I. Sri Venkateswara Institute of Medical Sciences, Tirupati

Quality & Patient Safety

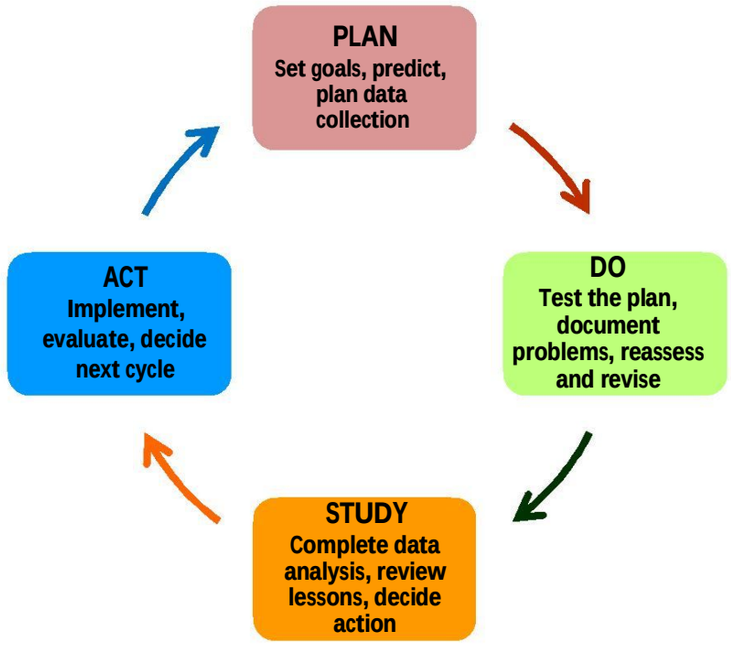
It is envisaged to **transform SVIMS into a "High Reliability Organization"** and **an "Accountable Health System".** Towards that path of transformation & global repute, the new Director / Vice Chancellor Dr. T.S.Ravikumar, on behalf of the institute, has laid out a road-map of value based health care. A major step towards this value proposition is emphasis on quality and patient safety as drivers of health system performance. To drive the performance, a programme of **SVIMS Quality Council (SQC)** is commissioned by the Director for iterative self improvement. Cataloguing, reporting, analysing and learning from errors has become the lynchpin for quality improvement in health care.

The **SQC** planning process resulted in the formation of nine focus groups and four core groups of workforce consisting of Doctors, Nurses, Administrators, Allied health staff and various other types of employees representing all segments of health system. The focus groups were formed to address: Emergency services, Never events, Medication safety, workforce/workplace safety, fire safety / disaster management, Radiation safety, Hospital Acquired Infections, Blood / injection safety and operating room / interventional areas safety. The four core groups will find sustainable solutions through **–** Root cause analysis of sentinel events, check lists / communications, accreditations and hospitality services.

Domains of SVIMS Quality Council

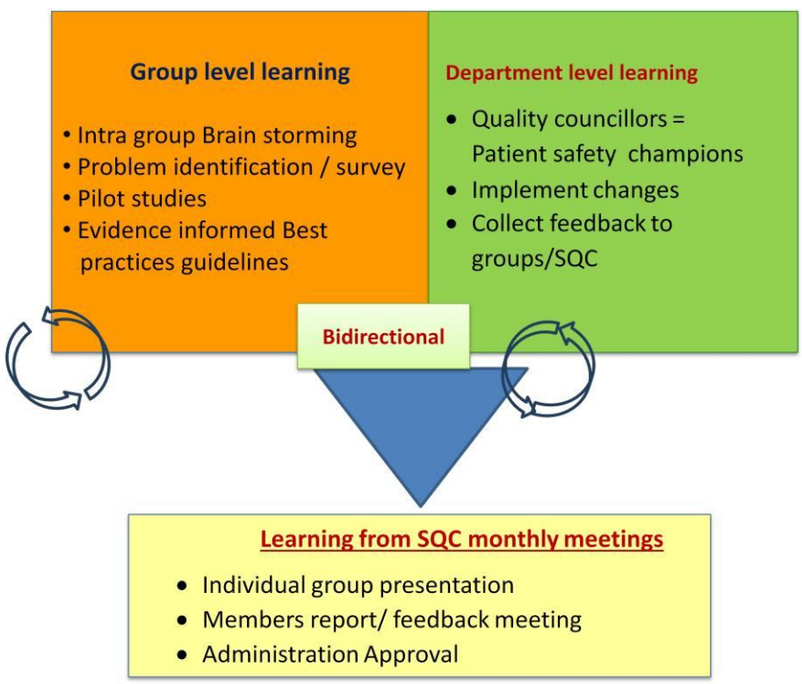
The groups will work, on monthly deliverables and share barriers / successes, so as to find culturally competent and substantively sound sustainable solutions. The ultimate goal is to deliver **"Right Care,** to the **Right Patient** by the **Right Teams** in the **Right Place** at the **Right Time**…. ***Every Time***".

PDSA Cycle for Quality Improvement



A modified PDSA (Plan, Do, Study, Act) cycle for quality improvement process will be followed, strengthened by Rapid Cycle, Bidirectional Learning from SQC monthly meetings. Tools of Trade and Analytics will be tailored to establish a robust process of attainable goals.

Rapid Cycle Learning



Tools of Trade

Tools of Trade	Analytics (Pre and Post intervention)
➢ Check lists, SOPs ➢ Rounding tool ➢ Structured hand offs ➢ Structured communication tools ➢ Real case studies/ Scenarios ➢ Simulation models ➢ Root cause analysis models	➢ Hospital patient safety survey ➢ Staff competence, knowledge and satisfaction questionnaires ➢ Mutual performance assessment ➢ Measurable patient related outcomes ➢ Patient and care taker's feedback forms

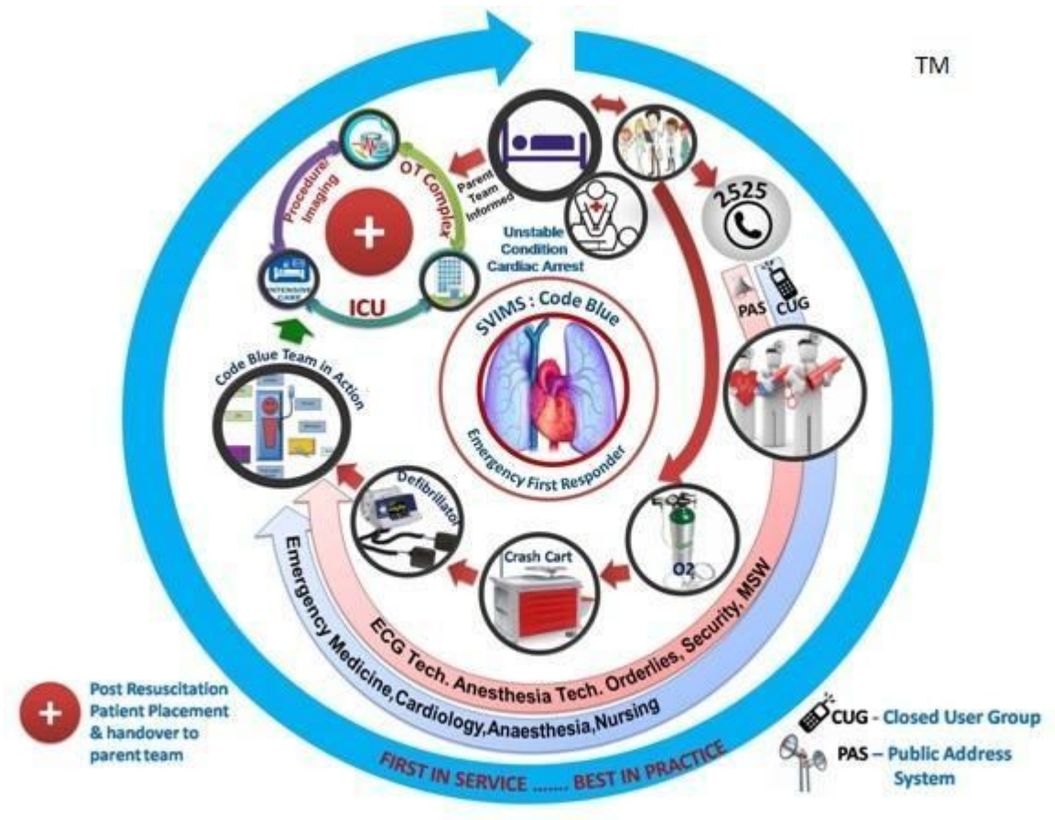
In addition to outlining its unique Quality & Patient Safety initiative through 'SQC', SVIMS takes a major step on June 12th 2016, coinciding with the visit of Hon'ble Health Minister, Dr. Kamineni Srinivas garu, in declaring its accountability & transparency in quality improvement and patient-centered care. SVIMS announces voluntary public reporting in four domains on 7/12/16 to start with, and reporting of many other areas will follow sequentially.

The four areas are:

1. Code Blue
2. Never Events
3. Healthcare Associated Infections
4. Biomedical Equipment List and Performance Report

1. CODE BLUE:

It is well recognized that preventable deaths occur in hospitals due to 'failure to rescue' a patient with deteriorating condition. When cardiopulmonary arrest or acute deterioration of condition occurs, appropriate resources need to be summoned to resuscitate & rescue the patient. This concept is codified in 'CODE BLUE'. Code blue teams are in existence for many years in health systems of developed countries, but need emphasis in India. Accordingly, under the leadership of SVIMS Director a working group was formed and CODE BLUE is launched in June to establish the process. It is formally unveiled on 12-7-2016 by the Hon'ble Health Minister.



Code Blue is a comprehensive process design for emergency responder team and response process to rescue patients and other personnel in the hospital premises. When the person sustains cardio pulmonary arrest or experiences sudden deterioration on physiologic condition it codifies the afferent limb of recruiting the necessary personnel and equipments and medicines as well as the efferent limb of the response and post – response management.

Code Blue has been evolved for integration of all the stakeholders i.e., Emergency physician, Cardiologist, Anaesthetist, Emergency Nurse, ICU physician, Orderly for transportation, Pharmacist, as well as Nurse Manager, security officer, Medico Social Worker and Telephone Operator while attending to an emergency situation. Necessary resuscitation medicines, gadgets, including defibrillator will be made available with alacrity. Resuscitation training is imparted to all first responders.

