



LABORATORY RISK ASSESSMENT TOOL

STATE HYGIENIC LABORATORY AT THE UNIVERSITY OF IOWA

Overview:

The SHL Laboratory Risk Assessment Tool is available electronically by request by contacting drew-fayram@uiowa.edu. This tool is intended to guide laboratory staff through the risk assessment process for the work they regularly perform. It should serve as a template, which can be modified for risk assessments at your facility. The goal of the risk assessment process is to identify and minimize all potential risks that may adversely affect 1) the health and safety of laboratory staff, 2) the health and safety of non-laboratory staff, 3) the health and safety of the general public, and 4) the quality of work being performed. For additional information on biosafety and the risk assessment process, please refer to the [list of resources](#) provided in this document.

Step 1. Identify the hazards.

Please select ALL potential hazards listed below that could affect the laboratory section being assessed. Where appropriate, provide additional details describing specific hazards. If more space is needed, please attach an additional page(s).

Biological
<input type="checkbox"/> Blood/Body fluid <input type="checkbox"/> Bacteria <input type="checkbox"/> Viruses <input type="checkbox"/> Parasites <input type="checkbox"/> Fungus <input type="checkbox"/> Toxins <input type="checkbox"/> Waste <input type="checkbox"/> Other/Details:
Chemical (Refer to the label and Safety Data Sheet (SDS) for the classification and management of all chemicals)
<input type="checkbox"/> Non-hazardous chemical(s) <input type="checkbox"/> Hazardous Chemicals <input type="checkbox"/> Waste <input type="checkbox"/> Other/Details:
Radiological (includes ultraviolet light sources)
<input type="checkbox"/> External radiation sources (resulting from close proximity to, limited shielding of, or prolonged exposure to source) <input type="checkbox"/> Internal radiation sources (e.g. resulting from ingestion, inhalation, inoculation, or skin absorption) <input type="checkbox"/> Waste <input type="checkbox"/> Other/Details:
Physical and Environmental
<input type="checkbox"/> Heat <input type="checkbox"/> Cold <input type="checkbox"/> Sharps <input type="checkbox"/> Loud noise <input type="checkbox"/> Electrocutation <input type="checkbox"/> Allergens <input type="checkbox"/> Pinch/crush/scrape <input type="checkbox"/> Repetitive movements (e.g. bending, crouching, pipetting) <input type="checkbox"/> Heavy lifting <input type="checkbox"/> Reaching <input type="checkbox"/> Slip/trip/fall <input type="checkbox"/> Other/Details:
Procedure, Equipment, and Instrumentation
<input type="checkbox"/> Aerosols <input type="checkbox"/> Splash/splatter/spray <input type="checkbox"/> Vapors <input type="checkbox"/> Steam <input type="checkbox"/> Small volume spills <input type="checkbox"/> Large volume spills <input type="checkbox"/> Surface contamination <input type="checkbox"/> Explosion (contents under pressure) <input type="checkbox"/> Projectiles (e.g. failed centrifuge) <input type="checkbox"/> Other/Details:
Facilities and Systems
<input type="checkbox"/> Electricity (e.g. power outage) <input type="checkbox"/> Gas (e.g. interior lines) <input type="checkbox"/> Pressurized gas (e.g. gas cylinders) <input type="checkbox"/> Air handlers/HVAC <input type="checkbox"/> Other/Details:
Critical Incident
<input type="checkbox"/> Fire <input type="checkbox"/> Severe weather <input type="checkbox"/> Intruder <input type="checkbox"/> Lockdown <input type="checkbox"/> Evacuation <input type="checkbox"/> Disruption <input type="checkbox"/> Other/Details:
People
<input type="checkbox"/> Students <input type="checkbox"/> Visitors <input type="checkbox"/> Staff <input type="checkbox"/> Psychological/Stress <input type="checkbox"/> Other/Details:
Other hazards and/or additional details (if more space is needed, please attach an additional page(s))

Step 2. Assess the level of risk.

Use tables A through D below to assess the risk level associated with each hazard associated with this work. The results will be used in Step 3 when you complete the Laboratory Risk Management Worksheet found in [Appendix A](#).

Table A. Likelihood of hazard occurrence.

