

PROTOCOL TITLE: *Clinical Utilization of a Sous Vide Device in the Acute Rewarming of Frostbitten Extremities*

**D-HH IRB OVERSIGHT:**

*One of the following must be true in order to submit to the D-HH IRB. Please check all that apply:*

- ☒ The Principal Investigator is employed by D-H
- ☐ The study will utilize any D-H data or specimens
- ☐ The study will enroll D-H patients or recruit from D-H sites
- ☐ The study will utilize any D-H resources, e.g. study procedures will occur at D-H locations and/or use of D-H equipment or shared resources

**PROTOCOL TITLE:**

*Clinical Utilization of a Sous Vide Cooking Device in the Acute Rewarming of Frostbitten Extremities*

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**VERSION NUMBER/DATE:**

*Version 1, 8/14/20*

**REVISION HISTORY**

Revision #	Version Date	Summary of Changes	Consent Change?

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## 1.0 Study Summary

<b>Study Title</b>	<i>Clinical Utilization of Sous Vide Cooking Devices in the Acute Rewarming of Frostbitten Extremities</i>
<b>Study Design</b>	Patients with acutely frostbitten hands or feet presenting to the emergency department will be consented to participate in the study. An ANOVA sous vide device will be attached to a water basin and set at 38°C. Two thermometers will continuously monitor water bath temperatures and the readings will be recorded every two minutes. The frostbitten extremity will remain in the circulating warm water bath for 30 minutes, at which time the extremity will be evaluated to see if rewarming is complete (warm to touch, pliable tissue). Tissue that is still frozen will be placed back into the water bath for an additional 30 minutes, at which time they will be reassessed. Medical providers directly involved in the care of the patient will fill out a survey regarding viability of this method and ease of use.
<b>Primary Objective</b>	To assess the ability of sous vide rewarming in maintaining constant water bath temperatures and efficacy in rewarming the acutely frostbitten extremity.
<b>Secondary Objective(s)</b>	To determine the ease of use of sous vide water bath rewarming in the acutely frostbitten extremity.
<b>Research Intervention(s)/ Investigational Agent(s)</b>	ANOVA sous vide device
<b>IND/IDE #</b>	NA
<b>Study Population</b>	Patients presenting to the emergency department with acute frostbite requiring rewarming
<b>Sample Size</b>	3-5 patients
<b>Study Duration for individual participants</b>	1-2 hours
<b>Study Specific Abbreviations/ Definitions</b>	SVD – sous vide device, SVR – sous vide rewarming

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## **2.0 Objectives\***

- The purpose of the study will be to describe the use of a sous vide cooking device in heating a water bath for the acute treatment of frostbite in the emergency department (ED).
- The aims will be to use this device in the treatment of 3-5 cases of acute frostbite in the ED. The specific aims will be to assess the ability of the device to reach and maintain a target water temperature, and to survey those involved in the management of the patient regarding ease of use of this modality.
- We hypothesize that the sous vide device will rapidly heat a small water bath, maintain the target temperature, and be considered easy to use.

## **3.0 Background\***

- Frostbite is a clinical entity in which extremities, digits, and appendages undergo freezing damage due to unintentional exposure to environmental cold. Once in a safe environment where the potential for re-freezing is minimal, the current standard of care for acute frostbite is the rapid rewarming of the affected body part, using a circulating warm water bath targeted to 37-39°C. There is no current “best” modality to warm and circulate the water. Depending on resources, this may be difficult and time consuming. In the field, water can be heated over a fire and added to a water bath. If heated water is present, hot tap water can be incrementally added to a water bath to achieve and maintain the targeted temperature. In the ED, some have advocated for placing the frostbitten hand or foot in a sink with running hot water and a thermometer in the sink to detect temperature. These methods are difficult at best, and may be dangerous in that they either do not maintain the water at the targeted temperature, or burn the frostbitten and often insensate extremity. An inexpensive, small, and transportable device that could reliably heat and circulate the water would decrease provider effort and optimize the water bath to the targeted temperature range. In remote locations where electricity is present but not hot water, a portable heating device would drastically improve care.
- This modality is novel and has not been used in the clinical setting, to our knowledge. In early 2020, a study was published investigating the in vitro use of sous vide devices in creating circulating warm water baths for the rewarming of frozen pigs feet. In this study, the

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sous vide device maintained the water bath at a constant 40°C for 30 minutes and resulted in the rewarming of the pig foot from frozen to pliable. The sous vide modality was compared against and outperformed manual water exchanges.