S.No	Department	Total Calls	Poor Prognosis	Survived	Death	Remarks
1	Cardiology ICCU	28	-	-	23	Repeat Calls-5
2	Ext.RT Ward	02	-	-	02	-
3	SICU	01	-	01	-	Stll on Bed-01
4	RT-I	02	-	-	01	Repeat Call-01
5	MICU	05	-	01	04	Still On Bed-01
6	ANCU	03	-	-	03	-
7	Pranadanam Ward	02	-	01	-	Repeat Call-01 Discharge-01
8	Surgical Oncology Ward	01	-	01	-	Discharge-01
9	Emergency Medicine	02	-	-	02	-
10	Nephro Plus	01	-	-	01	-

Code Blue may be initiated from any in patient or out patient service areas of the hospital by dialing 2525 in the intercom. The 2525 call is only for code blue to mobilize emergency responder team and not for other calls.

The process and outcomes will be monitored regularly for iterative improvement.

CODE BLUE CALL LIST FOR THE MONTH OF APRIL'2017

S.No	Department	Total Calls	Poor Prognosis	Survived	Death	Remarks
1	Neurology	03		01	02	Discharged on 28.03.2017.
2	Cardiology ICCU	19		01	18	Still on bed. Repeat call -01.
3	MICU	03			03	
4	Nephrology-II	01	-	01	-	Alive Discharge.
5	EMD	01			01	
6	Radiology Dept. CT Scan	02		01	01	Alive Discharge.
7	SICU	01			01	
8	RT-I	01			01	
9	Nephroplus	01		01		Alive Discharge.
10	Medical Oncology	01			01	
11	Ext.RT	01			01	
12	SORR	01			01	
13	Neurosurgery	01		01		LAMA

TOTAL CALLS - 47
Poor Prognosis - 00
Survived - 04
Still on Bed - 02
Discharge - 02
Death - 36
Repeat Calls - 07

47

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2. NEVER EVENTS

First introduced in 2001, the term 'Never Events' refers to shocking, egregious, unambiguous and measurable **events that should never occur in healthcare**. During the last 15 years, a list of such highly serious adverse events have been catalogued in many countries. These events result in death or significant disability and are preventable. SVIMS has started measuring each of these 'Never Events' and has put in place safety parameters to mitigate any harm with the goal to eliminate them. Thus, SVIMS become the First Health Care System in India, to voluntarily report safety record, towards continuous quality improvement. Never Events indicate fundamental safety problems within an organization or system. They are grouped into 7 categories SVIMS will choose one from each of these groupings as outlined above & will methodically put in place safety measures to eliminate them:

i) Care Management Events - - - Stage ¾ Decubitus ulcer during hospital
ii) Administration of drug or biological - - - Mismatched Blood Transfusion with serious harm.
iii) Radiological Events - - - Metallic object in MRI suite causing injury
iv) Environmental Events - - - Falls in hospital premises with serious injury
v) Procedure Events - - - Wrong site/wrong patient procedure
vi) Device Events - - - Foreign object unintentionally left inside body during surgery
vii) Patient Protection Events - - - Misidentification or missing baby

On 12-07-2016, Hon'ble Health Minister, Dr. Kamineni Srinivas garu unveiled SVIMS Website reporting of **one such never event, namely stage 3 / 4 Decubitus Ulcer.**On 9-12-2016, to coincide with **"World Patient Safety Day'** , Director-cum-Vc of SVIMS Dr.T.S.Ravi Kumar unveiled ('go live') the full spectrum of Seven Never Events listed, under the banner **'Serious Seven'**

i)Decubitus Ulcer - stage 3 / 4

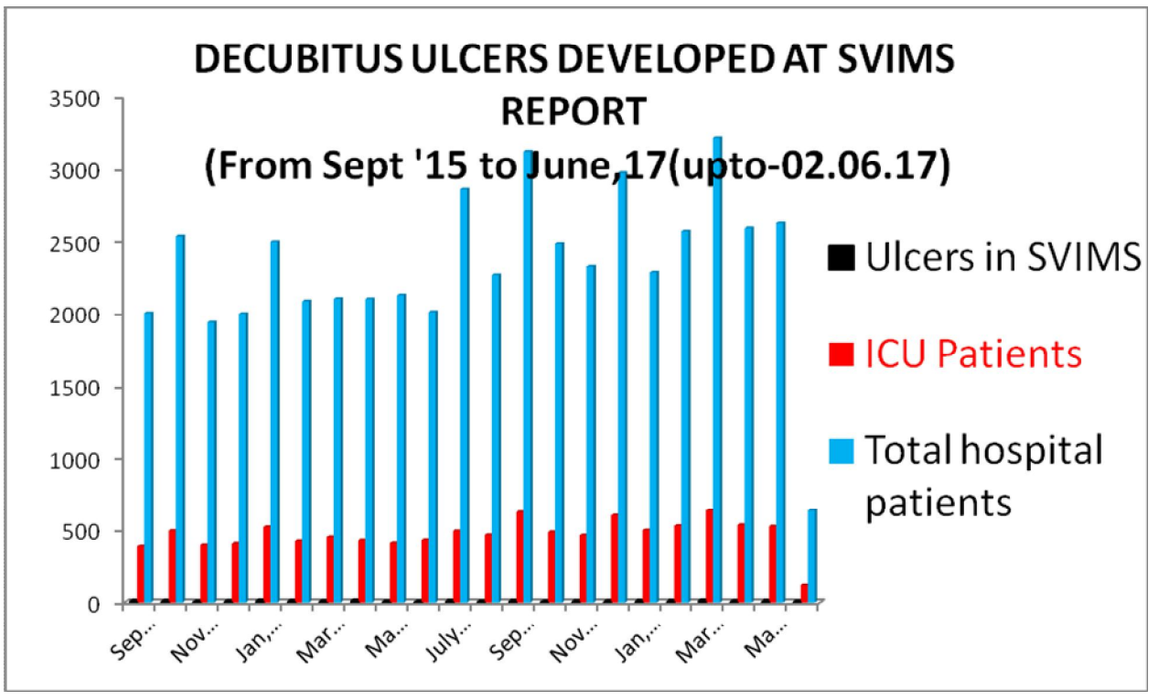
Decubitus Ulcer is also known as Pressure sore/bed sore. Since the monitoring started in September 2015 after the arrival of the new Director and **during the period Sep 2015 to June 2017, no stage 3 / 4 Decubitus Ulcer has developed in any patient as a result of stay at SVIMS.**

Even though only stage 3 and 4 Decubitus Ulcer are considered as never events, at SVIMS nursing section has started following all patients for the identification and corrective measures for stage 1 and stage 2 Decubitus Ulcer in order to prevent them progressing to stage 3 or 4. Only stage 1 ulcers have been documented during this time period.

DECUBITUS ULCERS REPORT STAGE 1 (Sept'15 TO June'17)

Month	Ulcers Developed at			Inpatients	
	SVIMS	Out side	Total	ICU Total	Hospital Total
Sept,15	5	13	18	388	2002
Oct,15	5	2	7	495	2539
Nov,15	1	0	1	397	1937
Dec,15	4	7	11	408	1999
Jan,16	9	9	18	521	2496
Feb,16	5	8	13	425	2085
Mar,16	3	3	6	451	2102
Apr,16	9	5	14	430	2100
May,16	2	7	9	410	2126
June ,16	1	6	7	431	2010
July,16	6	8	14	493	2860
August,16	2	4	6	466	2271
Sept,16	6	8	14	623	3121
Oct, 16	1	5	6	485	2484
Nov,16	4	8	12	464	2329
Dec,16	3	11	14	601	2973
Jan, 17	6	14	20	499	2288
Feb, 17	5	8	13	529	2573
Mar,17	6	8	14	634	3215
Apr,17	3	6	9	535	2594
May,17	5	6	11	525	2628
June,17(02.06.17	2	2	4	124	634
Total	93	148	241	10334	51366
%	0.18	0.28	0.46	20.11	

Note : Total Hospital Census : 51366. Among ICU patients 10334, i.e 20.11% hospital patients residing in ICUs. Among Decubitis ulcers 0. 18% developed in SVIMS , 0.28 patients admitted with bed sores from outside hospitals. Among No stage 3-4 patients identified.
For this month first week statistics only.



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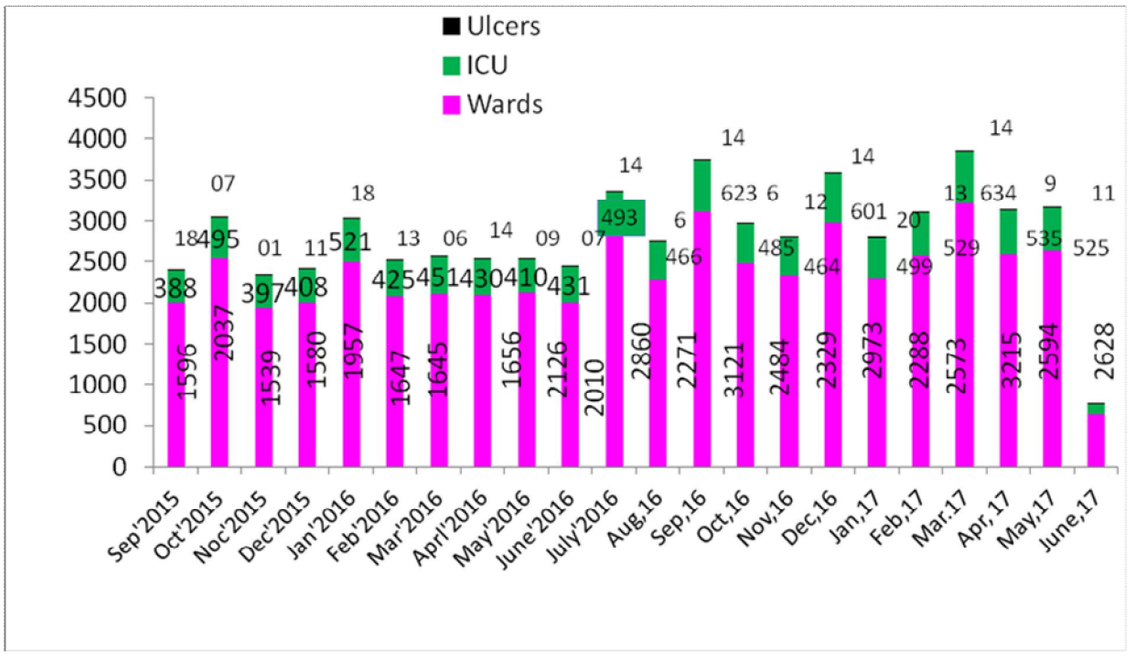
DECUBITUS ULCERS DEVELOPED AT SVIMS and FROM OUTSIDE HOSPITALS REPORT

(From Sept '15 to June,17(upto 02.06.17)



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For this month first week statistics only.

ii)Mismatched Blood Transfusions causing serious harm

Protocol for Prevention of Mismatched Blood Transfusion

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1. SCOPE & APPLICATION

Never events are serious medical errors or adverse events that should never happen to a patient. Consequences include both patient harm and increased cost to the institution. Technicians and nurses provide a critical role in preventing never events through risk anticipation and adoption of evidence-based practice. Mismatched blood transfusion is one of the never events which should never happen in a hospital

2. RESPONSIBILITY

- Staff nurse in donor section to correctly label the blood bag.
- The technician on duty in Red Cell Laboratory to correctly receive the blood sample and to issue the blood for which requisition is received.
- The staff concerned in the ward/OT to correctly label the sample and to transfuse the blood unit.

