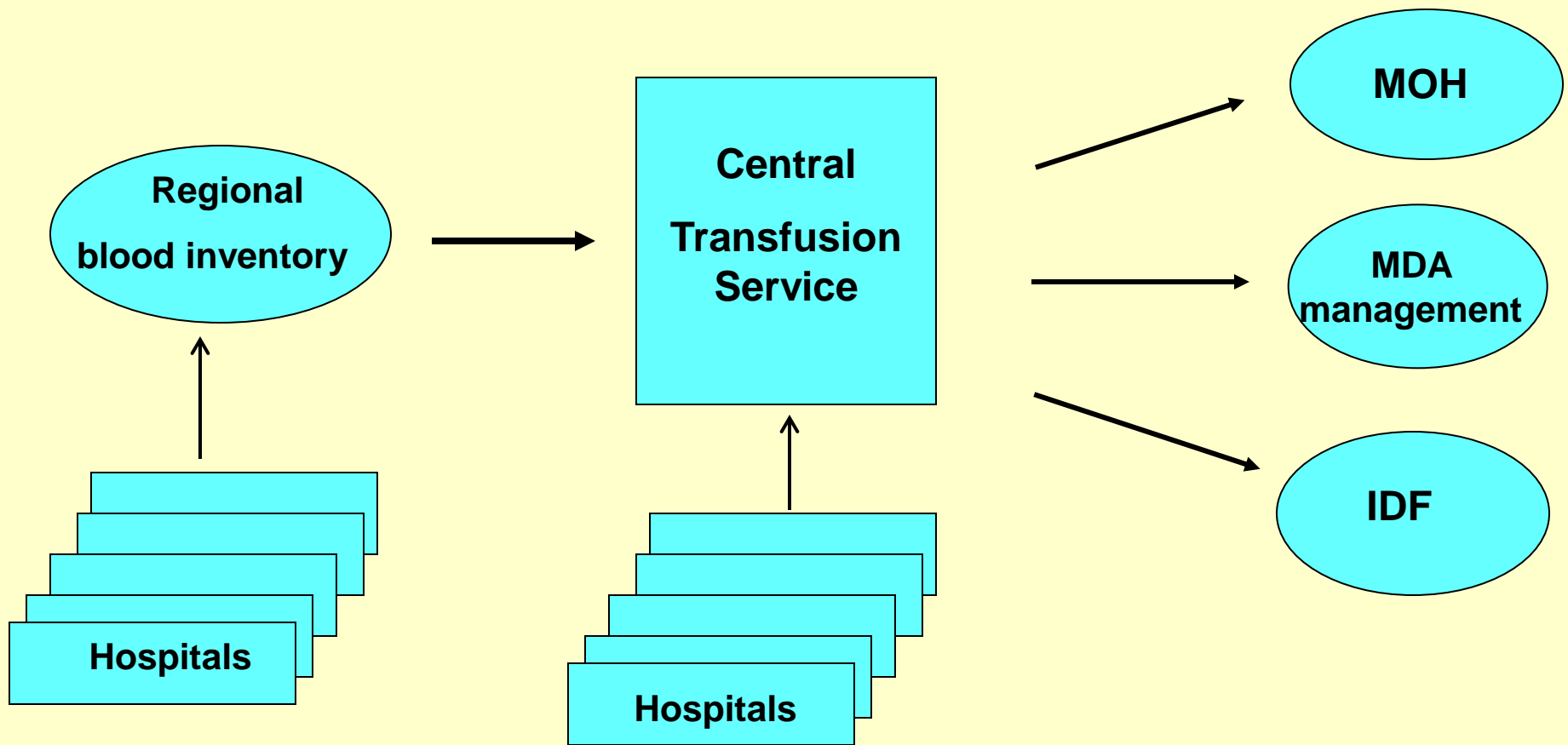
דוח לתאריך: 18/04/02

O+ alert

O- alert



Central Control of the National Blood Inventory



Shinar



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
		Blood requiring casualties*					
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



