Hospital Source Control–
Unmet need of an Integrated Antimicrobial Stewardship Practice

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DEPT. OF GENERAL MEDICINE

INTRODUCTION

- **Definition:** Source control in medical literature refers to the use of physical measures to control and contain invasive infections, facilitating optimal healing and restoring anatomic function.

- **Hospital as a Source:** Hospitals are significant sources of infections. Source control strategies at the hospital level are crucial for adequate source control.
- Cleaning and disinfection, routine practices in hospitals, are vital for source control, though they are just a part of a comprehensive strategy.

Evolving Significance of Source Control in Healthcare

- Source control is not limited to routine practices; it extends to the prevention and control of various communicable infections like influenza, tuberculosis, and scabies.
- **Impact of COVID-19:** The recent COVID-19 pandemic has emphasized the crucial role of source control beyond standard infection prevention and control (IPC) practices.
- Recognizing the importance of source control, many hospitals now consider it a crucial component in the management of infectious diseases.

The 4Ds of Source Control in Healthcare

1. **Drainage:**
    - Removal to a controlled sinus or fistula.
    - Facilitates the controlled elimination of infectious material.
2. **Debridement:**
    - Removal of devitalized infected tissue.
    - A critical step in promoting optimal healing and preventing further infection spread.
3. **Device Removal:**
    - Removal of devices or foreign bodies that serve as a focus of infection.
    - Eliminates potential sources of ongoing infection, enhancing control measures.
4. **Definitive Reconstructions:**
    - Repair the damage resulting from infection or its management.
    - Restoration of optimal anatomic function after source control measures.

What is 5th D ??

5. Demarcation/Isolation:

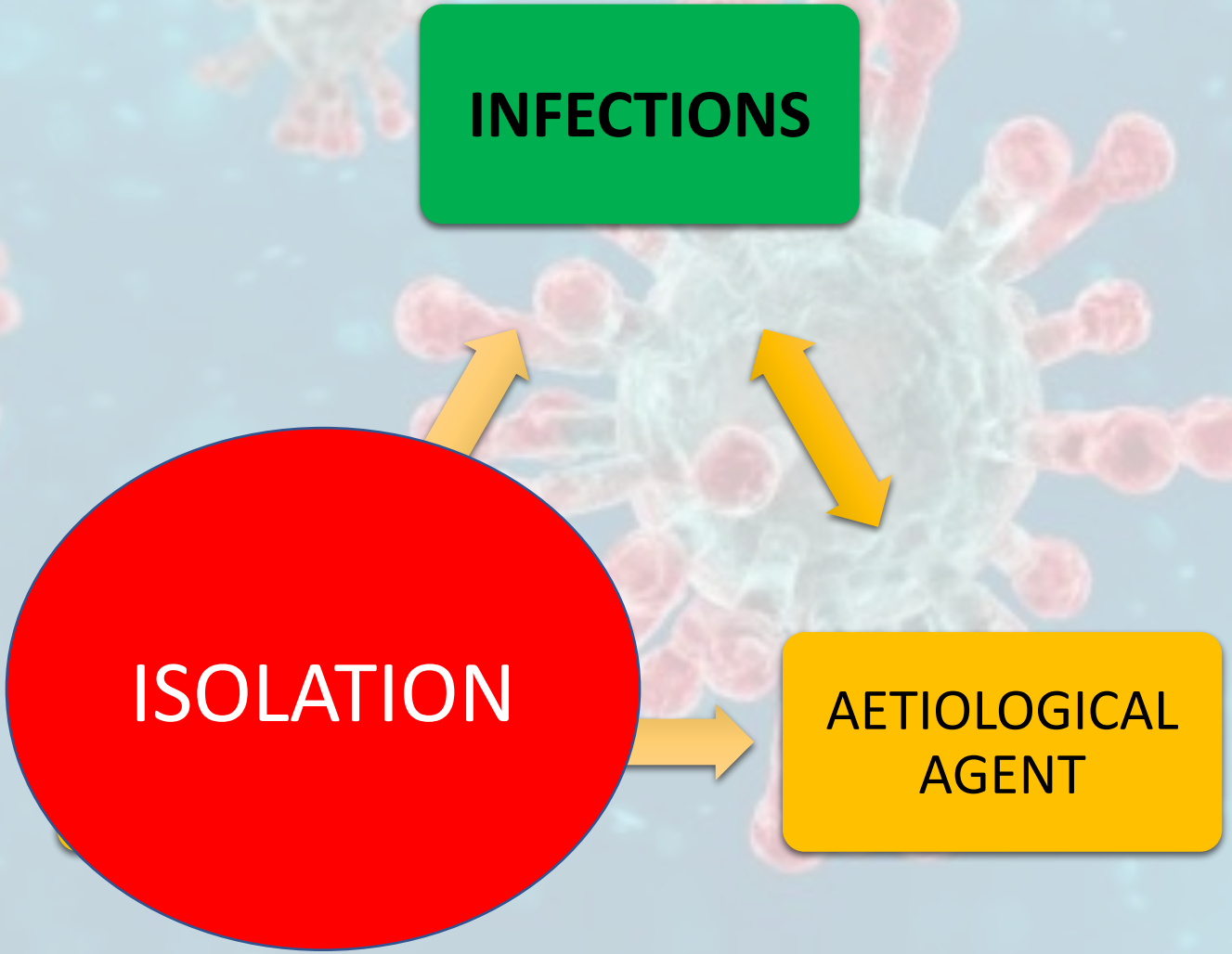
- Identification of transmittable infected patients.
- Isolation or cohorting, treatment, and de-isolation once sterile.
- Acknowledges the challenges in isolation in resource-poor settings, emphasizing the importance of cohorting and IPC practices.