3. REFERENCE

- Technical Manual, Directorate General for Health Services-2nd edition
- Model standard operating procedures for blood transfusion services, WHO
- NACO guidelines 2015

4. PROTOCOL

Checks at the donor blood collection section

- Each donor will be given a unique number and once his blood is collected, it is identified by that number only.
- Verify the donor's identity by tallying with the name on the donor card and the donor number.
- Write the segment number of the blood bag on to the donor card as a second check.
- Cross check the numbers on the bag, pilot tubes and donor card to ensure identity. Record the entry in the donor registers using the same number.

Checks while doing blood grouping and typing:

- One technician should do forward grouping from the segment of the blood bag by correlating the segment number and unique donor number with that entered in the donor card. Enter the results in the donor unit and in the donor cell grouping register.
- Another technician should do reverse grouping from the pilot tubes collected, by identifying the unique donor number. Enter the result in the serum grouping register. Both the forward and reverse grouping result should correlate each other

Checks at the component storage section

- All untested units should be kept in the unscreened Refrigerator/agitator.
- After testing is over, release the fully tested. Write clearly the unit number, date of collection and expiry and the volume on each colour coded label as per the grouping register records.
- After the bags are labelled, ask a second technician to double check the number and group on the bags tallying them with the records.

Checks in the cross matching section:

- Receive the requisition form along with the patient's blood sample. Check for patient's identity. Name of the patient, UHID number, age and sex should correlate with the blood sample and requisition form. Check the blood group with that of the blood group entered in the request. If there is any discrepancy, check the blood group of the received blood sample. If it correlates with the hospital information system, then ask the concerned ward staff to change in the request before proceeding with the crossmatching.
- If there is no discrepancy between the HIS and the blood group in the request, proceed with the blood grouping of the patient with the currently received sample
- If there is no discrepancy then proceed with the crossmatching. If still discrepancy persists, then the old blood sample might be a wrong sample. Trace back the old details and investigate where the fault is.

- Carry out compatibility testing using departmental SOP. In order to avoid outdating, implement FIFO policy
- The technician who is issuing blood should make entries in the crosmatching form with counter sign from the medical officer.
- Make entries in the issue register and in the request.
- The receiving person should check the blood unit and the crossmatching report from for any discrepancy

Checks at the ward/OT:

- Before administering blood component, FINAL IDENTITY -check of the patient, blood unit compatibility tag and the complete documentation should be done.
- Ask the patient, if conscious, to identify himself/ herself by name, spouse name, age or any other identification.
- If unconscious, ask relatives or any other staff to verify the patient's identity.
- Check that details on the compatibility tag exactly match with the documentation.
- Check the blood unit for any leakage and for any visible discoloration & expiry date
- Two different persons should do the check for patient's identity and the same should be documented.

5. DOCUMENTATION

- Make necessary entries in donor register, grouping register, crossmatching register, issue register, incident report register, critical value reporting register, crossmatching form, case file.

STATISTICS OF WHOLE BLOOD/BLOOD COMPONENTS ISSUES AND NEVER EVENTS

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Sl.No.	Year	Total No. of Whole Blood/ Blood Components Issued	Never events Record
1.	2014	18,062	Nil
2.	2015	17,109	Nil
3.	2016 (30.11.2016)	16,696	Nil

iii)Metallic Object in MRI Suite causing injury

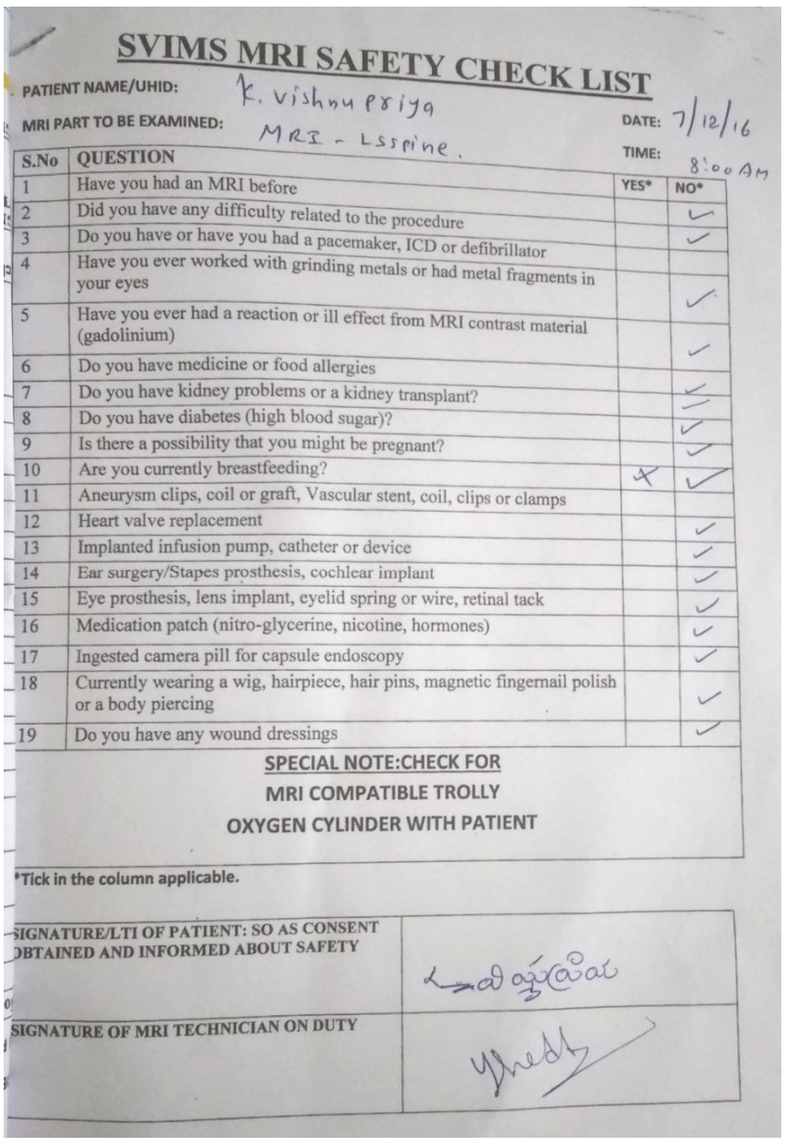
MRI SAFETY REPORT

The last unexpected event in MRI occurred on 10th January 2015 at 2.30 PM where in Oxygen cylinder was pulled in the magnet. However **no patient / personnel injury** or hardware loss was suffered.

To totally avoid such situation in future following steps are being followed :-

1. Oxygen lines are made available in preparation area
2. Screening at inlet for oxygen cylinders is being done
3. Maintenance of routine duly signed MRI safety check list for all the patients is being done

Since from that time no such incident has occurred in our department.



SVIMS MRI SAFETY CHECK LIST

PATIENT NAME/UHID: K. vishnu priya

MRI PART TO BE EXAMINED: MRI - LS spine.

DATE: 7/12/16

TIME: 8:00 AM

S.No	QUESTION	YES*	NO*
1	Have you had an MRI before		✓
2	Did you have any difficulty related to the procedure		✓
3	Do you have or have you had a pacemaker, ICD or defibrillator		
4	Have you ever worked with grinding metals or had metal fragments in your eyes		✓
5	Have you ever had a reaction or ill effect from MRI contrast material (gadolinium)		✓
6	Do you have medicine or food allergies		✓
7	Do you have kidney problems or a kidney transplant?		✓
8	Do you have diabetes (high blood sugar)?		✓
9	Is there a possibility that you might be pregnant?		✓
10	Are you currently breastfeeding?	X	✓
11	Aneurysm clips, coil or graft, Vascular stent, coil, clips or clamps		
12	Heart valve replacement		✓
13	Implanted infusion pump, catheter or device		✓
14	Ear surgery/Stapes prosthesis, cochlear implant		✓
15	Eye prosthesis, lens implant, eyelid spring or wire, retinal tack		✓
16	Medication patch (nitro-glycerine, nicotine, hormones)		✓
17	Ingested camera pill for capsule endoscopy		✓
18	Currently wearing a wig, hairpiece, hair pins, magnetic fingernail polish or a body piercing		✓
19	Do you have any wound dressings		✓

SPECIAL NOTE:CHECK FOR
MRI COMPATIBLE TROLLY
OXYGEN CYLINDER WITH PATIENT

*Tick in the column applicable.

