

#### **Preservation and Collections Hazards** July Webinar

Marie Desrochers Utah Division of Arts and Museums July 21, 2022 11 am - 1 pm



NATIONAL ENDOWMENT FOR THE HUMANITIES





#### **PROGRAM OVERVIEW: Year at a Glance**

1. ACCESSAND ARTIFACTHANDLING

JANUARY FEBRUARY MARCH 3. ENVIRONMENT AND BUILDING SYSTEMS

JULY AUGUST A SEPTEMBER

Webinar
 Webinar
 Webinar

Workshop

(pt A & B)

2. PRESERVATION IN STORAGE AND DISPLAY



APRIL MAY JUNE Workshop (pt A & B) 1. Webinar 2. Webinar 3. Webinar 4. RISK MANAGEMENT, EMERGENCY PREPAREDNESS & DISASTER RESPONSE

OCTOBER (pt A & B) NOVEMBER 2. Webinar DECEMBER 2. Webinar

3. Webinar

#### Gain a better understanding of Key Themes...



#### **Key Themes**

- Increase understanding of common hazards found in collections
- 2. Increase understanding of basic health and safety precautions in collections care
- Understand human health risks associated with collections hazards
- 4. Develop response plan when hazardous objects are found in collections

#### INTRODUCTIONS

Please share the following:

Your name, where you work, and your role



#### AGENDA

- Introduction to collections hazards and professional health and safety
- Explore common collections hazards and different types of hazards and their risk
- Responding to hazards
- Preventive tasks for managing risks
- Activity



#### **COLLECTIONS HAZARDS**



#### Normally our focus is on protecting objects

#### **COLLECTIONS HAZARDS**



#### Mercury in hat manufacture

#### **COLLECTIONS HAZARDS**





Arsenic book cloth



#### Old pharmaceuticals





Lead Paint

### WHAT IS A HAZARD

A material is considered hazardous if it has the potential to:

- Cause injury, illness, or death;
- Cause damage to or loss of equipment, property or collections; or
- Inhibit operations such as restricting access to storage cases.





### WHAT IS A HAZARD

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#### **HAZARD VERSUS RISK**

- Hazard: a dangerous property

   Chemical hazards such as toxicity, carcinogenicity, reproductive toxicity, etc.
   Physical hazards such as flammability, radioactivity, pressurization, etc.
- **Risk**: a combination of the hazardous property and the likelihood and degree of exposure



#### WHO IS AT RISK



The Public



Collections Stewards



Collectors



#### WHO IS RESPONSIBLE





Collections Stewards

- We are the people who (often) know the collections best
- We are responsible for the wellbeing of collections and wellbeing of those using them

# ADVOCATE FOR COLLECTIONS AND FOR THOSE WHO USE THEM

- Managing hazards is part of managing collections
- Never want to be in a situation where you have to choose between object safety and human safety
- Advocate for collections to preserve them while protecting those using them



Cultured Magazine





Occupational Safety and Health Administration









Occupational Safety and Health Administration

(OSHA) to ensure safe and healthful working conditions for workers by setting and enforcing standards and by providing training, outreach, education and assistance.

UNITED STATES DEPARTMENT OF LABOR	f 🖌 🖸 y 🖂 🖸	
Occupational Safety and Health Administ	tration CONTACT US FAQ	A TO Z INDEX ENGLISH ESPAÑOL
OSHA 🗸 STANDARDS 🗸 ENFORCEMENT TOPICS	✓ HELP AND RESOURCES ✓ NEWS ✓	Q SEARCH OSHA

Safety and Health Topics / Occupational Health Professionals

**Occupational Health Professionals** 



#### Overview

Standards	>
Selecting Occupational Health Professionals	>
Workers' Rights	>

The goal of a multidisciplinary occupational health and safety team is to design, implement, and evaluate a comprehensive health and safety program that will maintain and enhance health, improve safety, and increase productivity. Such programs often provide similar results for the families of workers, with resultant financial and other benefits for the corporation. Occupational health and safety professionals include occupational and environmental health nurses, occupational medicine physicians, industrial hygienists, safety professionals, and occupational health psychologists. Other related members of the multidisciplinary team are ergonomists, toxicologists, epidemiologists, human resource specialists, and industrial/organizational psychologists

In Focus





Occupational Safety and Health Administration

(OSHA) to ensure safe and healthful working conditions for workers by setting and enforcing standards and by providing training, outreach, education and assistance.



