Outcome studies: Neonatal Sepsis: Methodology

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Sir Ganga Ram Hospital

New Delhi

Neonatal Sepsis: An outcome study at a Tertiary Care Centre in New Delhi, India

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Department of Clinical Microbiology and Immunology, Sir Ganga Ram Hospital, New Delhi

INTRODUCTION

GOALS AND OBJECTIVES

MATERIAL AND METHODS

RESULTS

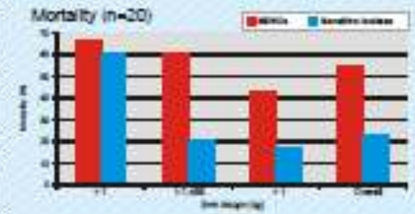
Demographics of Blood culture positive sepsis cases (59)

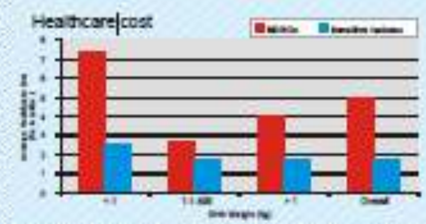
Parameter	Number
Intramural/ Extramural	21/38
<37 Wks/ >37 wks	43/16
Female/ Male	14/45
<1 kg	8
1-1.499 kg	30
≥2.5 kg	21
Early onset sepsis / Late onset sepsis	11/48
Mortality	20 ([illegible])

Aetiology of neonatal sepsis

Organism	No.
+ Enteric Gram negative Bacilli	20
- Klebsiella pneumoniae	12
- Escherichia coli	5
- Enterobacter cloacae	2
- Serratia marcescens	1
+ Non Fermenting Gram Negative Bacilli (NFGNB)	12
- Acinetobacter spp.	7
- Other NFGNB	5
+ Gram positive	14
+ Yeast	17
Total	63

Outcomes: MDROs v/s Sensitive Isolates:





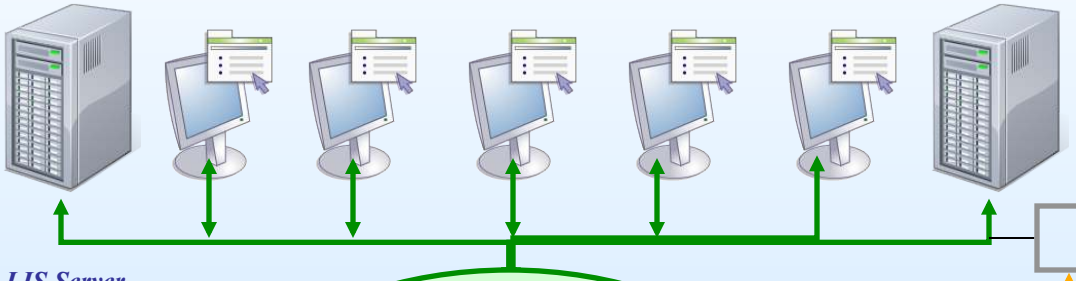
CONCLUSION

POLICY RELEVANCE OR IMPORTANCE TO PUBLIC HEALTH OR CLINICAL MEDICINE

Methodology

- Blood culture reports death/ LOS/ cost of hospital stay as an outcome of babies with culture positive sepsis was reviewed from Jan to Dec 2010 to have an indirect evidence for attributable mortality in neonatal sepsis due to MDRO
- Use of HIS

Hospital Informatics



Hospital Information system

Infection Control

LIS Server

INFORMATION

MANAGEMENT

WORKFLOW

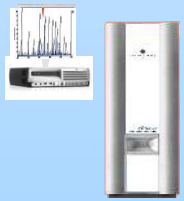
CONNECTIVITY

Pharmacy

Purchase

BacT/ALERT®

PREVI Isola™



Vitek-MS

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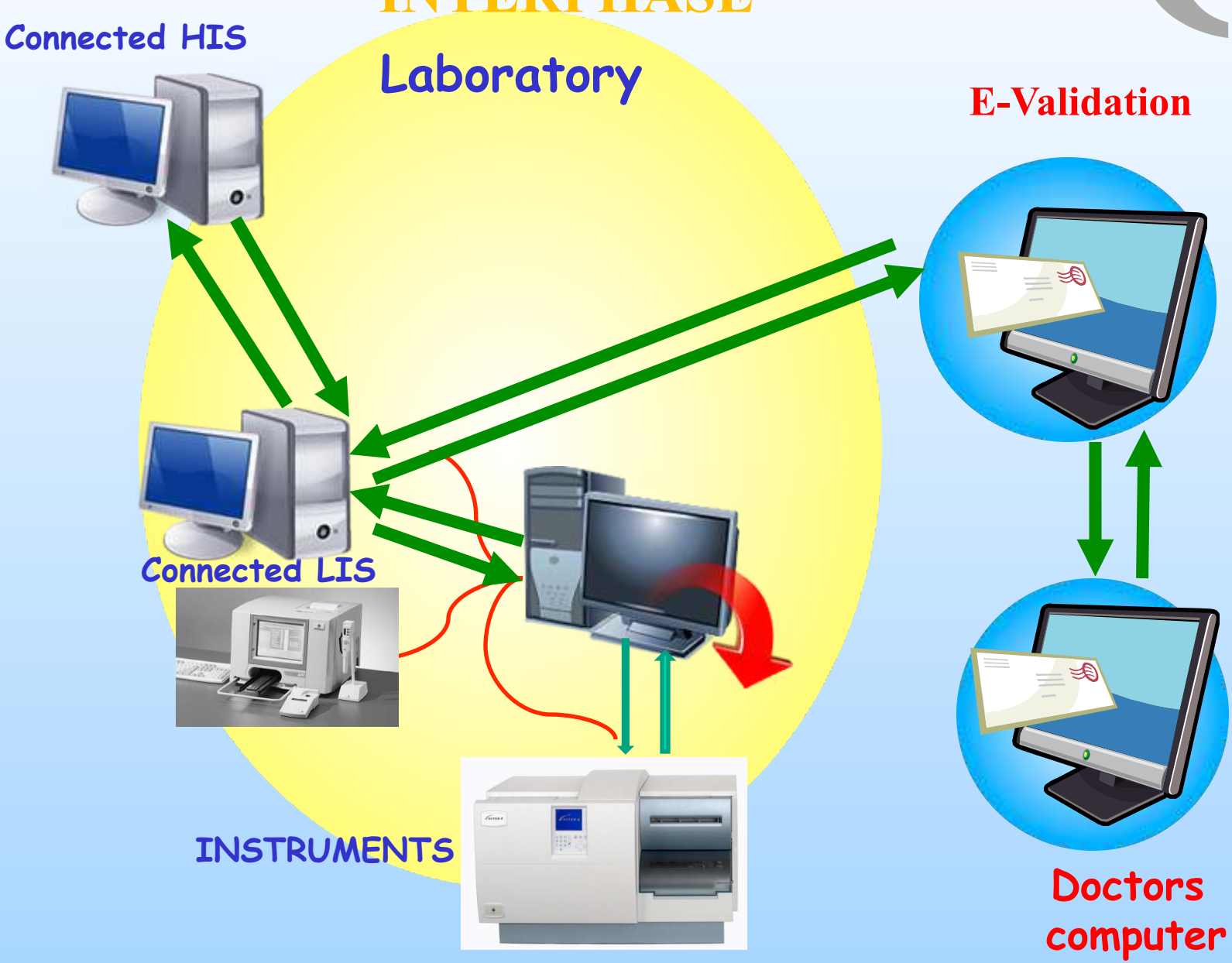
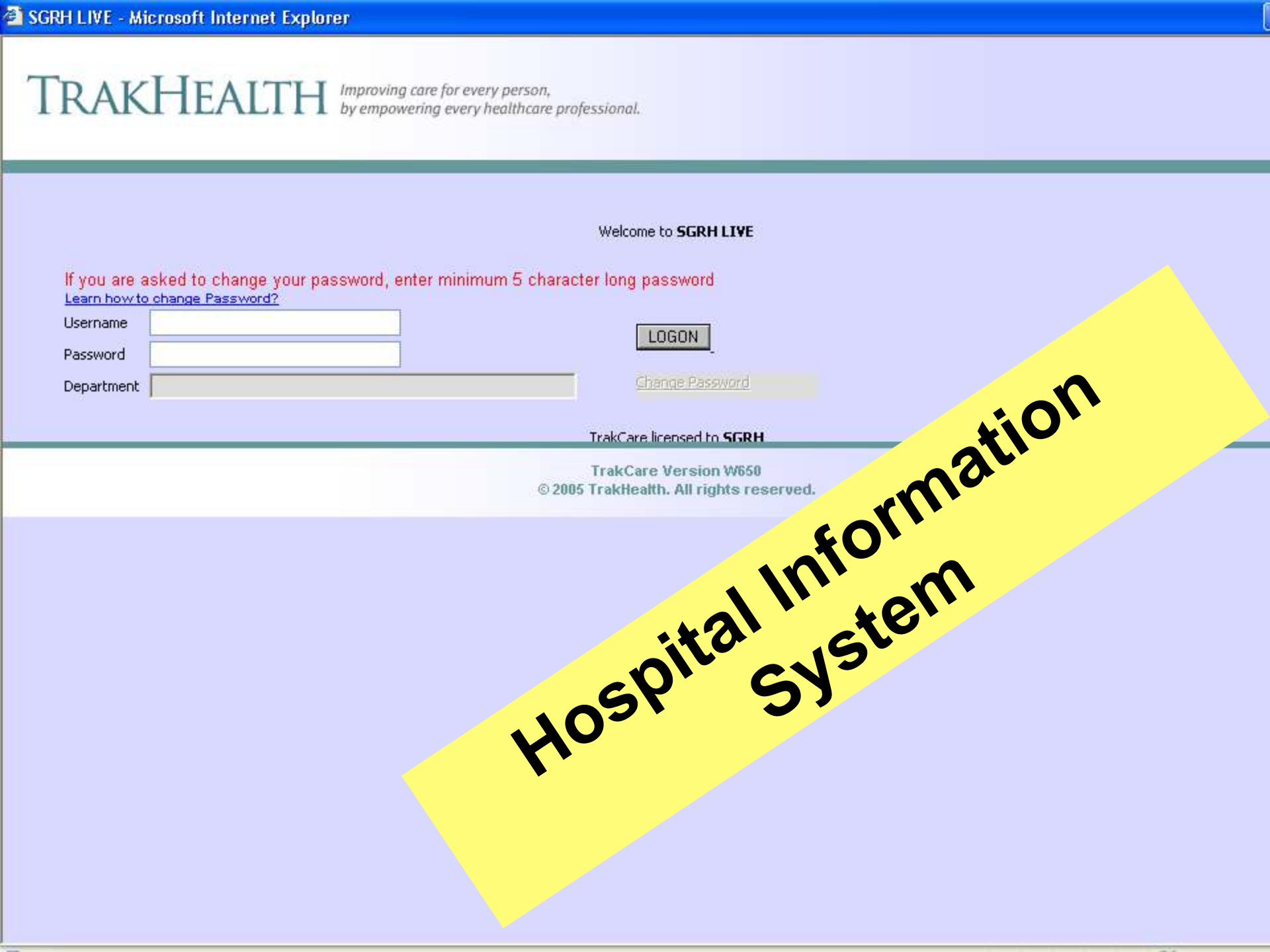
INTERPHASE


Connected HIS
Laboratory
E-Validation
Connected LIS
INSTRUMENTS
Doctors computer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by empowering every healthcare professional.
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Department
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Hospital Information System

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Home | Search | EPR | Sample Collection List | Specimens Receive | Order | Re print barcode | Payment Status | View Reg | Pt. Account Detail

Patient Search

Registration Number

Episode Number

First Name

Surname

Father's Name — Fill in BOTH FIRST NAME and SURNAME before entering FATHER'S NAME

Mother's Name

Sex

Telephone

New Employee ID (GAA)

