Therapeutic Targeted Temperature Management has become one of the most important new advances in critical care. It is through the work of many different people, working in all facets of the hospital, that the full potential of temperature management is realized. Upon completion of The Arctic Circle™ Clinical Training & Education Program, you become a leader within your field operating at the center of the circle of care.

Module Goals

- The following information is intended to provide guidance in providing optimal care of patients treated with the Arctic Sun® Temperature Management System.
- This information is not intended to replace formal in-service training or the use and understanding of the Help Screens.
- Please refer to the Help Screens for complete indications, instructions, warnings and cautions pertaining to the use of the Arctic Sun® Temperature Management System.

Table of Contents

<table>
<thead>
<tr>
<th>Module 1:</th>
<th>01</th>
<th>Link for E-inservice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 2:</td>
<td>03</td>
<td>Advanced Patient Care</td>
</tr>
<tr>
<td></td>
<td>07</td>
<td>Common Questions</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Troubleshooting and Case Studies</td>
</tr>
<tr>
<td>Module 3:</td>
<td>14</td>
<td>Inservice Highlights</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Level 1: Standard User Competency</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Level 2: Advanced User Competency</td>
</tr>
<tr>
<td>References:</td>
<td>18</td>
<td>Site of Temperature Probe Placement</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>Therapeutic Hypothermia Supply Cart</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Patient Transport/End Therapy/Initiate Treatment</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>Using the Helpline</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>Conversion and Pad Weight Charts</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>Module 2 and 3 References</td>
</tr>
</tbody>
</table>

The 24/7 Helpline is intended to assist healthcare professionals with technical questions they may have regarding the use of the Arctic Sun® Temperature Management System. The Helpline is not able to provide medical or nursing advice or to prescribe treatment.
Prepare for the Clinical Training Workshop by completing the Arctic Sun® Temperature Management System Electronic Inservice

To use the Arctic Sun® Temperature Management System Electronic Inservice you will need access to the internet.

www.medivance.com
1. Click on product training and support icon
2. Select module 1 computer based learning
3. Read the terms, and if acceptable click the line that state Accept and agree
4. Select New Users Click Here
5. Enter your e-mail address and select a password
This self-paced program takes about 14 minutes to complete

Customer Service 877-267-2314
Users must register using the “New Users Click Here”, providing an email address, password and contact information. Once submitted an email with password will be sent.

I can’t remember my Arctic Sun® Training password

Step 1 – Go to Medivance Training (https://training.medivance.com/default.aspx) and click the “Forgot Your Password?” link

Step 2 – Enter your email address and click submit. Your new password will be sent to your email address

Step 3 – Login using the password sent to you in email and reset your password using the “Change Your Password” link at the top of the screen
Why use hydrogel for a temperature control device?
- Hydrogel is water-based; it provides excellent surface contact and transfers energy effectively
- Hydrogel has a gentle adhesive nature
- Hydrogel absorbs transpired moisture

ArcticGel™ Pad Patented
Three-Layered Construction

ArcticGel™ Pads
- Single Kit
  - Patients 16-100+ kg (35-220+ lbs)
  - Available in 4 sizes
  - Each kit holds 2 back pads and 2 thigh pads
- Universal Pad
  - Supplement coverage on larger patients
- Small Universal Pad
  - Patients 2.5-16 kg (5.5-35 lbs)
Applying ArcticGel™ Pads

- Pads must be used immediately after the package is opened
- Place on intact skin
  - Do not place ArcticGel™ Pads on skin that has signs of ulceration, burns, hives, or rashes
- While there are no known allergies to hydrogel materials, caution should be exercised with any patient who has a history of skin sensitivities or allergies
- ArcticGel™ Pads are clean, but not sterile; do not place in a sterile field
- Do not allow antibacterial agents to pool underneath the ArcticGel™ Pads
- Do not allow body secretions to collect underneath the Gel Pads.
- Do not place positioning devices underneath the ArcticGel™ Pads.
- Do not place positioning devices under the pad manifold or patient lines
- Avoid oils, lotions, and powders
- Apply to dry skin
- No need to shave, gel will not pull hair
- Avoid covering or interfering with joint motion
- Large breasts should clear the pad edges