Hazard Likelihood	Description of Likelihood
1. Rare	Will only occur in exceptional circumstances
2. Unlikely	Not likely to occur within the foreseeable future
3. Possible	May occur within the foreseeable future, sporadic exposure is possible
4. Likely	Likely to occur within the foreseeable future, routine exposure is likely
5. Highly Likely	Almost certain to occur within the foreseeable future, consistent exposure is highly likely

Table B. Consequence of hazard occurrence.

Hazard Consequence	Description of Consequence
1. Insignificant	No treatment required
2. Minor	Minor injury requiring First Aid treatment (e.g. minor cuts, bruises, bumps)
3. Moderate	Injury requiring medical treatment or lost time
4. Major	Serious injury (injuries) requiring specialist medical treatment or hospitalization
5. Critical	Loss of life, permanent disability or multiple serious injuries

Table C. Based on the likelihood and consequence determined above, identify the risk level of each hazard using the Risk Assessment Matrix below.

Risk Assessment Matrix		Hazard Consequence				
		Insignificant	Minor	Moderate	Major	Critical
Hazard Likelihood	Highly likely	Medium	Medium	High	Extreme	Extreme
	Likely	Low	Medium	High	High	Extreme
	Possible	Low	Medium	High	High	High
	Unlikely	Low	Low	Medium	Medium	High
	Rare	Low	Low	Low	Medium	Medium

Table D. Based on the assessed risk level for each hazard, determine whether additional control measures should be implemented.

Assessed Risk Level		Description of Risk Level	Actions
<input type="checkbox"/>	Low	If an incident were to occur, there would be little likelihood that an injury would result.	Undertake the activity with the existing controls in place.
<input type="checkbox"/>	Medium	If an incident were to occur, there would be some chance that an injury requiring First Aid would result.	Additional controls are advised.
<input type="checkbox"/>	High	If an incident were to occur, it would be likely that an injury requiring medical treatment would result.	Control will need to be in place before the activity is undertaken.
<input type="checkbox"/>	Extreme	If an incident were to occur, it would be likely that a permanent, debilitating injury or death would result.	Consider alternatives to doing the activity. Significant control measures will need to be implemented to ensure safety.


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Step 3. Identify control measures and complete the Laboratory Risk Management Worksheet.

Using the following guidance, complete the Laboratory Risk Management Worksheet found in [Appendix A](#).

- A. List the specific task being performed.
- B. List the identified hazard associated with that task.
- C. List the risk level determined for that hazard in Step 2, above.
- D. Describe the control measure you will implement to eliminate or mitigate the risk. **Note:** Control measures should be implemented in accordance with the preferred **hierarchy of control** (see Table E below). If a lower level control measure (such as Administrative Controls or PPE) is to be implemented without higher level controls, it is important that the reasons are approved by supervisor.
- E. List the risk level (refer to Steps 1 and 2) remaining with the described control measure in place.
- F. Describe how the described control measure will be implemented (e.g. implement precautions into SOP and/or ensure employees are trained in hazards/precautions).
- G. Describe how this control measure will be supervised (e.g. daily by supervisor, monthly by safety committee, annually by associate director).

NOTE: The Laboratory Risk Management Worksheet should be completed by laboratory staff who regularly perform the work being assessed. The completed worksheet should then be reviewed and signed by the section supervisor and the division associate director.

Table E. Hierarchy of Control Measures		
Most Effective (High Level)  Least Effective (Low Level)	Engineering/Design Controls	Elimination: remove the hazard completely from the workplace or activity
		Substitution: replace a hazard with a less dangerous one (e.g. a less hazardous chemical)
		Redesign: make equipment or processes safer (e.g. raise a bench to reduce bending)
		Isolation: separate people from the hazard (e.g. perform work in biosafety cabinet)
	Administrative Controls	Administration: putting rules, signage, or training in place to make a workplace safer (e.g. blood borne pathogens training)
	Personal Protective Equipment (PPE)	PPE: Protective clothing and equipment (e.g. gloves, lab coat, safety glasses, respirator)

Step 4. Monitor and review the control measures and complete the Risk Management Hotwash Worksheet.

After performing work with the implemented control measures identified in Step 3 above, complete the Risk Management Hotwash Worksheet found in [Appendix B](#).

NOTE: The Risk Management Hotwash Worksheet should be completed by laboratory staff who regularly perform the work being assessed. The completed worksheet should then be reviewed and signed by the section supervisor and the division associate director.