#### Overview Mold can be found indoors and outdoors all year round. Exposure symptoms include Recognize Mold Hazards Highlights nasal stuffiness, eye irritation, or wheezing. The following materials can help you identify and prevent hazards, and comply with OSHA requirements. Control and Clean-up Fact Sheet: Mold Hazards during Disaster Cleanup. 5 Know the Law Recognize Mold Hazards Control and Clean-up QuickCard<sup>™</sup>: Mold. Also available in Spanish. Find resources on preventing mold. Find resources on preventing and 5 More Resources Publication: Preventing Moldcontrolling mold exposure. recognizing exposure symptoms, Related Problems in the Indoor and more. Workplace. Information for > Workers' Rights building owners, managers and occupants about mold, mold sources, and building-related illnesses. Safety and Health Information Bulletin: A Brief Guide to Mold in More Resources Know the Law the Workplace. How to prevent Employers: Find your responsibilities Find training and more resources. mold growth and protect building related to mold in the OSHA occupants and workers involved standards for general industry, in cleanup and prevention. shipyard employment, and construction.

National Institute for Occupational Safety and Health Centers for Disease Control and Prevention CDC 24/7: Saving Lives, Protecting People™

The National Institute for Occupational Safety and Health (NIOSH)

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NIOSH -

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To develop new knowledge in the field of occupational safety and health and to transfer that knowledge into practice.







To develop new knowledge in the field of occupational safety and health and to transfer that knowledge into practice.

#### The National Institute for Occupational Safety and Health (NIOSH) Workplace Safety & Health Topics ♠ Workplace Safety & Health Promoting productive workplaces through safety and health research Topics ASBESTOS Asbestos Other Resources "Asbestos" is a commercial name, not a mineralogical definition given to a variety of six naturally occurring fibrous minerals. These minerals possess high tensile strength, flexibility, resistance to chemical and thermal degradation, and electrical resistance. These minerals have been used for decades in **Related Topics** thousands of commercial products, such as insulation and fireproofing materials, automotive brakes and textile products, Construction and cement and wallboard materials. When handled, asbestos can separate into microscopic-size Follow NIOSH particles that remain in the air and are easily inhaled. Persons occupationally exposed to asbestos have developed several F Facebook types of life-threatening diseases, including asbestosis, lung Asbestos with a penny to show the size cancer and mesothelioma. Although the use of asbestos and Pinterest asbestos products has dramatically decreased in recent years, they are still found in many residential and commercial settings and continue to pose a health risk to workers and others. Twitter

Spotlight



ACGIH<sup>®</sup> is a 501(c)(3) charitable scientific organization that advances occupational and environmental health. Examples of this include our annual editions of the *TLVs*<sup>®</sup> and *BEIs*<sup>®</sup> book and work practice guides in ACGIH's *Signature Publications*.





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Science V

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#### Top 4 Ways to Connect

#### ACGIH<sup>®</sup> Membership Directory

ACGIH's Membership Directory makes it easy for you to find other members following a similar career path.

#### Access the Directory (Members Only)

Not a member? Join today!.

#### Volunteer Groups

Volunteers support ACGIH's mission by providing recommendations on various chemical substances and physical agents, raising awareness of issues impacting the field and developing guidelines to help industrial hvaienists worldwide with their work.