SIGNATURE/LTI OF PATIENT: SO AS CONSENT OBTAINED AND INFORMED ABOUT SAFETY	
SIGNATURE OF MRI TECHNICIAN ON DUTY	

sample checklist

iv)FALLS IN HOSPITAL PREMISES CAUSING SERIOUS INJURY

FALL HUDDLE REPORT ON (9/11/15 TO 31/03/17)

S/No	Name of the Resident	Injury after fall	Diagnosis	Date of fall	Time	Root Cause of fall	Treatment & status at discharge
1	Patient attender	Patella transverse #	Not Applicable	November,19 TH,2015	7.30PM	- Rain water stagnation &pt not taken diet more than 10 hrs	T.Dolo 650, Ranctac, Physiotheraphy & shifted to BIRRD OT
2	Staff Nurse	Patella swelling and back pain	N.A	December, 10TH 2015	1.15PM	Due to water stagnation	Strict bedrest 14 days, Volini gel, myospase
3	Fessy worker	Fracture ulnar bone ,	N.A	January, 19TH 2016	5.30PM	Slip from trolley while cleaning Roof	POP applied, Immobilisation of hand,voveran, Rantac, myospase
4	Patient Attender	Head injury	N.A	January, 17TH 2016	12.30AM	Giddiness due to not taken diet	Inj –Rantac, Inj-Diclofenac- 1 Taxim given
5	Patient Attender	Injury over chin 3x2 cms	N.A	March, 8TH 2016	3.45PM	Phobia regarding hospital instruments	Suturings done, minor dressing,voveron, antacids
6	Patient	Left humerus #	HTN	March, 22, 2016	7 AM	Hypertension sudden giddiness	POP applied & shifted to BIRRD
7	Patient	Injury over Rt.eyebrow	Metabolic Encepahalopathy	April, 26TH 2016	11.45AM	Hypertension sudden giddiness	Suturings done, minor dressing,voveron, antacids
8	Patient	Rt.parietal region injury	Meningoma	May, 4TH 2016	5.30PM	Giddiness,reoccurence history of fall	Suturings done, minor dressing,voveron, antacids
9	Patient	Fracture Rt.femur	Dcmp with AFwith FVR	May, 28TH 2016	10.30pm	Giddiness, vomitings	Skin traction, bird consultation sent plan for sub trachetic extension
10	Patient	Mild back pain	CKD,HTNon MHD	May, 29TH 2016	12;45pm	Dizziness	Tab;ultracet;local application of diclo gel
11	Patient	Injury over Lt.fore head	Right occipital infract in parietal region	June, 9TH 2016	4.am	Sudden loss of muscle control,parathesia	Suturings done, minor dressing,voveron, antacids
12	Patient	Fracture Left femur	Rt.Lung consolidation	July, 10TH 2016	7.30am	Obstructed dhothi of patient leeds fall	Skin traction with 3 kgs of weight
13	Patient	OP-Endo Giddiness	RVD with thyroid nodule& dysp	July, 01ST ,2016	12.00pm	Sitting on chair	1 point DNS IV Fluid given, Foot elevation.
14	Patient Attender	Fracture at Lt.elbow ulnar region	-	August, 20TH , 2016	12.30pm	Slip while walk	Pop applied on left elbow, Tab. Aceclopara, Tab.Rantac, Tab.Chymoralforte
15	Patient	Injury Occipital region		August, 29TH , 2016	10.30am	Slip	Tab. Cefixime 200mg Tab. Aceclopara
16	Student	Fracture medical condyle of Lt.humerus	-	September19 TH , 2016	2.30pm	Slipped leg	Pop applied Tab. Dolpal Tab. Chymoral forte
17	Staff	Fractured Rt.prosthetic femur	-	September26, 2016	9.30am	Slip	Plan for LCLCP plate fixation.
18	Patient attender	Lt.Distal radial and ulna fracture	-	November 5th2016	6:20 Am	Power earthling	Inj . Taxim 1g Tab .calpol BD Tab. Chymoral forte BD Tab. Ecosprin 75 mg
19	Patient	Bilateral fracture calcaneum D2-L2 spondylosis of both posterior calcaneum	Post of MVR	November09th 2016.	8.30pm	Disoriented, Anxiety	Pop slab applied in both feet, suturing done at parietal region. Psychiatric consultation done.
20	In December month there is no falls reported.						
21	In January, 2017 month there is no falls reported.						
22	In February, 2017 month there is no falls reported.						
23	Patient	Rt. temporal bone fracture & laceration over lower lip.	CKD with diabetic nephropathy, HTN, Hbs Ag+ve	March, 11th, 2017.	6.30am	Wet floor.	1.Inj.Pan.40mg IV given. 2.Tab.Chymoral forte BD. 3.Tab.Ultracet SOS. 4.Tab.Augmentin 625mg BD. 5.Neurosurgery consultation done and advised dressing.
24	In April, 2017 month there is no falls reported.						

Total fall's report

Patient attenders : 05
Patients :11
Staff : 03
Student : 01
Total 20

Note : S.no : 9 patient expired on 02.06.16 due to disease

Corrective Action :

1. Side rails fixed to all trolleys in EMD and decided to be procured side rails Trolleys in future.
2. Fixed support handles in all toilets.
3. Fixed support handles to Ramps.
4. For construction of new bathrooms/toilets anti-skid tiles arranged.
5. Arranged caution boards while mopping the floors.
6. Planning to Education programmes regarding to prevent fall huddle.

v)Procedure Events & vi)Device Events

In order to prevent wrong site/wrong patient procedure , SVIMS has begun implementation of WHO surgical checklist in all procedure areas. Members of SVIMS quality council (SQC) group assigned this task, will monitor & report data monthly.

Department of Anaesthesiology and Critical care Sri Venkateswara Institute of Medical Sciences University	**WHO SURGICAL SAFETY CHECK LIST**

Hand over S/N Ward---------- Date----- Time--------	**Take over S/N OT---------- Date-------- Time ------**	**Hand over S/N/Anaesth Tech. RR---------- Date----------Time----------**

BEFORE INDUCTION OF ANAESTHESIA (SIGN IN)								
Patient has confirmed	**Yes**	**No**	**Relevant Lab result**	**Yes**	**No**	**Anaesthesia safety check list**	**Yes**	**No**
Identity			ECG/ECHO/Angio			Known allergy		
Site marked/Not applicable			CXR/CT/MRI			Airway/Aspiration risk		
Consent obtained			Biochemistry			If, yes assistance/equipment available		
Procedure			Haematology			Risk of > 0.5L(>7mL/kg in children) blood loss		
Part preparation done			Microbiology			If, yes IV access and fluid planned		
Denture/Jewellery/contact lenses removed			Xylocaine/Antibiotic test dose given and encircled					
Double hair bun prepared for females			DVT Prophylaxis					
NPO status(write no of hours)			Patient warming system/Need for active warming					
Blood group and cross matching done			Blood and blood product availability					

BEFORE SKIN INCISION (TIME OUT)				
Entire surgical team confirms	**Yes**	**No**	**Surgeon shares**	**Nursing /Anaesthesia technician reviews**
Patient's name			Critical/Unexpected step	Sterility, including indicator results
Surgical procedure to be performed			Expected duration	Equipment Issues
Surgical site			Expected blood loss	Working suction
Essential imaging available			**Anaesthesiologist shares**	Baby tray/Crash cart
Antibiotic prophylaxis within the last 60 minutes			Anaesthesia plan	Catheter/Tube/Lines
Antibiotic re-dosing plan			Patient specific concerns	Other concerns

BEFORE PATIENT LEAVES OPERATING ROOM (SIGN OUT)			
Nurse reviews with Team	**Yes**	**No**	Equipment problems that need to be addressed.
Instrument, sponge and needle counts are correct			Entire team discusses concerns for patient recovery and management
Specimen labelling			
Name of the procedure recorded			

vii)Patient Protection Events

Measures taken in SPMC Hospital to prevent baby abduction

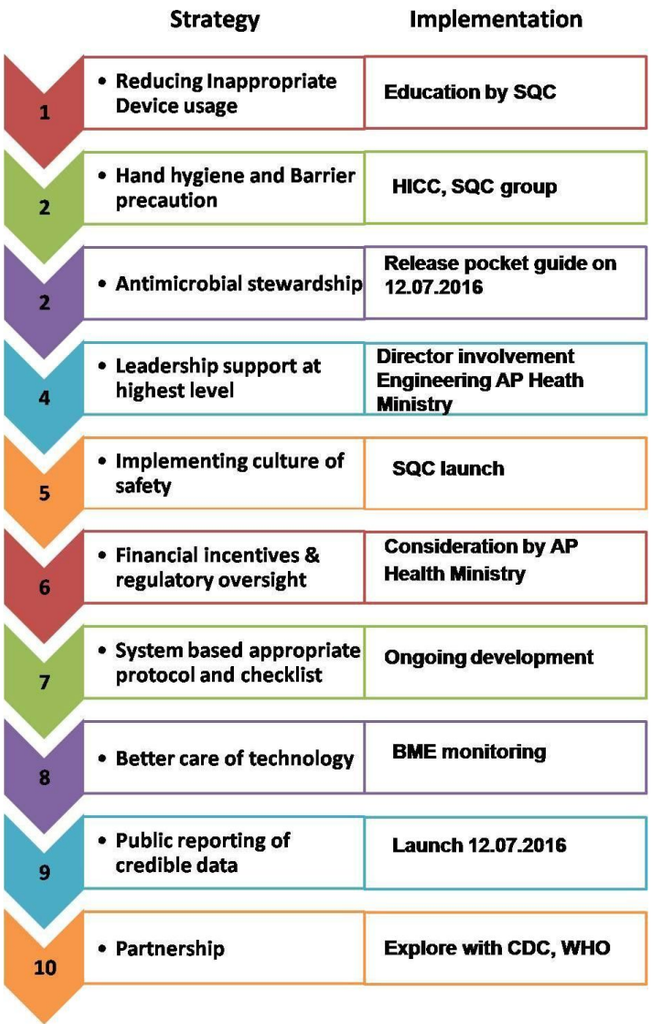
- Standard Operating Procedures have been developed for security& ward staff in order to prevent baby abduction .
- ID tags tied to the wrist of the mother and baby Immediately after delivery.
- Foot prints of the baby taken in the Case sheet/File immediately after delivery in the case sheet along with signature of responsible patient attender.
- Transfer out/discharge forms developed to transfer the baby with in hospital (Intra hospital) and outside hospital (Inter hospital), also for normal discharge.
- Baby will not be allowed to move outside of the ward without proper transfer out/discharge form and also without responsible attendant along with hospital staff.
- At the time of transfer out/discharge of the baby from the post natal ward/NICU the duty nurse along with doctor on duty and baby mother will sign on the transfer out/discharge slip which will be checked by security at Post natal ward & main entrance along with baby ID tag.
- Security guards at the Post natal ward and main entrance will record the details of the baby along with attendant details at the time of transfer out/discharge.
- CC Camera's were fixed at the entrance of the Post natal ward and at main entrance.

