Worksheet for Procurement IPE Activity

SPECIMEN TRANSPORT DELAY

Within the Mr. Johnson case, there was an issue concerning the procurement process. This issue was **specimen transport delay**. The sample was temporarily misplaced and sent to the lab 3 hours after the procurement. Within your team, work on the following questions. Aim to have all voices heard in order to determine the best course of action.

Questions	Answers
How do specimen transport delays impact sample integrity and patient care?	• **Sample Degradation:** Prolonged delays can lead to specimen deterioration, affecting test accuracy. Students can discuss how different tests have different stability profiles, but a generally accepted rule is that samples must arrive in the lab at the latest 2 hours after initial procurement. • **Misdiagnosis:** Altered sample quality can result in incorrect diagnoses or treatment decisions. • **Treatment Delays:** Patients may experience delays in receiving necessary treatment. • **Anxiety and Uncertainty:** Delays can cause stress and anxiety for patients awaiting results. • **Resource Allocation:** Inefficient transport may strain healthcare resources and staff time • **Financial Implications:** Delays can increase healthcare costs due to retesting or extended hospital stays.
What are some common reasons for delays in specimen transport within a healthcare facility?	• **High Volume:** Overwhelmed with a large number of specimens to process. • **Staffing Shortages:** Insufficient personnel for timely handling. • **Transport Logistics:** Issues in specimen pickup and delivery routes. • **Communication Gaps:** Lack of timely communication between departments. • **Equipment Failures:** Malfunctioning transport equipment, like pneumatic tubes. • **Environmental Factors:** Weather-related delays affecting transport of samples from one site to another • **Inefficient Workflow:** Poorly designed processes and inefficiencies.
In what ways can interdisciplinary collaboration between nursing and lab teams be improved to minimize specimen transport delays?	• Regular meetings • Shared goals and metrics • Mutual respect and understanding

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PROLONGED TOURNIQUET USE

Within the Mr. Johnson case, there was an issue concerning the procurement process. The patient's veins were very difficult to find and the **tourniquet had been applied for a long period of time** (more than 1 min). Results for several of the analytes were elevated not consistent with the clinical picture. Within your team work on the following questions. Aim to have all voices heard in order to determine the best course of action.

Questions	Answers
What is the greatest risk to both the patient and the sample when the tourniquet is left on the patient?	• **Hemoconcentration:** Increased concentration of blood components due to prolonged venous stasis under the tourniquet. • **Hemolysis:** Reduced blood flow to the extremity can lead to stasis, where blood remains stagnant in the veins. Stasis can cause cellular and molecular changes in the blood, potentially leading to the rupture of red blood cells, or hemolysis • **Altered Test Results:** Hemoconcentration can lead to falsely elevated test results, potentially leading to misdiagnosis or incorrect treatment. • **Patient Discomfort:** Prolonged tourniquet use can cause pain, discomfort, and potential nerve damage to the patient. • **Tissue Damage:** Ischemia and tissue damage may occur if the tourniquet is left on for an extended period, risking tissue necrosis. • **Compromised Blood Flow:** Reduced blood flow can lead to clot formation, particularly in patients with underlying clotting disorders. • **Patient Anxiety:** Patients may experience anxiety and discomfort, affecting their overall experience during blood collection. • **Decreased Sample Quality:** Altered blood composition can affect sample integrity, potentially rendering it unsuitable for testing.
What is the recommended amount of time for the tourniquet to be in place for blood procurement?	Maximum 1 minute.

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IMPROPER ORDER OF DRAW

You receive a call from the lab reporting critically high potassium and critically low calcium for your patient. This doesn't make sense to you, the nurse, since there has been no significant clinical change in the patient. The lab suggests that the order of draw was not respected and that the sample is probably contaminated. You have to redraw the patient's blood.

