**WSU Guide to Identify Particularly Hazardous Substances (PHS) and High-Risk Chemicals**

The Occupational Safety and Health Administration (OSHA) Laboratory Standard requires that special handling procedures be employed for certain chemicals identified as “**Particularly Hazardous Substances (PHS)**.” PHS defined by OSHA include chemicals that are “select carcinogens, reproductive toxins, and chemicals with high degree of acute toxicity.” In addition, the Wayne State University Chemical Safety Committee (WSU CSC) also considers some reactive materials, nanoparticles, and novel chemicals with unknown/limited hazards as PHS. WSU CSC further classified PHS that possess extremely hazardous characteristics as **“High-Risk Chemicals”.**

How to identify PHS and High Risk Chemicals?

WSU laboratories should evaluate hazards of a chemical of interest using:

1. [Globally Harmonized System(GHS)](https://pubchem.ncbi.nlm.nih.gov/ghs/) based chemical information systems (e.g. Safety data sheets, [PubChem](https://pubchem.ncbi.nlm.nih.gov/), Duke University [GHS Lookup Tool](https://www.safety.duke.edu/laboratory-safety/chemical-hygiene/particularly-hazardous-substances))
2. Other non-GHS based chemical information systems (e.g. [European Chemical Agency (ECHA)](https://echa.europa.eu/information-on-chemicals))

If the chemical of interest has one or more hazard classification (GHS and/or non GHS based) listed below it should be treated as a PHS. **If a PHS has a hazard classification shown in yellow, it is also considered a “High Risk Chemical”.**

1. **GHS based hazard classifications**
2. Carcinogens - Category 1A or 1B
3. Reproductive Toxins - Category 1A or 1B
4. Acute Toxins, Oral – Category 1
5. Acute toxins, Dermal or inhalation - **Category 1** or 2
6. **Aspiration hazard – Category 1**
7. Specific Target Organ Toxins, Single Exposure – Category 1
8. Sensitizers, respiratory or skin – Category 1 or 1A
9. Oxidizing liquid or solid – Category 1
10. Substances and mixtures which in contact with water, emit flammable gases - Category 1 or 2
11. **Pyrophoric liquid or Solid – Category 1**
12. **Explosives – Unstable, division 1.1, 1.2 or 1.3**
13. **Self-Reactive or Organic Peroxides - Type A or Type B**
14. **Self-Heating substances and mixtures – Category 1**
15. **European union (EU) based hazard classifications: non-GHS**
16. **Contact with water liberates toxic gas (EUHO29)**
17. Contact with acids liberates toxic gas (EUHO31)
18. **Reacts violently with water (EUH014)**
19. **Explosive when dry (EUH001) or Explosive with or without contact with air (EUHOO6)**
20. **Other non-GHS based hazard classifications**
21. Other carcinogen designations

National toxicology program (NTP) – [Known human carcinogens](https://ntp.niehs.nih.gov/ntp/roc/content/listed_substances_508.pdf)

[Occupational Safety and Health Administration (OSHA) carcinogens](https://www.osha.gov/SLTC/carcinogens/standards.html)

[International Agency for Research in Cancer (IARC)](https://www.iarc.fr/) – [Group 1](https://monographs.iarc.fr/list-of-classifications/)

GHS carcinogen 2 and IARC 2 and NTP reasonably anticipated human carcinogens

1. Nanoparticles
2. [The National Institute for Occupational Safety and Health (NIOSH) hazardous drugs](https://www.cdc.gov/niosh/docs/2016-161/pdfs/2016-161.pdf?id=10.26616/NIOSHPUB2016161)
3. Novel chemicals – **Hazards unknown** or limited hazardous data.
4. [**OSHA hazardous class – Pyrophoric gases**](https://www.osha.gov/Publications/OSHA3844.pdf)

WSU Requirements for labs using PHS and High-Risk Chemicals

1. Maintain up to date inventory of PHS and High-Risk Chemicals.
2. Develop and maintain customized lab specific SOPs- Refer to [OEHS Standard Operating Procedures](https://research.wayne.edu/oehs/chemical/sops) webpage.