- Fiutko A, Foreman C, Mycyk M, Weber J. A novel approach to rapid rewarming of a frostbitten extremity: The sous vide method. *Am J Emerg Med.* 2020;38(3):463-465.
- This study will be the first documented use of sous vide rewarming (SVR) in the clinical setting. Demonstration of the efficacy of using this method will provide the foundation for further study of SVR as a rapid, reliable, and portable modality for treating acute frostbite.

#### 4.0 Study Endpoints\*

- The primary study endpoint will be the rewarming of frostbitten extremities for 30 minutes at 38°C.
- The secondary study endpoint will be a survey regarding ease of use of this rewarming modality.
- The primary safety endpoint will be patient pain or discomfort that is determined to be unrelated to the discomfort known to be associated with rewarming frostbitten tissue. Two consecutive temperature measurements above 42°C will prompt the cessation of the SVR.

#### 5.0 Study Intervention/Investigational Agent

- 1.1 Description: The intervention will be the use of a sous vide device to heat the water bath to 38°C, rather than the traditional methods of manual water exchanges or placing the frostbitten tissue under running water.
- Drug/Device Handling: The SVD will be stored in a Tupperware container and appropriately labeled. The container will be stored in a locked supply closet and only accessible by providers. This device is not used for other purposes in the ED, however signs on the container will read that this device is to be used only for this study.
    - Cleaning the SVD:
      - A sign up chart will be taped to the container housing the SVD. The user will record the date of use, and upon returning the SVD to the container, will check a column indicating that they have sanitized the SVD with Purple SaniWipe cloths and a dishwasher detergent run

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## 6.0 Procedures Involved\*

- Patients presenting to the ED at Dartmouth-Hitchcock with acute frostbite (tissue still frozen) of the hands or feet will be identified and approached for recruitment. Patients not entering the study will continue to be treated by ED providers in the traditional fashion.
- Patients recruited for the SVR study will be consented to have their circulating warm water bath(s) heated by the novel SVR method. Providers or nurses caring for the study subjects will be consented to participate. A researcher will gather SVR equipment and attach two thermometers on the basin: one on the side nearest the SVD, the other on the opposite side. The researcher will verbally walk the provider or nurse carrying out the SVR through the following steps. A 15 L Sterilite® basin will be filled to the marked line (12cm) with water from jugs at room temperature, for each frozen extremity. The sous vide device (SVD) will be attached to the distal edge of the basin. The SVD will be turned on and set to maintain the bath at a constant 38°C for 30 minutes duration. The thermometers will be powered on continuously and the researcher will record temperatures simultaneously from each thermometer every 2 minutes. At the end of the 30 minute treatment, the SVD will be powered off and the extremity assessed by the researcher for warmth and pliability. If the extremity still feels cold or frozen, an additional 30 minutes in the water bath will commence, with subsequent reassessment. Rewarming will be considered complete when the affected tissue becomes red or purple, soft, and pliable.
- Patients who do not consent to SVR and elect for traditional water bath management will be asked for their consent to record the similar demographic, water temperature, and time-to-rewarm data as in the SVR treatment arm. After re-warming is complete, the provider will be asked to fill out a survey regarding the ease of use and efficacy of the SVR.
- *Describe:*
  - *Procedures performed to lessen the probability or magnitude of risks.*
    - Dual thermometers will record water bath temperature to assess for the possibility of disequilibrium in water temperature and to detect possible hot spots.