5th D is a classic example of ‘low-hanging fruit’ in reference to integrated antimicrobial stewardship (IAMS) practices.

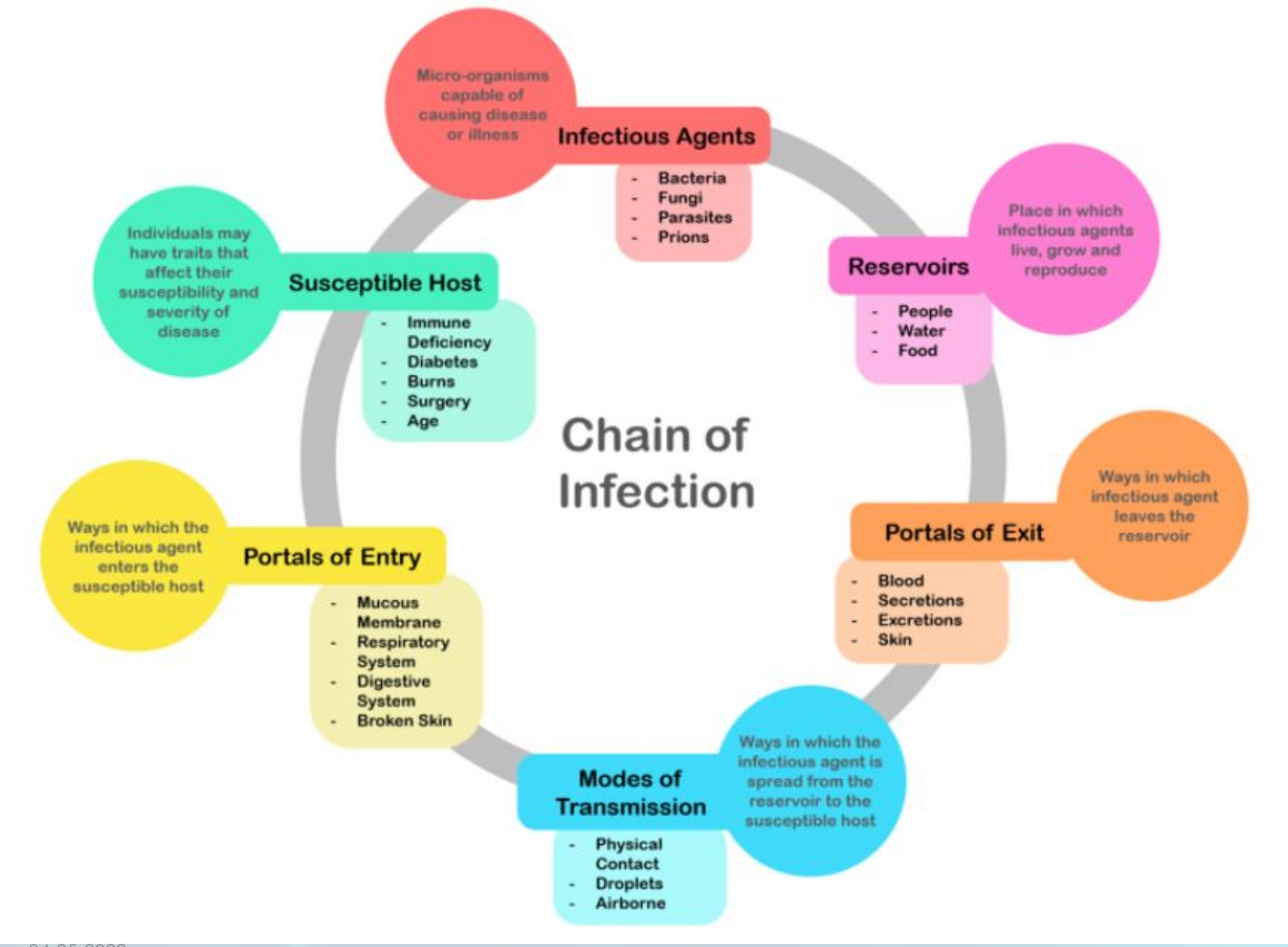
Low-hanging fruits

- Selecting the most obtainable targets rather than confronting more complicated management issues
- Need fewer resources and less effort
- Cost effective and applicable to all settings

Rationale for isolation



Break the Chain of transmission…



Source Control is an Integral Component of (IAMS) Practices

- HAIs contribute sig[illegible]th hospital and community settings
- Transmittable HAIs, [illegible]AK-ME infections, act as point sources for
- The first crucial step [illegible]AK-ME is source control.

PEAK-ME includes common MDR organisms:

- **P**seudomonas aeruginosa,
- **E**nterococcus faecium,
- **E**nterococcus faecalis,
- **A**cinetobacter baumannii,
- **K**lebsiella pneumoniae,
- **M**RSA (Methicillin-resistant S. aureus), and
- **E**scherichia coli.

Steps to be followed to achieve source control

Timely identification of MDR PEAK-ME infected patient by involving hospital infections control surveillance team and bedside treating team.