<table>
<tr><th>Questions</th><th>Answers</th></tr>
<tr><td>What is the approved order of draw for specimen collection, and why is it significant in preventing contamination?</td><td>
Approved Order of Draw:
<table>
<tr><th colspan="2">Cap color</th><th>Additive</th><th>Current use</th><th>Reason for position in order of draw and risk of contamination</th></tr>
<tr><td colspan="2">  </td><td>SPS (sodium polyanethol sulfonate)</td><td>Blood culture (aerobic bottle first, then anaerobic)</td><td>Fill first to avoid bacterial contamination from other tubes.</td></tr>
<tr><td colspan="2">  </td><td>Sodium Citrate 3,2 %</td><td>Coagulation analyses</td><td>Fill before the tubes with coagulation activators to avoid triggering coagulation.</td></tr>
<tr><td>  </td><td>  </td><td>With or without clot activator, with or without separating gel</td><td>Serum for biochemistry, endocrinology, serology analyses</td><td>Fill before the tubes with anticoagulant (except sodium citrate) to avoid that these chemical compounds contaminate the tubes intended for analyzes on serum. Note that contamination with sodium citrate is negligible.</td></tr>
<tr><td>  </td><td>  </td><td>Sodium heparin or lithium heparin</td><td>Plasma for biochemical analysis (except if measuring sodium or lithium)</td><td>Fill before the tube with EDTA to prevent this anticoagulant from contaminating the tubes intended for biochemical analyses.</td></tr>
<tr><td>  </td><td>  </td><td>EDTA (acide éthylènediamine- tétraacétique) (K_2EDTA, plus rarement K_3EDTA ou Na_2EDTA)</td><td>Lavender: hematology
Pink: Blood Bank</td><td>Fill after any tube that can be used for measuring electrolytes.</td></tr>
<tr><td colspan="2">  </td><td>Potassium oxalate/Sodium Fluoride (glycolysis inhibitor)</td><td>Glucose or lactate measurements</td><td>Fill towards the end to minimize the risk of contamination of the tubes for biochemical analysis, as it contains several chemical compounds.</td></tr>
<tr><td colspan="2">  </td><td>Sodium citrate 3.8%</td><td>Sedimentation rate by Westergren method</td><td>Fill at the end to minimize the risk of altering biochemistry tests, given the greater amount of anticoagulant it contains.</td></tr>
</table>
</td></tr>
<tr><td>Can you explain the consequences in the laboratory when samples are collected out of order?</td><td>The lab could inadvertently report inaccurate lab results.

For instance, the EDTA anticoagulant (lavender tube) is a calcium chelator and also contains potassium. Drawing a chemistry (yellow tube) after the lavender can thus lead to falsely increased potassium values and falsely decreased levels of calcium, as seen in this case.</td></tr>
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MISLABELED/PATIENT IDENTIFICATION

You get a call from the lab telling you that the specimens they received were likely mislabeled since there was a significant difference in all the results compared to previous results that cannot be explained by normal biological variations. The lab suggests that to be on the safe side, samples should be redrawn.

Questions	Answers
What challenges do nurses encounter when labeling specimens that may contribute to mislabeled samples?	• **High Workload:** Heavy patient loads, overcrowding and time constraints can lead to rushed specimen labeling. • **Distractions:** Busy healthcare environments with interruptions and distractions can result in labeling errors. • **Incomplete Information:** Missing or incomplete patient information on labels due to haste or oversight. • **Similar Patient Names:** Patients with similar names may be confused, leading to mislabeling. • **Multitasking:** Nurses often multitask, increasing the risk of mislabeling when handling multiple specimens simultaneously. • **Inadequate Training:** Lack of training or awareness regarding proper labeling procedures can contribute to errors. • **Fatigue:** Long shifts and fatigue can impair attention to detail during labeling. • **Lack of Standardization:** Inconsistent labeling practices among healthcare providers can lead to confusion. • **Communication Breakdown:** Ineffective communication between nurses and laboratory staff about specimen labeling requirements. • **Equipment Issues:** Problems with label printers or label stock can disrupt the labeling process. • **Specimen Collection Challenges:** Difficulties in collecting samples from certain patients may lead to errors in labeling.
What steps can be put in place to ensure positive patient/specimen identification?	• **Bedside sample identification**: Label all samples in the presence of the patient immediately after procurement. Never pre-label tubes • **Patient Verification:** Use at least two unique patient identifiers (e.g., name, date of birth) before specimen collection. Always ask patient their name, never “are you Mr. Johnson?” • **Barcoding:** Utilize barcoded patient wristbands and specimen labels for accuracy. • **Standardized Labeling:** Implement standardized labeling procedures with clear, legible, and complete information. • **Two-Person Verification:** Require two healthcare professionals to verify patient identity before critical procedures (I.e. transfusion protocols). • **Training:** Provide training and education to healthcare staff on proper identification and labeling protocols. • **Quality Control Checks:** Perform regular quality checks of labels and patient information for accuracy. • **Communication:** Establish clear communication channels between nursing staff and the laboratory. • **Patient Involvement:** Educate patients about the importance of verifying their identity during specimen collection. • **Error Reporting:** Encourage a culture of reporting and learning from identification errors. • **Regular Audits:** Conduct regular audits of specimen identification processes to identify and address issues. • **Continuous Improvement:** Continuously assess and improve identification protocols based on feedback and data analysis.