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- If more than 2 extremities require rewarming at any one point in a subject consenting to SVR, SVR will occur with two extremities and standard rewarming for extremities >2.
  - The treatment will be terminated if two consecutive thermometer recordings detect water temperatures of 42°C or above.
  - The treatment will be terminated if the patient had discomfort deemed above that expected with the rewarming of frostbitten tissue.
- *Explain if any part of this study involves the use of procedures that are inconsistent with the standard of care at Dartmouth-Hitchcock Medical Center.*
  - There are no parts of the study that are inconsistent with the standard of care at DHMC. The novel treatment is to assess a treatment modality that may elevate the standard of care.
- *All drugs and devices used in the research and the purpose of their use, and their regulatory approval status.*
  - There will be no use of a placebo.
- *Describe randomization:*
  - All patients presenting with acutely frostbitten hands or feet will be approached for inclusion in the study.
- *Prior and Concomitant Therapy:*
  - Concomitant therapies, such as intravenous fluids, anti-emetics, and analgesia, as well as other medications deemed necessary by the provider, may be given concomitantly during the treatment period.
  - The blood pressure cuff will be placed on an extremity that is not currently being rewarmed, to avoid constricting blood flow to the affected tissue.
- *Data Collection:*
  - Prior to rewarming, physical examination of the patient, including the frozen extremity, will be completed and documented in the EPIC chart by the provider.

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- Two thermometers, placed in the rewarming basin, will continuously monitor the water temperature. The temperature reading on both thermometers will be recorded on a paper data sheet by a trained provider at 2-minute intervals until the 30 minutes of treatment are complete.
  - The researcher will repeat an exam at 30 minutes to determine warmth and pliability of the tissue, confirming thaw.
  - The provider will be asked to fill out a survey on all acute frostbite patients whom consent to the study protocol, as well as those that do not.
- *The source records that will be used to collect data about subjects. (Attach all surveys, scripts, and data collection forms.) If there are plans for long-term follow-up (once all research related procedures are complete), what data will be collected during this period.*
  - The patient's age and sex will be recorded. The physical examination and pertinent medical information will be reviewed to confirm the location and extent of the frostbite and for contributing conditions.
  - Demographics and relevant medical history will be accessed.
  - Please see attached surveys and data collection forms.
- *Explain if any part of this study involves genetic analysis of biological specimens. If yes, explain whether the study is based on one the following:*
  - This study does not involve genetic analysis of biological specimens.

## 7.0 Data and Specimen Banking\*

- There will be no specimens banked for future use.
- Individual patient data from the emergency department visit will exist in the patient's EMR.
- A de-identified, numerically listed spreadsheet of the study participants will be stored on the protected Dartmouth-Hitchcock H:



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drive of the PI. The participant key will exist on the same drive. The PI laptop computer will remain on-campus in a locked office shared by the PI.

- Consented subjects will be tracked in the DHH CTMS (currently Velos, transitioning to OnCore)

## 8.0 Sharing of Results with Subjects\*

- Neither the individual subject or study results will be shared directly with the subjects or others, including the subject's primary physician. The study results will be shared via publication.

## 9.0 Study Timelines\*

- *Describe:*
  - Each participant will be enrolled during the study period for this treatment, which includes the emergency department visit. The actual estimated treatment duration is 30 minutes. Some participants may exceed this and be treated for 60-90 minutes.
  - Given the incidence of frostbite and census of the Dartmouth-Hitchcock emergency department, and the requirement for the participant to have acute frostbite (currently frozen) rather than already thawed, it is expected to take the entire cold frostbite season to enroll 3-5 participants.
  - The estimated date for the investigators to complete this study: Sept 11, 2022

## 10.0 Inclusion and Exclusion Criteria\*

- The primary and sub-investigators will identify patients presenting to the emergency department with a chief complaint of frostbite, as seen on the EMR patient tracking board. Reminder signs and group awareness in the emergency department of this study will help alert providers of the potential to approach subjects for enrollment who presented to the department with an associated complaint, such as "foot pain" or other chief complaint, but determined to have acute frostbite on initial examination. The PI or a Sub-I will be on-call to drive to the ED to enroll and consent the patient with the standard forms, and assist with the treatment. Consent will always be obtained in-person, by a study team member with consenting privileges.

