Hospital Infection Control - I

Principles and Practice

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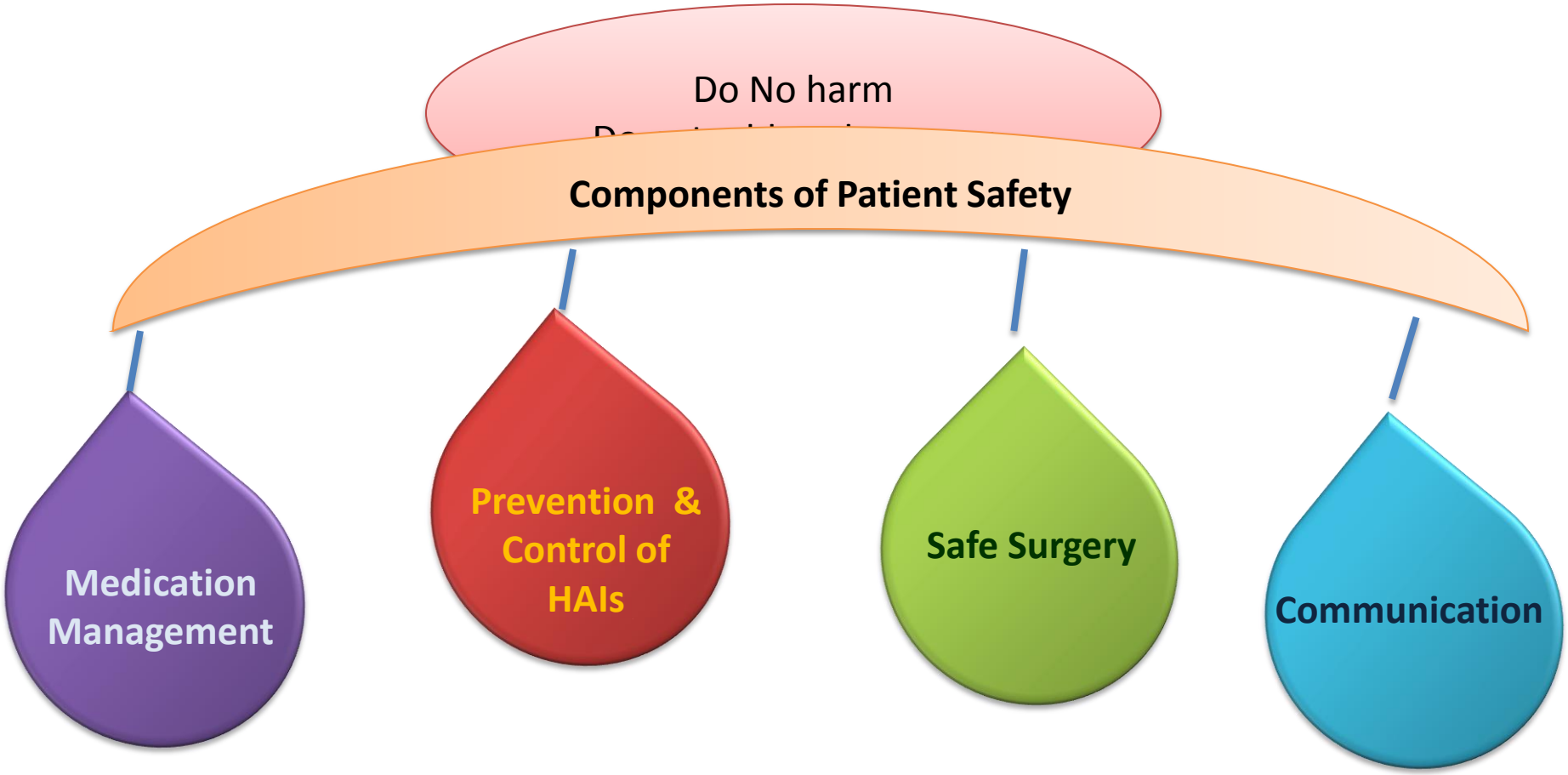
In this presentation…

- Definitions of HAIs
- Designing a HIC program
- Role & duties of HICC, ICT, ICO and ICN
- Biomedical Waste Management
- Hand Hygiene
- Standard Precautions
- Employee Health
- Management of Sharps Injury
- Surveillance – Active and Passive, Targeted surveillance
- Disinfection and Sterilization
- Care of Systems and Devices
- Spill management
- Housekeeping
- Isolation Policy
- Care of Ambulance
- Monitoring the HIC program

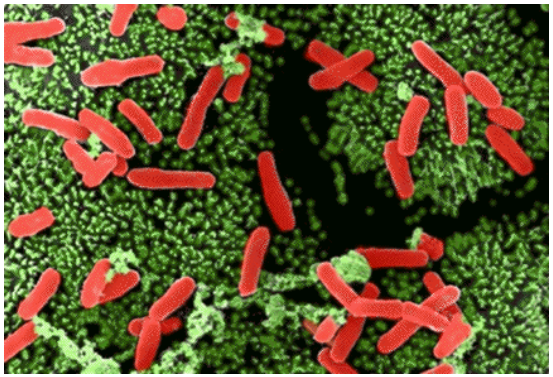
In next presentation we will discuss…

- Engineering controls
- Laundry and Linen Management
- CSSD
- Kitchen
- Investigation of an outbreak
- Antimicrobial stewardship program

Patient safety is a fundamental right



- **HCAI** – The most common complications of health care.
- **Infection control** –
  - prevention and management of infection
  - application of research based knowledge to practices.



Healthcare associated infections

Do we have checks and systems in place equivalent to airline industry ?

Healthcare associated infections(HAI) kill more people in a year than a jumbo jet crashing every day of the year

The cost of prevention is only a miniscule compared to treatment of these infections

Sources of HAIs

- **Endogenous sources** are body sites, such as the skin, nose, mouth, gastrointestinal (GI) tract, or vagina that are normally inhabited by microorganisms.
- **Exogenous sources** are those external to the patient, such as patient care personnel, visitors, patient care equipment, medical devices, or the health care environment.

Introduction & Definitions

CDC/NHSN SURVEILLANCE DEFINITION OF HEALTH CARE–ASSOCIATED INFECTION

- This document **replaces** those articles, which are now considered obsolete, and uses the generic term **"health care–associated infection" or "HAI" instead of "nosocomial."**

CDC/NHSN surveillance definition of health care–associated infection and criteria for specific types of infections in the acute care setting

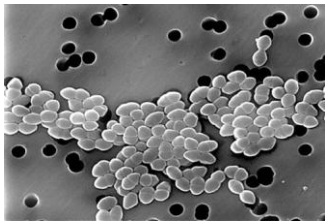
Teresa C. Horan, MPH, Mary Andrus, RN, BA, CIC, and Margaret A. Dudeck, MPH
Atlanta, Georgia

Am J Infect Control 2008;36:309-32.

NHSN Web site (www.cdc.gov/ncidod/dhqp/nhsn.html)

- one of the criteria for SSI or HAIs is ‘‘**surgeon or attending physician diagnosis**’’

- Infections occurring in infants that result from passage through the birth canal are considered HAIs



The following infections are NOT considered HAI:

- Infections associated with complications or extensions of infections already present on admission, ***unless*** a change in pathogen or symptoms strongly suggests the acquisition of a new infection
- Infections in infants that have been acquired transplacentally (eg, ToRCH, or syphilis) and become evident #48 hours after birth
- Reactivation of a latent infection (eg, herpes zoster [shingles], herpes simplex, syphilis, or tuberculosis).

Infection control strategy

Worldwide

USA.gov Government Made Easy

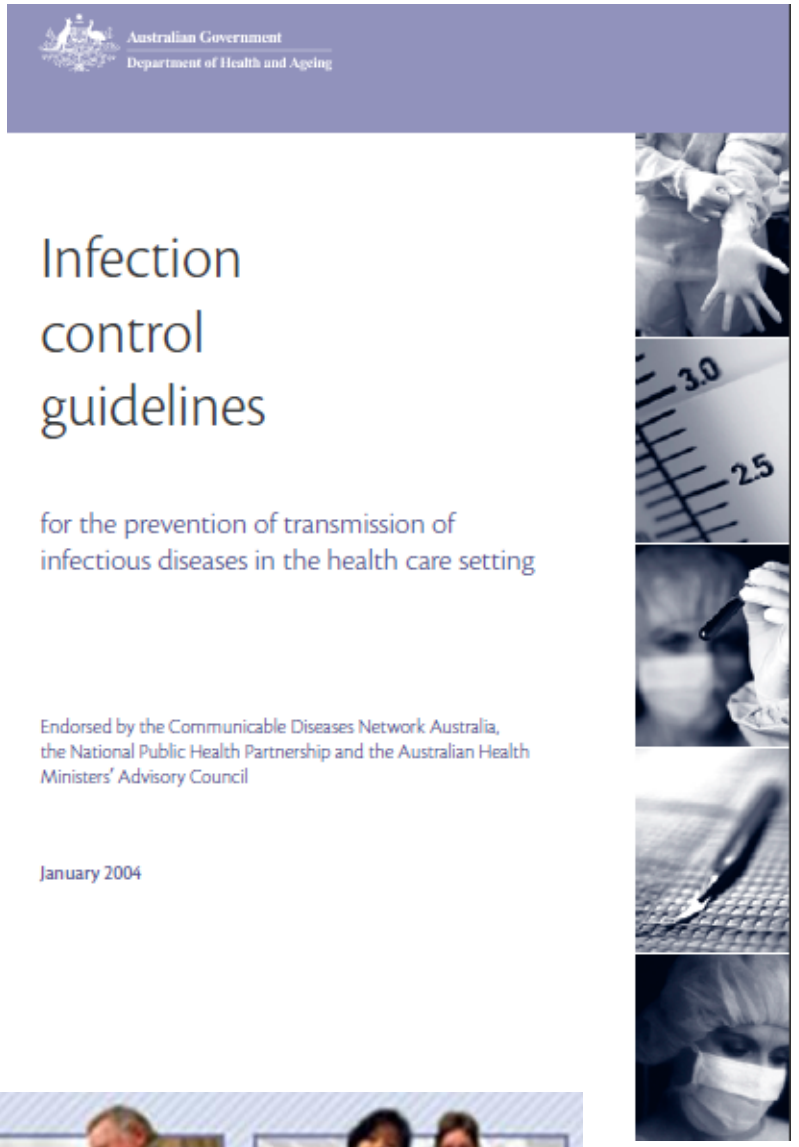
NHSN National Healthcare Safety Network

- National Healthcare Surveillance Network
- Provides Definition & Benchmarking
- Surveillance Data in real time
- Mandatory by law - public reporting of HAIs by individual hospitals

CDC Centers for Disease Control and Prevention
Your Online Source for Credible Health Information

- **UK**
  - HPA
  - Surveillance network and referral laboratories
  - In unison with EU – issues periodic European guidelines

- **Australia**
  - Australian Commission on Safety and Quality in Healthcare (ACSQHC)



Australian Government
Department of Health and Ageing

Infection Prevention - Developing world

- Singapore
- Thailand
- Brazil

THAILAND

Zero SARS Transmission Country

Zero SARS Transmission Country

Severe Acute Respiratory Syndrome (SARS), a newly emerging infectious disease, has been spreading in several regions of the world, becoming a major health problem with extensive social and economic impacts.

Strengthened national disease Surveillance and control of SARS

National disease surveillance system has been intensified to early detect, investigate and contain possible spread of infection from all cases suspected of SARS and their contacts persons. The system is strongly supported by extensive involvement of local health personnel, health volunteers and community leaders nationwide.

Indian Scenario

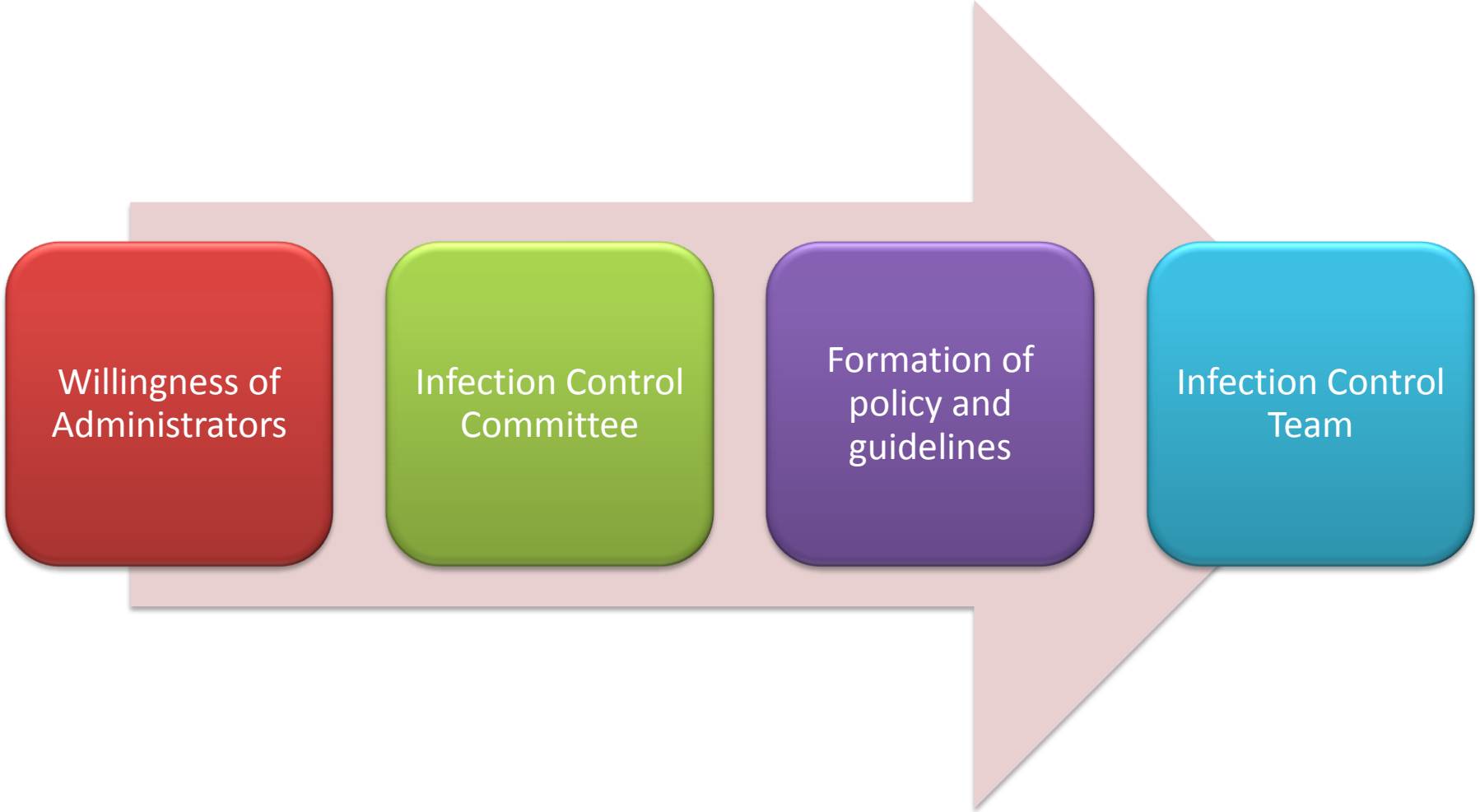
Accredited Hospitals

- **Corporate sector**
- **Government Healthcare settings**
  - **Tamilnadu**
  - **Gujarat**
  - **Delhi**
- **Well documented program**
- **Dedicated manpower**
- **Data generation and monitoring**
- **Action and review mechanisms in place**