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SAMPLE CLOTTED

The CBC sample for your patient was cancelled due to clotting. As the nurse who drew the patient's blood, you are convinced that there was no clot and frustrated that you must now redraw the sample, unsure if the lab is going to cancel it again.

Questions	Answers
What is sample clotting, and why is it a concern in laboratory testing?	Formation of clots in the collected sample. Some types of testing require the sample to clot, while for others clotting must be avoided to ensure accurate and reliable results Concerns when the lab receives a mistakenly clotted sample: • Inaccurate results • Clots can damage instruments, leading to potentially prolonged downtimes • Result delays caused by need to repeat testing • Additional discomfort to patient • Affects professional credibility in the eyes of the patient
What are the common reasons for sample clotting during blood collection and processing?	• **Inadequate Mixing:** Poorly mixing blood with anticoagulants can cause clot formation by not inhibiting coagulation factors effectively. • **Prolonged Stasis:** Leaving a tourniquet on for too long can lead to stasis and clot formation, especially in delicate veins. • **Inadequate Tube Filling:** Tubes must be adequately filled to maintain proper anticoagulant-to-blood ratios; underfilled tubes can cause clotting. • **Blood Agitation:** Excessive shaking or mixing can harm blood cells and induce clotting; gentle inversion is preferred. • **Improper Tube Selection:** Using the wrong tube type for specific tests can lead to clotting and sample contamination. • **Blood Dilution:** Overly dilute samples, often due to collection errors, can disrupt anticoagulant-to-blood ratios and promote clotting. • **Transport Issues:** Rough sample handling during transport can mechanically damage blood cells and encourage clot formation.
What are the best practices for preventing sample clotting during venipuncture and sample handling?	• Gently invert each tube a few times immediately after it is procured • Proper use of appropriate anticoagulant

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WORKFLOW AND TIME PRESSURES

To promote a culture of respect, it is crucial that we gain insight into the different workflow challenges and time constraints encountered in each of our respective fields on a daily basis. This understanding can shed light on circumstances that may contribute to the occurrence of errors. Within your team, work on the following questions. Aim to have all voices heard in order to determine the best course of action.

