अखिल भारतीय आयुर्विज्ञान संस्थान (एम्स , ऋषिकेश
All India Institute of Medical Sciences (AIIMS)
Rishikesh, Uttarakhand, India, 249203

PEAK ERADICATION

A Program

Under

Integrated Antimicrobial Stewardship Initiative

AIIMS, Rishikesh

Contents

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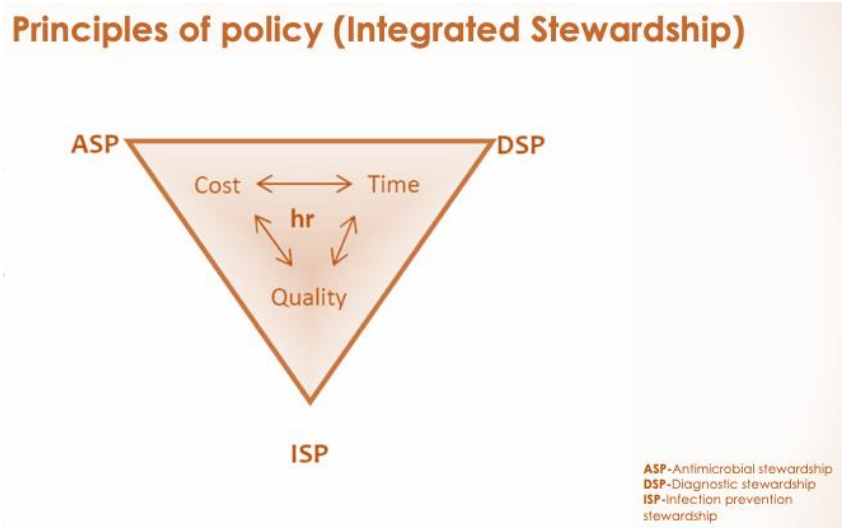
Integrated Antimicrobial Stewardship (IAS)

Integrated antimicrobial stewardship is a coordinated practice that promotes the appropriate use of antimicrobials (including antibiotics), improves patient safety and outcomes, reduces antimicrobial resistance, and decreases the spread of infections caused by multidrug-resistant organisms.



Target:

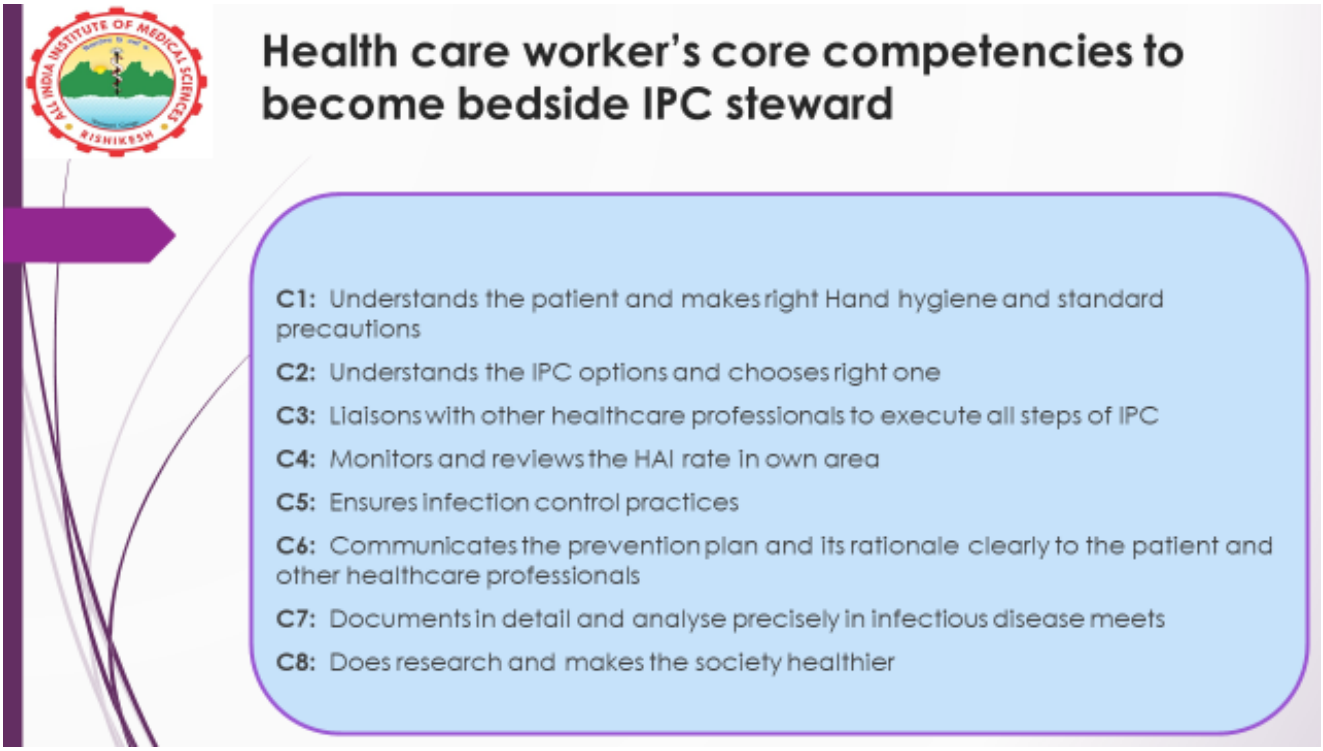
1. Zero tolerance to hospital acquired infections – By ISP
2. Decreasing turn-around time for all microbiological diagnosis – By DSP
3. Improving optimal utilization of antimicrobials – by ASP
4. Achieving 100% vaccination to all health care workers
5. Achieving 100% regular training to all health care workers

