



MOST

WebTHAL

Web-based clinical records program for thalassaemia patients

Medical Board: **Brindisi, Cagliari, Genova, Milano, Torino**

Educational grant: **Novartis**

Development & support: **M.O.S.T. srl**

Dott. Lorenzo Nazario



WebTHAL

- The project
- Core functions
- Project status
- Future developments



The project

- **Origins**
- **Mission**
- **Implementation**



WebThal: project history

- **Get rid of the drawbacks of the old Camputhal program:**
 - Not Year 2000 compliant
 - >20 year old!
 - Not internet ready
 - Shared use of clinical data among users (> 20 hospitals, both in Italy and abroad)



Project goals

- **Common core:**
 - Clinical records
 - Computer code
- **Ad hoc enhancements for specific needs**
- **Capitalize on the internet advantages**



Project goals

- **A tool both flexible and extendable**
(custom sections, i.e. cardiological,..)
- **Deploy a network of thalassaemia competence centers:**
 - Epidemiological data
 - Therapy
 - Studies
 - National registry



Implementation

- Take advantage of an existing product, in order to minimize startup delays
- Intranet / internet web solution
- Handling of records and attachments
- Data export for statistical analysis



Implementation

- **Standard based solution**
- **No scalability limits**
- **Native web support**
- **Local and Remote access**



Implementation

- No software installation on the user workstation
- Remote maintenance and updates



Core

- Features
- Strengths
- Clinical core
- Application survey



Features

- Off the shelf product that handles both data base and archive interactions:



- Both data and documents archiving (echography, radiography, spettrographical analisys, ...)
- Web based





Features

- **Standards based**

- Web Interface (HTML+Java+Javascript)



- SQL database



- Secure protocol for data transmission over public lines: Secure Socket Layer (SSL)



- **Easy scalability**

- Already used for millions of documents

- Available on Unix platforms, both Intel (Linux) and SUN (Solaris) based





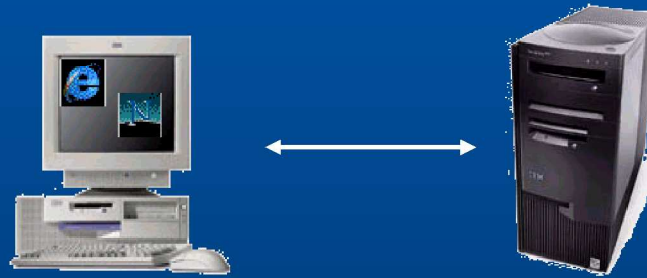
Features

- **Easy customization:**
 - Common core, ad hoc developments
 - Ad hoc developments will be shared among remaining centers (prenatal analysis, computer interface with test laboratories)



Features

- Model based on Web servers and Browser client

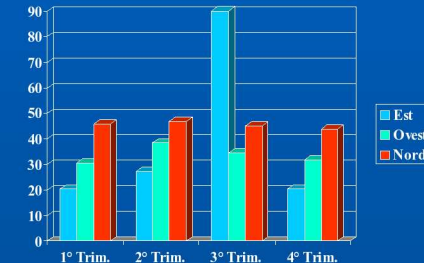


- Client workstation do not need special software



Features

- Data export for statistical programs
- Remote software update

**MOST**

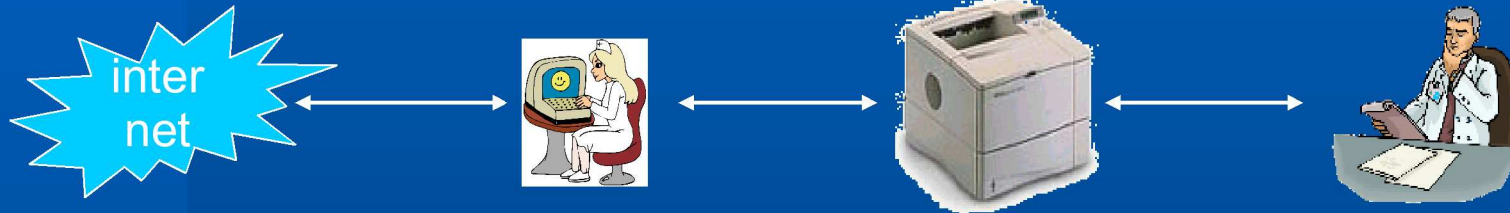
800 number



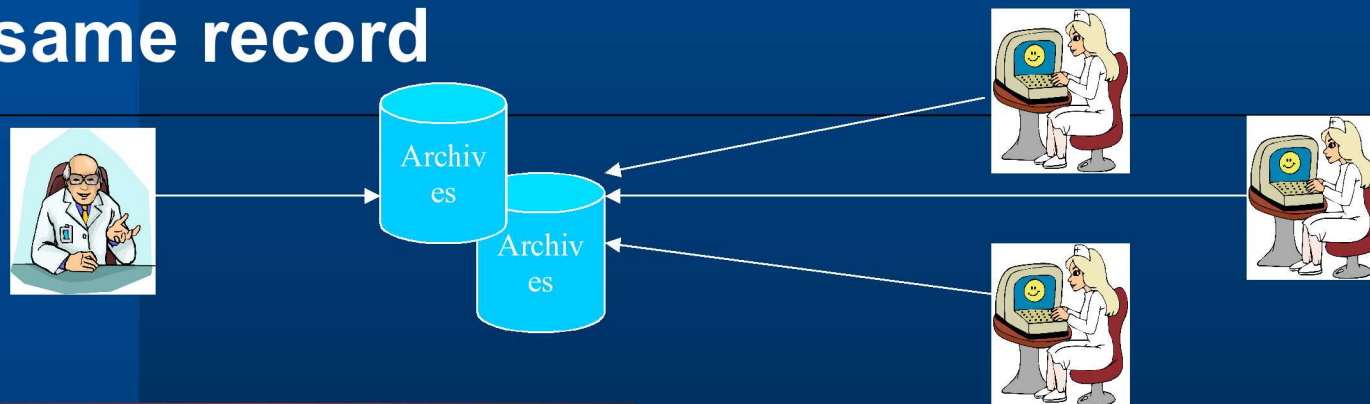


Features

- **Paper print** of the clinical records



- Complex queries can be saved and retrieved later
- Handling of a **simultaneous** change of the same record





Strengths

- Local and remote access
- Easy data sharing and data aggregation on the main server
- Easy customization
- Web based from project design
- Everybody knows how to use a web browser: fast learning curve



Q&A

- **Is the network mandatory?**
 - No, in case of a missing network, the server can be installed stand alone
- **Who is in charge of the server handling?**
 - Remotely controlled
 - A National server is available (www.talassemia.it), it can be used by small centers, maintaining all the features of a local installation (clinical records print from the browser)



Medical core

1. Private data
2. Family tree
- 3-10. DAY HOSPITAL
 3. Treatment
 4. Blood transfusion
 5. Iron chelation
 6. Chelation follow up
 7. Therapy 1
 8. Therapy 2 (diet)
 - 9-10. Blood test (1-2)
11. New Iron chelator FOLLOW UP
12. TESTS.
13. Cardiological data.
14. Urinary Iron Excretion
15. Intensive Chelation
16. Annual Summary chart
17. SCHEDA COMPLICANZE
18. Clinical diary
- *** Specialistic Charts ***
- 19-22. Cardiological chart
 19. Heart assessment
 20. Echocardiography
 21. HOLTER
 22. ERGOSPIROMETRY
23. Prenatal diagnosis
24. Test Laboratories interface
- XX. ENDOCRINOLOGIC chart



MOST

Netscape

File Edit View Go Communicator Help

Bookmarks Location: <http://thalassemia.most.it/> What's Related

Web THAL

Versione 1.0

- Copyright 1999-2000

- [Archivio WebTHAL \(DIM\)](#)

ARCHIVI PERSONALI PER OGNI REGIONE

- [Archivio WebTHAL \(BRIN\)](#)
- [Archivio WebTHAL \(CAGL\)](#)
- [Archivio WebTHAL \(GEN\)](#)
- [Archivio WebTHAL \(MILA\)](#)
- [Archivio WebTHAL \(MON\)](#)
- [Archivio WebTHAL \(PALE\)](#)
- [Archivio WebTHAL \(PINE\)](#)
- [Archivio WebTHAL \(RHO\)](#)
- [Archivio WebTHAL \(TORI\)](#)

[FAQ \(Commenti, note, domande\)](#)

E' uno strumento per:

- inserire i propri commenti
- inserire domande e ricevere risposte
- poter visionare le domande e le risposte

Sponsor **NOVARTIS**

Realizzazione **MOST**

Document: Done

Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Media

Address <http://www.talassemia.it/WWW/MOSTDOC/html?THAL+auth+ENG> Go Links >>

Web THAL

Clinical records programme for thalassaemia patients

User: Password:

Avvio **Start**

Local intranet

http://www.talassemia.it - MOSTdoc Applicazione Web-THAL - (wtao on www.tala - Microsoft Internet Explorer)