Questions	Answers
Identify and discuss factors that contribute to workflow and time pressures. For example, staffing levels, patient acuity, and so on.	**Clinical Labs:** **Staffing Levels:** Insufficient staffing can lead to a high workload for laboratory personnel. Shortages of medical technologists and technicians can result in increased pressure to process samples and report results promptly. **Sample Volume:** High sample volumes, especially during peak hours, can overwhelm laboratory resources. Managing a large number of specimens within a limited timeframe can lead to time pressures and the need for efficient workflow management. **Instrumentation and Equipment:** Aging or malfunctioning laboratory equipment can disrupt workflow. Downtime due to equipment maintenance or repairs can delay testing processes. **Emergent Testing:** Urgent or stat tests often take precedence over routine testing. The need to prioritize and process these tests quickly can create time pressures for laboratory staff. **Sample Complexity:** Certain tests, particularly specialized or molecular tests, may require more time and attention due to their complexity. These tests can affect overall workflow and turnaround times. **Compliance and Quality Assurance:** Maintaining compliance with regulatory requirements and quality assurance standards demands meticulous documentation and adherence to protocols. Meeting these standards while managing daily operations can add time pressures. **Nursing:** **Patient Acuity:** Nursing staff often care for patients with varying levels of acuity. High-acuity patients require more time and attention, potentially limiting the availability of nursing staff for other tasks. **Staffing Ratios:** Nurse-to-patient ratios significantly impact workflow. High ratios can lead to increased workload and time pressures, potentially compromising the quality of patient care. **Administrative Tasks:** Administrative duties, such as charting, documentation, and compliance with regulatory requirements, can be time-consuming. These tasks can detract from direct patient care and create time pressures. **Medication Administration:** Ensuring the safe and accurate administration of medications involves multiple steps and documentation, which can be time-intensive, especially when managing complex drug regimens. **Patient Flow:** Admissions, discharges, and patient transfers can disrupt planned nursing activities and create time pressures. Managing patient flow efficiently is crucial. **Patient Calls and Requests:** Frequent patient calls and requests for assistance can interrupt nursing tasks and add to time pressures, especially in units with high patient needs. **Emergencies:** Unpredictable emergencies, such as code blue situations or rapid responses, require immediate attention and can disrupt planned workflows **Interdisciplinary Collaboration:** Effective communication and collaboration with other healthcare professionals and departments are essential but can require additional time and coordination.
How can workflow and time pressures affect patient outcomes in specimen procurement?	I think the answers to this question can be captured in the discussion from above.

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DELAYED RESULTS / FAILURE TO FOLLOW UP ON RESULTS

Within the Mr. Johnson case, there was an issue concerning the procurement process. The results for the blood test are significantly delayed and nursing staff is growing increasingly frustrated as it impedes care. When you call to follow up, you learn that many of the results were critical. Within your team, work on the following questions. Aim to have all voices heard in order to determine the best course of action.

Questions	Answers
What are the most common reasons for delays in lab testing and result reporting?	**Sample Quality Issues:** Delays can occur when blood samples are hemolyzed, clotted, or improperly labeled, necessitating recollection **Specimen Transport Delays:** Delays may result from inefficient specimen transport within the healthcare facility, especially when samples are not promptly delivered to the lab **High Sample Volume:** Increased sample volume during peak hours can overwhelm the lab, leading to longer processing times and result reporting. **Instrument Downtime:** Equipment maintenance and downtime can disrupt routine testing, causing delays until the issue is resolved. **Stat Test Prioritization:** Urgent or stat tests take precedence, leading to delays in routine testing when resources are diverted to meet immediate patient needs. **Data Entry and Validation:** Data entry errors or discrepancies between patient information and sample details can result in delays as technicians reconcile discrepancies. **Quality Control Checks:** Laboratories perform quality control checks to ensure accurate results, which can add time to the testing process. **Outsourced Testing:** Some tests may be sent to reference laboratories, leading to longer turnaround times compared to in-house testing. **Regulatory Compliance:** Compliance with stringent regulatory requirements, such as documenting testing processes and quality assurance, can add time to lab operations. **Emerging Testing Technologies:** The introduction of new testing technologies or assays may require validation and implementation time, causing delays. **Communication Gaps:** Delays can occur when there are communication gaps between nursing and lab staff, such as incomplete or unclear test orders.
What are the procedures for reporting critical values in the lab, and how can nurses expedite the notification process?	**Identification of Critical Values:** Laboratories establish predetermined critical values for various tests, such as extremely high or low levels of specific analytes (e.g., potassium, glucose, or hemoglobin). These critical values are often based on clinical guidelines and consensus. **Immediate Notification:** When a test result falls within the critical value range, the lab technician or technologist recognizes it as a critical result and flags it for immediate attention. **Verification:** Before reporting, the lab staff verifies the result to ensure accuracy. This may involve retesting the specimen to rule out errors. **Documentation:** The critical value result and related information are documented thoroughly, including the date and time of the result, the name of the person who verified it, and any actions taken. **Notification:** The lab communicates the critical value result to the responsible healthcare provider, typically the ordering physician or nurse, through established communication channels. Expediting the reporting process involves addressing several challenges on both sides: **Communication Gaps:** Inefficient communication channels or misunderstandings between the lab and healthcare providers can lead to delays in reporting critical values. **Incomplete or Inaccurate Patient Information:** Missing or incorrect patient identifiers, such as name, medical record number, or date of birth, can lead to difficulties in matching results to the correct patient.