Immediate isolation/cohorting of pathogen harbouring patients in an isolation room/cubicle

Environmental deep cleaning of affected area after shifting the patient

Right antimicrobial drug, dose, delivery, decision on followup, and duration in the treatment of the patient

Timely de-isolation/cohorting of the patient

Dynamically creation and co-ordination of local ground working team members in the area to master and monitor in each infection prevention aspects.

Major IPC practices of Source Control

Contact Precautions: Implemented when there is definitive or suspected evidence of certain infectious agents transmitted by direct or indirect contact during patient care.

- **Direct Transmission:**

  Occurs when infectious agents transfer directly from one person to another.

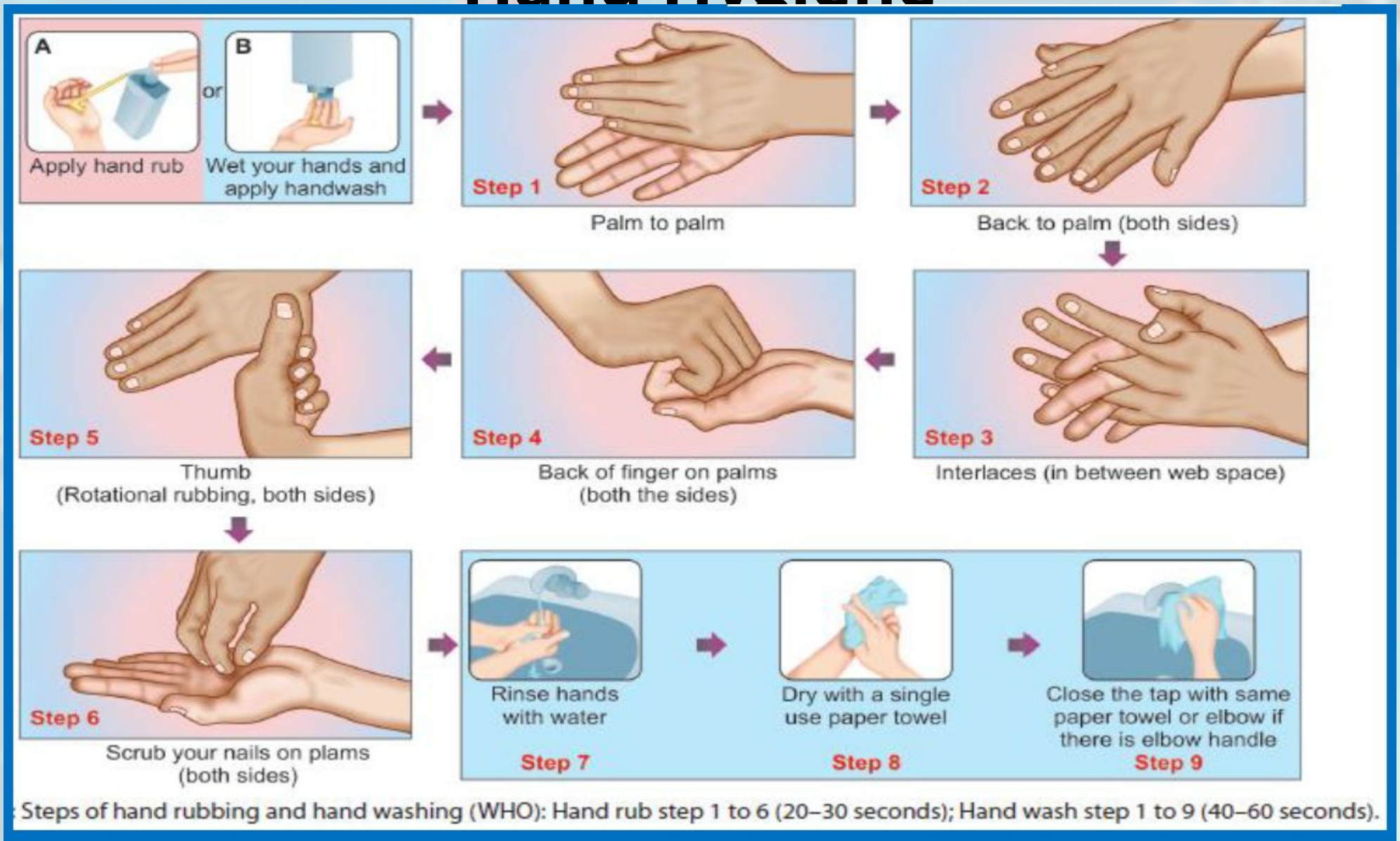
- **Examples:**
  - Contaminated hands (most common in healthcare settings).
  - Direct contact with blood or body fluids from an infectious person.

- **Indirect Transmission:**

  Involves the transfer of infectious agents through a contaminated intermediate object or person.

- **Examples:**
  - Contaminated clothes.
  - Patient-care devices.
  - Environmental surfaces.
  - Fomites.

Hand Hygiene



Steps of hand rubbing and hand washing (WHO): Hand rub step 1 to 6 (20–30 seconds); Hand wash step 1 to 9 (40–60 seconds).

Personal Protective Equipment (PPEs)

- PPE, including gloves and gowns, sl
  patient-care area and removed bef
- Surgical masks and protective eyew
  potential for splashes or sprays of b
- Hand hygiene is mandatory before

Proper Disposal to Contain Transmi

- PPEs must be discarded into desig
  transmission of pathogens

Single-use or Patient-dedicated Equipment

- **Priority on Single-Use or Patient-Dedicated Equipment:**

  Emphasizes the use of single-use patient-dedicated equipment, such as blood pressure cuffs, stethoscopes, thermometers, and nebulizers.