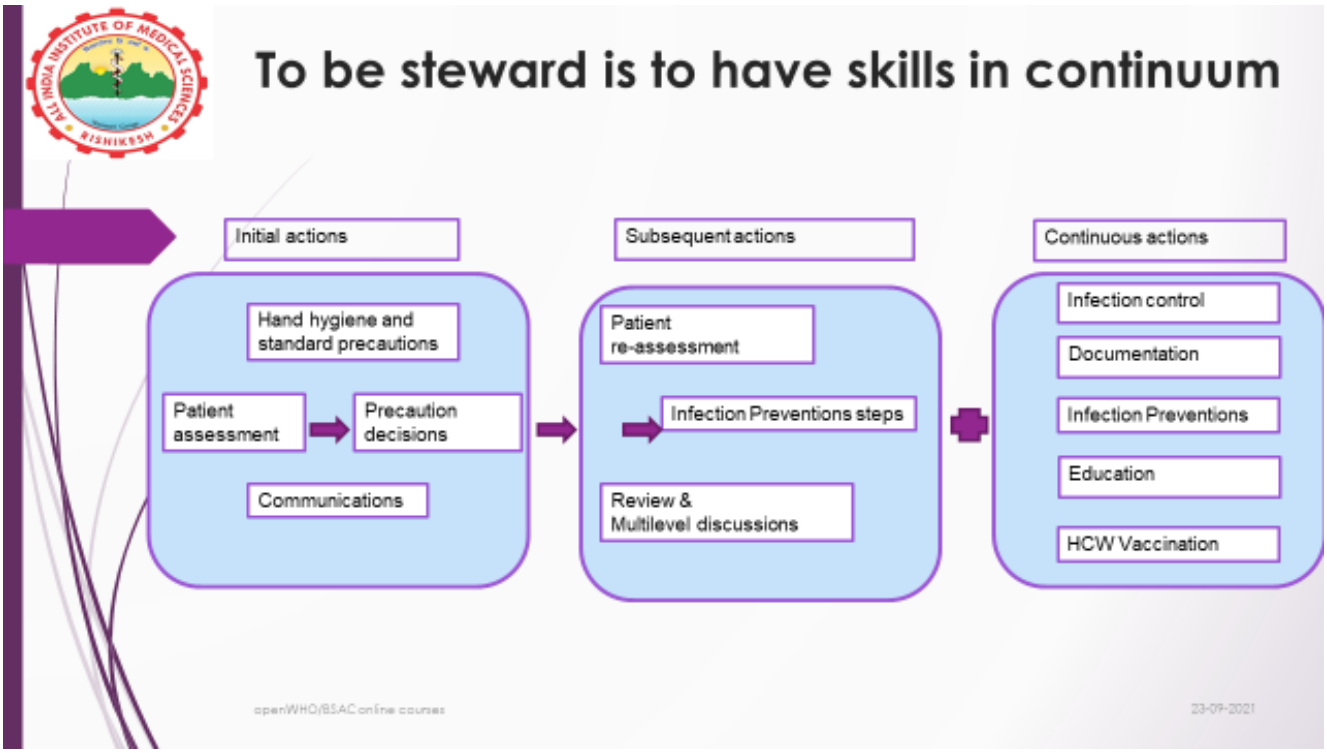
Who will do:

