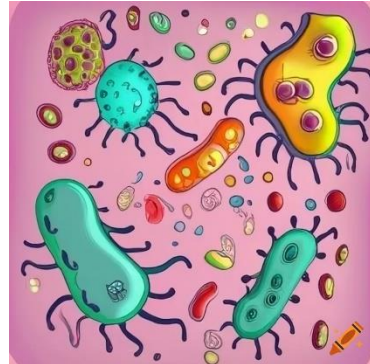


SEPTEMBER 11, 2024







# GUIDELINES TO INVESTIGATE OUTBREAKS OF MULTIDRUG RESISTANT ORGANISMS IN HEALTHCARE FACILITIES

MINISTRY OF HEALTH AND WELLNESS OF MAURITIUS

## Approval Form

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GUIDELINES TO INVESTIGATE OUTBREAKS OF MULTIDRUG RESISTANT ORGANISMS IN HEALTHCARE FACILITIES			
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### PEER REVIEW

Dr A. Joorawon. This document has been sent to the lab and to the IPC teams for review.

**Date of next review:** January 2027

## **Guidelines to Investigate Outbreaks of Multidrug Resistant Organisms in Healthcare Facilities**

### **Introduction**

In 2021, after setting up the National One Health Antimicrobial Resistance Monitoring (NOHARM) system, outbreak notifications were submitted on a monthly basis to public healthcare facilities (HCF) to alert healthcare workers about the spread of resistant bacteria.

Since irrelevant points were often being raised during outbreak investigations by hospital staff (e.g., the presence of leaky roofs, blistering, flaky or peeling paint on buildings, toilets not flushing properly, broken or rusty chairs, beds and tables, uncut grass, flying pigeons, dirty window panes, cracked floors and damaged air conditioners or fans), a first version of an outbreak investigation form was developed to better guide investigators – the purpose of that form was to familiarize staff with a ‘bundle of care’ for patients infected with high priority multidrug resistant organisms (HPMDRO; MDRO).

The bundle of care consists of whether:

- Contact precautions are in place and being followed.
- Facilities for ‘isolation’ (e.g., personal protective equipment – PPE) are available.
- Environmental cleaning is appropriate.
- Antibiotics are used correctly.
- Written notification is in place to inform all necessary staff and visitors to take necessary precautions, especially when infected patients are being moved.
- Compliance with hand hygiene is good.
- Principles of injection safety are observed (in particular, whether unhygienic pricking of fluid pints is not being carried out).
- Staff have had training on HPMDRO and understand what needs to be done when they take care of patients colonized or infected with such organisms.

### **Challenges**

Over the course of the previous two years, significant difficulties were faced with outbreak investigations as described below:

- Outbreaks were generally notified four to six weeks after their onset. By then, the outbreak could be either ‘out of control’ or have ended.
  - Due to logistical difficulties, especially the lack of an electronic system, no short-term solution has been found.
- Some hospitals did not complete their outbreak investigations at all while others submitted their reports weeks or months after the deadline – this could be because outbreaks of HPMDRO are now considered the new normal by hospital administration or that Outbreak Investigation Teams (OIT) were understaffed. Irrespective, it implies that outbreaks were allowed to persist, thus threatening patients’ lives.

- Some investigators erroneously suggested that the bundle of care was being religiously followed, thus signifying that no cause could be found for the spread of the bacteria. Further audits by national teams confirmed that the bundle of care was actually not being adhered to.
- It was difficult for investigators to get access to patients' medical records, partly because of constraints at the Medical Records Department, and partly because captured patient data, like the Medical Record Number (MRN), was inaccurate.
  - Given the absence of a Laboratory Information Management System, it is currently not possible to ensure that recorded patient data is accurate.
- Some investigation reports had missing data e.g., they did not mention the number of deaths, what antibiotics were utilized and what type of hospital-acquired infections (HAI) (if any) were acquired.
- Several reports did not contain any recommendations to help control the outbreak.
- Many investigations did not look for additional cases. Instead, investigators relied solely on data collected from the laboratory or that submitted by the Ministry of Health and Wellness (MOHW) to the hospital.
- Recommendations were sometimes not followed up several months after the onset of the outbreak.
- Sometimes, outbreaks were inappropriately labeled as pseudo-outbreaks – establishing suitable measures to control infections then becomes difficult.

