Webinar Q&A

Anything left in black text is a question or comment from the webinar.
Sometimes similar questions (and comments) are grouped together.
Blue text represents information added after the webinar. Answers are based on best practices and current understanding, but you should check your own institution's guidance.

Labeling

Just a note on "label expecting death"... In one clinical lab that I worked, we were instructed even further, "If you drop dead at your bench, labeling and bench organization should be sufficient that anyone else can finish your experiment.
Love it!

How do you get the old label off?
You can order label remover that is used in breweries. PBW brew cleaner by Five Star works well.

Any recommendations for labeling chemicals that degrade typical labeling materials (examples: fades the inks, integrity of label compromised)
Answers provided in the context of secondary labeling. You need to consider what the reactivity is, as well as your local storage conditions (e.g. regions of high humidity can affect label glue and cause them to come off of bottles).

- Standard labels covered with packing tape (low budget; downside is packing tape can be hard to remove)
- Dymo label maker is one option.
- Brother P Touch is also a good choice, and can be removed more easily than Dymo.
    - Labels can be printed in numerical series quickly
    - Labels are easy to remove and re-stick
    - Multiple sizes and colors
    - Chemical resistant label material
    - Operates w/ or w/out PC connection
- Avery has a line of chemical resistant labels that can be printed on (Ultra duty – but you need to have a laser printer).
- Using a pencil on a paper label or a hang tag works pretty well as most inks will fade over time.
- Flinn scientific label making through Chemventory is great

You can get printable magnetic sheets for labeling anything metal, such as shelves or cabinets (facilitates re-organizing without damage to the surface).

Labels for secondary containers (containers other than those purchased)

OSHA has issued some interpretation letters relevant to this topic.

Is it necessary to quote the original manufacturing date of the chemical on the secondary label or the date in which it was transferred into it

If you are re-bottling the same material, then you should include the original manufacturer's information (this depends on what is provided – name, address, original manufacturing date, lot number (particularly useful if there are problems),etc.). You may also want information related to the re-bottling (such as who did it) but the date of the re-bottling does not seem as relevant as the manufacturer's information from a safety or regulatory perspective.

If we are labeling a lower concentrated chemical diluted from a higher concentration, but can't find an SDS for that new molarity, should we label it according to the closest molarity's SDS?

This is a particularly difficult question for which we do not have a definitive universal answer.

- You do not want to understate the hazards of the new solution (not only safety of the person handling it, but also legal liability suggests that understating is particularly risky for the person who made the determination of the lower hazards).
- Overstating the hazards, however, is also a problem as far as:
    - Potentially increases hazardous waste amount (which also increases costs)
    - Contributing to chemophobia (because all the chemicals seem very hazardous)
    - Requiring PPE that is not necessary and impedes dexterity, thus introducing other elements of risk

The final balance between these topics depends on your institution's preferences as well as the specific substance. For example, corrosivity can be evaluated with the pH. Some common substances have tables of flammability by concentration that can be referenced.

We reuse containers for wastes, and having the old label indicates if prior contents are compatible.

If the bottle has been properly cleaned and air-dried, then the former contents should not be an issue and removing the label completely should be done. If you cannot be sure of complete removal of previous contents, best practice would be not to re-use the bottle. If you are re-using a bottle for waste and want to indicate compatibility in case of residue (even after cleaning), we would recommend removing the original label and adding any waste use notation on a separate label or with a permanent marker (e.g., organic waste, inorganic waste, not for nitric acid waste, etc.).

Safety Data Sheets

What is the best way to obtain an SDS sheet?

- Some suppliers still place a hard copy of the SDS in the package when you purchase a laboratory chemical. If you are receiving the package directly, you should have a process for how SDSs are maintained. Check the processes of your institution to see who takes that and where it gets filed, so that you can get a copy.
- Many suppliers will provide their safety data sheets online, so digging through the supplier's or manufacturer's website often yields the SDS you need. If it does not, you can find contact information and reach out to the manufacturer to get a copy.