Archive selection
Archive: **1.Basic data**

Patient (birth date)	Archives
ALT Alt (12/05/2001 - 10/11/2001)	1.Basic data
CC Cc (23/03/2001)	2.Family tree
GRI Teo (02/09/1953)	3.Day Hospital
MAN Ema (12/10/2002)	4.Investigations and Consultations
MAS Fra (10/02/2003)	5.Urinary Iron Excretion
MAX Max (05/08/1985)	6.Intensive Chelation
NNN Ggggg (22/02/1992)	7.Annual Summary Chart
PER Patrivio (21/05/1999)	8.Weekly Deferiprone Follow up
PIN Pal (11/11/1991)	Blood Request Form
PRO Pro (12/05/2001)	Record cancellati
SI Tre (01/02/1967)	c1.Heart Assessment
TES Tes (01/04/2002)	c2.Holter E.K.G.
TOM Jer (01/01/1970)	c3.Echocardiogram
TYA Jit (12/06/1999)	c4.Ergospirometry
UNO Q (12/03/1946)	
WWW/ www (14/10/2002)	
ZIO Zc (07/07/1977 - 01/01/2003)	
ZZ Q (12/05/1980)	

Search

Patients

Archives

Functional buttons

Local intranet



http://www.talassemia.it - MOSTdoc Applicazione Web-THAL - (wtao on www.tala - Microsoft Internet Explorer)

Insert menu
Archive: 3.Day Hospital

HOSPITAL DAY FORM

Surname : **ALT** Name : **ALT** birth date : **12/05/01**

CLINICAL FORM

Clinic Program

Check Type

Date in Date out

History

Physical examination

Heart rate	<input type="text"/>	Pressure (mmHg)	<input type="text"/>
Weight Kg.	<input type="text"/>	Height cm.	<input type="text"/>
Liver cm.	<input type="text"/>	Spleen cm.	<input type="text"/>


Done Local intranet



















http://www.talassemia.it - MOSTdoc Applicazione Web-THAL - (wtao on www.tala - Microsoft Internet Explorer)


Printing Preview
Archive: 3.Day Hospital

ALT ALT (12/05/2001)

☒ **Print sections** 

From: 26/05/2003 To: 25/05/2004

<input type="checkbox"/> Index 	<input type="checkbox"/> Urinary Iron Excretion(13) 
<input type="checkbox"/> Basic Data(1-2) 	<input type="checkbox"/> Intensive Desferal Chelation (14) 
<input type="checkbox"/> Family Tree (Data at Diagnosis) 	<input type="checkbox"/> Annual Summary Chart(15) 
<input checked="" type="checkbox"/> Clinical Data (3) 	<input type="checkbox"/> Complications(16) 
<input checked="" type="checkbox"/> Transfusional Treatment(4) 	<input type="checkbox"/> In-patient cord(17) 
<input checked="" type="checkbox"/> Iron Chelation(5-6) 	<input type="checkbox"/> Heart Assessment(19)
<input checked="" type="checkbox"/> Other Drugs(7-8) 	<input type="checkbox"/> Echocardiogram(20)
<input checked="" type="checkbox"/> Blood Tests(9-10) 	<input type="checkbox"/> Holter E.K.G. (21)
<input type="checkbox"/> Weekly Deferiprone Follow up(24) 	<input type="checkbox"/> Ergospirometry (22)
<input type="checkbox"/> Investigations and Consultations(11) 	<input type="checkbox"/> Dimission Paper(25) 
<input type="checkbox"/> Heart Assessment Summary(12) 	

Order by date 

Done Local intranet



http://www.talassemia.it - MOSTdoc Applicazione Web-THAL - (wtao on www.tala - Microsoft Internet Explorer)

Simple search
Archive: 3.Day Hospital

Sorting order

✓ ✗ 1000 Max number matching records ☒ Wait results

Field	Operator	Value	Show in the result	Order by
Date in		From: <input type="text"/> To: <input type="text"/>	<input checked="" type="checkbox"/>	<input type="radio"/>
Surname	= <input type="text"/>	ALT	<input checked="" type="checkbox"/>	<input type="radio"/>
Name	= <input type="text"/>	ALT	<input checked="" type="checkbox"/>	<input type="radio"/>
Check Type	= <input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="radio"/>
Check Hb	= <input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="radio"/>
on Hb	< <= = > >= > not present	<input type="text"/>	<input checked="" type="checkbox"/>	<input type="radio"/>
Post-transfusion Hb	< <= = > >= > not present	<input type="text"/>	<input checked="" type="checkbox"/>	<input type="radio"/>
Hb fall expected	< <= = > >= > not present	<input type="text"/>	<input checked="" type="checkbox"/>	<input type="radio"/>
Hb pre desired	= <input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="radio"/>
AST (mU/ml)	= <input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="radio"/>
ALT (mU/ml)	= <input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="radio"/>
Weight Kg.	= <input type="text"/>	<input type="text"/>	<input type="checkbox"/>	<input type="radio"/>

Search operators

Date range

Check the fields you want to show

Done Local intranet



http://www.talassemia.it - MOSTdoc Applicazione Web-THAL - (wtao on www.tala - Microsoft Internet Explorer)

Advanced search
Archive: 3.Day Hospital

1000
Max number matching records

Database Fields	Conditions connector	Value	Conditions
Date out History Number Amount <input type="button" value="Show Fields"/> <input type="button" value="Order By"/>	< <= = <> >= > contains does not contain not present <input type="button" value="Add Cond."/> <input type="button" value="OR"/> <input type="button" value("(""=""/> <input type="button" value=")"/>	<input type="text"/> <input type="text"/> <input type="text"/>	<div></div> <input type="button" value="Remove Cond."/>

Show Fields : Order By :

 Local intranet

Lista di tutti i campi

Choose the fields you want to show

di tutti operatori

Search operators



Grafico

Esportazione

MOSTdoc Applicazione Web-WTTO - (mostdoc on enterprise) - Netscape

Ricerca semplice
Archivio: 3.Ricoveri

66 record trovati 20 record per pagina dal 1 al 20

<input checked="" type="checkbox"/>		Data di ingresso	AST (mU/ml)	ALT (mU/ml)	Ferritina (ng/ml)
<input type="checkbox"/>		05/01/1990	79.00	59.00	2130.00
<input type="checkbox"/>		07/02/1990	144.00	143.00	3487.00
<input type="checkbox"/>		21/03/1990	105.00	116.00	4343.00
<input type="checkbox"/>		03/05/1990	89.00	129.00	2739.00
<input type="checkbox"/>		29/05/1990	51.00	72.00	2696.00
<input checked="" type="checkbox"/>		Data di ingresso	AST (mU/ml)	ALT (mU/ml)	Ferritina (ng/ml)
<input type="checkbox"/>		24/07/1990	51.00	78.00	2660.00
<input type="checkbox"/>		13/09/1990	47.00	60.00	2244.00
<input type="checkbox"/>		09/10/1990	44.00	59.00	2347.00
<input type="checkbox"/>		03/12/1990	54.00	74.00	2308.00
<input type="checkbox"/>		18/01/1991	44.00	52.00	1891.00

Document: Done

Move through
the results

Record
selection

Actions on the
results: view,
update, delete
print, graph,
export



MOST

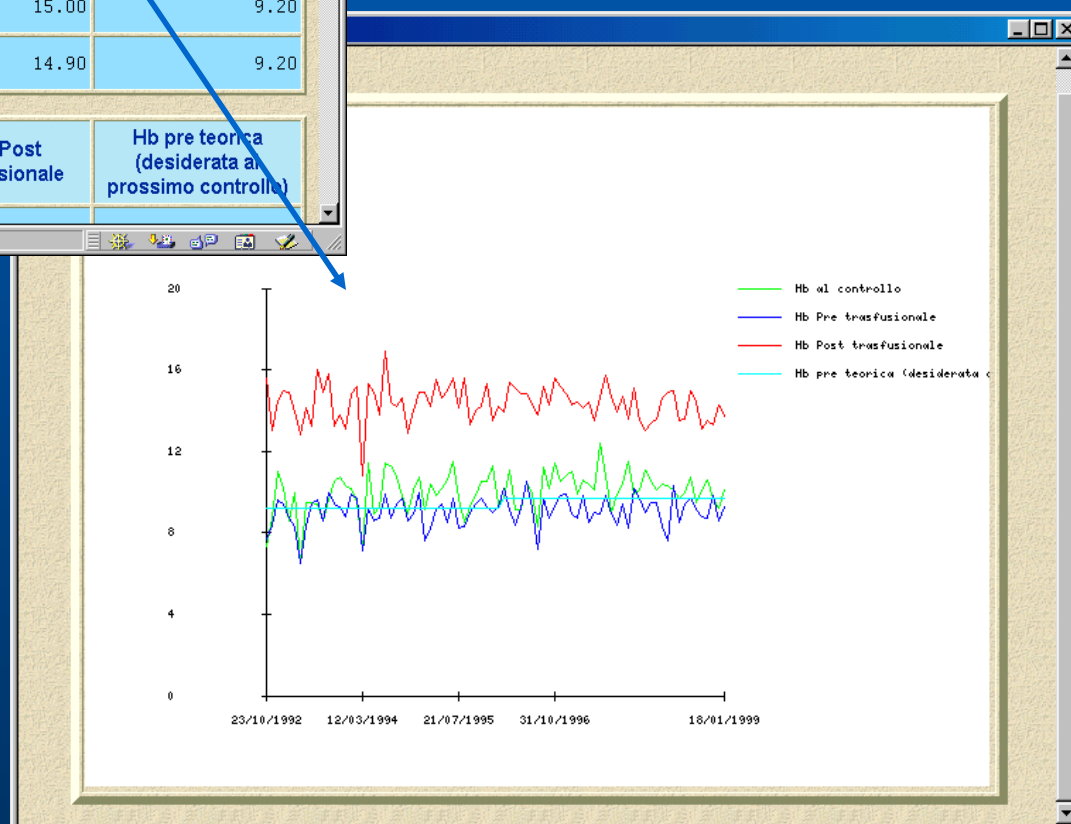
MOST doc Applicazione Web-WTTO - (on 130.192.110.4) - Netscape