According to a national report in 2024, 59% of outbreaks that occurred from 2021 to 2023 are still persisting and the median case fatality rate was 63% - this is quite high. Therefore, it was decided that the quality of outbreak investigations should be improved.

### **Objective**

The purpose of this document is to provide more detailed guidance to investigators involved in assessing outbreaks of HPMDRO in HCF.

The goal of an outbreak investigation is to control the outbreak.

It should be highlighted that, in Mauritius, HPMDRO (many of which are actually classified as extremely drug-resistant organisms internationally) have become endemic in some intensive care units. While this means that it is even more difficult to eliminate such HPMDRO from these locations, efforts should at least be made to limit the number of patients catching HAI from these organisms.

### **Steps**

The steps described in this section are adapted from information gathered from references 2 and 3.

The National IPC Focal Point (NIFP) or the Microbiologist of the laboratory informs the Infection Prevention and Control (IPC) team of the HCF of a suspected outbreak of HPMDRO. Usually, basic data regarding patient demographics is also provided to the team to start the investigation. This means that the organism causing the outbreak is already known. Moreover, the general mode of transmission is also well understood i.e., HPMDRO are transmitted by direct or indirect contact, and are created through prolonged exposure to antibiotics.

It should be pointed out that currently few private clinics in Mauritius have IPC teams and surveillance for HPMDRO is not being carried out there. Hence, private institutions who wish to use this guide are advised to set up their own surveillance systems and to establish their IPC teams and OIT.

1. Prepare for the investigation.

a. Form the team:

- i. The lead investigator is generally the IPC Team Leader (ITL). However, he / she can be replaced by the Antimicrobial Stewardship (AMS) Team Leader if the ITL is not free. Moreover, the ITL can also delegate the Deputy ITL to carry out the task.
- ii. The other member/s of the team is usually the IPC Nursing Officer/s. If an IPC Registered Medical Officer is available in the hospital, he / she should join in as well.
- iii. The AMS Pharmacist can support the investigation, especially with respect to antibiotic use.
- iv. Given that most hospitals do not have epidemiologists or microbiologists, they are not routinely included as part of the team.
- v. Whenever national support is needed, the NIFP, Microbiologist and other experts may join or lead the team.

- b. The OIT members should ensure that they understand the disease being investigated well.
- c. Prior to starting the investigation, the OIT should ascertain that the administration of the hospital is aware of the outbreak.

2. Confirm the existence of an outbreak.

- a. Usually, the NIFP or the Microbiologist will already have verified whether the number of cases being detected is more than normal. Hence, the OIT does not have to carry out this task.
- b. A pseudo-outbreak may occur if more tests than usual are sent. It is recognized that the OIT will have difficulty assessing whether this is the case. However, the NIFP may point out such anomalies in case this happens.
- c. A pseudo-outbreak can also occur if the lab changes its testing methodology. This will be highlighted by the Microbiologist if this occurs.
- d. The OIT should confirm that the submitted list of patients was truly infected or colonized with that particular HPMDRO since the data collector could have made incorrect entries due to typographical errors or misunderstanding of handwriting. The patient demographics should also be verified and corrected if needed.
- e. In addition, an incorrect signal may occur if multiple patients with the same resistant organism are coincidentally transferred to the same location at the same time.
  - i. Comparing the dates of transfer and dates of cultures will help to elucidate where the infection initially started, hence the importance of recording these data.