- If the manufacturer no longer exists, sometimes you can still get the appropriate SDS from whoever took them over. This answer is based around the regulatory requirement to keep the original SDS.
- If you simply want an SDS for a classroom exercise or to educate yourself, an internet search for the substance will yield many options – make sure to pay attention to the form and concentration of the material.
- Train your folks on how to obtain SDS' and document how to do that in your lab safety plan.
- Go to the manufacturer website and search for the specific chemical. There should be a live link to the SDS.

Is it OK to replace the bulky SDSs with QR codes on the original bottles?
If what was being asked was whether SDSs have to be attached physically to the original bottles… this would not be a good idea (for so many reasons, from storage mess to spills and contributing to fires…). If your institution has an online SDS system and you want to add QR codes to the bottles, that's great but don't obscure the original label!

What the requirements from OSHA say?
What is the requirement for safety data sheets?
1910.1450(h)(1)(ii)
"Employers shall maintain any safety data sheets that are received with incoming shipments of hazardous chemicals, and ensure that they are readily accessible to laboratory employees."
1910.1200(g)(8)
"Electronic access, microfiche, and other alternatives to maintaining paper copies of the material safety data sheets are permitted as long as no barriers to immediate employee access in each workplace are created by such options."

Do labs have to print all the SDSs out?
As stated above, labs do not need to have hard copies, as long as access is available and well known.

Since this question came from a STEM center that may do outreach, prudent practice for outreach activities suggests that SDSs should be packed for chemicals considered hazardous. SDSs should be reviewed for those who will be participating as demonstrators. SDSs may also be needed in case of an accident during transport.

Anyone else get frustrated when consulting the (M)SDS for disposal instructions and find some variation of "consult all <insert whatever> guidelines"??
We understand the frustration, but such issues are unavoidable since safety data sheets are written for global distribution and hazardous waste disposal instructions are local. Disposal of hazardous (and non-hazardous) waste may be regulated at national/federal, regional, and local levels, or even vary by institution.

Storage

What are some down-sides of use of penny-head stoppers?

- The worst problem is that vapors escape more easily from penny-head stoppers than from other types of lids.This contributes to loss of the solution, potential reaction of the substance with other cabinet contents, and destruction of the cabinet. For example, using penny-head stoppers on acids contributes to the corrosion of any metal in the vicinity of the bottle and also tends to allow the vapors to oxidize the label on the bottle as well.
- Penny stoppers (like other ground-glass joints) can also become “frozen” over time and nearly impossible to remove.

Are all the cabinets you show vented?

- No. Some cabinets cannot be vented. Some can be, but whether they are vented depends on your setting and contents.
- Flammable cabinets do not necessarily need to be vented.
- Be cautious about venting cabinets. Venting a flammable cabinet incorrectly can compromise its flammability rating. Venting a corrosive cabinet can damage duct work.
- For vented cabinets, be sure the vent duct material and the vent motor is compatible with the contents of the cabinet being vented. It should be negative with respect to surroundings. And by venting, I mean mechanically.

Are the bungs from flammable storage cabinets supposed to be removed?

- Bungs must be left intact if there is not a venting system attached.
- NFPA does not require flammable cabinets to be vented. If they are not vented, then the bungs should be in place.

We are in the process of receiving funding to install a ventilation system in our chemical storage cabinets. Would you recommend a negative pressure vent system or something else?
This is a very complex issue and you should consult with a ventilation specialist who can look at your specific setting. As indicated above, venting requires appropriate ductwork, decisions about passive versus active, consideration of the chemicals being stored, etc.

We have lots of cabinets and the hinge's are all rusted out. Any advice? They just change it to new one but its still rusting
This sounds like a situation with incompatibility between chemicals and storage cabinets, potentially with ventilation issues. To answer this question fully requires an inventory of contents.

- First, try to identify the chemicals responsible for the corrosion. Since you are mentioning corrosion of metals, the first likely culprits would be fugitive vapors from acids.You could also use CAMEO to combine all the chemicals to see if any reactions would produce gasses. Check lids or remove those chemicals to more suitable storage cabinets.
- If these are cabinets under a chemical fume hood, check whether ventilation can be provided via the hood.

