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PRACTICAL NOTES

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Specimen Selection Collection and Transport

Practical 01 / Skills laboratory simulation

Aim

Choose the right specimen and demonstrate a complete collection-to-laboratory handover using training material.

Principle

A diagnostic result can only represent the material actually collected. Site, timing, container, labelling and transport conditions affect recovery and interpretation.

Materials and Requirements

- Clean mock collection kits and labels
- Facility specimen manual and rejection examples
- Fictional clinical requests

Procedure

1. Identify the clinical question, body site and specimen type. Check the laboratory's current collection and transport requirements.
2. Use the fictional request to match the question and anatomical site with the lab directory. Record acceptable specimen, container and information needed to explain the collection and verify with the instructor.
3. Practice explaining collection to a simulated patient using plain language and teach-back.
4. Ask the patient to repeat the key directions and when to contact the collection team. Check consent, privacy and whether the person needs an interpreter or help understanding the container label.

Continue with step 5 on the next page.

Procedure Continued

Specimen Selection Collection and Transport

5. Label the mock specimen at collection with the required identifiers, site, time and relevant information. Use the approved packaging demonstration.
6. Match two identifiers on the dummy label and request before sealing the approved primary and secondary packaging model. Put the written request in its assigned clean compartment.
7. Check mock container integrity, correct site and time, required transport information and whether the collection meets the lab criteria. Flag a discrepancy without guessing or relabelling the contents.
8. At handover check the request and sample match, communicate hazards as required and resolve a rejection in a fictional case.
9. Document who collected or received it, times and the reason for any hold or rejection. Explain how to contact the clinical team to arrange a replacement.

Precautions

• Use clean mock materials in the classroom.

• A real exposure or spill requires prompt facility reporting.

Observations and Interpretation

Specimen Selection Collection and Transport

Observations and Record

Item	What to record	What it tells you
Selection	Site, timing and approved container	Ensures the specimen answers the question
Identity	Identifiers, site and collection time	Links the sample to the request
Handover	Packaging and condition acceptance	Prevents delay and misidentification

Worked Example

A mock sample arrives labelled only with bed number. Identify it as an identity discrepancy and follow the simulation rejection or escalation pathway.

Result and Interpretation

Complete one acceptable training handover and one documented rejection scenario.

Viva Questions and Answers

Why state the exact specimen site?

Organisms and interpretation depend on whether the site is normally sterile or colonised.

Why ask about prior antimicrobials?

They can affect microbiological recovery and the meaning of negative results.

Gram Stain Prepared Slides and Controls

Practical 02 / Teaching laboratory

Aim

Demonstrate stain reading with validated controls and describe bacteria on approved prepared films.

Principle

Gram staining distinguishes broad staining patterns related to cell wall properties. Smear quality, decolourisation, cell damage and mixed specimens can alter appearance.

Materials and Requirements

- Instructor-prepared slides or digital micrographs
- Gram-positive and Gram-negative controls
- Microscope and authorised teaching workflow

Procedure

1. Check slide labels, magnification and staining control results. Record the reagent sequence on the approved teaching checklist.
2. Place positive and negative prepared controls alongside the coded teaching slide. Check that the controls have the expected contrasting results and inspect the slide for stain debris or thick areas.
3. Compare primary stain, mordant, differentiation and counterstain roles using fixed teaching material or a demonstration.

Continue with step 4 on the next page.

Procedure Continued

Gram Stain Prepared Slides and Controls

4. On the fixed teaching demonstration, match crystal violet, iodine, differentiation and counterstain to their roles. Compare a controlled image with an over-decolourised or under-decolourised image.
5. Read multiple fields. Record cell shape, arrangement, staining and relevant host cells separately.
6. Survey the smear at low power, then examine the instructor-designated fields with the approved objective. Focus on representative areas and record colour reaction, cell shape and grouping.
7. Check whether staining is uniform across several fields. Describe host cells, mixed forms or debris separately and compare the questionable feature with the controls.
8. Write a descriptive report and state what further approved clinical tests can establish identity.
9. Enter the stain type, morphology, location, limitations and control status. Describe whether further clinical testing is needed and report a failed control or unclear slide to the instructor.