- ii. Patients who have been recently admitted may have acquired the organism from their previous admission/s. This should be taken into account.
  - iii. Carbapenem resistance is not known to be widely circulating in the Mauritian community (contrary to reports from other countries). Hence, it is highly unlikely that carbapenem resistant organisms would have been acquired outside an HCF. The OIT should bear this in mind.
  - iv. While most HAIs are presumed to occur from calendar day 3 of admission onwards, healthcare facility-onset of infection by MDRO is presumed to occur as from day 4 of admission per US CDC.<sup>1</sup> However, this does not imply that the patient could not have been colonized beforehand through prior visits to healthcare institutions.
  - v. It is further highlighted that sepsis from contaminated medications can lead to symptoms on calendar day 1 of admission i.e., not all HAI have to occur after day 2.
3. Construct a case definition.
- a. The case definition used is generally simple: it is the occurrence of that particular HPMDRO in that location from any specimen site as from the date of onset of the outbreak.
  - b. The date of onset of the outbreak is usually submitted by the NIFP to the IPC team.
  - c. Sometimes, multiple locations may be affected at the same time. In case of contaminated medications, fluids or disinfectants, multiple hospitals may be involved.
4. Identify cases and record patient information.
- a. The OIT should look for additional cases that have occurred in that ward. Going through each of the currently admitted patients' charts can be a good way to identify new cases since outbreaks are often ongoing. In addition, the OIT can go through the HPMDRO registry that is kept by the IPC team.
  - b. Clearly, the discharged patients' folders can be difficult to access. A list of previously admitted patients is available at the nursing station – basic patient demographic data can be corrected and obtained from that list. Moreover, due to confidentiality issues, full patient names are not recorded and submitted to hospitals by the NIFP; however, full patient names can be obtained from registers at the nursing station. Regardless of the challenges, a reasonable attempt should be made to gather some information from patient folders. The final report should mention clearly which folders remained inaccessible.
  - c. Even if patient data is not available, this does not mean that the investigation should stall or be aborted. In most, if not all cases, evaluating whether the bundle of care is being implemented will highlight the weaknesses in existence and hence, will help guide actions to stop the outbreak.
  - d. On the other hand, patient folders may not contain all the necessary information – patient interviews may therefore be required occasionally to complete the investigation.

- e. Basic patient information can be recorded in a table as follows. Otherwise, paragraphs or bullet points describing each case are also acceptable. The format below can serve as a template for a standardized questionnaire or a case investigation form.

	<b>Patient 1</b>	<b>Patient 2</b>	<b>Patient 3</b>	<b>Patient 4</b>
<b>Patient initials</b>				
<b>MRN</b>				
<b>Age</b>				
<b>Gender</b>				
<b>Date of admission</b>				
<b>Symptoms on admission</b>				
<b>Hospital and ward</b>				
<b>Bed no.</b>				
<b>Date/s of culture</b>				
<b>Specimen type/s</b>				
<b>Organisms cultured</b>				
<b>Susceptibility pattern</b>				
<b>Transfers from other wards / transits of patient</b>				
<b>Travel history over last 12m</b>				
<b>Admission to other HCF over last 30d</b>				
<b>Whether known to have had the same resistant organism before – if yes, when was it first cultured and when was it last cultured?</b>				
<b>Outcome / current status</b>				
<b>Risk factors for MDRO</b>				
<b>Type of HAI (if any)</b>				

- f. Identifying which antibiotics each organism was susceptible to may help the investigators assess whether the same strain is circulating. Generally, same strains will differ in their susceptibility patterns by at most one antibiotic.
- g. Patient outcomes can include whether he / she died, was intubated, went into septic shock, had multi-organ failure and / or was discharged from hospital.