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- *Inclusion criteria:* Age 18 or up or <17 with parent or guardian able to provide consent, ability to understand English and provide consent to the study, acute frostbite (frozen tissue) of the hands or feet.
- *Exclusion criteria:* Children under age 18 without parent or guardian, frostbite that has already thawed, frostbite (thawed or acute) of tissue other than hands or feet, inability to understand English and to provide consent.
- *Indicate specifically whether you will include or exclude each of the following special populations: (You may not include members of the above populations as subjects in your research unless you indicate this in your inclusion criteria.)*
  - *Adults unable to consent* - Exclude
  - *Individuals who are not yet adults (infants, children, teenagers)* - Include
  - *Pregnant women* - Include
  - *Prisoners* - Exclude

### **11.0 Vulnerable Populations\***

- *If the research involves individuals who are vulnerable to coercion or undue influence, describe additional safeguards included to protect their rights and welfare.*
- *If the research involves pregnant women, review "CHECKLIST: Pregnant Women (HRP-412)" to ensure that you have provided sufficient information.*

### **12.0 Local Number of Subjects**

- The maximum available to enroll will be enrolled during the study period. The investigators estimate 3-5 may be feasible during the cold season.

*Describe the statistical methods for determining the sample size for the study*

- N/A. As a feasibility study to the use of SVR for acute frostbite, there are no sample size calculations. All potential participants will be approached for enrollment.

### **13.0 Recruitment Methods**

- Patients presenting with acute frostbite in the Dartmouth-Hitchcock Emergency Department and whom have expressed interest in

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participating in the study to their care team will be approached for recruitment during their emergency department visit.

- Patients will be identified by the PI, Sub-Is, and other providers by the chief complaint, which may state frostbite, cold-injury, or pain in an extremity. Word-of-mouth and departmental awareness of this study will assist providers in identifying the appropriateness of recruiting patients that had varying other chief complaints, but found to have acute frostbite on evaluation.
- Subjects will be recruited in person, during their emergency department visit and will be Describe materials that will review consent form HRP-502.
- There will be no payments for participation in this study.

#### 14.0 Withdrawal of Subjects\*

- Subjects will be withdrawn without their consent for safety reasons or medical necessity. Criteria as follows: If water bath temperatures are recorded at over 42°C on two consecutive readings, if subject is judged by the treating clinician to have pain greater than expected for frostbite rewarming, or if a separate medical issue arises in the subject in which urgent treatment necessitates termination of the research.
- *Describe any procedures for orderly termination.*
  - The SVD will be powered off and the water bath maintained manually by medical staff.
- *Describe procedures that will be followed when subjects withdraw from the research, including partial withdrawal from procedures with continued data collection.*
  - Withdrawal from the research will preclude any further data collection. Data already collected at the time of the withdrawal will be analyzed with other study data but noted that the study terminated prematurely.

#### 15.0 Risks to Subjects\*

- *List the reasonably foreseeable risks, discomforts, hazards, or inconveniences to the subjects related the subjects' participation in the research. Include as may be useful for the IRB's consideration, a description of the probability, magnitude, duration, and reversibility*

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*of the risks. Consider physical, psychological, social, legal, and economic risks.*

- The standard of care for acute frostbite rewarming, which is a circulating warm water bath, will not be altered and patients will receive the standard of care treatment. Frostbite rewarming is known to be a painful process. Pain control will be at the discretion of the treating physician and the study will have no implications on this aspect of care.
- Potential hazards include hot water burns and the unlikely chance of catastrophic device failure and electrical injury. Hot water burns are also a risk in the current practice of manual hot water bath management, and the SVD may actually mitigate this risk by improved temperature control. Biomedical engineering at Dartmouth-Hitchcock has assessed the ANOVA SVD..
- The investigators do not see any specific psychological, social, or economic risks to the subjects directly related to the research, as the circulating water bath rewarming method is the standard of care for frostbite management.