Medical Entitlement

Date of Birth

Age

Similar Sounding Names

Only Current Inpatients

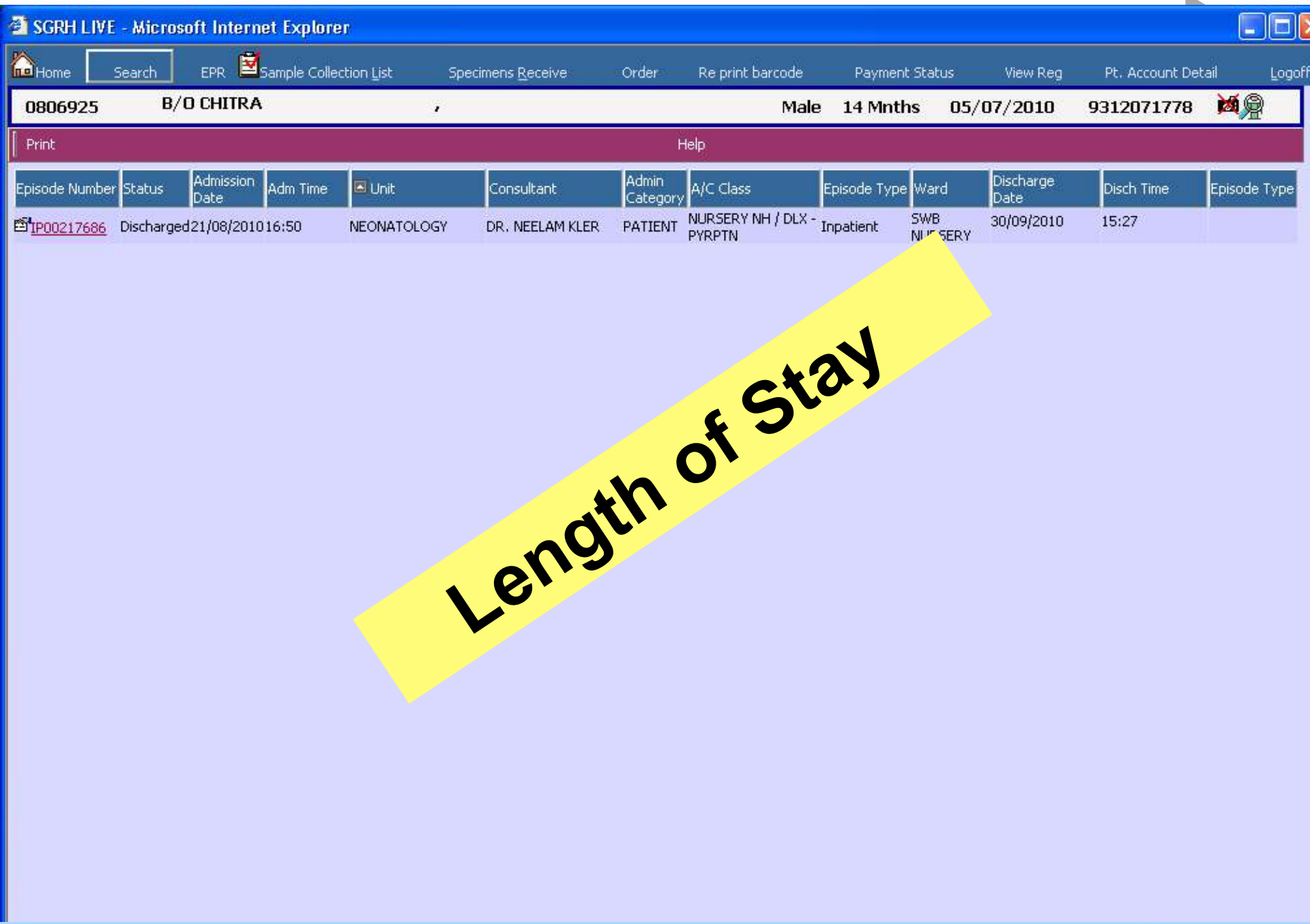
Visit Status

Location — Treating Unit

Ward

Find

Data Retrieval for individual Pts.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Home
Search
EPR
Sample Collection List
Specimens Receive
Order
Re print barcode
Payment Status
View Reg
Pt. Account Detail
Logoff
0806925
B/O CHITRA
,
Male
14 Mnths
05/07/2010
9312071778
Print
Help
Episode Number
Status
Admission Date
Adm Time
Unit
Consultant
Admin Category
A/C Class
Episode Type
Ward
Discharge Date
Disch Time
Episode Type
IP00217686
Discharged
21/08/2010
16:50
NEONATOLOGY
DR. NEELAM KLER
PATIENT
NURSERY NH / DLX - PYRPTN
Inpatient
SWB
30/09/2010
15:27
Length of Stay

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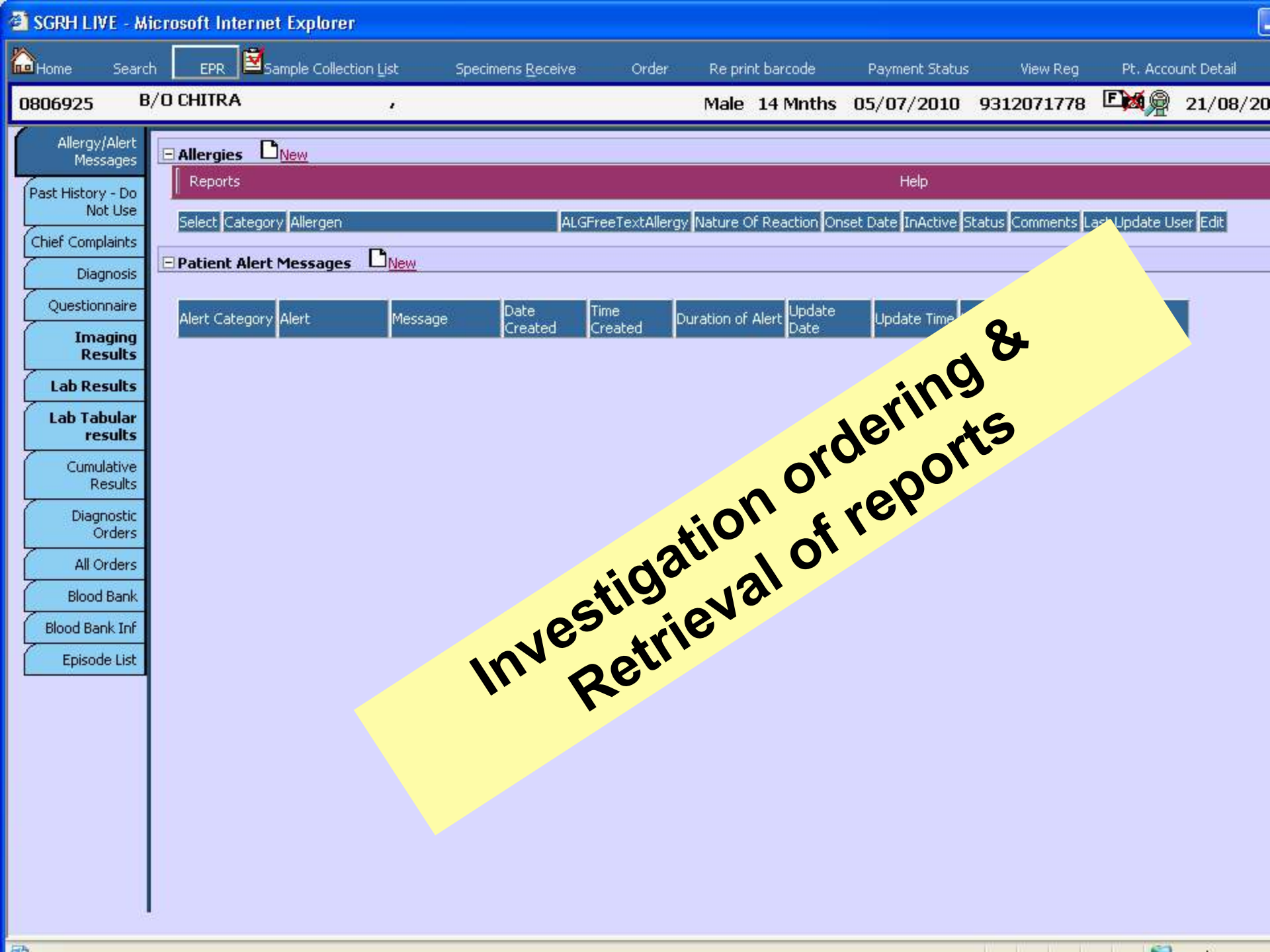
Home | Search | EPR | Sample Collection List | Specimens Receive | Order | Re print barcode | Payment Status | View Reg | Pt. Account Detail

0725298 B/O RADHIKA UPPAL (2) Male 1 Mnths 15/03/2010 9871462999 D

Print Help

Episode Number	Status	Admission Date	Adm Time	Unit	Consultant	Admin Category	A/C Class	Episode Type	Ward	Discharge Date	Disch Time	Episod
IP00187200	Discharged	15/03/2010	00:49	NEONATOLOGY	DR. NEELAM KLER	PATIENT	NURSERY NH / DLX - PYRPTN	Inpatient	SWB NURSERY	30/04/2010	13:55	

Mortality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Payment Status
View Reg
Pt. Account Detail
0806925
B/O CHITRA
Male 14 Mnths 05/07/2010 9312071778
21/08/20
Allergy/Alert Messages
Past History - Do Not Use
Chief Complaints
Diagnosis
Questionnaire
Imaging Results
Lab Results
Lab Tabular results
Cumulative Results
Diagnostic Orders
All Orders
Blood Bank
Blood Bank Inf
Episode List
Allergies
New
Reports
Help
Select
Category
Allergen
ALGFreeTextAllergy
Nature Of Reaction
Onset Date
InActive
Status
Comments
Last Update User
Edit
Patient Alert Messages
New
Alert Category
Alert
Message
Date Created
Time Created
Duration of Alert
Update Date
Update Time
Investigation ordering &
Retrieval of reports

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Home | Search | EPR | Sample Collection List | Specimens Receive | Order | Re print barcode | Payment Status | View Reg | Pt. Account Detail

0806925 B/O CHITRA , Male 14 Mnths 05/07/2010 9312071778 21/08/20

- Allergy/Alert Messages
- Past History - Do Not Use
- Chief Complaints
- Diagnosis
- Questionnaire
- **Imaging Results**
- **Lab Results**
- **Lab Tabular results**
- Cumulative Results
- Diagnostic Orders
- All Orders
- Blood Bank
- Blood Bank Inf
- Episode List

Diagnosis

ICD Description	Description	Diagnosis Type	Date	Time
Other apnoea of newborn				
Birth asphyxia, unspecified				
Other preterm infants				

Admission Diagnosis

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0806925 B/O CHITRA , Male 14 Mnths 05/07/2010 9312071778 21/08/20

- Allergy/Alert Messages
- Past History - Do Not Use
- Chief Complaints
- Diagnosis
- Questionnaire
- **Imaging Results**
- **Lab Results**
- **Lab Tabular results**
- Cumulative Results
- Diagnostic Orders
- All Orders
- Blood Bank
- Blood Bank Inf
- Episode List

Result Profile: Lab Results

Print | Reports | Help

Search *Italics* indicate the test was done in a prevous episode and not in this one

Select	Description	Test Episode No	DateCreated	TimeCreated	Status	Results	Date Order Executed	Epis
	BLOOD GROUPING-1 FFP / PLATELETS Etc. FOR X-MATCH (Mention quantity)	8810022837	28/09/2010	10:27	Final	Results	28/09/2010	IP00
	BLOOD GROUPING -2 FOR X-MATCH	8810022837	28/09/2010	10:27	Final	Results	28/09/2010	IP00
	Bilirubin (Total & Direct)	9910173180	27/09/2010	11:22	Final	Results	27/09/2010	IP00
	Reticulocyte count	1110163524	27/09/2010	11:22	Final	Results	27/09/2010	IP00
	Haemoglobin (Hb)	1110163524	27/09/2010	11:22	Final	Results	27/09/2010	IP00
	BacT/Alert aerobic culture (Blood)	5510068263	22/09/2010	12:59	Final	Results	23/09/2010	IP00
	Platelet count	1110158005	20/09/2010	14:42	Final	Results	20/09/2010	IP00
	Platelet count				Final	Results	17/09/2010	IP00
	Supplementary BacT/Alert aerobic cultur				Final	Results	16/09/2010	IP00
	Platelet count	1110154450	16/09/2010	09:15	Final	Results	16/09/2010	IP00
	Renal Biochemical Profile - Basic (BUN,Creat,Ca,PO4,Na,K)	9910165809	16/09/2010	09:15	Final	Results	16/09/2010	IP00
	LFT - Liver Function Test (Hepatic Profile)	9910165809	16/09/2010	09:14	Final	Results	16/09/2010	IP00
	Platelet count	1110153719	15/09/2010	11:22	Final	Results	15/09/2010	IP00
	Haemoglobin (Hb)	1110153719	15/09/2010	11:21	Final	Results	15/09/2010	IP00
	Platelet count	1110152704	14/09/2010	08:24	Final	Results	14/09/2010	IP00
	BacT/Alert aerobic culture (Blood)	5510065260	14/09/2010	05:56	Final	Results	15/09/2010	IP00
	BLOOD GROUPING-1 FFP / PLATELETS Etc. FOR X-MATCH (Mention quantity)	8810021494	13/09/2010	14:34	Final	Results	15/09/2010	IP00
	BLOOD GROUPING -2 FOR X-MATCH	8810021494	13/09/2010	14:34	Final	Results	15/09/2010	IP00
	Platelet count	1110151875	13/09/2010	10:28	Final	Results	13/09/2010	IP00
	Platelet count	1110151151	12/09/2010	06:37	Final	Results	12/09/2010	IP00
	Supplementary BacT/Alert aerobic culture (Blood)	5510063545	11/09/2010	15:15	Final	Results	11/09/2010	IP00
	BLOOD GROUPING-1 FFP / PLATELETS Etc. FOR X-MATCH (Mention	8810021310	11/09/2010	13:07	Final	Results	11/09/2010	IP00