- **Cleaning Protocols for Shared Equipment:**

  If common use of equipment for multiple patients is unavoidable, thorough cleaning and drying are imperative before use on another patient.

Patient Placement

Single Isolation Room:

- Recommended for contact precautions.
- Preferably with bathroom and anteroom.
- Patient notes outside; strict donning and doffing.
- Closed door with clear signage.

- **Cohorting in Resource-Limited Settings:**
- Acceptable when single rooms are unavailable.
- Group patients with similar infections.
- Spatial separation (3 feet) with privacy curtains.
- Use visual cues (color-coding) for restricted access

Transfer of Patients on Contact Precautions

- Limit transfers outside the room to medically-necessary purposes.
- Cover infected or colonized areas during transport to contain infection.
- Remove contaminated PPE and perform hand hygiene before transporting.
- Use clean PPE at the transport destination.

Disinfection and Environmental Cleaning

- Cleaning and disinfection of patient rooms, focusing on frequently-touched surfaces and equipment.
- Healthcare-associated pathogens can survive for months on surfaces, emphasizing the importance of thorough environmental cleaning.
- Removal of colonizers through cleaning is crucial to prevent outbreaks.

Care Bundle for Infections

- Care bundles, including evidence-based measures, improve patient care and have a greater impact when implemented together.
- Adapt measures to the local setting, ensure compliance, and record and evaluate outcomes.
- Specific care bundles exist for CAUTI, CLABSI, VAP, SSI, and Ryle's Tube Care.

Body Care

- Skin care, mouth care, anogenital region care, nail and hair care, and positioning are essential for infection control.
- Daily body care contributes to boosting patient immunity.

HCW Vaccination

- Healthcare workers should receive appropriate vaccines (COVID-19, H1N1, HBV, Tdap, Varicella, MMR, rabies, etc.) to reduce the risk of exposure to and spread of vaccine-preventable diseases

Approach to Source Control in MDR PEAK-ME Cases

1. **Sample Collection:**
    1. Send detailed sample cultures to the microbiology lab.
    2. Include patient diagnosis, symptoms, and antibiotic history on culture forms.
2. **Microbiology Process:**
    1. Identify organism within 24-48 hours; AST results within 48-72 hours.
    2. Promptly communicate initial report if growth is observed.
    3. Utilize online software to alert clinicians if no growth is observed.
3. **Pathogenicity Assessment:**
    1. Correlate organism pathogenicity with area treating team.
    2. Determine resistant phenotypes (MDR/XDR/PDR) using standard definitions.

4. Isolation/Cohorting:

4. In-charge isolates/cohorts the patient immediately.
5. After transfer, deep clean bed with sodium hypochlorite 0.5% and send for culture.
6. Prohibit new admissions until environmental culture is negative.

5. Complete Isolation/Cohorting:

4. Maintain isolation until clinical recovery with completed antimicrobial dosing.
5. Repeat sample cultures every 72 hours to assess de-isolation need.

6. Clinical Department Protocol:

4. Each clinical department should have an isolation room/cubicle.
5. Implement contact, droplet, and airborne precautions as needed.
6. Dedicated healthcare workers manage infection control information and patient follow-up.
7. Instruct de-isolation upon negative results.

Isolation/cohorting procedures

Implement standard precautions at all level of services

Place patient in a single room (or cubicle with other similar pathogen) and maintain at least 3 feet gap.

Wear clean non-sterile gloves, non-sterile gown, and surgical/N95 mask when entering the room OR full PPE if airborne transmitted pathogen is there.

MDRs, such as PEAK-ME 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.

Limit the movement and transport of the patient used devices from the room without sterilisation.

Patients should be moved for essential purposes only with covering of whole body.

All HCWs entering the area should be appropriate vaccinated. STOP cross-infection.

