

CLINICAL RESEARCH - USE OF LIQUID NITROGEN PROCEDURE[®]

DOCUMENT SUMMARY/KEY POINTS

- The purpose of this procedure is to ensure the safe handling of liquid nitrogen by clinical research personnel.
- The procedure must be followed by all personnel using liquid nitrogen for clinical research.

CHANGE SUMMARY

- Minor typographical changes.

READ ACKNOWLEDGEMENT

- Training/Assessment Required – Personnel using liquid nitrogen for clinical research.

This document reflects what is currently regarded as safe practice. However, as in any clinical situation, there may be factors which cannot be covered by a single set of guidelines. This document does not replace the need for the application of clinical judgement to each individual presentation.

Approved by:	SCHN Policy, Procedure and Guideline Committee	
Date Effective:	1 st August 2021	Review Period: 3 years
Team Leader:	Clinical Trials Program Manager	Area/Dept: Kids Research Institute

Purpose/Scope

The purpose of this procedure is to ensure the safe handling of liquid nitrogen by clinical research personnel.

The procedure must be followed by all personnel involved in the conduct of clinical research involving the use of liquid nitrogen.

Background

Liquid nitrogen is nitrogen in a liquid state. It presents as a colourless clear liquid with a temperature of -196°C .

Liquid nitrogen is commonly used as a cooling and cryopreservation (freezing) agent for bio specimens including blood samples and tissue used in clinical research.

When appropriately insulated from ambient heat, liquid nitrogen can be stored and transport within vacuum flasks. SCHN has supplies of liquid nitrogen available in various locations for clinical research use.

Equipment and Supplies

- Bio specimen
- Liquid nitrogen
- Insulated Gloves
- Goggles
- Lab coat or gown
- Dewar
- Tongs or Forceps and Transfer Pipette(s) (if required)
- Spill Kit
- Waste Receptacle(s) incl. Sharps Bin (if applicable)

Procedure

Incorrect handling of liquid nitrogen can pose a risk to the user and others through the potential for the extreme cold to cause cold burns/frost bite and risk of asphyxiation due to oxygen deficiency during vaporisation.

All clinical research personnel are required to receive training/assessment prior to any use of liquid nitrogen, documented in accordance with SCHN Procedure 2019-027 – Clinical Research - Personnel Qualifications and Training Records.

Safe Work Practice(s) are posted in the area(s) where liquid nitrogen is located for easy-reference by users.

Clinical research personnel may require additional certification and/or training to transport dangerous materials via air transportation in accordance with the IATA Dangerous Goods Regulations (DGRs).

Use of Liquid Nitrogen

- Don PPE including lab coat or gown, insulating gloves, goggles and enclosed footwear;
- Access and review the applicable SDS, noting any precautions;
- Liquid nitrogen must be stored in cryogenic cylinders, in the upright position in dedicated areas with appropriate hazard signage;
- Ensure that liquid nitrogen is stored and handled in well-ventilated area(s) at all times and that no unprotected part of the body is in contact with uninsulated containers at any time (as contact with the extremely cold metal can cause skin to quickly adhere to the surface);
- Ensure that any containers and tools used are appropriate for use with low-temperature liquids (e.g. metal dewar flask(s)), and are free from any visible defects prior to accessing the liquid nitrogen storage location;

Note: Never enclose liquid nitrogen in a sealed or screw-top container, as this may result in bursting or an explosion.

- When dispensing liquid nitrogen from the cylinder in the storage location into a dewar, ensure the supply pipe is a few inches inside the vessel, not above it;
- Fill the dewar slowly by turning on the supply tap and adjusting the speed of dispensing, to prevent splashing and minimise the stress caused by cooling;
- Ensure that the dewar contains only the minimum volume of liquid nitrogen required for the task to be performed;
- Do not use a stopper or other device on the dewar as it may interfere with the venting of gas and could result in excessive pressure damaging or bursting the container;
- Check the unit periodically during filling to ensure that venting is not restricted by accumulated ice or frost;
- Once filled, turn the tap off and replace the lid/top on the dewar;
- Transport only 1 dewar at a time to the laboratory processing area, using a trolley that stores the dewar in an upright position. Ensure that the route taken minimises any risks to the user and others (e.g. avoid the use of lifts and other and small enclosed spaces, to ensure adequate ventilation is maintained, avoid any slip/trip hazards and heavily populated areas);
- In an appropriate laboratory processing area, gently place the dewar onto the laboratory bench, ensuring it is situated towards the rear of the bench;