Non-Accredited Hospitals

- Public & private hospitals
  - Lack of administrative focus
  - Committee available but defunct in most cases
  - Documentation seriously lacking
  - Backbones- State of Microbiology Laboratories- area of major concern
  - Knee – jerk reaction – often inadequate and too late

Designing of program



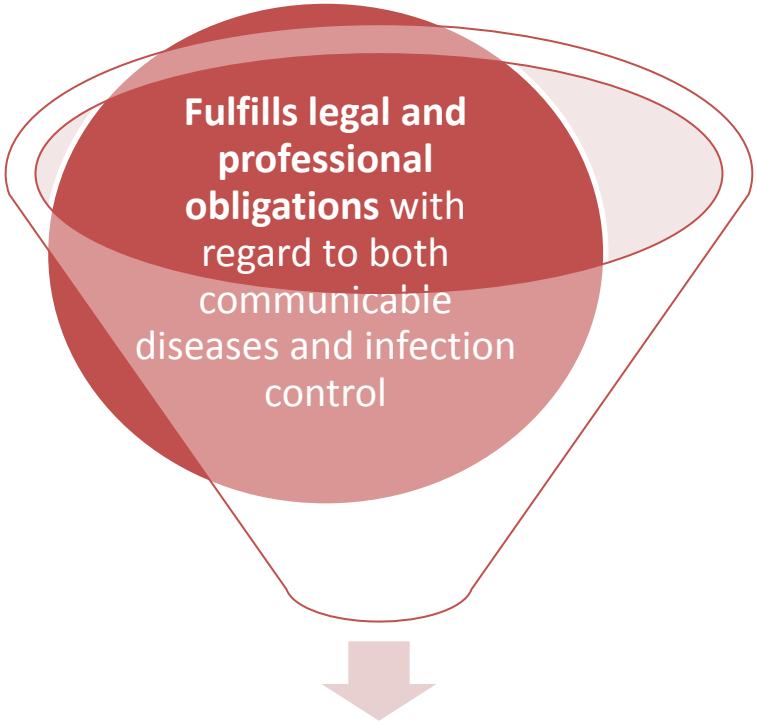
OBJECTIVES

- To **minimize the risk of infection** to patients, staff and visitors.
- To identify the **roles and responsibilities** of key personnel involved in the prevention and control of infection
- To **recommend antibiotic policy** for the hospital and **identify areas if irrational use** of antibiotics and curb irrational use of antibiotics.

Scope of program

- Hospital guidelines for prevention & control of infections including Biomedical waste management
- Hand Hygiene
- Identification of high risk areas
- Surveillance policy – Active, Passive
- Disinfection policy
- Isolation policy
- Policy for investigation of an outbreak
- Antimicrobial stewardship program
- Health care workers safety – immunization & PEP

Formulation of Policy and preparation of infection control manual



Should be **reviewed and updated** at least once a year by **HICC**

MEMBERS OF THE HICC

- Chairperson – head of the hospital /top administrator
- Microbiology Faculty - work as infection control officer (ICO)
- Infection Control Nurse/s – 1ICN per 250 beds X 100
- Faculty looking after Biomedical waste management
- Faculty various departments
- Nursing In-charges OT / ICUs/ Dialysis/ Transplant Units/ Emergency
- Engineering Departments – Civil, Electrical, (Facility managers?)
- Pharmacist
- Store In charge

Responsibilities of HICC

- Maintain good infection control **practices**
- Establish standards for the **procedures** or system for identification and containment of infectious organisms
- Take policy decisions on -
  - Education programme for HCW
  - Rational use of antibiotics
  - Use of disinfectants, sterilization practices & frequency of cleaning of the hospital
  - Occupation health hazard among HCW

Infection Control Team

- **Responsibilities of the Infection Control Team**
  - *Advise staff* on all aspects of infection control and maintain a safe environment for patients and staff.
  - *Advise management* of at risk patients.
  - Carry out *targeted surveillance* of HAIs and act upon data obtained e.g. investigates clusters of infection above expected levels.
  - Recommend *antibiotic policy* for different areas of the hospital.
  - Provide a *manual of policies and procedures* for aseptic, isolation and antiseptic techniques.
  - *Investigate outbreaks* of infection and take corrective measures.
  - Provide relevant *information on infection problems* to management.
  - Assist in *training of all new employees* as to the importance of infection control and the relevant policies and procedures.
  - Have written procedures for maintenance of *cleanliness*.
  - *Surveillance* of infection, *data* analysis, and implementation of corrective steps. This is based on reviews of lab reports ,reports from nursing in charge etc.,
  - *Waste management*
  - Supervision of *isolation procedures*.
  - Monitors *employee health* programme.
  - Addresses all requirements of infection control and employee health as specified by state and local laws

Responsibilities of ICO

- *Prepare guidelines* for infection control practices
- *Analyze the surveillance data*
- *Provide trends of HAI* to the different patient care units
- Provide data regarding organisms isolated and their resistance pattern *(antibiograms)*
- *Monitor rational use of antimicrobials*
- *Investigate the outbreak*, if any
- Hold regular *training program* for HCWs on HAI and BMWM
- Hold *HAI control committee* meeting quarterly

Infection Control Nurse (ICN)

- The duties of the ICN are primarily associated with **ensuring the practice** of infection control measures by healthcare workers .
- Thus the ICN is the **link between the HICC and the wards/ICUs** etc. in identifying problems and implementing solutions.

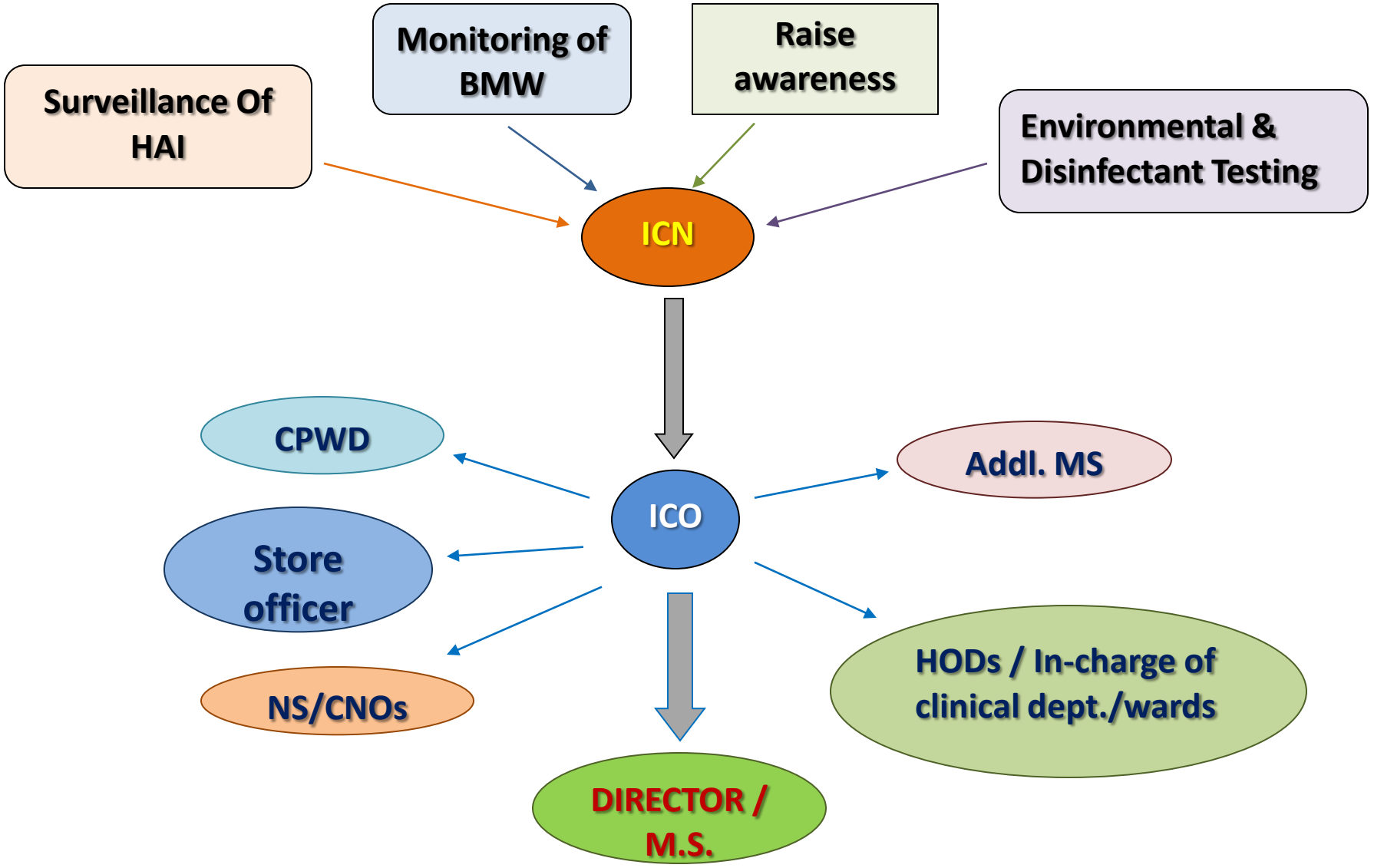
Duties of infection Control Nurse

- The ICN conducts **Infection control rounds** daily and maintains the registers.
- The ICN is involved in **education** of HCWs
- Maintains registers and data of Sharps/Needle stick injuries and Post –exposure prophylaxis
- Initiates and ensure proper immunization for Hepatitis B Virus Immunoglobulin and HBsAg vaccine, in consultation with microbiologist (Member HICC) in case of suspected exposure to any hospital worker

Duties of infection Control Nurse

- Ensures that all positive culture cases are been tracked and for each positive culture from inpatient unit a hospital infection information sheet or surgical site infection Sheet is filled and keep record for each positive culture case. All probable cases of HAIs and anomalous/irrational use of antibiotics must be discussed in HICC meetings.
- Track the indicators of infection control and present the data to the HICC meetings on regular basis.
- Conducts special tasks given to him/her regarding hospital infection control.

Schematic Representation of Working of ICT



BMWM Team

- *A subcommittee of HICC*
- ***Chairperson***
  - Head of Institution / Medical Superintendent
- ***Secretary***
  - Faculty from Department of Microbiology **(WMO)**
- ***Members***
  - Faculty from Microbiology
  - Senior Administrators
  - Chief Nursing Staff
  - In charge of Engineering & maintenance department (Civil & Electrical)
  - Store In charge
  - ICNs

Responsibilities of BMWM Team

- Fulfill Legal obligations – Consent to generate & Consent to operate
- Daily rounds & monitoring
- Generation, Transport, Storage and disposal of BMW
- Data generation

The team to meet at least once in two months or earlier if required and resolve the issues needing urgent attention with respect to biomedical waste management of the hospital

Used Gloves

Blood soaked/soiled cotton swabs

Blood soaked bandages

Dressings

Soiled plaster casts

Gowns / Masks soiled with blood

Soiled diapers

Laboratory cultures

Micro-organisms live / vaccines

Foley catheters or bags with blood

Blood bags

Hemodialysis tubings

Non infected plastics

Wrappers

Tissue paper

Packaging material

Cardboard

Discarded medicines

Food & food packaging

Municipal Waste

Buckets with 0.5% Bleaching powder

IV sets

Tubing

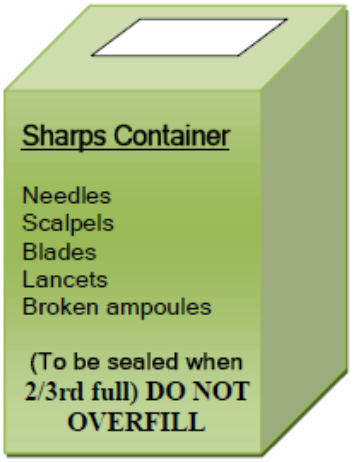
Catheters

Syringes without needles

Plastic IV bottles

Collection vials with cap removed

(To be dipped minimum for 30 min. before disposing in Red bags)



Human tissues

Human body parts

placenta

CHACHA NEHRU BAL CHIKITSALAYA

(Affiliated to Maulana Azad Medical College)

Geeta Colony, Delhi - 31

Segregation and discarding of waste is responsibility of generator of waste

Don’ts

Never overfill the bins

Don’ts

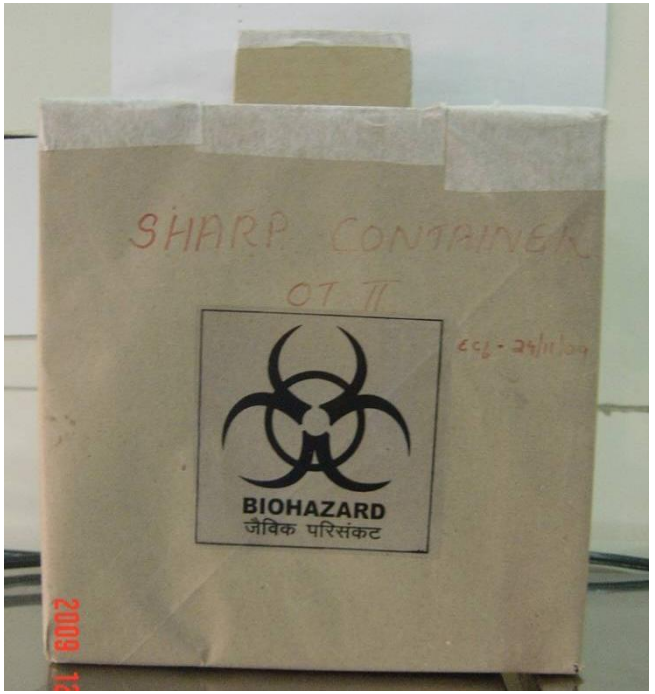
Never overfill the bins.