Document the date pads applied on label

Cautions

- Due to underlying medical or physiological conditions, some patients are more susceptible to skin damage from pressure, heat or cold
- Patients at risk include those with poor tissue perfusion or poor skin integrity due to:
  - Diabetes
  - Peripheral vascular disease
  - Poor nutritional status
  - Steroid use
  - High dose vasopressor therapy
  - Young and old age
  - Anticoagulant therapy
  - Pre-existing skin conditions or skin injury
- Skin injury may occur as a cumulative result of pressure, time, and temperature
  - If the patient does not reach target temperature in a reasonable period of time or is not able to be maintained at target temperature, the skin may be exposed to low temperatures for an extended period of time which may increase the risk for skin injury
  - If patient is not at target within 4 hours, OR if water temperature is below 10°C (50°F) for 8 consecutive hours, refer to Patient Temperature Not Controlled in Help Screens.
• Maximum system water temperature is 42°C (107.6°F). This setting can be decreased for patients with fragile skin or other medical conditions that put them at higher risk of skin injury.
• Minimum system water temperature is 4°C (39.2°F). This setting can be increased for patients with fragile skin or other medical conditions that put them at higher risk of skin injury.
• Do not place electrosurgical grounding (Bovie) pads under ArcticGel™ Pads. The combination of heat sources may result in skin burns.

Special Considerations
• Edematous patients
  - Avoid applying pads too tightly
  - Reposition pads as patient swells (i.e. edema) to avoid skin irritation at the edges or blistering and to provide some “give”
  - Skin integrity may be compromised and more vulnerable to mechanical injury.

Use of Other Devices with the Arctic Sun® Temperature Management System
• Sequential compression boots
  - If indicated, are compatible with the Arctic Sun® Temperature Management System.
• Specialty beds
  - If indicated, are compatible with the Arctic Sun® Temperature Management System.
• Continuous passive movement devices (orthopedic patients)
  - May be used if indicated
  - Make certain there are no points of friction or pad overlap near the joint(s) being mobilized.

Skin Inspection
• Examine the skin under the ArcticGel™ Pads often, especially in patients with higher risk of skin injury.
• Recommended skin inspections every 4-6 hours or per hospital guidelines
  - Light skin- observe color: red, pallor, purple
  - Darker skin- look for darker hues
  - Check for capillary refill
  - Look for abnormalities
• Inspect areas over boney prominences
• Vasoconstriction
  - Skin will be vasoconstricted during cooling.

Routine Skin Care
• Replace Pads
  - When the hydrogel no longer uniformly adheres to the skin. Replacing the pads at least every 5 days is recommended.
• Bathing Skin
  - Not required before application
  - Make certain skin is dry before applying
• Clean open areas after pads are in place
• Inspect under the pads
• No need to bathe under pads.

Incontinence
• Soil wipes easily from outer pad (ill.)
• Clean liquid soil from skin as per hospital protocol
• For unmanageable incontinence, replace soiled pad with ArcticGel™ Universal pad if necessary (ill.)
Caution
- Do not allow urine, antibacterial solutions or other agents to pool underneath the ArcticGel™ Pads
- Urine and antibacterial agents can absorb into the pad hydrogel and cause chemical injury and may decrease pad adhesion
- Replace pads immediately if these fluids come into contact with the hydrogel

Pad Removal
- Gently lift up the edge (ill.)
- Peel vs. pull
  - Peeling is more gentle
  - Avoid pulling
- Cold pads are stiffer and more adherent; peel cautiously and slowly

Summary
- Appropriate patient selection is essential
- Understand and adhere to cautions
- Place pads on intact skin
- Remove pads gently by peeling
- Routinely inspect skin
- Closely monitor patient response to treatment and water temperatures
Can I defibrillate while managing a patient with the **Arctic Sun®** Temperature Management System?