3. HEALTHCARE ASSOCIATED INFECTIONS (HAI)

Between 5% and 10% of patients admitted to hospitals acquire one or more infections, based on reporting data largely from developed countries. In the USA, it is reported that 1 out of every 136 hospital patients becomes seriously ill as a result of acquiring an infection in the hospital. It is estimated that in developing countries (including India) the risk of Healthcare Associated Infections (HAI) is 2 to 20 times higher than in developed countries. In India, indiscriminate use of antibiotics both in community settings and in hospital settings contributes to development of antibiotic resistance. Further there is need for robust reporting of reporting of HAI in India. This 'double-edged-sword' of indiscriminate antibiotic use and lack of reporting of healthcare associated infections needs to be addressed. The Director-cum-Vice Chancellor of SVIMS Dr. T.S.Ravikumar announced that SVIMS is taking a step forward to contribute in containing HAI in India. Adapting international guidelines (eg WHO, CDC) SVIMS is invoking a ten pronged strategy. One key component is 'Antimicrobial Stewardship', which aims to optimize antibiotic use among patients in order to reduce antibiotic resistance, improve patient outcomes and safety and ensure cost effective therapy. Hon'ble Health Minister of Andhra Pradesh, Dr. Kamineni Srinivas garu will release the first edition of

"SVIMS Antimicrobial Stewardship pocket guide" on 12.07.2016. This will be revised 6 monthly and new editions will be released every January and July to inform all health care personnel (doctors, nurses, and allied health staff) of pathogen surveillance, antimicrobial use, infection control measures and outcomes. This programme is jointly monitored by Hospital Infection Control Committee and SVIMS Quality Council.

Healthcare Associated Infections (HAI): SVIMS Ten Pronged Strategy



SQC = SVIMS Quality Council
HICC = Hospital Infection Control Committee
BME = Biomedical Engineering
CDC = Center for Disease Control
WHO = World Health Organization

SVIMS
Antimicrobial Stewardship Pocket Guide
January 2017

2nd Edition

Editors

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Message from Health Minister

It is very timely that Sri Venkateswara Institute of Medical sciences is making strides in controlling Health Care Associated Infections and innovating Antimicrobial Stewardship. Congratulations to the institute and I am proud that my Government will be at the forefront of tackling this emerging healthcare menace of misuse / overuse of antibiotics and drug resistance.

Dr. Kamineni Srinivas garu
Hon'ble Minister for Health Medical and Family Welfare
Govt., of Andhra Pradesh

Preface

Healthcare Associated Infections (HAI)

Among patients admitted to hospitals 5%-10% acquire one or more infections, based on reporting data largely from developed countries. It is estimated that in developing countries the risk of HAI is 2 to 20 times higher than in developed countries. In India, indiscriminate use of antibiotics both in community settings and in hospital settings contributes to development of antibiotic resistance. Further there is need for robust reporting of HAI in India. The Director-cum-Vice Chancellor of SVIMS Dr. T.S.Ravikumar announced that SVIMS is taking a step forward to contribute in containing HAI in India. Adapting international guidelines (e.g. WHO, CDC), SVIMS is invoking a ten pronged strategy. One key component is 'Antimicrobial Stewardship', which aims to optimize antibiotic use among patients in order to reduce antibiotic resistance, improve patient outcomes and safety and ensure cost effective therapy. This pocket guide of SVIMS Antimicrobial Stewardship (fist Edition) is released on 12-7-2016 by Hon'ble Health Minister of Andhra Pradesh, Dr. Kamineni Srinivas garu. This will be revised 6 monthly and new editions will be released every January and July to inform all health care personnel (doctors, nurses, and allied health staff) of pathogen surveillance, antimicrobial use, infection control measures and outcomes. This programme is jointly monitored by Hospital Infection Control Committee and SVIMS Quality Council.

Dr. T.S.Ravikumar
Director cum Vice Chancellor

From the desk of editors……..

Greetings from Infection Control team,

- Antimicrobial resistance (AMR) results in increased morbidity, mortality, and costs of health care.
- Prevention of the emergence of resistance and the dissemination of resistant microorganisms will reduce these adverse effects and their attendant costs.
- In SVIMS, 74% of Multidrug Resistance (MDR) is contributed by *Acinetobacter.baumanii* followed by *Enterobacter* (60%), *Citrobacter* (54%), *Klebsiella* (43%) and *Escherichia. coli* (31%).
- Most predominant pathogen in ICU's is *Acinetobacter.baumanii.*
- *Acinetobacter.baumanii & Enterobacter* are attributable for 67% of infection in wards.
- In our hospital percentage of MRSA was 10%, VRE was 1% and VRSA isolates were nil.
- We therefore urge everyone to restrict our use of antimicrobial agents.

R. Jayaprada
Infection Control Officer
Hospital Infection Control Committee

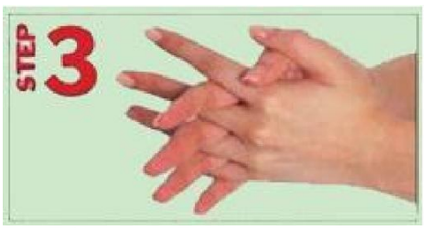
T.S.Ravikumar
Director cum Vice Chancellor

INDEX

1. Hand Hygiene (Seven steps of hand washing)

Rub palms together

Rub the back of both hands.



Interlace fingers and rub hands together.

Interlock fingers and rub the back fingers of both hands

Rub thumb in a rotating manner followed by the area between index finger and thumb for both hands.

Rub fingertips on palm for both hands.

(Credit :CDC)

Rub both wrists in a rotating manner. Rinse and dry thoroughly

Specific antiseptics recommended for hand antisepsis:

- 1.2%-4% chlorhexidine / 2.5-7.5% povidone iodine/ 3.1% triclosan or 70% alcoholic hand rubs.

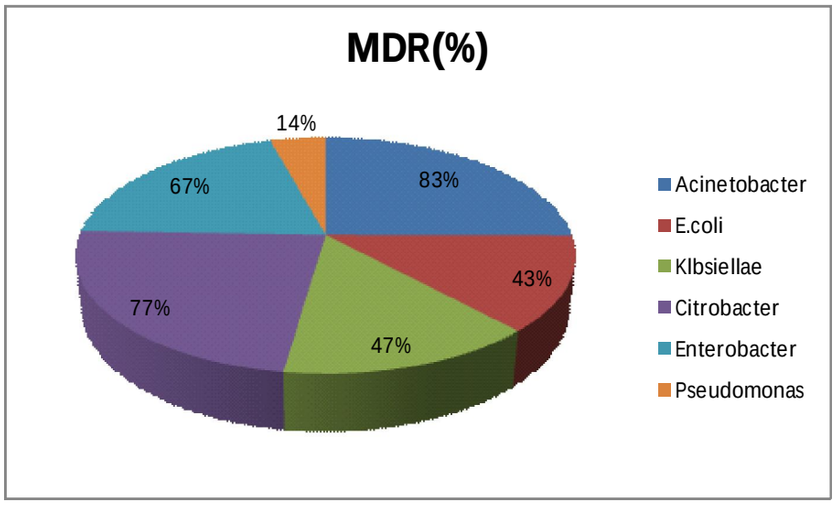
  Alcohol hand rubs are appropriate for rapid hand decontamination between patient contacts. (15-30secs)

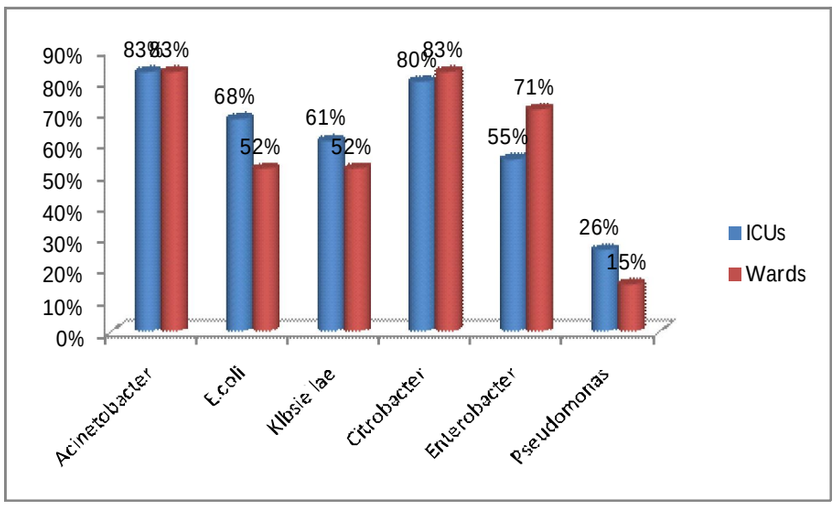
2. Hand Hygiene Compliance

	Doctors	Nursing Staff	Ward Boys
Hand hygiene patient contact	Jan:71% Feb: 84% Mar :84% Apr: 88% May:81% June: 87%	Jan: 64% Feb: 77% Mar:75% Apr:82% May:77% June: 75%	Jan:57% Feb:73% Mar: 68% Apr: 77% May: 68% June: 69%
Hand hygiene using gloves	100	100	100
Average	Jan: 85.5% Feb: 92% Mar: 92% Apr: 94% May:90% June: 93%	Jan: 82% Feb:88% Mar:87% Apr :91% May:88% June:87%	Jan:78.5% Feb: 86% Mar:84% Apr:88% May:84% June 84%

- **Overall Compliance for Patient Contact : 77%**
- **Overall Compliance for Gloves Use : 100%**
- **Average**
- **: 88%**

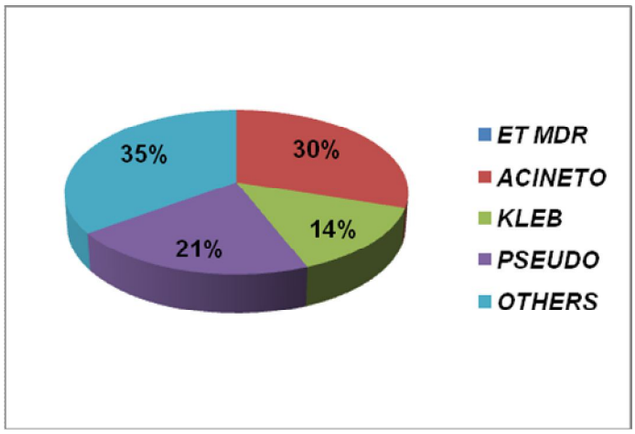
- In SVIMS, 83 % Multi Drug Resistance (MDR) is contributed by *Acinetobacter* species followed by *Citrobacter* spp (80%), *E.coli* (68%), *Klebsiella* spp (61%) *Enterobacter* (55%).
- Most predominant pathogen in ICUs is *Acinetobacter baumanii.*
- *Acinetobacter baumanii*, *E.coli* and *Klebsiella spp* were attributable for 53% infection in wards.
- In our hospital percentage of MRSA was 20%, VRE was 4% and VRSA isolates were nil.