Bad: Don’t overfill the bins bin

Good: Always fill only 3/4th

Sharps container

- Needles
- Scalpels
- Blades
- Lancets
- Broken ampoules



- **(To be sealed when 2/3rd full) DO NOT OVERFILL**

Never collect sharps in plastic bags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Monitoring

- Generation, Transport, Storage and disposal of BMW
  - Waste storage area
    - General Waste
    - Infectious Waste Site
- Visit to the disposal site (outsourced)
- Hospital Waste data

What data you should be able to generate ?

- Total Hospital Waste
- Total Infectious Waste
- % Infectious Waste

Hand Hygiene

Corner Stone of Infection Prevention

WHO Guidelines on Hand Hygiene in Health Care

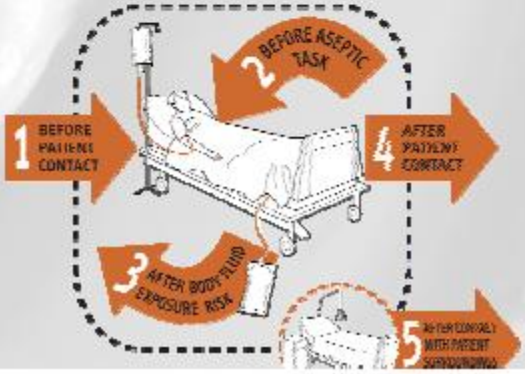
First Global Patient Safety Challenge
Clean Care is Safer Care

Summary of the WHO approach to hand hygiene improvement

Five part Multimodal Hand Hygiene Improvement Strategy

Five Step Implementation Schedule

The 5 moments for hand hygiene



The 5 part WHO Multimodal Hand Hygiene Improvement Strategy

System change – alcohol-based handrub at the point of care

+

Training and education

+

Observation and feedback

+

Reminders in the workplace

+

Creating a safety culture

The WHO 5 steps to implementation

Step 1: Facility preparedness	Months 1-3
Step 2: Baseline evaluation	Months 4-5
Step 3: Implementation	Months 6,7,8
Step 4: Follow-up evaluation	Months 9-10
Step 5: Action planning & review	Months 11-12

…Hand hygiene

- When to observe?
- How to observe?
- How to monitor?
- How to promote?

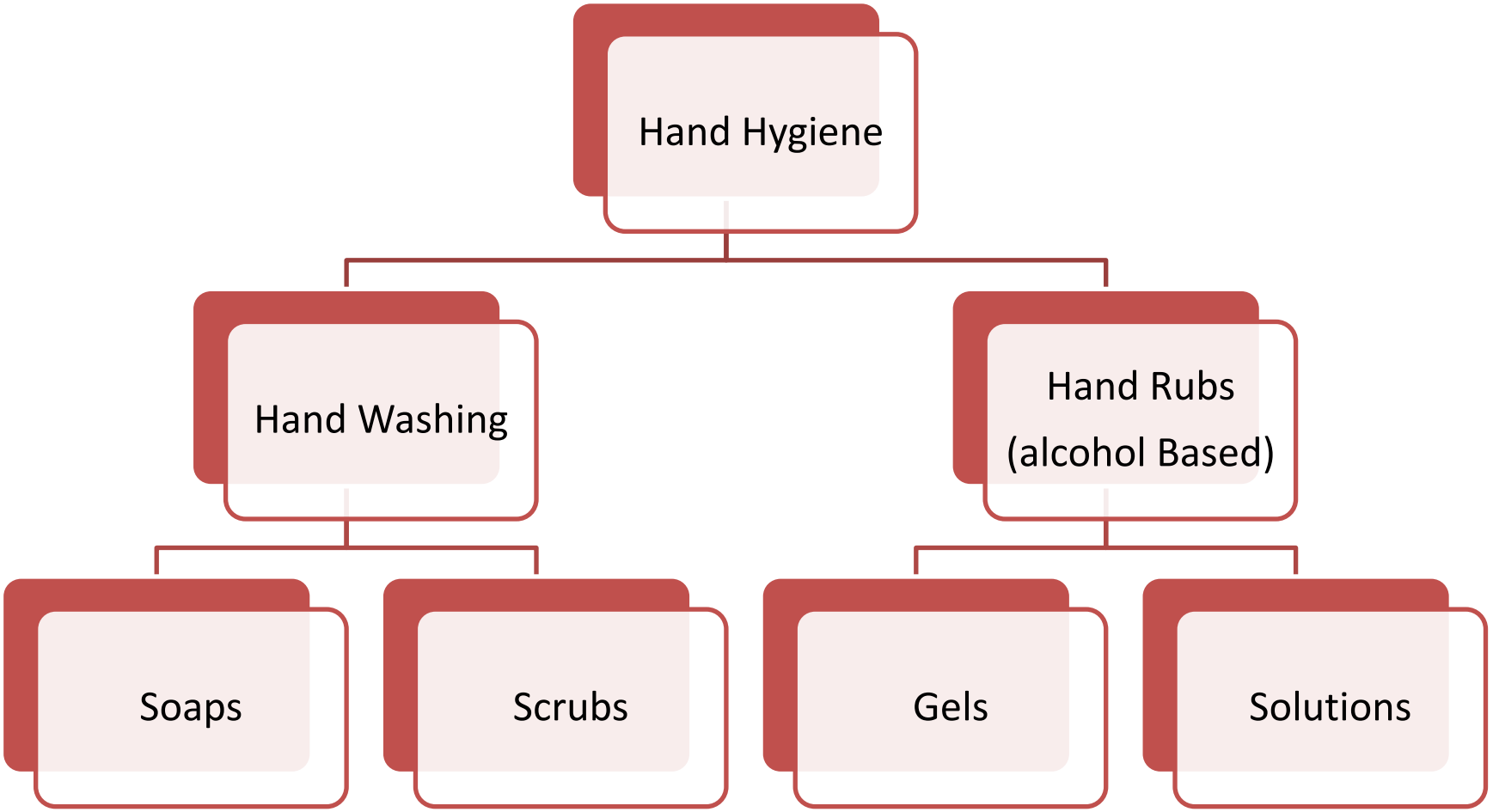
…Hand Hygiene

When to observe?

- Five Moments of hand hygiene

…Hand Hygiene

How to observe?

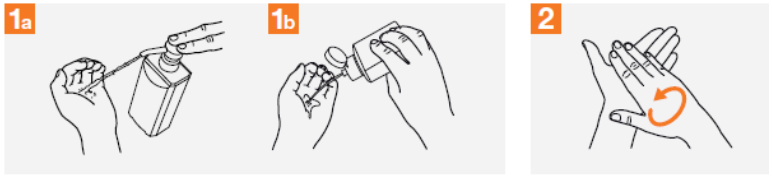


Hand-Hyigene

How to Handrub?

RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

Duration of the entire procedure: 20-30 seconds



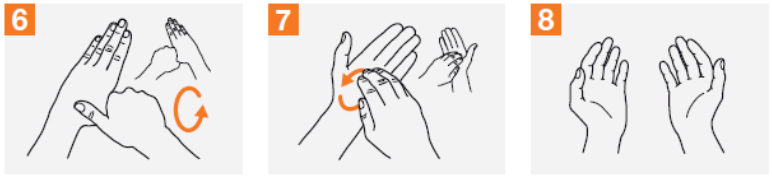
Apply a palmful of the product in a cupped hand, covering all surfaces;

Rub hands palm to palm;

Right palm over left dorsum with interlaced fingers and vice versa;

Palm to palm with fingers interlaced;

Backs of fingers to opposing palms with fingers interlocked;



Rotational rubbing of left thumb clasped in right palm and vice versa;

Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

Once dry, your hands are safe.

World Health Organization | Patient Safety A World Alliance for Safer Health Care | SAVE LIVES Clean Your Hands

How to Handwash?

WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

Duration of the entire procedure: 40-60 seconds

Wet hands with water;

Apply enough soap to cover all hand surfaces;

Rub hands palm to palm;

Right palm over left dorsum with interlaced fingers and vice versa;

Palm to palm with fingers interlaced;

Backs of fingers to opposing palms with fingers interlocked;

Rotational rubbing of left thumb clasped in right palm and vice versa;

Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;

Rinse hands with water;

Dry hands thoroughly with a single use towel;

Use towel to turn off faucet;

Your hands are now safe.

World Health Organization | Patient Safety A World Alliance for Safer Health Care | SAVE LIVES Clean Your Hands

…Hand Hygiene

How to monitor?

- Hand Hygiene compliance tools
  - Define areas of monitoring
  - Define population for monitoring
  - Record various parameters in structured format
  - Data analysis
  - Feedback

Method: Calculation of compliance

$$\text{Compliance} = \frac{\text{Hand hygiene actions performed}}{\text{Hand hygiene actions required (hand hygiene opportunities)}}$$

SURVEILLANCE AND INFECTION CONTROL DIVISION

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Govt. of NCT Delhi

Geeta Colony

Delhi – 110031

Hand Hygiene Observation Form

Facility:		**Period N°:**		**Session N°:**	
Service:		**Ward:**		**Observer:** (initials)	
Department:					

Prof.cat		Prof.cat		Prof.cat		Prof.cat	
Code		Code		Code		Code	
N°		N°		N°		N°	
Date: (dd/mm/yy)	/ /	Date: (dd/mm/yy)	/ /	Date: (dd/mm/yy)	/ /	Date: (dd/mm/yy)	/ /
Start/End time: (hh:mm)	: / :	Start/End time: (hh:mm)	: / :	Start/End time: (hh:mm)	: / :	Start/End time: (hh:mm)	: / :
Session duration: (mm)		Session duration: (mm)		Session duration: (mm)		Session duration: (mm)	

Opp.	Indication	HH Action	Opp.	Indication	HH Action	Opp.	Indication	HH Action	Opp.	Indication	HH Action
1	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ☐ *missed* ☐ *gloves*	1	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ☐ *missed* ☐ *gloves*	1	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ☐ *missed* ☐ *gloves*	1	☐ bef-pat. ☐ bef-asept. ☐ aft-b.f. ☐ aft-pat. ☐ aft.p.surr.	☐ HR ☐ HW ☐ *missed* ☐ *gloves*

World Health Organization | Patient Safety — A World Alliance for Safer Health Care | SAVE LIVES Clean Your Hands

Observation Form – Optional Calculation Form

(Indication-related compliance with hand hygiene)

	Facility:						Period:			Setting:					
	Before touching a patient			Before clean/ aseptic procedure			After body fluid exposure risk			After touching a patient			After touching patient surroundings		
Session N°	Indic (n)	HW (n)	HR (n)	Indic (n)	HW (n)	HR (n)	Indic (n)	HW (n)	HR (n)	Indic (n)	HW (n)	HR (n)	Indic (n)	HW (n)	HR (n)
1															
2															
3															
4															
14															
15															
16															
17															
18															
19															
20															
Total															
Calculation	Act (n) = / Indic1 (n) =			Act (n) = / Indic2 (n) =			Act (n) = / Indic3 (n) =			Act (n) = / Indic4 (n) =			Act (n) = / Indic5 (n) =		
Ratio act / indic*															

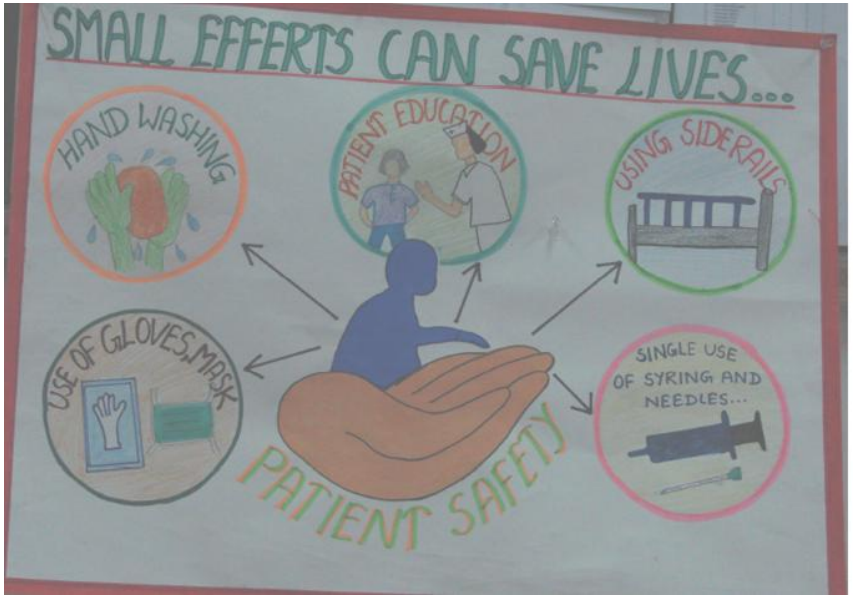
…Hand Hygiene

How to promote?

