

Just how dangerous is that object?

Identifying and Managing Hazardous Materials In Museum Collections

Hayley Monroe - Museum of Vancouver



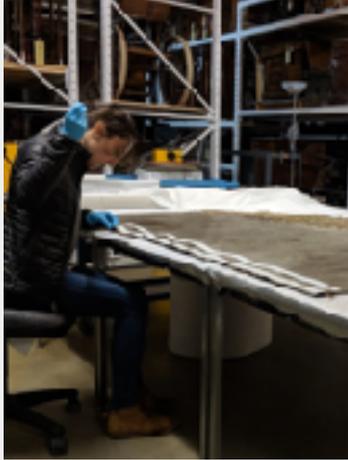
Summary

- Introduction
- What makes a material hazardous?
- Hazardous materials common in museum and heritage collections
- Surveying your collection for hazardous materials
- Identification
- Management and safe working procedures

*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.***

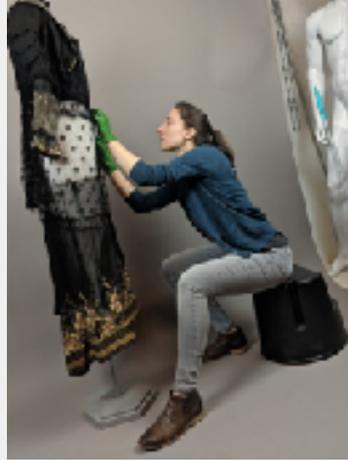
AIC Health and Safety, 2008

Exhibition prep



DDT

Object photography



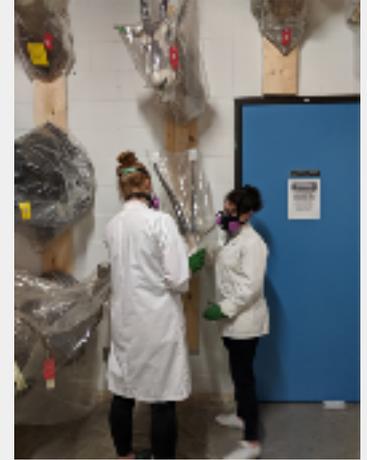
Naphthalene

Complying with WorkSafe BC requirements



Asbestos

Storage reorganizations



**Arsenic,
mercury & lead**

What makes a material hazardous?



Hazardous materials commonly found in cultural collections:

Pesticides - organic and inorganic

Preservatives (for wet specimens)

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
- Geological specimens

Asbestos

- Incorporated in objects and architectural elements
- Mineral specimens

Pharmaceuticals, patent medicines & controlled substances

Ethnobotanical and other biological toxins

- Poison darts/arrows, and herbaria
- Including: strychnine, aconite, ergot, curare, *Abrus precatorius*, etc. etc.
- Mold
- Pathogens (from contaminated objects)

Chemicals

- Historic industrial or household
- CTC-containing grenade-style extinguishers

Explosive and pressurized objects

- Firearms, ammunition, firecrackers, pressurized fire extinguishers, etc.

Cellulose nitrate & celluloid

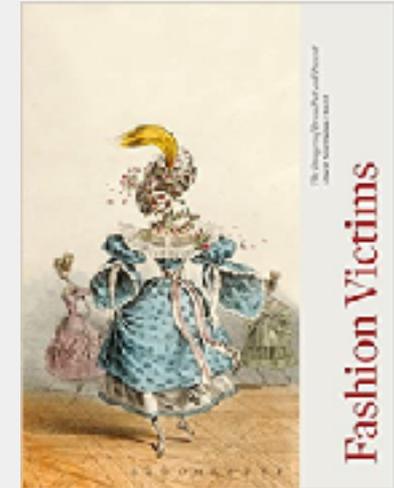
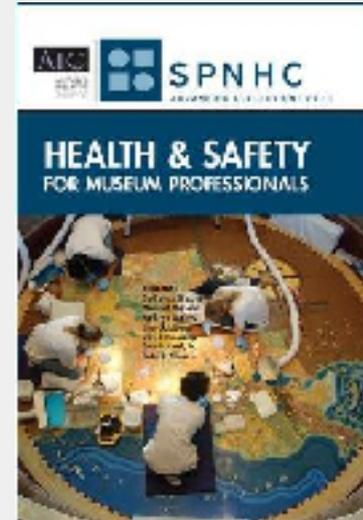
Deterioration products of some plastics