Precautions

- Use fixed teaching slides or a certified teaching system under approved supervision.
- Handle clinical specimens within the designated laboratory only.

Observations and Interpretation

Gram Stain Prepared Slides and Controls

Observations and Record

Item	What to record	What it tells you
Control	Expected positive and negative control appearance	Checks validity
Cells	Staining, shape and arrangement	Supports a preliminary morphology description
Specimen quality	Host cells, mixed forms and background	Informs interpretation

Worked Example

A prepared smear contains purple cocci in clusters with valid controls. Describe Gram-positive cocci in clusters. An image alone does not establish a species or sensitivity.

Result and Interpretation

Give an observation-first smear report and preserve the appropriate uncertainty.

Viva Questions and Answers

What makes over-decolourisation misleading?

A Gram-positive control may lose its primary stain.

Does the stain determine susceptibility?

Susceptibility requires a separate validated test.

Acid-Fast Smears and Respiratory Microbiology

Practical 03 / Report and data interpretation

Aim

Interpret prepared acid-fast, Gram and Albert-stain teaching images in respiratory diagnostic cases.

Principle

Acid-fast organisms retain primary stain under the adopted differentiation method. AFB microscopy does not establish species, viability or drug susceptibility. Each respiratory specimen type has its own quality criteria.

Materials and Requirements

- Prepared ZN stain images and control set
- Throat and lower respiratory teaching reports
- Supplied molecular result and case history

Procedure

1. Check the stain identity, control results and clinical sample site in each prepared record.
2. Compare the fixed teaching fields with their stain key and signed controls. Match each record to throat, sputum or other respiratory source and note whether the reported specimen was adequate.
3. Compare acid-fast structures with artefacts on the supplied fields and record the authorised reporting category used in the exercise.

Continue with step 4 on the next page.

Procedure Continued

Acid-Fast Smears and Respiratory Microbiology

4. On the prepared acid-fast teaching view compare the size, shape and stain retention of marked rods with fibres or precipitate. Verify each clue against the approved example images.
5. Review throat Gram or Albert images and a lower respiratory Gram report. Describe morphology and specimen quality without inferring species from appearance alone.
6. In the throat and lower respiratory views record cell reaction, arrangement and host cells. Compare an epithelial-cell-rich field with a field that the supplied report judged representative.
7. Keep acid-fast, Gram and Albert observations on separate lines. Use the supplied grading or descriptor and indicate when limited material or controls weaken the conclusion.
8. Combine the smear finding with the supplied molecular or other definitive report, timing and infection-control pathway.
9. Pair the stain result with the fictional molecular or other validated test and its date. Summarise morphology, limits and who should be informed through the appropriate clinical pathway.

Precautions

- Use prepared slides and reports. Keep all respiratory sample handling in the authorised laboratory.
- Never use an AFB-negative slide alone to exclude tuberculosis.

Observations and Interpretation

Acid-Fast Smears and Respiratory Microbiology

Observations and Record

Item	What to record	What it tells you
Acid-fast slide	Stain, controls and observed morphology	Supports a preliminary report
Respiratory sample	Source and quality clues	Helps distinguish sampling limitation from result
Follow-up	Supplied molecular or definitive evidence	Resolves part of the organism or resistance question

Worked Example

A fictional sputum slide is AFB positive and the species assay is pending. Report the AFB observation promptly under the local pathway and wait for the designated confirmation.

Result and Interpretation

Describe what the smear shows and what the accompanying test can determine.

Viva Questions and Answers

Why can a smear and molecular test differ?

They detect different features and have different analytical limits.

Can a smear identify viable organisms after treatment?