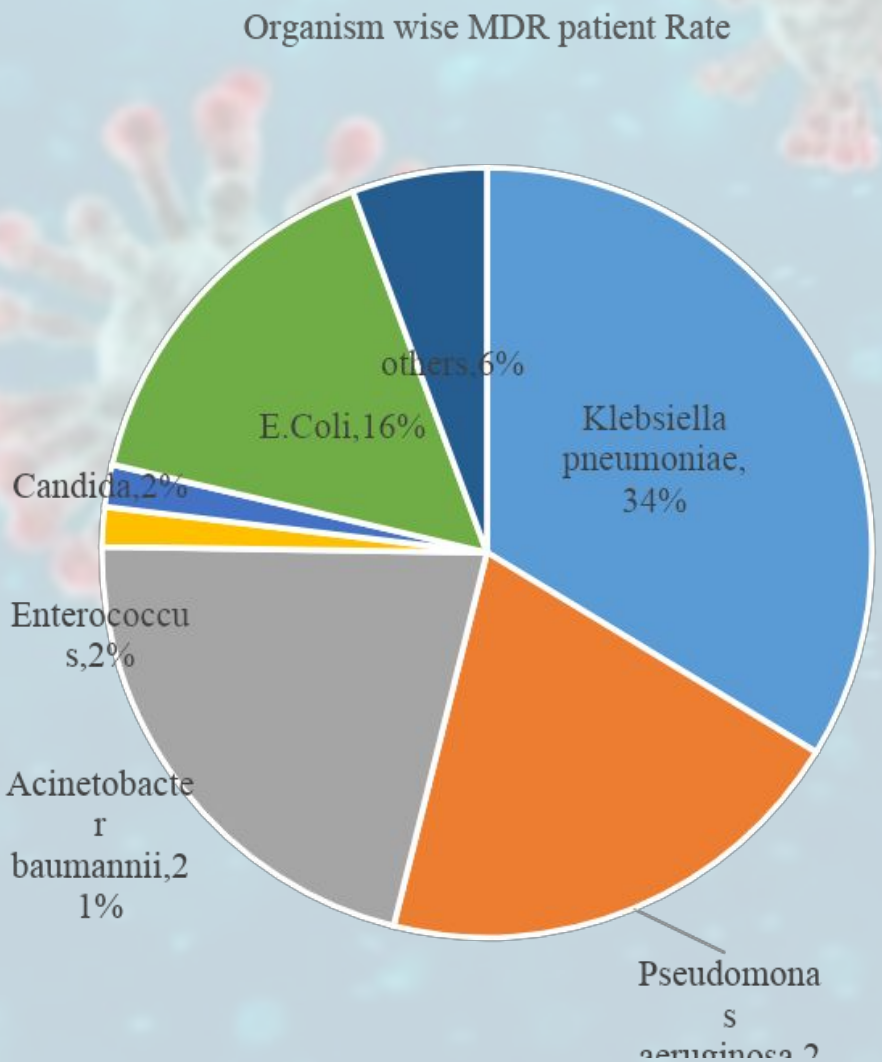
Exhaust fans are to be on in each room/cubicle or negative pressure room for airborne pathogen-isolated areas.

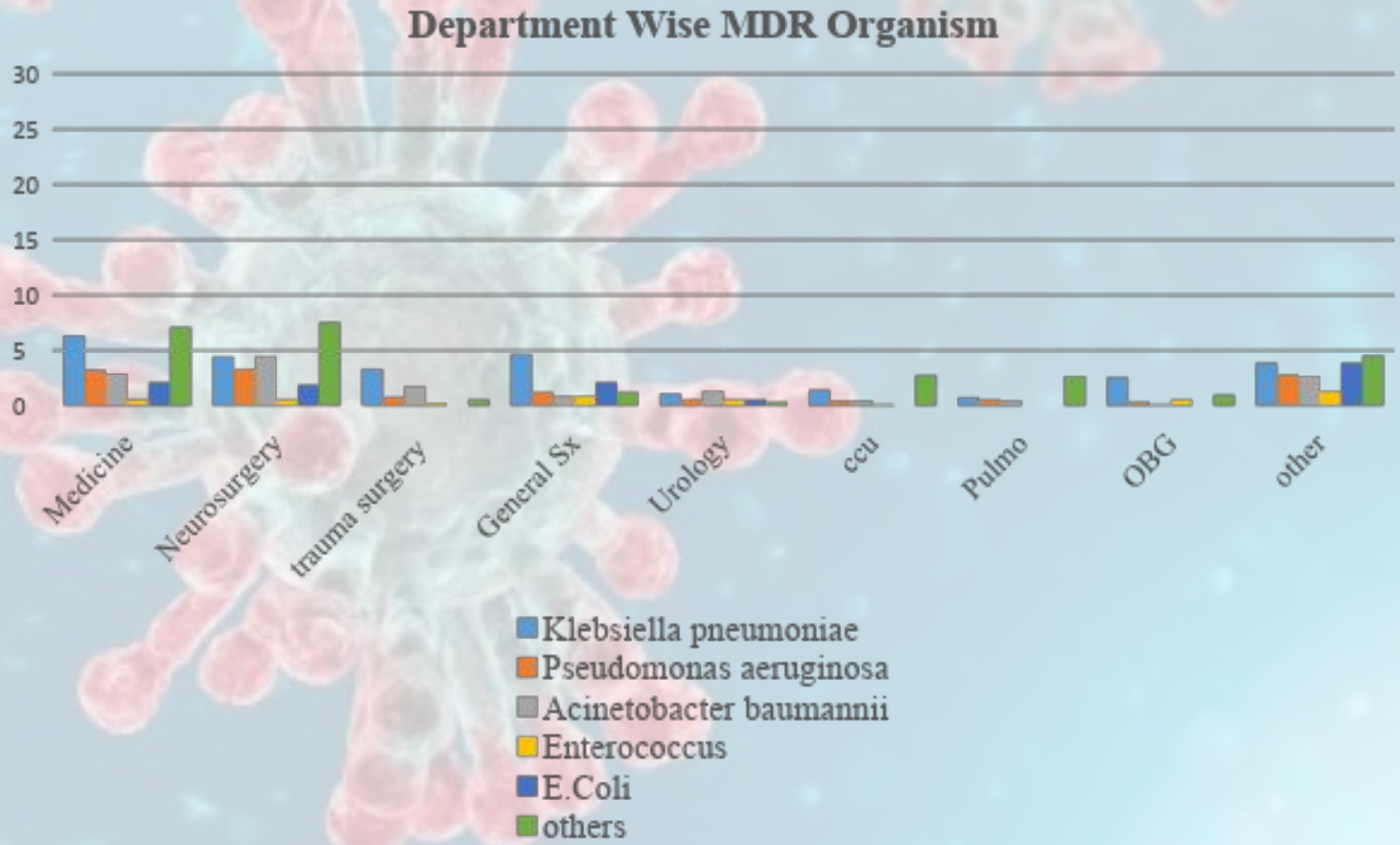
Entry of each HCW to the isolation room to be documented in a register and IPC surveillance to be monitored strictly.