- h. Risk factors for acquiring MDRO (apart from those already listed in the above questionnaire) include being on hemodialysis, being immunosuppressed, having foreign bodies (like central lines, Foley catheters, etc.), having chronic wounds, suffering from chronic lung disease and having family members colonized or infected with multidrug resistant organisms.
  - i. Admission screening and contact tracing are not being carried out in Mauritius currently due to a lack of isolation facilities and limited laboratory resources. However, this may become an important pillar to limit transmission of certain MDRO in the future.<sup>5</sup>
5. Perform descriptive epidemiology.
- a. If more than 10 cases are identified within a period of time, it may be reasonable to analyze the data by age and gender.
  - b. Time and place associations are normally useful but by definition, the lab or the NIFP will only send an outbreak notification if such associations are already known to exist.
  - c. Some investigators like to do a location map i.e., draw the layout of the ward / hospital and place dots on the beds / wards where the patients were admitted / transferred. This can be done in complex, widespread outbreaks.
  - d. Drawing epidemiological curves, carrying out statistical tests (like attack rates and risk ratios) and calculating p-values and confidence intervals are not necessary in most cases.
  - e. Case-control studies are usually not needed. Retrospective cohort studies can help for other types of outbreaks e.g., dispersed or community-wide outbreaks (which often does not occur with HPMDRO).
  - f. Additional tests to confirm outbreaks and the circulating strain are not performed in the country e.g., Pulsed Field Gel Electrophoresis or Wide Genome Sequencing.
  - g. While testing for carbapenemases can be done at the Central Health Laboratory, due to the limited clinical impact, this is only carried out on a case-by-case basis and should not be routinely requested for now.
6. Evaluate the site using the National IPC Checklist for Healthcare Facilities with a particular emphasis on items forming part of the bundle of care for HPMDRO.
- a. Contact precautions:
    - i. Is it written in the patient's folder that contact precautions should be instituted?
    - ii. Ask the patient what type of PPE is worn by staff when he / she is assessed.
    - iii. Check the bin to see whether PPE was disposed of and what type.
    - iv. How are dressing changes carried out? Is aseptic non-touch technique utilized?
    - v. Is there dedicated medical equipment for that patient?
  - b. Isolation facility:
    - i. Is a signage present and is it the right one?

- ii. Are there posters for donning and doffing?
  - iii. Is there a donning / doffing station?
  - iv. Is there a hand sanitizer within 1m of the doffing station and 1m of the donning station?
  - v. Is there paper towel at the handwashing station (if present)?
  - vi. Is there soap at the handwashing station (if present)?
  - vii. Is there a yellow bin for PPE disposal?
  - viii. Are beds more than 1m apart?
  - ix. Are the donning and doffing stations more than 1m apart?
- c. Environmental cleanliness, disinfection and sterilization:
- i. Does the ward appear clean? What about the refrigerators and toilets?
  - ii. Is there clutter?
  - iii. Are there pests observed?
  - iv. Is the 3-bucket technique used for the isolation bay?
  - v. Is the Javel concentration accurate?
  - vi. Is the cleaning schedule filled in properly?
  - vii. If sterilization is carried out in the unit, is it done according to the national Standard Operating Procedure?
  - viii. Is the cleaning equipment including mops and buckets separate for HPMDRO patients?
- d. Written notification:
- i. Is it clearly written in the chart that the patient has a multidrug resistant organism?
  - ii. Is there a record to confirm that the nurse has notified the destination (e.g., operation theater or radiology department) when the patient was moved?
  - iii. Has the patient and / or his / her relatives been counselled about HPMDROs?
- e. Hand hygiene:
- i. Is there one sanitizer for each point of care in the ward? A point of care is a distance of 1m from where care is administered. The most common place where care is given in the hospital is the patient's bed.
    - 1. Of note, the minimum requirement nationally in a ward is currently one sanitizer for six beds (with the exception of ICUs where one sanitizer per bed is essential). However, in locations where outbreaks are ongoing or are likely to occur, the number of sanitizers should be increased.

