

Cryotherapy: Liquid Nitrogen (LN2) treatment for Non-Genital Warts

Site Applicability

- VCH Primary Care (PC) Community Health Centres (CHC), including:
 - Heatley Integrated Care Team (ICT)
 - Downtown Community Health Centre (DCHC)
 - Pender ICT
 - Raven Song PC
 - Three Bridges PC
- Primary Care Network (PCN) sites, with Operations and Professional Practice approval

Practice Level

Profession	Advanced Skill
RN	Nurse-Initiated Activity (NIA) with additional Education and Training Diagnose and use Liquid Nitrogen (LN2) to treat common warts affecting the: <ul style="list-style-type: none"> • Plantar aspects of the feet • Palmar aspects of the hands • Periungual areas (around the nailbeds) of the hand, and • Dorsal aspects of the hands up to the metacarpal-phalangeal joints See below for photos.
	With an order and additional education and training, <ul style="list-style-type: none"> • Apply LN2 to treat common warts affecting remaining body areas not specified above.
RPN	With an order and additional education and training, an RPN may apply LN2 to treat common warts on all body areas.

Requirements

- Additional education and training will be provided by a member of the Clinical Nurse Leadership team.
- A member of the Clinical Nurse Leadership team or an experienced MD, NP or RN competent in the assessment, treatment and management of non-genital warts, will provide shoulder to shoulder training, and must sign off on the Cryotherapy Skills Checklist before a nurse can perform cryotherapy on common warts.
- All sites must follow the [VCH Handling Small Amounts of Liquid Nitrogen in Community Settings SOP](#).

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- RNs must follow the [VCH Nurse Independent Activities \(NIA\) and Nurse Initiated Protocols \(NIP\) SOP](#), if autonomously applying LN2.
- A provider must be present on site when a nurse is providing LN2 treatment:
 - For escalation of care.
 - For alternative treatment(s).
 - To address unacceptable treatment related levels of pain and/or anxiety.
 - For persistent warts (especially plantar warts), requiring conservative sharp wound debridement. The removal of keratin with a scalpel blade may help improve LN2 outcomes.
 - Conservative sharp wound debridement (CSWD) is out of the scope of this document and must be referred to a Most Responsible Provider (MRP) for support. RNs require additional education and training prior to perform [CSWD in Adults & Children](#).
 - A Nurse Specialized in Wound, Ostomy and Continence (NSWOC) can perform CSWD.

Need to Know

- Cryotherapy is a first-line treatment for cutaneous warts. Cure rates for cutaneous warts from cryotherapy in randomized clinical trials range from 14 to 90% (Sterling et al., 2014)
- Cutaneous warts include common, plantar, and flat warts, and exclude anogenital warts. Cutaneous warts are seen more frequently in children, young adults, people with immunocompromising conditions, and people who have jobs where they handle meat and fish.
- In adults, spontaneous resolution of warts may take several years. Thus, cryotherapy is recommended to prevent transmission.
- Common warts are diagnosed based on clinical appearance, which may include an interruption of the regular lines of the skin and thrombosed capillaries which often appear as black or red dots, like in the image below (UptoDate, 2022).



- RNs and RPNs can apply LN2 to the whole body with an order.
- As an **NIA without an order** and with additional education and training, an RN may apply LN2 to common warts affecting the following areas **only**:



Above (L-R): Plantar aspects of feet, palmar aspect of hand, periungual area of hand (around nailbeds), dorsal aspects of the hands up to the metacarpal-phalangeal joints

- Key considerations to look for while applying LN2:
 - Standard practice is two applications of LN2 per wart, creating a 1-2 mm white halo visible around the wart.
 - Wait for 30-60 seconds between applications until white halo is no longer visible
 - If no improvement is seen after 3 visits (typically two weeks apart), client should be referred to a provider (nurse practitioner or physician).
- **Contraindications**
 Contraindications for LN2 treatment for non-genital warts include (Prohaska, 2022 and Andrews, 2004):
 - Any previous adverse reaction to LN2.
 - Any signs or symptoms of infection, including active pyoderma gangrenosum (PG).
 - Lesion located where there is poor circulation (e.g., peripheral vascular disease).
 - Conditions that can be worsened by exposure to cold temperatures (e.g., cold urticarial, prior cold induced injury, cryoglobulinemia, multiple myeloma or Raynaud disease).
 - Melanoma.