Cummulative Results

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0806925 B/O CHITRA , Male 14 Mnths 05/07/2010 9312071778 21/08/20

SUPPLEMENTARY BACT/ALERT AEROBIC CULTURE (BLOOD)

Order Code	AERBTA+B-BLDS	Order Start Date & Time	16/09/2010 12:50
Order Lab Status	Final	Specimen Collection Date & Time	14/09/2010 05:57
Ordering Clinician		Specimen Reception Date & Time	14/09/2010 06:23
Lab Number	5510065260	Result Date & Time	16/09/2010 13:58
Age at time of test	10 Weeks	Specimens	Blood

Click HERE to see Test Result

Last Update:

Date & Time:

ANTIBIOTIC SENSITIVITY

	Amikacin	Ampicillin	Aztreonam	Cefepime	Cefoperazone+Sulbactum	Ciprofloxacin	Colistin	Ertapenem	ESBL	Gentamicin	Imipenem	Ceftriaxone	Tigecycline	Piperacillin+Tazobactum
KPN	R	R	S	R	R	R	S	R	NEG	R	R	R	S	R

Bacteriology report

0806925 B/O CHITRA , Male 14 Mnths 05/07/2010 9312071778 21/08/20

Authorised by DR. JASWINDER KAUR OBEROI on 16/09/2010 at 13:58

Supplementary Report

Bact/Alert Culture (Blood)

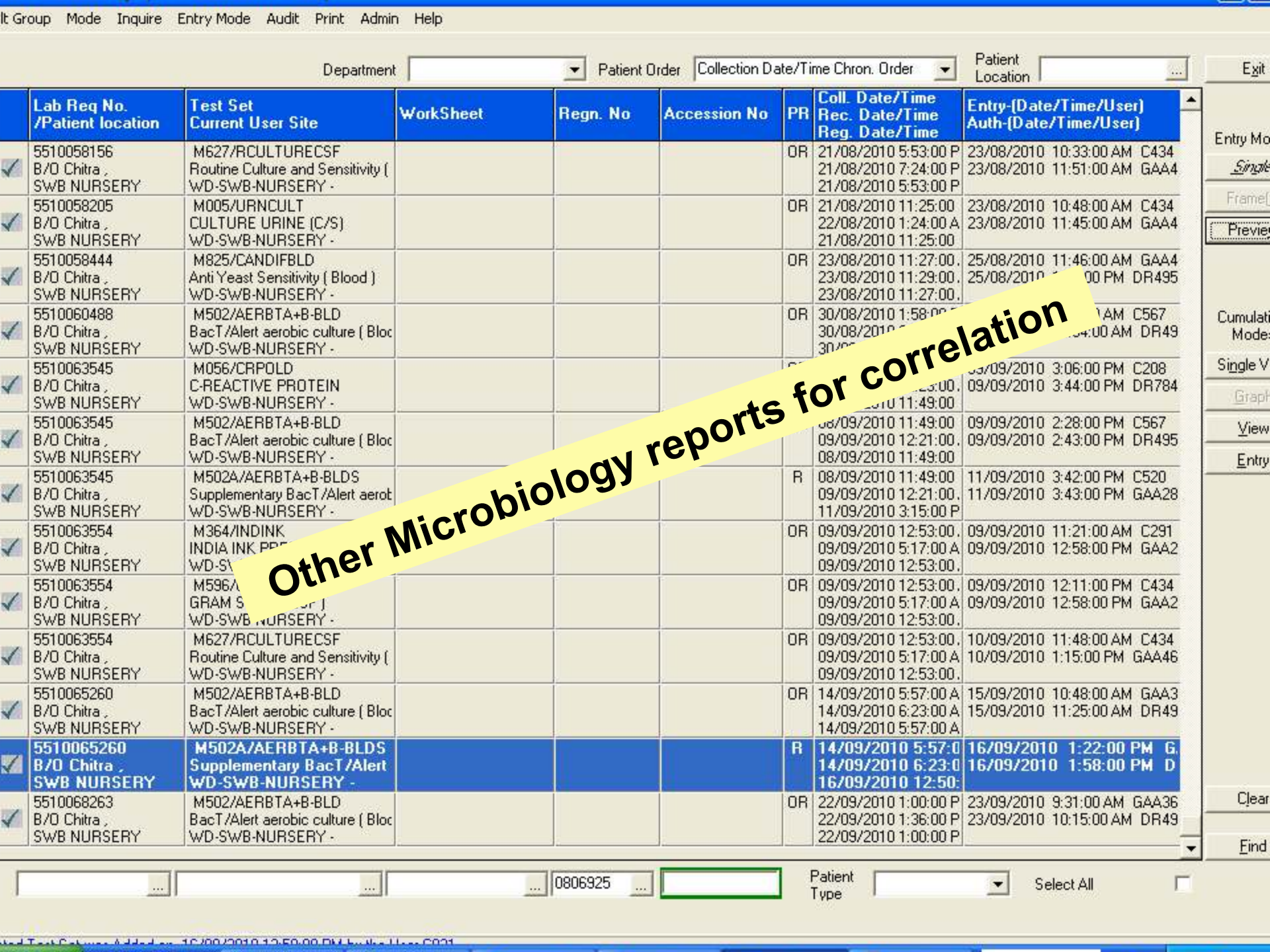
1) Klebsiella pneumoniae

Antibiotic/Sensitivity:	1
Co-Amoxyclav	-
Amikacin	R
Ampicillin	R
Aztreonam	**S**
Cefotaxime	-
Cefepime	R
Cefazolin	-
Cefoperazone	-
Cefoperazone+Sulbactum	R
Ciprofloxacin	R
Colistin	**S**
Co-Trimoxazole	-
Cefuroxime	-
Ertapenem	R
ESBL	NEG
Gentamicin	R
Imipenem	R
Meropenem	-
Netilmicin	-
Ofloxacin	-
Ceftriaxone	R
Tigecycline	**S**
Piperacillin+Tazobactum	R

S : Sensitive MS : Moderate Sensitive R : Resistant

Carbapenemase producing strain.
Positive after 0.40 days.
Final report.

Detailed Bacteriology ABST report


lt Group Mode Inquire Entry Mode Audit Print Admin Help
Department
Patient Order
Collection Date/Time Chron. Order
Patient Location
Exit
Lab Req No. /Patient location
Test Set Current User Site
WorkSheet
Regn. No
Accession No
PR
Coll. Date/Time Rec. Date/Time Reg. Date/Time
Entry-(Date/Time/User) Auth-(Date/Time/User)
5510058156 B/O Chitra , SWB NURSERY
M627/RCULTURECSF Routine Culture and Sensitivity (WD-SWB-NURSERY -
OR
21/08/2010 5:53:00 P 21/08/2010 7:24:00 P 21/08/2010 5:53:00 P
23/08/2010 10:33:00 AM C434 23/08/2010 11:51:00 AM GAA4
5510058205 B/O Chitra , SWB NURSERY
M005/URNCULT CULTURE URINE (C/S) WD-SWB-NURSERY -
OR
21/08/2010 11:25:00 22/08/2010 1:24:00 A 21/08/2010 11:25:00
23/08/2010 10:48:00 AM C434 23/08/2010 11:45:00 AM GAA4
5510058444 B/O Chitra , SWB NURSERY
M825/CANDIFBLD Anti Yeast Sensitivity (Blood) WD-SWB-NURSERY -
OR
23/08/2010 11:27:00. 23/08/2010 11:29:00. 23/08/2010 11:27:00.
25/08/2010 11:46:00 AM GAA4 25/08/2010 00 PM DR495
5510060488 B/O Chitra , SWB NURSERY
M502/AERBTA+B-BLD BacT/Alert aerobic culture (Bloc WD-SWB-NURSERY -
OR
30/08/2010 1:58:00 30/08/2010
AM C567 00 AM DR49
5510063545 B/O Chitra , SWB NURSERY
M056/CRPOLD C-REACTIVE PROTEIN WD-SWB-NURSERY -
09/09/2010 3:06:00 PM C208 09/09/2010 3:44:00 PM DR784
5510063545 B/O Chitra , SWB NURSERY
M502/AERBTA+B-BLD BacT/Alert aerobic culture (Bloc WD-SWB-NURSERY -
09/09/2010 11:49:00 09/09/2010 12:21:00. 08/09/2010 11:49:00
09/09/2010 2:28:00 PM C567 09/09/2010 2:43:00 PM DR495
5510063545 B/O Chitra , SWB NURSERY
M502A/AERBTA+B-BLDS Supplementary BacT/Alert aerot WD-SWB-NURSERY -
R
08/09/2010 11:49:00 09/09/2010 12:21:00. 11/09/2010 3:15:00 P
11/09/2010 3:42:00 PM C520 11/09/2010 3:43:00 PM GAA28
5510063554 B/O Chitra , SWB NURSERY
M364/INDINK INDIA INK PR WD-S
OR
09/09/2010 12:53:00. 09/09/2010 5:17:00 A 09/09/2010 12:53:00.
09/09/2010 11:21:00 AM C291 09/09/2010 12:58:00 PM GAA2
5510063554 B/O Chitra , SWB NURSERY
M596/ GRAM S WD-SWB NURSERY -
OR
09/09/2010 12:53:00. 09/09/2010 5:17:00 A 09/09/2010 12:53:00.
09/09/2010 12:11:00 PM C434 09/09/2010 12:58:00 PM GAA2
5510063554 B/O Chitra , SWB NURSERY
M627/RCULTURECSF Routine Culture and Sensitivity (WD-SWB-NURSERY -
OR
09/09/2010 12:53:00. 09/09/2010 5:17:00 A 09/09/2010 12:53:00.
10/09/2010 11:48:00 AM C434 10/09/2010 1:15:00 PM GAA46
5510065260 B/O Chitra , SWB NURSERY
M502/AERBTA+B-BLD BacT/Alert aerobic culture (Bloc WD-SWB-NURSERY -
OR
14/09/2010 5:57:00 A 14/09/2010 6:23:00 A 14/09/2010 5:57:00 A
15/09/2010 10:48:00 AM GAA3 15/09/2010 11:25:00 AM DR49
5510065260 B/O Chitra , SWB NURSERY
M502A/AERBTA+B-BLDS Supplementary BacT/Alert WD-SWB-NURSERY -
R
14/09/2010 5:57:0 14/09/2010 6:23:0 16/09/2010 12:50:
16/09/2010 1:22:00 PM G. 16/09/2010 1:58:00 PM D
5510068263 B/O Chitra , SWB NURSERY
M502/AERBTA+B-BLD BacT/Alert aerobic culture (Bloc WD-SWB-NURSERY -
OR
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23/09/2010 9:31:00 AM GAA36 23/09/2010 10:15:00 AM DR49
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Find
0806925
Patient Type
Select All
Other Microbiology reports for correlation

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0806925 B/O CHITRA , Male 14 Mnths 05/07/2010 9312071778 21/08/20