*If applicable, explain how the use of the placebo or non-standard of care therapy may affect risks for participants, addressing the following:*

- *The safety and efficacy of other available therapies*
  - The current available therapy for frostbite rewarming is the same as being used in this study – circulating warm water bath. The study will use a new technique to creating this water bath. SVR is expected to more efficacious than the current method of water bath management.
- *The greatest potential harm that may result from not receiving or delaying effective therapy*
  - While unlikely, it is possible that the SVR would not heat the water and delay time to the current practice of manual water bath management. If this were to occur, delay to therapy would be minimal as the only change in intervention would be the manual addition of warm water to the basin. It is expected that the research treatment will speed up the delivery of effective therapy.

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- Risk will be minimized by assessing the water temperature continuously. The SVR will be ceased and the manual rewarming started if the water bath does not reach the target temperature in 25 minutes, or if the water bath temperature drops below 37°C for more than 5 minutes.
- *If applicable, indicate which procedures may have risks to the subjects that are currently unforeseeable.*
  - Unforeseeable risks different than typical water bath rewarming, if any, would relate to SVD failure.

## 16.0 Potential Benefits to Subjects\*

- *Describe the potential benefits that individual subjects may experience from taking part in the research. Include as may be useful for the IRB's consideration, the probability, magnitude, and duration of the potential benefits.*
  - The current method of creating and maintaining a circulating warm water bath is arduous, time consuming, and not controlled. It is highly suspected that the research method of water bath management will be quicker to achieve target water temperatures, safer in that the water temperature will be electronically monitored and maintained, and will benefit the patient in the expedited thawing of the frozen tissue.

## 17.0 Data Management\* and Confidentiality

- *Describe the data analysis plan, including any statistical procedures or power analysis.*
  - This is a pilot feasibility study where the primary outcome is whether or not the tissue rewarmed and the time required. Descriptive statistics will be performed to describe the patient population, time to rewarm, and the provider assessment of ease of use.
- *Describe the steps that will be taken to secure the data (e.g., training, authorization of access, password protection, encryption, physical controls, certificates of confidentiality, and separation of identifiers and data) during storage, use, and transmission.*

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- Paper data collection forms will be kept in a locked office until transferred by the PI to a Microsoft excel file on a password-protected computer. The identifiers and data will be contained in two separate files. Only the PI and sub-investigators will have access to the de-identified data and the PI will retain sole access to the identification key.
- *Summarize the record retention plan applicable to the study (taking into account any applicable Dartmouth Department, Division or Research Center requirements, or applicable funding sponsor requirements.)*
  - Records will be stored on-site on the PI's password protected computer for 3 years after publication.
- *Describe any procedures that will be used for quality control of collected data.*
  - Dual thermometers will act as redundant sampling of water bath temperatures
- *Describe how data or specimens will be handled study-wide:*
  - *What information will be included in that data or associated with the specimens?*
    - The data collection form will include the MRN of the patient and a numeral used to de-identify the data in the excel file. The collection form will contain a table of recorded water temperatures, including a temperature from each of the two thermometers every 2 minutes during the rewarming period. Any adverse events will also be recorded.
  - *Where and how data or specimens will be stored?*
    - Data collection forms filled out by clinicians or investigators will be stored in a locked office until the data is transferred to a Microsoft excel file. The data file will be stored on the password-protected computer of the PI.
  - *How long the data or specimens will be stored?*
    - Data will be stored throughout the duration of the study and manuscript preparation.
  - *Who will have access to the data or specimens?*
    - The data collection forms will be accessible to the clinician filling it out. Once transferred to excel

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format, only the PI and sub-investigators will have access to the de-identified data. Only the PI will have access to the de-identification number key.

- *Who is responsible for receipt or transmission of the data or specimens?*
  - Data collection forms will be deposited in the locked office by the clinician or investigator filling out the form during active rewarming of a subject.
- *How data or specimens will be transported?*
  - Data will remain on the password protected hard drive of the PI.

