Section 1: Laboratory Standard Operating Procedures for General Procedures

1. Access to the laboratory is limited to faculty, staff, students, or other persons with permission of the Program Director, when work with BSL-2 pathogens is being conducted. Access is limited according to attached procedures.

2. All faculty and staff must be screened by Employee Health before working with potentially infectious materials. Any available vaccinations which would reduce the risks associated with exposure to any of the agents in the protocol must be offered to all personnel or a signed waiver must be obtained by the Program Director.

3. All students must meet the vaccination requirements of AU Student Health.
   a. All students enrolled in the program are required to meet the health requirements set forth by AU Student Health. All vaccinations must be up to date. The students will be handling blood and body fluids so they must have the Hepatitis B vaccination or sign a waiver explaining that they understand the risks and choose not to take the vaccine.

4. Persons who are at increased risk of infection, or for whom infection may have serious consequences, and persons not trained in the required safety precautions should not enter the laboratory when work with infectious agents is in progress. They may enter upon signing Acknowledgement of Understanding Essential Functions and Risks in the Clinical Laboratory Science Program document.
   a. Students are not required to divulge their health status to the faculty at AU. However, students will be working with infectious agents that require Biosafety Level-2 containment and practices in the student laboratories. They will be handling blood and blood products. Human blood can contain blood borne pathogens, such as HIV and Hepatitis B.
b. In the clinical internships, students could encounter agents that require a higher Biosafety containment and practices level. Clinical affiliates will provide PPE and training for students in their clinical facilities who may encounter these agents. Clinical affiliates are required to complete safety training for the AU students prior to or on their first day of their internships.

b. In the student laboratories, students will be working with actively growing cultures of:

- $\sqrt{Staphylococcus\, aureus}$
- $\sqrt{Staphylococcus\, epidermidis}$
- $\sqrt{Staphylococcus\, saprophyticus}$
- $\sqrt{Streptococcus\, pyogenes}$
- $\sqrt{Streptococcus\, agalactiae}$
- $\sqrt{Streptococcus\, bovis}$
- $\sqrt{Streptococcus\, viridians}$
- $\sqrt{Streptococcus\, pneumonia}$
- $\sqrt{Enterococcus\, faecalis}$
- $\sqrt{Neisseria\, lactamica}$
- $\sqrt{Neisseria\, gonorrhoeae}$
- $\sqrt{Neisseria\, meningitidis}$
- $\sqrt{Haemophilus\, influenzae}$
- $\sqrt{Haemophilus\, parainfluenzae}$
- $\sqrt{Escherichia\, coli}$
- $\sqrt{Klebsiella\, pneumoniae}$
- $\sqrt{Klebsiella\, oxytoca}$
- $\sqrt{Proteus\, mirabilis}$
- $\sqrt{Proteus\, vulgaris}$
- $\sqrt{Providencia\, stuartii}$
- $\sqrt{Pseudomonas\, aeruginosa}$
- $\sqrt{Alcaligenes\, faecalis}$
- $\sqrt{Bacillus\, cereus}$
- $\sqrt{Erysipelothrix\, rhusiopathiae}$
- $\sqrt{Candida\, albicans}$
- $\sqrt{Candida\, tropicalis}$
- $\sqrt{Salmonella\, enterica\, subsp.\, enterica}$

5. All persons entering the laboratory must be advised of potential hazards. Faculty, students, and staff must be trained and made aware of the hazards and appropriate safety precautions before working with any of the biological agents.

a. The CLS students will complete the following safety training events:

✓ AU Environmental Health and Safety Initial Chemical and Biological Safety training.
✓ Safety training modules incorporated into the CLSC 3220/6220 Introduction to Clinical Laboratory Science course.
✓ Any additional safety training incorporated into CLS curriculum courses (e.g. CLSC 4445/6445 Clinical Microbiology).

b. Faculty and staff are required to complete the annual USG RTK training.

6. Spills and accidents that result in overt exposures to infectious materials must be immediately reported to the Program Director and appropriate medical evaluation must be provided.