- ii. Are the sanitizers functional?
  - iii. Is there soap at handwashing stations?
  - iv. Is there paper towel at handwashing stations? If not, personal reusable cloths (like handkerchiefs) should be used.
  - v. Is there at least one handwashing station for 10 beds?
  - vi. Are there posters on hand hygiene? Can the staff demonstrate how to do hand hygiene?
- f. Injection safety:
- i. Has the IPC team noted unhygienic pricking in that ward over the last 30 days?
  - ii. Is unhygienic pricking ongoing during the visit? Check by looking for holes in pints.
  - iii. Are there enough small vials of fluids?
  - iv. Are pints dated and labeled after pricking?
  - v. Does the nurse ensure that the end of drip set lines does not touch any surface?
- g. Training:
- i. Have all the staff been trained on MDRO in the last 12 months?
  - ii. Can they answer basic questions on MDRO?

7. Review the antibiotics used for treatment.

- a. A table can be filled in with the appropriate information as shown below. Once again, investigators can also provide the same data in paragraph form or in bullet points.

<b>Patient initials</b>	<b>Diagnosis</b>	<b>Antibiotic</b>	<b>Dose &amp; frequency</b>	<b>Date of start</b>	<b>Date stopped (if stopped)</b>	<b>Expected antibiotics to be used &amp; duration per national guidelines</b>	<b>Days of therapy</b>

- b. Each row should correspond to one antibiotic – do not enter several antibiotics on the same row. Since patients can be on multiple antibiotics, several rows can contain data on the same patient.
- c. Diagnoses are often not clearly spelt out in patient folders – a doctor’s help will be required to clarify the diagnosis.
- d. If the antibiotic has not been stopped, the reporter can mention “continuing” in the table (or something to that effect).
- e. Clinicians do not have to follow the exact antibiotics listed in the national guidelines in every scenario. However, all antibiotics should be prescribed according to AMS principles. Help from the AMS team can be sought if clarification is required.

8. Based on the results of steps 6 and 7, develop one or more hypotheses.
  - a. Hypotheses are generally simple to formulate e.g.:
    - i. If there aren't enough sanitizers, one can hypothesize that poor hand hygiene compliance may have exacerbated transmission of the organism.
    - ii. If contact precautions were not started, then sharing of medical equipment or contaminated hands may be a source of transmission.
9. Test the hypotheses by using audit tools, indicators, observation forms and/or by taking samples for cultures.
  - a. Investigators are allowed to use national or international toolkits to confirm their hypotheses. Examples are provided below:
    - i. Contact precautions: Observe staff going in and out of the patient's room. Are they following contact precautions as indicated by the signage?
    - ii. Isolation facility: Use the National Checklist on the Layout of Wards.
    - iii. Environmental cleanliness, disinfection and sterilization: Follow the US CDC Environmental Services Observation Form or the WHO Sterilization Checklist.
    - iv. Written notification: Check with the destination site to confirm that they knew about the patient's HPMDRO status before transfer (e.g., for a radiological test).
    - v. Hand hygiene: Use the WHO Hand Hygiene Observation Toolkit, WHO Hand Hygiene Self-Assessment Framework or the WHO Ward Infrastructure Survey.
    - vi. Injection safety: Use the UD CDC Observation Form for Injection Safety
    - vii. Training: Do a knowledge assessment as per nationally defined protocols.
    - viii. Antibiotic use: Calculate the days of therapy per patient and compare with the expected days of therapy per national guidelines.
  - b. Indicators can also be calculated and compared with the baseline for that hospital or with the values in other wards:
    - i. Contact precautions or isolation facility: % of HPMDRO patients who are placed under contact precautions.
    - ii. Environmental cleanliness, disinfection and sterilization: Thoroughness of Disinfection Score.
    - iii. Hand hygiene: Hand hygiene compliance rate, alcohol consumption rate or soap consumption rate.
  - c. Not all tools have to be used for every investigation. Select the ones that are more likely to be useful.
  - d. Routine cultures of surfaces should not be taken outside of outbreak settings. During outbreaks, it is recommended to take cultures only if the ward has more than 80% compliance to the MDRO bundle of care for more than six months, since most outbreaks

currently appear to be happening due to inadequate contact precautions, poor hand hygiene compliance, antibiotic abuse and incorrect cleaning / disinfection / sterilization practices. These breaches in standard practices are often so pronounced and remarkable that additional evidence does not need to be gathered.