Equipment and Supplies

- Personal Protective Equipment (PPE):
 - Eye protection, such as a full face shield with safety goggles.
 - Non-porous, knee length disposable contact precaution gown, and long pants without cuffs.
 - Loose fitting cold insulating (insulated or leather) gloves.
 - Nitrile gloves.
 - Closed toe shoes.
- Sterile bandages.
- Non-sterile cotton tipped applicators, if required.
- Liquid Nitrogen in cryogenic appropriate container, such as Styrofoam cup or spray canister (NSHA, 2017).

Guideline

Assessment

Review conditions impacting circulation and sensation. If a client has one of the listed conditions, nurses should perform a [comprehensive skin integrity assessment](#) and review client history prior to administering LN2. A risk/benefit analysis should be considered for clients where applying LN2 may create opportunities for infection or further adverse events. Consult with a provider if unsure.

1. These conditions require caution when administering treatment ([NSHA, 2017](#)):
 - Autoimmune disease
 - Collagen disease
 - Diabetes
 - Peripheral Vascular Disease (PVD)
 - Immunosuppression
 - Agammaglobulinaemia
 - On anticoagulants
2. Assess skin lesion(s) requiring treatment, including:
 - Color
 - Size (length, width, height)
 - Symmetry
 - Any signs or symptoms of infection (e.g., purulent drainage, redness, swelling, odor)
 - Assess integrity of surrounding skin prior to administering treatment. For more guidance review “[performing a skin assessment](#)” (Hess, 2010)
 - If the lesion is on a lower limb, a basic lower limb assessment at baseline is recommended to rule out PVD.

If there are any concerns with the lesion or if there is excess callous and debridement is needed, consult with a provider for further assessment (NSHA, 2017).

Cryotherapy Steps:

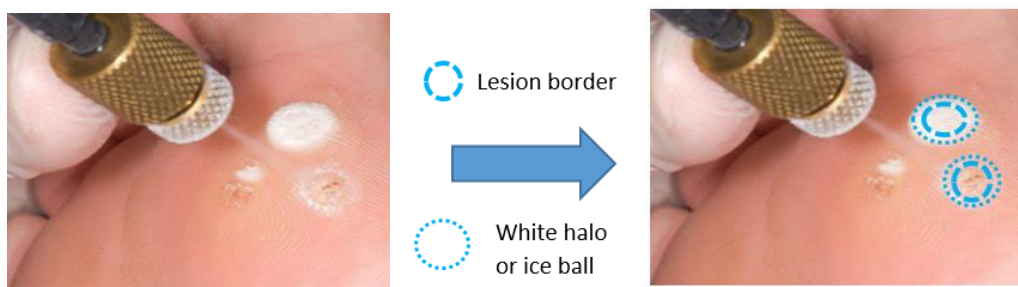
Obtain informed verbal consent before proceeding (see [patient education](#) section).

1. Gather supplies.
2. Apply PPE as per [VCH Handling Small Volumes of Liquid Nitrogen in Community Settings SOP](#).
3. Wearing PPE, including thick cryogenic gloves, dispense LN2 into either nitrogen spray decanter or styrofoam cup.
4. Prior to patient care, remove PPE needed for dispensing LN2 and replace it with eye protection and nitrile gloves.
5. Position patient to easily access the common wart and maintain one’s proper body mechanics. Ensure lighting is good and that wart is clearly visible.
6. Prepare for application of LN2 using the nozzle of a spray decanter or cotton tipped applicator:
 - a. **If using cotton-tipped applicator:**
 - **Do not over saturate applicator with LN2 to prevent contact with healthy tissue.**
 - If cotton tip becomes too saturated, use a new cotton tipped applicator (UptoDate, 2022).
 - Apply LN2 to the skin lesion requiring treatment by placing the applicator **firmly and perpendicularly against the skin lesion** for approximately 3 to 20 seconds, depending on size and sensitivity of lesion, until an ice ball (frozen white halo as pictured below) appears and extends 1-2 mm past the lesion border (UptoDate, 2022).



b. If using a spray canister:

- Hold the tip of the spray canister approximately 1 cm away from the lesion (do not touch the tip of canister to skin).
- Depending on the size and sensitivity of the lesion, apply LN2 for approximately 3 to 20 seconds until an ice ball (i.e., frozen white halo as pictured below) appears and extends 1-2 mm past the lesion border.



- If tolerated by client, apply LN2 a total of two times at the same visit:

Allow the lesion to thaw (white halo should disappear) for 30-60 seconds between applications. If halo does not disappear, discontinue treatment for the day and advise client to return in two weeks.