Publications V

Foundation V

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### HOW DO WE DETERMINE THE RISK A HAZARD POSES? "HOW DANGEROUS IS IT?"



#### **AN INDIVIDUAL'S RISK IS UNIQUE**



### **AN INDIVIDUAL'S RISK IS UNIQUE**

- While hazards may present universal risks, the impact a hazard may have on an individual can depend on many factors.
- We cannot know all factors influencing a person's experience of a different hazard.
- Depending on health, and both visible and invisible disabilities, people may experience higher risks than others.
- This is one reason why it is so important to be aware and cautious of collections hazards.



#### **ROUTES OF EXPOSURE**



• **Route**- site of exposure, will determine the ultimate dose of the exposure and health impact

"Unlike industrial workers who are likely to encounter higher doses of potentially hazardous materials resulting in **acute** exposure, museum workers are more likely to be exposed to low-level doses of heavy metals [and other toxins] over an extended period of time, resulting in **chronic** health problems."

-American Institute for Conservation, 2008



### **TYPES OF EXPOSURE**

Acute exposure- is a short contact with a chemical. It may last a few seconds or a few hours. For example, it might take a few minutes to clean windows with ammonia, use nail polish remover or spray a can of paint. The fumes someone might inhale during these activities are examples of acute exposures.



### **TYPES OF EXPOSURE**

**Chronic exposure**- is continuous or repeated contact with a toxic substance over a long period of time (months or years). If a chemical is used every day on the job, the exposure would be chronic. Over time, some chemicals, such as PCBs and lead, can build up in the body.



## **Common Collections Hazards**

### **TYPES OF HAZARDS**

• Chemical

Toxic, causing a variety of different harmful chemical effects in the body. These may be both acute or immediate/short term effects as well as cumulative long term effects. Examples include carcinogens and reproductive toxicity.

• Physical

Not toxic, but may cause the body physical harm including flammable, explosive or radioactive materials materials. Also includes sharp or heavy materials.

• Biological

These include a wide variety of substances, from mold to pathogens

From Hayley Monroe, Connecting to Collections Care 2021

### **Common Chemical Hazards**

Pesticides - organic and inorganic Preservatives (for wet specimens) **Geological specimens Pharmaceuticals** Heavy metals (non-pesticide) -Pigments -Mercury -felted hats -As associated with 19th C dying

- -Solid lead and lead solder
- -Corrosion products of lead and cadmium
- -Liquid mercury

From Hayley Monroe, Connecting to Collections Care 2021

### **Common Physical Hazards**

Asbestos Firearms Knives, blades, sharp tools Ammunition Firecrackers, explosives Pressurized equipment, fire extinguishers **Radioactive Materials** Flammable Materials -Cellulose nitrate film

### **Biological Hazards**

Mold Pathogens Toxins on specimens Poison darts

### **Chemical Hazard: Pesticides**

- Arsenic both powered and liquid arsenic, also known as arsenic soap, were especially prevalent in taxidermy preservation
- **Mercury** also known as mercuric chloride or corrosive sublimate was commonly used on botanical specimens
- Napthalene in either flake or ball form remains in use, most commonly known as 'mothballs'
- **Paradichlorobenze (PDB)** in either cake or crystal form also remains in use, commonly known as 'mothballs'
- **Dichloro-diphenyl-trichloroethane (DDT)** from the 1940-70s DDT was sometimes applied as a pesticide or disinfectant to biological and animal specimens as well as library materials.

