GENERAL

nurses quick reference to common laboratory and diagnostic tests

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In the fast-paced environment of modern healthcare, nurses are often the first point of contact for patients undergoing laboratory and diagnostic investigations. Whether it's drawing a blood sample, preparing a urine specimen, or explaining the significance of a test result, nurses must possess a solid grasp of the most frequently ordered tests. This comprehensive guide serves as a quick reference for nurses, offering clear explanations, normal ranges, patient education points, and practical tips for specimen collection and interpretation. By mastering this information, nurses can streamline workflow, reduce errors, and enhance patient safety.

Why a Quick Reference is Essential for Nurses

Clinical decision-making relies heavily on laboratory data. Nurses must interpret these values in real time to assess patient status, monitor treatment response, and identify potential complications. A concise, easily accessible reference:

- Reduces reliance on bulky textbooks or time consuming online searches.
- Improves accuracy in specimen handling, thereby minimizing pre analytical errors.
- Supports effective patient education and shared decision making.
- Enhances interdisciplinary communication with physicians, pharmacists, and lab technicians.

Below, you'll find a categorized overview of common tests, key points for nursing practice, and practical mnemonics to aid recall.

1. Hematology – The Blood Count Basics

1.1 Complete Blood Count (CBC)

Purpose: Evaluates overall health, detects anemia, infection, and many other disorders.

Key Parameters & Normal Ranges* (values may vary slightly by laboratory and patient demographics):

- White Blood Cells (WBC): 4.5–11.0 /× /109/L
- Red Blood Cells (RBC): 4.5–5.9 /× /1012/L (men); 3.9–5.0 /× /1012/L (women)
- Hemoglobin (Hb): 13.5–17.5 /g/dL (men); 12.0–15.5 /g/dL (women)
- Hematocrit (Hct): 41–53% (men); 36–48% (women)
- Platelets: 150–450 /× /109/L
- Mean Corpuscular Volume (MCV): 80–100 /fL
- Mean Corpuscular Hemoglobin (MCH): 27–31 /pg
- Mean Corpuscular Hemoglobin Concentration (MCHC): 32–36 /g/dL

Nursing Responsibilities:

1. Specimen Collection: Use a 21 22 gauge butterfly needle for venipuncture; ensure proper tourniquet application (no more than 1 /minute).
2. Label accurately with patient name, DOB, and collection time.
3. Rotate tubes: start with the anticoagulant (EDTA) tube for CBC, then the serum separator tube for chemistry.

4. Document collection time and any patient concerns (e.g., pain, anxiety).

Patient Education:

- Explain the purpose of the CBC and how it informs treatment.
- Reassure patients about the minimal discomfort of a quick blood draw.
- Advise patients to stay hydrated before the test to improve venous access.

1.2 Differential White Blood Cell Count

Provides a breakdown of WBC subtypes: neutrophils, lymphocytes, monocytes, eosinophils, basophils.

Clinical Significance:

- High neutrophils: bacterial infection or inflammation.
- Elevated lymphocytes: viral infections or chronic inflammatory conditions.
- Increased eosinophils: allergic reactions or parasitic infections.

Nursing Tips:

- Check for recent antibiotic use, as it may alter counts.
- Notify the provider if differential values are abnormal.

2. Chemistry – Metabolic Panel Overview

2.1 Basic Metabolic Panel (BMP)

Key Components: Glucose, sodium, potassium, chloride, bicarbonate, BUN, creatinine, calcium.

Normal Ranges* (approximate):

- Glucose: 70–99 /mg/dL (fasting)
- Sodium: 135–145 /mmol/L
- Potassium: 3.5–5.0 /mmol/L
- Chloride: 98–107 /mmol/L
- Bicarbonate: 22–28 /mmol/L
- BUN: 7–20 /mg/dL
- Creatinine: 0.6–1.3 /mg/dL
- Calcium: 8.5–10.5 /mg/dL

Clinical Applications:

- Assess electrolyte balance and renal function.
- Monitor glucose levels in diabetic patients.
- Evaluate acid–base status via bicarbonate and chloride.

Nursing Actions:

1. Verify patient fasting status; fasted samples should be collected after 8–12 /hours of fasting.
2. Check for recent ingestion of supplements or medications that affect electrolytes.
3. Document any symptoms such as dizziness, palpitations, or confusion.

2.2 Comprehensive Metabolic Panel (CMP)

Includes all BMP components plus albumin, total protein, alkaline phosphatase (ALP), AST, ALT, and bilirubin.

Why CMP Matters:

- Provides a broader assessment of liver function and protein status.
- Helps detect hepatic injury, malnutrition, or chronic liver disease.

Nursing Guidance:

- Ask patients about recent alcohol consumption or medication use that could affect liver enzymes.
- Advise patients to avoid high fat meals before the test if liver function is being evaluated.

3. Coagulation Panel – Clotting Insights

3.1 Prothrombin Time (PT) & International Normalized Ratio (INR)

Indications: Monitoring anticoagulant therapy (warfarin), evaluating liver synthetic function.

Normal INR: 0.8–1.1 (without anticoagulation).

Nursing Considerations:

- Ensure accurate timing of sample relative to last anticoagulant dose.
- Document dietary vitamin K intake, as it can affect INR.
- Alert provider promptly if INR > 4.0 (high bleeding risk).

3.2 Activated Partial Thromboplastin Time (aPTT)

Assesses intrinsic pathway; used for heparin monitoring.

Key Points:

- Normal range: 25–35 /seconds (varies by lab).
- Prolonged aPTT may indicate clotting factor deficiencies or lupus anticoagulant.

4. Microbiology – Pathogen Identification

4.1 Blood Culture

Detects bloodstream infections such as bacteremia or sepsis.

Specimen Collection Tips:

1. Use aseptic technique; disinfect with 2% chlorhexidine.
2. Collect at least 2 sets (aerobic and anaerobic) from separate sites.
3. Label with date, time, and patient identification.

Patient Communication:

- Explain the importance of early detection for treatment.
- Reassure patients about the sterile nature of the procedure.

4.2 Urine Culture

Identifies urinary tract infections (UTIs).

Collection Guidelines:

- Midstream clean catch technique.
- Use sterile collection cups; instruct patients on proper wiping technique.
- Label promptly; note collection time.

5. Urinalysis – Quick Screening Tool

Provides rapid insight into renal function, hydration status, and possible infection.

Key Parameters:

- Color, clarity, specific gravity.
- Protein, glucose, ketones, bilirubin, urobilinogen.
- pH, nitrite, leukocyte esterase.

Nursing Actions:

1. Ensure patient follows instructions for sample collection.
2. Check for any abnormal findings (e.g., cloudy urine, strong odor).
3. Document observations and notify provider if significant changes are noted.

6. Imaging – Complementary Diagnostic Tools

6.1 X Ray

Used for evaluating bone fractures, lung pathology, and abdominal issues.

Nursing Role:

- Confirm patient identity and order details.
- Explain positioning and procedure to patients.
- Ensure safety protocols (e.g., lead aprons for pregnant patients).

6.2 Ultrasound

Non invasive imaging for abdominal organs, gynecological assessment, and vascular studies.

Key Points:

- Patient fasting status may be required for abdominal ultrasound.
- Explain the sensation of the probe and reassure patients.
- Document any patient discomfort or concerns during the procedure.

7. Quick Reference Mnemonics for Nurses

Memorizing normal ranges and key test purposes can be challenging. These mnemonics help keep critical information at your fingertips.

- “WELL” for CBC: White cells, Erythrocytes, Leukocytes, Lymphocytes – a quick reminder of the main components.

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