Duty roster of each HCW in the isolation area to be fixed for a particular duration with time to time training to them.

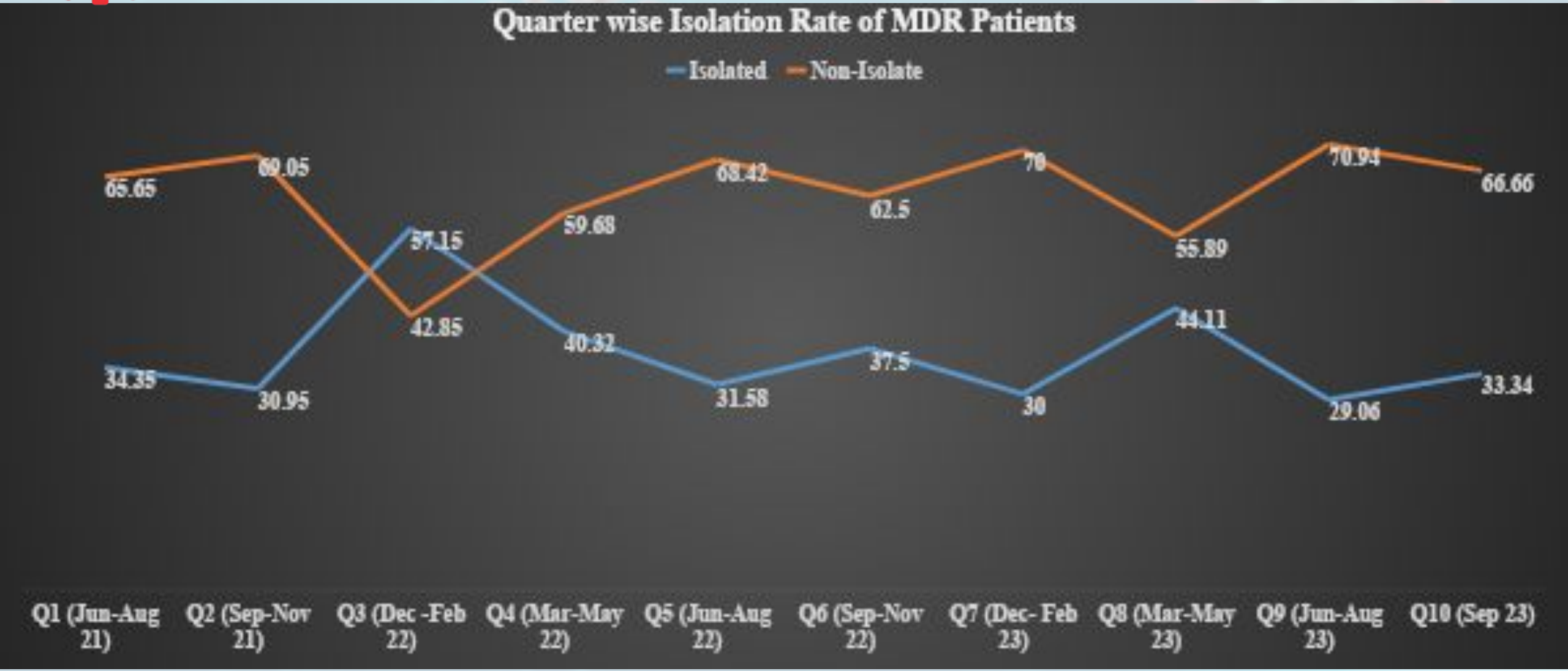
MDR Project/PEAK-ME Isolation program

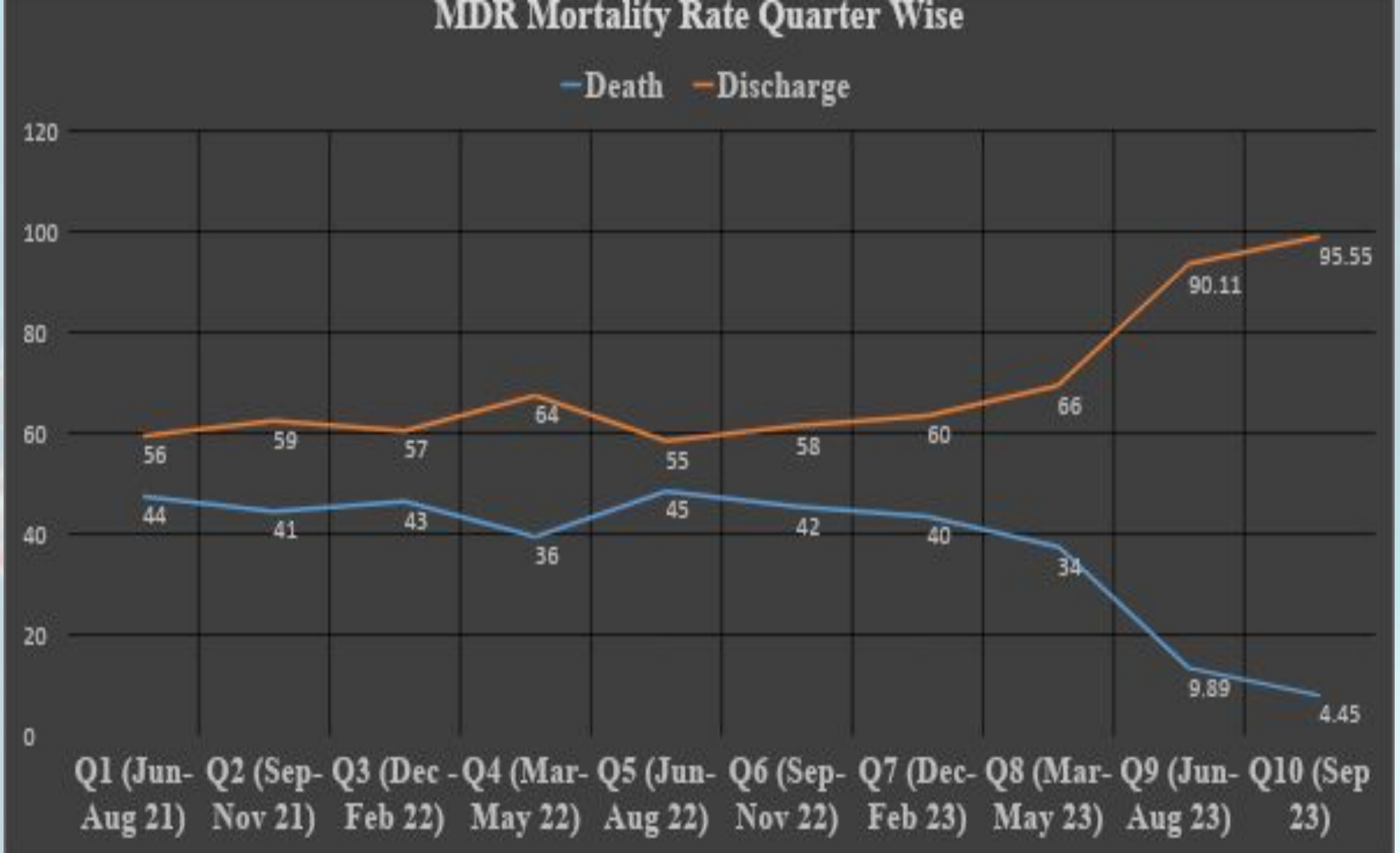
From Jun 2021- Sep 2023 **(n=900)**





Quarter wise Isolation Rate of MDR patients in %




MDR Mortality Rate Quarter Wise
Death
Discharge
120
100
80
60
40
20
0
56
59
57
64
55
58
60
66
90.11
95.55
44
41
43
36
45
42
40
34
9.89
4.45
Q1 (Jun-Aug 21)
Q2 (Sep-Nov 21)
Q3 (Dec -Feb 22)
Q4 (Mar-May 22)
Q5 (Jun-Aug 22)
Q6 (Sep-Nov 22)
Q7 (Dec-Feb 23)
Q8 (Mar-May 23)
Q9 (Jun-Aug 23)
Q10 (Sep 23)

PATIENT: BALESH KUMARI
AGE|SEX: 38|F
UHID: 202201543 61
PH:- 6397086730

JUNIOR RESIDENT.: Dr. Rajat Sharma
PH:- 7536049804

OPAT (Outpatient parenteral antimicrobial therapy)

Rational (Educate)

- OPAT is defined as administration of intravenous antimicrobial therapy on at least two separate days without hospital admission
- It has become standard of care for management of infective conditions like infective endocarditis, osteomyelitis, prosthetic joint infections, skin and soft tissue infections.
- It reduces hospital stay, hospital associated infection, and cost-effective

Patient with infection warranting antimicrobial therapy

YES

Does the patient require intravenous antimicrobial therapy?

YES — NO → Give oral Rx

Does the patient meet OPAT criteria? (All to be ticked as satisfied)

- ☐ Patient party does not require hospitalization for any intervention
- ☐ Patient party is vitally stable or clinically improved to a state of discharge