	Unavailability of Responsible Providers: In some cases, healthcare providers may not be readily available to receive critical value notifications, especially during off-hours or when covering multiple patients. **Multiple Critical Results:** When multiple critical values are identified for a single patient, prioritizing, and managing these results simultaneously can be challenging. **Resource Constraints:** Limited staffing in the lab or nursing units can lead to delays in verifying and reporting critical values. **Documentation Burden:** The need for thorough documentation of the critical value reporting process can add time to the overall procedure. **Adherence to Protocols:** Ensuring that all staff members adhere to established protocols for identifying, verifying, and reporting critical values can be a challenge, especially in high-stress situations. **Clinician Awareness and Training:** Some clinicians may not be fully aware of the critical values for specific tests or may lack training on how to respond to critical results. **Patient Complexity:** Patients with complex medical histories or comorbidities may require more extensive assessment and intervention in response to critical values, which can take additional time. **Integration of Systems:** In healthcare systems with multiple facilities or systems, integrating critical value reporting across different platforms can be complex and may lead to delays.

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HEMOLYSIS

You receive a call from the laboratory stating that your patient's potassium tests were cancelled due to gross hemolysis. The patient's sample must now be redrawn.

Questions	Answers
What is hemolysis, and why is it significant in laboratory testing?	**Impact on Test Accuracy:** Hemolysis can alter the composition of the sample, leading to inaccurate test results. Hemoglobin release can affect the concentration of various analytes, potentially leading to both false elevations and false depressions in test values. Potassium values, among others, are particularly sensitive since the intracellular potassium levels are very high compared to extracellular potassium (which is what we measure). **Interference in Spectrophotometry:** Hemoglobin has absorbance properties that can interfere with spectrophotometric measurements used in many laboratory tests. This interference can distort the results of assays that rely on absorbance or colorimetric detection. **Potential for Misdiagnosis:** In clinical practice, erroneous test results due to hemolysis can lead to misdiagnosis and incorrect treatment decisions. This can have serious consequences for patient care. **Waste of Resources:** Hemolyzed samples often require retesting, leading to increased healthcare costs, resource utilization, and delayed diagnosis and treatment. **Quality Control and Assurance:** Hemolysis can indicate issues with specimen handling, transportation, or collection. Continuous occurrence may suggest a need for quality improvement measures within a healthcare facility. **Patient Experience:** Repeated blood draws due to hemolysis can be uncomfortable and stressful for patients, negatively affecting their experience during healthcare procedures.
What are some of the common causes of hemolysis in collected specimens?	**Needle-Related Factors:** 1) Use of a small or inappropriate needle gauge 2) Excessive negative pressure during blood collection. 3) Traumatic insertion or removal of the needle. **Tourniquet-Related Factors:** 1) Prolonged tourniquet application. 2) Tourniquet tied too tightly. **Sample Handling and Transportation:** 1) Aggressive mixing or shaking of samples. 2) Delayed processing or centrifugation. 3) Rough handling during transportation. **Patient-Related Factors:** 1) Hemolytic conditions or diseases. 2) Medications that affect red blood cells. **Collection Technique:** 1) Repeated probing or redirection during venipuncture. **Temperature Extremes:** 1) Exposure to extreme cold or heat during sample handling or storage.

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QUANTITY NOT SUFFICIENT (QNS)

The lab has informed you that your specimen must be cancelled due to inadequate sample volume.