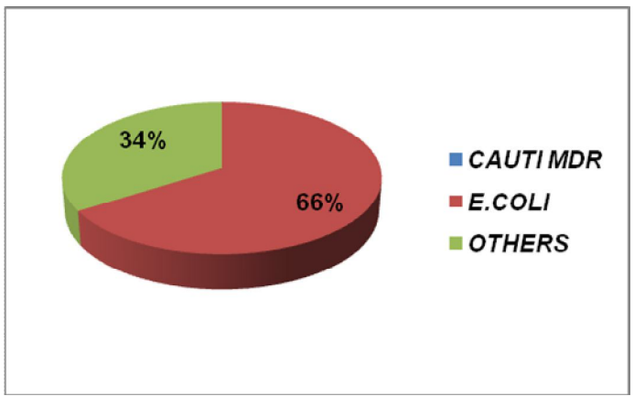


- Most common gram negative bacteria isolated from various departments were *Acinetobacter baumanii*, *E.coli*, *Klebsiella spp*, *Pseudomonas aeruginosa*, *Enterobacter spp* and *Citrobacter* species.
- Most of the isolates were resistant to resistant to Ampicillin, Amoxyclav, Ciprofloxacin, Cefotaxime and Cotrimaxazole. Most of the isolates were sensitive to Cefaperazone sulbactum, Imipenem, Amikacin, Gentamicin and Piperacillin+tazobactum.
- Most common gram positive organisms isolated from various departments were Coagulase negative staphylococci, Staphylococcus aureus and Enterococci.
- In our hospital MRSA percentage was 20%, VRE was 4% and No VRSA.

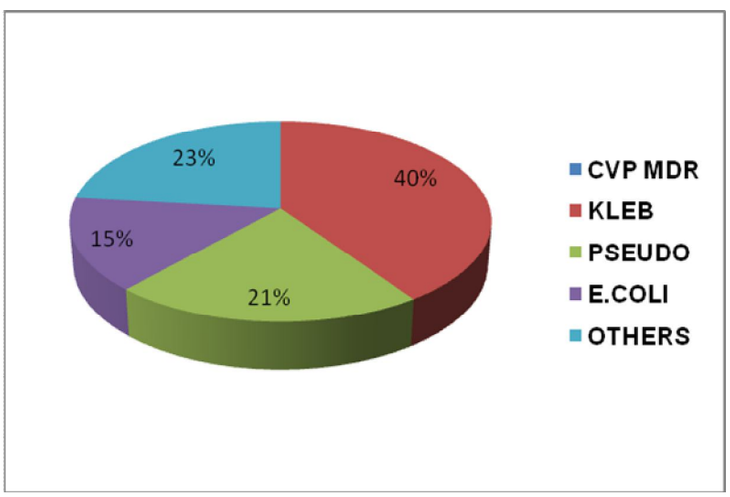
Distribution of MDR Pathogens in ET samples



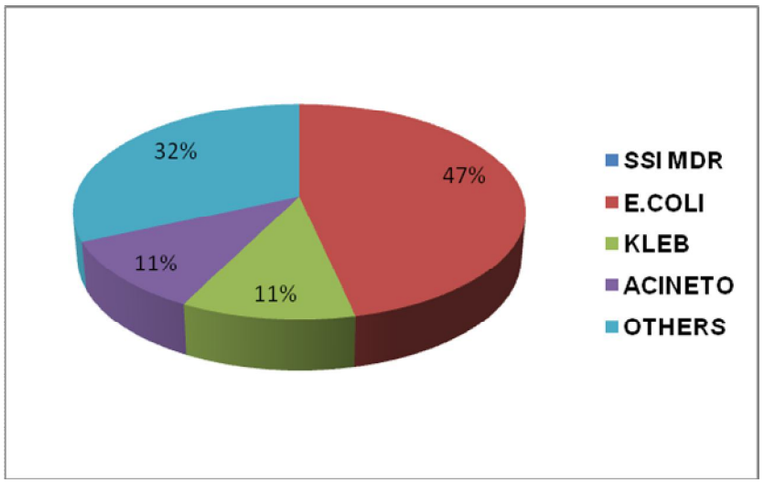
Distribution of MDR pathogens in CAUTI samples



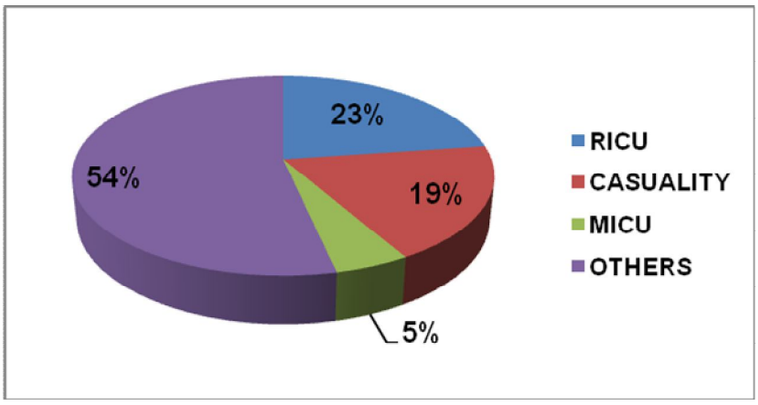
Distribution of MDR pathogens in CLABSI samples



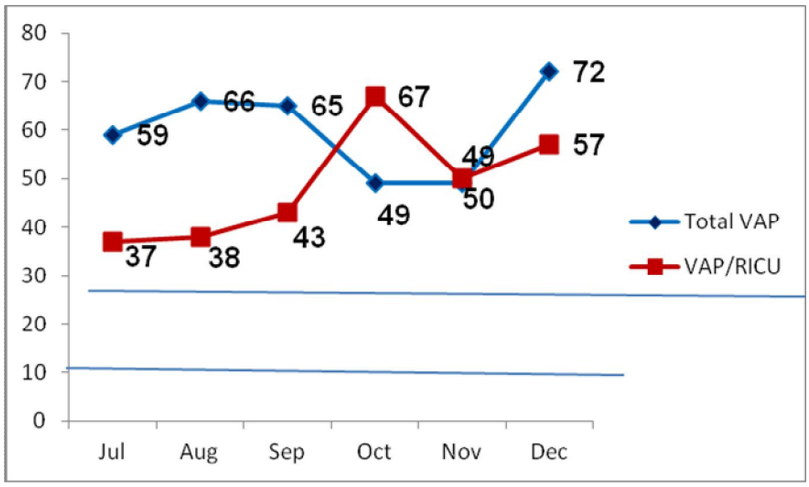
Distribution of MDR pathogens in SSI samples