Roles of Health-care Workers towards right 8D's of Integrated Antimicrobial Stewardship practices								
IAS team members	**Right Do in IPC**	**Right Don't in IPC**	**Right Diagnosis**	**Right Drug**	**Right Dose**	**Right Delivery (route)**	**Right Decision (of STOP/SWITCH/CHANGE/CONTINUE/OPAT) in Follow-up**	**Right Duration**
Role of clinician	□	□	□	□	□	□	□	□
Role of microbiologist	□	□	□	□	□	□	□	□
Role of pharmacologist	□	□	□	□	□	□	□	□
Role of Nursing staff	□	□	□	□	□	□	□	□
Role of pharmacist	□	□	□	□	□	□	□	□
Role of patient/public	□	□	□	□	□	□	□	□

Role of other staff	□	□	□	□	□	□	□	□

How to do:

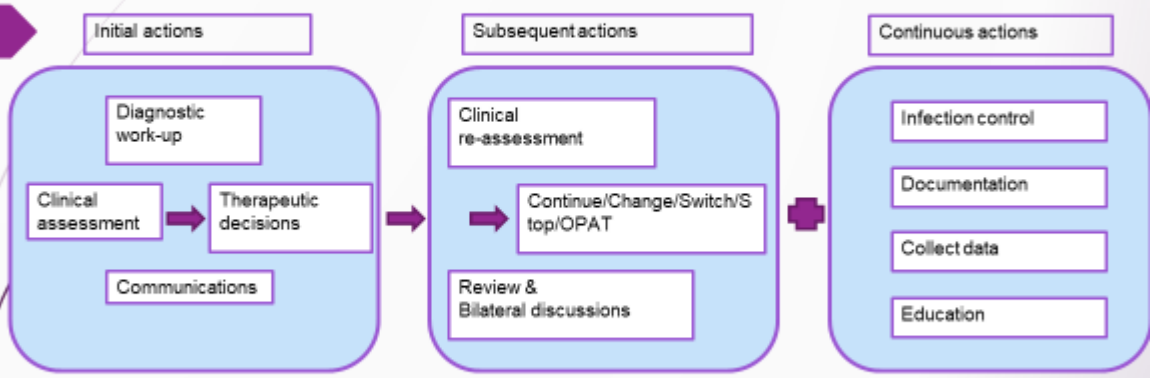




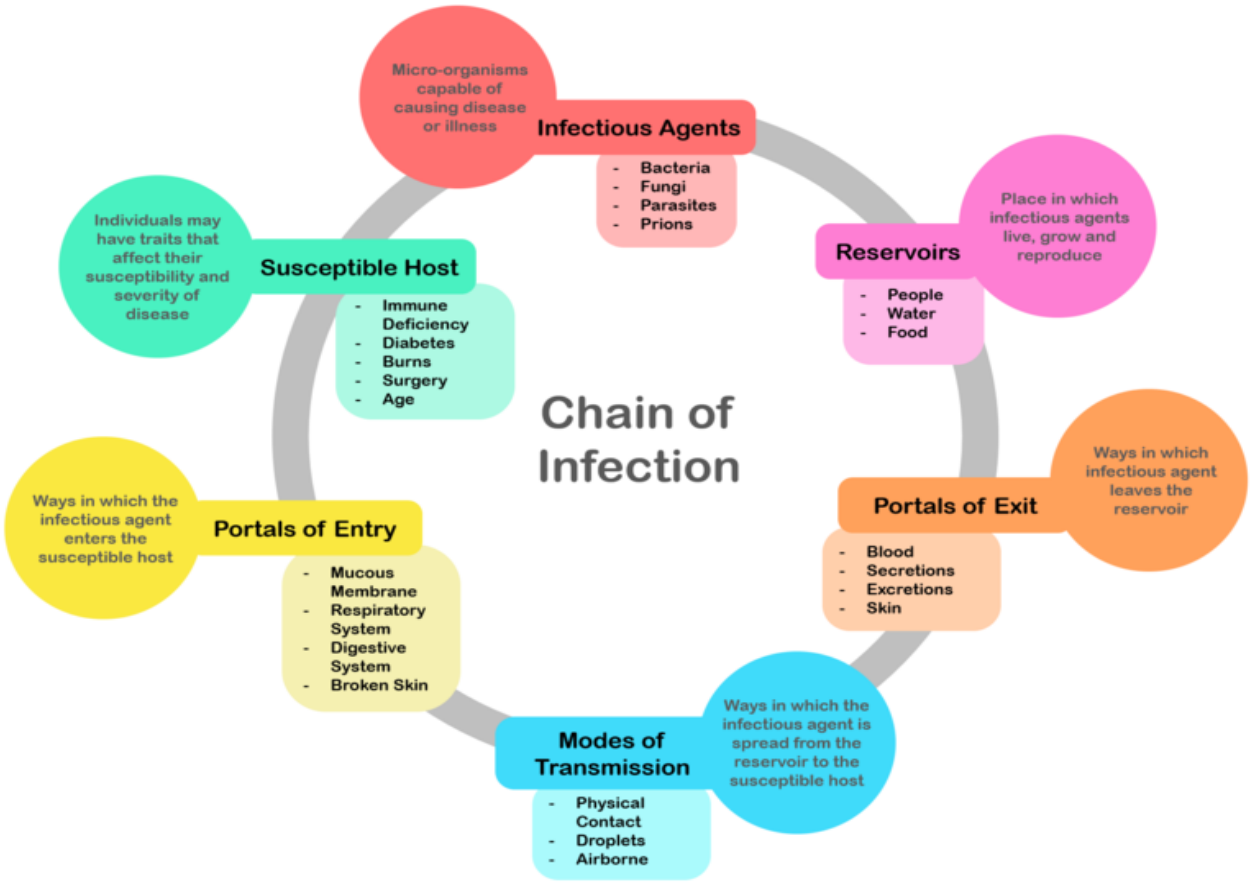
Clinician's core competencies to become bedside steward