- Process the bio specimen in accordance with the protocol-specific instructions provided by the Sponsor or Delegate, and reference to the SCHN Procedure 2019-012 – Bio Specimen Handling and Shipping;
- Any unused liquid nitrogen must be disposed of outdoors in a safe space. To do this, pour the liquid slowly on the gravel or bare earth, allowing it to evaporate without causing any damage. Do not pour the liquid on the pavement;
Note: Never dispose of liquid nitrogen in a sink, toilet, or other drain/waste receptacle.
- Discard any waste in the appropriate waste receptacle(s) (if applicable);
- Ensure that any transfer container(s) used for bio specimens cryopreserved with liquid nitrogen are packaged appropriately and collected in a timely manner (as applicable);
- The user is responsible for notifying Reception and/or Courier personnel that the transfer container(s) contain bio specimens cryopreserved with liquid nitrogen to ensure handling in accordance with the Safety Data Sheet for Liquid Nitrogen;
- The user is responsible for the safe handling, storage and transfer of the transfer container whilst it is on SCHN premises, from the time of preparation to dispatch.

Appendices

BOC SDS for Liquid Nitrogen

Abbreviations and Definitions

C	Celsius
DGRs	Dangerous Goods Regulations
Dewar	A double-walled flask of metal or silvered glass with a vacuum between the walls, used to hold liquids at well below ambient temperature.
IATA	International Air Transport Association
NSW	New South Wales
PD	Policy Directive
PPE	Personal Protective Equipment
SCHN	Sydney Children's Hospitals Network
SDS	Safety Data Sheet

Related Documents

1. NSW Health PD2017_026 - Clinical and Related Waste Management for Health Services - http://www1.health.nsw.gov.au/pds/ActivePDSDocuments/PD2017_026.pdf
2. NSW Health PD2017_013 - Infection Prevention and Control Policy - http://www1.health.nsw.gov.au/pds/ActivePDSDocuments/PD2017_013.pdf
3. NSW Health PD2007_052 - Sharps Injuries - Prevention in the NSW Public Health System - http://www1.health.nsw.gov.au/pds/ActivePDSDocuments/PD2007_052.pdf
4. SCHN Policy – Clinical Research [DRAFT]
5. SCHN Policy 2019-021 – Clinical Research - Use of Laboratory Facilities - <http://webapps.schn.health.nsw.gov.au/epolicy/policy/4643>
6. SCHN Policy 2014-9061 - Sharps Injuries - Prevention in the NSW Public Health System - <http://webapps.schn.health.nsw.gov.au/epolicy/policy/3295>
7. SCHN Policy 2015-9070 – Waste Management - <http://webapps.schn.health.nsw.gov.au/epolicy/policy/3649/>
8. SCHN Practice Guideline 2016-9029 - Personal Protective Equipment for Infection Control - <http://webapps.schn.health.nsw.gov.au/epolicy/policy/2609>
9. SCHN Procedure 2019-012 – Clinical Research - Bio Specimen Collection, Processing and Shipping - <http://webapps.schn.health.nsw.gov.au/epolicy/policy/4626>
10. SCHN Procedure 2019-010 – Clinical Research - Equipment and Supplies - Maintenance and Calibration - <http://webapps.schn.health.nsw.gov.au/epolicy/policy/4622>
11. SCHN Procedure 2019-027 - Clinical Research - Personnel Qualifications and Training Records - <http://webapps.schn.health.nsw.gov.au/epolicy/policy/4623>
12. SCHN Procedure 2019-028 – Clinical Research – Personnel Roles and Responsibilities - <http://webapps.schn.health.nsw.gov.au/epolicy/policy/4624>
13. SCHN Procedure 2019-145 – Clinical Research - Record Keeping - <http://webapps.schn.health.nsw.gov.au/epolicy/policy/4661>

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