Clinical Performance Objectives in Clinical Chemistry
Department of Medical and Research Technology
University of Maryland School of Medicine
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Upon completion of the **Clinical Chemistry** rotation the **MLS** student will be able to:

I. Laboratory Safety

1. Comply with the standard operating procedure (SOP) for specimen handling, distribution, and storage including correct triage of specimen for in house and send out laboratory testing **100% of the time**.
2. Demonstrate safe work practices following departmental protocol 100% of the time by the following
   a. Wearing personal protective equipment (PPE) as required.
   b. Handling and disposing of contaminated materials according to standard precautions.
   c. Handling chemicals or reagents according to safety procedures.
3. Dispose of waste according to laboratory protocol.

II. Specimen Handling

1. Check for correct identification/labeling of specimens according to the current National Patient Safety Standard from TJC **100% of the time**.

2. **Summarize the acceptable sample specifications for the following analytes after reading the related procedures at the facility:**
   - **Ammonia** - **Bilirubin**
   - **Calcium** - **Cholesterol**
   - **Glucose** - **Iron**
   - **Magnesium** - **PCO_2, PO_2 & pH**
   - **Potassium** - **Triglycerides**
3. Evaluate specimens for appropriate anticoagulant, collection time, and site of collection according to the facilities protocol and procedures.
4. Explain the **clinical site's** corrective measures for unacceptable specimens.

5. **Observe** a minimum of 20 specimens for analysis by centrifugation and separation of cells from serum/plasma.
6. Describe the process for archiving and retrieving patient specimens including the correct specimen storage requirement for each specimen type.

III. Quality Assurance

1. Explain the purpose of the quality control program.
2. Observe the documentation of results of calibration, performance, maintenance checks, malfunctions, and corrections.
3. Observe basic LIS computer applications where relevant.
4. Comply with regulatory issues **100% of the time**.
5. **WAS DELETED**

IV. Performance of Procedures

A. Analytical Principle

1. Describe the sample path or flow in 2 instruments.
2. **Create a chart on the following four methodologies (Kinetic Spectrophotometry, Ion-Selective electrodes, Osmometry, Chemiluminescence) as applied at the clinical site with regard to:**
   - **Instrument Model (name)**
   - **Specimen requirements**
   - **Reagents**
   - **Reaction principle**
   - **Verification of normal results**
   - **Follow-up of abnormal results**
3. Recognize common malfunctions of the instruments referred to in the previous objective.
4. Recognize interfering substances for each procedure performed.
5. Describe the effect of interfering substances for each procedure performed.
6. **Describe examples of 2 automated and 2 semi-automated (if available) instruments at the site including the analytes measured by each**.

7. **Define the analytes included in CMP and BMP at the facility**.
8. State the facility's procedure when a delta check occurs. - new

B. Maintenance

1. Perform routine maintenance checks on at least 2 instruments according to the procedure of the clinical site.
2. Describe the purpose of periodic maintenance and documentation procedures for at least 2 different instruments.

C. Reagents

1. Load reagents, calibrators, and control material according to the lab procedures for 10 different assays.
2. In manual assays, when available, pipet reagents and samples accurately.

D. Quality Control and Calibration

1. Observe the performance of assay calibrations.
2. Evaluate the validity of the standardization/calibration of the instrument with **100% accuracy**.
3. Identify all control results that are not within the accepted quality control limits.
4. State possible reasons, why QC results are not within the prescribed limits (e.g. outside instrument limitations).
5. Discuss appropriate actions for unacceptable control results.
6. Observe documentation of corrective actions for unacceptable control values.

E. Testing of Samples

1. **Describe how samples that require dilution are handled**.
2. Complete a minimum of 10 specimen runs on repeat samples with acceptable results and within the laboratory's timeframe specified for routine turn-around time.
3. Operate at least one analyzer on repeat samples with minimal supervision in accordance with laboratory protocol.
4. Demonstrate the ability to organize workflow.

5. Describe or demonstrate basic trouble-shooting skills for the common instrument malfunctions.

V. Interpretation and Reporting of Results

1. Recognize serum reference intervals and critical values for the following tests:

Glucose	Blood urea nitrogen
Total protein	Creatinine
Sodium	Total bilirubin
Potassium	Cholesterol
Chloride	Therapeutic drugs (peak and trough)
Blood gases	Troponins

2. Identify all patient values that are significantly different (e.g. risk values, critical values, analytical errors) and bring these to the attention of the technologist immediately.
3. According to the laboratory protocol document investigative and corrective action for discrepant results.
4. Determine need for repeat analysis on unacceptable reportable ranges.
5. Determine whether results fit the expected pattern with respect to previously obtained results on same test or other test results on same patient.
6. Evaluate a minimum of 10 patient result runs according to laboratory protocol including routine, STAT, critical value, and phone results.
7. Perform and interpret 10 routine calculations to include anion gap, 24-hour urine, creatinine clearance and, LDL, with 100% accuracy**.**
8. Correlate laboratory data (normal and abnormal) to clinical conditions to the satisfaction of the clinical liaison. This includes:
    - Tropinins
    - Liver enzymes
    - Bilirubin
    - Protein
    - Glucose
    - Electrolytes
    - Tumor markers
    - Drugs of Abuse
    - Creatinine
    - Blood gases
    - Iron
    - Lipids
    - Endocrine function
    - Blood urea nitrogen
    - Therapeutic Drugs
9. State the difference between the analytical measurement range (AMR) and clinically reportable range (CRR).

VI. Professional Qualities

1. Arrive at the laboratory on time.

2. Adhere to the established student uniform policy.

3. Notify the clinical supervisor of any unavoidable absences prior to the scheduled arrival time and make arrangements to make up the time on a mutually convenient date.

4. Demonstrate the ability to follow verbal and written instructions.

5. Communicate in a constructive, professional manner (i.e. polite, considerate, pleasant and unhurried) with members of the laboratory and hospital staff, peers and patients.

6. Organize work in a logical sequence.

7. Complete work and assignments within established deadlines.

8. With the approval of the clinical instructor, demonstrate the initiative to perform tasks without being reminded.

9. Demonstrate constructive utilization of all training time by examining available study materials during periods of time not devoted to instruction.

10. Demonstrate flexibility in changes to the scheduled daily learning activities due to laboratory staffing, emergencies, etc.

11. Demonstrate the ability to recognize and admit mistakes or discrepancies and take appropriate corrective measures, including seeking help and notifying staff when needed.

12. Demonstrate the ability to accept professional constructive criticism regarding work and modified behavior appropriately.

13. Maintain the confidentiality of all patient information when questioned by patients or other unauthorized individuals.

14. Adhere to all published safety regulations in the laboratory.

15. Demonstrate professionalism in attitude, appearance and work ethic 100% of the time.

16. Adhere to standards and regulations regarding proper access and utilization of institutional computers.

17. Adhere to policies of the affiliate regarding the use of ALL electronic devices, including but not limited to, portable music players such as MP3 and Smart/cell phones.