**Defibrillation Options**
- Multi-purpose hands free defibrillation pad
  - Place directly on skin and under ArcticGel™ Pads
- Hands on conventional defibrillation
  - Apply defibrillation saline or gel pads directly on skin

How are the electrodes for telemetry monitoring placed?

**EKG / Electrodes**
- Chest or limb lead electrodes may be placed under the ArcticGel™ Pads if necessary
- Avoid placing between body structure and pad

Can microorganisms grow in the water reservoir?

**Algaecide**
- An algaecide (Chloramine-T) must be added to the water when the device is initially filled and each time the unit is drained and refilled
- The water must be drained and refilled with the algaecide every 6 months
- Each ArcticGel™ Pad contains algaecide powder in the layer where the water flows so the reservoir is re-dosed every time you attach a new pad kit
How is a patient weighed with the ArcticGel™ Pads on?

- Weigh the patient with the full set of ArcticGel™ Pads on
  - Ensure the manifold and large gray hose are lifted off the weighing surface
- Use the ArcticGel™ Pad weight chart to deduct the specific pad weight from the total weight
  - Refer to Weigh Patients with ArcticGel™ Pads in Help Screens
  - Pads may be empty or full for weighing procedure

How do I cool an obese patient?

- Use a large kit and then use supplemental Universal Pads (up to 2) as needed
- Single Kit
  - Patients 16-100+ kg
  - (35-220+ lbs)
  - Available in 4 sizes
- Universal Pad
  - Supplement coverage on larger patients
    See Pad Sizing Chart and example placement on page 3.

What if the patient has no urine output and a urinary bladder temperature probe is being used?

Probes

- Bladder temperature probes may require urine to be present in the bladder to read accurately (check with the manufacturer to determine minimum urine output necessary)
  - For example: The BARD® bladder temperature probe measures ambient temperature even if there is no urine.
- When cooling to hypothermia, cold-induced diuresis may occur; therefore it is imperative to closely monitor input and output

Lag Time with Temperature Probes

- Urinary bladder and rectal temperature probes may not always reflect core body temperature during hypothermia induction
  - It is not uncommon to see a lag time when comparing these probes to a pulmonary artery catheter or esophageal probe during rapid temperature shifts

Why is the pulmonary artery catheter reading lower than the Arctic Sun® Temperature Management System?

- The use of esophageal temperature is recommended for patient core temperature control below 33°C
  - Lag time is approximately 5 minutes
  - Placement can be challenging
- Once cooling becomes generalized, temperatures should correlate appropriately

Do the ArcticGel™ Pads need to be removed for Chest X-rays?

- No need to remove for radiographic imaging
  - Even safe with water flowing
- MRI, CAT scan, X-ray, Cath Lab

How is a patient with the Arctic Sun® Temperature Management System being transported?

- X-ray image with ArcticGel™ Pad in place
Transport
• **Empty Pads** to avoid water spills
  - Press **EMPTY PADS** icon and follow directions on screen
  - This takes about 30 seconds
• Then pinch and push the connectors to release (ill.)
• If the **Arctic Sun** Temperature Management System will not be transferred with the patient, leave the device on to keep the chiller running
• Reminder: The **Arctic Sun** Temperature Management System does not have a battery; for longer procedures, bring the device with you and utilize the setting **Continue Current Patient**

Please explain the Patient Temperature Trend Indicator
**Arctic Sun** Temperature Management System Features which help detect Heat Generation

- The **Arctic Sun** Temperature Management System measures temperature in 0.01°C = 0.04°F increments and can internally identify change before it shows on the display screen
- The **Patient Temperature Trend Indicator** reflects the rate of change in the patient’s temperature over the previous 5 minutes
- When assessing a patient, the clinician may refer to the **Patient Temperature Trend Indicator** for insight into patient heat generation which may be indicative of shivering or fever generation

**Patient Temperature Trend Indicator**

°Fahrenheit
- Center bar- no change or less than 0.45°F change per hour
- One arrow (up or down) - 0.45°F to 0.96°F change per hour
- Two arrows (up or down) - 0.96°F to 1.35°F change per hour
- Three arrows (up or down) - 1.35°F to 3.6°F change per hour
- Four arrows (up or down) - > 3.6°F change per hour