- Training –seminar, discussions
- Bedside training
- Screen Savers
- Plays, awareness tools

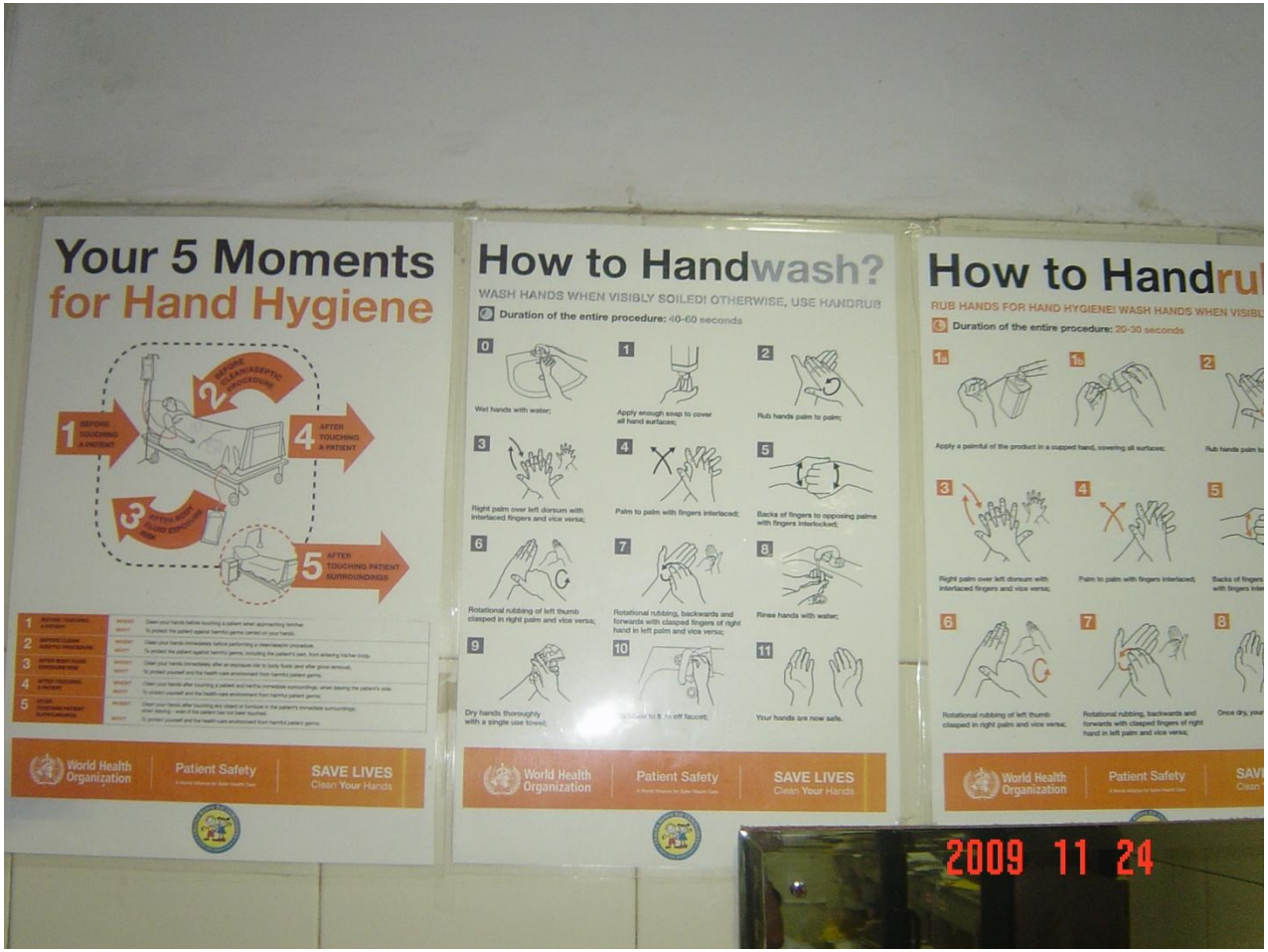
METHODS

- Induction classes - for new joining staff
- Individual training - Bed side training of HCW
- Group discussions – part of routine training
- Painting & debate competitions



Debate competition among Nursing orderlies on "Patient Safety- WHO themes"

CNBC poster competition on "WHO themes on Patient safety"


Your 5 Moments
for Hand Hygiene
1 BEFORE TOUCHING A PATIENT
2 BEFORE CLEAN/ASEPTIC PROCEDURE
3 AFTER BODY FLUID EXPOSURE RISK
4 AFTER TOUCHING A PATIENT
5 AFTER TOUCHING PATIENT SURROUNDINGS
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SAVE LIVES
Clean Your Hands
How to Handwash?
WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB
Duration of the entire procedure: 40-60 seconds
Wet hands with water;
Apply enough soap to cover all hand surfaces;
Rub hands palm to palm;
Right palm over left dorsum with interlaced fingers and vice versa;
Palm to palm with fingers interlaced;
Backs of fingers to opposing palms with fingers interlocked;
Rotational rubbing of left thumb clasped in right palm and vice versa;
Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;
Rinse hands with water;
Dry hands thoroughly with a single use towel;
Your hands are now safe.
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How to Handru
RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBL
Duration of the entire procedure: 20-30 seconds
Apply a palmful of the product in a cupped hand, covering all surfaces;
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Rotational rubbing of left thumb clasped in right palm and vice versa;
Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;
Once dry, your
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Don't give
germs a
chance!


How to Handwash?
How to Handrub?
2009 11 24

Factors which influence infection control practices

- Importance of Hand Washing

Soap

Water

&

Common Sense

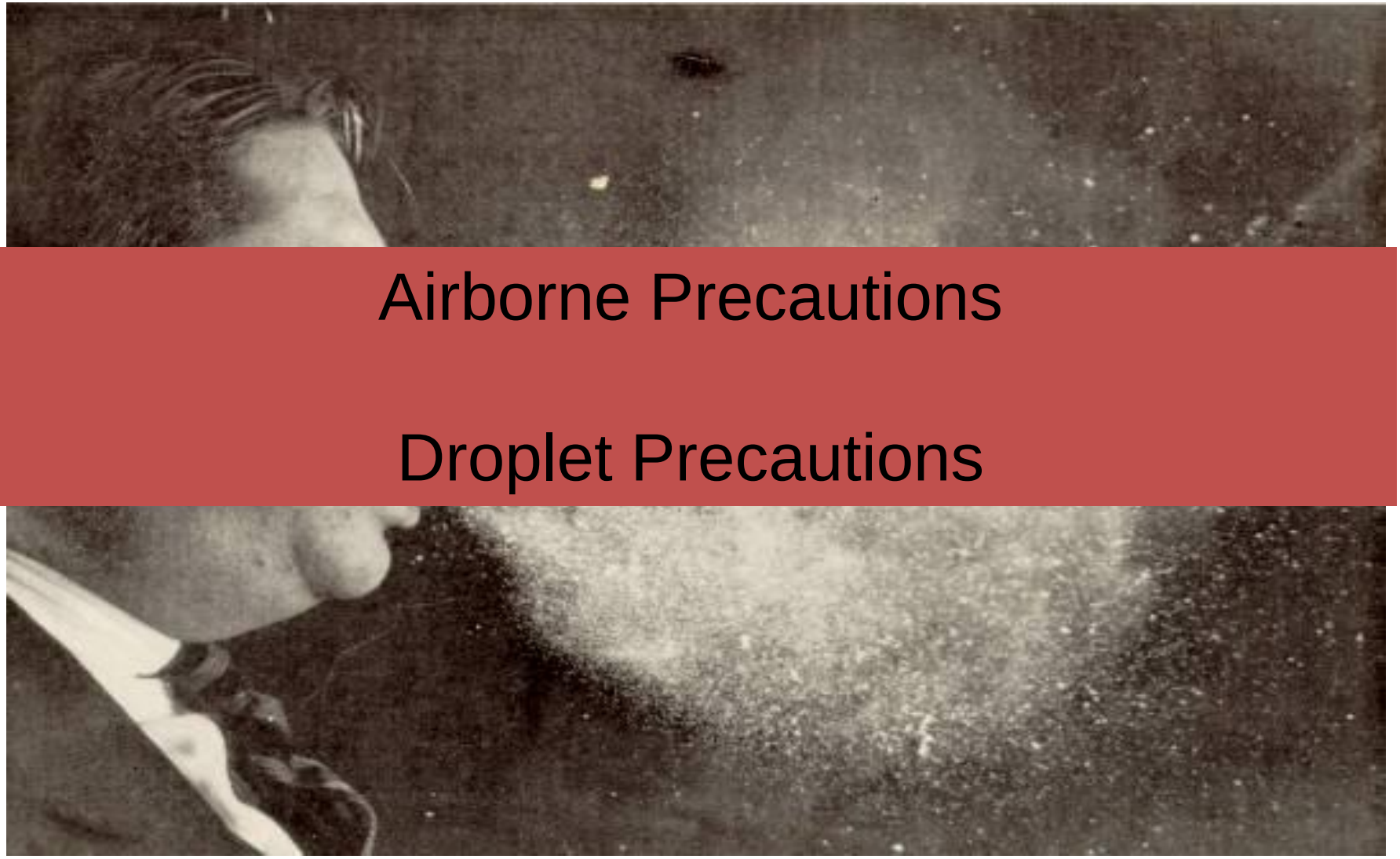
Yet the best Antiseptic

William Osler

Standard Precautions

- WHY?? WHEN?? HOW??

Air droplets ??

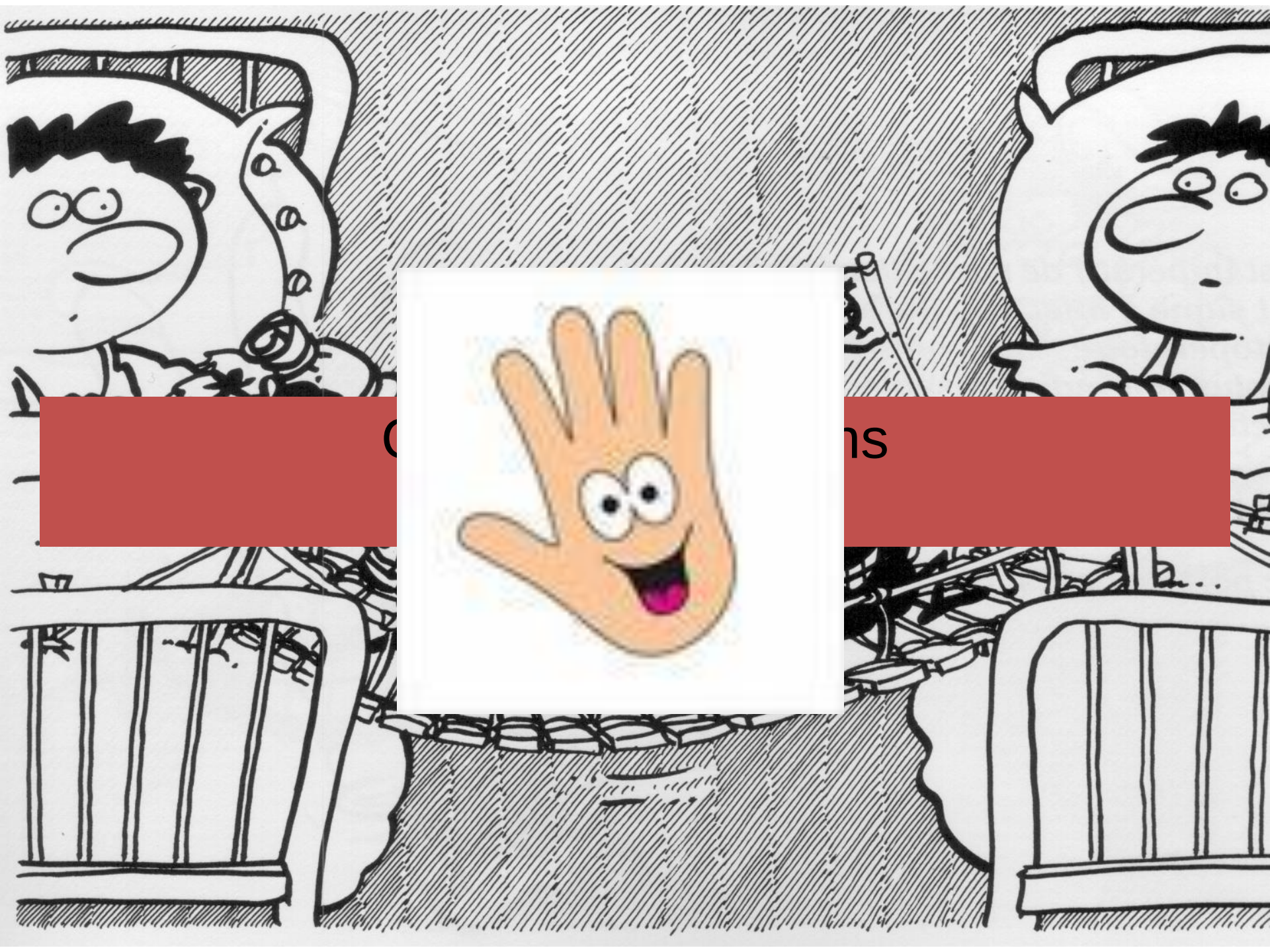


Airborne Precautions

Droplet Precautions

- How many patients or samples you receive without knowing there HIV/ HBsAg/HCV …. Status??

Personal Protective Equipments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When to use standard precautions ?