Questions	Answers
Why is it so crucial for specimen tubes to be adequately filled? Doesn't the lab only need a few drops?	• **Test Accuracy:** Adequate specimen volume ensures accurate test results. • **Analyte Concentration:** It prevents over dilution of analytes with the anticoagulant, which can lead to false results. • **Repeat Testing:** Inadequate volume may necessitate retesting, causing delays. • **Resource Efficiency:** It maximizes laboratory efficiency. • **Patient Care:** Timely and accurate results are essential for patient care. • **Minimizes Errors:** Adequate volume reduces pre-analytical errors. • **Cost-Effective:** It reduces the need for costly retesting.
What barriers or factors exist in a nurse's daily work that would affect their ability to collect sufficiently filled specimens?	• **Patient Factors:** Dehydration, difficult venous access, uncooperative patients, and age-related challenges can affect specimen collection. • **Emergency Situations:** Rapid collection needs may lead to insufficient volume. • **Time Constraints:** Pressure to collect specimens quickly can result in inadequate samples. • **Workload and Stress:** High workloads and stress may reduce attention to detail during collection. • **Resource Limitations:** Inadequate equipment or resources can hinder specimen collection. • **Inexperience and Training:** Lack of experience or training may lead to errors. • **Communication Gaps:** Ineffective communication can exacerbate issues in specimen collection.
Are there any tests that are particularly susceptible to false results due to underfilling?	**Tests Sensitive to Underfilling:** • Coagulation Tests (e.g., PT, aPTT) • Hematology Tests (e.g., CBC) • Blood Gas Analysis (e.g., ABG) • Microbiology Cultures These tests require specific specimen volumes for accuracy. Underfilling can lead to inaccurate results, false negatives, or prolonged clotting times. Adhering to volume requirements is crucial for reliable laboratory testing.

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LOST SAMPLES

The Nurse calls the lab asking for the patient's results. The lab says that the samples were never received. The Nurse becomes angry, accusing the lab of losing samples yet again.

Questions	Answers
What are some of the most common causes for losing samples?	**Misplacement:** Specimens being put in the wrong storage location or inadvertently moved to an incorrect area, making them difficult to locate. **Storage Issues:** Inadequate organization or storage systems that make it challenging to keep track of specimens. **Human Error:** Mislabelling, data entry mistakes or clerical errors that result in specimens being recorded incorrectly in the laboratory information system (LIS). **Laboratory Workflow:** Complex workflows or multiple steps in the testing process may lead to specimens being inadvertently overlooked or lost in the process. **Transportation Problems:** Specimens getting lost during transport between various laboratory departments or facilities. **Inadequate Documentation:** Poor documentation practices that make it difficult to trace the specimen's journey within the lab. **Communication Breakdown:** Lack of effective communication among lab personnel, particularly during handoffs or shifts, can lead to uncertainty about specimen location
What can both nursing and labs do to ensure samples do not get lost?	**Accurate Labeling:** Ensure proper labeling of all specimen containers with the patient's name, medical record number, and other required identifiers. Double-check labels for accuracy. **Documentation:** Complete all necessary documentation accurately and promptly, including requisition forms and test orders. Verify that all required information is included. **Specimen Collection:** Follow established protocols and guidelines for specimen collection, including proper labeling and securing containers. Pay careful attention to patient identifiers. **Transportation:** Safely and promptly transport specimens to the laboratory, adhering to recommended transport conditions. Avoid delays in sending samples. **Communication:** Maintain open communication with laboratory staff, particularly when there are special handling instructions or specific requirements for certain tests. **Training:** Stay up to date with training and education related to specimen collection and handling procedures. Ensure that staff members are well-trained. **Continuous Improvement:** Participate in interdisciplinary discussions and quality improvement initiatives to identify areas for improvement in the specimen collection process. **Audits and Compliance:** Comply with regulatory requirements and participate in internal audits to assess specimen handling practices and identify areas for improvement. **Report Issues:** Promptly report any issues related to specimen collection, labeling, or transport to the appropriate personnel for investigation and resolution. **Teamwork:** Foster teamwork and collaboration between nursing and laboratory staff to ensure that everyone is aligned with the goal of accurate and efficient specimen handling.

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