7. Faculty, staff, and students must not eat, drink, smoke, handle contact lenses, chew gum, or apply cosmetics in the laboratories.

8. Students will not take home laboratory reports that were generated in the student laboratories while handling infectious agents. The students will not remove any material from the student laboratory, such as pencils, notebooks and will not take into the student laboratories any material that will be taken home at a later date, unless that object can be cleaned with the approved disinfectant.

9. Food or drink for human consumption or utensils or cups must be stored outside laboratory work area in refrigerators designated for that purpose only.

10. Faculty, staff, and students working with infectious substances must wear gloves. Contaminated gloves must be changed IMMEDIATELY. Under NO CIRCUMSTANCES will gloves be reused.

   Gloves: The student will be provided with laboratory gloves designed for use in clinical/research laboratories. The students will receive training in how to remove contaminated gloves safely. The student will dispose of contaminated gloves in the appropriate Hazardous Waste trash can. Not contaminated gloves per Gwinnett Medical Center waste disposal regulations will dispose in the regular trash can.

11. Faculty, staff, and students must wash hands after handling infectious materials, after removing gloves, and before leaving the laboratory.

   Hand Washing: Students will receive training in the CLSC 3320/6220 Introduction to Clinical Laboratory Science course in how to appropriately wash hands and when hands should be washed.

12. Face protection (goggles, mask, face shield, or other splatter guard) must be used for all procedures when such procedures could produce splashes or sprays of infectious or other hazardous materials. See attached procedures for more detailed PPE requirements.

   Face and eye protection: Students will be provided with a new face shield for each student laboratory at the beginning of the semester. The face shield will be used when a procedure is being performed that could produce a splash or spray. For example:
   ✓ When opening tubes that contain potentially infectious agents, such as vacutainer tubes.
   ✓ When performing blood banking procedures, such as manual cell washing.
automated cell washing, or centrifugation.
√ When pipetting blood or blood products.
√ When preparing blood smears for hematology

13. Protective clothing must be removed and left in the laboratory before going to non-laboratory areas (restroom, cafeteria, library, administrative areas).

   **Lab coats:** Students are provided with a disposable laboratory coat at the beginning of each semester. The student must write their name on this lab coat, and when not in use, must store the laboratory coat in the designated area for dirty lab coats. This laboratory coat should not be worn outside of the student laboratories. If the student contaminates the laboratory coat with any infectious agent, he/she will dispose of the lab coat in the appropriate Hazardous Waste trash can, and will be provided with a new disposable laboratory coat.

14. Protective clothing must be either disposed of in the laboratory or laundered by institution. (NEVER taken home!)

15. Mechanical and manual pipetting devices will be used in the laboratory. **No mouth pipetting** will occur. Only appropriate pipetting devices will be used.

16. All sharps must be placed in red (approved) sharps containers.

17. Sharps containers must be turned in when ¾ full.

18. All procedures must be performed to minimize creation of splashes or aerosols.

19. All infectious liquids must be decontaminated or disinfected prior to being poured into drain.

20. All work surfaces must be decontaminated at the completion of work, at the end of the day, or after any spill or splash of viable material according to attached procedures.

21. Laboratory equipment, surfaces and other contaminated materials must be decontaminated with an effective disinfectant on a routine basis, after work with infectious materials is finished, and especially after overt spills, splashes, or other contamination according to attached procedures. Equipment must be decontaminated before removal from the laboratory (for repair maintenance or other purposes). Decontamination protocol is attached.

22. Mobile Laboratory doors must be locked all time.

23. Spaces between benches, cabinets, and equipment must be kept accessible for cleaning.

24. Eyewash must be flushed at least monthly and kept clear of obstructions.

25. All personnel must know the location of the nearest safety shower and must ensure that the area under the shower is kept free of obstructions.

26. Any personnel with overt exposure will be taken to the appropriate site (Faculty and Staff to Employee Health or Students to Student Health), and/or the ER for immediate (<1 hour) post-exposure medical intervention and monitoring. Any overt exposures of personnel to biological agents will be reported to the faculty working with the student at time of exposure, Program Director and the BSO as soon as possible. Upon exposure
c

Note: At Mobile lab in Lawrenceville, GA, due to distance from Augusta campus students are not able to visit AU Student Health Department for overt exposure. Students are encouraged to contact AU Student Health by phone at 706-721-3448 if they have any questions.