Staining alone does not demonstrate viability.

Stool Microscopy and Enteric Diagnostic Reports

Practical 04 / Spotter and viva

Aim

Identify common parasite forms on prepared stool images and relate findings to specimen quality and the history.

Principle

Eggs, cysts and other forms have distinguishing morphology. Some organisms cannot be differentiated reliably by routine microscopy alone.

Materials and Requirements

- Prepared stool micrographs or authorised permanent slides
- Reference scale and comparison atlas supplied by instructor
- Fictional case reports

Procedure

1. Note specimen collection and history and choose the allocated prepared slides or images.
2. Confirm the age, symptom course, collection information and allocated prepared slides or scans. Choose a suitable reference image set with measurement scale and verify that the labels match.
3. Scan at low power then compare labelled structures by size, shape, wall, internal structures and scale.
4. Scan the whole teaching field at low power, then use the assigned objective to inspect selected structures. Compare wall thickness, shape and distinctive internal features against the atlas card.

Continue with step 5 on the next page.

Procedure Continued

Stool Microscopy and Enteric Diagnostic Reports

5. Record the specific features that separate a candidate parasite from artefacts. Use cautious reporting for overlapping species.
6. Compare each candidate with common non-parasitic debris or air bubbles using size and internal structure. Check a second field and document when finding is absent, scarce or uncertain.
7. Draw the representative structure proportionally and label key features and the scale. Use separate entries and link each observation to its case and slide code.
8. Integrate clinical syndrome, exposure and requested antigen or molecular confirmation where appropriate.
9. Explain how the reported symptom and reference result fit the appearance. Identify what remains uncertain and what approved follow-up result, if any, would clarify it.

Precautions

- Use prepared slides or images rather than student-handled clinical stool.
- Report scale and distinguish borderline findings from confirmed forms.

Observations and Interpretation

Stool Microscopy and Enteric Diagnostic Reports

Observations and Record

Item	What to record	What it tells you
Specimen	Collection timing and requested test	Defines the scope of the result
Structure	Dimensions, shape and diagnostic features	Supports identification to the justified level
Case correlation	Symptoms and supporting targeted tests	Clarifies aetiology and need for follow-up

Worked Example

A supplied image contains amoebic cysts whose morphology cannot distinguish related species. Describe the finding and identify a species-specific confirmatory method in the case record.

Result and Interpretation

Write a concise morphology report and its limitation. Preserve the urgency of severe illness in the clinical scenario.

Viva Questions and Answers

Why do size and shape matter together?

Similar outlines may represent different organisms or artefacts.

Does one negative microscopy result exclude parasitic disease?

Sampling and test sensitivity can limit detection.

Blood Culture Sepsis and Endocarditis Reports

Practical 05 / Report and data interpretation

Aim

Interpret anonymised blood-culture records and identify collection and reporting factors relevant to sepsis and endocarditis.

Principle

Culture interpretation combines organism, bottle and set patterns, timing and clinical context. A positive bottle can be important and the possibility of contamination requires assessment.

Materials and Requirements

- Mock collection labels and supplied blood-culture reports
- Fictional endocarditis and sepsis timelines
- Local laboratory notification template

Procedure

1. Verify sample identities, collection timing, set source and prior antimicrobial exposure in the provided record.
2. Build a timeline from symptom onset, collection sets and clinical observations. Identify whether the supplied sets came from separate sites and note any antimicrobial exposure before collection.
3. Review the reported growth pattern and time to positivity. Compare repeat sets with the patient's condition.

Continue with step 4 on the next page.