- STANDARD - used for care of all patients

- All Patients All Times

Types of PPE Used in Healthcare Settings

- Gloves – protect hands
- Gowns/aprons – protect skin and/or clothing
- Masks and respirators– protect mouth/nose
  - Respirators – protect respiratory tract from airborne infectious agents
- Goggles – protect eyes
- Face shields – protect face, mouth, nose, and eyes
- Shoes

Factors Influencing PPE Selection

- Type of exposure anticipated
  - Splash/spray versus touch
  - Category of isolation precautions
- Durability and appropriateness for the task
- Fit

Do's and Don'ts of Glove Use

- Change gloves
  - During use if torn and when heavily soiled (even during use on the same patient)
  - After use on each patient
- Discard in appropriate receptacle
  - Never wash or reuse disposable gloves

Linen Management

Dirty Linen – Black Bag
Soiled Linen – Red Bag

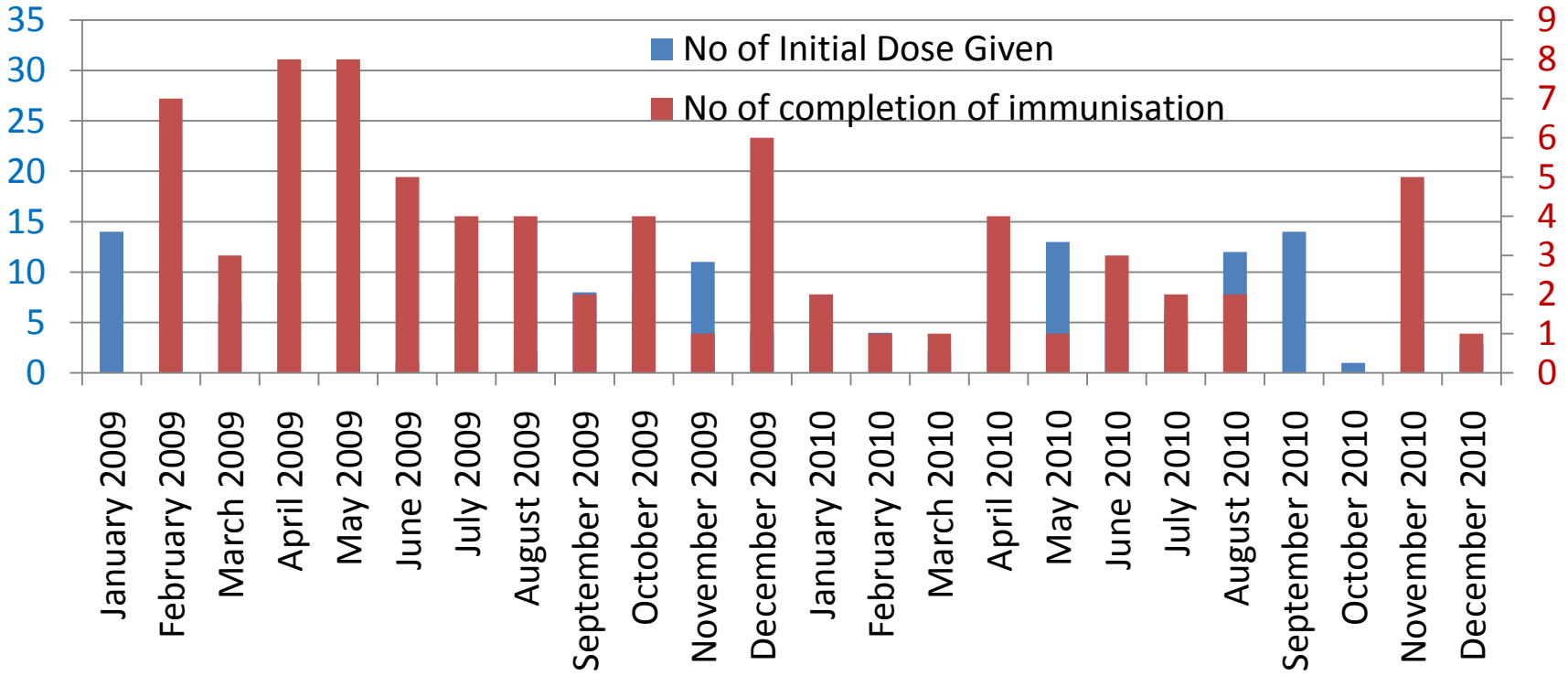
Recommended Personal Protective Equipment for Processing Linen

TYPE OF PPE	WHEN TO WEAR
Gloves (preferably household utility gloves) and closed shoes that protect feet from dropped items (sharps) and spilled blood and body fluids	• Handling disinfectant solutions • Collecting and handling soiled linen • Transporting soiled linen • Sorting soiled linen • Hand washing soiled linen • Loading automatic washers
Plastic or rubber apron and protective eyewear	• Sorting soiled linen • Hand washing soiled linen • Loading automatic washers

Employee health programme

- At the time of recruitment followed by Annual Medical Examination
- Staff Immunization & protection (anti-HBsAg levels)
- Managing exposure to potentially infectious body fluid and provision for screening and PEP

Healthcare worker immunisation



Total immunization initiated: 186
Total immunization completed: 74

Needle stick Injuries and Management of Sharps

HIV: 3 Infections per 1,000 Sticks with a HIV+ Needle

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Hepatitis C: 18 Persons per 1,000 Needle-sticks

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Hepatitis B is Most Infectious

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WHAT IS THE RISK OF HIV INFECTION?

Occupational	
Percutaneous	0.03%
Mucous membrane	0.09%
Sexual transmission	0.018% to 3%
Mother to child	25-40%
Infected blood products	95%

Antiviral therapy 1998; 3 (Suppl 4): 45-47

Incident reporting

CHACHA NEHRU BAL CHIKITSALAYA
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Geeta Colony
Delhi – 110031

Surveillance and Infection Control Division

ACCIDENT/ INCIDENT REPORT CNBC, DELHI

Serious injury/ death must be reported immediately to concerned authority at .....

1	Date of accident/ incident Time Location
2	Affected person (please tick) ☐ Patient ☐ Staff ☐ Resident ☐ Contractual ☐ Others Age _____years **Sex:-** ☐ Male ☐ Female **Name & Address** Tel (R) Tel (M)
3	Type of accident/ incident severity ☐ Clinical ☐ Non Clinical ☐ Major ☐ Moderate ☐ Minor ☐ Near miss
4	Details of accident/ incident Equipment model Removed from service Y N **Witness (If Any):** Details of witness:

Sharps Injury Incident Form

Date of Incident	
Time of Incident	
Location of Incident	

DONOR	RECIPIENT
Surname:……	Surname:……
Forenames:……	Forenames:……
Patient No:……	Patient No:……
Sex:……	Sex:……
Date of Birth:……/……/……	Date of Birth:……/……/……
Department:……	Department:……
Telephone no :……	Telephone no :……
Donor investigations: Hepatitis B surface antigen Hepatitis C antibodies HIV 1 & 2 antibodies Syphilis screen Collect EDTA blood in appropriate gel tube	**Recipient investigations:** Save serum only Collect EDTA blood in appropriate gel tube

Clinical details and / or other relevant medical information:	Signature of staff collecting blood sample:
……	……

TO BE COMPLETED BY THE DOCTOR:

I have discussed the serological investigations with the Donor and have documented this in the notes. The Donor would / would not like a copy of the test results. (Please delete as appropriate)

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Needlestick & Sharp Injury Report

Facility Code:	Facility Phone:
Report Completed By:	Facility Name:
Date of Exposure:	Time of Exposure: AM ☐ PM ☐
Date of Reporting: Quarter: Year:	Time of Reporting:: AM ☐ PM ☐

1) What is the job classification of the Health Care Worker:

☐ Dentist
☐ Technologist *(non-lab)* Specialty: _____
☐ Laundry Worker
☐ Surgery Attendant
☐ Doctor *(Consultant)*: Specify Specialty: _____
☐ Doctor *(intern / Sr. Resident/Jr. Resident)*: Specify Specialty: _____
☐ Nurse: Specify: SN ☐ NS ☐ ANS ☐ Other: _____
☐ Other *(describe)*: _____

☐ Medical Student (DNB)
☐ Nursing Student
☐ Security
☐ Other Attendant

☐ Clinical Laboratory Worker
☐ Housekeeper
☐ Paramedic
☐ Phlebotomist/Venipuncture/IV Team

2) In which department/work area currently your are working in?

☐ Ward Specify Ward: _____
☐ Emergency Department
☐ Operating Room/Recovery
☐ Blood Bank
☐ Procedure Room *(x-ray, ECG, etc)*
☐ Service/Utility *(laundry, central supply, loading dock, etc)*
☐ Dialysis Facility *(hemodialysis and peritoneal dialysis)*
☐ Immunisation Room
☐ Other Describe: _____

☐ Intensive/Critical Care Unit: Specify Type: _____
☐ Outpatient Clinic/Office
☐ Venipuncture/collection Center
☐ Clinical Laboratories

3) How did the incident occur?

3a) While manipulating patient or needle/sharp:

After filling up of form…

- PROVIDE COUNSELING
- OFFER POST EXPOSURE PROPHYLAXIS (PEP)
- DO FOLLOW UP TESTING

Management for prevention of HIV after Needlesticks (Post Exposure Prophylaxis)

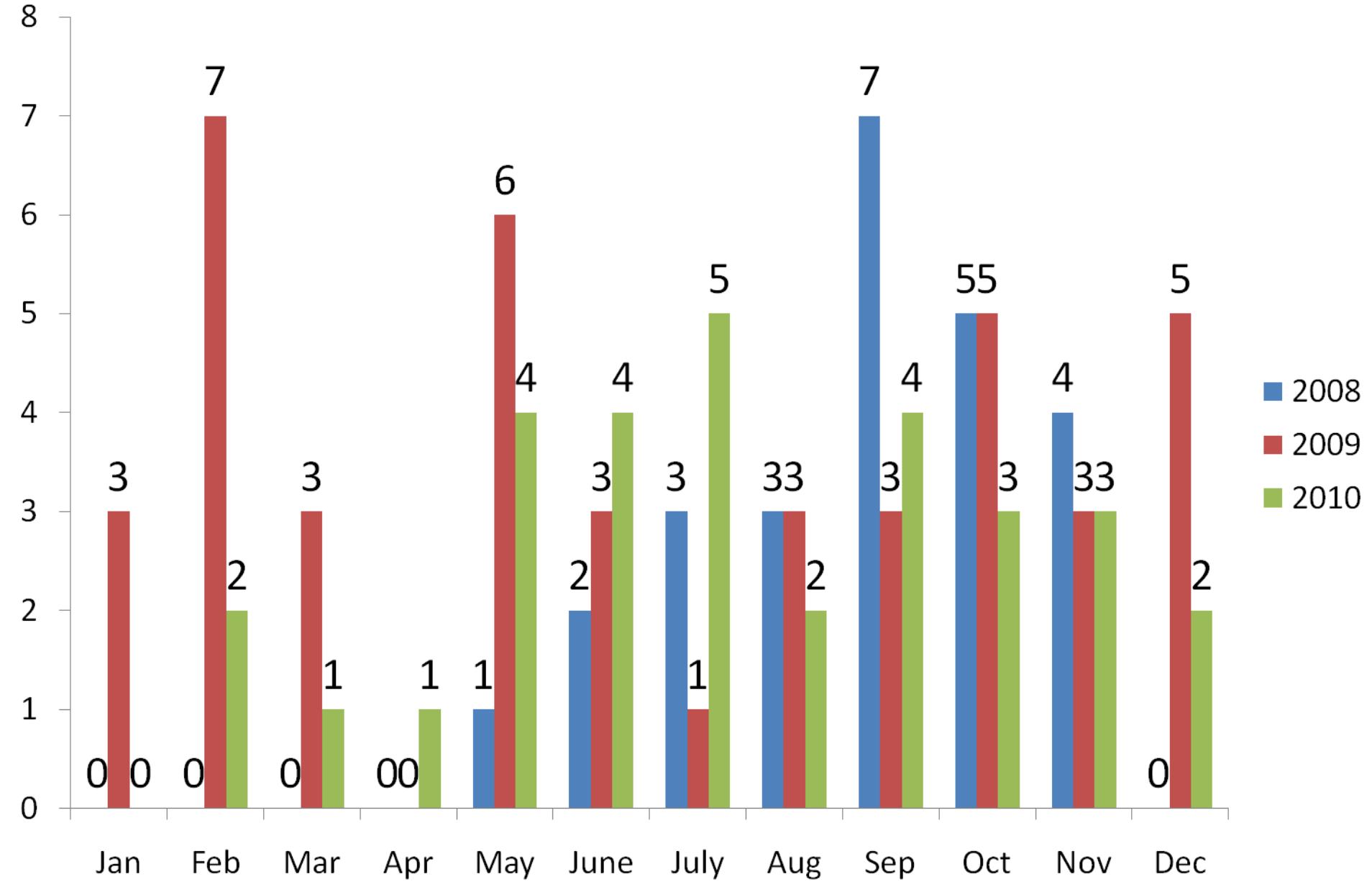
- It is most effective if started 1- 2 hours after exposure
- Can be given up to 72 hours after exposure
- Should NEVER be given without medical follow-up and filing an incident report because of the serious side effects, and the need to try to prevent similar injuries
- Must be taken for 28 days
- Pregnant staff can take PEP drugs. Tell the duty officer if you might be pregnant so he can give appropriate medications
- Staff member on PEP should avoid sex or practice safe sex (use condoms)

DO FOLLOW UP TESTING

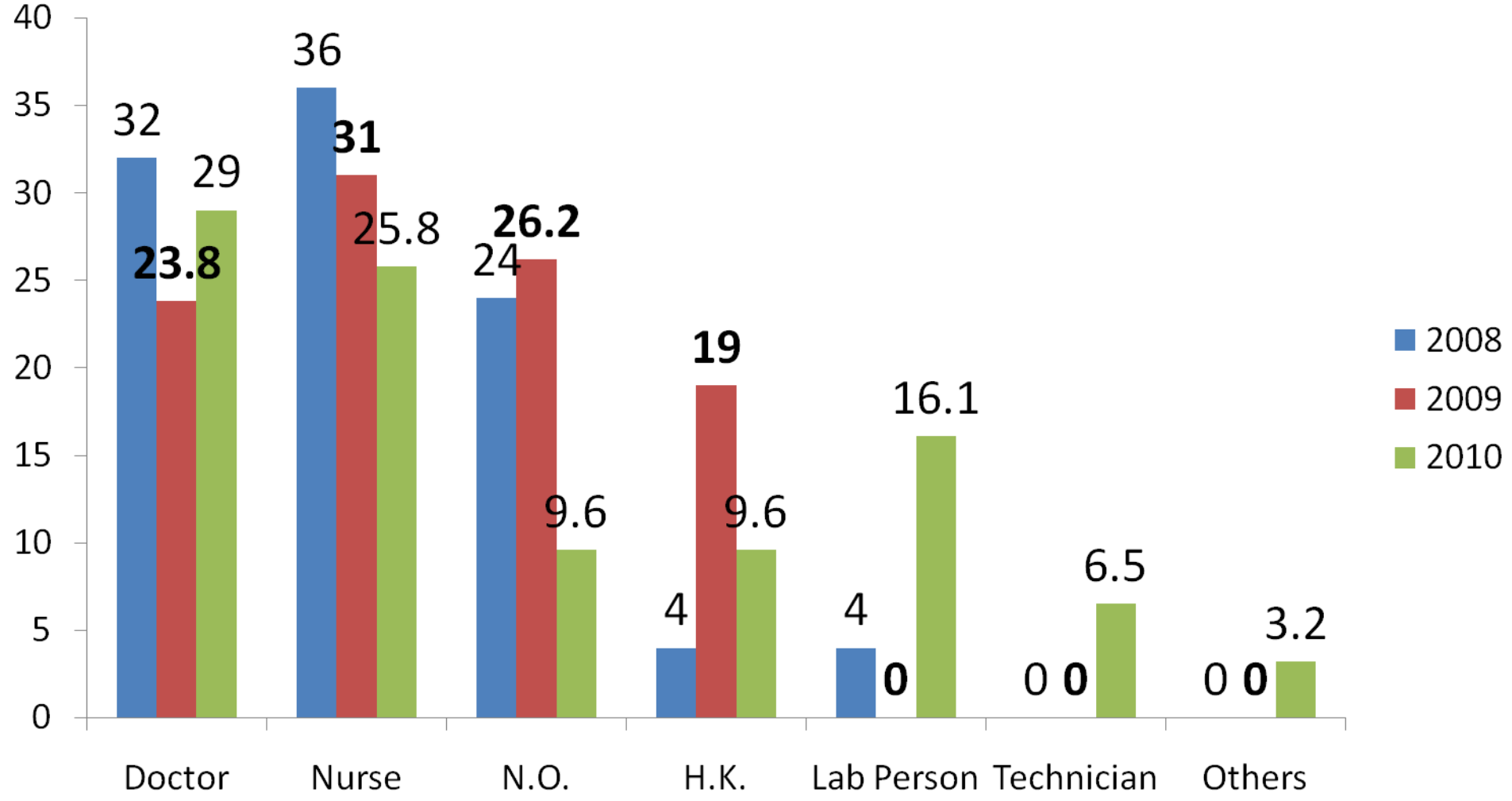
- Anti-HBs 1-2 months after exposure
- Baseline and follow up for anti -HCV and alanine amino-transferase (ALT) 4-6 months after exposure
- HIV antibody for at least 6 months post exposure - Baseline, 6 weeks, 3 months, 6 months