Ricerca semplice Archivio: 3.Ricoveri

82 record trovati 20 record per pagina dal 1 al 20

<input checked="" type="checkbox"/>		Data di ingresso	Hb al controllo	Hb Pre trasfusionale	Hb Post trasfusionale	Hb pre teorica (desiderata al prossimo controllo)
<input type="checkbox"/>		23/10/1992	7.30	7.70	15.60	9.20
<input type="checkbox"/>		25/11/1992	8.70	8.40	13.00	9.20
<input type="checkbox"/>		23/12/1992	11.00	9.60	14.50	9.20
<input type="checkbox"/>		28/01/1993	10.20	9.40	15.00	9.20
<input type="checkbox"/>		11/03/1993	8.60	8.70	14.90	9.20

Document: Done





http://www.talassemia.it - MOSTdoc Applicazione Web-THAL - (wtao on www.tala - Microsoft Internet Explorer)

Simple search
Archive: 3.Day Hospital

Submit Export Back to the Records list

Export Type

☒ Selected records Only (0 records)
☐ All the search matching records (54 records)
☐ All the records of the Table

☒ Fields Names into the export Column separator: TAB 0x09
Decimal separator: Dot

☒ Date format: dd/mm/yy
☐ Date format: mm/dd/yy

Export Destination

Local Browser - Export target application: Statistica

- Excel
- Word
- Statistica
- SPSS
- Starcalc
- Archivio ZIP
- Generic

Microsoft Excel

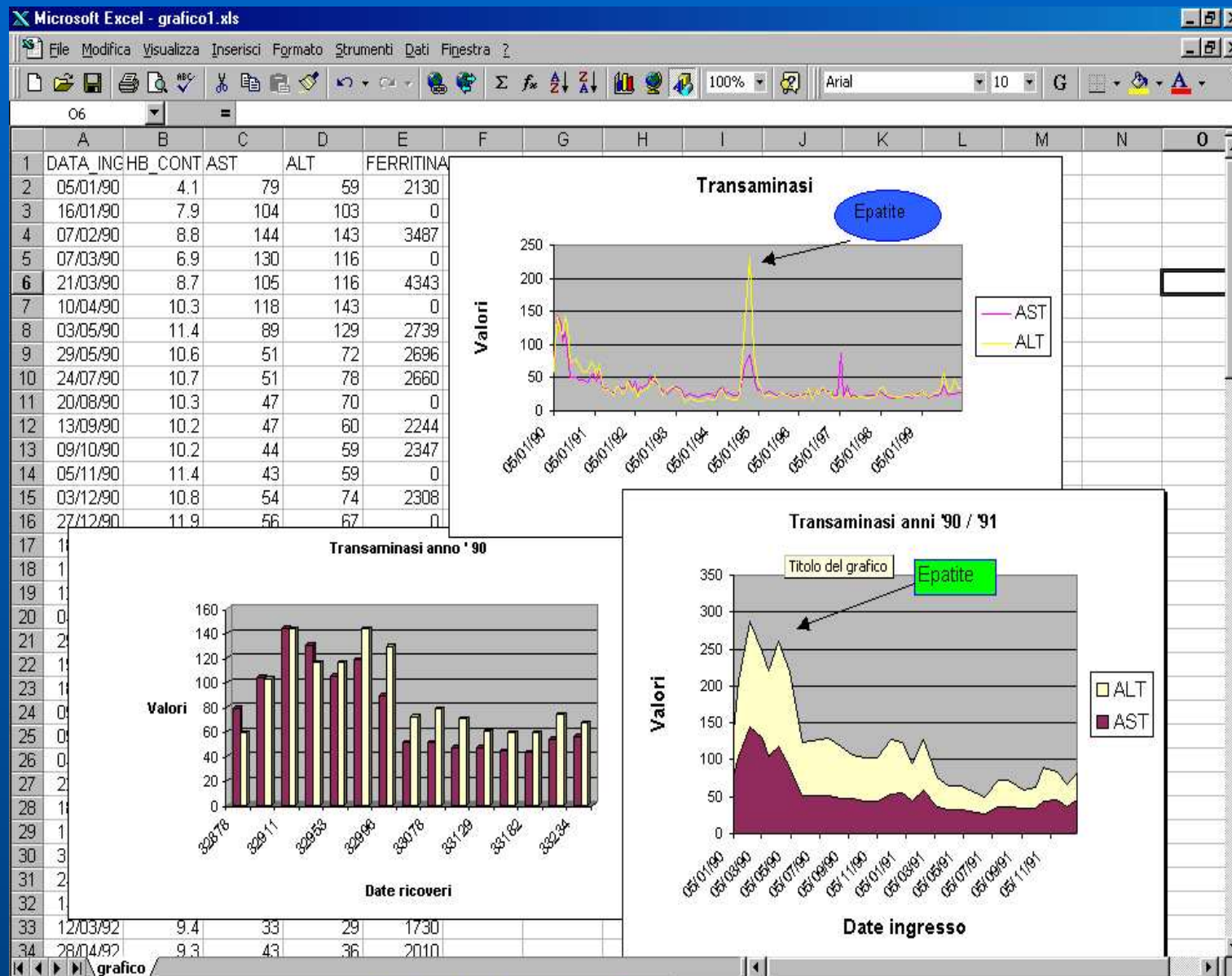
Microsoft Word

Signing System

Done. Local intranet

Impostazione
record da
esportare

Impostazione
applicazione
destinataria





Hardware requirements

- **WebTHAL servers**

- Pentium III or higher, Hard disk > 20Gbyte, Ethernet and remote connection
- Main center is based on a 64 bit Ultra sparc

- **WebThal clients**

- Any graphical workstation (Windows 3.11, 95, 98, NT, W2000, XP Macintosh o Unix) with a browser (Netscape 3.1 or higher, Explorer 4.0 or higher)



Software requirements

- **WebTHAL Servers**

- Intel: Linux, with security updates (at least monthly)
- *MOSTdoc archiving system*
- Webthal enhancements to MOSTdoc

- **WebTHAL clients**

- Netscape 3.1 or higher, Explorer 4.0 or higher



Project status

- Possible use
- Core extensions
- Multicenter studies
- Security
- Support
- Logistic / administration



Utilization patterns

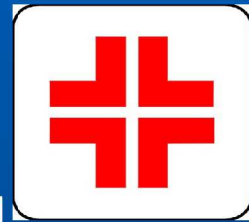
- **International Master Server**
 - Data Collection, backup and post processing of the peripheral records
 - Handling of *remote access* centers
- **Independent local access server**
 - High level centers, able to customize the software installation, that share data with the main server
- **Local access server**
 - In house server with remote support
- **Remote access**
 - Web browser only, with internet access (and a printer)