Admin | Print | Reports | Help

Search Select All

Select	Order Name	Quantity	Receiving Location	Status of order	Pharmacy Status	Last User Update	Radiology St
	WATER FOR INJECTION 10 ml (ALBERT DAVID)(Solvent for injection)	5	INPATIENT PHARMACY STORE (GF)	Verified	Packed	Joginder Singh	Verified Orde
	WATER for Injection 10 ml - PDPL (Solvent for injections)	5	INPATIENT PHARMACY STORE (GF)	D/C (Discontinued)	Completed	Joginder Singh	Discontinued
	ALCOHOL SWAB (MAK)	1	INPATIENT PHARMACY STORE (GF)	Verified	Packed	Joginder Singh	Verified Orde
	AMIKANEX Vial Injection 500 mg (Amikacin) (GW)	1	INPATIENT PHARMACY STORE (GF)	Verified	Packed	Joginder Singh	Verified Orde
	AMICIN Injection Vial 500 mg (Amikacin)	1	INPATIENT PHARMACY STORE (GF)	D/C (Discontinued)	Completed	Joginder Singh	Discontinued
	IV SET (ROMSONS)	1	INPATIENT PHARMACY STORE (GF)	Verified	Packed	Joginder Singh	Verified Orde
	DISPOSABLE SYRINGE 1 ML (TUBERCULINE) C	5	INPATIENT PHARMACY STORE (GF)	Verified	Packed	Joginder Singh	Verified Orde
	DISPOSABLE SYRINGE 2 ML (ROMSONS)	5	INPATIENT PHARMACY STORE (GF)	Verified	Packed	Joginder Singh	Verified Orde
	Disposable Syringe 10 ml with needle BD - Discardit (Dispovan)	5	INPATIENT PHARMACY STORE (GF)	Verified	Packed	Joginder Singh	Verified Orde
	DISPOSABLE SYRINGE 10 ML (ROMSOMS)	5	INPATIENT PHARMACY STORE (GF)	D/C (Discontinued)	Completed	Joginder Singh	Discontinued
	DISPOSABLE SYRINGE 20 ML (ROMSONS)	2	INPATIENT PHARMACY STORE (GF)	Verified	Packed	Joginder Singh	Verified Orde
			IENT PHARMACY STORE (GF)	Verified	Packed	Joginder Singh	Verified Orde
		2	IENT PHARMACY STORE (GF)	D/C (Discontinued)	Completed	Joginder Singh	Discontinued
	MERSILK (NW5028) 76 cm (3-0) 3/8 Circle Reverse Cutting 26mm	1	INPATIENT PHARMACY STORE (GF)	Verified	Packed	Narayan Singh	Verified Orde
	Cut open (venesection) / suturing set usage charges	1	CSSD STORE	Executed		Josmy Jose	Executed
	INTRALIPID 20% Injection 100 ml (Parenteral Fat Emulsions)	1	INPATIENT PHARMACY STORE (GF)	Verified	Packed	DEV PRAKESH	Verified Orde
	IV SET (ROMSONS)	2	INPATIENT PHARMACY STORE (GF)	Verified	Packed	DEV PRAKESH	Verified Orde
	Blood Gas + S.Elect Analysis	1	Dummy Receiving Location	Executed		Mukesh Kumar Verma	Executed
	BLOOD GROUP - 1 FOR BLOOD / PACKED CELL X-MATCH (mention quantity)	1	BLOOD TRANSFUSION MEDICINE	Verified		Josmy Jose	Verified Orde
	BLOOD GROUPING -2 FOR X-MATCH	1	BLOOD TRANSFUSION MEDICINE	Verified		Josmy Jose	Verified Orde
	Antibody screening of patient's blood (pre-transfusion) WITH		BLOOD TRANSFUSION MEDICINE			Josmy Jose	Verified Orde

Treatment

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Home | Search | EPR | Sample Collection List | Specimens Receive | Order | Re print barcode | Payment Status | View Reg | Pt. Account Detail

0806925 B/O CHITRA , Male 14 Mnths 05/07/2010 9312071778

Description	Total All Episode Invoices	Total Discounts	Total Deposits / Receipted	Total Amount Outstanding
Patient	394,782.00	0.00	-394,782.00	0.00
Payor	0.00	0.00	0.00	0.00
Total	394,782.00	0.00	-394,782.00	0.00

Cashiers - Episode Options Print Help

Show Unpaid Bills Only ☐ Show Patient Bills ☐

Check / Uncheck All

Select Bill	Transaction Type	Episode Number	Episode Date	Pt. Bill No.	Payor Bill No	Date Bill Printed	Payor	Inv Total	Pt. Inv Total	Payor Inv Total	Recp & Dep Total	Outstand. Amt.	Deposit Date	Discount Total	Epi. Tota
☐	Deposit							0.00	0.00	0.00	0.00	0.00	30/09/2010	0.00	
☐	Invoice	IP00217686	21/08/2010	2010-2011/Ca/I/0026780		30/09/2010	PATIENT	394,782.00	394,782.00	0.00	-394,782.00	0.00		0.00	394,

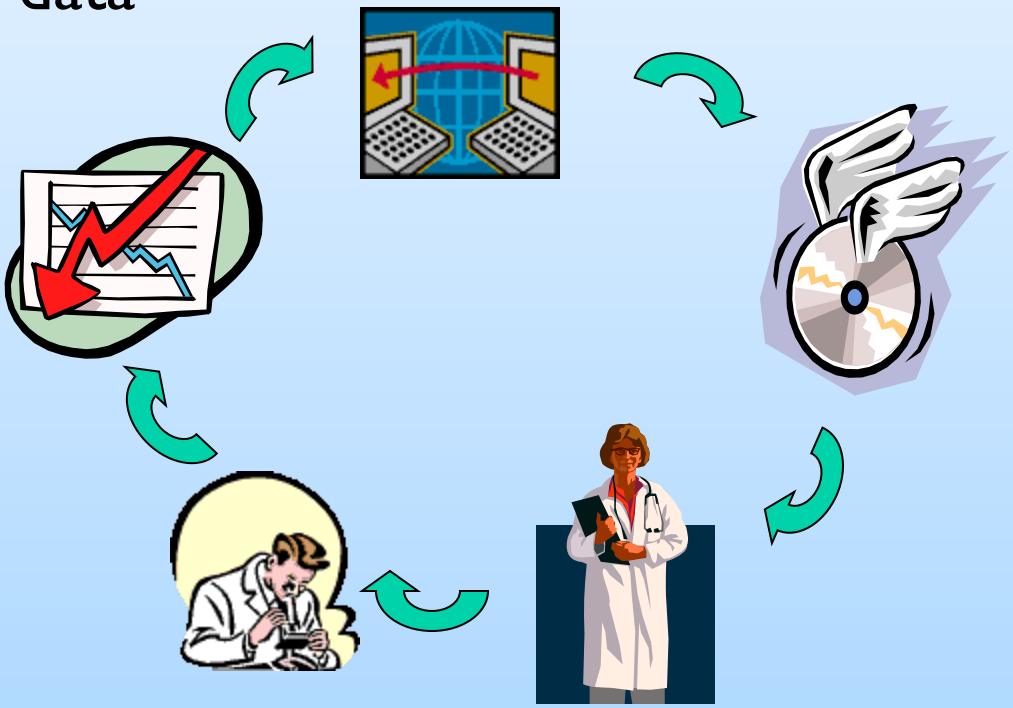
Bill at Discharge

Total data: the sum of

...

hardware, software, people, procedures

and data



Patient Demographics (n=59,Culture proven sepsis)

Parameter	Number
Intramural/ Extramural	21/38
<37 Wks/ >37 wks	45/14
Female/ Male	13/46
<1 Kg	8
1-1.499 Kg	20
≥1.5 Kg	31
Early Onset / Late Onset Sepsis	11 /48
Mortality	20 (33.8%)

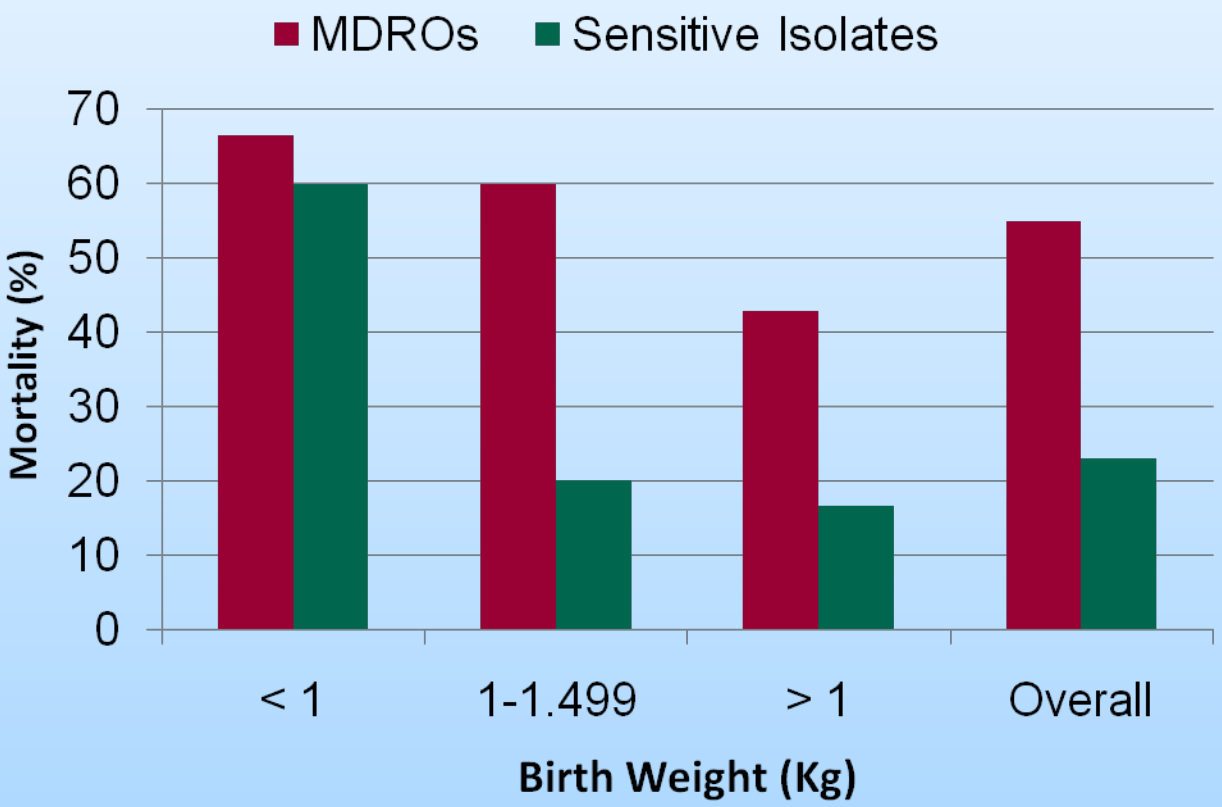
Results

- A total of 879 babies were admitted to the NICU during the period of study, of whom 618 were intramural and 261 were extramural.
- Of the 426 samples received for culture from neonates with clinically suspected sepsis, **59 (13.8%) were positive.**
- The proportion of culture proven sepsis for intramural babies and extramural babies was 3.4% and 14.1%, respectively.
- Majority of the preterm male (76.2%) babies developed sepsis (76.2%) .
- Mortality rate was 33.8% in blood culture positive neonates.