- ☐ Patient party is capable of safe & effective IV/IM drug administration
- ☐ Therapeutic monitoring is feasible over phone/OPD basis
- ☐ Drug storage is feasible with patient party
- ☐ Patient party is willing to start & did participated in a sharing decision resulting a signed (patient & doctor) page of this

YES

Initiate OPAT

When to stop OPAT (Explain):

- ✓ Any adverse reaction or drug reaction
- ✓ Catheter related infections like local site pain and swelling, fever with chills and rigor
- ✓ After completion of the duration of therapy
- ✓ Desired commitment is not possible by the Patient party

Document — What OPAT criteria fulfilled in patient file including discharge slip

Demonstrate — How to attach the antimicrobial infusion to the IV catheter and deliver the antibiotic

Practice — How to conduct sterile technique to reduce catheter-related thrombosis and infection

Articulate — The signs of potential problems associated OPAT as above along with whom to contact when OPAT to be stopped

Norris AH, Shrestha NK, Allison GM, et al. 2018 Infectious Diseases Society of America Clinical Practice Guideline for the Management of Outpatient Parenteral Antimicrobial Therapy. Clin Infect Dis 2019; 68:e1.
Rucker RW, Harrison GM. Outpatient intravenous medications in the management of cystic fibrosis. Pediatrics. 1974;54:358–360.

Importance of Hospital Source Control

- **Unmet Need for Safe, Healthy Lives:**
  - Hospital source control is crucial to ensure safety and promote health in society.
  - Addresses the challenge of controlling Hospital-Acquired Infections (HAIs) and reducing healthcare expenditures.