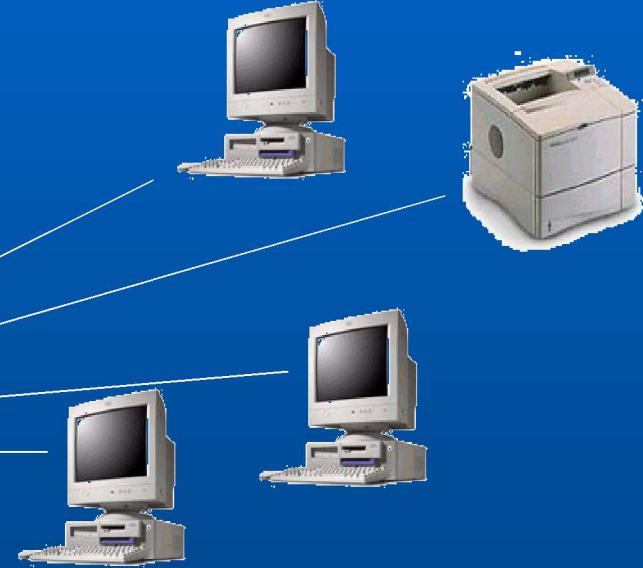
Uses

Local connection

Local server



rete locale

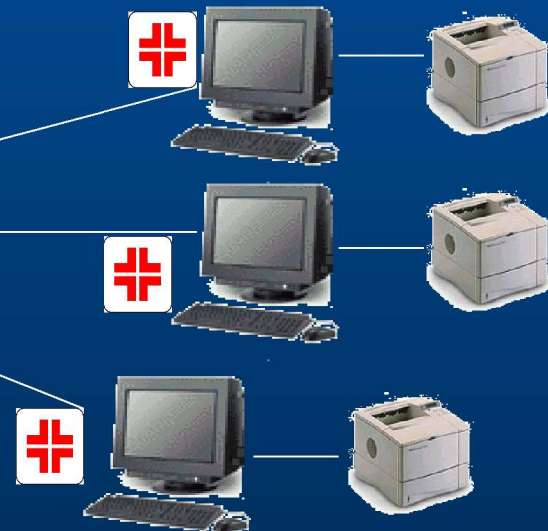


Remote connection

International Master Server

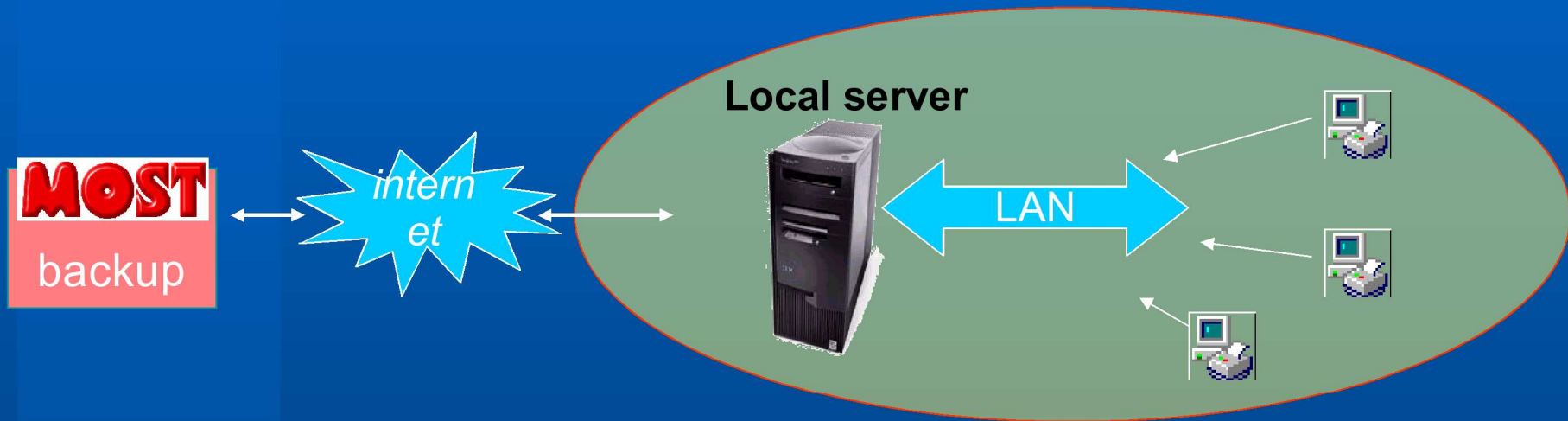


intern
et



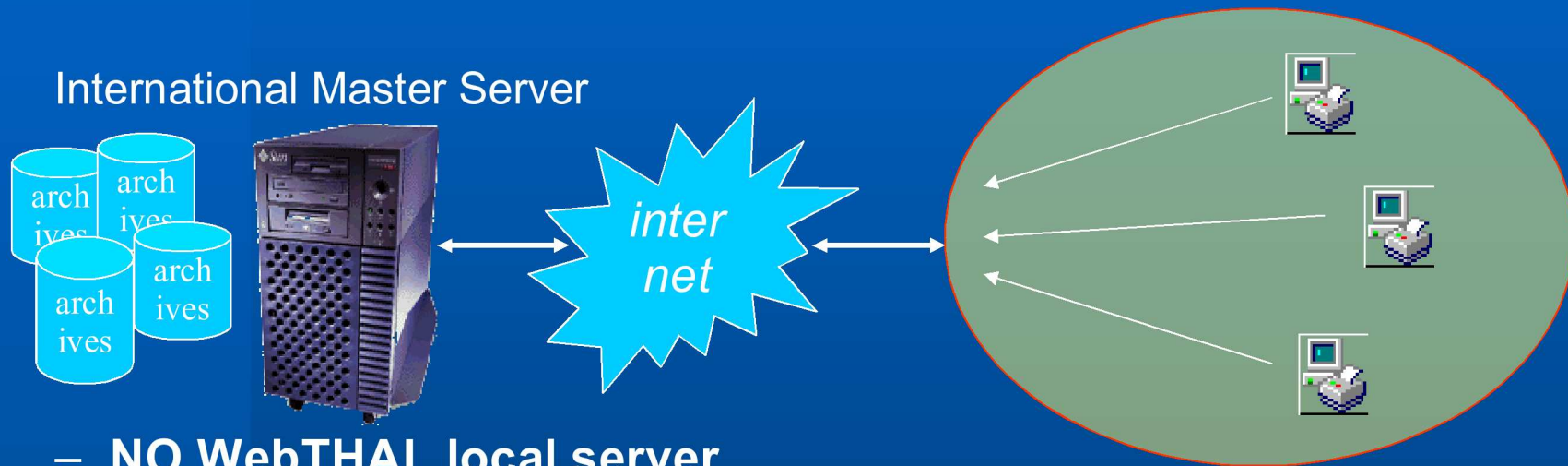


Local access server



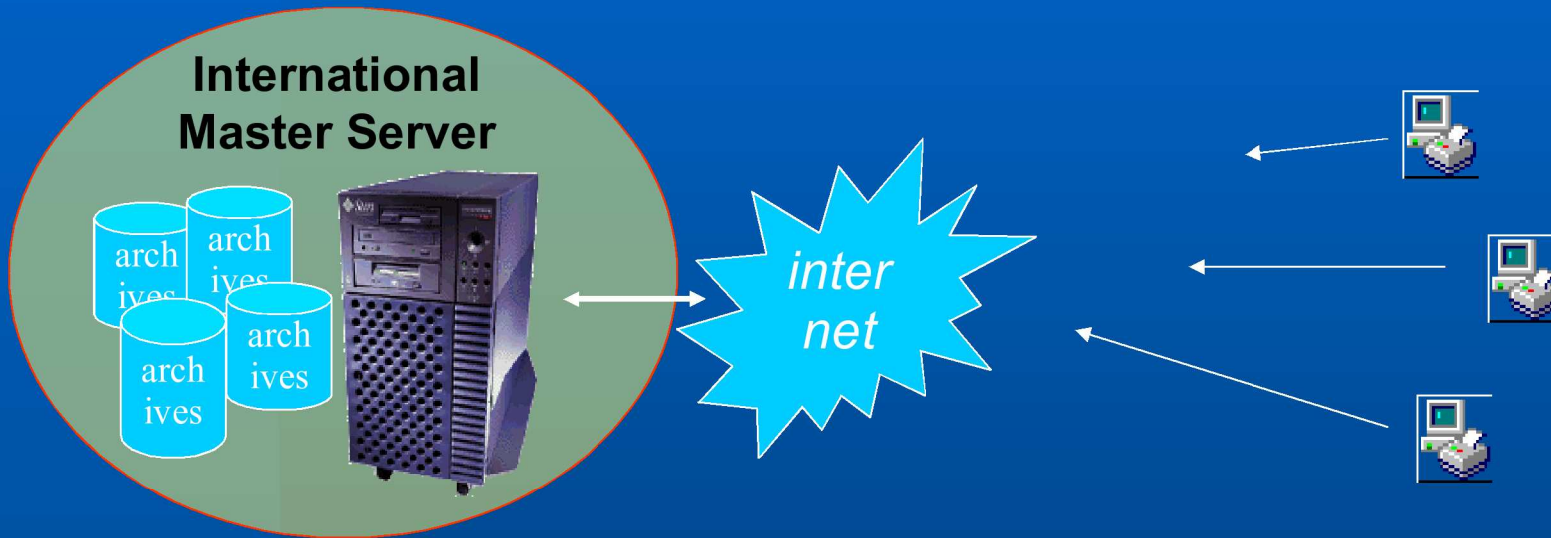
- WebTHAL server, seen as a black box
- The server has a graphical interface, allowing a direct operation on it, or, having a Local Area Network, client workstation can be used (if enabled)
- The server, if **enabled**, allows remote handling and backup
- Program updates, security patches etc , are performed remotely

Remote access centers



- **NO WebTHAL local server**
- **One or more PC connected to the national server using internet**
- **They connect to the national server for day by day use of the clinical records and for shared studies**
- **Clinical records are printed on local printers**
- **Data privacy is strongly enforced, cryptography is applied on every data transmission**
- **Explicit agreement is mandatory for a shared use of the collected data**

International Master Server



- High availability connection (10 MB/s Fiber optic and 2 Mb/s HDSL)
- Holds:
 - clinical records of the remote access centers
 - Backup copy of the clinical records of the local access servers
 - Talassemia.it Site
 - Anonymous data for shared studies