Sharps Related Injuries

Episodes of Sharp Related Injuries

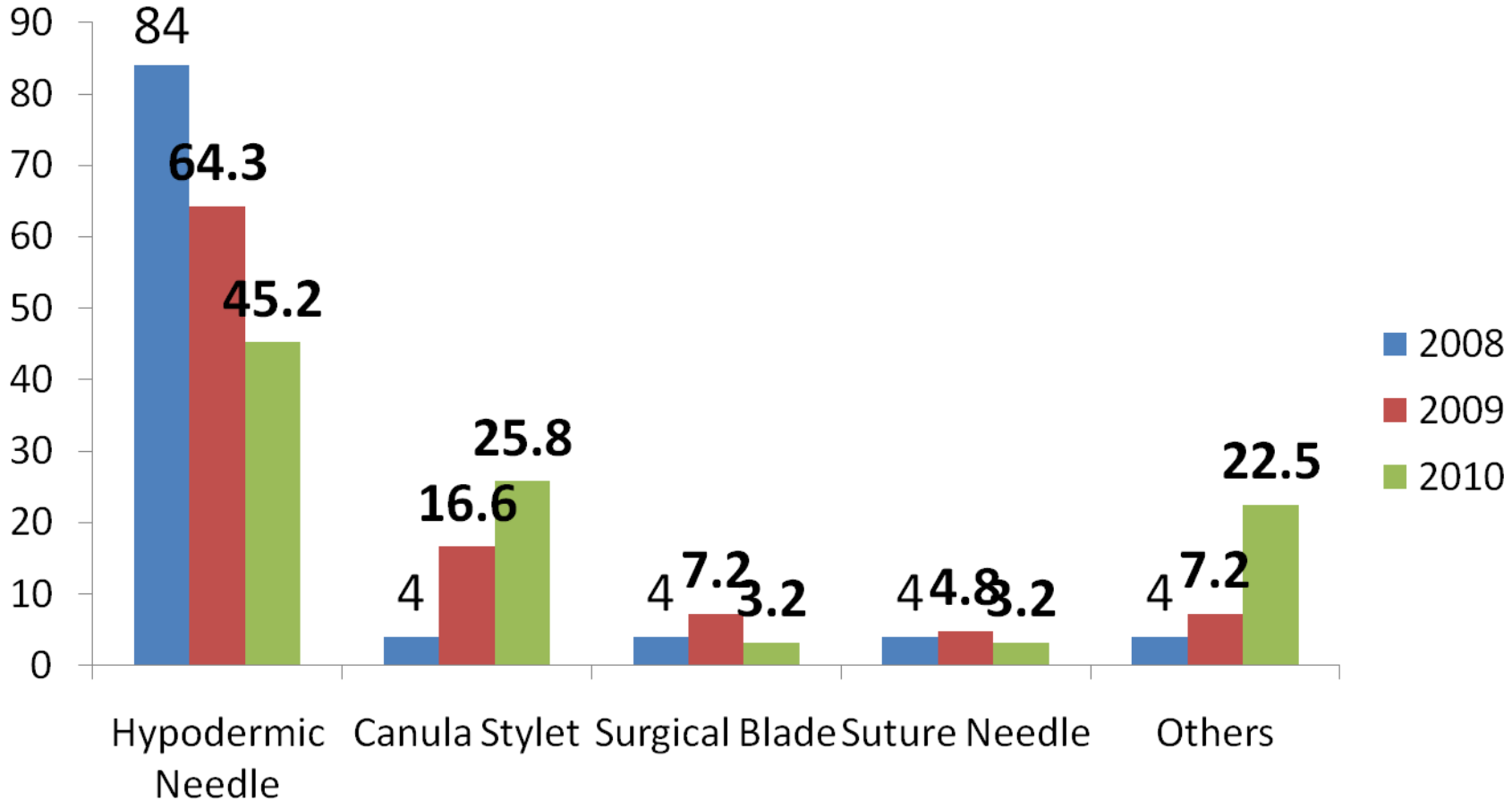


Percent of Medical Personnel involved in Sharp related injuries



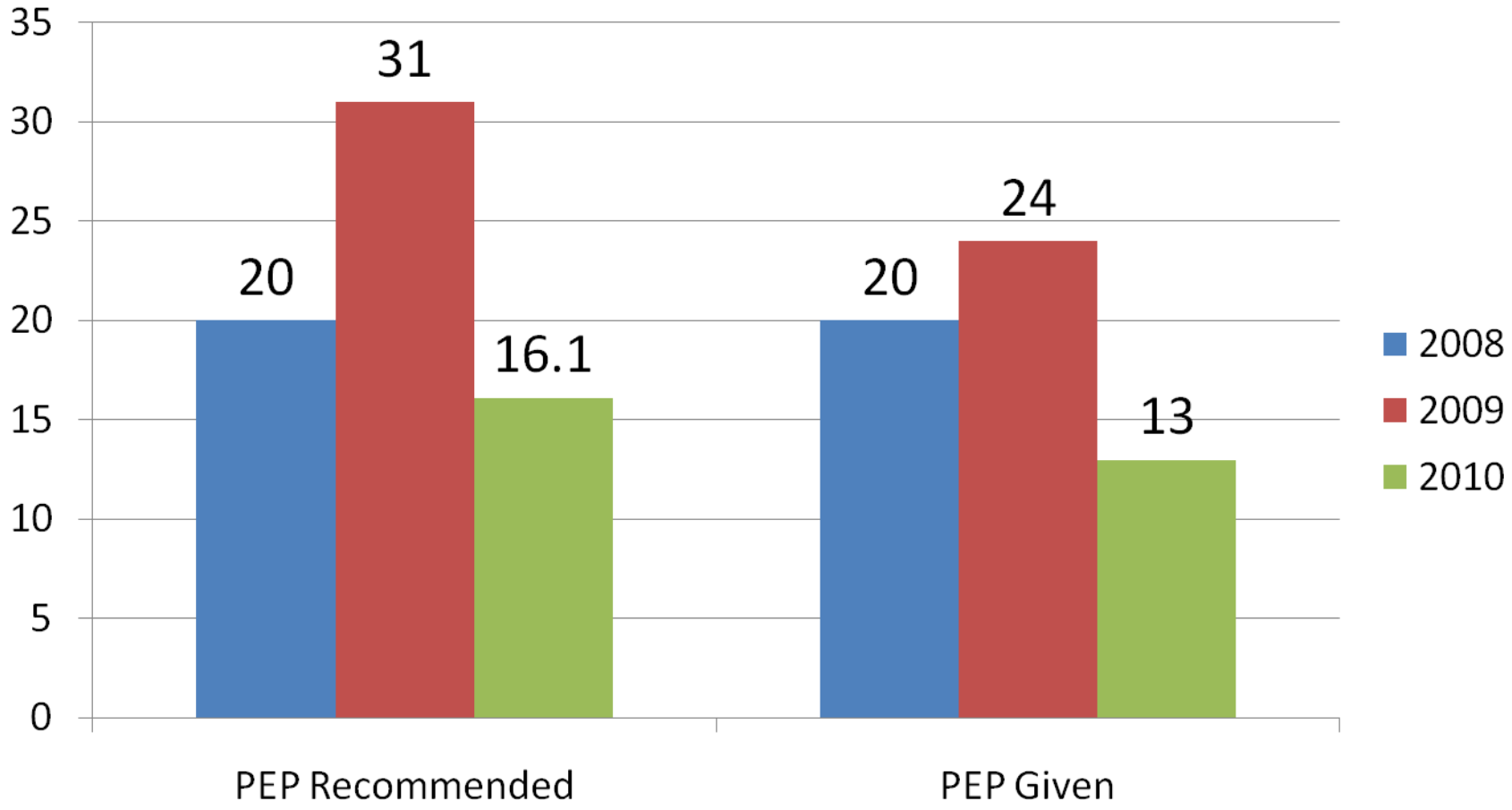
Others involved Patient attendent.

Types of Sharps involved in injuries



Others involve Glass, needle protruding from red / black bag or unknown object.

Percent of persons in whom PEP was recommended and given



Management of spillage

Body Fluid Spillage

- Spillage of blood / other body fluid visibly contaminated with blood
- Urine spillage visibly contaminated w/ blood
- Spillage of body fluids not visibly contaminated with blood

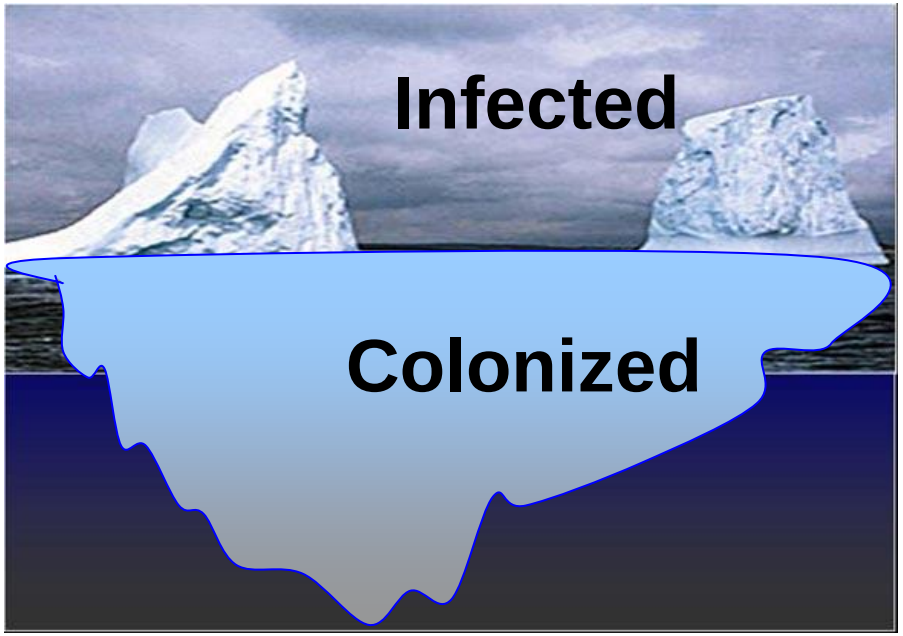

SPILL KIT (PVT WARD)
MANAGEMENT OF SPILLS OF BLOOD AND BODY FLUIDS .....
CONTENTS
PROCEDURE
Bleaching Powder 0.7gm
Bleaching Powder 0.75gm
Bleaching Powder 0.75gm
Bleaching Powder 0.75gm
H2O


SPILL KIT (PVT WARD)
MANAGEMENT OF SPILLS OF BLOOD AND BODY FLUIDS
CONTENTS
PROCEDURE

SURVEILLANCE AND REPORTING OF INFECTIONS

- **Statutory Notifications**

- **Obligatory conditions**



Types of Surveillance

- Active surveillance

- Passive surveillance – Targeted Surveillance
  - Laboratory-based inpatient surveillance (Alert organisms)
  - Ward based surveillance (Alert conditions)

Active Surveillance

- Define High Risk areas
  - Operation Theatres
  - Intensive care units -NICU, PICU
  - HDU
  - Dialysis
  - CSSD
  - Transfusion services unit
  - Food handlers
  - Drinking water facilities

Monitoring areas

- OTs
- Intensive care units -NICU, PICU
- HDU
- Dialysis
- Transfusion services unit
- Food handlers
- Drinking water facilities
- CSSD

Air Quality
Engineering controls – Temp, Humidity
Disinfectants monitoring

Water Testing

Wastage of blood bags
Disposal of bags

MRSA nasal carriage, Stool
Examination, Skin Diseases

Monitoring of sterile zone
Monitoring of disinfectants
Load recall system
Load control; Pack Control; Equipment control

TARGETED SURVEILLANCE

- **ALERT ORGANISMS**
  - BACTERIA
    - Methicillin-resistant *Staphylococcus aureus*
    - Penicillin-resistant *S. pneumoniae*
    - *Haemophilus influenzae*
    - Glycopeptide-resistant enterococci
    - *Neisseria meningitidis*
    - Pan-resistant Gram negative bacilli
    - *Mycobacterium tuberculosis*
    - Any unusual bacteria
  - VIRUSES
    - Hepatitis B, Hepatitis C,
    - Varicella zoster , Parvovirus , Measles,
    - Novel H1N1, Dengue

ALERT CONDITIONS

- Chicken pox or shingles
- Mumps, measles, rubella, parvovirus
- Whooping cough
- Poliomyelitis
- Diphtheria
- Meningococcal Meningitis
- HBV & HCV Infection
- Ophthalmia neonatorum
- Pyrexia of unknown origin
- Typhoid and paratyphoid fevers
- Viral haemorrhagic fever
- Swine flu

DISINFECTION AND STERILISATION

- **Disinfection** is a process where most microbes are removed from defined object or surface, expect bacterial endospores.

- **Sterilization** is defined as a process where all microbes are removed from a defined object, inclusive of bacterial endospores.

Spaulding classification

- Critical instruments /equipments (that are those penetrating skin or mucous membrane) should undergo sterilisation before and after use. e.g. surgical instruments and implants

- Semi-critical instruments /equipments (that are those in contact with intact mucous membrane without penetration) should undergo high level disinfection before use and intermediate level disinfection after use. e.g laryngoscopes.