°Celsius
- Center bar- no change or less than 0.25°C change per hour
- One arrow (up or down) - 0.25°C to 0.5°C change per hour
- Two arrows (up or down) - 0.5°C to 0.75°C change per hour
- Three arrows (up or down) - 0.75°C to 2.0°C change per hour
- Four arrows (up or down) - > 2.0°C change per hour
**Thermoneutral**
No increase or decrease in temperature

**Progression of Hypothermia**
Patient possibly generating heat as indicated by a drop in water temperature

**Explain the significance of water temperature changes**

**Changes in Water Temperature**
- Circulating water temperature will stay in the range of 4°C to 42°C (39.2°F to 107.6°F)
- By selecting **Control Patient, Cool Patient** or **Rewarm Patient**, the Arctic Sun® Temperature Management System will modulate the water temperature through a feedback algorithm to either cool or warm the patient

**Record key parameters**
According to Institutional Protocol

**Water Temperature Stabilization**
- When a patient's temperature is maintained at target temperature, the water temperature will typically be maintained in a stable range 18°C to 25°C (64.4°F to 77°F)
- However, if the patient starts to gain or lose heat, the Arctic Sun® Temperature Management System will change the water temperature within minutes to keep the patient at target temperature
Normothermia
Target 37°C/98.6°F, Patient Temp 37°C/98.6°F, Water Temp 22°C/71.6°F, Patient Trend Indicator in center

Hypothermia
Target 34°C/93.2°F, Patient Temp 34°/93.2°F, Water Temp 32.6°C/90.7°F, Patient Trend Indicator in center

Water Temperature and Heat Generation
- If a patient begins to generate excess heat, the water temperature of the Arctic Sun® Temperature Management System will decrease in order to keep the patient at target temperature
- If the water temperature drops more than 10°C from baseline during Maintenance phase and remains there (not just artifact):
  - Further assess the patient
  - Check for shivering
  - Check for other sources of heat generation
  i.e.
  - heated ventilator
  - room heat
  - OR light
  - etc.

What should I do if the water temperature stays cold over an extended period of time?
Extended Cold Water Exposure
- The water temperature in the Arctic Sun® Temperature Management System will decrease when cooling a patient or when it is necessary to eliminate heat generation to maintain target temperature
- If the patient has been cooled continuously and does not reach target temperature within 4 hours OR if water temperature remains less than 10°C for 8 hours, refer to the Patient Temperature Not Controlled or Extended Cold Water Exposure in Help Screens
- Contact the 24/7 HelpLine for further assistance.

Shivering
- Shivering must be addressed; monitor for early signs of shivering through a shivering assessment scale13
- Treat as directed by Physician in charge

Rationale:
- Shivering increases metabolic rate
- Shivering generates heat and raises patient’s temperature1
- Increase in patient temperature will direct the Arctic Sun® Temperature Management System to deliver cool water and may increase patient exposure to cold water
- Refer to the Patient Temperature Not Controlled in Help Screens and immediately inform treating Physician, following institutional protocols

Shivering Recognition
- Look at the arrows on the Trend Indicator
- Look for irregularity of the baseline on your limb leads (any of the conductors connected to the electrocardiograph)1
- Visible shivering:
  - Mandible (masseter muscles)
  - Pectoralis muscles
  - Large or small muscle groups6,7
- If patient is generating heat, the Arctic Sun® Temperature Management System’s algorithm will trigger the delivery of cold water

Rewarming
- The Arctic Sun® Temperature Management System can be programmed to rewarm a patient automatically or manually at a rate of 0.01-0.5°C/per hour
### Troubleshooting

#### Alarms / Alerts
- If an alarm or alert occurs, the Arctic Sun® Temperature Management System will produce both an audible and visual cue.
  - A screen will appear that displays: alarm or alert number, title, a description of the problem and instructions for resolving the condition.
- When an alarm occurs, therapy is stopped.
  - Clear the alarm.
  - Identify and resolve the problem.
  - Press the green Start button to resume therapy.