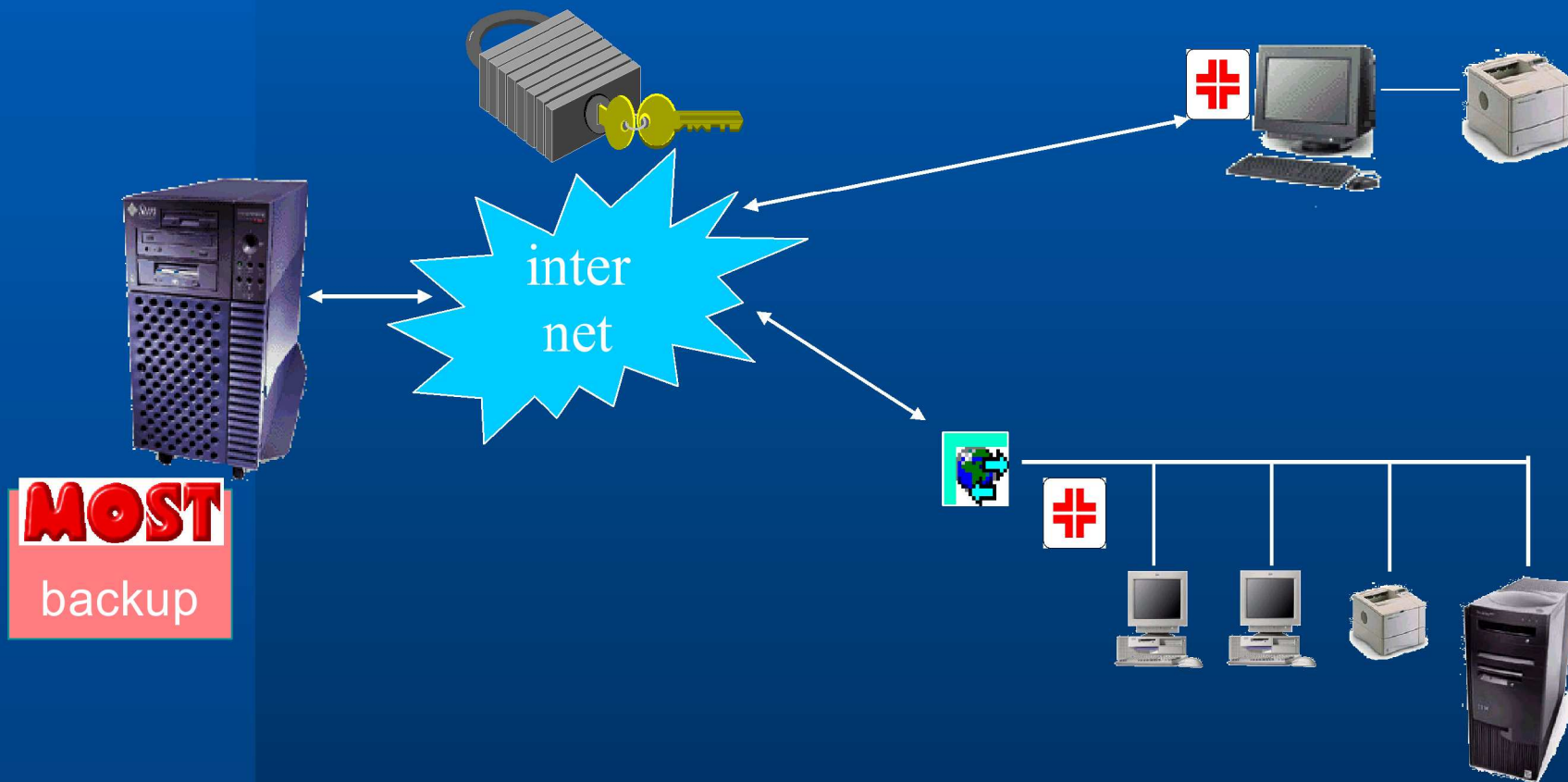


International Master Server

- ***Internet site: www.talassemia.it***
 - Project presentation
 - Newsletter
 - Meeting schedule
 - WebTHAL, working demo version
 - Shared studies results
 - Center list
 - Clinical examples

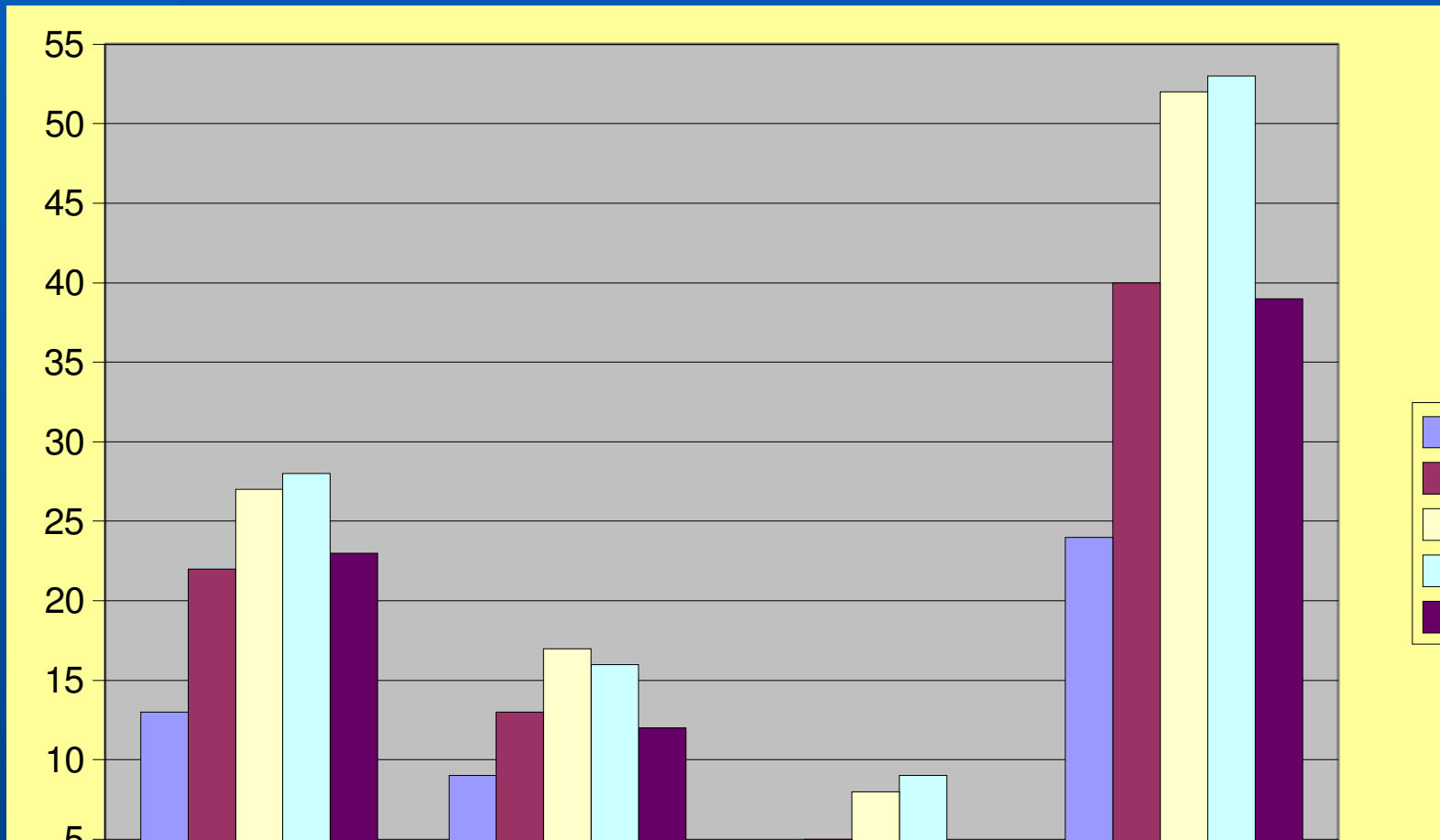


Overall picture





Overall picture





“CORE” extensions

- **Cardiological section (2001)**
- **Prenatal diagnosis (2002-2003)**
- **Laboratories interface (2002-2003)**
- **Endocrinological section (2004-2005)**



Laboratories interface

- Exams record in XML format, common to all centers
- Custom plug-in for data conversion from the laboratories of the 3 pilot centers (Torino, Genova e Cagliari)
- Digital signature of imported data



Laboratories section

MOST

http://www.talassemia.it - MOSTdoc Applicazione Web-THAL - (wtao on www.tala - Microsoft Internet Explorer)

Archive selection
Archive: **3.Day Hospital**

Patient (birth date)

[Redacted] 01)

[Redacted] 003)

Archives

- 1.Basic data
- 2.Family tree
- 3.Day Hospital**
- 4.Investigations and Consultations
- 5.Urinary Iron Excretion
- 6.Intensive Chelation
- 7.Annual Summary Chart
- 8.Weekly Deferiprone Follow up
- Blood Request Form
- Record cancellati
- c1.Heart Assessment
- c2.Holter E.K.G.
- c3.Echocardiogram
- c4.Ergospirometry

Done Local intranet



Laboratory Data Preview & Validation MOST

MOST-PA Applicazione Web-WTTO - (mostdoc on giotto.private) - Microsoft Internet Explorer