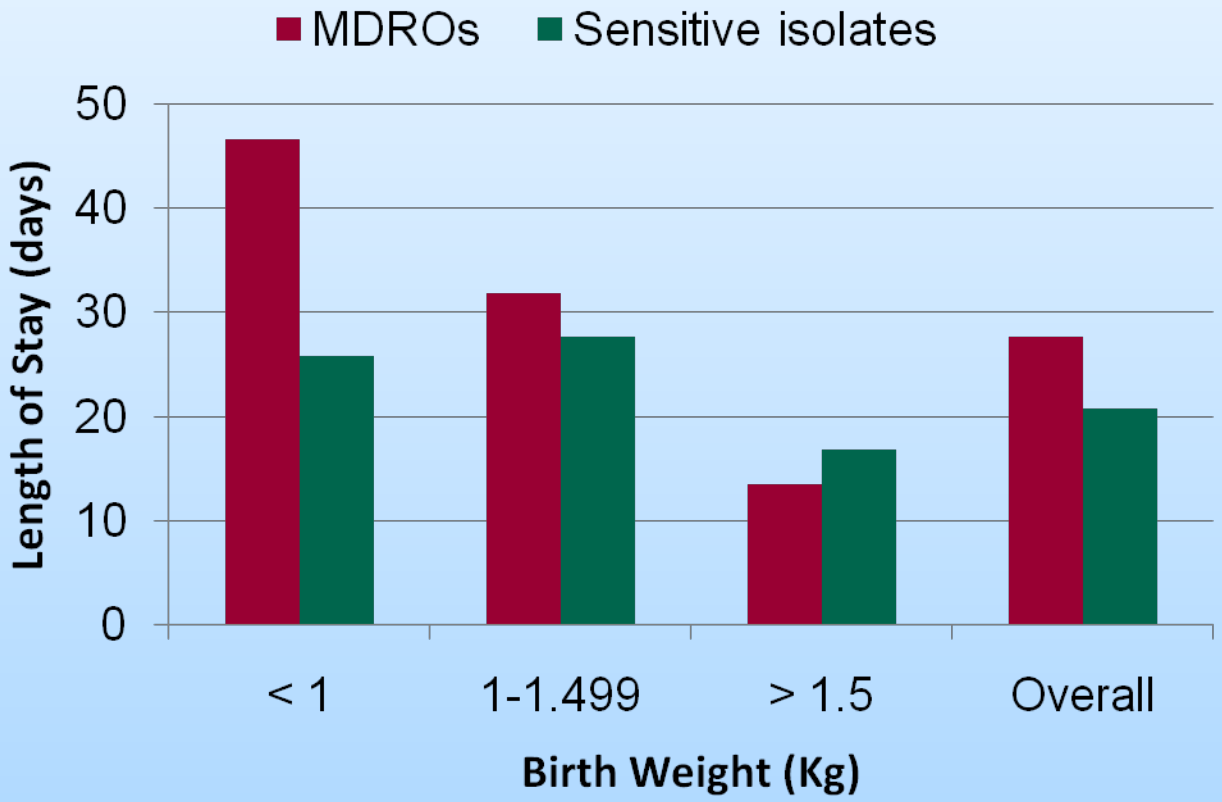
Aetiology of Neonatal Sepsis

Organism	Value
Enteric Gram negative Bacilli	20
Klebsiella pneumoniae	12
Escherichia coli	5
Enterobacter cloacae	2
Serratia marcescens	1
NonFermenting Gram Negative Bacilli (NFGNB)	12
Acinetobacter spp.	7
Other NFGNB	5
Gram positive	14
Yeast	17
Total	63

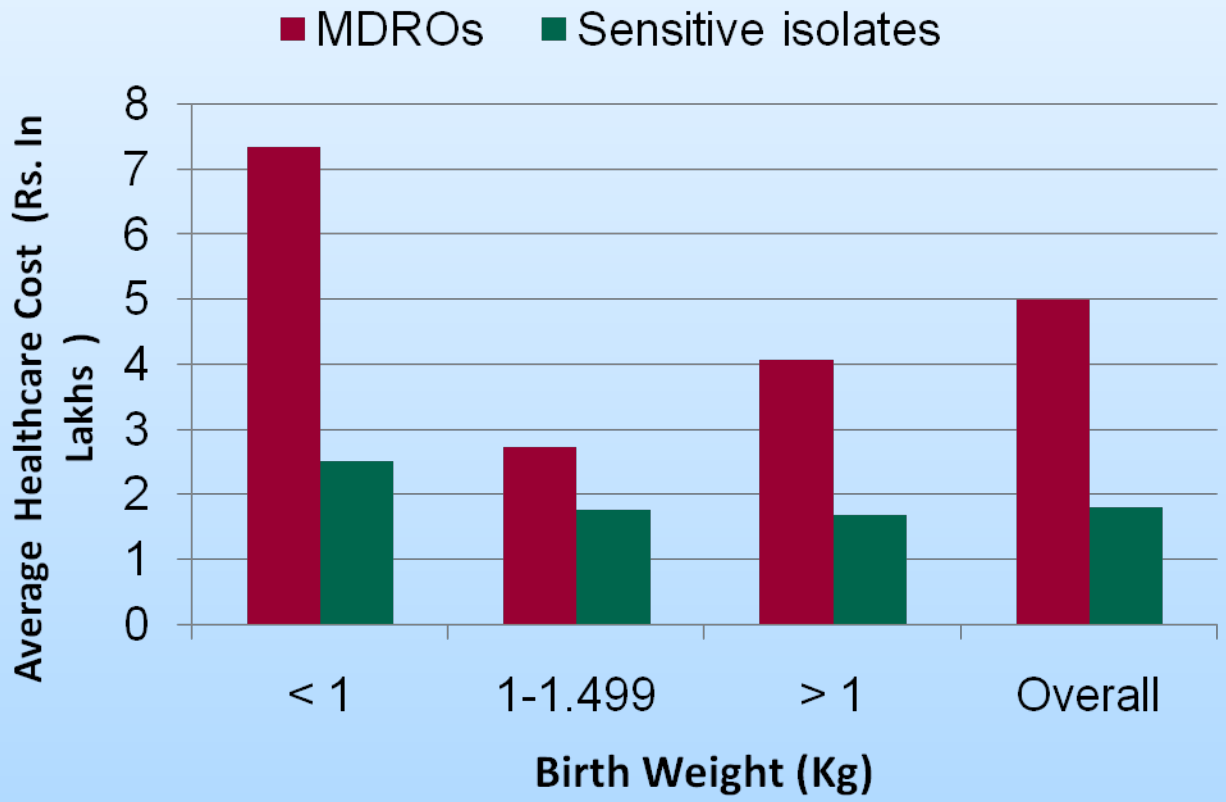
Outcomes: MDROs v/s Sensitive isolates: Mortality (n=20)



Outcomes: MDROs v/s Sensitive isolates: LOS



Outcomes: MDROs v/s Sensitive isolates: Healthcare cost



MDROs outcomes

Birth wt. (Total nmber)	Parameter (N)	Deaths (%)	LOS (days)	Average Cost of hospital stay (Rs.)
<1 Kg (8)	MDROs (3)	2 (66.6)	46.66	7,34,798.3
	Sensitive isolates (5)	3 (60)	25.8	2,50,558.2
1-1.499 Kg (20)	MDROs (10)	6 (60)	31.9	2,73,352.9
	Sensitive isolates (10)	2 (20)	27.6	1,76,453.9
≥1.5 Kg (31)	MDROs (7)	3 (42.8)	13.4	4,07,786.7
	Sensitive isolates (24)	4 (16.6)	16.8	1,67,741.5
Overall (59)	MDROs (20)	11 (55)	27.65	4,99,841.3
	Sensitive isolates (39)	9 (23.07)	20.76	1,80,592.9

Confounding factors

- Outcomes: apart from isolation of MDROs
  - Severity of illness
  - Pt. specific risk factors (surgery, etc)
  - Associated co-morbidities
- **Well designed case controlled prospective studies for determination of attributable mortality due to MDRO**

Hospital level Resistance: Collection of data & Analysis

- Antibiogram

  Report generated by analysis of isolates from a particular institution in a defined period of time that reflects the percentage susceptibility to each of the antimicrobial agents routinely tested

- Antimicrobial Consumption

Tools available for Data collection & Analysis

Available softwares:

- WHONET
- Viziguard
- Myela

SGRH

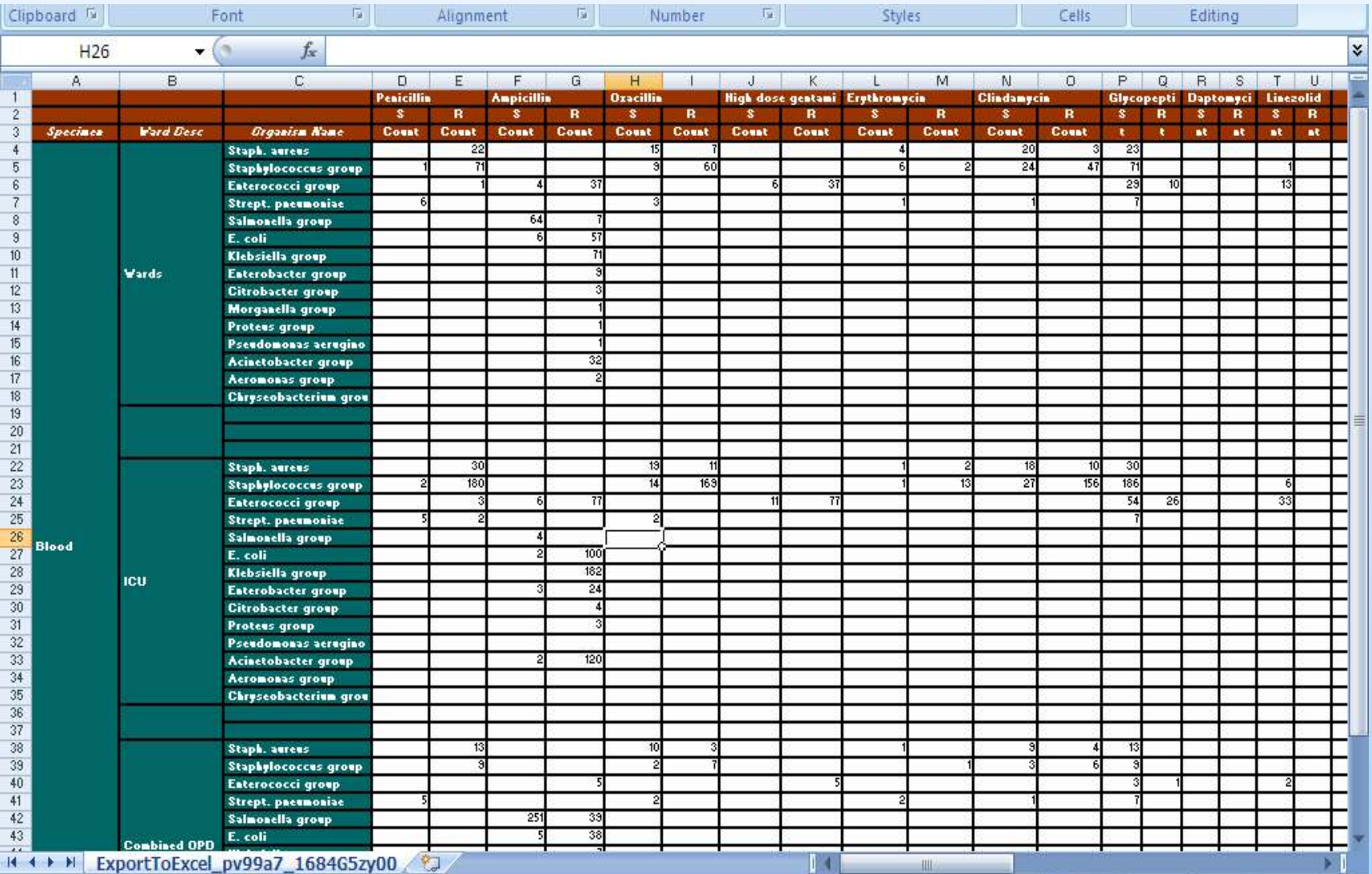
- TrakHealth
- Speedminer
- Protech

SPEEDMINER

MICROBIOLOGY MAIN DASHBOARD

- Tests
- Tests + Specimens information
- Drug prescriptons
- Susceptibility Analysis - Individual
- Susceptibility Analysis - Grouped
- GARP - Antibiotic prescription
- ALL UNIT - Antibiotic prescription
- GARP - Unit wise admissions & LOS
- ALL UNITS - Unit wise admissions and LOS
- GARP - Unit bed days and ICU days
- ALL UNIT - Unit bed days and ICU days

Antibiotic sensitivity data-speedminer (SGRH)



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H26

			Penicillin		Ampicillin		Oxacillin		High dose gentami		Erythromycin		Clindamycin		Glycopepti		Daptomyci		Linezolid	
			S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R
Specimen	Ward Desc	Organism Name	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	t	t	at	at	at	at
Blood	Wards	Staph. aureus		22			15	7			4		20	3	23					
		Staphylococcus group	1	71			9	60			6	2	24	47	71				1	
		Enterococci group		1	4	37			6	37					29	10			13	
		Strept. pneumoniae	6				3				1		1		7					
		Salmonella group			64	7														
		E. coli			6	57														
		Klebsiella group				71														
		Enterobacter group				9														
		Citrobacter group				3														
		Morganella group				1														
		Proteus group				1														
		Pseudomonas aerugino				1														
		Acinetobacter group				32														
		Aeromonas group				2														
		Chryseobacterium grou																		
	ICU	Staph. aureus		30			13	11			1	2	18	10	30					
		Staphylococcus group	2	180			14	163			1	13	27	156	186				6	
		Enterococci group		3	6	77			11	77					54	26			33	
		Strept. pneumoniae	5	2			2								7					
		Salmonella group			4															
		E. coli			2	100														
		Klebsiella group				182														
		Enterobacter group			3	24														
		Citrobacter group				4														
		Proteus group				3														
		Pseudomonas aerugino																		
		Acinetobacter group			2	120														
		Aeromonas group																		
		Chryseobacterium grou																		
	Combined OPD	Staph. aureus		13			10	3			1		3	4	13					
		Staphylococcus group		3			2	7				1	3	6	9					
		Enterococci group				5				5					3	1			2	
		Strept. pneumoniae	5				2				2		1		7					
		Salmonella group			251	33														
		E. coli			5	38														