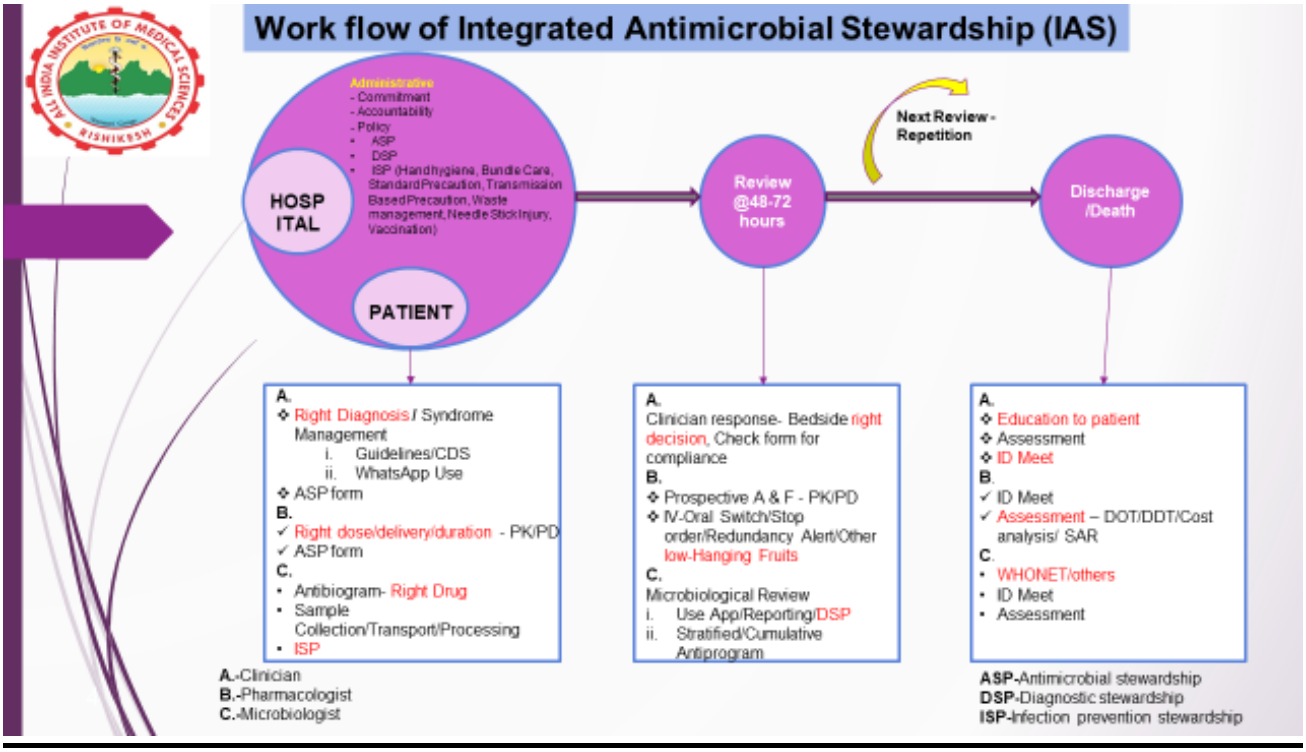
- **C1:** Understands the patient and makes right diagnosis
- **C2:** Understands the treatment options and chooses right drug
- **C3:** Liaisons with other healthcare professionals to execute right dose, delivery, decision on follow-up, and duration
- **C4:** Monitors and reviews the patient's response to treatment
- **C5:** Ensures infection control practices
- **C6:** Communicates the diagnosis, treatment, and prevention plan and its rationale clearly to the patient and other healthcare professionals
- **C7:** Documents in detail and analyse precisely in infectious disease meets
- **C8:** Does research and makes the society healthier

Bedside steward – ASP skills in continuum

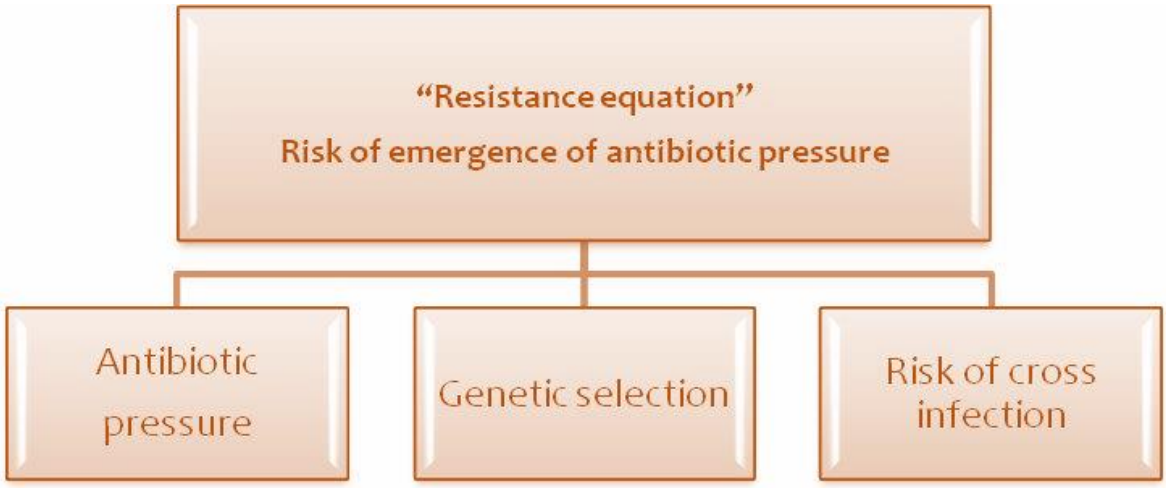


Break the Chain of transmission





Antimicrobial resistance (AMR)