Gestione Esami di Laboratorio
Archivio: 1.Anagrafe

Validazione del file esami

Torna al menù principale Torna al menù - Gestione Esami di Laboratorio

Gli esami **Fuori Norma** sono identificati con il colore rosa

AKAKPO KOSSWA DELALI (12/04/1964)
corretto con
AKAKPO KOSSWA DELALI (12/04/1964)

Data esami: 07/03/2003
Manca un DH recente, l'ultimo è del 02/07/2002
Creazione di un DH non-trasf. in data 07/03/2003 Si

Nome Esame	Valore	Unità di misura	Limiti di normalità	Importa	Campo del database da modificare	Codice esame
K	4.54	mEq/l	3.50- 5.30	<input checked="" type="checkbox"/>	07/03/2003 - DH(K) =	2007
NA	140	mEq/l	136 -146	<input checked="" type="checkbox"/>	07/03/2003 - DH(NA) =	2009
URIC	33	mg/dl	17- 50	<input checked="" type="checkbox"/>	07/03/2003 - DH(URIC) =	2031
Urea nell'urina	24.03	g/24h	10.00-30.00		inserisci in altri esami	2032
CREATININA	0.71	mg/dl	0.60- 1.40	<input checked="" type="checkbox"/>	07/03/2003 - DH(CREATININA) =	2033
Creatinina nell'urina	17.18	mg/Kg/24h	21 - 26		inserisci in altri esami	2034
GLICEMIA	79	mg/dl	60 - 115	<input checked="" type="checkbox"/>	07/03/2003 - DH(GLICEMIA) =	2036
Basale	79	mg/dl			inserisci in altri esami	2040
Prelievo N. 2	113	---			inserisci in altri esami	2040
SIDEREMIA	99	microg/dl	60 - 160	<input checked="" type="checkbox"/>	07/03/2003 - DH(SIDEREMIA) =	2041
TRANSFERRINE	231	mg/dl	200 -330	<input checked="" type="checkbox"/>	07/03/2003 - DH(TRANSFERRINE) =	2042
P	3.15	mg/dl	2.50- 4.80	<input checked="" type="checkbox"/>	07/03/2003 - DH(P) =	2043
Fosfato inorganico nell'urina	0.71	g/24h	0.90 - 1.30		inserisci in altri esami	2044
Urato nel siero	3.67	mg/dl	3.40- 7.00		inserisci in altri esami	2045
Urato nell'urina	823.2	mg/24h	250 -750		inserisci in altri esami	2046

Gestione Esami di Laboratorio Local intranet



Manual and automatic exams overlap (**MOST** case of matching values)

MOST-PA Applicazione Web-WTTO - (mostdoc on giotto.private) - Microsoft Internet Explorer

Gestione Esami di Laboratorio
Archivio: [1.Anagrafe](#)

Validazione del file esami

[Torna al menù principale](#) [Torna al menù - Gestione Esami di Laboratorio](#)

Gli esami **Fuori Norma** sono identificati con il colore rosa

CANATO DARIO nato il 04/04/1976
Data esami: 06/03/2003
Day Hospital di destinazione: 06/03/2003

Nome Esame	Valore	Unità di misura	Limiti di normalità	Importa	Campo del database da modificare	Codice esame
AST	55	mU/ml	Inf 40	<input checked="" type="checkbox"/>	06/03/2003 - DH(AST) =	2080
ALT	83	mU/ml	Inf 40	<input checked="" type="checkbox"/>	06/03/2003 - DH(ALT) =	2081
LDH	553	mU/ml	210 - 460	<input checked="" type="checkbox"/>	06/03/2003 - DH(LDH) =	2082
GAMMAGT	27	mU/ml	10 - 47	<input checked="" type="checkbox"/>	06/03/2003 - DH(GAMMAGT) =	2083
ALPH	87	mU/ml	100 - 260	<input checked="" type="checkbox"/>	06/03/2003 - DH(ALPH) =	2084
LEUCO	8.97	x1000/microl	4.0 - 11	già presente	06/03/2003 - DH(LEUCO) = 8.97	3001
Eritrociti	3.51	mil/microl	4.5 - 5.9		inserisci in altri esami	3001
HB	9.3	g/dl	13.5 - 17.5	<input type="checkbox"/>	Scegliere la destinazione dell'esame HB	3001
Ematocrito	27.9	%	41 - 53		inserisci in altri esami	3001
Volume cellulare medio	79.3	fl	80 - 100		inserisci in altri esami	3001
Contenuto medio Hb	26.6	pg	26 - 34		inserisci in altri esami	3001
Concentrazione media Hb	33.5	g/dl	31 - 37		inserisci in altri esami	3001
PIASTRINE	269	x1000/microl	150 - 400	già presente	06/03/2003 - DH(PIASTRINE) = 269.00	3001
Piastrinocrito	0.17	%			inserisci in altri esami	3001

Done Local intranet



Manual and automatic exams overlap of mismatching values)

MOST (case

Applicazione Web-WTTO - (mostdoc on giotto.private) - Microsoft Internet Explorer

Gestione Esami di Laboratorio
Archivio: 1.Anagrafe

Sangue	++	---	ASSENTE		inserisci in altri esami	2501
Urobilinogeno	1.0 E.U./DL	---	inf. 1		inserisci in altri esami	2501
Nitriti	PRESENTI	---	ASSENTI		inserisci in altri esami	2501
Leucociti	PRESENTI ++	---			inserisci in altri esami	2501
LEUCO	24	x1000/microl	4.0 - 11	valori diversi!	07/03/2003 - DH(LEUCO) = 27.25	3001
Eritrociti	4.0	mil/microl	4.5 - 5.9		inserisci in altri esami	3001
HB	10.0	g/dl	13.5 - 17.5	<input type="checkbox"/>	07/03/2003 - L1(HB_CONT) = 10.2	3001
Ematocrito	31.7	%	41 - 53		inserisci in altri esami	3001
Volume cellulare medio	78	fl	80 - 100		inserisci in altri esami	3001
Contenuto medio Hb	25.1	pg	26 - 34		inserisci in altri esami	3001
Concentrazione media Hb	32.2	g/dl	31 - 37		inserisci in altri esami	3001
PIASTRINE	479	x1000/microl	150 - 400	già presente	07/03/2003 - DH(PIASTRINE) = 479.00	3001
Piastrinocrito	0.31	%			inserisci in altri esami	3001
Volume piastrinico medio	6.6	fl	6.8 - 9		inserisci in altri esami	3001
Indice distr. vol GR (RDW)	20.3	%	12.3 - 14.3		inserisci in altri esami	3001
Indice distr. conc. Hb (HDW)	3.77	g/dl	2 - 3		inserisci in altri esami	3001
Indice distr. vol. piastr.	65.2	%			inserisci in altri esami	3001
NEUTRO	54.4	%		già presente	07/03/2003 - DH(NEUTRO) = 54.40	3002
Linfociti	35	%			inserisci in altri esami	3002
Monociti	6.1	%			inserisci in altri esami	3002
Eosinofili	1.2	%			inserisci in altri esami	3002
Basofili	0.5	%			inserisci in altri esami	3002
Altre cellule (LUC)	2.8	%			inserisci in altri esami	3002
Aplocitosi	++				inserisci in altri esami	3003

Gestione Esami di Laboratorio Local intranet



Validation phase

MOST

MOST-PA Applicazione Web-WTTO - (mostdoc on giotto.private) - Microsoft Internet Explorer

Gestione Esami di Laboratorio
Archivio: [1.Anagrafe](#)

Torna al menù principale Torna al menù - Gestione Esami di Laboratorio

La destinazione dell'esame HB di S [redacted] ROSA non è stata definita
La destinazione dell'esame HB di ZI [redacted] ATTIA non è stata definita
La destinazione dell'esame HB di B [redacted] ALESSANDRA non è stata definita
La destinazione dell'esame HB di M [redacted] non è stata definita
La destinazione dell'esame HB di S [redacted] COLA non è stata definita
La destinazione dell'esame HB di M [redacted] NA non è stata definita
La destinazione dell'esame HB di C [redacted] UCCU MONICA non è stata definita
La destinazione dell'esame HB di A [redacted] OSSIWA DELALI non è stata definita
La destinazione dell'esame HB di P [redacted] DEBORA non è stata definita
La destinazione dell'esame HB di B [redacted] CARMINE non è stata definita
La destinazione dell'esame HB di S [redacted] NUELA non è stata definita

```
# START OF IMPORT FILE
#####
# Identificatore del file: 3E68DE210227290001
# File di import: /space/MOSTdoc/upload/WTTO/labs/imported/Micro-2003-03-07.txt.xml.import
# File di validazione: Micro-2003-03-07.txt.xml
# File di origine: /space/MOSTdoc/upload/WTTO/labs/Micro-2003-03-07.txt
# Data esami: 07/03/2003
# Laboratorio: Lab Torino
# Utente WebTHAL: mostdoc
# Credenziali utente: MOSTdoc Administrator
#####
#
# Elenco di Day Hospital non-trasfusionali che devono essere aggiunti perchè mancanti:
#
DH| [redacted] SIWA DELALI| n.12/04/1964|K [redacted] N|07/03/2003|
DH| [redacted] RICO| n.05/12/1983|P [redacted] X|07/03/2003|
DH| [redacted] OSA| n.24/01/1953|S [redacted] G|06/03/2003|
#####
#
# ATTENZIONE !!!
# Importazione di esami con valori che differiscono rispetto a quelli presenti in archivio
#
| [redacted] GUIDO| n.13/08/1967|F [redacted] X|07/03/2003|CARTELLE.LEUCO | 24.25|sostituisce il valore 27.25
#####
```