ExportToExcel_pv99a7_1684G5zy00

SPEEDMINER

Microbiology Susceptibility Dashboard - grouped

Tests with no growth and hence no entries in the antibiotic sensitivity tables will not be included in the analysis.
Total list of all tests processed (including sterile ones) is via the Test Workload Report

Date from 01/01/2009 Date Date to 31/01/2010 Date Find

			Penicillin		Ampicillin		Oxacillin		High dose gentamicin		Erythromycin		Clindamycin
			S	R	S	R	S	R	S	R	S	R	S
Specimen	Ward Desc	Organism Name	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count
Blood	Combined OPD	Staph. aureus	1	5			3	3			3	1	5
		Staphylococcus group		17			7	10			4	7	11
		Enterococci group			2	4			1	5			
		Strept. pneumoniae	1								1		1
		Salmonella paratyphi A			1								
		E. coli			2	12							
		Klebsiella group				18							
		Enterobacter group				3							
		Citrobacter group				1							
		Proteus group			2								
		Pseudomonas aeruginosa											
		Acinetobacter group				1							
		Aeromonas group				1							
		Staph. aureus	1	12			6	7			5	8	6
		Staphylococcus group		31			2	29			4	21	12

|< < Page 1 of 5 > >|

Dashboard - Microsoft Internet Explorer

SPEEDMINER

GARP - Unit wise antibiotic prescription

Date from 01/01/2009 Date

Date to 31/01/2009 Date

Find

Warning! This is a very heavy report and can take a very long time to run.
The data will eventually appear but will slow down your computer for many minutes

GARP-Unit wise antibiotic prescription < Level 0 of 0 >

	Amikacin		
	MIKACIN Vial Injection 500 mg (Amikacin)	AMICIN Injection Vial 500 mg (Amikacin)	AMIKANE Vial Injecti 500 mg (Amikacin
Episode Department	Item Daily Qty	Item Daily Qty	Item Daily
CARDIOLOGY (UNIT 3)-Dr.P.K.Khanna			
Chest Medicine (Unit 1)-Dr.Neeraj Jain		7	
Chest Medicine (Unit 2)-Dr.Arup Basu	19		
GENERAL SURGERY (UNIT 1) - Dr. R. Sarangi	24	2	
GENERAL SURGERY (UNIT 2)-Dr.Vijay Arora			
GENERAL SURGERY (UNIT 3)-Dr.Vinod K.Malik			
Surgical Gastroenterology & Liver Transplant - Dr. Nundy		12	
MEDICINE (UNIT 2)-Dr.S.P.Byotra	4		
MEDICINE (P.S. GUPTA)		2	
MEDICINE (UNIT 3) - K. P. JAIN			
NEUROLOGY (UNIT 1)-Dr.P.K.Sethi	2	3	
NEUROLOGY (UNIT 2)-Dr.C.S.Agarwal	49	9	
NEUROSURGERY (UNIT 1)-Dr.H.N.Agarwal	8	3	
NEUROSURGERY (UNIT 2)-Dr.Satnam Singh			

Generic drug

- Amikacin
- Amoxycillin
- Amoxycillin + Bromhexine
- Amoxycillin + Clavulanic Acid
- Amoxycillin + Cloxacillin
- Amphotericin-B (Conventional)
- Amphotericin-B (Lipid Complex I)
- Ampicillin
- Ampicillin + Cloxacillin
- Ampicillin + Sulbactam Sodium
- Azithromycin
- Azithromycin + Fluconazole + Secnidazole
- Azithromycin+Ambroxol
- Aztreonam
- Baclofen
- Benzyl Penicillin
- Bifonazole
- Cefaclor
- Cefadroxil
- Cefazolin
- Cefdinir
- Cefepime
- Cefepime + Tazobactam
- Cefetamet Pivoxil
- Cefixime
- Cefixime + Cloxacillin
- Cefoperazone Sodium
- Cefoperazone Sodium + Sulbactam Sodium
- Cefotaxime
- Cefotaxime + Sulbactam
- Cefpirome
- Cefpodoxime
- Ceftazidime
- Ceftizoxime
- Ceftriaxone
- Ceftriaxone + Sulbactum Sodium
- Ceftriaxone + Tazobactam
- Cefuroxime
- Cephalexin
- Cephalexin + Bromhexine
- Chloramphenicol
- Chloramphenicol (Eye/Ear Drops)

Dashboard - Microsoft Internet Explorer

Date from 01/01/2009 Date Date to 31/01/2009 Date Find

Unit bed days Total

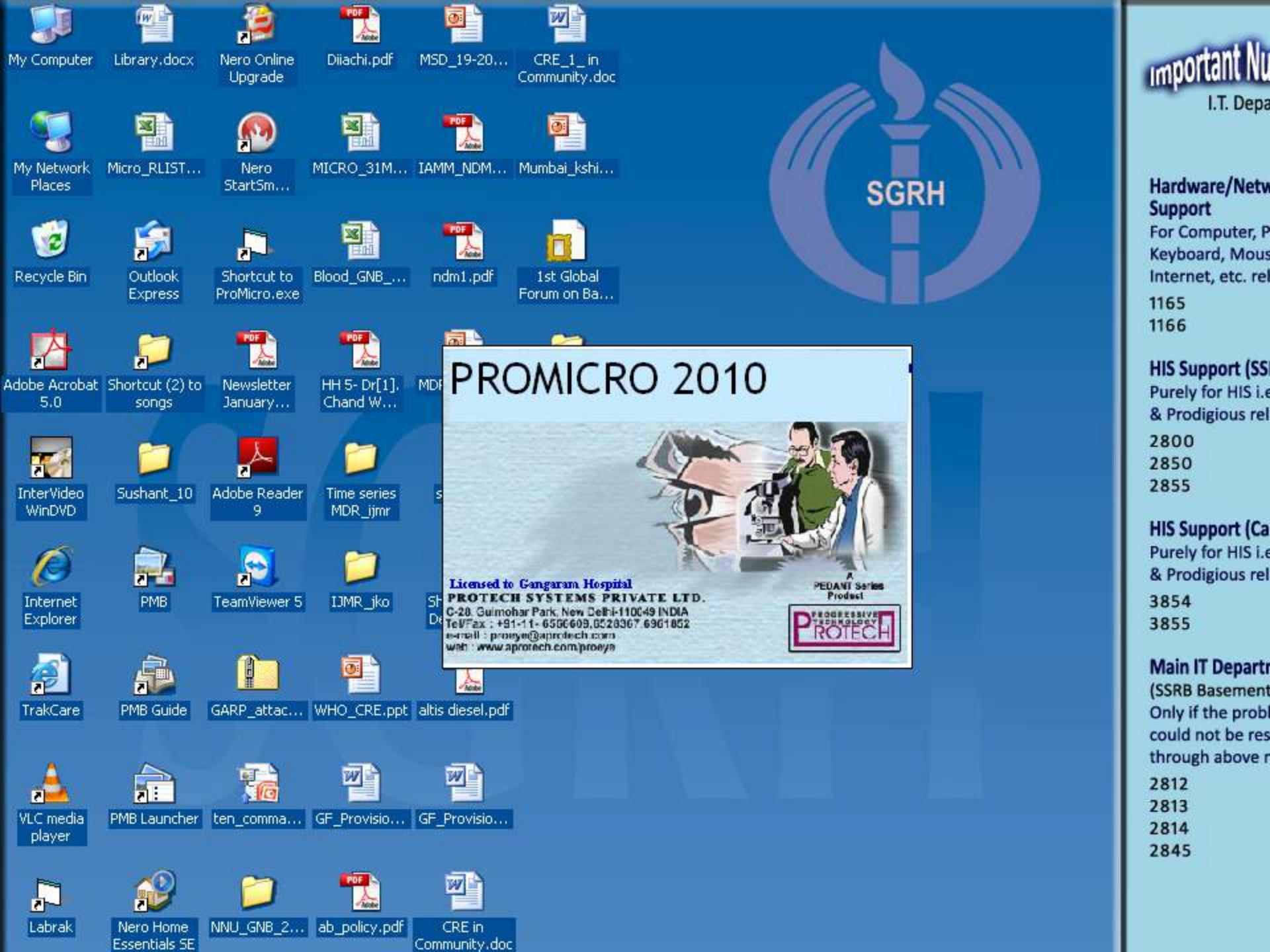
GARP - Unit bed days including ICU stay Level 0 of 0

Episode Department	Free wards Item Daily Qty	Paid wards Item Daily Qty
CARDIOLOGY (UNIT 1)-Dr.J.P.S.Sawhney		433
CARDIOLOGY (UNIT 2)-Dr.S.C.Manchanda		206
CARDIOLOGY (UNIT 3)-Dr.P.K.Khanna		295
Chest Medicine (Unit 1)-Dr.Neeraj Jain	19	166
Chest Medicine (Unit 2)-Dr.Arup Basu	20	54
GENERAL SURGERY (UNIT 1) - Dr. R. Sarangi	41	100
GENERAL SURGERY (UNIT 2)-Dr.Vijay Arora	37	217
GENERAL SURGERY (UNIT 3)-Dr.Vinod K.Malik	105	111
Surgical Gastroenterology & Liver Transplant - Dr. Nundy		530
MEDICINE (UNIT 2)-Dr.S.P.Byotra	30	249
MEDICINE (P.S. GUPTA)		27
MEDICINE (UNIT 1) -DR. V.P. SACHAR		94
MEDICINE (UNIT 3) - K. P. JAIN	4	211
NEUROLOGY (UNIT 1)-Dr.P.K.Sethi	32	307
NEUROLOGY (UNIT 2)-Dr.C.S.Agarwal	91	553
NEUROSURGERY (UNIT 1)-Dr.H.N.Agarwal	24	202
NEUROSURGERY (UNIT 2)-Dr.Satnam Singh		213
NEUROSPINE - Dr. V. S. Madan (Combined)	27	96
OBS & GYNAE (UNIT 1) - Dr.. I. Ganguli	210	244
OBS & GYNAE (UNIT IV B) - Dr. A Majumdar	8	130
OBS & GYNAE (UNIT 2) - Dr. SK Bhandari	81	314
OBS & GYNAE (UNIT 3) - Dr. K Gujral	196	256