- Non-critical instruments /equipments (that are those in contact with intact skin and no contact with mucous membrane) requires only intermediate or low level disinfection before and after use.e.g. ECG electrodes

- **Levels of action of disinfectants:**

- Bacteria
- Lipid viruses
- Fungi
- Non lipid viruses
- Mycobacteria
- Spores

Low (benzalkonium chloride, some soaps)

Intermediate (alcohols, chlorine compounds, hydrogen peroxide, chlorhexidene, glutaraldehyde (short term exposure)

High (glutaraldehyde 2%)

Department	Spirit	0.5% - 0.1% Sodium Hypochlorite	Glutraldehyde	Bacillocid	Sterisol/ Superoxide water
O.T.	For skin disinfection, Trolley tops, cautery leads	Disinfection of infected plastics (syringes, cannula caps)	Disinfection of sharp instruments or heat labile instruments (scissors, laryngoscope)	(2%) Tables, trolleys, tiles, floor cleaning, surgery tables.	Floor mopping
ICU's	For skin disinfection, Trolley tops, monitors leads, BP cuff	Disinfection of infected plastics (syringes, cannula caps), for cleaning of patient's furniture and fittings.	Disinfection of suction jars & tubings, laryngoscope, O2 Humidifiers	Surface disinfection (Bed frames, trolleys, , tiles).	Floor mopping & damp dusting
Laboratory	Surface cleaning - tables, Biosafety cabinets, work stations	Disinfection of used syringes, slides, cover slips and culture loops etc.	NA	NA	NA
Wards	For skin disinfection,& Surface cleaning (Trolley tops etc)	Disinfection of infected plastics (syringes, cannula caps, patient patient furniture and fixtures.)	Disinfection Heat labile and other instruments(scissors etc)	surface disinfection (Bed frames, trolleys, , tiles).	Floor mopping & damp dusting
Dental	Dental Chairs	Disinfection of infected plastics (syringes etc)	Disinfection of instruments	Surface cleaning	NA
ENT OPD	Ear speculum cleaning, skin disinfection	Disinfection of infected plastics (syringes etc) and damp dusting	Infected Ear speculum cleaning	NA	NA
Dressing Room	For skin disinfection, Trolley tops etc	Disinfection of infected plastics (syringes etc)	Disinfection of instruments	NA	NA

Ecosheild: Fogging; **Phenol (0.5%):** Disinfection of culture media**;**
Hand Gel: Hand Hygiene

CARE OF SYSTEMS AND INDWELLING DEVICES

- VASCULAR CARE
  - Preparation of skin
  - Applying dressings
  - Inspecting catheter insertion sites
  - Manipulation of intravascular catheter systems
    - Flushing IV lines
    - Peripheral IV sites (short/long term catheters)
    - Dressing changes
    - Replacement of Peripheral IV Catheters

…CARE OF SYSTEMS AND INDWELLING DEVICES

- RESPIRATORY CARE
  - Ventilator
  - Tracheostomy Care / Endotracheal Tube
  - Suctioning of endotracheal / tracheostomy tube

…CARE OF SYSTEMS AND INDWELLING DEVICES

- URINARY CATHETER
  - Catheterization
  - Personnel
  - Catheter Use
  - Catheter Insertion
  - Anchoring the catheter

- WOUND CARE

Care/policy

- Ampoules
- Single dose vials
- Multidose vials
- IV cannulas, labeling, care, duration 72hrs
- IV lines- labeling – date/ content
- Pediatric drip set/ blue covers
- Needle - syringe safety
  - Needle recapping
  - Needle disposal
  - Syringe disposal

HOUSE KEEPING

- In Wards/other patient care units
  - Frequency of cleaning with time table
  - Material used
  - Personnel
  - Mopping techniques

…HOUSEKEEPING

- IN THE OPERATION THEATRES
  - Before the start of the 1st case
  - Between two surgeries
  - After the last case
    - Linen & gloves
    - Instruments
    - Environment
  - Weekly cleaning procedure

Isolation policy

- *Objectives*
  - To prevent the transmission of pathogenic microorganisms within the healthcare setting

- List Diseases for isolation

…Isolation

- Patients are isolated when
  - Suffering from highly transmissible diseases e.g. chicken pox. Patient is placed in a single room with hand washing and toilet facilities.
  - Infected with epidemiologically important microorganisms such as MRSA, Imipenem resistant Acinetobacter spp.

…Isolation policy

- Engineering and flow
  - Separate ward/room/area for the patient
  - Double door entry with a separate changing room with availability of PPE, disinfectants and a hand washing area.
  - Provide negative pressure with adequate air changes (6-12/hour) & HEPA filtered air for patients suffering from respiratory pathogens
  - Central A/C and use of desert coolers is not permitted.

…Isolation policy

- Ensure 1 metre distance b/w patient beds
- No overcrowding in isolation ward / area
- Unauthorised visitor's entry - prohibited
- Donning of adequate PPE - mandatory
- Only dedicated HCWs to be posted

…Isolation policy

- Clean and disinfect frequently touched surfaces
- Avoid aerosolisation - damp sweeping / wet mopping.
- Standard work precautions & barrier nursing: followed with special stress on hand hygiene (adequate display of procedures).

Barrier nursing

- The aim is to erect a barrier to the passage of infectious pathogenic organisms between the contagious patient and other patients and staff in the hospital, and hence to the outside world.
- The nurses, attending consultants as also any visitors must wear gowns, masks, and sometimes rubber gloves and they observe strict rules that minimize the risk of passing on infectious agents.

- Bedding is carefully moved in order to minimize the transmission of airborne particles, such as dust or droplets that could carry contagious material.
- Barrier nursing must be continued until subsequent cultures give a negative report

…Isolation policy

- Strict adherence to appropriate use of PPE.
- Avoid sharing of equipments among the patients.
- Disinfect all equipments coming in contact with the patient
- Avoid use of mobile phones by healthcare staff
- Appropriate waste disposal facilities

…Isolation policy

- All paper work / records kept outside the isolation area

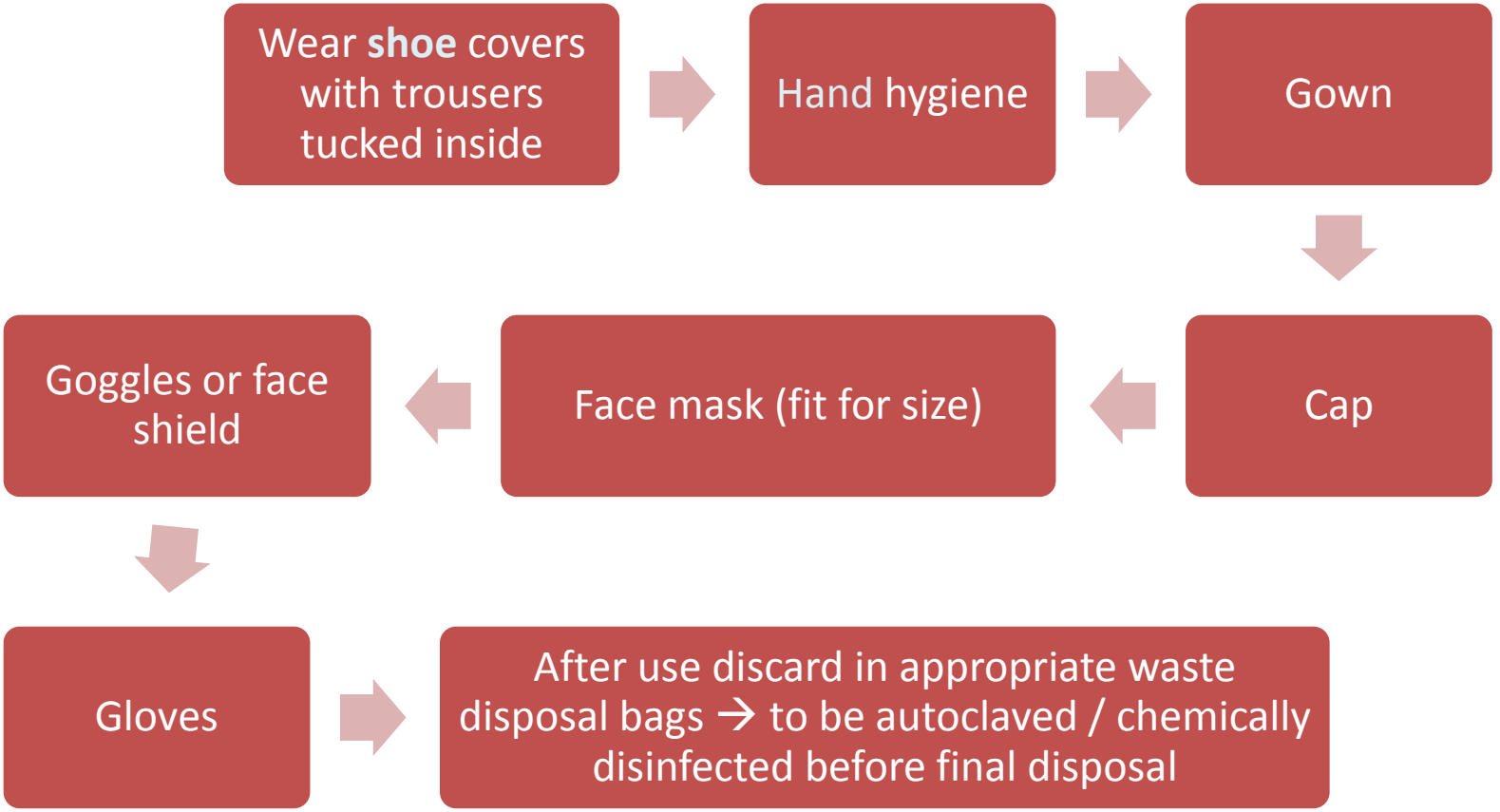
- Handle used linen as little as possible with minimum agitation, labelled as infectious and transported in closed containers.

…Isolation policy

- **PPE:**
- The sequence of donning PPE
- The sequence of removing PPE

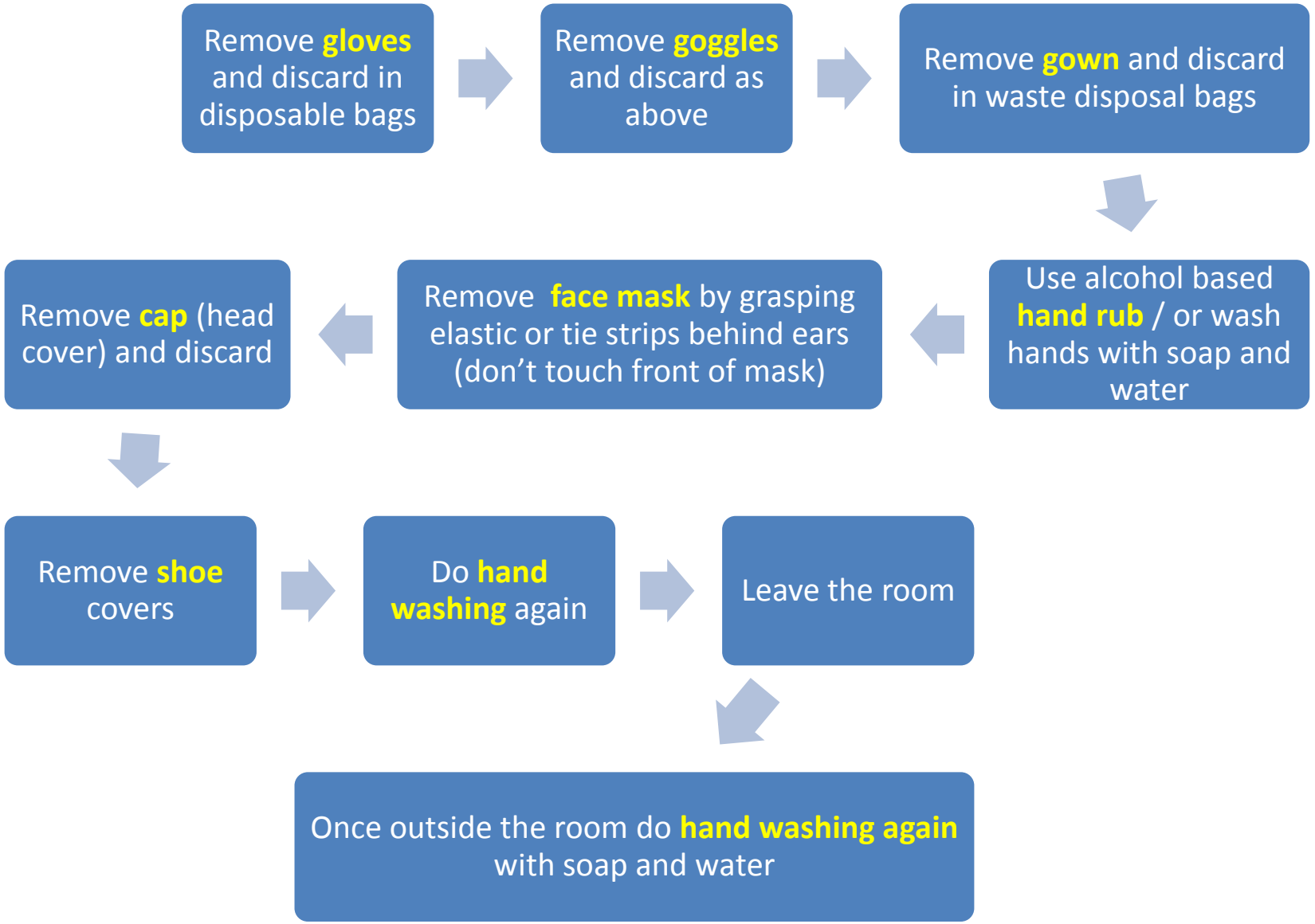
…Isolation policy

- The sequence of donning PPE



…Isolation policy

- The sequence of removing PPE



…Isolation

- CLEANING OF EQUIPMENT AND ARTICLES
- LAUNDRY
- TERMINAL CLEANING
  - Terminal cleaning of walls, blinds, and curtains may be done. Disinfectant fogging is not recommended.

VISITORS POLICY

Vehicle Disinfection

- Patient care areas must be cleaned and disinfected after each patient use.
- Outline below are general guidelines for vehicle disinfection while the vehicle is in use.
  - Cot linen and pillow to be changed between patient use.
  - The spill kit to be used for cleanup of body fluids.