Procedure Continued

Blood Culture Sepsis and Endocarditis Reports

4. Record which sets and bottles were reported positive, their times and whether repeat sets show the same reported finding. Compare this with the clinical course and collection context.
5. Separate findings compatible with contamination from those requiring urgent review by considering consistency, device history and symptoms. Treat clinical significance as a patient-level interpretation.
6. Distinguish a preliminary Gram report, organism identification and susceptibility report.
7. Place the preliminary stain description, final laboratory identification and susceptibility results on separate lines. Keep times visible and note any report still pending.
8. Give a simulated urgent handover and state the clinical and echocardiographic information needed when endocarditis is considered.
9. Call the appropriate simulated clinician with the identifier, critical finding and time. Confirm read-back, document the owner for follow-up and identify the relevant echocardiography or repeat-case information.

Precautions

- Use records only for culture workflows.
- Do not delay escalation of suspected sepsis while waiting for final culture results.

Observations and Interpretation

Blood Culture Sepsis and Endocarditis Reports

Observations and Record

Item	What to record	What it tells you
Collection record	Site, sets, time and prior antimicrobials	Supports interpretation of negative or positive findings
Growth report	Organism and affected sets	Assess significance with symptoms
Notification	Recipient, time and unresolved question	Supports timely review

Worked Example

A fictional unstable patient has the same clinically important organism reported from multiple sets. Communicate the result promptly to the supervising team. Further management depends on the full clinical assessment.

Result and Interpretation

State the supported microbiological interpretation and a safe follow-up or urgent communication step.

Viva Questions and Answers

Why compare independent sets?

Repeated matching results can help assess clinical significance.

Can prior antimicrobials reduce recovery?

Yes. Record timing when interpreting negative results.

Serology Rapid Tests and Diagnostic Accuracy

Practical 06 / Report and data interpretation

Aim

Interpret a controlled rapid or laboratory test and calculate a basic diagnostic performance measure.

Principle

A test can detect antigen, antibody or other target depending on design. Timing and prior probability affect the meaning of a result. An invalid control prevents interpretation.

Materials and Requirements

- Mock rapid-test cards and anonymised serology panels
- Two-by-two validation table
- Test instructions and case context

Procedure

1. Identify the test target, control and read window. Separate valid negatives from invalid runs.
2. Verify the fictional specimen, test target and lot, confirm the control signal and inspect the result at the read time specified on the card. Mark missing control as invalid.
3. Compare the case timing with the expected detection window and identify the authorised confirmation or repeat strategy.
4. Plot reported exposure, symptom onset and sample date. Explain how the timing may affect detectability and use the teaching algorithm to decide whether a repeat or different test is needed.

Continue with step 5 on the next page.

Procedure Continued

Serology Rapid Tests and Diagnostic Accuracy

5. Complete a two-by-two table and calculate sensitivity and specificity using the correct denominators.
6. Place reference status on one axis and index test on the other. Enter true and false positives and negatives and confirm that all four cells sum to the stated total.
7. Divide true positives by all condition-positive cases for sensitivity, and true negatives by all condition-negative cases for specificity. Use all test-positive cases as the denominator for positive predictive value.
8. Explain how positive predictive value depends on the tested population even when other test performance measures are similar.
9. Compare the case results across two prevalence scenarios. Give the count, denominator and percentage and distinguish an individual test result from a population performance estimate.

Precautions

- Keep personal identifiers out of teaching data.
- Follow the appropriate national algorithm for diagnoses that require sequential testing.

Observations and Interpretation

Serology Rapid Tests and Diagnostic Accuracy

Observations and Record

Item	What to record	What it tells you
Control and readout	Control status and test target	Determines whether a reading is valid
Diagnostic timing	Collection date and exposure or symptoms	Guides interpretation and confirmation
Two-by-two table	True and false results	Calculates performance by correct denominator

Worked Example

An illustrative validation has 90 positive tests among 100 reference-positive cases and 95 negative tests among 100 reference-negative cases. Sensitivity is 90% and specificity is 95%.

Result and Interpretation

State the test result, its limitations and the correct confirmatory or reporting pathway for the fictional case.

Viva Questions and Answers

What does a missing control band mean?

The run is invalid under the stated device instructions.

