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| **SAFETY IN THE MICROBIOLOGY/VIROLOGY LABORATORY**  |
| **Purpose** | This procedure provides instructions for safe work practices. |
| **Principle and Clinical Significance** | Many hazards are encountered from the time the specimen is collected to the time the specimen is discarded. The greatest risk of infection for microbiologists is associated with processing primary specimens and manipulating the pathogens that are isolated. It is important to exercise safe practices for handling infectious material to prevent microbial transmission. |
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| **Handling of Specimens** | 1. **Gloves and lab coats**
2. Wear gloves and lab coats when processing patient specimens, decontaminating instruments and countertops, and cleaning spills.
3. Wear lab coats when reading plates and performing identification and susceptibility procedures.
4. Bandage open cuts on hands and then wear gloves.
5. Wash hands after gloves are removed and before leaving the laboratory.
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|  | 1. **Goggles / face shields**

Eye and/or face protection shall be worn for these activities when they are not performed under the Biological Safety Cabinet (BSC):* Wear a mask, goggles, glasses with side shields or chin length face shield when splashes, spray,splatter or droplets of blood, body fluids or OPIM may be generated.
* Staining fixed slides
* Vortexing bacterial suspensions
* Handling or preparation of chemicals or reagents
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|   | 1. **Specimen transport**
2. Place specimens in plastic bags and transport in leak-proof containers with the biohazard symbol.
3. Do not accept grossly contaminated specimens. Notify the floor submitting the specimen and follow the specimen rejection policy.
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|  | 1. **Needles and syringes**
2. Never recap needles or remove them from syringes.
3. Specimens received in syringes with needles attached require the submission of a Safety Learning Report. Notify the floor submitting the specimen to prevent a reoccurrence. Process with caution.
4. Discard in puncture-proof container with the biohazard symbol.
5. Use the needleless system for processing blood cultures.
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|  | 1. **Tubes**
2. Carry tubes in racks.
3. Use plastic tubes when possible.
4. When removing tops from vacuum tubes, uncap in biosafety cabinet (BSC) to contain splashes.
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|  | 1. **Centrifuges**
2. Centrifuge tubes must be intact and properly balanced before centrifugation.
3. Centrifuge safety cups must be opened in a BSC.
4. Do not place tabletop centrifuges in BSC because air turbulence can allow aerosols to escape.
5. Slide preparation for Cytospin slides must be done in a BSC.
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|  | 1. **Hand washing**
2. Perform hand washing after removing gloves, before leaving the laboratory, and before eating, drinking or applying cosmetics.
3. Use antiseptic soap followed by thorough hand washing for accidental skin contamination.
4. Use nonirritating soap for routine washing.
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| **Processing of Specimens** | 1. Process all specimens in a BSC.
2. Sterilize inoculating needles and loops in a Bacti-incinerator to prevent splattering of material upon heating.
3. Cool needle and loops enough to avoid searing the agar that may create aerosols.
4. Mix and transfer liquids by using plastic dispo-pipettes or Pipette-Aid.
5. Cap or parafilm tubes when mixing or vortexing.
6. Plan tasks to minimize exposure to known hazards.
7. Follow Universal Precautions.
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| **Culture Exam/Workup and Other Miscellaneous Safety Practices** | General1. Avoid sniffing organisms on plated media.
2. When working with a **colony exhibiting mycelial growth**, all LCB preps and subculture transfers must be performed within the biological safety cabinet.
3. Primary culture and subculture plates should be taped, shrink sealed or parafilmed to seal, to prevent accidental opening of a plate.
4. Always work with ***Neisseria meningitidis*** and **suspected *Bacillus anthracis, Brucella* sp., *Clostridium botulinum*, and *Francisella* sp.**, ***Yersinia pestis, and Variola major*** in a BSC.
5. Primary culture and subculture plates should be shrink sealed or parafilmed to seal.
6. Be suspicious of hazy growth or no growth day 1.
7. Use **MDH/CDC/LRN** manual flowcharts to guide work-up.
8. **Do not use** **automated** **systems** (Vitek 2) or microdilution (MicroScan) methods to identify.
9. Always work with **CAP Lab Preparedness Surveys and MDH Challenges** in a BSC.
10. Primary culture and subculture plates should be shrink sealed or parafilmed to seal.
11. Be suspicious of hazy growth or no growth on day 1.
12. Use **MDH/CDC/LRN** manual flowcharts to guide work-up.
13. **Do not use automated systems** (Vitek 2) or microdilution (MicroScan) methods to identify.