Gestione Esami di Laboratorio Local intranet

Digital signature of imported data

MOST

MOST-PA Applicazione Web-WTTO - (mostdoc on giotto.private) - Microsoft Internet Explorer

Gestione Esami di Laboratorio
Archivio: 1.Anagrafe

LA	n. 23/06/1978	K 07/03/2003 CARTELLE.LEUCO	3.88
LA	n. 23/06/1978	K 07/03/2003 CARTELLE.MG	1.43
LA	n. 23/06/1978	K 07/03/2003 CARTELLE.NA	141
LA	n. 23/06/1978	K 07/03/2003 CARTELLE.NEUTRO	62.7
LA	n. 23/06/1978	K 07/03/2003 CARTELLE.P	4.19
LA	n. 23/06/1978	K 07/03/2003 CARTELLE.PIASTRINE	171
LA	n. 16/01/1976	P 07/03/2003 CARTELLE.ALPH	126
LA	n. 16/01/1976	P 07/03/2003 CARTELLE.ALT	17
LA	n. 16/01/1976	P 07/03/2003 CARTELLE.AST	15
LA	n. 16/01/1976	P 07/03/2003 CARTELLE.FRUTTOS	209
LA	n. 16/01/1976	P 07/03/2003 CARTELLE.GAMMAGT	8
LA	n. 16/01/1976	P 07/03/2003 CARTELLE.GLICEMIA	82
LA	n. 16/01/1976	P 07/03/2003 CARTELLE.LDH	243
LA	n. 16/01/1976	P 07/03/2003 CARTELLE.LEUCO	9.47
LA	n. 16/01/1976	P 07/03/2003 CARTELLE.NEUTRO	52.3
LA	n. 16/01/1976	P 07/03/2003 CARTELLE.PIASTRINE	526
SA	n. 24/01/1953		164
SA	n. 24/01/1953		232
TT0	n. 20/11/1979		2394.3
NA PAOLA	n. 01/08/1969		230
NA PAOLA	n. 01/08/1969		11.5
NA PAOLA	n. 01/08/1969		2.65
TIA	n. 19/05/1994		16
TIA	n. 19/05/1994		23
TIA	n. 19/05/1994		7.17
TIA	n. 19/05/1994		64.5
TIA	n. 19/05/1994		344

END OF IMPORT FILE

Digitare il PIN

OK ANNULLA

Firma

Torna al menù principale Torna al menù - Gestione Esami di Laboratorio

IMPORTA GLI ESAMI SELEZIONATI

Gestione Esami di Laboratorio Local intranet



Smart-card readers for digital signing





Smart-card readers for digital signing





Multi-center Studies

- Splenectomy (2001)
- Complications (2002)

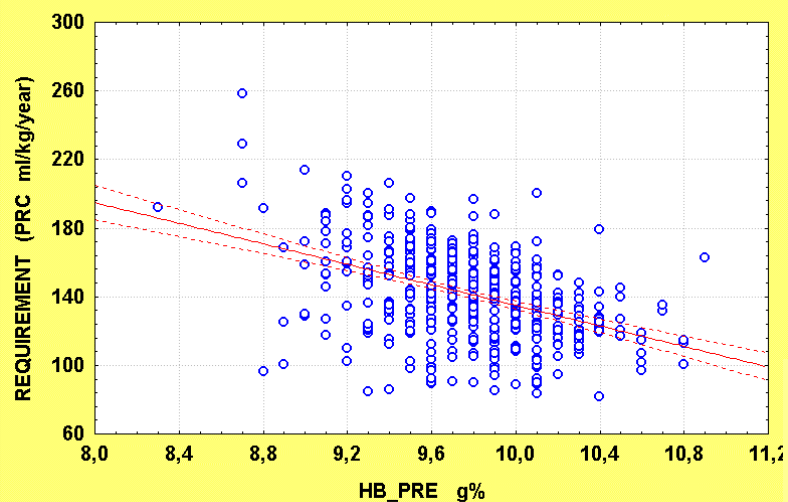


Splenectomy study

HB_PRE vs. REQUIREM (Casewise MD deletion)

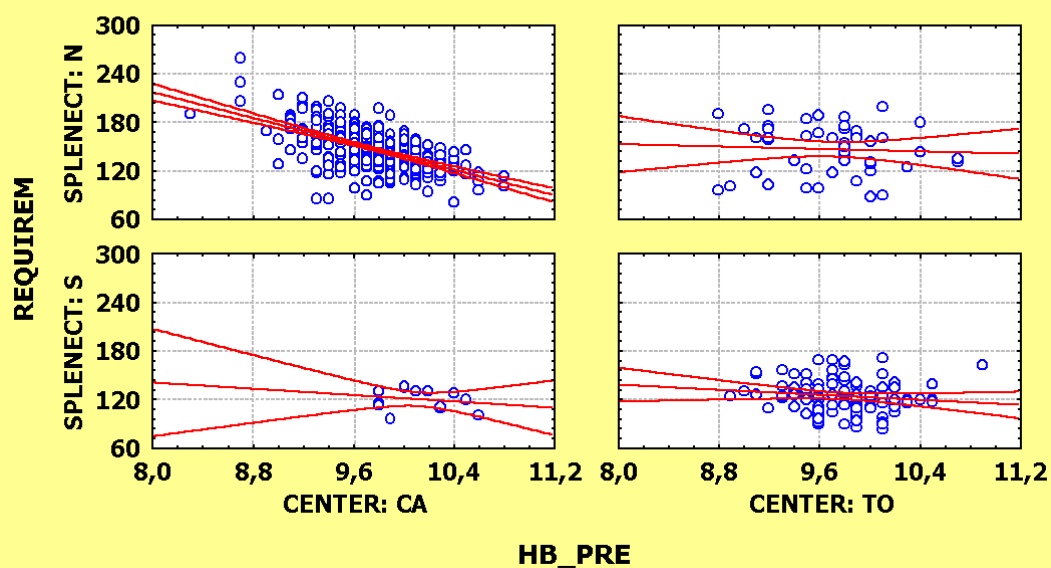
$$\text{REQUIREM} = 434,33 - 29,93 * \text{HB_PRE}$$