- Use absorbent cartridges (such as the Vap-R-Gard) to capture fugitive vapors.
- Seal the hinges with an after-market treatment.
- You could try using an isolation cabinet within the cabinet, but these do not generally completely contain fugitive vapors.

Fugitive Vapors

What are the vapor absorbent cartridges for?
Vap-R-Gard cartridges can be purchased from several retailers to use in either flammable cabinets (to absorb organic vapors) or acid cabinets (to absorb corrosive vapors).

This is more of a user concern. Whenever we open a solvent cabinet (since it's not vented) a waft of all the solvent smells is too bothersome (sometimes it burns our nose). Is there any advice?

- Vap-R-Gard available from Lab Safety Supply can passively scavenge fugitive emissions
- A more permanent solution might be to evaluate whether the cabinet can and should be vented. (See comments above under the Storage subheading)

Specific Chemical Questions (isolation)

Source for isolation cabinet shown in presentation: https://scimatco.com/products/sc8071

I had a question about Acetic Acid, we have to store that in our flammable cabinet not corrosive.
For acetic acid above about 40%, we would agree, as the flammability hazard would take precedence. If you're required to store acetic acid in a flammable cabinet, use caution to prevent corrosion if your flammable cabinet is metal. You can get composite flammable cabinets (mentioned in the webinar, available from SciMatCo). Isolation cabinets are good to prevent mixing with other solvents in the event of a spill but will not stop vapors.

What is the best compatibility area for the storage of finely divided metals?
Where should chemicals that are finely divided in small enough pieces to be flammable be stored?

- It would depend on the metals and what is "finely divided." Particle size affects whether or not the metal is reactive or flammable.
- If in a closed container, general storage should be fine as long as any incompatibles (such as separation from acids) are taken into account. You might designate an isolation cabinet for all your flammable or explosive metals and provide additional signage on/near the cabinet, such as avoiding dusts or metal utensils.

There's a recent publication highlighting the potential peroxide formation in IPA (isopropyl alcohol) when exposed to air and light overtime. How do you manage IPA --under peroxide formation list and require testing or do you store solutions containing IPA and prepared in the lab in non-transparent bottles?

- IPA is probably the last one to worry about as a peroxide former in a research lab.

- I have been testing IPA solutions for 7 years after a 100% 2-Propanol explosion. The solutions of 70% solution never see any peroxides in them.
- Secondary alcohols such 2-propanol (IPA) are Class B peroxide formers, which means concentration is a factor in the formation of peroxides. UC-Santa Cruz Environmental Health and Safety seems to have a thorough discussion about peroxides including testing recommendations and examples of each class; you should check with your own institution and do some additional research to see what is the best protocol for your situation.
- In many educational settings, the concentrations used (see note above) and the turnover of solution amounts may make these concerns very minor.

What are some chemicals that might not be expected to be corrosive but are (for instance, 30% hydrogen peroxide)?
Many chemicals that are oxidizers are also corrosive. Common examples include halogens and bleaches. This is why checking the SDS for each chemical should be part of storage and management decisions.

Does ACS have a sample management plan for peroxide forming chemicals?
Not to the best of our knowledge. There are many authoritative sources available on the internet.

Inventory and Culture

Can you recommend an app for taking chemical inventories in the lab?
Can you recommend an APP for MANAGING chemical inventories?
Can you recommend an app for chemical inventory management?
We have no experience with apps for these purposes. As discussed in the webinar, there are various software packages that help with chemical inventory management. Quartzy and ChemInventory were both mentioned during the webinar as inexpensive. Many institutions have a software package that individual labs must use.

I am one person managing >3000 primary containers and 1000 secondary containers. Any great suggestions for how to manage /record a "live" record of holdings. I make annual updates but I can't even get users to checkout chemicals let alone report how much they took.

- Having your EHS team Checking Inventory during your annual inspection is a great way to keep it up to date.
- Having a barcode system (chemicals labeled with barcodes and scanners readily available) can be key to managing many people obtaining chemicals, as the scanning can be quick and people can be easily trained into using it.