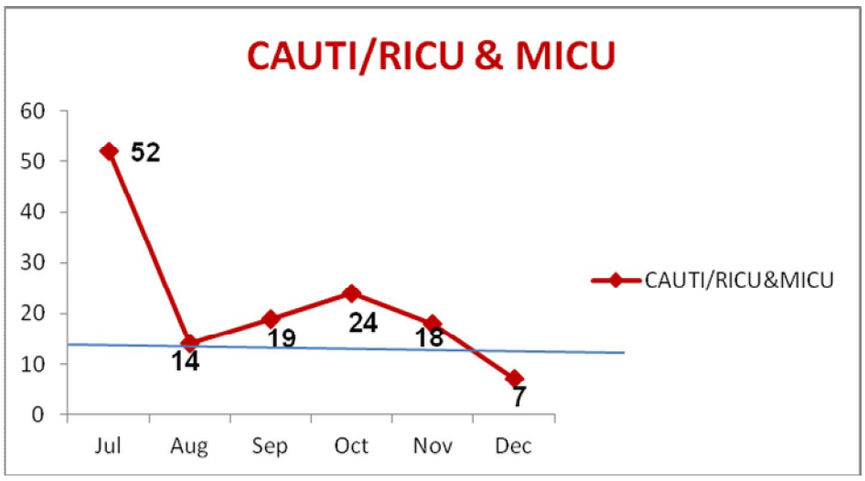
Department wise distribution of MDR



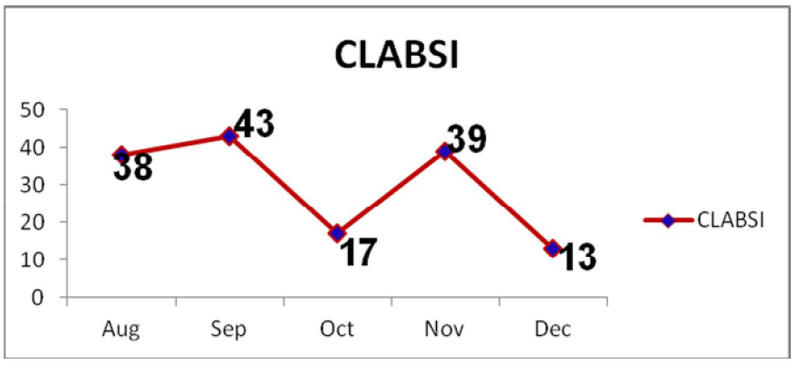
Trends of VAP from July-December



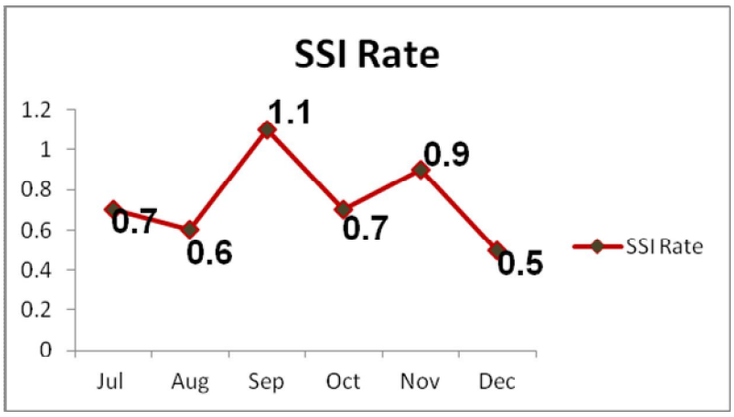
Trends of CAUTI from July-December



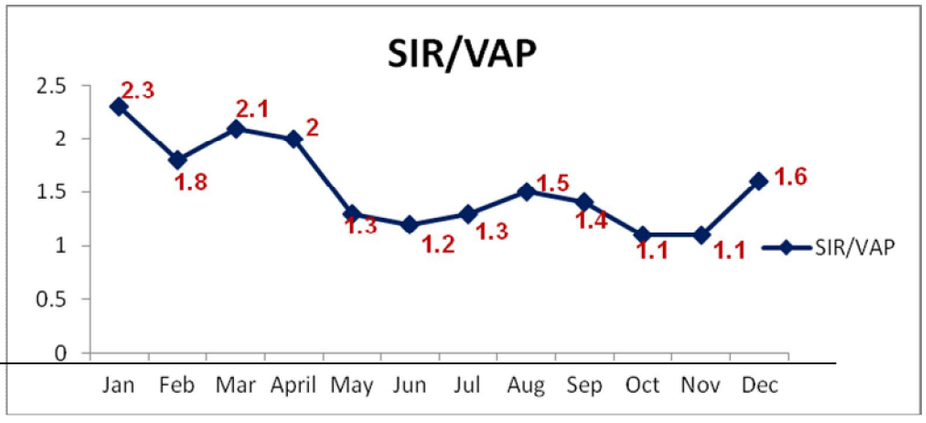
Trends of CLABSI from July-December



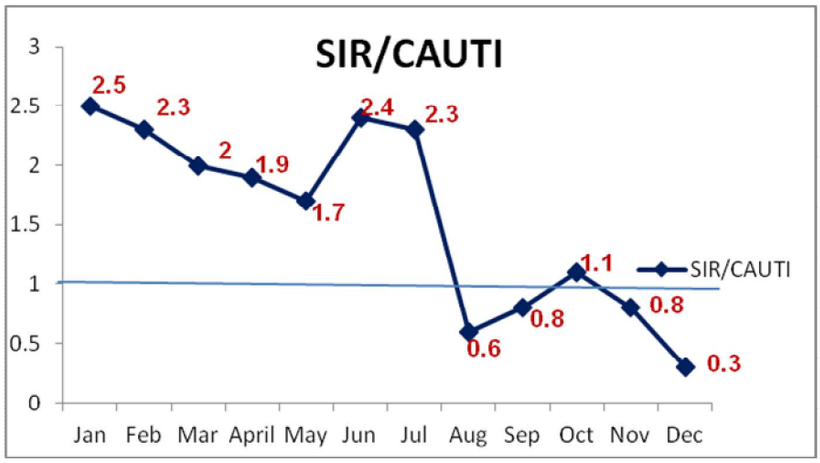
Trends of SSI from July-December



Trend of Standardized Infection Ratio (SIR) / VAP from January to December 2016



Trend of Standardized Infection Ratio (SIR)/ CAUTI from January to December



Monthly Expenditure for Prefumigation & Post fumigation cultures and For Environmental Air Sampling by Settle plate method

O.T	Expenditure
Urology	**Rs14,600**
C.T.O.T	**Rs8760**
N.S.O.T	**Rs9720**
Surgical. Oncology.O.T	**Rs9720**
G.E.O.T &GERR	**Rs5840**
Lung O.T	**Rs2920**
FNAC, Pathology	**Rs2920**
Nephrology (SSD,SPD,SVD)	**Rs8760**
Dialog Samples	**Rs9600**
SVIMS,SPMC(W)	**Rs17,520**
Medical Oncology ICU	**Rs2920**
Radiology (4 U/S rooms, X-ray &CT Scan Rooms)	**Rs20,440**
Water Tanks	**Rs7040**
Blood Bank Surveillance(4 bags at 4,22,37 º C)	**Rs7680**
TOTAL	**1,28,440**

Additional Expenditure for Outbreak Investigation

Department	Expenditure
RICU	Rs 4,200
Nephrology	Rs 12,640
Total	Rs 16,480

Suggestions from ICC desk:

1. Strict Implementation of Hand Hygiene for nursing, paramedical staff and doctors.
2. Isolation of Multi Drug Resistant cases (including MRSA, VRE), Tuberculosis cases.
3. Cost for infection control is escalating year on year & this can be remedied by collective effort of clinicians, nursing & paramedical staff.
4. By effectively following Hand Hygiene & Antimicrobial Stewardship, significant costs could be saved (Please see the cost analysis).
5. Stake holder meeting is to be convened for a revision of Antibiotic Policy 2017.

Isolates from ICU and Resistance pattern

Common Pathogens	Antibiotic Resistance pattern
Acinetobacter	Amikacin(76%) , Ampicillin(90%), Cefotaxime(89%), Ciprofloxacin(79%), Cotrimaxazole(90%), Gentamycin(79%), Imipenem(62%), Cefaperazone+Sulbactum(37%), Piperacillin +Tazobactum(77%)
Escherichia coli	Amikacin(39%) , Ampicillin(73%), Cefotaxime(73%), Ciprofloxacin(66%), Cotrimaxazole(78%), Gentamycin(31%), Imipenem(25%), Cefaperazone+Sulbactum(27%), Piperacillin+Tazobactum(34%)
Klebsiellae	Amikacin(50%) , Ampicillin(85%), Cefotaxime(81%), Ciprofloxacin(64%), Cotrimaxazole(77%), Gentamycin(50%), Imipenem(23%), Cefaperazone + Sulbactum(43%), Piperacillin + Tazobactum(44%)
Pseudomonas	Amikacin(14%) , Cefotaxime(27%), Ciprofloxacin(33%), Gentamycin(14%), Imipenem(8%), Cefaperazone + Sulbactum(5%), Piperacillin+Tazobactum(2%)
Staphylococcus aureus	18% were MRSA, VRSA-0, Linezolid-2%
CONS	12% MRSA, VRS-2%, Linezolid-2.5%
Enterococcus	VRE-0, Ampicillin(66%), Amoxyclav(73%), Ciprofloxacin(81%), Erythromycin(66%), Penicillin(73%)

VAP – Antibiogram

Most common pathogens & Prevalence	Antibiotic sensitivity 1st line	Antibiotic sensitivity 2nd line
***Escherichia coli* 18%**	Amikacin(61%), Ampicillin(27%), Cefotaxime(27%),Ciprofloxacin(34%), Ctrimaxazole(22%),Gentamicin(69%) Imipenem(75%), Cefaperazone + Sulbactum(73%), Piperacillin+ Tazobactum(66%)	Polymixin B/Colisitin (98%), Netilmicin(54%),Cefipime(24%),Tigecycline(98%)
Klebsiellae 10%	Amikacin(50%), Ampicillin(15%), Cefotaxime(19%),Ciprofloxacin(21%), Cotrimaxazole(10%),Gentamicin(50%) Imipenem(77%), Cefaperazone+Sulbactum(57%), Piperacillin+Tazobactum(56%)	Polymixin B/Colisitin (98%), Netilmicin(54%),Cefipime(24%),Tigecycline(98%)
Pseudomonas 10%	Amikacin(86%),Gentamicin(86%) Ceftazidime(73%),Ciprofloxacin(67%), Imipenem(92%), Cefaperazone + Sulbactum(95%), Piperacillin + Tazobactum(98%)	Polymixin B/Colisitin (100%), Netilmicin(84%), Tobramycin(98%)
Acinetobacter 7%	Amikacin (24%), Ampicillin (10%), Cefotaxime (11%), Ciprofloxacin(21%), Ctrimaxazole(10%), Gentamicin(21%) Imipenem(38%), Cefaperazone + Sulbactum(63%), Piperacillin + Tazobactum(67%)	Polymixin B/Colisitin (98%), Netilmicin(84%), Cefipime(20%), Tigecycline(98%)
Staphylococcus aureus 16%	Linezolid/Vancomycin (98%), Cefoxitin (82%), Augmentin/Erythromycin 76%)	
Enterococci 4%	Linezolid/Vancomycin (98%), Ampicillin(66%), Amoxyclav(73%), Ciprofloxacin(61%), Erythromycin(66%), penicillin(73%)	

CAUTI – Antibiogram

Most common pathogens & Prevalance	Antibiotic sensitivity 1st line	Antibiotic sensitivity 2nd line
***Escherichia coli* 47%**	Amikacin(82%), Ampicillin(27%), Cefotaxime(47%),Ciprofloxacin(44%), Ctrimaxazole(46%),Gentamicin(80%) Imipenem(85%), Cefaperazone+Sulbactum(83%), Piperacillin+Tazobactum(86%)	Polymixin B/Colisitin (98%), Netilmicin(84%),Cefipime(54%),Tigecycline(98%)
Klebsiellae 4%	Amikacin(80%), Ampicillin(15%), Cefotaxime(39%),Ciprofloxacin(52%), Ctrimaxazole(50%),Gentamicin(80%) Imipenem(87%), Cefaperazone+Sulbactum(87%), Piperacillin+Tazobactum(86%)	Polymixin B/Colisitin (96%), Netilmicin(84%),Cefipime(64%),Tigecycline(100%)
Pseudomonas 8%	Amikacin(96%),Gentamicin(96%) Ceftazidime(73%),Ciprofloxacin(77%), Imipenem(92%), Cefaperazone+Sulbactum(95%), Piperacillin+Tazobactum(98%)	Polymixin B/Colisitin (100%), Netilmicin(84%), Tobramycin(100%)
Acinetobacter 2%	Amikacin(84%), Ampicillin(60%), Cefotaxime(81%),Ciprofloxacin(81%), Ctrimaxazole(70%),Gentamicin(81%) Imipenem(88%), Cefaperazone+Sulbactum(83%), Piperacillin+Tazobactum(87%)	Polymixin B/Colisitin (98%), Netilmicin(74%),Cefipime(24%),Tigecycline(98%)
CONS 6%	Linezolid/Vancomycin (98%), Cefoxitin (86%), Augmentin/Erythromycin (76%)	
Enterococci 15%	Linezolid/Vancomycin (98%), Ampicillin(86%),Amoxyclav(83%), Ciprofloxacin(51%), Erythromycin(56%), penicillin(83%)	
Proteus 2%	Amikacin(80%), Ampicillin(15%), Cefotaxime(40%),Ciprofloxacin(52%), Ctrimaxazole(50%),Gentamicin(80%) Imipenem(87%), Cefaperazone+Sulbactum(87%), Piperacillin+Tazobactum(86%)	
Candida 5%	90% to VRC, FLC,AMP	

PATIENT RISK STRATIFICATION

Patient Type 1	Patient Type 2	Patient Type 3	Patient Type 4
No contact with health care system	Contact with health care system (e.g. recent hospital admission, nursing home, CAPD) without/minimal invasive procedures	Hospitalization >5 days and or infections following invasive procedures	Type 3 patient with fever despite antibiotic therapy (>5days) with no obvious source / after appropriate source control
No prior antibiotic treatment in last 90 days	Antibiotic therapy in last 90days	Recent & multiple antibiotic therapies	± severe sepsis/septic shock PLUS
Patient young with no co-morbid conditions	Patient old (> 65years) with few co-morbidities	Patient with multiple Co-morbidities eg: cystic fibrosis, structural lung disease, advanced AIDS, neutropenia, other severe immunodeficiency	Has 1 or more than 1 of the following factors. (but not limited to) for invasive fungal infections: TPN, Hemodialysis, Immunodeficiency of variable origin, Major Abdominal surgery, Multi -focal candida colonization, Diabetes

