

# Development of an Occupational Risk Assessment Tool for Laboratory Animal Facilities

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## SUMMARY/ABSTRACT

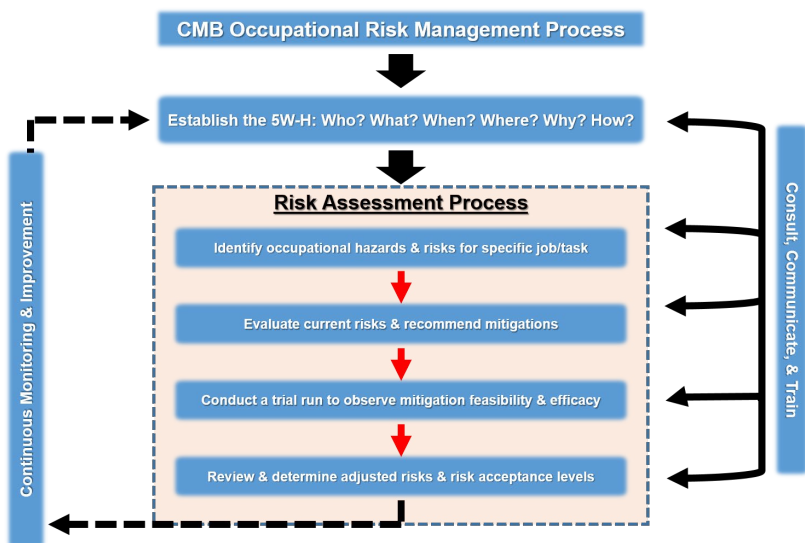
Laboratory animal facilities aim to provide excellence in animal care and welfare and support scientific research. Critical to these goals is to ensure a safe work environment for personnel comprised of veterinary and animal care, laboratory research, and maintenance staff. Thus, performing occupational risk assessments allows for evaluation of risks from identified hazards associated with a variety of tasks ongoing in laboratory animal facilities. Herein, we present the development of an occupational risk assessment tool purposed to capture the dynamics of work performed in laboratory animal facilities, calculate and prioritize identified risks associated with procedures and processes, and inform and evaluate risk mitigations. This tool and framework evolves into a holistic occupational risk management system that: identifies, evaluates, and mitigates occupational risks; determines risk acceptability; consistently ensures communication and consultation with front line personnel, stakeholders, senior leadership, and subject matter experts in biosafety, science, and animal care and welfare; and continuously strives to improve and enhance the operations of laboratory animal facilities.

## INTRODUCTION

At its core, a risk assessment is asking the following questions: What can go wrong? How likely will it happen? What are the consequences if it does happen? Risk assessments should be done before a standard operating procedure (SOP) is performed, especially a new procedure, and in response to an incident to identify root causes and implement corrective actions. Additionally, risk assessments should be done at least annually to review work procedures and recommended mitigations and to continuously monitor for risks and improve work environments in animal facilities. While the terms “risks” and “hazards” are used interchangeably, a hazard is something that has the potential to cause harm, such as a syringe needle. A risk is a function of the likelihood and consequence of an event occurring due to a hazard, such as a needle stick injury. Performing an occupational risk assessment is part of a larger, systematic, management process intended to identify, evaluate, and mitigate risks. A key first step in our occupational risk management process is establishing the who, what, when, where, why, and how (the 5W-H) of the procedure and its accompanying risk assessment. Examples of 5W-H questions may include: Who is performing the procedure? What is the procedure? When is the procedure performed? Where is the procedure being performed (e.g., the animal biosafety level)? Why is the risk assessment being performed (e.g., in response to an incident)? How will the risk assessment identify risks and mitigate them? This process involves consulting with front line staff performing the procedures and subject matter experts such as veterinary, scientific, facilities and maintenance, and safety and occupational health personnel; additionally, engaging these diverse teams and consistently communicating with personnel and stakeholders, such as researchers and the IACUC, is pivotal. Another component involves training personnel when recommended mitigations drive changes in SOPs to make tasks safer. This occupational risk management process continuously monitors for risks to improve the safety landscape while achieving quality and excellence in animal care and research support. This process integrates occupational safety into the daily operations of an animal facility as it involves front line staff throughout the process, creates buy-in, and empowers personnel to be a participating voice in enhancing the safety of their work environment.