14. Clean and disinfect all surfaces after spills and at the end each work shift.
15. Keep all work areas neat and uncluttered.
16. Do not store personal items in the work area.
17. Do not store large quantities of disposable items in the work area.
18. Remove lab coats before leaving the laboratory. Place contaminated lab coats in designated laundry bags for cleaning.
19. Discard all contaminated materials in provided biohazardous containers for autoclaving/disposal.
20. All employees are responsible for participating in safety training and following all safety policies and procedures.
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|  | 1. **Compressed gases**
2. Secure cylinders in an upright position with wall mounts.
3. Store cylinders away from open flames and sources of heat.
4. Verify the contents of the cylinder before the gas is used.
5. Transport cylinders in secured handcarts.
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|  | 1. **Chemicals**
2. Label all reagents with their chemical names and appropriate hazard warnings using the MSDS information.
3. Be familiar with the online MSDS’s and Disaster Plan flip chart located by the culture desk sink.
4. Wear appropriate PPE when handling hazardous chemicals.
5. Store flammable and combustible liquids in fire-safety cabinet and explosion-proof refrigerator.
6. Store all hazardous chemicals including reagents below eye level.
7. Only store volumes on the bench necessary for daily work.
8. Refer to protocol [MCVI 3.3 *HAZARDOUS WASTE MANAGEMENT IN THE MICROBIOLOGY/VIROLOGY LABORATORY*](MCVI%203.3%20Hazardous%20Waste%20Management.docx) for proper management of chemical waste Contact Laboratory Safety Officer for additional information.
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|  | 1. **Ultraviolet (UV) light**
	* Do not expose eyes and skin to direct UV light. UV radiation generated by the germicidal UV lamp in the BSC and the Wood’s lamp can cause injury with only a few seconds of exposure.
	* Do not look directly at UV light. Wear protective goggles (ANSI Z87.1 – 1989 UV certification). Ordinary eyeglasses do not block UV radiation. Goggles located on the two molecular hoods.
	* Wear a fully buttoned lab coat if there is potential for skin exposure.
	* Never work in a BSC while the germicidal lamp is on. Keep sash closed.
	* UV light should not be relied upon as the sole decontaminating agent. Additional disinfecting should be performed before and after BSC use.
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|  | 1. **Emergency Response**
2. In the event of a hazardous material spill, fire or explosion, call **5-7777** in Minneapolis and **1-8899** in St. Paul immediately. Emergency numbers are located on the badge card and on each telephone. The security department will respond to the call.
3. If the Safety Officer and Safety Specialist are not able to be contacted, Children’s has contracted with Baywest Incorporated to respond to an emergency chemical spill at 1-800-279-0456.
4. Remember the basic emergency procedures, **RACE** (rescue, alert, confine, extinguish) and **PASS** (Pull, aim, squeeze, sweep).
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|  | 1. **Record Keeping**
2. Notify supervisor.
3. Fill out a Safety Learning Report from the Children’s Intranet and submit to the Laboratory Safety Officer for quality assurance.
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| **References** | 1. Isenberg, Henry, D., *Essential Procedures for Clinical Microbiology,* 1998, ASM Press, Washington, D.C.,

Pg. 752-755.1. Frazier, Jillyne, Children’s Hospitals and Clinics *SAFETY, Everyone’s Job,* 1999 Safety Workbook,
2. pg. 16-21.
3. Leste, Jim, *Employee Hazardous Waste Management and Emergency Response Training,* 2014.
4. The Baker Company Operator’s Manual, *Proper Cabinet Use,* pg. 11, 333D002 Rev B SGIIITX manual.doc, June 5, 2003, P.O. Drawer E, Sanford Maine, 04073.
5. Office of Environmental Health and Radiation Safety (EHRS), [www.ehrs.upenn.edu](http://www.ehrs.upenn.edu), (215) 898-4453.
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| **Historical Record** | **Version** | **Written/Revised by:** | **Effective Date:** | **Summary of Revisions** |
| 1 | Pat Ackerman | 10/87 | Initial Version |
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| 1.6 | Becky Carlson | 9/14/10 | Added to Section C General: Primary culture and subculture plates should be shrink sealed or parafilmed to seal. |
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| 2 | Becky CarlsonHelen Stefan | 4/3/2015 | Re-numbered from MC 202Added Goggle/Face shield section |
| 3 | Susan DeMeyere | 11/17/2017  | Add comment to be suspicious of hazy growth /no growth for highly contagious organisms. Fix hyperlink to MCVI 3.3 Hazardous Waste  |
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