- ✓ **MDR- Multiple drug resistance** (**MDR**), **multidrug resistance** or **multiresistance** is antimicrobial resistance shown by a species of microorganism to at least one antimicrobial drug in three or more antimicrobial categories. Antimicrobial categories are classifications of antimicrobial agents based on their mode of action and specific to target organisms. The MDR types most threatening to public health are MDR Pseudomonas, Enterococci, Acinetobacter, and Klebsiella (Pneumonic - PEAK) and lastly MRSA.
- ✓ **XDR- Extensively drug-resistant (XDR)** is the non-susceptibility of one bacteria species to all antimicrobial agents except in two or less antimicrobial categories.
- ✓ **PDR- pandrug-resistant (PDR)** is the non-susceptibility of bacteria to all antimicrobial agents in all antimicrobial categories.

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PEAK Eradication Strategy

Director of the institute has initiated a drive on 4th June 2021 to eradicate these MDR PEAKs along with other micro-organism by setting up a team of clinicians, microbiologist, nursing personnel, and admins from various fields with one aim to have ZERO hospital acquired infections in the institute.

Basic strategy is by achieving 100% compliance to infection prevention and control with right microbial diagnosis and right use of antimicrobials.

Various steps are being implemented in addition to usual work flow of HICC and DTC:

1. Immediate isolation of MDR PEAK pathogen harbouring patients in dedicated isolation room/cubicle and Environmental cleaning of affected area

2. Creation of local ground working team members of IPNa-d, IPRa-c, IPHa-b with linked ICNs in each area to Master in each IPC aspects. They will do local IAS meets on weekly basis in rotation (**Monday-B block area, Wednesday-C block, and Friday-D block**)

3. Use of monitoring team of QPN in each building block. They will do weekly clinical audit meets in rotation (**2nd Thursday of Month-B block area, 3rd Thursday-C block, and 4th Thursday-D block**) in collaboration with ICN (of both HICC and PEAK) of the concerned area.

4. Use of one NO as PEAK ICN for data collection, audit, feedback, and application in change of practice by all HCWs. He/she will co-ordinate each PEAK activities.

5. Overall implementation of the initiative by two member secretaries – one internist and another microbiologist with regular update of protocol and SOP

Till now over 3months, we have isolated >250 MDR Peak patients and done >10 local meets and 8 block level meets with regular clinical audit and feedbacks. This has resulted **>40% MDR reduction of HAI rate with >40% survival benefits** in a crude measurement.

Onwards this noble initiative will reduce further MDR rates and will achieve zero HAI by December 2021.

N:B: IPNa-d: Infection prevention Nurse for hand hygiene (A), Bundle and Ryle's tube care (B), Body care (C), and Disinfection/environmental cleaning (D) for an area for duration of posting under linked ICN

IPRa-c: Infection prevention Resident for hand hygiene (A), Bundle and Ryle's tube care (B), and Antimicrobial stewardship resident (C) for an area for duration of posting under linked ICN

IPHa-b: Infection prevention Hospital-attendant for hand hygiene (A) and Body care (B) for an area for duration of posting under linked ICN

IPHa-b: Infection prevention Housekeeping staff for hand hygiene (A) and Disinfection/environmental cleaning (B) for an area for duration of posting under linked ICN

Linked ICN: Area SNO

QPN: Quality prevention senior nursing officer for B, C, D blocks

All these dedicated team members should be fixed for particular time period to an area with identified names in roster during posting. They will be masters in their given work. Best staff will be awarded in each category time to time.