#### Patient is not cooled to target temperature
Determine if the Arctic Sun® Temperature Management System is working properly:

- Is a full kit (four pads) being used?
  - Are Pads the appropriate size?
  - Are Universal Pads being supplemented as needed for larger patients?
- Is flow rate a minimum of 2.3 L/min?
- Is the water temperature appropriately low?
  - If water temperature is too high, what is the minimum water temperature set to?
  - To view: Check under Hypothermia or Normothermia settings (press Adjust and then More to modify low water limits).
- Was the therapy stopped?
  - Stopping the device may reset the algorithm.

#### If Arctic Sun® Temperature Management System is working properly, determine external conditions
- Is the patient shivering?
  - Arrows flashing upward on the Patient Temperature Trend Indicator reveals heat generation.
- Was the temperature reading confirmed with a secondary source?

#### What are the environmental conditions?
- Is the room temperature too high?
  - Consider decreasing thermostat.
- Is the ventilator circuit heated?
  - Consider removing heated humidification.

#### Patient temperature falls below target
- Has the patient experienced an event or received a medication which would bring the cool blood from the periphery into the core?
  - For example, administration of vasoactive medications or change in hemodynamics.
- If the patient was shivering and received paralytics or sedatives, did the cessation of the heat generation cause the temperature to drop rapidly?

#### Patient temperature rises above target
- Is the patient generating heat through shivering or an infectious process?
  - Appropriate diagnostics and appropriate treatment may be required.
- Is the patient experiencing seizures?

#### Overshoot
- Ensure the appropriate automatic patient control modes (e.g. Control Patient, Cool Patient or Rewarm Patient) is activated.
  - The appropriate patient window and the Arctic Sun® Temperature Management System icon will be blinking.
- Is the water warming or cooling appropriately?
  - If water temperature is too high or too low, what is the maximum or minimum water temperature set to?
  - To view: In Hypothermia or Normothermia settings (press Adjust and then More to modify water limits).
• What are the arrows on the Patient Temperature Trend Indicator doing?
• Verify the patient’s temperature is accurate with another source
• What is the flow rate on the Arctic Sun® Temperature Management System?

If the flow is below 2.3L/min
• Ensure that one full pad kit is used (Universal Pad supplementation if needed)
• Check all connections and ensure they are secure and not kinked
• Look for air bubbles to assess if a pad is damaged
  – May check for damaged pad by disconnecting one pad at a time and waiting one minute; if flow increases during disconnect, replace the damaged pad with Universal pad

The patient temperature is not displayed on the screen
• Ensure that the patient temperature probe is connected to Temp Probe 1 outlet
• Confirm correct placement of temperature probe in patient
• If using bladder temperature probe, check for adequate urine output (if needed)
• Ensure that the connection between the temperature probe and the cable is secure
• Ensure the connection is not wet or moist
• Ensure the patient temperature probe is functional

The patient is rewarming too quickly
• Ensure Rewarm Patient is activated
  – The Rewarm Patient window will pulse and the Arctic Sun® Temperature Management System icon will be flashing
• Ensure warming rate is set appropriately as per Institutional protocol and/or physician’s order
• Review Patient Temperature Trend Indicator arrows to assess heat generation
  – If identify source, treat accordingly
• Ensure water temperature is responding appropriately to patient temperature fluctuations, as evidenced on therapy graph
Case Studies

Case Study 1
A patient is admitted to the unit and the Arctic Sun® Temperature Management System is set to cool the patient to 33°C (91.4°F). The patient’s starting temperature was 37.1°C (98.8°F), but is now 32.3°C (90.1°F) 3 hours later. The patient was medicated at the beginning of therapy with a Versed drip. The patient started to shiver at 35.6°C (96.1°F) and was given a bolus of Vecuronium (neuromuscular blockade). Nothing else has changed with the patient’s drug regime- he remains on low dose Vasopressin for BP control.