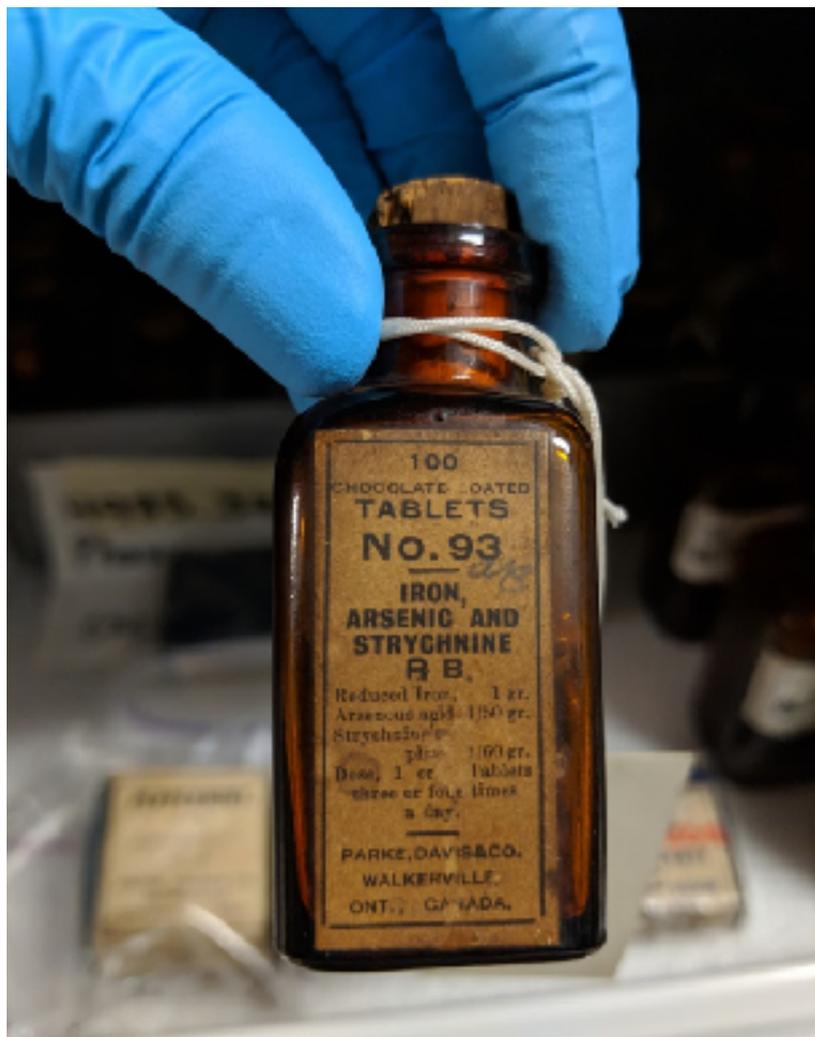
Radioactive objects and specimens

Evaluating your collection

Research!

- What have other museums identified?
- Historical information (ie. details of manufacture, or timelines of use for specific materials such as pesticides or pigments).
- Toxicological data