From American Museum of Natural History

### **Chemical Hazard: Pesticides**

- Arsenic affects nearly all organ systems; causes skin, lung and other types of cancer; acute exposure can cause shock and failure of cardiovascular system
- **Mercury** neurotoxin; causes brain, nerve and kidney damage
- **Napthalene** probable carcinogen, toxic for inhalation
- **Paradichlorobenze (PDB)** probable carcinogen; irritant when inhaled
- **Dichloro-diphenyl-trichloroethane (DDT)** possible carcinogen; acute exposure may cause tremors, seizures, vomiting



From American Museum of Natural History

### **Chemical Hazard: Pesticides**

These chemicals and compounds were applied in a variety of ways:

- brushing or rubbing onto the object
- submersion
- fumigating a storage or exhibit area

Routes of Exposure:

 Contamination may occur through inhalation, ingestion, or dermal contact. Symptoms may be acute or chronic and will vary depending on the amount of pesticide introduced into the body.
#### **Chemical Hazard: Pesticides**



Gutskin garment panel with poison tag, dated September 12, 1884. Collection of the Anthropology Department, National Museum of Natural History, Smithsonian Institution (1996, Volume 35, Number 1, Article 3)

#### From American Museum of Natural History



Nancy Odegaard 2019

#### **Chemical Hazard: Pesticides**



Unidentified white powder deposits on a natural history specimen should be treated as pesticide residues (Canadian Museum of Nature, CCI)



Becky Desjardins, Natural Sciences Collections Association, 2021 38

#### **Chemical Hazard: Other Metallic toxins**

Heavy metals (non-pesticide)

- Pigments: Cadmium, arsenic, lead
- Mercury
- Felted hats
- As associated with 19th C dying
- Solid lead and lead solder
- Corrosion products of lead and cadmium
- Liquid mercury

#### **Chemical Hazard: Other Metallic toxins**

Heavy metals (non-pesticide)

• Pigments:

**Cadmium**- cancer and organ system toxicity such as skeletal, urinary, reproductive, cardiovascular, central and peripheral nervous, and respiratory systems

Arsenic- carcinogen; acute toxicity

**Lead**- Neurotoxin; reproductive system, cardiovascular and musculoskeletal damage

• Mercury- neurotoxin

#### **Chemical Hazard: Other Metallic toxins**



1927 Lead Paint Advertisement



Wallpaper pigments, such as this yellow, often contained **arsenic**. In "The Yellow Wallpaper" (1892) by Charlotte Perkins Gilman, a woman is locked in a small room in order to cure her "hysteria," but the woman only grows more nervous, paranoid, and unsettled. (source)



Mercuric nitrate was used in manufacture of felt used in many different products, including hats such as this. This is where the term "Mad as a Hatter" comes from.

### **Common Physical Hazards**

Asbestos Firearms Knives, blades, sharp tools Ammunition Firecrackers, explosives Pressurized equipment, fire extinguishers **Radioactive Materials** Flammable Materials Cellulose nitrate film

**Asbestos**- name given to a group of naturally occurring minerals that are resistant to heat and corrosion. Asbestos has been used in products, such as insulation for pipes (steam lines for example), floor tiles, building materials, and in vehicle brakes and clutches

Route of Exposure: inhalation

-can cause a buildup of scar-like tissue in the lungs called asbestosis and result in loss of lung function that often progresses to disability and death. -causes cancer of the lung and other diseases such as mesothelioma which is a fatal malignant tumor of the membrane lining the cavity of the lung or stomach

**Asbestos**- name given to a group of naturally occurring minerals that are resistant to heat and corrosion. Asbestos has been used in products, such as insulation for pipes (steam lines for example), floor tiles, building materials, and in vehicle brakes and clutches



Asbestos Paper



Albatato I The mapic minered of the Middle Ages Today, still a "magic" minered Reproct. Area proof, and practically indestructible. When combined with gartlend cement 2 in manufactured leta products which are especially important and the fam. Decause they provide permenent protection ageinst fine, weather, and wear. Read this folder. Learn how to gut this magic releard to work on your fam.

Jax Asbestos



**Radioactive Materials**- class of chemicals where the nucleus of the atom is unstable. They achieve stability through changes in the nucleus. This process is called radioactive decay or transformation, and often is followed by the release of ionizing radiation (beta particles, neutrons, or gamma rays)



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Radioactive materials can cause cancer. For example, radon gas is the second leading cause of lung cancer in the United States. Poisoning from chronic exposure to radioactive materials can cause deterioration to a variety of body systems.