PEAK Prevention – Patient centric

1. **Hand hygiene** – 100% compliance (by checklist) to be ensured by each HCW; 1 ICN for master control (surveillance and monitoring) & 1 IPNa, 1 IPRa, and 1 IPHa (hospital attendant) and 1 IPHa (house-keeping staff) from each CCU/ICU/ward to practice, instruct, influence, feedback others in a role model approach
2. **Bundle care** (CAUTI/CLABSI/VAP/SSI/Ryle's tube care) – 100% compliance (by checklist) to be ensured; 1 ICN for master control (surveillance and monitoring) & 1 IPNB and 1 IPRB from each CCU/ICU/ward to practice, instruct, influence, feedback others in a role model approach
3. **Body care** (Skin, Mouth, Ano-genital region, Nail, Hair, Positioning) - 100% compliance (by checklist) to be ensured; 1 ICN for master control (surveillance and monitoring) & 1 IPNC and 1 IPHB (hospital attendant) from each CCU/ICU/ward to practice, instruct, influence, feedback others in a role model approach
4. **Disinfection** & **Environmental cleaning** – 100% compliance (by checklist) to be ensured; Two beds per day to be deep cleaned (vacant-clean-occupy-vacant rotational cycle) followed by environmental cleaning; 1 ICN for master control (surveillance and monitoring) & 1 IPND and 1 IPHB (house-keeping staff) from each CCU/ICU/ward to practice, instruct, influence, feedback others in a role model approach
5. **HCW Vaccination** – Each HCW to be vaccinated through EHS system:

Vaccines	Doses	Assessment of Vaccination	Contraindications
Hepatitis B	3 doses at 0, 1, 6 months	1)Documentation 2)Antibody titre ≥10 MIU/mL	Serious allergic reaction to vaccine
SARS-CoV-2	2 doses at 8-12weeks gap	1)Documentation	As per type of vaccine
Influenza	One annually dose	1)Documentation in last 1 year	As per type of vaccine
MMR	2 doses- 0, 1 month	1)Documentation 2)Laboratory evidence of immunity 3)Laboratory confirmation of disease 4)Birth before 1957	• Immunocompromised state • Pregnancy • Allergic to vaccine components
Varicella (chickenpox)	2 doses at 4 weeks interval	1)Documentation 2)Laboratory evidence of immunity 3)Laboratory confirmation of disease 4)Diagnosis or verification of a history of varicella disease or HZ by a health-care provider	• Allergic to vaccine components • Immunosuppressed conditions • Pregnancy or breastfeeding
Tdap	One dose as soon as possible, then Td booster dose after every 10 years	1)Written documentation 2)Antibody titre >0.1U/ML	Severe allergic reaction
Rabies; Meningococcal; Pneumococcal; H. influenza; Other Adult Vaccines	As per type of vaccine	1)Indicated only in specific indication of HCW's #Consult treating Physician if indicated	As per type of vaccine

Any concern for these prevention steps, PEAK team may be contacted (SR Microbiology Dr Sasi (9897375630), Microbiology faculty Dr Amber (78144 81836), and Medicine faculty Dr PK Panda (9868999488)

PEAK Control– Patient centric

1. **Isolation**: Complete isolation of MDR PEAK is a mandate till one concerned sample is sterile OR patient is clinical recovered with completed dosed of antimicrobials for right duration. Each clinical Dept to have isolation room where contact (for PEAK MDR), droplet (for Covid, H1N1), and airborne (for Pulm TB, Covid, measles) precautions be implemented:

A.	Implement standard precautions
B.	Place patient in a single room (or cubicle with other similar pathogen) and maintain at least 3 feet gap
C.	Wear clean non-sterile gloves, non-sterile gown, and surgical/N95 mask when entering the room
D.	MDROs, such as PEAK, MRSA contaminate the environment (surfaces and items) in the vicinity of the infected or colonized patient. Therefore, barrier precautions to prevent contamination of exposed skin and clothing to be used.
E.	Limit the movement and transport of the patient used devices from the room without sterilisation
F.	Patients should be moved for essential purposes only with covering of whole body
G.	Wear partial or full PPE for airborne pathogened isolation rooms
H.	Exhaust fans to be on in each room/cubicle or negative pressure room for airborne pathogened isolation rooms
I.	Entry of each HCW to the isolation room to be documented in a register and IPC surveillance to be monitored strictly
J.	Duty roster of each HCW in the isolation room to be fixed for a particular duration. STOP cross-infection