Patient Type 1	Patient Type 2	Patient Type 3	Patient Type 4
• **Bacterial infections with minimal risk of Multidrug resistant pathogens like ESBL producing Enterobacteriacae, MRSA or Non fermentors likePseudomonas and Acinetobacter** • **Invasive Fungal Infections are unlikely**	• Risk of Bacterial infections with pathogens like ESBL producing Enterobacteriacae and MRSA. • Minimal risk of Nonfermentors like Pseudomonas and Acinetobacter • Minimal risk of Invasive Fungal infections .	• High risk of Bacterial infections with any of Multi drug resistant pathogens like ESBL producing Enterobacteriacae, MRSA and nonfermentors likePseudomonas and Acinetobacter • Risk of invasive fungal infections in special cases like patients undergoing Allogenic BMT, Liver transplant or chemotherapy induced neutropenic patients.	• Risk of Bacterial infections with Pan-drug resistant Pseudomonas and Acinetobacter • High Risk of Invasive fungal infections
• **Limited use of broad Spectrum antibacterials** • **No role of Antifungal agents**	• ESBL infections to be treated with Non-Pseudomonal antibiotics like Group 1Carbapenem • BL+BLI's can also be preferred for mild ESBL infections. •Vancomycin/Tiecoplanin to be used for MRSA • No role of Antifungal agents	Bacterial infections to be treated with broad spectrum antibiotics like Group 2. Carbapenem or Anti-Pseudomonal BL-BLI's in combination with Fluoroquinolones/aminoglycosides/Glycopeptides. • Prophylaxis for fungal infections in select cases as per IDSA guidelines	Bacterial infections to be treated with novel combination of antibacterials suggested for Pan resistant bacteria using alternate drug delivery systems/PK-PD parameters. • Empiric treatment of fungal infections for both stable and unstable patients as per IDSA guidelines.

» **To use these protocols follow these steps:**

- Identify the type of infection – Respiratory, intra-abdominal, pneumonia, blood stream, urinary tract and skin and soft tissue.
- Define the location – ICU or ward patient
- Accordingly refer to the respective chart.
- Identify the patient type based on described parameters – Type 1, 2, 3, or 4
- Refer to the empiric/presumptive therapy column for that patient type.
- This will give you the protocol drug to start.
- If a column has more than one drug option –
    - Choose the drug showing better susceptibility data in the left hand side table OR
    - Doctor's discretion advised
- Send respective cultures before starting antibiotic therapy
- Once culture / sensitivity report available:
    - Presumptive therapy antibiotic may require to be changed
    - Consult Microbiologist / ID physician to decide the choice of antibiotic (based on narrowest spectrum antibiotic which covers the pathogen isolated)
- In all cases physician's discretion is advised based on patient condition

5. Antibiotic policy

Antimicrobial policy should be implemented through the infection control committee or an antimicrobial use committee.

- Antibiotic use must be justifiable on the basis of the clinical diagnosis and known or expecting micro-organisms.
- Appropriate specimens for bacteriological examination must be obtained before initiating antibiotic treatment, in order to confirm the treatment is appropriate.
- The selection of antibiotic must be based not only on the nature of the disease and that of the pathogenic agents, but on the sensitivity patterns, patient tolerance, and cost.
- The physician should receive timely, relevant information of the prevalence of resistance in the facility.
- An agent with as narrow a spectrum as possible should be used.
- Antibiotic combinations should be avoided, if possible,
- Selected antibiotics may be restricted in use (like vancomycin, linezolid, Carbapenems...)
- The correct dose must be used (low doses may be ineffective for treating infections, and encourage the development of resistance, while excessive doses may have adverse effects, and may not prevent resistance)

6. Surveillance

Regular Active & passive Surveillance & Reporting is carried out every month.

a. Active Surveillance & Reporting:

High risk areas of the hospital are identified as:

i. Minor OT.
ii. Major OT
iii. Labour room
iv. NICU/SNCU
v. ICU
vi. Blood bank
vii. Wards
viii. Drinking water zone

b. Passive Clinical Surveillance & Reporting:

- Clinicians suspecting occurrence of HAI may report this to Infection Control officer (ICO).
- All details regarding the patient, procedures, medication, etc. are made available.
- The ICO of the microbiology department is responsible for reporting any information about infections suspected to be hospital acquired.

Health Care Associated Infection Surveillance- carried out & monitored monthly.

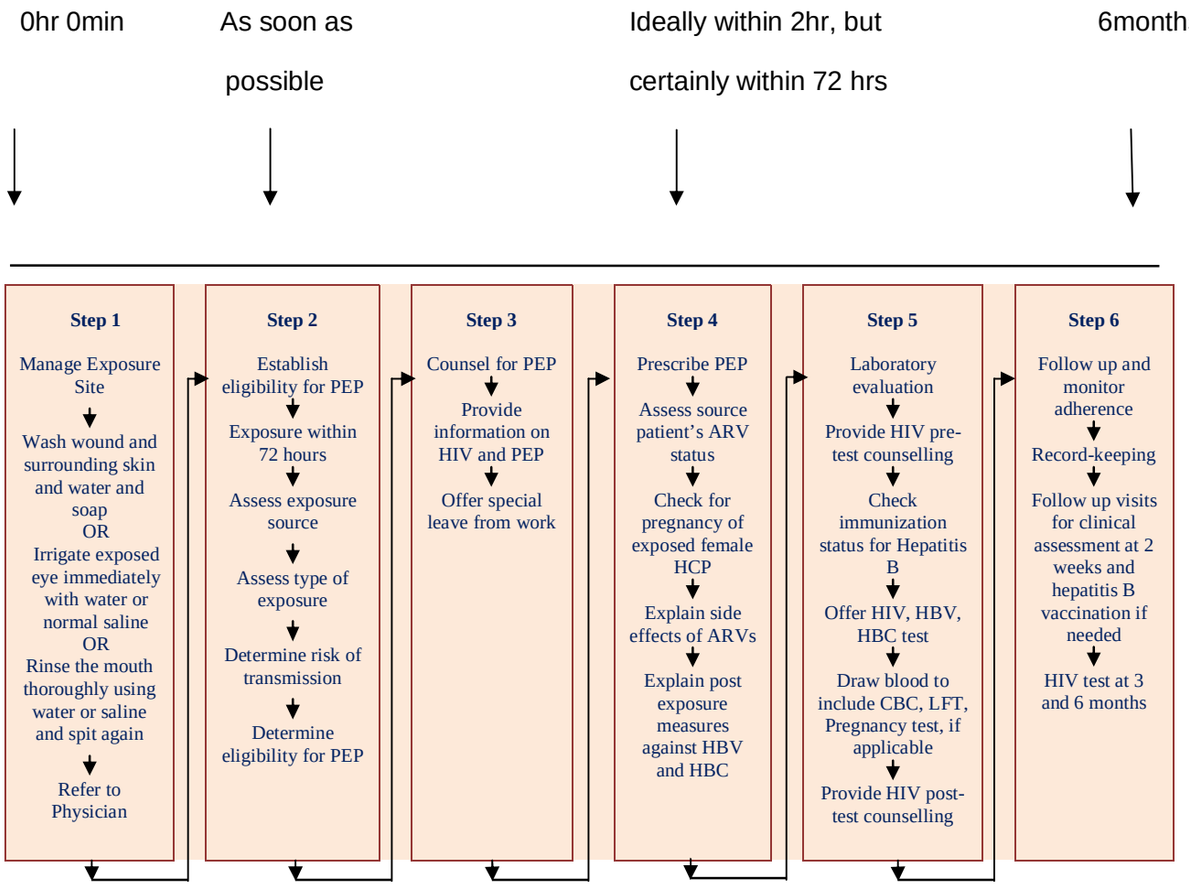
1. Catheter Related Blood Stream Infections or CR-BSI
2. Ventilator Associated pneumonia or VAP
3. Catheter Associated Urinary Tract Infection (CAUTI)
4. Surveillance of Hand Hygiene Compliance
5. Surveillance for Emerging Resistance and Changing Flora

7. Biomedical Waste Management

COLOR	CONTAINER	CATEGORY	Treatment
Blue Sharp	Blue plastic bag in Puncture Proof box	Broken Glasses, ampoules, vials, suture, etc	Steam sterilize, shread, deepburial, encapsulation
Red Infectious Non sharp	Red plastic bag in plastic bin	Soiled Cotton, Gauzes , Catheters, IV tubing,i.v. cannulas etc	Steam sterilize and shread or inceneration-Landfill
Yellow (Organ and tissue waste)	Yellow plastic bag in plastic bin	Human tissues, organs, body parts, placenta, pathological and surgical waste, microbiology and biotechnology waste	Steam sterilize and shread, incineration-Sewer or landfill, ash to landfill
Black	Black bag in plastic bin	All expired drugs, Radioactive Waste	Stored in cement tanks until half life is over
Green	Green liner in green bin	All general and food wastes which are biodegradable, General paper waste and also kitchen waste, that is disposed separately.	To compost

"Post exposure prophylaxis" (PEP) refers to the comprehensive management given to minimize the risk of infection following potential exposure to blood-borne pathogens (HIV, HBV, HCV).

Steps for Managing Occupational Exposure



PEP : Post Exposure Prophylaxis

ARV : Anti Retroviral

HCP : Health Care Professional

CBC : Complete Blood Count

LFT : Liver Function Test.

4. Biomedical Equipment list & performance Report

In order to improve efficiency, effectiveness and reduce Non Performing Assets (NPA) in the health system, SVIMS has put forth an accountable system of making a full list of Biomedical Equipments and enumerate the functional status of each and every equipment. The goal is to ensure that 99-100% of equipments are functional and repairs are done in a timely fashion according to benchmark (days in disrepair). In addition all equipments will be listed with their price and date of commissioning in the website. As on June'2017 the following functional equipment benchmark is shown. The details are listed in Annexure 1 & 2.

SVIMS - Bio-Medical Equipment Status List

Total No. of Equipments	**1010**
No. of functional Equipments	**1003**
No. of non-functional Equipments	**7**
Percentage functional	**=1003/1010*100 = 99%**

SVIMS SPMC (W) IPW - Bio-Medical Equipment Status List

Total No. of Medical Equipments	**117**
Total No. of Medical Equipments Working	**117**
Total No. of Medical Equipments Not Working	**1**
Percentage functional	**=117/118*100 = 100%**