Surveying

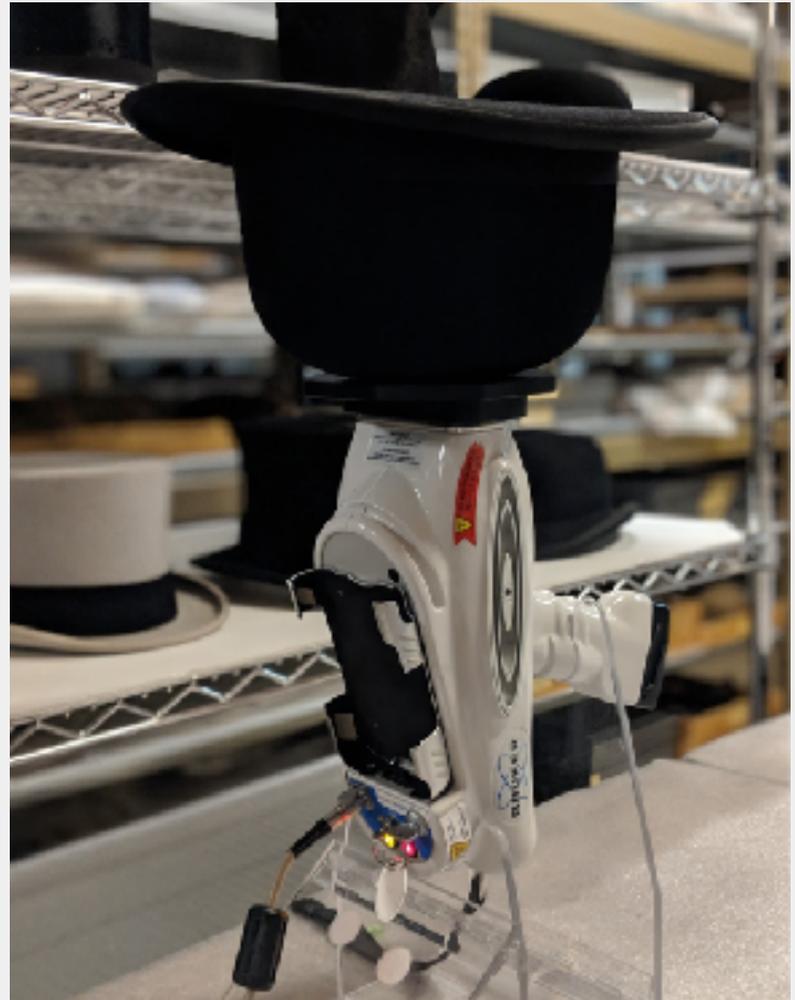
- Walk your aisles, explore your records
- Visual and non-analytical positive IDs
- Likely IDs (good candidates for further testing and/or preemptive flagging)



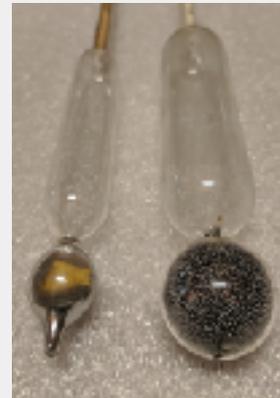
Analytical testing (when possible)

- Non-invasive techniques
Such as X-Ray Fluorescence (XRF)
- Invasive techniques which require sampling

(Such as GC-MS - especially for detecting organic molecules such as organic pesticides and ethnobotanical toxins)



Visual & otherwise straightforward identifications



Visual & otherwise straightforward identifications



Cocaine



Strychnine
(*Nux vomica*)



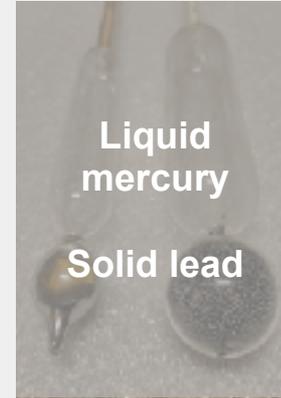
Uranium glass



Liquid preservatives



Cellulose nitrate
(many names)



Liquid mercury
Solid lead



Radium paint



Naphthalene



Abrus precatorius



"Poison!"

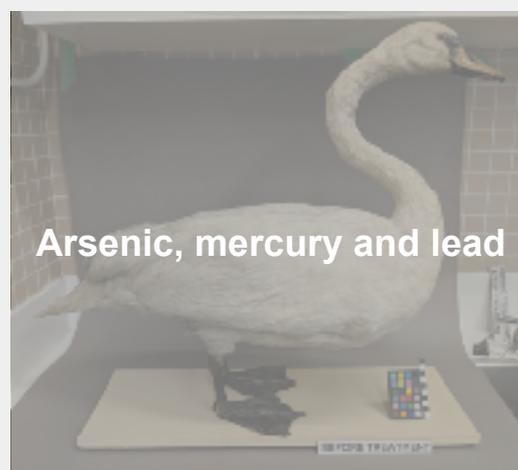
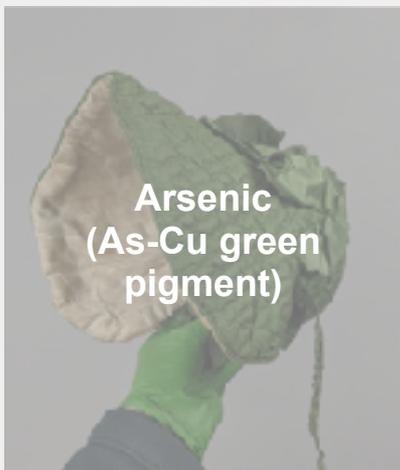
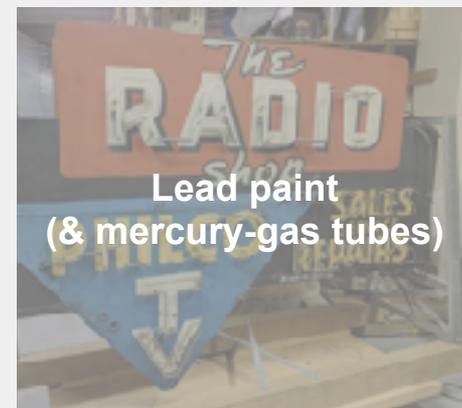
XRF