Shinar



MDA Blood Services

Israeli Blood Donor Response to the Sept 11th 2001 Attack

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

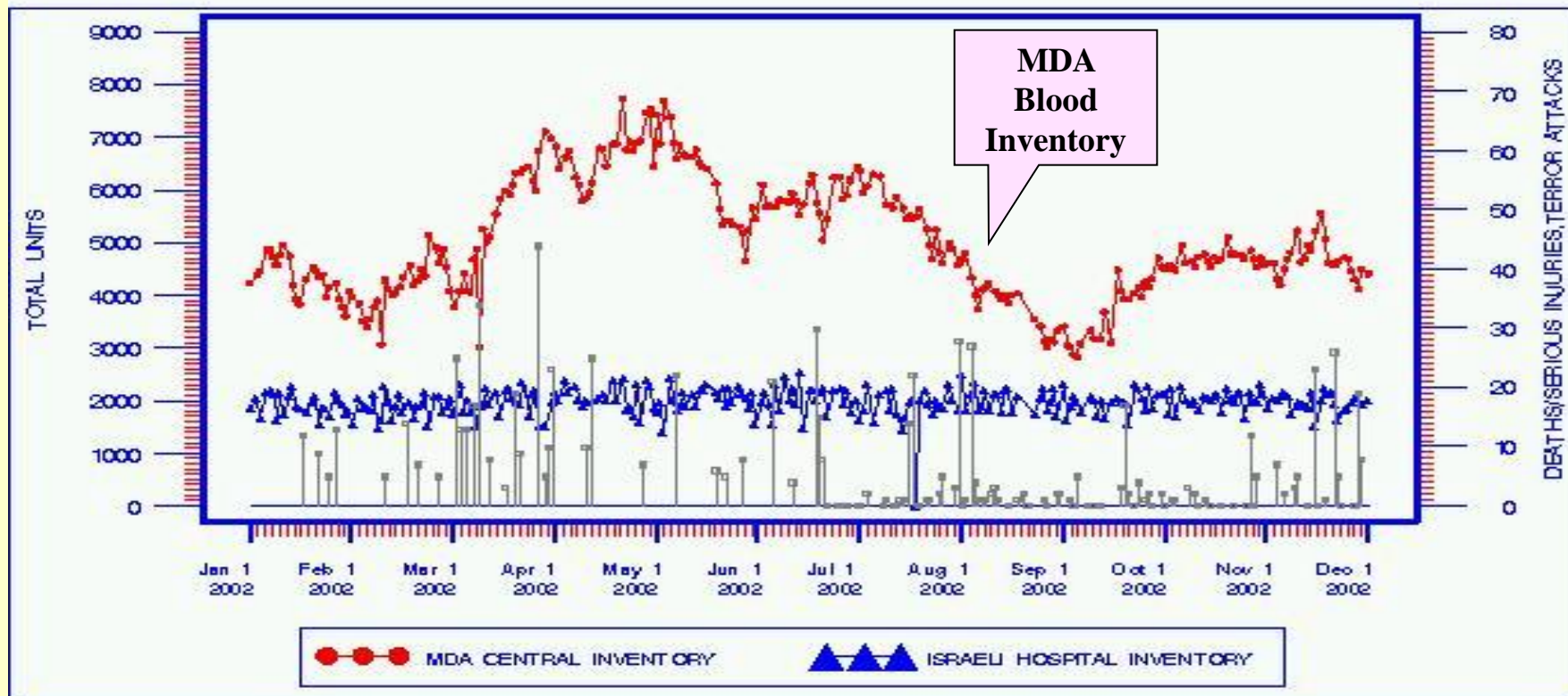
☆ Donor response:

<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
Total:	3745	6634



Effect of MCEs on the National Blood Inventory (2002)

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



Shinar



MDA Blood Services

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.

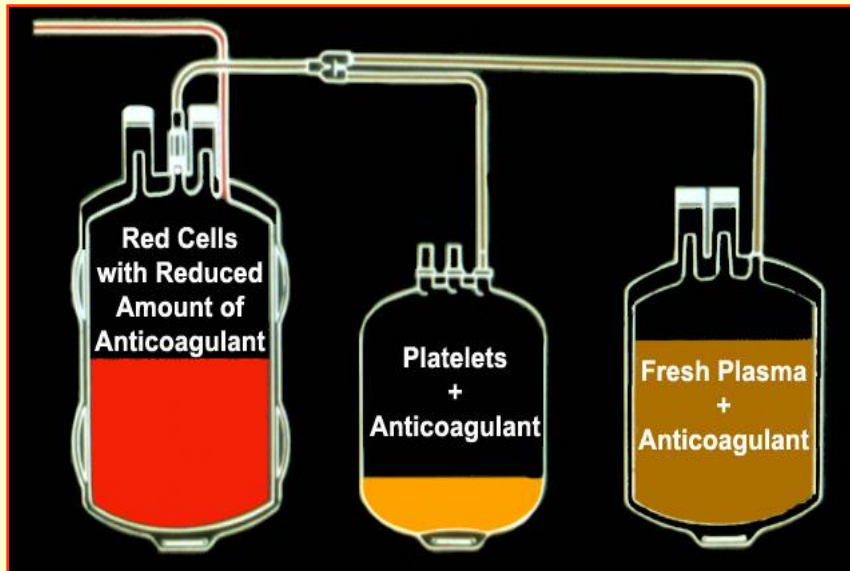
Thanks

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



eilats@mdais.co.il

Blood components production



Shinar



MDA Blood Services