If you have AU student insurance and have a blood or body fluid exposure or other emergent condition, report directly to an in-network emergency room. See www.uhcsr.com/gru for a list of in-network facilities and providers for the United Healthcare student-group plan. There will be a $300 deductible and then the plan pays 80% in-network for any ER visit including exposures. Gwinnett Medical Center ER is considered in-network.

If you have other insurance, please consult your insurance provider about your in-network facilities (you should have the facilities identified BEFORE the exposure so that you don’t waste the time making phone calls upon injury). If needed, see your private physician immediately. Do not delay the visit to make sure the assessment of HIV prophylaxis is done in a timely manner (within 3 hours of exposure)

Payment for all treatment will be student’s responsibility.

27. Students must stay off the mobile lab wheelchair lift area of any time lift is in use.

Section 2: Dress for Student Laboratories

1. Faculty, laboratory assistants, and students are required to dress appropriately for all student laboratories. If the student is not dressed appropriately, they will not be allowed to enter into or perform the student laboratories until corrected.

2. Shoes that cover the entire foot are required. These shoes should not be cloth. They can be either leather or plastic, and there cannot be any holes in the shoes.

3. Faculty, laboratory assistants and students must have pants or skirts that cover their entire legs. Not shorts or short skirts can be worn.

4. Appropriate PPE that is required for that laboratory must be worn. AU will provide the PPE, but it is the responsibility of the individual to wear it and to use it appropriately.

5. If the individual has long hair, past shoulder length, it must be tied back away from the face.

6. Long dangling earrings should not be worn.

Section 3: Laboratory Standard Operating Procedures for Specific Tasks

1. Cell Washing
   *PPE required – lab coat, gloves, face shield
a. Manual cell washing

- Blood banking requires a 5% suspension of red cells for testing. The student will prepare this solution following the blood bank technical procedure provided in the student manual.
- After the addition of saline to the red cells, the student will cover the cell suspension with parafilm, and then centrifuge the solution.
- The student will remove the solution from the centrifuge and decant the supernatant into a beaker containing a 10% bleach solution.
- The student will wash the cells the required number of times outlined in the technical procedure.
- At the end of the laboratory session, the laboratory assistant will add bleach to the discarded solution to ensure a 10% solution of bleach, allow the solution to sit for 30 minutes, and then discard the solution down the drain.

b. Automated Cell Washing

- Blood banking requires that red blood cells that have already been washed be washed using an automated cell washer. For this procedure the student will follow the blood bank technical procedure provided in the student manual.
- The laboratory assistant will use an empty saline container to collect the discard solution from the automated cell washers.
- The cell washer will be placed on the counter and the discard collection container will be placed on the floor. Tubing will extend from the cell washer to the collection container. The collection container will sit in a secondary container with sides.
- The laboratory assistant will pour bleach into the discard collection container at the beginning of each lab to ensure a 10% bleach solution.
- At the end of each laboratory session, the laboratory assistant will add more bleach to the discard solution to ensure a 10% bleach solution was obtained, allow the solution to sit for 30 minutes, then discard the solution down the drain.

2. Centrifugation

*PPE required – lab coat, gloves, face shield

a. To operate centrifuges make sure the covers are closed (including serofuges).

b. Keep hair, beard, hair ribbons or other frilly or dangling items OUT OF THE WAY. Keep lab coats buttoned to prevent neck ties or other loose clothing from being a hazard.

c. All tubes of specimens (blood, urine, sputum) must be covered with a secure fitting cap or with parafilm before being placed in the centrifuge. Centrifugation creates a vacuum and volatilizes liquids. (Contaminated items become aerosols, flammable liquids become bombs, etc.).

d. Do not open centrifuges until the rotor has come to a complete stop.
e. Blood bank serofuges do not have centrifuge covers. The student must wear a face shield when using the serofuge.

f. If there is a spill in the centrifuge, the student should notify the instructor. The instructor will clean the equipment, as stated in the instrument manual, with the approved cleaning agent.

g. For blood banking procedures, 12 x 75 glass tubes are used to perform blood bank testing. If a tube breaks in the centrifuge, the student will NOT attempt to clean the centrifuge or remove the broken glassware. The student will notify their instructor of the broken tube, and the instructor will use laboratory tongs or tweezers to remove the glassware from the centrifuge and will clean the equipment, as stated in the instrument manual, with the approved cleaning agent.