What can you do to convince faculty? The culture, even though young, with EZ checkout there is not buy in

- On the persuasive side, you can share the problems with ordering and having materials available if inventories are not accurate. For example, teaching labs being disrupted

because prepared solutions were taken without permission, or running out of solvent because of shipping delays when no one reported taking some.
- On the procedural side, you can put cages or locked doors between chemicals and people, track who accesses locked areas (key usage, card swipes, or cameras), and make regular reports on problems and associated costs.
- On the punitive side, you can suspend stockroom privileges for people that do not follow the procedures.
- Procedural and punitive options require institutional support or authority.

Faculty feel that chemicals are like "books on the shelves" and should be retained indefinitely. I'm of the opposite mind saying, just in time ordering. It is an endless fight. Any regulations that I can cite to encourage faculty to discard?

- Hoarding can be a serious problem in academic laboratories. To the best of our knowledge there are currently no regulations that directly speak to this problem. The nature of funding cycles and fiscal/budget cycles contribute to this issue.
- Developing institutional procedures based on best practices for storage and management and then rigorously following them may help minimize hoarding. If required to follow strict documentation practices, the burden of hoarding may encourage faculty to reduce inventory.
- As with keeping inventory up-to-date, during inspections, discussion about shelf-life and usability may prove fruitful.

Miscellaneous

I actually store my chemicals by anion and cation

This was an alternate response to our first poll question about storage. As with alphabetical (which was in the poll) and some other niche methods not in the poll (such as by carbon number), storing by anion and cation can be practical as long as you have separated out hazard types such as reactives and corrosives, and checked for other incompatibilities and storage needs. Without doing this, this method sounds like you could, for example, end up with oxidizers in general storage.

Is CAMEO chemicals better than the Chemical Reactivity Worksheet from AIChE?

- Using both CAMEO and the Chemical Reactivity Worksheet can help you to make decisions. I like CAMEO as it can accommodate mixtures.
- Thanks for bringing this resource up. We were previously unaware of the AIChE Chemical Reactivity Worksheet (CRW) software (which is free) but it seems like a good tool that would complement CAMEO. One noted difference is that CAMEO can be run either as a web-based tool or downloaded, while AIChE CRW must be downloaded.

For chemicals that have GHS symbols outside of what's listed on the container/manufacturer SDS (I have several that are listed flammable, but Pubchem also lists irritant, and such). Should we take those extra symbols into consideration for storage?

- Yes, you should consider GHS classifications from other manufacturers and sources in PubChem and evaluate for your own circumstances. Some countries and companies are more rigorous than others in their GHS determinations.
- Some hazards, such as irritation, are primarily use hazards and thus not considerations for storage. Remember that toxicity is more of a security concern for storage.
- I've even seen that SDS sheets will be updating the GHS labeling; it is not static but fluid. [Note: we're not exactly sure what this is referring to, but it seemed to fit in this topic.]

Beyond the scope of this webinar topic

How to categorize chemical waste and how to determine what chemicals go in which category (aqueous, organic, heavy metal, etc)?
This is a complex topic, and beyond the scope of this topic. Hazardous waste is characterized as: ignitable, corrosive, toxic, and reactive. The terms you mention may be local terms that are often put on waste bottles. For more detail on hazardous waste, we encourage you to look at the relevant sections of ACS Foundations for Storing, Organizing, and Disposing of Chemicals in Educational Settings.

How a stockroom works in a University?
This varies by university, and is beyond the scope of this topic.

What are the ideas from industrial labs that would be easiest to implement to improve storage?
This is a complex topic and we have both only worked in academic settings so this is beyond the scope of our knowledge.

Is there a benefit to ACS membership if outside of the US?
This is beyond the scope of this topic, but…yes. The ACS encourages global participation. There are International Chemical Sciences Chapters. With ACS membership, for example, you have access to many other resources; with Premium membership, that includes access to this webinar on demand as opposed to only when it is synchronously offered.