Non-invasive elemental analysis



XRF

Non-invasive elemental analysis



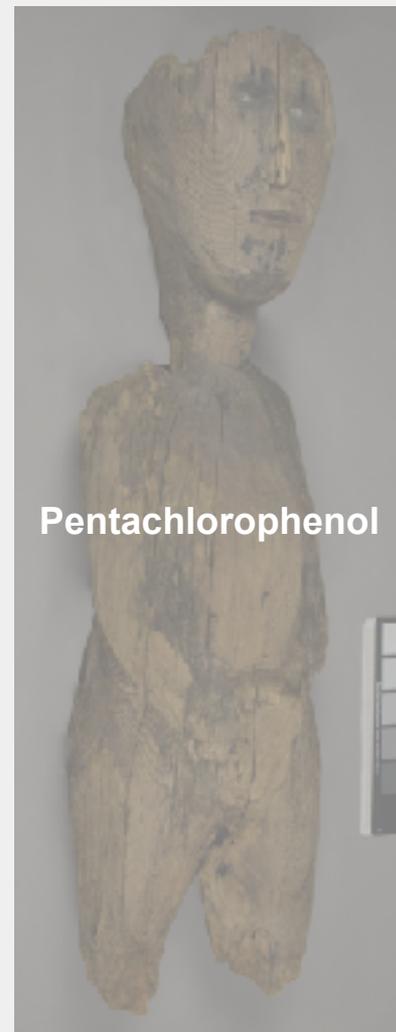
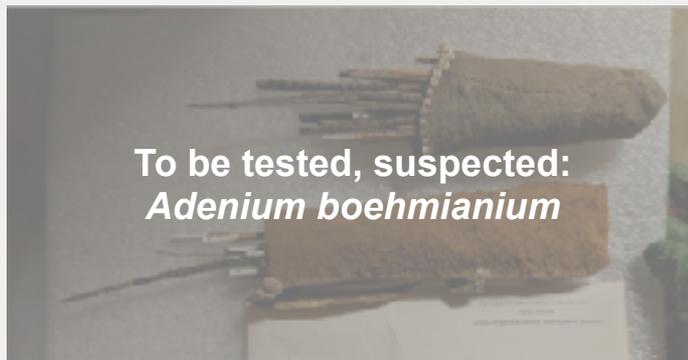
GC-MS

Minimally invasive analysis of organic molecules



GC-MS

Minimally invasive analysis of organic molecules



Just how dangerous *is* that object?



[http://catalogue.wellcomelibrary.org/
record=b1353023](http://catalogue.wellcomelibrary.org/record=b1353023)

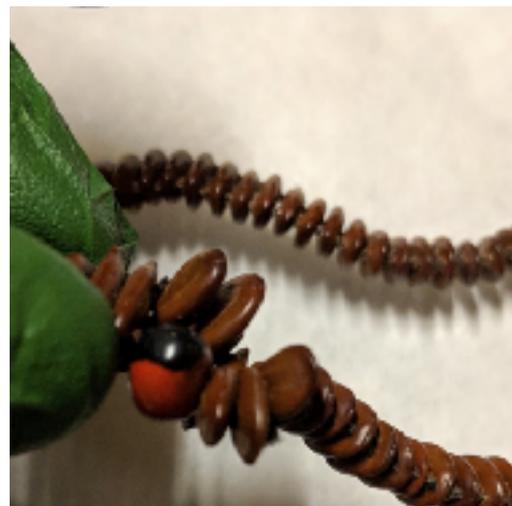
Hazard vs. Risk

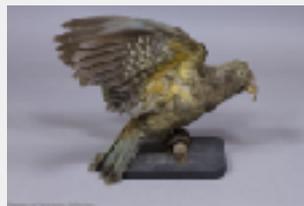
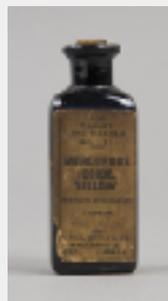
What's the difference?