3. Disposable Laboratory Supplies

a. Disposable laboratory supplies are used in the student laboratories. Examples of these are agglutination cards, Westergren sed rates, plastic pipettes, test tubes, accuvettes, gauze, wooden applicator sticks, cotton swabs, glass slides, test strips, parafilm, tube caps, vacutainer tubes, fingerstick devices, venipuncture needles, venipuncture tubes, reagent tablets, and various plastic tubes…. 

b. Disposable laboratory supplies that can puncture red bagged waste and all disposable glass should be discarded in the Sharps containers.

c. Disposable laboratory supplies that cannot puncture red bagged waste and are contaminated with infectious waste should be disposed of in red bagged waste.

d. Disposable laboratory supplies that cannot puncture red bagged waste and are NOT contaminated with infectious waste can be disposed of in regular waste.

4. Laboratory Equipment

*PPE required – lab coat, gloves, face shield

a. Various types of laboratory equipment are used in the student laboratories. Examples of some of the equipment are spectrophotometers, microscopes, pH meters, electrophoresis equipment, densitometer, PCR analyzer, chemistry analyzer, hematology analyzer, urinalysis analyzer, MTS centrifuges, MTS incubators, microtiter plate washers, RPR rotators, mixers, shakers, Rh viewers, fibrometers, cell counters, blood rotators, hemocrit centrifuges, cytospin, slider stainer, slider warmer…

b. Laboratory equipment, surfaces and other contaminated materials must be decontaminated with an effective disinfectant on a routine basis, after work with infectious materials is finished, and especially after overt spills, splashes, or other contamination according to attached procedures.

c. The laboratory assistant and the clinical instructor will provide the students with guidelines for
cleaning the instruments. The laboratory assistant and clinical instructors will follow the cleaning procedures outlined in the instrument manual and will use the approved disinfecting agent.

d. "Standard Precaution" measures must be followed by all personnel performing maintenance on equipment that has come in contact with potentially infective material. Gloves must be worn when changing analyzer membranes and tubing.

e. When emptying waste material, the student or laboratory assistant must avoid contact and aerosolization via splatter.

e. Equipment must be decontaminated before removal from the laboratory (for repair maintenance or other purposes).

5. Microbiology

PPE required – lab coat, gloves

a. In the microbiology student laboratory the student will be working with live organisms. The organisms that are used in the student laboratories are outlined in Section1, 4c.

b. In the student laboratories, when handling cultures, liquid or agar based, the student will wear a lab coat and gloves. A face shield will be added if there is a potential for a splash.

c. The student will NOT stab petri dish agar plates when streaking for isolation.

d. The student will NOT wave the culture in front of the face to determine what type of smell the organism has.

e. Metal inoculation loops and incinerators are used in the Microbiology student laboratories. The student will use caution when handling the metal inoculating loops and the metal inoculating needles. To sterilize the metal inoculating loops or metal inoculating needles, the student will place the loop or needle into the micro-incinerator until the loop or needle turns red. The student will NOT walk away and leave the loop or needle in the incinerator.

f. Plastic inoculation loops are used in the Microbiology student laboratories. After use the student will dispose of the plastic loop into the Sharps container. The student will NOT place the plastic loop into the incinerator.

g. At the end of the student laboratory, the student will place the active culture agar plates into the plate holder and give it to the instructor. The instructor will then place the cultures into a locked cabinet for the next student laboratory.

h. To dispose of the culture plates, the student will tape the plates shut with masking tape, and will place the plates into the large red bucket for disposal.

