Liquid nitrogen (N\textsubscript{2}) has a reputation of being benign. However, being odorless, colorless, tasteless and nonirritating, nitrogen has no warning properties. Humans possess no senses that can detect the presence of N\textsubscript{2}. There are four distinct dangers from liquid N\textsubscript{2}: (1) it can asphyxiate, (2) it can cause frost bite, (3) it can condense oxygen and increase flammability and (4) it can explosively release gas.

**Asphyxiation**
Under normal circumstances, lab ventilation is usually sufficient to remove an excess of N\textsubscript{2}. However, liquid N\textsubscript{2} and dry ice have caused fatalities after being released in enclosed areas such as cold rooms. A scientist died of suffocation at CSIRO in Australia in December 2001 because of a liquid N\textsubscript{2} leak in a cold room.

**Frost bite**
Cold burns result from close contact with liquid N\textsubscript{2}. Small amounts evaporate rapidly with little damage. However, larger amounts will not evaporate before causing burns. The eyes are especially vulnerable.

**Oxygen Condensation**
Liquid N\textsubscript{2} (B.P. -196°C) is capable of condensing oxygen (B.P. -183°C) from the air causing oxygen enrichment in unsuspected areas. Increased oxygen greatly increases flammability of combustible materials.

**Explosive Release**
In a 1.5 mL closed vial, the evaporation of 0.5 g liquid N\textsubscript{2} generates an internal pressure of 4053 psi. Failure of the screw threads turns the cap into a 296 mph projectile!

**Personal Protective Equipment**
- full face-shield over safety glasses
- loose-fitting thermal insulated or leather gloves
- long-sleeved shirts and trousers
- preferably safety shoes – at least ensure feet are fully covered

**Remember!**
1. If a large spill occurs, leave the room until the liquid is evaporated.
2. Remove soaked clothing immediately.
3. Use loose-fitting gloves so that they can be removed quickly in case of a spill.
4. Serious cold burns should be treated by a doctor.
5. Smaller exposure burns may be treated as a sunburn injury of comparable magnitude. Warm affected skin slowly using COLD water only. Hot water will worsen the injury.

**Did You Know?**

**Rescue in Oxygen-Deficient Atmosphere**

**Fiction:** I can hold my breath long enough to rescue a downed coworker

**Fact:** Over 50% of the workers who die in confined spaces are attempting to rescue other workers