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Resources

The creation of this guidance document involved the review and integration of information from many resources, listed below. If additional information on this process is desired, these resources should be consulted.

[Biosafety in Microbiological and Biomedical Laboratories, 5th Ed.](#) (2009). U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, and National Institutes of Health.

Chapter 12 Prevention of Lab-acquired Infections. (2015). Manual of Clinical Microbiology, 11th Ed.

Chapter 12.6 Health and Lab Work. Section IV Humans. (2006). Exposure – A Guide to Sources of Infections.

[Department of the Army Form DA FORM 7566. Composite Risk Management Worksheet.](#) (2005). Department of the Army.

[Health and Safety Risk Assessment Template.](#) (2012). Queensland Government, Department of Education, Training and Employment.

Hierarchy of Controls (2015). The National Institute for Occupational Safety and Health (NIOSH). Center for Disease Control and Prevention. <http://www.cdc.gov/niosh/topics/hierarchy/>.

[Laboratory Biosafety Manual, 3rd Ed.](#) (2004). World Health Organization.

[Managing Health and Safety Risks.](#) (2012). Queensland Government, Department of Education, Training and Employment.

[Morbidity and Mortality Weekly Report \(MMWR\) Supplement/Vol. 61](#) (2012). U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

[NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules](#) (2013). Department of Health and Human Services, National Institutes of Health.

[Pamphlet 385-69. Safety. Safety Standards for Microbiological and Biomedical Laboratories](#) (2013). Department of the Army.

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Appendix A

SHL LABORATORY RISK MANAGEMENT WORKSHEET

For instructions on use of this form, [see guidance information above](#). Determine risk levels using the [Risk Assessment Matrix](#) above.

LABORATORY SECTION AND/OR PROCEDURE:					DATE PREPARED:	
PREPARED BY:			TITLE/POSITION:			
A. TASK	B. HAZARD	C. INITIAL RISK LEVEL	D. CONTROL MEASURES	E. RESIDUAL RISK LEVEL	F. HOW TO IMPLEMENT	G. HOW TO SUPERVISE (WHO)
<i>Example: Slide preparation</i>	<i>Exposure to infectious organisms and laceration from glass slide</i>	<i>High</i>	<i>Follow precautions in Agent Summary Statement in BMBL and standard precautions. When appropriate, process specimens in BSC. Wear PPE appropriate for work being performed, including lab coat, gloves, and safety glasses or face shield. Use respirator protection if aerosol risk is identified. Dispose of broken glass in sharps container using forceps.</i>	<i>Low</i>	<i>Ensure all employees are trained in universal precautions, procedure-specific risks/hazards, and how to work in a BSC, if applicable. Medical evaluation and fit test is required if using a respirator.</i>	<i>All employees are responsible for their own safety and the safety of those around them. Daily supervision provided by supervisor and laboratory management. All safety incidents and 'near misses' should be reviewed at least monthly by all staff for ongoing training.</i>

OVERALL RISK LEVEL FOR THIS SECTION OR PROCEDURE AFTER CONTROL MEASURES HAVE BEEN IMPLEMENTED (CHECK ONE):

 Low Medium High Extreme

RISK MANAGEMENT AUTHORIZATION (TO BE SIGNED BY SECTION SUPERVISOR AND DIVISION ASSOCIATE DIRECTOR)				
	SUPERVISOR	TITLE/POSITION	DATE	SIGNATURE
	LAB DIRECTOR	TITLE/POSITION	DATE	SIGNATURE

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Appendix B. Risk Management Hotwash Worksheet

<i>To be completed by laboratory staff during and/or after they perform work with control measures in place.</i>		Yes	No
1.	Are the planned control measures sufficient and effective in minimizing the level of risk?	<input type="checkbox"/>	<input type="checkbox"/>
2.	Have there been any changes to the planned control measures?	<input type="checkbox"/>	<input type="checkbox"/>
3.	Are any changes and/or additional control measures required in the future?	<input type="checkbox"/>	<input type="checkbox"/>
DETAILS:			
Hotwash Authorization (TO BE SIGNED BY SECTION SUPERVISOR AND DIVISION ASSOCIATE DIRECTOR)	REVIEW COMPLETED BY:	POSITION/TITLE:	
	SIGNATURE:	DATE:	
	REVIEW COMPLETED BY:	POSITION/TITLE:	
	SIGNATURE:	DATE:	

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