i. For the glass tubes that will be autoclaved, the student will place the tubes in the test tube racks that are designated for this, and the laboratory assistant will take the tubes for autoclaving.
6. Pipetting
PPE required – lab coat, gloves, face shield

a. Manual pipetting

✓ Manual glass pipets are used in the student laboratories for the pipetting of reagents. No infectious materials are pipetted with manual glass pipettes.
✓ No mouth pipetting is allowed. Only approved devices will be used for pipetting.

c. Automated pipetting

✓ Automated pipetting devices are used in the student laboratories for the pipetting of reagents and infectious agents.
✓ Pipette tips should be disposed of in Sharps containers.
✓ Automated pipettes should be cleaned after the end of each laboratory session.

c. Disposal pipets

✓ Plastic disposable pipettes are used in the student laboratories. After use, the disposable pipettes can be disposed of in red bagged waste.

7. Venipuncture
PPE required – lab coat, gloves

Venipuncture is performed in the student laboratories. First, the student performs venipunctures on the phantom arm. Then the student will perform a venipuncture on another student or one of the instructors. The student will also perform a fingerstick.

a. No manual needle recapping is allowed.

b. The needles used for venipuncture have safety devices that allow the student to use one hand behind the needle technique to cover the needle with the safety device attached by the manufacturer either to the needle or to the tube holder. Then the venipuncture needle is disposed of in the Sharps container along with attached tube holder or butterfly tubing.

c. The fingerstick device used is a single-use retractable device. Once used, it is disposed of in the Sharps container.

8. Transport of specimens
Specimens are transported from the MCGHI Clinical Pathology Laboratories to the student laboratories. (or Gwinnett Medical Center)

a. All specimens will be placed in a container or sealed plastic bag.
b. This will then be placed in a secondary container that can be sealed (plastic container with lid that seals). This container will have a biohazard label affixed to it.

9. PPE
Students, laboratory assistants, and faculty are provided with PPE for performing laboratories.

a. Protective three-layer SMS fabric long-sleeved cuffed lab coats are used in the student laboratories. Students are given a lab coat at the beginning of each semester. If the lab coat becomes soiled or torn, the lab coat is disposed of and a new lab coat is given to the student. At the end of the semester, the lab coat is disposed of in red bagged waste.

b. Nitrile examination gloves are provided for all students/lab assistants/faculty. The gloves must be worn when performing all laboratory procedures. If the gloves become contaminated or torn the gloves are removed and disposed of in red bagged waste and then hands must be washed. Gloves are never reused, once removed, they are disposed of.

c. Disposable Full Face Shields are provided for all faculty, laboratory assistants, and students for laboratory procedures that could produce splashes or sprays of infectious or other hazardous materials.

10. Autoclaving
The laboratory assistant autoclaves nondisposable microbiology media tubes.

a. Autoclaving is performed using the autoclave instructions in the manual

b. Contaminated material (such as media inoculated with the organisms listed in Section 1, 4c.
  ✓ The contaminated media that was autoclaved is removed from the autoclave and transferred into a biohazard bucket.
  ✓ Concentrated bleach will be added to a final concentration of 10% then added to the autoclaved material in the bucket.
  ✓ Paper towels are placed in the biohazard bucket to absorb the liquid, the lid is placed on the bucket, and then removed by housekeeping.

c. Reusable items (laboratory test tube racks, hematology rockers ……)
  ✓ Are autoclaved using the instructions in the manual.
  ✓ The reusable items are then washed and placed into use.

11. Disinfection/decontamination
PPE required – gloves, lab coats, face shield if potential for splashes

a. All work surfaces are decontaminated with 10% bleach (Bleach Rite).

b. Work surfaces are decontaminated at the completion of work, at the end of the day, or after any spill or splash of viable material.
c. Laboratory equipment, surfaces and other contaminated materials must be decontaminated with 10% bleach (Beach Rite) or OPTI-CIDE-3 on a routine bases, after work with infectious materials is finished, and especially after overt spills, splashes, or other contamination.

d. Equipment is decontaminated before being removed from the laboratory.