2. **Antimicrobial policy:**

a. ***Local antibiogram*** as per records for PEAK organisms to be distributed time to time

b. ***Right samples*** to be processed under diagnostic stewardship:

Identification within 24 hrs by MALDI TOF as per clinical correlation if growth is obtained. AST available in 48 hours.

c. Utilization of empirical antibiotics:

- ✓ Patient with local pathology from where samples collected - Go ahead with institutional empirical antimicrobial therapy or any guideline till guided by culture sensitivity report
- ✓ If NO local sampled pathology, look for features for septicaemia by calculating SOFA score, if more than 2 changes from baseline - Go ahead with institutional empirical antimicrobial therapy till guided by antibiotic sensitivity testing
- ✓ If No septicaemia - DO NOT start antimicrobials, discuss with PEAK team (SR Microbiology Dr Jitendra (8360979173) and Microbiology faculty Dr Biswajeet (9402733188)), or Medicine faculty Dr PK Panda (9868999488)

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PEAK MDR Isolation

After suspecting infectious etiology, cultures to be sent to Microbiology Lab with right culture forms in which diagnosis and symptoms of the patients to be mentioned

After receiving the samples, Identification to be made after 24 hours by MALDI TOF, performed as when required and AST comes after 72 hours

If it is showing any growth in 24 hours then initial report to be given to respective treating JR/SR

After 24hrs if no growth is their then wait for 72hrs and after that report is generated

AST Report after 72 hrs.

Microbiology SR Dr Sasi correlate the organisms' pathogenicity by crossing the symptoms and diagnosis of patient by asking area JR/SR and by AST form to rule out contaminants, colonisers, and commensals

Also Microbiology SR Dr Jitendra decides if resistant organism is MDR/XDR/PDR and prepare an Excel on same to be circulated into PEAK group to isolate and mailed to respective treating faculties for reference and needful

Respective Quality prevention nursing officer (QPNs – Mr Prakash B-block, Mr Giriraj C-block, & Mr Mahesh D-block) isolate the patient immediately with TL-TL co-ordination in their area and deep clean the bed after isolation. New admission on that bed is prohibited till the environmental culture is negative report (within first 24 hours)

Dedicated PEAK ICN Ms Deepa collects the information w.r.t. Infection control, diagnostic, and antimicrobial stewardship of isolated MDR PEAK positive patients and follow-up the patients till it comes negative and instruct to de-isolate

 # Each Dept to have own isolation room and follow SOP as above and maintain sterility and STOP MDR PEAK to be cross-infected. Any issue on this protocol to be brought to member secretaries (Dr Biswajeet and Dr PK Panda)of this noble initiatives.

Only by joining hands, we can prevent this HAI and onwards we should have ZERO tolerance to this.

ACKNOWLEDGMENT

I would like to thank Ex-Director Padmashri Prof Ravi Kant for initiation and guiding us to manage this tedious work flow in the institute to eradicate PEAK MDR. We would like to thank present director, MS, DHA, and Dean (A) for their invaluable supports. We would like to thank HOD, Department of Internal Medicine and Microbiology for generous support. We would like to thank all other colleagues in various Departments including Nursing, Hospital attendants, Housekeeping staffs, and Guards for their active role in management of these patients. Last we would like to acknowledge and sincere request the role of the following supporting ground members to achieve ZERO HAI:

1. HICC members including ICNs
2. Antimicrobial stewardship members
3. Drug and therapeutic committee members
4. Clinical Dept incharges and their staffs
5. BMW Incharge and their staffs
6. Laboratory Incharges and their staffs
7. Nursing staffs and superintendent
8. House-keeping Incharge and their staffs
9. House-attendant Incharge and their staffs
10. Patients and their population

 # This protocol is based on local, national, and international guidelines, updated research studies, in-house research findings, and expert opinions.