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





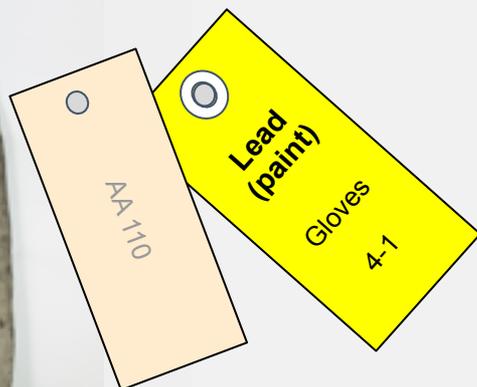
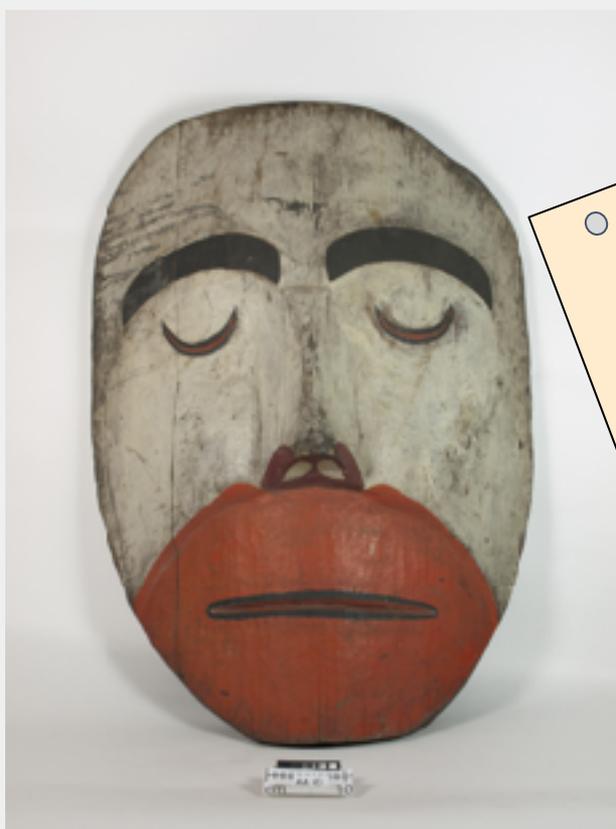
Managing the Hazards in Your Collection

- Labels and database records (tagging and flagging)
- Storage and housing upgrades
- Safe working practices and PPE

Labels and database records



☐	Cat. #	Descriptive Name	Location	Dept.	Source	Acc. #	Prov.	Artifact History	Last Edit	Loan Number	
☐	AA 110	Atlakim Mask	14A.9.2	Ethnology	Clair, Charlie	1958.88	2	*The Atlakim (Atlikim), known also as the Dance of the Forest Spirits, is one of the four main dances performed during the	9 months 4 days		edit / view



Hazardous Material:

Lead

Hazardous Material Procedures:

Required PPE:

Gloves and labcoat

Work surface/space requirements:

No special requirements

Cleanup:

Recycle Gloves.

Housing, storage and transportation requirements:

No special requirements

Exhibition requirements:

No special requirements

Special notes & warnings:

In case of fire - lead released in smoke and deposited in soot

Hazardous Material Notes:

High levels of lead detected.

Method of testing - XRF (2018)

Toxicity - 4 (high levels of lead)

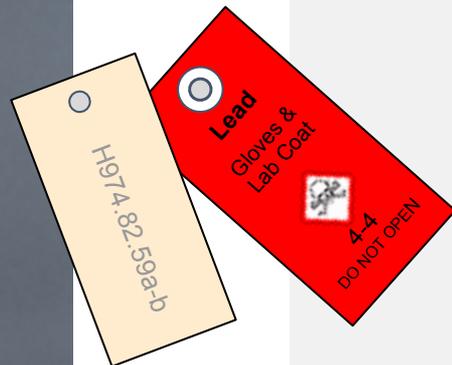
Transferability - 1 (bound in paint film)