ICU bed days

GARP - ICU days Level 0 of 0

Episode Department	Free wards Item Daily Qty	PAID wards Item Daily Qty
CARDIOLOGY (UNIT 1)-Dr.J.P.S.Sawhney		249
CARDIOLOGY (UNIT 2)-Dr.S.C.Manchanda		119
CARDIOLOGY (UNIT 3)-Dr.P.K.Khanna		157
Chest Medicine (Unit 1)-Dr.Neeraj Jain	10	39
Chest Medicine (Unit 2)-Dr.Arup Basu		10
GENERAL SURGERY (UNIT 2)-Dr.Vijay Arora	23	16
GENERAL SURGERY (UNIT 3)-Dr.Vinod K.Malik		18
Surgical Gastroenterology & Liver Transplant - Dr. Nundy	6	206
MEDICINE (UNIT 2)-Dr.S.P.Byotra	10	38
MEDICINE (UNIT 1) -DR. V.P. SACHAR	1	9
MEDICINE (UNIT 3) - K. P. JAIN		37
NEUROLOGY (UNIT 1)-Dr.P.K.Sethi		108
NEUROLOGY (UNIT 2)-Dr.C.S.Agarwal	3	232
NEUROSURGERY (UNIT 1)-Dr.H.N.Agarwal		119
NEUROSURGERY (UNIT 2)-Dr.Satnam Singh		137
OBS & GYNAE (UNIT 1) - Dr.. I. Ganguli		27
OBS & GYNAE (UNIT IV B) - Dr. A Majumdar		1
OBS & GYNAE (UNIT 2) - Dr. SK Bhandari		13
OBS & GYNAE (UNIT 3) - Dr. K Gujral		25
ORTHOPAEDICS (UNIT 2)-Dr.V.K.Nijhawan		2
ORTHOPAEDICS (UNIT 3)-DR. GAGAN CHADHA		4
ORTHOPAEDICS (UNIT 4)-Dr.D.N.Nagi		2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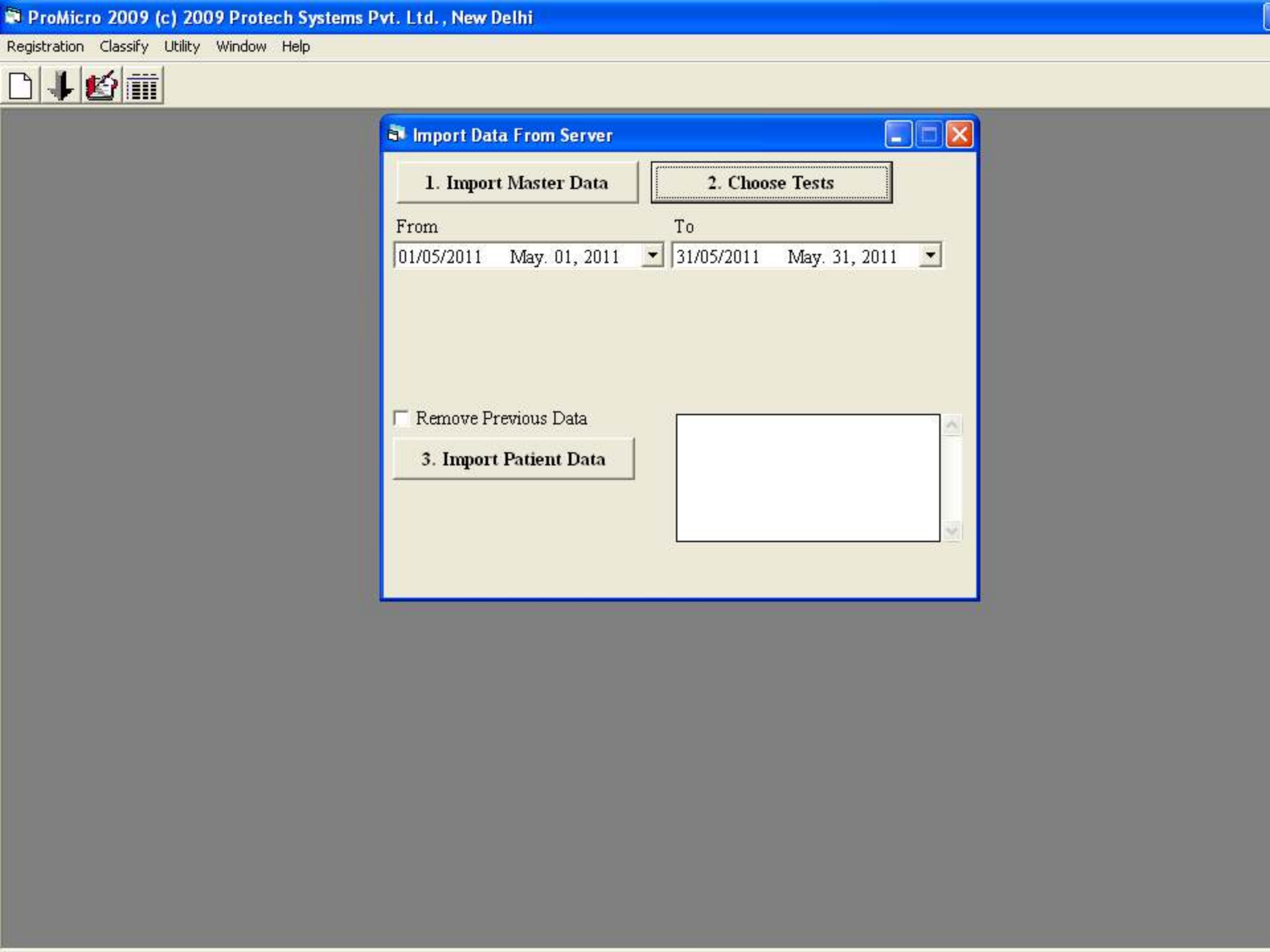
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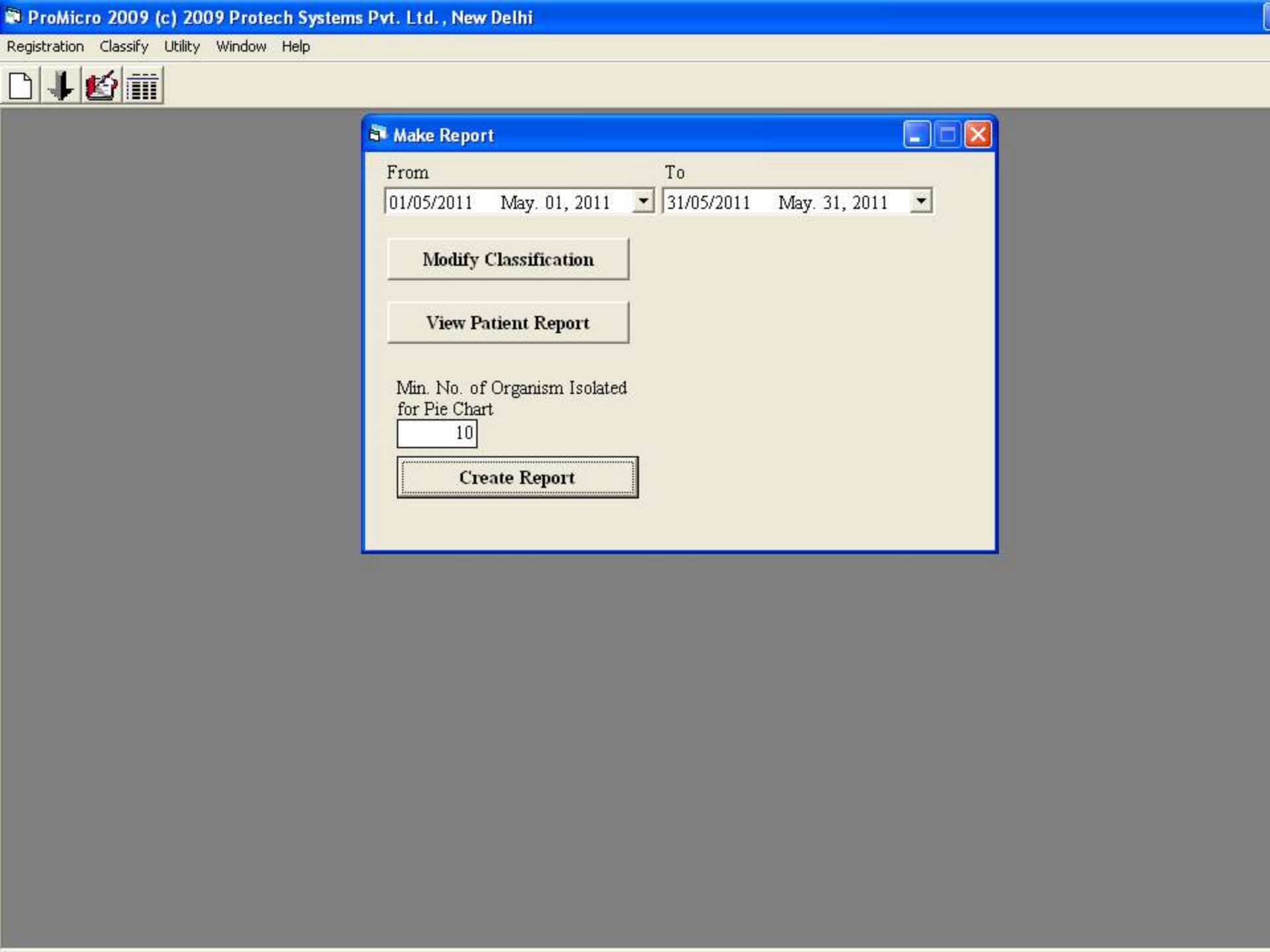
Classify
Utility
Window
Help
Import Data From Server
1. Import Master Data
2. Choose Tests
From
To
01/05/2011 May. 01, 2011
31/05/2011 May. 31, 2011
Remove Previous Data
3. Import Patient Data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Utility
Window
Help
Make Report
From
01/05/2011 May. 01, 2011
To
31/05/2011 May. 31, 2011
Modify Classification
View Patient Report
Min. No. of Organism Isolated for Pie Chart
10
Create Report

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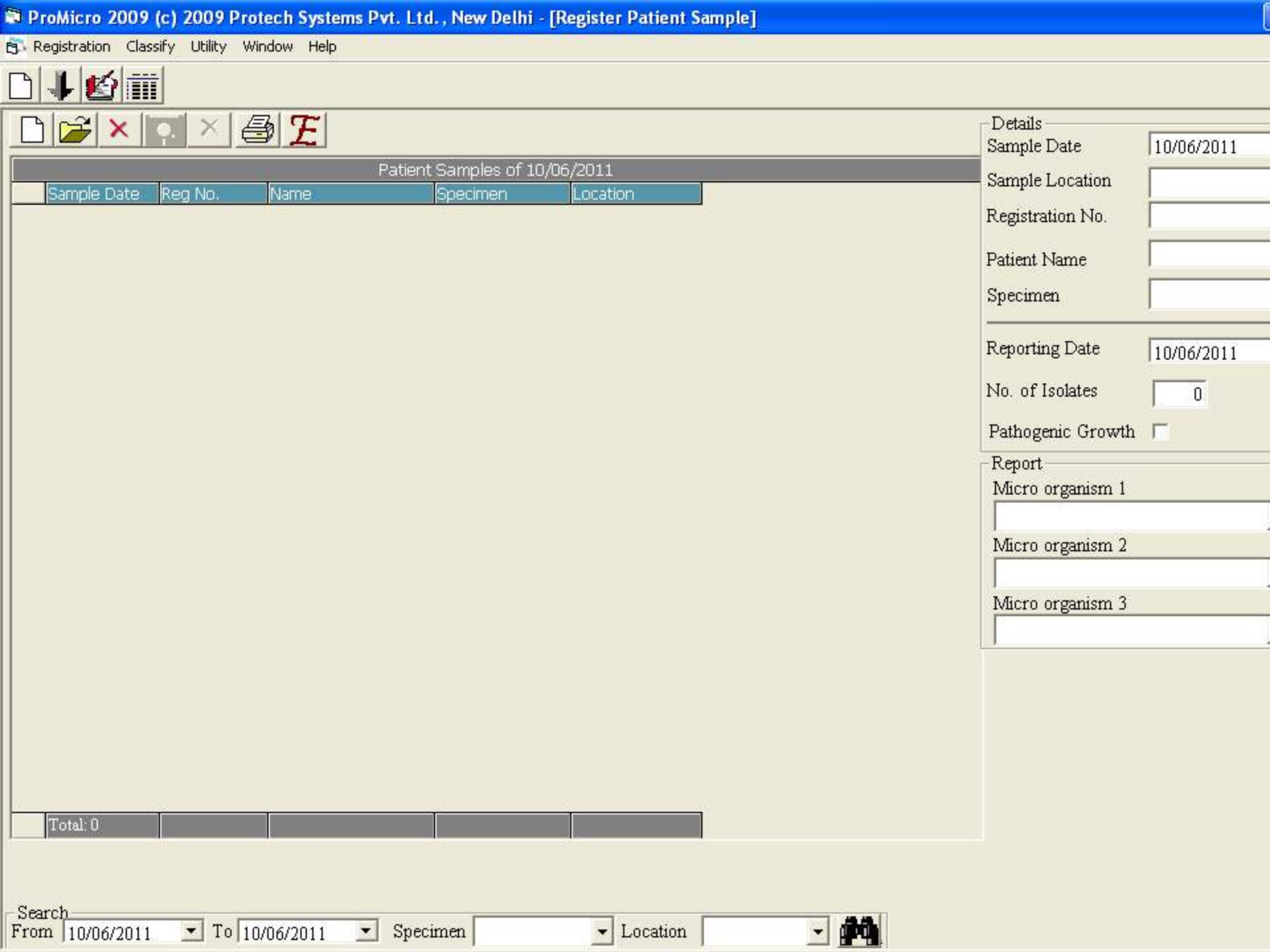
Registration Classify Utility Window Help