#### Three uranium glass subtypes



**Custard glass** 

**Vaseline glass** 



Vintage uranium-containing fiestaware



**Jadite glass** 

Mold Pathogens Toxins on specimens Poison darts

**Mold**- fungal growth that forms and spreads on various kinds of damp or decaying organic matter. There are many different mold species that come in many different colors. Excess moisture is generally the cause of indoor mold growth. Molds reproduce by releasing tiny spores that float through the air until landing in other locations. When they settle on wet or moist surfaces, the spores can form new mold colonies. Moderate temperatures and available nutrient sources make most office buildings ideal for mold growth. (CDC)

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Some molds are toxic, and mold can irritate respiratory systems and chronic lung disease

The greatest exposure concern for us as collection stewards would be when cleaning (even just dusting) moldy collections.





**Museum Textile Services** 

From Alabama Department of Archives and History

#### BREAK (5 Minutes)



# Taking Action (Being Proactive)

#### **ACTION TO TAKE**

You suspect there are hazards within your collection, maybe things you've never considered before...





#### **ACTION TO TAKE**

You suspect there are hazards within your collection, maybe things you've never considered before...

- 1. Use caution when handling-protect ourselves
- 2. Do research
- 3. Survey/inventory/better understand objects
- 4. Documentation and Labeling
- 5. Improve storage
- 6. Communicate hazards and educate others

#### **1. ALWAYS PROTECT YOURSELF- PPE ETC**

If you are unsure whether or not a hazard is present, **Personal Protective** Equipment (PPE) is a must. Assume the hazard is present. Do not assume a mysterious powder residue is safe for exposure.



#### **2. RESEARCH HAZARDS**

Collections Hazards aren't new, even if our awareness is only beginning. There are many great resources online to help familiarize yourself with potential hazards in your collection. Remember, context is everything. Knowing roughly when, where, and how your objects were made and previously stewarded can give you clues about the likelihood of a particular hazard in your collection.





#### Health & Safety in Collection Care [edit | edit source]

The Health & Safety wiki pages are created and monitored by the members of the Health & Safety Network of the American Institute for Conservation (AIC).

Please note: Some of the information included on this wiki may be out of date, particularly with regard to toxicological data and regulatory standards. New information on safety issues is continually published; therefore, resources outside of AIC should be consulted for more specific information.

## **3. SURVEY/GET TO KNOW YOUR COLLECTION**

It is always the right time to get to know your collection more, and approach it from a new perspective, such as, "how are you potentially dangerous?"

In all seriousness, getting new eyes and new information to our collections helps us better interpret and make preservation decisions for our objects.

Remember: Know what you have, and work to help get some good out of it- safely!



#### **3. SURVEY/GET TO KNOW YOUR COLLECTION**

In some cases, testing can take place to determine the nature of a potential hazard. This service can be costly, but it can be helpful to determine whether or not an object is actually a hazard.



A Geiger Counter is another handheld analytical instrument for determining levels of radioactivity being emitted in an environment



Portable X-ray Fluorescence is a tool for determining elements present in a sample, and identifying certain elements, including arsenic

#### **3. SURVEY/GET TO KNOW YOUR COLLECTION**

There is a lot you can do just with the naked eye, however. You may not know exactly what you have, but it can help you make decisions about precautions.



Use of a handheld blacklight or UV lamp can make the Uranium glass fluoresce. (Museum of Radiation and Radioactivity) The same type of light can help reveal the extent of mold infestation on an object as well (Inside the Conservator's Studio)

# 4. DOCUMENTATION/LABELING

Beyond basic object labeling, hazardous, or potentially hazardous objects require additional labeling and hazard communication.