- i. As a side note, cultures are usually required when assessing outbreaks of *Burkholderia cepacia* complex since this organism often infects medications, fluids and disinfectant solutions.
  - ii. If cultures are to be sent, the OIT should contact the laboratory for permission and for details regarding the types of swabs or samples to take. Specify which organism you are looking for.
  - iii. Avoid taking swabs from places that are naturally contaminated e.g., the sluice, toilets, floor, walls and dust.
  - iv. Unless explicitly allowed by the laboratory, do not send more than 20 environmental samples per investigation.
- e. In fact, in some cases, discrepancies may be so evident as to obviate the need to use any tool at all.

10. Reconcile the findings with the hypotheses.

- a. Briefly describe how the findings of the assessment could have led to an outbreak.

11. Propose recommendations to control the outbreak.

- a. The OIT should lay out a set of activities that will be implemented in the near future to stop the outbreak. These activities can be entered in the following table in the form of an operational plan. An example of an activity has been added for illustration's purpose.

Activity	Sub-activity	Responsibility	Timeline	Monitoring indicator / tool	Baseline	Target	When reassessment will occur
Training on MDRO	Face-to-face training of 3 Nursing Officers and 2 Healthcare Assistants in Ward 3-2	IPC Nursing Officer	Within 2 months	Knowledge assessment	20%	60%	1 week after training

- b. Activities should be practical, impactful and cost-effective. Complex activities requiring funds will necessitate permission from the hospital administration.

12. Initiate or maintain surveillance.

- a. The onus is on the hospital to ensure that the outbreak is controlled within a timely manner. To assess whether this has been achieved, proper surveillance is needed.

- b. Some hospitals have developed HPMDRO notification forms for doctors to fill and inform IPC teams whenever HPMDROs are cultured.
- c. Data can be entered into a registry as follows. While it is important to monitor the number of cases occurring during outbreaks, IPC teams may wish to capture more detailed data in a more widespread manner outside of outbreaks too.

<b>Patient initials</b>	<b>MRN</b>	<b>Age</b>	<b>Gender</b>	<b>Hospital</b>	<b>Ward</b>	<b>Bed no.</b>	<b>Date of culture</b>	<b>Specimen type</b>	<b>Organism &amp; resistance pattern</b>

- d. It is expected that the registry will be incomplete due to omitted notifications by hospital staff to the IPC teams. It is the responsibility of the hospital administration to ensure that missing notifications are minimized.
- e. Data should never be collected without later being analyzed and interpreted. Hence, every few weeks, the IPC team should check to see if the number of cases meeting the case definition for the outbreak are diminishing.
- f. If no improvement has been made, the operational plan should be revised, and new activities carried out.
- g. An HPMDRO dashboard is submitted regularly by the NIFP – this can also help to assess the status of the outbreak.
- h. An outbreak should not be allowed to expand and persist without appropriate actions being taken.

13. Communicate the findings.

- a. In all cases, feedback in the form of a report should be provided to the Regional Health Director, NIFP, Director Health Services (Public Health) and Director Health Services (Curative).
- b. In addition, verbal or written feedback should be given to staff working in the affected wards.
- c. The Regional IPC Committee should regularly assess the status of outbreaks ongoing in its hospital/s and help to raise awareness about ongoing issues.
- d. A good investigation report should mention:<sup>4</sup>
  - i. Who? What is the age and gender of the affected groups?
  - ii. Where? Where do the affected individuals come from?
  - iii. What? What is the causative organism and what are the signs and symptoms?
  - iv. When? When was the first case and subsequent cases reported?
  - v. How? What is the mechanism of transmission?