Correlation: $r = -.4353$ $p < 0,0001$ $N = 496$



Categorized Scatterplot

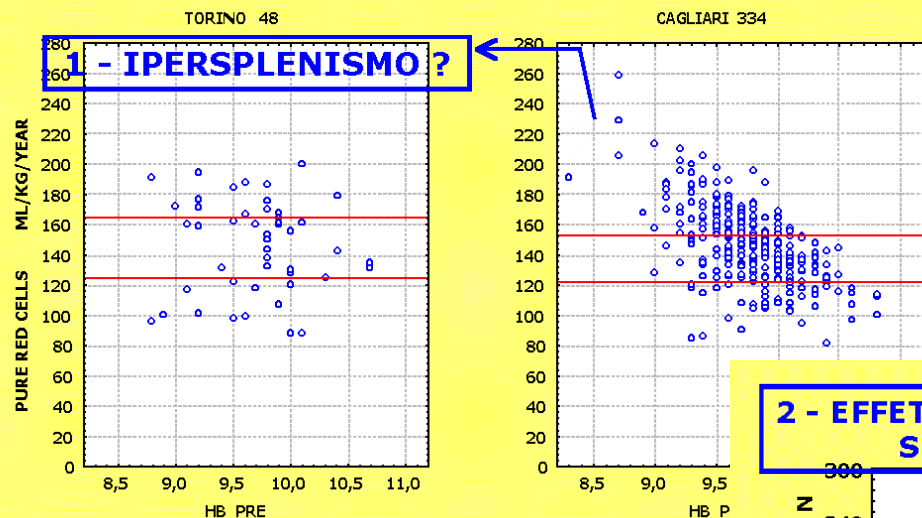
HB_PRE vs. REQUIREM



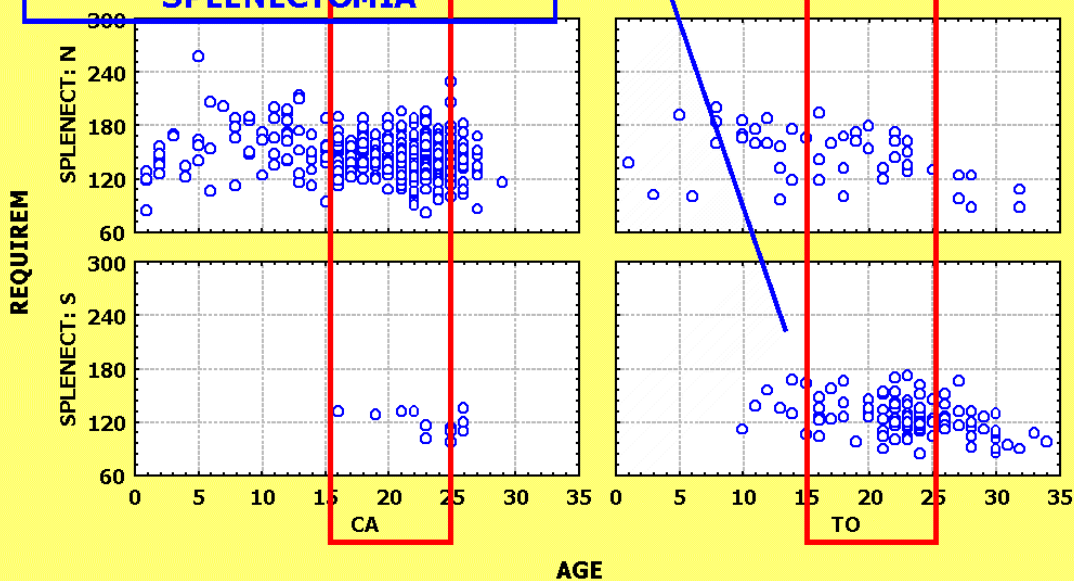


Splenectomy study

BLOOD REQUIREMENT IN NOT-SPLENECTOMIZED THALASSEMIC PATIENTS



2 - EFFETTI A LUNGO TERMINE SPLENECTOMIA





Complications study

MOST

COMPLICANZE				TERAPIA	
1	CARDIOPATIA	si	no	si	no
2	IPOTIROIDISMO	si	no	si	no
3	DIABETE	si	no	si	no
4	IPOGONADISMO	si	no	si	no
5	IPOPARATIROIDISMO	si	no	si	no
6	EPATOPATIA	si	no	si	no
7	OSTEOPATIA	si	no	si	no
8	COLELITIASI	si	no	si	no
9	NEFROLITIASI	si	no	si	no
10	COAGULOPATIA	si	no	si	no
11	INFEZIONI	si	no	si	no
12	ALTRO	si	no	si	no

	CARDIOPATIA	IPOTIROIDISMO	IPOGONADISMO	IPOPARATIROIDISMO	DIABETE	EPATOPATIA	COLELITIASI	NEFROLITIASI	OSTEOPATIA	COAGULOPATIA	ALTRO
anno											
1979											
1980											
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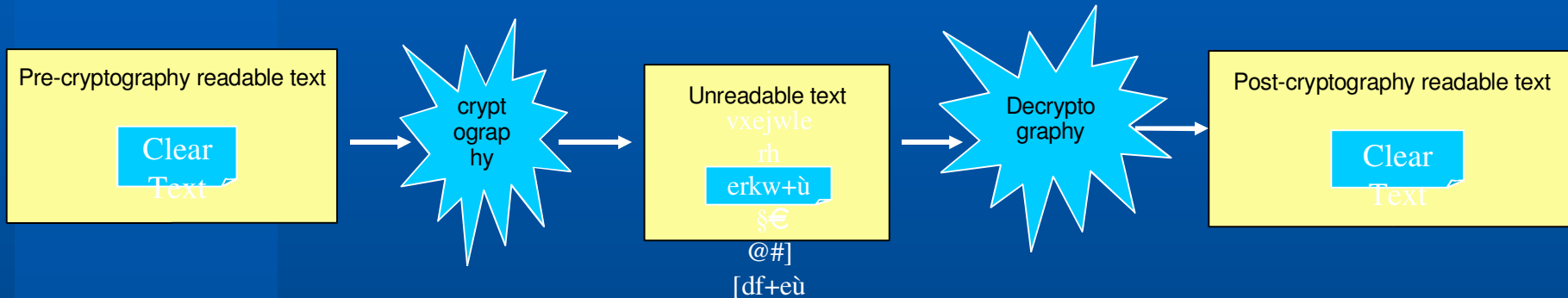
Security and privacy of data

- Username and password authentication
- Https security web protocol
- Security inside the servers



The HTTPS protocol

- Cryptography of network traffic



- User certificate





Authentication

Sicurezza

Sicurezza

Sicurezza

Applicazione Web-WTTO - Netscape

File Edit View Go Communicator Help

Back Forward Reload Home Search Netscape Print Security Shop Stop

Bookmarks Location: http://enterprise/www/MOSTDOC/html?WTTO=auth

Hardware Zone - Benvenuti ad Ho Zio Budda Linux Valley AltaVista Avanz Arianna avanzat AltaVista Trans Echos PHP3 Manual PostGresAdmin

Web THAL

Cartella clinica computerizzata per la thalassemia

User: Password:

Avvio Start



Privacy

- Personal user Login



- Password changing



- Login with different profiles:

- Read-only

- Delete



- Export



- Archives subset (database view)





Security

- Encrypted communication

- HTTPS protocol



- Server security

- User authentication on the server

- Professional DBMS security



- Unix Operating System

Archives security

- Reliability given by professional DBMS
- Data is shared only by means of an explicit action by the physician



Data security

- Professional DBMS reliability (transactional systems, logging, recovery)
- Automatic nightly backup
- Monthly backup on CD of historical data of the national and international centers

It's time to save data...

Max 24 h of lost work



internet

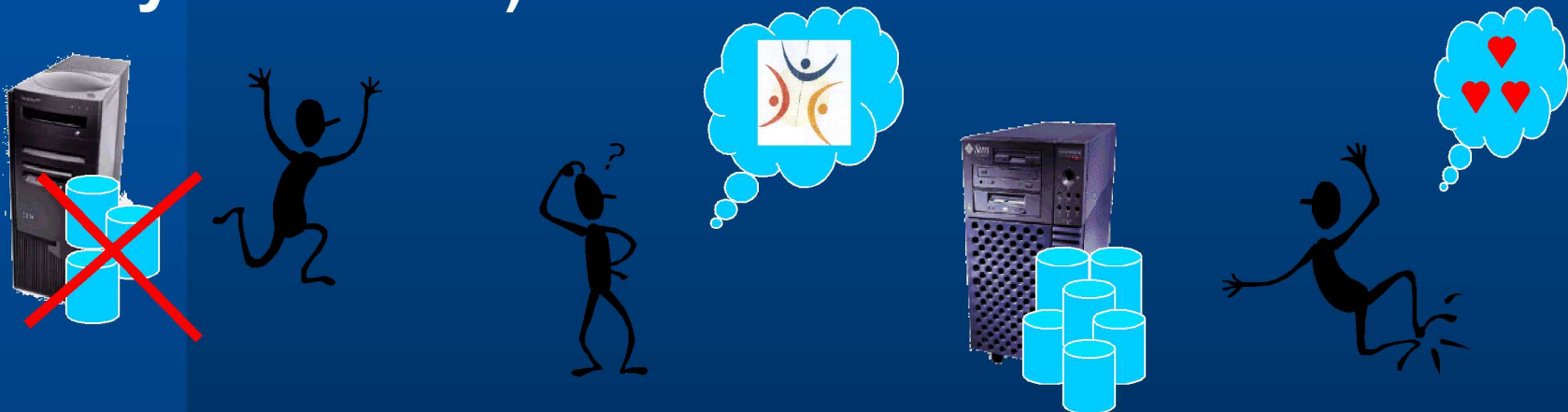


WebTHAL



Data security

- Compliance with national security laws (dpr 196/03)
- Worst case scenario: in case of disaster max 24 h of lost data
- In case of local server troubles, the national server may be used as a fallback (weekly sync of data)





Support

- Hot-line service
- Security upgrades (firewall, security hole)
- Operating system and WebTHAL application upgrades
- Backup





Support



- **Hardware turnover**
- **28 server deployed and managed**
- **Hardware rotation:
WebTHAL servers are
changed every three years**



Logistic / Administration

- Bailment contract (fixed serial number)
- Asset management
- HW purchase and storage
- Warranty (HW replacement)
- Non internet connected servers:
GPRS board



Evolution

- **Printing in PDF format – 2003/2005**
- **Versioning of records - 2004**
- **Digitally signed media (CNIPA/AIPA rules)**
- **Barcodes for transfusional requests**
- **Endocrinological records**
- **Disease costs computation**



Evolutions

- Transplants follow up
- Hb F sintesis induction
- drepanocytosis
- Intermediate thalassaemia
- Interactions with the National Sanitary service (Sanitary card)



- **SEAT Pagine Gialle**
 - Data filtering and delivery of customer letters (invoices etc), using hybrid print
- **COSTA Cruises**
 - Pictures and catalogues archive
- **Cedacri**
 - C.O.L.D. and scanned documents for primary italian banks
- **San paolo/IMI**
 - E-mail archive
- **CSI Piemonte**
 - Document archiving solutions, conforming to the official requirements for the government agencies.



Main References: Banca Popolare di Bergamo

- The bank handles every single piece of non numeric information using MOSTdoc:
 - Cheques Acquisition and archiving
 - Register of official documents
 - Print spools
 - Internal documents and manuals
 - Phone calls of the on line bank
 - Credit line attachments