Vehicle Disinfection...

- All hard surfaces should be sprayed and wiped with a disinfecting spray as needed. It should also be done weekly routinely.
- The floor should be washed as needed and done each shift routinely.
- Garbage bags will be emptied between calls.
- Cab and patient care area should be kept free of litter or expendable supplies used on a previous patient.
- Entire vehicle should be cleaned each shift as needed.

Monitoring of the program

HIC INDICATORS

- Device- associated Infection Rate

  = No. of device-associated infections for a specific site X 1000

  Number of device days

- VAP

  No. of patients developed VAP X 1000

  No. of Ventilator days

- CRBSI

  No. of patients developed CRBSI X 1000

  Total no. catheter days

- CAUTI

  No. of patients developed CRBSI X 1000

  Total no. catheter days

HIC INDICATORS

- **Device (**Ventilator, central line, Foley's Catheter**) Utilization Rate:**

$$\frac{\text{No. of Device days}}{\text{No. of Patient days}}$$

- **Antibiotic Utilization rate:**

$$\frac{\text{Antibiotic used (gms)}}{\text{Defined drug Dose (gms)}}$$

Catheter device utilisation (Ward, Hospital , PICU, NICU)	No of catheter days (urinary)	No. of patient days	HIC 4 (a-c) & CQI 3 d
Ventilator device utilisation(Hospital , NICU,PICU)	No of ventilator days	No of patient days for ventilated beds	HIC 4 (b) & CQI 3 d
Central line device utilisation(Hospital , NICU,PICU)	No of central line days	No of patient days	HIC 4 (c) & CQI 3 d
HOSPITAL CRUDE INFECTION /1000 Patient days	No. of culture positive cases	No of patient days	HIC 3 (e)
HOSPITAL NOSOCOMIAL INFECTION	No. of nosocomial infection	No. of total cases studied	HIC 3 (e)
IRRATIONAL USE OF ANTIBIOTIC	No. of irrational use of antibiotics	No. of total antibiotics studied	HIC 2(e)
IMMUNISATION OF HEALTH CARE WORKERS	No of Initial Dose Given	No of completion of immunisation	HIC 9(e)
Portable Water Testing	Total no. of samples of water tested		FMS 4(c)
BSI /1000 Pt days (NICU, PICU ,Ward , Hospital)	No. of BSI Identified	No of pt days	HIC 4 (e)
Hospital Hand hygiene Compliance rate of HealthCare Workers	No. of action	Total no. of opportunities	HIC 5(b)
Catheter related blood stream infection /1000 patient days(Hospital , PICU, NICU, Ward)	Cases of CRBSI identified	Total central line days	HIC 4(c)
Surgical Site Infection per 1000 surgeries- Hospital	Number of patients developing SSI during specific time	Number of operations during specific time	HIC 4(d)
CAUTI /1000 Catheter days (Hospital, NICU, PICU)	Number of catheterised patients developing UTI / identified in the hospital	Total number of urinary catherter days	HIC 4(a)
VAP rates/1000 ventilator days (Hospital, NICU, PICU)	Number of VAP identified in Hospital	Number of Ventilator days	HIC 4(b)

Daily appraisal form

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Govt. of NCT Delhi

Geeta Colony

Delhi – 110031

Surveillance and Infection Control Division

Daily appraisal form

Date: **Hospital Unit Name: ICU/Ward____**

Total No. of bed strength:

Total no. of patients:

Number of patients with one or more central lines:

Number of patients with a urinary catheter:

Number of patients on a ventilator:

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Geeta Colony

Delhi – 110031

Surveillance and Infection Control Division

Daily appraisal form (NICU)

Date:

Total No. of bed strength:

Total No. of beds occupied:

≤750 gm				751-1000gm				1001-1500gm				1501-2500gm				>2500gm			
Pts	U/C	CL	VNT	Pts	U/C	CL	VNT	Pts	U/C	CL	VNT	Pts	U/C	CL	VNT	Pts	U/C	CL	VNT

If infant has both a U/C and CL, count as U/C infant only for the day

Pts=number of infants,

U/C=number of infants with **umbilical catheter**

CL=number of infants with 1 or more **central lines**

VNT=number of infants on a **ventilator**

Antimicrobial use and Resistance(AUR)

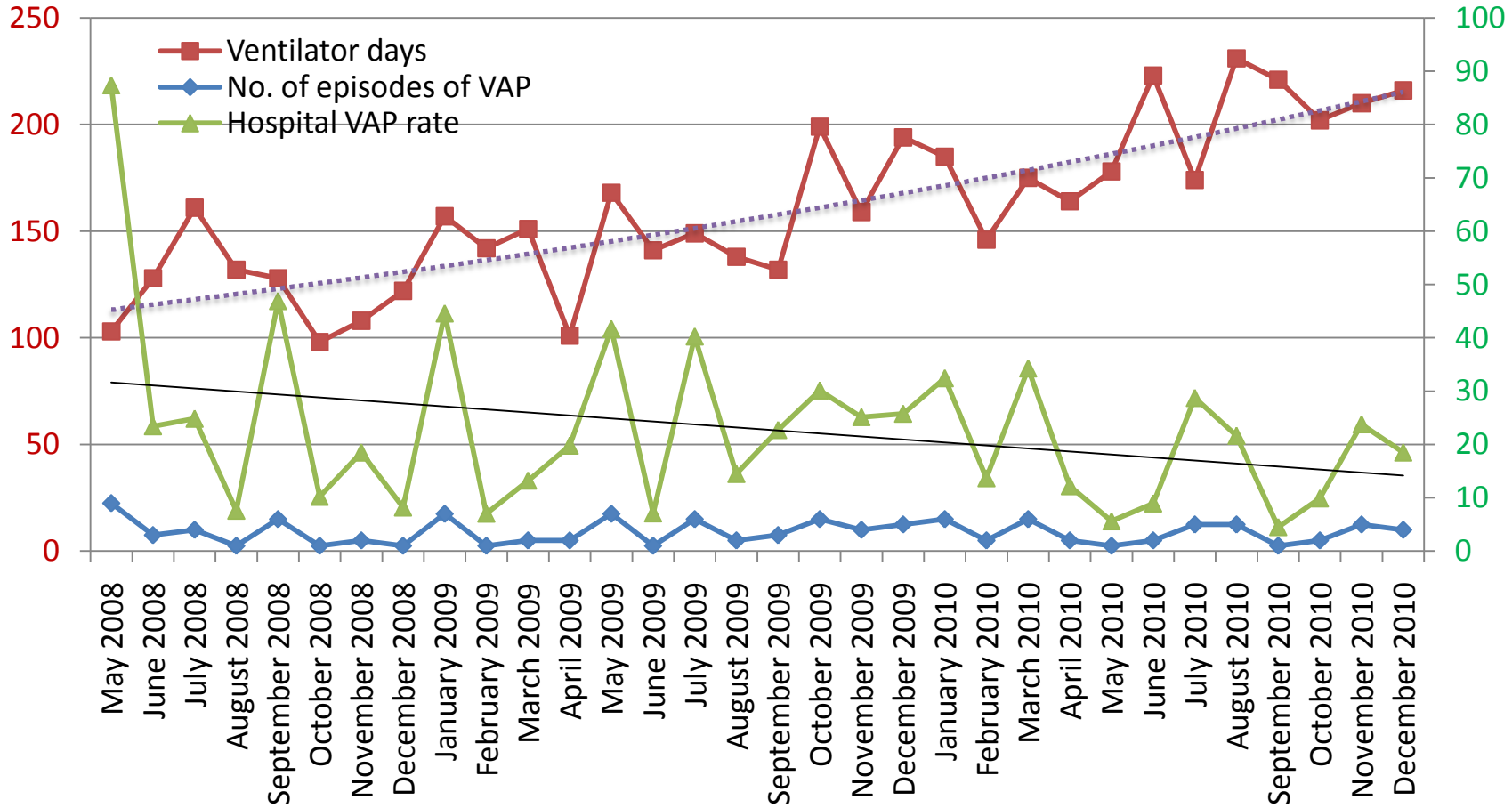
Pharmacy Data - Daily Report Form

Facility I.D : Location Code: Patient Days:

Parenteral Antibiotics					
Antibiotics	**Quantity Used**			**Antibiotics**	**Quantity Used**
Amikacin	g			Gentamicin	g
Ampicillin	g			Imipenem	g
Ampicillin**/Clavulanate	g			Levofloxacin	g
Ampicillin**/ Sulbactam	g			Linezolid	g
Azithromycin	g			Meropenem	g
Azetreonam	g			Metronidazole	g
Cefamandole	g			Nafcillin	g
Cefepime	g			Ofloxacin	g
Cefmetazole	g			Cloxacillin	g
Cefotaxime	g			Penicillin G	g
Cefoxitin	g			Pen. G Benzathine	g
Ceftazidime	g			Procaine Pen G	g
Ceftizoxime	g			Piperacillin	g
Cefttriaxone	g			Piperacillin**/ Tazobactam	g
Cefuroxime	g			Quinuprstin**/ Dalfopristin	g
Cephalothin	g			Ticarcillin	g
Chloramphenicol	g			Ticarcillin**/ Clavulanic Acid	g
Ciprofloxacin	g			Tobramycin	g
Daptomycin	g			Vancomycin	g
Ertapenem	g				
Others					
Oral Antibiotics					
Antibiotics	**Quantity Used**			**Antibiotics**	**Quantity Used**
Amoxicillin	g			Gatifloxacin	g
Amoxicillin**/ Clavulanic Acid	g			Levofloxacin	g
Ampicillin	g			Linezolid	g
Azithromycin	g			Lomefloxacin	g
Cefaclor	g			Metronidazole	g
Cefadroxil	g			Moxifloxacin	g
Cefixime	g			Norfloxacin	g
Cefprozil	g			Ofloxacin	g
Cephalexin	g			Penicillin V	g

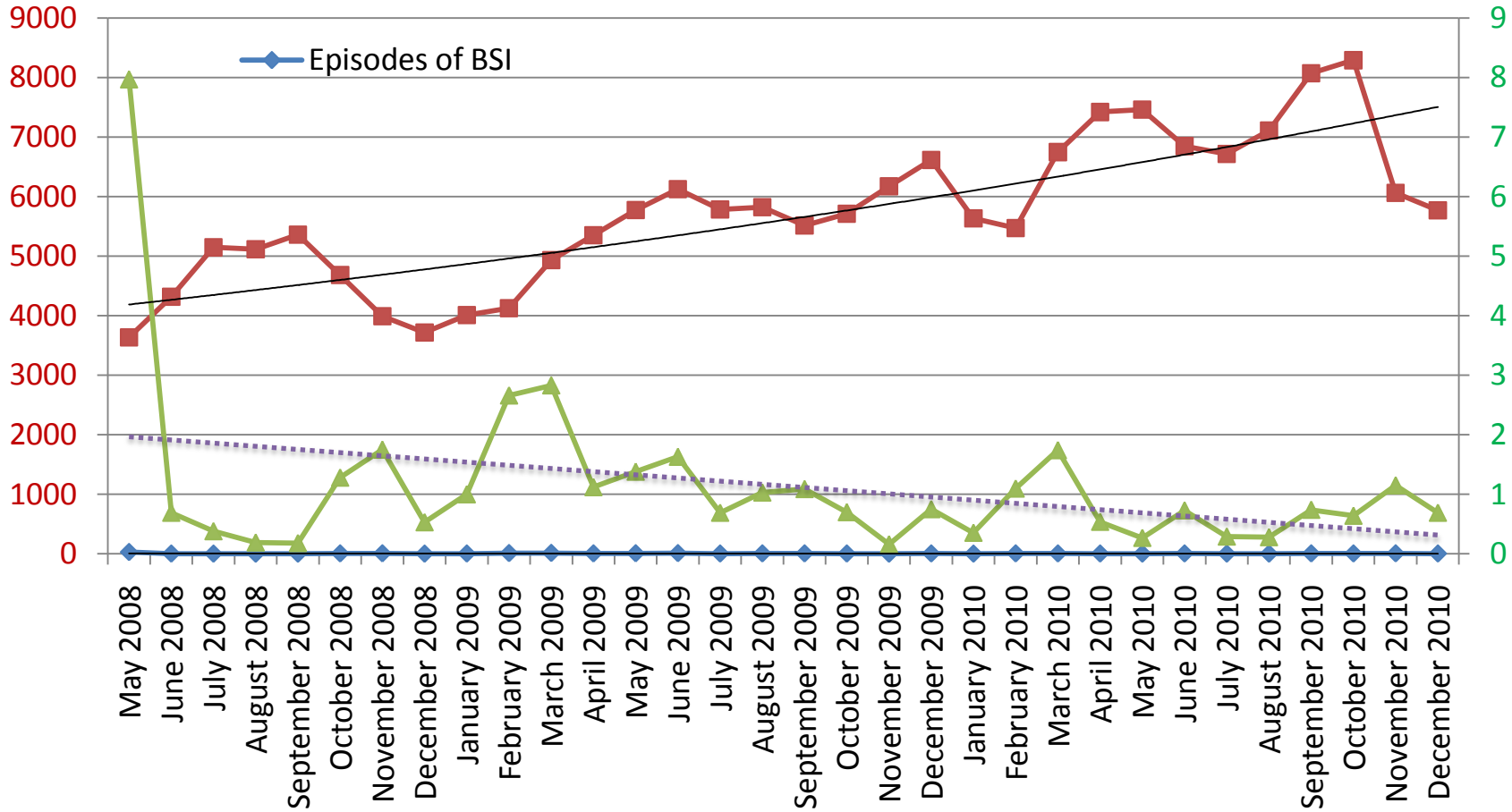
Hospital VAP Rates

(per 1000 ventilator days)



Hospital - HA-BSI rates

(per 1000 Patient Days)



International Benchmarking

Parameter	CNBC	NHSN
VAP	10.2	3.8
Ventilator DUR	0.7	0.42
CRBSI	2.8	3.0
Central line DUR	0.02	0.17
CAUTI	7	7.2
Urinary Catheter DUR	0.06	0.09
SSI	9.8	4.0

Responsibility of Infection Control

In next presentation we will discuss

- Engineering control
- Laundry and Linen Management
- CSSD
- Kitchen
- Investigation of an outbreak
- Antimicrobial stewardship program