- e. A template for an outbreak investigation report is annexed.<sup>6</sup>

### **Responsibilities<sup>3</sup>**

MOHW	Provide funding, training, guidance and other resources to plan outbreak investigations
Hospital administration including Regional IPC Committee	Review the outbreak report, support surveillance, monitor outcomes and assist with efforts to control the outbreak  Communicate with all departments to ensure that notifications of HPMDRO are not missed
IPC and AMS teams	Gather patient data, assess compliance to the bundle of care for MDRO, review antibiotic use, complete the outbreak investigation, make recommendations and write and submit the outbreak report  Carry out surveillance and monitoring
Laboratory	Inform the NIFP of suspected outbreaks and provide basic data on HPMDRO  Advice on sampling and testing  Culture samples, identify organisms and do susceptibility testing – ensure appropriate reagents are not out of stock
Clinicians	Contribute to discussions about investigations and cases  Facilitate and encourage control measures  Minimize abuse of antibiotics
Nurses	Champion and reinforce control measures

### **Timeline for an outbreak investigation**

Data collection regarding the outbreak	First week (after an outbreak has been officially notified)
Data analysis, report writing and submission of the outbreak report	Second week
Analysis of surveillance data to check if the outbreak is under control	Every four weeks till outbreak ends
Checking progress with respect to implementation of activities in operational plan	Every four weeks till outbreak ends
Discussion in RIC	Every eight weeks till outbreak ends

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**To:** Director Health Services – Public Health

Director Health Services - Curative

**Th.:** Regional Health Director

**Date:** \_\_\_\_\_

**Outbreak Investigation Report On High Priority MDRO**

**Describe the outbreak / nature of the outbreak**

**Composition of the Outbreak Investigation Team**

**Was an outbreak confirmed?**

**What case definition was used?**

**Case investigation and patient data**

	Patient 1	Patient 2	Patient 3	Patient 4
Patient initials				
MRN				
Age				
Gender				
Date of admission				
Symptoms on admission				
Hospital and ward				
Bed no.				
Date/s of culture				



<b>Specimen type/s</b>				
<b>Organisms cultured</b>				
<b>Susceptibility pattern</b>				
<b>Transfers from other wards / transits of patient</b>				
<b>Travel history over last 12m</b>				
<b>Admission to other HCF over last 30d</b>				
<b>Whether known to have had the same resistant organism before – if yes, when was it first cultured and when was it last cultured?</b>				
<b>Outcome / current status</b>				
<b>Risk factors for MDRO</b>				
<b>Type of HAI (if any)</b>				

**Brief description of the findings**

**Compliance to the bundle of care for MDRO**

- Contact precautions are in place and followed.
- Facilities for isolation (e.g., personal protective equipment – PPE) are available.
- Environmental cleaning is appropriate.
- Written notification is in place.
- Equipment for hand hygiene is available.
- Injection safety (absence of unhygienic pricking of fluid pints).
- Staff have had training on HPMDRO and understand what needs to be done.

**Review of antibiotic use**

<b>Patient initials</b>	<b>Diagnosis</b>	<b>Antibiotic</b>	<b>Dose &amp; frequency</b>	<b>Date of start</b>	<b>Date stopped (if stopped)</b>	<b>Expected antibiotics to be used &amp; duration per national guidelines</b>	<b>Days of therapy</b>




**Explain how the MDRO may be spreading**

**Evidence to support the hypothesis**

**Provide recommendations i.e., an operational plan**

Activity	Sub-activity	Responsibility	Timeline	Monitoring indicator / tool	Baseline	Target	When reassessment will occur

**This report was compiled by (name of IPC Team Leader): \_\_\_\_\_**

**CC:** National IPC Focal Point