Handling Biological Materials on the Open Bench

Why You Should Care

Many biological materials can be safely manipulated on the open bench; other biological materials should only be manipulated in a biological safety cabinet. Do you know where yours belong? Even if it is deemed safe to work at the bench, you will still need to take some basic precautions to ensure that your techniques do not pose an exposure hazard to your colleagues or yourself, as well as to prevent contamination of your workspace. Here is an example of one laboratory-acquired infection that highlights the need to follow the recommendations provided below.

Best Practices

Conduct a risk assessment – Review the flow chart on Page 3 to evaluate your material, procedure and equipment hazards.

Are you ready? – The risks on the open bench are higher for your science, your health and the people around you, so before you start, make sure that you have reviewed your activities with your supervisor or PI. If you aren’t sure, play it safe and work in a biosafety cabinet or fume hood, practice with a less hazardous material before working with the real thing, or ask EHS for our help in reviewing your plans.

On the benchtop, personal protective equipment (PPE) is crucial – The only physical barrier between you and your work on the open bench is the PPE you are wearing. Gloves and lab coats should always be worn, because you should never rely solely on your immune system to protect you, and based on what you are doing, you may need eye protection, face masks, or face shields to protect your mucous membranes from splatter or droplets.

Think about your neighbors – Make sure everyone knows when you are conducting work that could pose a risk to them and ask them to respect your space and concentration. If there is a risk of exposure to something, make sure they are aware of the hazards and understand the signs and symptoms of infection. If you are actively performing experiments that require PPE beyond a lab coat and gloves, consider whether you need to move your experiment to a more appropriate location. Similarly, are your neighbors actively performing research experiments? If they are wearing PPE, consider whether it’s an activity that could potentially expose you just by being near it. Ask them about it if you have questions.

Define your work zone – Remind yourself and let others know where your activities are taking place and that those locations could be contaminated by using tape to demarcate areas, absorbent liner for the bench, signs, and other visual tools that let everyone know what’s going on and where.

Keep it clean and organized – Disinfect the bench and equipment surfaces regularly, don’t leave sharp objects out, change absorbent materials frequently, have all waste streams clearly identified and disposal bins readily available, and keep things in order. A messy bench can also lead to scientific mistakes, since it can be more difficult to identify samples or know what is clean or dirty, thus leading to potential contamination issues.

Think about transport – when moving materials between locations, be sure to close up your containers, use trays, carts, and other items to help prevent and contain spills or breakages.

Questions? Contact EHS!
www.ehs.cornell.edu  255-8200  askEHS@cornell.edu
Think about cross-contamination – Even if your research doesn’t pose a hazard to you or your neighbors, think about whether you could contaminate your experiments or someone else’s if you choose to do work on the open bench rather than in a biosafety cabinet.

Things to Avoid

Don’t skip your PPE – just because your work may be safe to perform on the open bench, does not mean it is ok to perform that work without PPE, and remember that street clothes do not count as PPE.

Don’t use a Bunsen Burner near alcohol – this is a fire waiting to happen. Keep the flame as far apart from Ethanol and other flammable materials as possible.

Don’t get complacent – always consider the risks of your work to yourself and others, and remain diligent about maintaining open lines of communication with those around you. Act accordingly. If you’re feeling tired or hungry or stressed, consider rescheduling the work so that you are less likely to make mistakes.

Where to get training and more information

Read more about assessing the risks of your research in Chapter 2.0 of the Cornell EHS Biosafety Manual

Contact us at askEHS@cornell.edu or AskEHS.cornell.edu

Health Canada’s Pathogen Safety Data Sheet site provides detailed information on many common human pathogens

Visual Guide

What not to do: how many issues can you identify? The fact is, it’s difficult to know where to start in this picture, because it’s so cluttered. A cluttered bench makes it harder to do your work and is an accident waiting to happen!

Best Practices: Use absorbent lining, which helps to confine spills and also defines your work zone, keep only what you need on the bench, and manage your waste streams according to Cornell’s requirements. If absorbent lining isn’t necessary, you can use colored tape to define your work zone instead. How can you determine whether absorbent lining or tape should be used? Review the risks of your procedure and ask yourself will a drip or spill on the bare counter be easy to disinfect or spread contamination?
Is It OK for You To Be Working on the Open Bench?

1. **Do you use volatile or flammable chemicals with your biological materials?**
   - **Yes:** Contact EHS Biosafety to determine if Chemical Fume Hood is necessary
   - **No:** Hint: review the GHS labels and chemical safety data sheets for flammable or toxicity icons!

2. **Can the biological material cause illness in or potentially infect a healthy human adult?**
   - **Yes:** Will your activities likely generate Aerosols or Sprays?
     - **Yes:** Contact EHS for advice if you cannot use a BSC for your work, or if you need training in how to use one.
     - **No:** OR
   - **No:** OR
     - **Yes:** The Open Bench is ok with good microbiological practices and proper PPE. Contact EHS if you would like us to review your assessment.
     - **No:** OR

3. **Is the material recombinant or synthetically derived?**
   - **Yes:** A Biological Safety Cabinet is strongly recommended. Contact EHS if you cannot use a BSC for your work, or if you need training in how to use one.
   - **No:** OR
     - **Yes:** A Biosafety Cabinet is appropriate if there is concern about environmental contamination
       - **A Clean Bench** is appropriate if there is no environmental concern but there is concern for sample contamination.
     - **No:** OR

4. **Is contamination of your samples or the environment a concern?**
   - **Yes:** OR
   - **No:** OR

Contact EHS if you would like us to review your assessment.