- Bleeding during the procedure is rare but may occur due to blood vessel proximity to the surface in some warts. If bleeding occurs, apply firm pressure to the area and stop treatment. Consult with a provider about whether or not to continue treatment.
- If drainage present post procedure, consult with a provider as the treatment may have gone too deep.
- Repeat steps 5-8 for each additional skin lesion that requires treatment.
- Advise client to return every 2 weeks until lesion resolves (up to a **maximum of 6 treatments**). If no improvement after 3 treatments, refer to a provider.
- Disposal or return of LN2:
 - If using an open top container for LN2 and cotton tipped applicator, dispose of unused LN2: **Don PPE outlined in VCH SOP [Handling Small Volumes of Liquid Nitrogen in Community Settings](#):**
 - If there is leftover LN2 in a **spray canister** that has not been contaminated, it may remain in spray container for further use.

- c. External surfaces of the spray canister (including nozzle) should be cleaned and sanitized with bactericide between client uses.

When to escalate care to a provider:

- You are unsure if the lesion is a common wart and are unable to make a nursing diagnosis, and would like to consult. Review [UpToDate](#) (2022) for conditions that may be mistaken as a wart, including corns, black heels, seborrheic keratosis, skin tags, and malignancies.
- Debridement required prior to treatment.
- Baseline lower limb assessment suggests vascular compromise.
- Drainage after treatment.
- Unable to tolerate procedure.
- The client has returned with signs and symptoms of infection after treatment: warmth and redness to area, discharge from area.
- The lesion has not improved after 3 treatments, spaced 2-3 weeks apart, by using objective measures as outlined in Assessment section.

Documentation

In patient's health record, document (NSHA, 2017):

- Date and time of procedure.
- Assessment of conditions impacting circulation and sensation.
- Lesion location and assessment: you may use, for example, type "imagehand\" in an encounter note on Profile EMR to generate an image of the hand and mark the area that the lesion is in.
- If applicable:
 - Referral to a provider for lesion scraping or debridement.
 - Application of dressing.
- Total number of applications of LN2 that achieved a halo (maximum 2).
- Any unexpected outcomes such as bleeding or evidence of infection and how they were addressed.
- Client tolerance/response.
- Client education provided.
- Treatment plan.
- Subsequent treatments: note any improvements (e.g., size).

Client and Family Education

Review following with client:

- Treatment purpose and client goals.
- LN2 application procedure that will be performed and explain that there may be a cold sensation or mild-moderate pain or burning associated.
- Client tolerance of the procedure if they had it completed in the past.
- That many warts are contagious. Personal items including razors and towels should not be shared. For plantar warts, avoid walking around the house barefoot or sharing footwear. Consider giving client [HealthLink Handout](#).
- Common side effects/adverse events related to LN2 treatment:

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- Blistering can occur. Do not pop blisters, as this could lead to infection. Scab will form in a few days and may last up to 2 weeks. Keep clean and dry. Cover warts with bandage or athletic tape during treatment to prevent infection and transmission.
- Pain can persist after treatment for remainder of day. Oral analgesics may be taken if no contraindications.
- Redness and swelling is normal and should resolve in 2 to 3 days.
- In rare circumstances, numbness can occur and may take months to resolve.
- Pigment change around area of LN2 application is possible.
- Scarring is uncommon but possible.
- Hair loss around the area of LN2 application.
- Situations where the patient should **seek more urgent medical attention** such as:
 - Signs and symptoms of infection (increased redness and swelling, purulent drainage, fever).
 - Unresolved pain (longer than one week).
 - Unresolved bleeding.
- Client should book routine appointment with primary care provider if they notice an increase in size and number of lesions.
- Review recommended treatment intervals and provide appointment for next LN2 treatment.
- Explain wound care to the treated area:
 - The day after treatment, wash area gently with unscented soap and water. If dry, leave uncovered. If there is drainage, cover with a bandage and change daily.
 - Monitor area of treated lesions daily until next clinic visit for signs and symptoms of infection

Client education resources: [UptoDate Patient Education: Skin Warts: The Basics](#) and [HealthLinkBC Cryotherapy for Warts](#).

Related Documents

Related Policies

- [VCH Handling Small Amounts of Liquid Nitrogen in Community Settings SOP](#)
- [VCH Nurse Independent Activities \(NIA\) and Nurse Initiated Protocols \(NIP\) SOP](#)
- [VCH Documentation Policy](#)
- [VCH Indigenous Cultural Safety Policy](#)
- [BCCNM Documentation Practice Standards for LPNs, NPs, RNs, and RPNs](#)

Guidelines

- [VCH Community Medication Standard](#)
- [VCH Trauma Informed Practice Guideline](#)

References

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