The Comparative Medicine Branch’s (CMB) occupational risk management process, adapted from the International Organization for Standardization (ISO) 31000 standard on risk management.

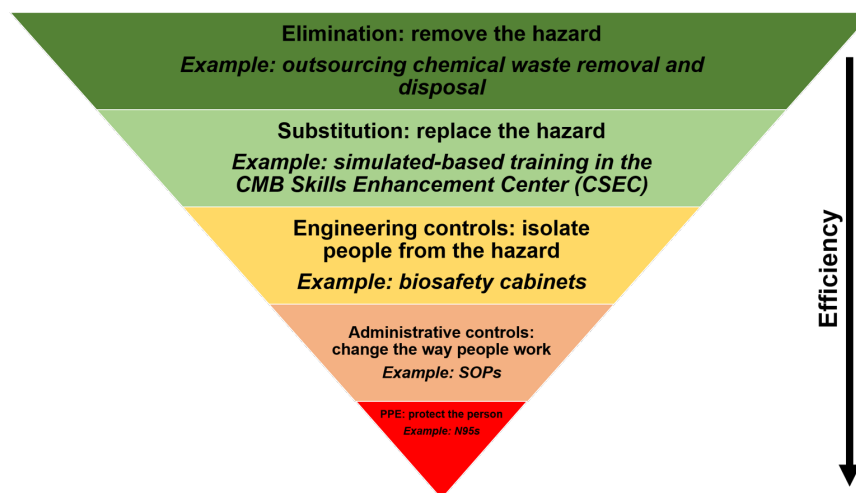
CMB developed a risk calculation matrix to account for other variables that affect occupational risks and to capture the dynamic workspace and operations of animal facilities.



Risk Matrix	Current Risk: $R_c=L*M*T*N*C$ or Adjusted Risk: $R_a=L*M*T*N*C$				
	Likelihood of risk occurrence	Mitigation Factors	Task/Job Frequency	Number of people who do the task	Consequence severity
Scale	L	M	T	N	C
5	FREQUENT	UNKNOWN/DONT EXIST	SEVERAL TIMES DAILY	≥ 101	CATASTROPHIC
4	LIKELY	DEFICIENCIES	DAILY	61-100	CRITICAL
3	OCCASIONAL	WEAKNESSES/LACK OF IMPLEMENTATION	WEEKLY-MONTHLY	31-60	SERIOUS
2	REMOTE	SUFFICIENT/ROOM FOR IMPROVEMENT	MONTHLY-YEARLY	11-30	MINOR
1	UNLIKELY	GOOD/WELL-IMPLEMENTED	RARELY-REMOTELY	1-10	NEGLIGIBLE

## ASSESSING MITIGATION EFFICACY AND DETERMINING RISK ACCEPTANCE

To determine the feasibility of recommended mitigations, it is necessary to “test drive” these mitigations and calculate  $R_a$ . This involves working with front line staff to receive their input and feedback to refine work processes. Outlined in the adjacent figure are relevant risk mitigations. It is essential that recommended mitigations maintain occupational safety and animal welfare. A critical discussion point that arises, as current risks, recommended and assessed mitigations, and adjusted risks are collectively determined, is risk acceptability. Criteria used to determine if a risk is acceptable include severity of consequences, access to resources to sustain proper mitigations, and goals and aims of the department and institution. In the context of an animal facility, it is important to consider risk acceptance or elimination against the backdrop of both occupational safety and health and animal welfare and care.



## CONCLUSIONS

Laboratory animal facilities present a dynamic occupational risk landscape. This tool and management process illustrates a systematic means of identifying, evaluating, and mitigating occupational risks to augment the safety operations of laboratory animal facilities.

## REFERENCES

1. Carvalho F, Melo RB. Stability and reproducibility of semi-quantitative risk assessment methods within the occupational health and safety scope. *Work*. 2015;51(3):591-600.

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