**What questions will you ask regarding the overshoot?**

**Answer:**
- What is the water temperature? (It should be rising to warm the patient back to target)
- What are the Patient Trend Indicator arrows doing? (Remember there is a 5 minute delay but you want to see the arrows trending upward to illustrate the patient is warming)
- Did the patient experience hemodynamic changes? (This can lead to movement between compartments and the cool blood rushing to the core and leading to overshoot)

Case Study 2
A patient is admitted with a temperature of 39.8°C (103.6°F) the staff has been attempting to cool this patient for about two hours to a target temperature of 37°C (98.6°F), so far the temperature has only dropped to 38.8°C (101.8°F).

**What could be the issues?**

**Answer:**
- Not enough coverage (ensure all four pads are being used or for obese patients, Universal Pads have been added)
- Flow rate is <2.3L/min
- Patient is generating heat from shivering
- There is an issue with the chiller (ensure water temperature is < 10°C (50°F) to ensure the device is working properly)

Case Study 3
A patient in your unit is being maintained at normothermia with the Arctic Sun® Temperature Management System. You receive Alarm 14.

**What could be the issues?**

**Answer:**
- Alarm 14: Patient Temperature 1 probe out of range
  - Temperature probe may be dislodged
  - Temperature probe may be in Temperature 2 port instead of Temperature 1 port
  - Connection between temperature probe and cable may be loose
  - Temperature cable may be damaged

Case Study 4
You are cooling a patient on the Arctic Sun® Temperature Management System to a target temperature of 33°C (91.4°F). After returning from lunch break, you find the water flow has dropped to 1.7L/min.

**What could be the issues?**

**Answer:**
- One of the pads is not connected properly to the manifold and air is leaking in
- There is a kink in the line
- There is a problem with one of the valves (you will need to contact Biomed)
Case Study 5
A patient is being cooled on the Arctic Sun® Temperature Management System to normothermia. The patient returns from a procedure, and as you walk by the room a half hour later, you notice the patient’s temperature at 37.9°C (100.2°F).

What could be going on?

Answer:
- **Continue Current Patient** was not reactivated upon return to unit
  - Verify with flashing Arctic Sun® Temperature Management System icon and Control Patient window is pulsing

Case Study 6
One of your colleagues calls you over to her patient’s bedside. She started rewarming her patient at 0.25°C/hour (0.45°F/hour) but after 2 hours, her patient has already warmed a full degree.

What could be the issue?
- The patient is generating heat from a fever or shivering
  - You will see arrows trending upward on the Patient Trend Indicator
  - You will see the water temperature drop to address the increase in heat
  - Identify the issue and treat accordingly
Inservice Highlights

CONTENT:

**ArcticGel™ Pads**
- Patented three-layered construction
- One-time patient use
- Place on clean, dry, intact skin
- One set may be used or up to 5 days (120 hrs)
- Latex-free and radiolucent, MRI friendly
- Use with defibrillator pads is possible
- Available in four sizes; up to two universal pads may be added for patients > 220lbs

**Pad Placement**
- Avoid overlap at posterior areas; do not cover spine with pads
- Keep all manifold connections anterior

**Water Flow**
- Negative Pressure
- Ensure adequate water flow
- Low flow issue: check for disconnection, kinks, or leaks

**Temperature Monitoring**
- May use rectal, esophageal, bladder, or nasopharyngeal probe with YSI 400 compatible connection
- Always ensure temperature cable is connected at “Temperature Probe 1” on back of device

**Arctic Sun® 5000 Temperature Management System Device:**
- Connections in rear of device
- On/Off switch
- Screen lock

  - Four Sections of Therapy Screen
    - Primary patient temperature, secondary temperature (“Temp 2”), patient temperature trend indicator, and temperature units
    - System Status Information
      - Water level indicator, water temperature and flow rate
      - Manual control
    - Therapy Graph
    - Therapy Control Windows
      - Normothermia and Hypothermia set-up

**Select Appropriate Patient Therapy**
- Verify target temperature and duration settings
- Adjust target temperature from pre-programmed protocol
- Enable preconditioning
- Monitor for heat generation through water temperature and patient trend indicator
Rewarming Phase
- Describe Automatic versus Manual start
- Adjust programmed parameters

Maintain Controlled Normothermia
- Automatically occurs after rewarming phase complete until device turned off