Very high lead in red paint on chin

Hazard Risk:

Low toxicity-risk

Obj. #	Cat. #	Descriptive Name	Location	Dept.	Source	Acq. #	Prov.	Artifact History	Last Edit	Loan Number	
□	H974.82.59a-b	Bottle	8A.11.2	History	Knowlton's Drug Store			Knowlton Drugs was located at Burnard and 4th until it went out of business c.1950. Mike Ratner collected old pharmaceutical supplies and kept them on display in the store.	1 year 9 weeks		edit / view



Artifact Contains

Yes

Hazardous Material:

Hazardous Material:

Lead

Hazardous Material

Required PPE:

Procedures:

Gloves and labcoat

Work surface/space requirements:

No special requirements

Cleanup:

Recycle gloves.

Housing, storage and transportation requirements:

Store bottles in boxes or trays that support and prevent bottles from tipping over and allow for easy transportation. Earthquake barriers a must

Exhibition requirements:

Must be kept beyond visitor reach

Special notes & warnings:

In case of spill, use chemical spill kit or HEPA vacuum. Dispose of as hazardous material

Hazardous Material Notes:

Bottle contains lead white powder.

Not tested

Toxicity - 4 (highly toxic)

Transferability - 4 (loose toxic powder)

"Flake white" is lead carbonate.

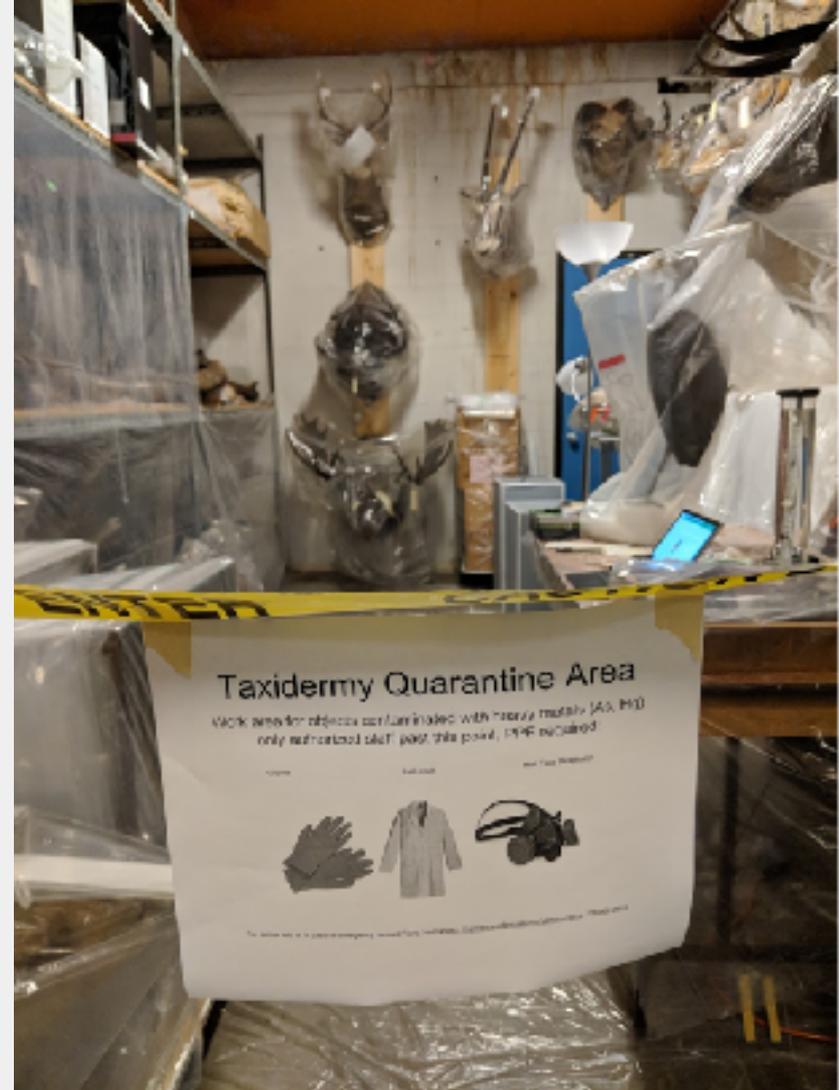
Hazard Risk:

High toxicity risk

Storage and housing upgrades



Safe Working Practices







Thank you!