## **18.0 Provisions to Monitor the Data to Ensure the Safety of Subjects\***

- *Describe:*
  - *The plan to periodically evaluate the data collected regarding both harms and benefits to determine whether subjects remain safe. The plan might include establishing a data monitoring committee and a plan for reporting data monitoring committee findings to the IRB and the sponsor.*
    - The data will be reviewed by the PI each time a subject participates in the study, to confirm standard process and to assess for reported adverse events.
  - *What data are reviewed, including safety data, untoward events, and efficacy data.*
    - Temperature recordings, water bath treatment time required to achieve rewarming, and adverse events will be reviewed.
  - *How the safety information will be collected (e.g., with case report forms, at study visits, by telephone calls with participants).*
    - Adverse events will be recorded on the data collection form during the treatment of the subject in the emergency department.
  - *The frequency of data collection, including when safety data collection starts.*
    - Data collection will commence when the subject is treated in the emergency department. Data will be reviewed for safety issues after each subject.
  - *Who will review the data.*
    - The PI will review the safety data.



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- *The frequency or periodicity of review of cumulative data.*
  - The PI will review cumulative data after each subject.
- *The statistical tests for analyzing the safety data to determine whether harm is occurring.*
  - With an expected subject size of 3-5 study participants in a single study location, safety data will be reviewed after each subject participates. There will be no need to make estimations.
- *Any conditions that trigger an immediate suspension of the research.*
  - If 1 or more unanticipated adverse events are considered possibly attributable to the use of the SVD, the study will be put on hold pending review of the incident.
- *Describe the procedures for unblinding study therapy on a subject, including documentation of this in the subject's source document.*
  - Unblinding study therapy will not be necessary, as the study is unblinded to the clinician treating the subject and the treatment will occur only during the rewarming phase in emergency department visit.

## 19.0 Provisions to Protect the Privacy Interests of Subjects

- *Describe the steps that will be taken to protect subjects' privacy interests. "Privacy interest" refers to a person's desire to place limits on whom they interact or whom they provide personal information.*
  - Patients who may meet the enrollment criteria will be approached and asked if they are willing to learn about a research study taking place that they may qualify for. If the patient is not interested they will receive the current standard of care treatment.
- *Describe what steps you will take to make the subjects feel at ease with the research situation in terms of the questions being asked and the procedures being performed. "At ease" does not refer to physical discomfort, but the sense of intrusiveness a subject might experience in response to questions, examinations, and procedures.*



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- Potential subjects will have the traditional method of rewarming explained as well as an explanation of how SVR works. They will be informed that research is voluntary and they can withdraw at any point.
- *Indicate how the research team is permitted to access any sources of information about the subjects.*
  - The PI will be permitted to access the emergency department chart of the subjects to be able to record de-identified sex, age, frostbite location, further information about the case or any adverse event, and patient outcomes.

## 20.0 Economic Burden to Subjects

- *Describe any costs that subjects may be responsible for because of participation in the research.*
  - Hot water burns or electrical failure causing injury and the treatment of such injuries would be the only foreseeable costs incurred by the patient. The burn risk is present in the traditional method of frostbite rewarming and the SVR is expected to minimize this risk. Biomedical has assessed the SVD.

## 21.0 Consent Process

- *Indicate whether you will be obtaining consent, and if so describe:*
  - *Where will the consent process take place*
    - Patient consent will be obtained in the Dartmouth-Hitchcock Emergency Department in exam room space (not the waiting room)
  - *Any waiting period available between informing the prospective subject and obtaining the consent.*
    - None. The prospective subject will be identified and consented at the earliest convenience as to avoid delaying emergency department rewarming.
  - *Any process to ensure ongoing consent.*
    - Upon initial consent, the subject will be informed that they are able to withdraw from the study at any point during the rewarming period.
  - *Whether you will be following "SOP: Informed Consent Process for Research (HRP-090)." If not, describe:*

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- SOP: Informed Consent Process for Research (HRP-090) will be followed.