What is the specificity denominator?

All people without the reference condition, including false positives.

Prepared Specimens for Parasitology Mycology and Other Syndromes

Practical 07 / Spotter and viva

Aim

Use prepared images and clinical reports to select targeted tests for selected infectious syndromes.

Principle

Syndrome, host factors, source and exposure guide appropriate testing. Morphological clues narrow the differential but can be shared by several organisms.

Materials and Requirements

- Prepared fungal and parasite images
- Fictional wound, urinary, CNS and vector-borne syndrome cards
- Laboratory test directory

Procedure

1. Read the syndrome card and decide which specimen and test are relevant. Use supplied reports for sterile-site or time-sensitive presentations.
2. Identify the likely anatomical source and record host, exposure and symptom timing from the case. Match sterile-site, skin or blood teaching material to the question and record the diagnostic test supplied.
3. Compare yeast and hyphal appearances and fungal skin specimen pictures without assigning a species from a single field.

Continue with step 4 on the next page.

Procedure Continued

Prepared Specimens for Parasitology Mycology and Other Syndromes

4. Inspect images at low and then higher magnification where available. Document budding, filament, septation or branching as visible and use the supplied controls or atlas for comparison.
5. Review prepared thick and thin blood-film images for a parasite pattern and correlate with the teaching report.
6. Compare a thick-film overview with the intact-cell detail of the corresponding thin film from the teaching set. Record the pattern and the features that support it.
7. Check the label, stain and calibration before comparing several prepared fields. Use a reference field to distinguish likely biological structures from stain precipitate or damaged cells.
8. Document a probable finding, one mimicking feature and a useful confirmation or referral question.
9. Prepare separate concise summaries for each specimen type. Record the predominant finding, a meaningful mimic and the approved confirmatory method or supervisor question.

Precautions

- Use prepared, validated teaching material.
- Avoid inferring pathogen identity from one morphology sign alone.

Observations and Interpretation

Prepared Specimens for Parasitology Mycology and Other Syndromes

Observations and Record

Item	What to record	What it tells you
Syndrome	Site, host risk and urgency	Directs specimen and test selection
Image	Morphology and reportable level	Supports a preliminary finding
Confirmation	Selected targeted test and reason	Shows evidence needed before classifying the result

Worked Example

A fictional blood film raises suspicion of malaria. Review the provided confirmatory report and alert the clinical team promptly if the case is concerning.

Result and Interpretation

Present one matched specimen-and-test choice per case and identify uncertainty and urgency.

Viva Questions and Answers

What differs between thick and thin malaria films?

Thick films aid detection, while preserved morphology in thin films helps species assessment.

Why review host factors?

They change test choice and the significance of possible organisms.

Susceptibility Report and Antimicrobial Stewardship

Practical 08 / Report and data interpretation

Aim

Read a supplied susceptibility report and communicate a justified stewardship question.

Principle

A breakpoint relates test results to an organism, drug, method and clinical framework. Agents sharing a class are not automatically interchangeable. Colonisation and infection are different.

Materials and Requirements

- Supplied organism and susceptibility reports
- Current institutional breakpoint framework and local antibiogram
- Fictional patient scenario

Procedure

1. Confirm organism identity, sample site, quantitative result units and the laboratory's interpretive framework.
2. Check the fictional identifier, body site and sample date for the report and comparator. State whether it reports a category alone or includes a measured value and its units.
3. Interpret the supplied S, I and R categories using that framework. Verify unusual results with the laboratory pathway.

Continue with step 4 on the next page.

