

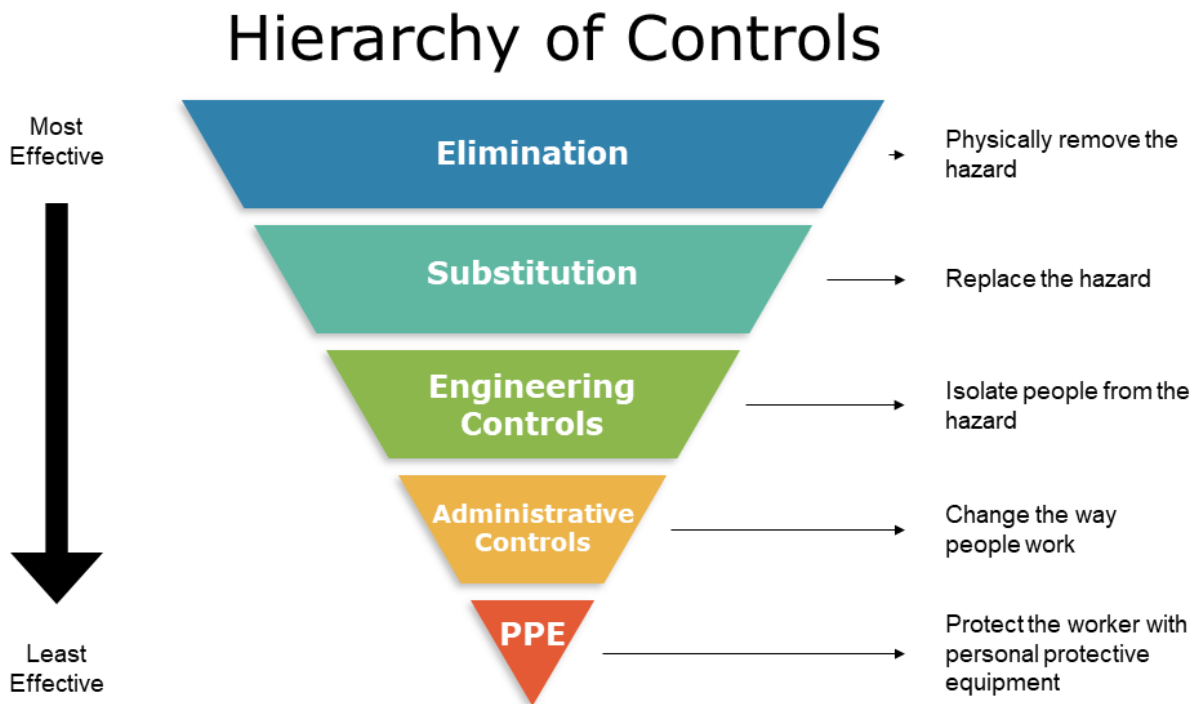
HIERARCHY OF CONTROLS

Controlling Risk

The Hierarchy of Controls is a concept about categorizing controls by effectiveness. There are 5 levels of control:

1. Elimination
2. Substitution
3. Engineering Controls
4. Administrative Controls
5. Personal Protective Equipment (PPE)

The Hierarchy of Control image below depicts the most important concepts associated with this mode of thinking, mainly that using a control from the highest level (e.g., elimination) is more effective than using those at the lowest level (e.g., PPE).



Examples

Hierarchy	Control
Elimination	<ul style="list-style-type: none"> ▪ Disposing of dangerous chemicals rather than keeping unused dangerous chemicals in the lab ▪ Reduce musculoskeletal disorders from lifting by replacing 40kg boxes with 20kg boxes ▪ Performing a task on the ground instead of on a ladder
Substitution	<ul style="list-style-type: none"> ▪ Using a 1 molar sodium hydroxide solution instead of a 5 molar ▪ Cleaning with 70% ethanol instead of 70% methanol ▪ Using a Class 1 laser instead of a Class 4 laser ▪ Using a less aerosolizable form of a chemical – metal pellets instead of powders
Engineering	<ul style="list-style-type: none"> ▪ Working in a fume hood to minimize the respiratory hazard ▪ Installing interlocks on mechanical devices to ensure operation only occurs when a worker is at a safe distance ▪ Installing guarding to protect from pinch points
Administration	<ul style="list-style-type: none"> ▪ Developing Safe Operating Procedures ▪ Using worker rotation to minimize exposure ▪ Limiting use of hazardous processes and equipment to only trained workers ▪ Categorizing laboratory work by hazard level and designated training, competence, and supervision requirements for each category of hazard.
PPE	<ul style="list-style-type: none"> ▪ Use of goggles and laboratory coat ▪ Use of appropriately compatible gloves with the chemical ▪ Use of fit-tested respirators (fit-testing is provided by Safety Office) ▪ Use hearing protection to protect from noise exposure