### ***Non-English Speaking Subjects***

- Inability to understand and speak English are exclusion criteria for this study.

### ***Subjects who are not yet adults (infants, children, teenagers)***

- *Describe the criteria that will be used to determine whether a prospective subject has not attained the legal age for consent to treatments or procedures involved in the research under the applicable law of the jurisdiction in which the research will be conducted. (E.g., individuals under the age of 18 years.)*
- *Describe whether parental permission will be obtained from:*
  - *One parent even if the other parent is alive, known, competent, reasonably available, and shares legal responsibility for the care and custody of the child.*
    - a. All subjects age 18 and over will be asked to provide informed consent.
    - b. All subjects ages 7-17 will be asked to provide assent in addition to consent of one parent or legal guardian.
- All subjects ages 2-6 will be enrolled if consent of one parent or legal guardian is provided. *Describe whether permission will be obtained from individuals other than parents, and if so, who will be allowed to provide permission. Describe the process used to determine these individuals' authority to consent to each child's general medical care.*
  - If a parent or legal guardian is not present to provide consent, patients under age 18 will be excluded.
- *Indicate whether assent will be obtained from all, some, or none of the children. If assent will be obtained from some children, indicate which children will be required to assent.*
  - Subjects age 7-17 will be asked to provide assent.
  - Subjects under age 7 will not be asked to provide assent.
- *When assent of children is obtained describe whether and how it will be documented.*

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- Confirmation of assent will be recorded in the appropriate location on form HRP-502 and comply with SOP HRP-091

## **22.0 Process to Document Consent in Writing**

This study will comply with SOP: Written Documentation of Consent (HRP-091) when the patient is physically able to sign the consent documentation.

We are requesting an alteration on the documentation of informed consent for subjects who are physically unable to sign. The consent process will remain unchanged from section 21.0 of this document, however given the enrolling population it is feasible if not expected that some potential subjects will present with bilateral frostbite of the hands and be physically unable to sign for themselves.

In cases where the patient is unable to legibly initial, sign and date, due to injury to the hands, but is able to make a mark on the page, the patient will make a mark on/near the line for initials and the place for signature. The person obtaining consent will print and date for the participant. A witness who is not a member of the study team will observe the marking of the consent and sign, print and date the witness section of the consent form.

In instances where the patient is unable to make any mark on the consent form we will obtain and document verbal consent from the patient on the consent form and have a non-study team member serve as witness to the consent process. The person obtaining consent will document in the area initial and signature areas that verbal consent was provided. The person obtaining consent will print the patient's name and date for them in the appropriate areas of the consent. The witness will sign and date the witness section of the consent form.

Only one consent form will be used even if two extremities are treated for frostbite using the SVR rewarming process detailed in this document.

## **23.0 Setting**

- *Describe the sites or locations where your research team will conduct the research.*

PROTOCOL TITLE: *Clinical Utilization of a Sous Vide Device in the Acute Rewarming of Frostbitten Extremities*

- The research team will identify, recruit, and perform the study treatment in the Dartmouth-Hitchcock emergency department, which is a Level I Trauma center.

## 24.0 Resources Available

- This research study has the support of the emergency department chair. As PI, Dr. Daniel will dedicate as much time as necessary to oversee and ensure appropriate conduct of this study.
- We are working with a ROM to ensure compliance with institutional practice and appropriate regulatory management.
- The Dartmouth-Hitchcock Emergency Department is an academic, level I Trauma center with an annual patient volume of approximately 35,000.
- The human research component is comprised of 30 minutes of treatment by placing hands or feet in a warm water bath. As such, there is unlikely to be untoward medical or psychological consequences. Should medical or psychological consequences occur, the study is being completed in a Level I Trauma center emergency department that contains the resources to address any unforeseen issues.
- All persons assisting with the research will undergo one-on-one training with the PI regarding the recruitment plan, consent process, and research procedures including monitoring, managing, and recording data on the participant and water bath, as well as protocols for cleaning and storing the SVD. A comprehensive email containing this information will be sent to all persons assisting as a reference.