Procedure Continued

Susceptibility Report and Antimicrobial Stewardship

4. Read the reporting standard and notes so the meaning of each category is clear. Identify findings not interpretable with the supplied reference or requiring the reporting laboratory to clarify.
5. Compare the final report with earlier preliminary results, separating organism identification from susceptibility. Verify that comparison across reports uses the same organism and method.
6. Consider infection versus colonisation, site, severity, allergies and individual patient factors with the supervising team.
7. Present colonisation versus infection clues and the drug-exposure, allergy and organ-function context. Ask the team to check whether a proposed agent fits the site and current facility guidance.
8. Record a stewardship review point including culture follow-up, duration and opportunities for narrowing or stopping when justified.
9. Document the working indication, time and plan for review, when to expect additional results and who will decide on continuation, change or cessation.

Precautions

- Use supplied reports. No resistance selection or pathogen culture is part of this exercise.
- Check the current local interpretation standard and patient context.

Observations and Interpretation

Susceptibility Report and Antimicrobial Stewardship

Observations and Record

Item	What to record	What it tells you
Organism and site	Source and clinical significance	Distinguishes infection and possible colonisation
Susceptibility	Reported category, standard and context	Supports clinical interpretation
Review plan	Team decision and reassessment point	Supports stewardship

Worked Example

A case shows a urine isolate without symptoms. Do not assume a positive result always requires treatment. Ask about pregnancy, planned procedures and other relevant circumstances and discuss with the team.

Result and Interpretation

Communicate the report and a reasoned review question without creating an unsupervised antibiotic order.

Viva Questions and Answers

Can a zone diameter be interpreted without a chart?

It depends on organism, drug, method and current breakpoint criteria.

Does susceptibility alone establish a treatment choice?

Clinical site, likely benefit and patient factors also matter.

Hospital Infection Control and Waste Segregation

Practical 09 / Skills laboratory simulation

Aim

Demonstrate hand hygiene, appropriate PPE and waste handling in a ward simulation.

Principle

Standard precautions apply consistently. Additional precautions depend on exposure and transmission risk. Correct segregation starts where waste is generated.

Materials and Requirements

- Training PPE, hand hygiene materials and mock waste items
- Current facility biomedical waste and isolation charts

Procedure

1. Identify the task, expected exposure and appropriate standard or additional precautions.
2. On the ward map identify anticipated contact, splash or respiratory exposure. Select standard and any specified additional precautions, including the right place for putting on and removing PPE.
3. Perform hand hygiene and select PPE. Demonstrate donning and removal using the locally taught sequence.
4. Prepare equipment and check gown, gloves, mask or respiratory and eye protection appropriate to the scenario. Demonstrate hand hygiene at key points and verify fit with the instructor.

Continue with step 5 on the next page.

Procedure Continued

Hospital Infection Control and Waste Segregation

5. Remove PPE in the locally approved order under partner observation. Check for contamination of hands, clothing or face before leaving the designated area.
6. Sort clean mock items into labelled waste streams and demonstrate immediate sharps disposal with a training container.
7. Sort the mock items at the point of use with the workplace chart. Discard each simulated sharp directly into the approved container and record incorrectly placed items.
8. Review a missed hygiene opportunity and simulate reporting a potential occupational exposure.
9. Rehearse immediate first aid and the occupational reporting route in a model exposure. Record time, task, type of exposure and who was informed, using the teaching form.

Precautions

- Use local waste instructions for exact streams.
- Keep training waste clearly separate from clinical material.

Observations and Interpretation

Hospital Infection Control and Waste Segregation

Observations and Record

Item	What to record	What it tells you
Precautions	Exposure, isolation and PPE choice	Matches protection to risk
Technique	Hand hygiene and doffing sequence	Reduces avoidable contamination
Waste and incidents	Point-of-use segregation and reporting	Supports staff and patient safety

Worked Example

In simulation a used training sharp is left on a tray. Identify the point-of-use disposal failure and demonstrate the correct action with the approved container.

Result and Interpretation

Complete the infection-control checklist and identify one measurable practice improvement.

Viva Questions and Answers

Do gloves make hand hygiene unnecessary?

Hand hygiene remains necessary at indicated moments.

Why segregate at the point of generation?

Later handling increases exposure and sorting error.

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