- **Low-Hanging Fruit of Integrated AMS Practices:**
  - Represents an easily achievable aspect of Integrated Antimicrobial Stewardship (AMS) practices.
  - Requires commitment from hospital administration to initiate.

- **Starting Point: MDR PEAK-ME and Major Transmitted Infections:**
  - Begin with managing patients infected with MDR PEAK-ME pathogens.
  - Address any major prevailing transmitted infections in the working area.
  - Acts as a strategic starting point for comprehensive source control.

“Source control is better than administrating various combination of antimicrobials to cure the MDR infection”

Similar to

“Prevention is better than cure”

Source control – For a patient

- An old term, an **oldest way** for controlling an ongoing infection

- Purpose is to
  - ✔ **Eliminate** the source of infection
  - ✔ Reduce the organism inoculum
  - ✔ Correct or control anatomic derangements to restore normal physiologic function

Source control – For a hospital

- Purpose is to
  - ✔ Recognition and **isolation** of a transmittable infection
  - ✔ **Control** by practicing precautions and right antimicrobial use after right diagnosis, or even by OPAT
- This will define hospital's source control resulting **zero HAI**
- Especially for MDROs like PEAK where contact precautions required

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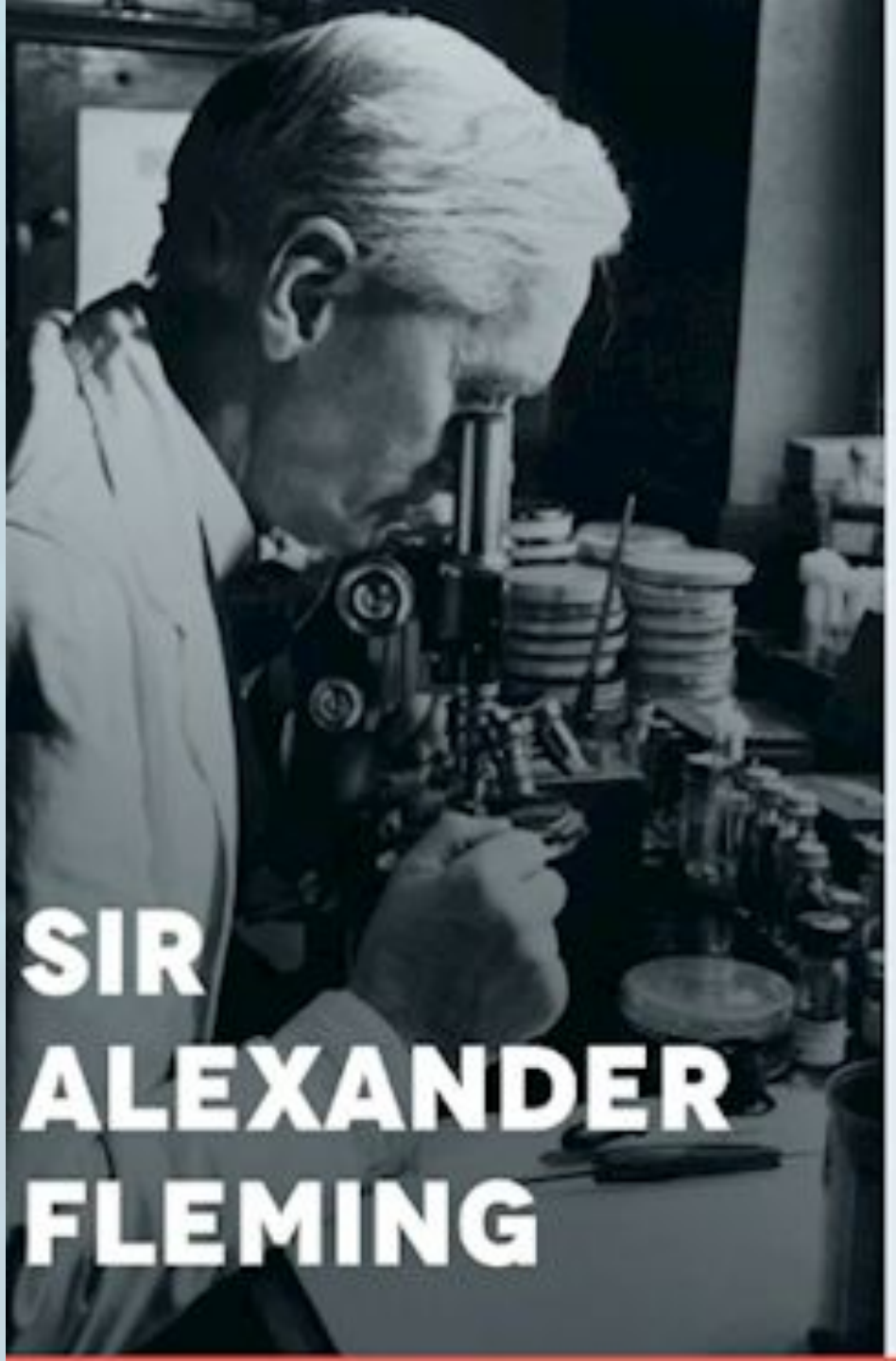
- Dr. PK Panda & Dr. B Sahoo_Version 2.0_21.09.2021 (Member secretaries, PEAK eradication Strategy, AIIMS Rishikesh)



The thoughtless person playing with penicillin treatment is morally responsible for the death of the man who succumbs to infection with the penicillin-resistant organism.

I hope this evil can be averted.