Show Duplicate Also

Filter Data | Patient Details | Infection Markers

Search

From: 01/06/2011 To: 10/06/2011 Specimen: Blood Organism Type: GPC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Registration
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Patient Samples of 10/06/2011
Sample Date
Reg No.
Name
Specimen
Location
Total: 0
Details
Sample Date
10/06/2011
Sample Location
Registration No.
Patient Name
Specimen
Reporting Date
10/06/2011
No. of Isolates
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Pathogenic Growth
Report
Micro organism 1
Micro organism 2
Micro organism 3
Search
From
10/06/2011
To
10/06/2011
Specimen
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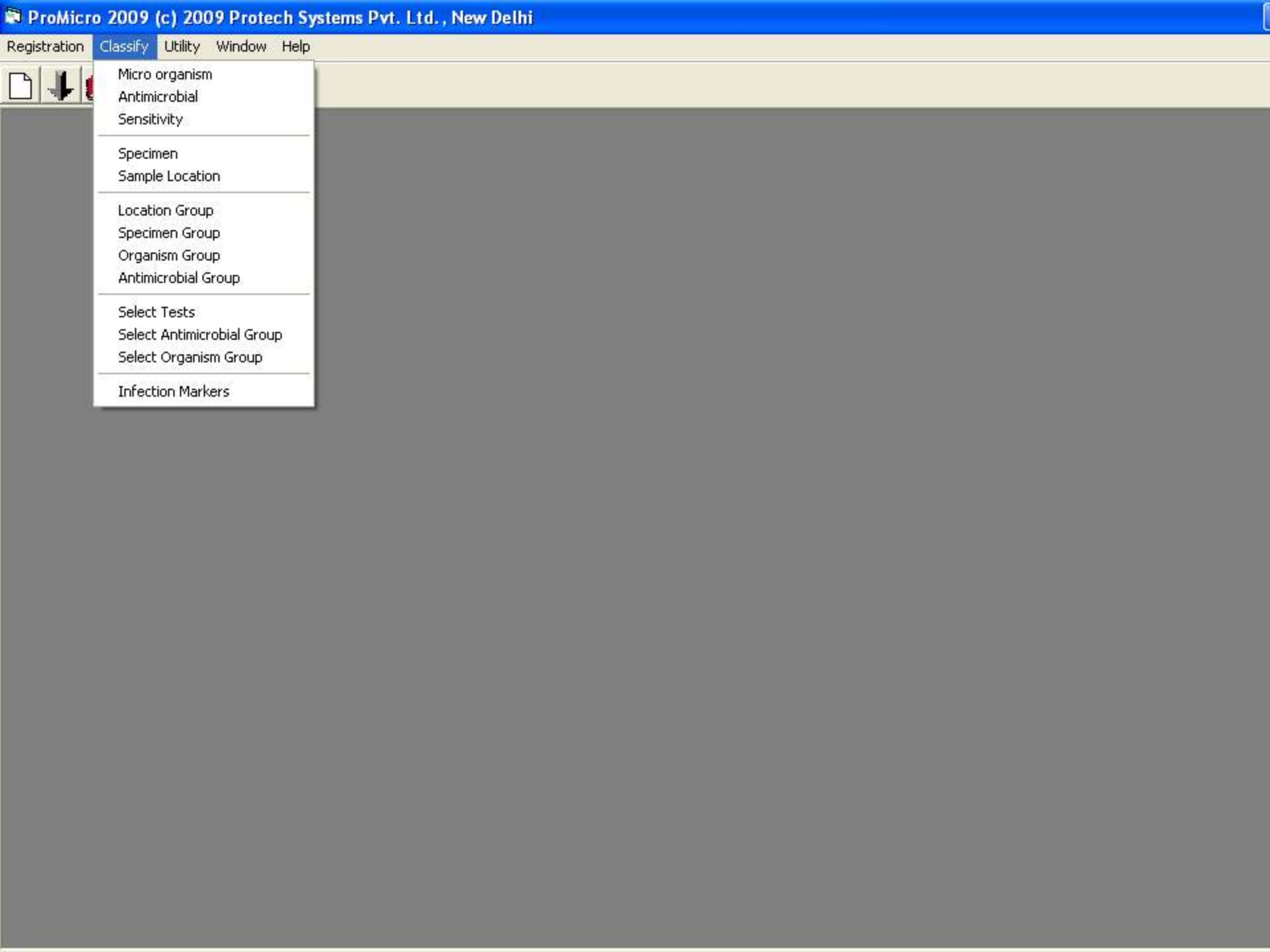
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Window
Help
Micro organism
Antimicrobial
Sensitivity
Specimen
Sample Location
Location Group
Specimen Group
Organism Group
Antimicrobial Group
Select Tests
Select Antimicrobial Group
Select Organism Group
Infection Markers

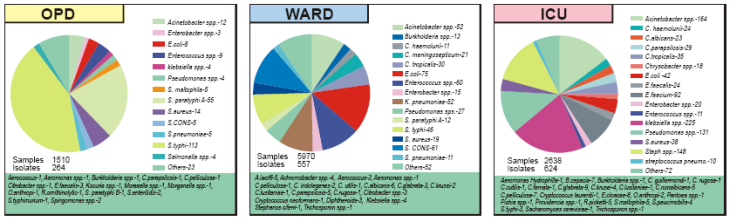
Distribution of Data

- Prescribers, Infection Control, pharmacists & microbiology personnel
- Format
  - Pocket guides
  - Laminated cards
  - Website – intranet / internet
  - Printed newsletters

CLSI M39-A2

SGRH ABG & USE-Newsletter

BLOOD January - December 2008



PERCENTAGE SENSITIVITY

OPD
WARD
ICU

GPC

	No. of Isolates	Penicillin	Ampicillin	Oxacillin	Ceftriaxone	Clindamycin	Levofloxacin	Gentamicin	Gentamicin 120	Vancomycin / Teicoplanin	Linezolid	Tigecycline
Staph aureus	14	7	-	100		78	-	100	-	100	100	100
	19	0	-	65	-	74	-	57	-	100	100	100
	38	0	-	57	-	50	-	44	-	100	100	100
Staph CNS	5		-	-	-	-	-	-	-	-	-	-
	61	0	-	5	-	21	-	34	-	100	100	-
	148	0	-	0	-	10	-	21	-	100	100	-
Enterococcus spp.	9		55	-	-	-	-	-	35	100	100	-
	60		47	-	-	-	-	-	25	90*	100	-
	127		42	-	-	-	-	-	16	90**	100	-
Strep. pneumoniae	5	100	-	100	100	-	100	-	-	100	100	-
	11	100	-	100	100	-	100	-	-	100	100	-
	10	80***	-	100	100	-	100	-	-	100	100	-

* 6 VRE **13 VRE (All VRE were E. faecium)
*** 2 isolates were MS to penicillin (MIC- 0.25-1mg/l), - Not Done

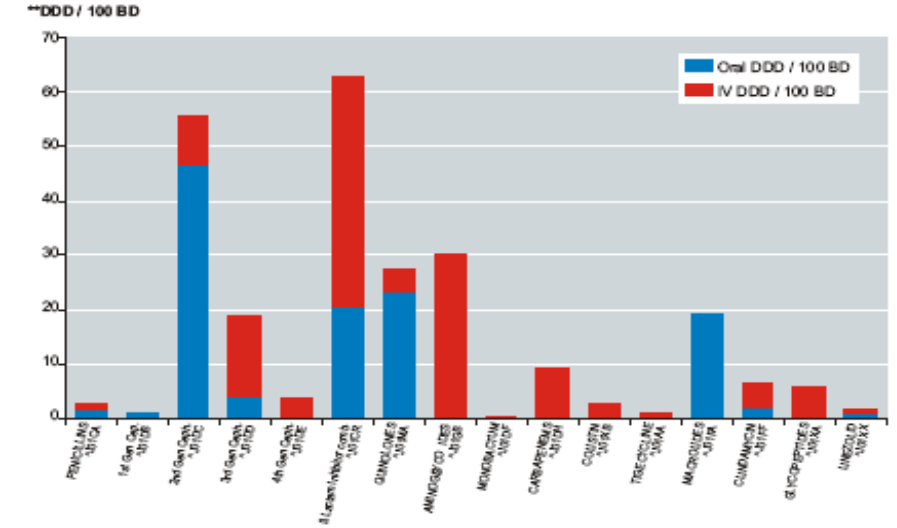
GNB

	No of isolates	Ampicillin	Ceftriaxone	Cefexime	Ceftazidime	Cefepime	Gentamicin	Amikacin	Nalidixic Acid	Ciprofloxacin	Levofloxacin	Co-trimoxazole	Chloramphenicol	Aztreonam	*Piperacillin + Tazobactam	*Cefoperazone + Sulbactam	Ertapenem	Imipenem / Meropenem	Tigecycline	Colistin
S.typhi	113	92	100	100	-	-	-	-	7	77	-	86	90	-	-	-	-	-	-	-
	46	88	100	100	-	-	-	-	8	81	-	72	87	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-
S.paratyphi A	55	96	100	100	-	-	-	-	0	100	-	98	100	-	-	-	-	-	-	-
	12	100	100	100	-	-	-	-	8	100	-	100	100	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. coli	8	12*	37	-	-	37	37*	87*	-	12	-	-	-	37	83	82	87*	100	100	-
	75	7	32	-	-	37	62	95	-	17	-	-	-	37	82	92	92	98	97	100*
	42	4	11	-	-	8	24	73	-	6	-	-	-	9	68	66	80	87	100	100
Klebsiella spp.	4	-	25*	-	-	20*	40*	50*	-	33*	-	-	-	20*	33*	50*	55*	60*	75*	-
	52	-	9	-	-	8	17	72	-	16	-	-	-	9	41	39	64	69	93	100
	225	-	4	-	-	5	11	42	-	8	-	-	-	4	18	22	39	49	80	100
Enterobacter spp.	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	15	-	33	-	-	33	38	85	-	13	-	-	-	45	68	63	80	95	-	100
	20	-	28	-	-	26	20	76	-	10	-	-	-	35	60	60	73	84	-	100
Pseudomonas spp.	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	27	-	-	-	58	59	33	38	-	30	-	-	-	15	68	54	-	61	-	92
	131				58	57	33	37		36			-	39	72	52		41		100
Acinetobacter spp.	12	54	75	-	67	75	75	75	-	54	-	100*	-	50	73	100	-	75	100	100
	52	4	20	-	37	44	52	52	-	39	-	100*	-	5	40	50	-	43	61	100
	164	1	0	-	8	2	14	24	-	11	-	12	-	2	11	28	-	20	30	100
Burkholderia spp.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
	13	-	-	-	100	-	-	-	-	-	90	84	-	-	-	-	-	8	-	-
	44	-	-	-	93	-	-	-	-	-	97	90	-	-	-	-	-	5	-	-

* < 5 isolates
ACCo in S. typhi: 14%
ESBL = 52.8%
Carbapenemase production - 17%
^Therapy of ESBLs with these agents can result in treatment failures - Not Done

*PRESCRIPTION AUDITING OF ANTIMICROBIALS

January - December 2009



*Based on the hospital pharmacy data of the antibiotic dispensed.
** DDD - Daily Defined Doses: Calculated as per the Anatomical Therapeutic Chemical (ATC) classification index; WHO Collaborating Centre for Drug Statistics Methodology, OSLO, Norway.
^ATC Codes.

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SHORT REPORT

Prescription auditing and antimicrobial resistance at a tertiary care hospital in New Delhi, India

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KEYWORDS
Antibiotic use;
Antimicrobial susceptibility

Summary This paper reports the antibiotic consumption data of Sir Ganga Ram Hospital, New Delhi and bacterial resistance over a seven-year period. Cephalosporins, penicillins and fluoroquinolones were the most widely prescribed antibiotics. A correlation was seen between *Escherichia coli* resistance to third-generation cephalosporins and increased cephalosporin use, as well as resistance to coamoxyclav and its use.
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Stratification of data

- **Location:**
- OPD, WARD, ICU

- **Specimen type**
- Blood, urine, respiratory tract, pus and fluids

- **Organism type**
- GPC
- GNB

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OUR JOURNEY WITH TOOLS FOR MONITORING AMR & USE

SGRH is publishing microbiology newsletter since: 1995

1998: Manual software (Foxpro)

Manual data entry, retrieval, calculations

> 2000 sheets of paper

> 1000 manhours

Chances of error in entry, retrieval and calculation

2008: Speedminer

Data entry and retrieval automated, manual calculation

Electronic data: No paper

50 manhours to compile the data

Manual calculations of data

Chances of error due to calculations

2010: SGRH Protech software –

No paper

0 manhours

Data entry and retrieval automated

No errors

Thank you