



## Example - Risk Assessment for Work with SARS-CoV-2 in Laboratory Animals

This risk assessment is designed for use as a template in the development of a site- and project-specific risk assessment relevant to the local situation. It is not intended to be used unmodified at any facility considering work with SARS-CoV-2, nor for any other purpose. Please consult with your Institutional Biosafety Committee (IBC), Institutional Animal Care and Use Committee (IACUC), biosafety officer and/or other safety and health personnel to conduct a formal risk assessment.

Agent/Toxin Description	
<b>Scientific name of agent or toxin:</b> SARS-CoV-2	<b>Origin of agent:</b> United States Pandemic 2020
<b>Type of susceptible host:</b> <input checked="" type="checkbox"/> Human <input checked="" type="checkbox"/> Animal <input type="checkbox"/> Other _____	
<b>Name of susceptible host (specific animal or entity):</b> Species of animal to be studied _____ (emerging pathogen; additional susceptible hosts possible)	
<b>Resulting disease that agent/toxin causes:</b> Coronavirus disease 2019 (COVID-19)	
<b>Route of transmission:</b> Aerosol, direct contact, fecal-oral, percutaneous	<b>Infectious dose:</b> Unknown
<b>Agent/toxin stability:</b> 3 days on laboratory surfaces	
<b>Concentration:</b> <1 L of 10 <sup>9</sup> plaque forming units prepared in the laboratory for inoculation of experimental animals (potential for higher titer in infected animal)	
<b>Any additional information:</b> While the assumption may not be borne out by experimental evidence, this risk assessment assumes animals will shed SARS-CoV-2 in infectious quantities at all times after exposure. In human populations, infected individuals may shed virus while remaining asymptomatic. High risk for severe illness in older adults, people with asthma, or other serious underlying medical conditions (especially those that affect the heart and lungs).	
<b>Agent/toxin activity will be performed at</b> <input type="checkbox"/> BSL-2 <input type="checkbox"/> BSL-3 <input type="checkbox"/> ABSL-2 <input checked="" type="checkbox"/> ABSL-3 <input type="checkbox"/> BSL-3Ag	

Procedures
<b>Brief description of procedures and research goals:</b> TO BE FILLED OUT LOCALLY
<b>Is the pathogen genetically modified?</b>
<b>Is the containment level appropriate for all life cycle stages or forms of the agent/toxin?</b>

<p>All life cycle stages of the agent, including prior to disease onset, can result in high virus shedding and must be remanded to ABSL-3 (minimum) to prevent unintended personnel exposure or environmental release. BSL-3Ag may be considered when large animals are loose-housed.</p>
<p><b>Identify special precautions used when agent/toxin is outside containment:</b>          If infected animals are to be handled outside of primary containment, personnel must don a filtering face piece respirator (FFR) N95 respirator or powered air-purifying respirator (PAPR).</p>
<p><b>Type of housing selected:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Co-housing</li> <li><input type="checkbox"/> physically separating virus-infected and uninfected animals</li> <li><input type="checkbox"/> Individual housing</li> <li><input type="checkbox"/> Other</li> </ul>
<p><b>Special handling procedures or pre-treatments prior to disposal:</b>          Live agent must be inactivated with an EPA-registered disinfectant active against SARS-CoV-2 or other human coronavirus prior to disposal. (<a href="http://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2">www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2</a>)</p>
<p><b>Immobilization procedures used:</b></p>
<p><b>Type of disposal used (e.g. autoclave: describe validated temperature and time parameters)</b>          Autoclave: 121°C for x minutes  <i>Management of biologicals, carcasses, and bedding:</i>          All wastes from the animal room (including animal tissues, carcasses, and bedding) are transferred from the animal room in leak-proof containers for appropriate disposal.          An autoclave is available which is convenient to the animal rooms where the biohazard is contained. The autoclave is utilized to decontaminate infectious materials and waste before moving it to the other areas of the facility.          Waste management is done in compliance with applicable institutional, local and state requirements.</p>
<p><b>Laboratory testing</b>          Molecular testing is available for agent detection in animal species.</p>
<p><b>Environmental disinfection practices of cages, surfaces, floors:</b> EPA-registered disinfectant active against SARS-Cov-2 and accepted for animal facility use will be used.          List disinfectants used:          Cages are washed manually or preferably in a mechanical cage washer. The mechanical cage washer should have a final rinse temperature of at least 180°F.</p>
<p style="text-align: center;"><b>Safety Controls</b></p>
<p><b>Biosafety level practices:</b> Small animals will be housed in isolator caging with HEPA filtered exhaust, all procedures with potentially infectious material or infected animals will be conducted within a biological safety cabinet, and personnel will shower out of the facility. BSL-3Ag facilities should be considered when animals cannot be housed in primary containment.</p>

Sharps with engineered sharps injury protection devices are recommended, if sharps are needed; use of sharps should be reviewed with the biosafety office.
<b>Engineering Controls:</b> isolator caging with HEPA filtered exhaust; Class II biological safety cabinet (certified annually), sharps with engineered sharps injury protections, sharps containers.
<b>ABSL3 Facility Verification date:</b>
<b>Clothing:</b> a clothing change into laboratory dedicated clothing (scrubs or coveralls) and laboratory dedicated shoes is required.
<b>Personal protective equipment (PPE):</b> filtering facepiece respirator (FFR) N95 respirator (or greater), solid front gown, double gloves, and safety glasses.
<b>Have workers been advised of and trained on hazards associated with this agent/toxin?</b> Workers (including but not limited to researchers, animal care staff, veterinarians and veterinary technicians) will be trained on the hazards and proper methods for handling the agent.
<b>Describe experience and skill level of at-risk personnel:</b> Personnel must be experienced working in a high containment laboratory and handling the target species for the study.
<b>Medical surveillance:</b> Personnel will monitor for general respiratory signs of viral infection during the duration of the project and 21 days after the conclusion of the experiment. Common symptoms include fever, dry cough, fatigue, and shortness of breath but can also sometimes include headache, aches and pains, sore throat, nasal congestion, runny nose, and diarrhea. Identification of any of these symptoms must be reported to the occupational health nurse, biosafety officer, and principal investigator.
<b>Incident Reporting:</b> Incidents, accidents or near misses must be immediately evaluated and treated according to procedures described in the safety manual. All such incidents must be reported to the animal facility supervisor or personnel designated by the institution.  Investigators will be provided an emergency card including COVID-19 signs and symptoms and mobile numbers for principal investigator, biosafety officer, and office of injury management/occupational health.
<b>Vaccinations:</b> No vaccinations are available for this agent.
<b>Post-exposure Treatment:</b> There are currently no specific first aid/post-exposure treatment for exposure or infection to this virus. Exposed or infected workers are expected to self-isolate for the recommended 14-day quarantine period.
<b>Do you have surveillance practices in place to assess risk of release in regards to infection of other animals?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Applicable Animals not associated with this project that develop unanticipated respiratory symptoms must be immediately reported to the attending veterinarian and biosafety officer.

- 1) <https://www.cdc.gov/coronavirus/2019-ncov/index.html>
- 2) <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>
- 3) van Doremalen N, et al. "Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1" N Engl J Med. DOI: 10.1056/NEJMc2004973
- 4) CDC BMBL 5<sup>th</sup> edition 2009 <https://www.cdc.gov/labs/pdf/CDC-BiosafetyMicrobiologicalBiomedicalLaboratories-2009-P.PDF>