## UNMC SARS-CoV-2 (COVID-19) Research Laboratory Biosafety Guidelines

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| **BSL-3/ABSL-3**         | • Storage and laboratory work with seed stocks, working stocks, or specimens\(^2\) with the intent to grow or use live virus at UNMC.  
                           - Virus isolation, characterization, and/or expansion  
                           - Ship viral cultures or isolates as Category A, UN2814, infectious substance, affecting humans\(^3\)  
                           • Use of live SARS-CoV-2 virus in functional assays:  
                             - Plaque/Focus Forming Unit assays  
                             - Serologic virus capture/binding assays  
                             - Therapeutic MIC assays  
                           • Use of live SARS-CoV-2 virus in animals | Restricted activity. Contact the Biosafety Officer or Associate Biosafety Officers for additional information. PI and personnel must have access to the facility, BSL-3 training, and project approval from the BSL-3/ABSL-3 Facility Director. SARS-CoV-2 is considered a Risk Group 3 pathogen\(^4\) |
| **BSL-2 with enhanced precautions** | • Processing, aliquoting, or preparing specimens\(^2\) for research use and storage.  
                                         • Preparation of chemical- or heat-fixed specimens\(^2\) for microscopic analysis  
                                         • Nucleic acid extraction of specimens\(^2\) for molecular analysis  
                                         • Preparation of inactivated specimens for other laboratory assessments  
                                         • Performing diagnostic tests with respiratory samples that do not involve activities with the potential to propagate the virus  
                                         • Inoculating bacterial or mycological culture media  
                                         • Work with inactivated viral lysate | Meet BSL-2 Requirements below, PLUS:  
                                         • Wear the following PPE: surgical mask (blood)/N-95 or PAPR (respiratory secretions), double gloves, impervious closed-front gown, eye protection or face shield.  
                                         • Perform all sample manipulations in a BSC  
                                         • Must use sealed centrifuge rotors or samples cups  
                                         • Do not use sharps (unless absolutely necessary)  
                                         • Restricted access to the lab and samples |
| **BSL-2**                | • Molecular analysis of already extracted nucleic acid preparations  
                            • Analysis of specimens\(^2\) that have been inactivated by a method approved by UNMC Institutional Biosafety Committee (IBC).  
                            • Final packaging of specimens\(^2\) already in a sealed, decontaminated primary container for transport to collaborating laboratories for additional analyses  
                            • Specimens\(^2\) from suspected or confirmed cases should be transported as UN3373, "Biological Substance, Category B  
                            • Pathologic/microscopic examination of fixed specimens\(^2\) (e.g., formalin-fixed tissues or glutaraldehyde-fixed grids).  
                            • FACS – fixed cells/samples  
                            • Serological analysis of serum or plasma or urinalysis | • An approved IBC protocol\(^1\) detailing the materials handled, procedures performed, aerosol-generating procedures, location of work, waste handling procedures, and personnel involved.  
                                         • The laboratory must meet requirements as outlined in IBC-19 Policy.  
                                         • Good (Standard) Microbiological Practices\(^5\)  
                                         • Conduct all procedures with the potential to generate aerosols in a BSC  
                                         • Use centrifuge safety cups whenever possible  
                                         • Ensure personnel have completed biosafety training and PI/lab supervisor must document their proficiency at working under BSL-2 conditions |

\(^1\) All research-related activities involving SARS-CoV2 must be covered by an IBC protocol  
\(^2\) Specimens are defined as, but not limited to, blood, tissues, feces, sputum, mucosal swabs, or washes/secrections collected from any species.  
\(^3\) For assistance with required import and export regulations, please contact the Export Control Office.  
\(^4\) The NIH recommends that IBCs consider SARS-CoV-2 a RG3 pathogen as a starting point for risk assessments and biocontainment  
\(^5\) PPE: single gloves, gown/lab coat, eye protection, (surgical mask)

**Resources:**  
- CDC’s Frequently Asked Questions about Laboratory Biosafety and SARS-CoV-2  
- CDC/NIAID Biosafety in Microbiological and Biomedical Laboratories, 5th ed.  
- Questions about Laboratory Biosafety? Email: UNMC Biosafety  
- UNMC Vice Chancellor for Research Institutional Biosafety Committee