## 4. DOCUMENTATION/LABELING

**Globally Harmonized System:** 

Pictographs are a quick way to Indicate hazard types present



All in One Poster House

# 4. DOCUMENTATION/LABELING

In-house labels and other ways to communicate hazards present



Health and Safety Wiki, American Institute for Conservation

#### 5. Improve Storage

Isolate chemical pollutants, provide good ventilation when necessary, and well seal and box hazards to prevent exposure



Flammable cellulose nitrate films should not be stored in sealed containers. They should be separated from other object types, however. (Film Preservation Wiki)



Pharmaceutical chemicals such as these have housings that alone are likely insufficient for the toxins they contain. (From Hayley Monroe, Connecting to Collections Care 2021)

#### 5. Improve Storage

When your own research proves insufficient for determining a course of action, you will always want to "call a grown-up", i.e. find an expert. Local Universities can prove great resources for safe disposal of chemicals or other assistance.



Do not attempt to dispose of a chemical hazard without professional assistance. Chemical cleanup is not normal cleanup

#### 6. Communicate Hazards and Educate Others

It is not enough for you to hold the collections hazard knowledge in your head. It needs to be accessible to your staff and volunteers, and it needs to be thoroughly documented for posterity.



Documentation of collections hazards within a collections database (From Hayley Monroe, Connecting to Collections Care 2021)



Nancy Odegaard 2019

# How do we manage this known collection hazard?

We know the risks of arsenic. Housing this object in a way that prevents excessive handling or exposure is a must. If this object would be exhibited, it would need to be sealed from the public and other objects. Any materials coming into contact with this object should be assumed contaminated. PPE is a must.



Unidentified white powder deposits on a natural history specimen should be treated as pesticide residues (Canadian Museum of Nature, CCI)

# How do we manage this unknown collection hazard?

If an unknown powder is present, we must assume that it could be hazardous. It should be sealed from the public if exhibited, and separated from other objects in storage. This powder SHOULD NOT be removed with a vacuum cleaner. Cleaning and handling should be avoided.



Wallpaper pigments, such as this yellow, often contained **arsenic**. In "The Yellow Wallpaper" (1892) by Charlotte Perkins Gilman, a woman is locked in a small room in order to cure her "hysteria," but the woman only grows more nervous, paranoid, and unsettled. (source)



Mercuric nitrate was used in manufacture of felt used in many different products, including hats such as this. This is where the term "Mad as a Hatter" comes from.

How do we manage this known collection hazard?

It should be sealed from the public if exhibited, and separated from other objects in storage. This powder SHOULD NOT be removed with a vacuum cleaner. Cleaning and handling should be avoided.





Vintage uranium-containing fiestaware



Radium dial on clock

#### How do we manage this known collection hazard?

Materials should be presented and stored behind a barrier. If they are in good condition, radioactivity exposure should be low and safe for general use. Handling should be minimized, and condition should be documented over time.

#### How do we manage this known collection hazard?

Isolate from other collections; clean as soon as possible; PPE and ventilation is necessary





**Museum Textile Services** 

From Alabama Department of Archives and History





Vintage uranium-containing fiestaware



Radium dial on clock

#### How do we manage this known collection hazard?

Materials should be presented and stored behind a barrier. If they are in good condition, radioactivity exposure should be low and safe for general use. Handling should be minimized, and condition should be documented over time.

#### ACTIVITY

In breakout rooms, discuss one potential hazard within your collection and how you intend to or have managed it. Prepare to share your conclusions with everyone afterward.


## Summary

- Hazards are apparent in our environment everywhere, including within historical collections
- We can these objects safely with planning and care, and we are obligated to do this, especially for the good of long term preservation and safety
- When in doubt, play it safe and create a culture of safety in your institution
  - When you do not know the nature of a potential hazard, seek

professional expertise

## Thank you!

## Marie Desrochers | mdesrochers@utah.gov https://artsandmuseums.utah.gov/utah-collections-preservation/

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