

QUICK GUIDE TO RISK ASSESSMENT FOR HAZARDOUS CHEMICALS

The following outline provides a summary of the steps discussed in this chapter that laboratory workers should use to assess the risks of handling toxic chemicals. Note that if a Laboratory Chemical Safety Summary is not already available, then following the protocol outlined here should enable a worker to prepare this or her own LCSS.

1. Identify chemicals to be used and circumstances of use. Identify the chemicals involved in the proposed experiment and determine the amounts that will be used. Is the experiment to be done once, or will the chemicals be handled repeatedly? Will the experiment be conducted in an open laboratory, in an enclosed apparatus, or in a fume hood? Is it possible that new or unknown substances will be generated in the experiment? Are any of the workers involved in the experiment pregnant or likely to become pregnant? Do they have any known sensitivities to specific chemicals?

2. Consult sources of information. Consult an up-to-date LCSS for each chemical involved in the planned experiment. Examine an up-to-date MSDS if an LCSS is not available. In cases where substances with significant or unusual potential hazards are involved, it may also be advisable to consult more detailed references. Depending on the workers' level of experience and degree of potential hazard associated with the proposed experiment, it may also be necessary to obtain the assistance of supervisors and safety professionals before proceeding with the risk assessment.

3. Evaluate type of toxicity. Use the above sources of information to determine the type of toxicity associated with each chemical involved in the proposed experiment. Are any of the chemicals to be used acutely toxic or corrosive? Are any of the chemicals to be used irritants or sensitizers? Will any select carcinogens or possibly carcinogenic substances be encountered? Are any chemicals involved in the proposed experiment suspected to be reproductive or developmental toxins or neurotoxins?

4. Consider possible routes of exposure. Determine the potential routes of exposure for each chemical. Are the chemicals gasses, or are they volatile enough to present a significant risk of exposure through inhalation? If liquid, can the substances be absorbed through the skin? Is it possible that dusts or aerosols will be formed in the experiment? Does the experiment involve a significant risk of inadvertent ingestion or injection of chemicals?

5. Evaluate quantitative information on toxicity. Consult the information sources to determine the LD₅₀ for each chemical via the relevant routes of exposure. Determine the acute toxicity hazard level for each substance, classifying each chemical as highly toxic, moderately toxic, slightly toxic, and so forth. For substances that pose inhalation hazards, take note of the threshold limit value time-weighted average (TLV-TWA), short-term exposure limit (STEL) and permissible exposure limit (PEL) values.

6. Select appropriate procedures to minimize exposure. Determine whether any of the chemicals to be handled in the planned experiment meet the definition of a particularly hazardous substance due to high acute toxicity, carcinogenicity, and/or reproductive toxicity. If so, consider the total amount of the substance that will be used, the expected frequency of use, the chemical's routes of exposure, and the circumstances of its use in the proposed experiment. As discussed in this chapter, use this information to determine whether it is appropriate to apply the additional procedures for work with highly toxic substances and whether additional consultation with safety professionals is warranted.

7. Prepare for contingencies. Note the signs and symptoms of exposure to the chemicals to be used in the proposed experiment. Note appropriate measures to be taken in the event of exposure or accidental release of any of the chemicals.

Referenced from: *Prudent Practices in the Laboratory: Handling and Disposal of Chemicals*