Patient Transport
- EMPTY pads prior to disconnection from device by pressing “Empty Pads” on screen
- Leave device turned on in patient room during short interruptions of therapy OR “Continue Current Patient” within six hours

Fill the device with sterile or distilled water by pressing “Fill Reservoir” on screen

Discontinuation of therapy and cleaning device with approved hospital disinfectant

Follow hospital protocol for Clinical Documentation (examples below):
- Patient temperature and water temperature every 1-2 hours for patient/water temperature documentation
- Presence of shivering every 1-2 hours
- Skin assessment every 4-6 hours or as per hospital protocol
- Verification of temperature with another source every shift

Utilization of Help screens

24-hour helpline may be contacted at 1-866-840-9776

Note: This overview does not replace the need for training and reading the Operators Manual and Help Screens for complete instructions.

Please consult product inserts and labels for any indications, contraindications, hazards, warnings, cautions and directions for use.
Trainee Name ____________________________________________
Hospital ________________________________________________
Bard Medical Trainer ______________________________________

**Level 1: Standard User Activities:**

The trainee has attended product training class and has completed the following activities:

<table>
<thead>
<tr>
<th>Activities</th>
<th>Completed</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifies appropriate patients to be placed on the Arctic Sun® device (as per hospital protocol)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ARCTICGEL™ Pads</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Describe essentials of pad placement and skin care</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Getting Started</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Device Set Up: Identify the fluid delivery line, temperature cable/probe, power cord, and fill tube.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turn device ON</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unlock screen lock</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interpret Display Screen</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Therapy Graph</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Normothermia Therapy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Therapy Selection: New Patient - Normothermia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set and verify therapy settings: Target Temperature, Duration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hypothermia Therapy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Therapy Selection: New Patient - Hypothermia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set and verify therapy settings: Cool Patient: Target Temperature, Duration</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rewarm Patient: Final Target Temperature, Rewarming Rate</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interrupt / Complete Therapy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Empty Pads</td>
<td></td>
<td></td>
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<td>Interrupt, transport, and “Continue Current Patient”</td>
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<td>Help and Help Index</td>
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Level 2: Advanced User Activities:
The advanced user attended product training, has been oriented to the Advanced Settings and has completed the following activities:

<table>
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<th>Activities</th>
<th>Completed</th>
<th>Comments</th>
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<td>Timer Begins</td>
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<td>Hypothermia Settings</td>
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<td>Cooling Begins</td>
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<td>Rewarming Begins</td>
<td></td>
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<td>Normothermia/Hypothermia Settings</td>
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<tr>
<td>Condition Water</td>
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<td>Manual Control settings</td>
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<td>High/Low Water Limit</td>
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<td>High/Low Patient Alert</td>
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<td>Control Strategy</td>
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<td>Temperature Units/Adjust</td>
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<td>Patient Temperature 2</td>
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<td>Manual Control</td>
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<td>Set and verify settings:</td>
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<td>Water target temperature, duration</td>
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<td>Start Manual Control</td>
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<td>Download Patient Data</td>
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<tr>
<td>Date/Time settings</td>
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<td>Save Settings as Default</td>
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</table>

Training Program Assessment
Rate the training program and trainer on a scale of 1 to 5: 1= Poor, 2=Fair, 3=Good, 4=Very Good, and 5=Excellent.

Please consult product inserts and labels for any indications, contraindications, hazards, warnings, cautions and directions for use.
## SITE OF TEMPERATURE PROBE PLACEMENT: ADVANTAGES AND DISADVANTAGES

<table>
<thead>
<tr>
<th>Site</th>
<th>Level of Accuracy</th>
<th>Average time lag between site and gold standard</th>
<th>Specific Advantages, problems and limitations</th>
</tr>
</thead>
</table>
| Pulmonary Artery (gold standard) | High              | NA Cannot be used with cooling devices        | (+) Highly precise and quick temperature registration  
(-) Complex insertion procedure required. Needs to be removed after 72-96 hours. |
| Esophagus                     | High              | 5 minutes (range 3-10)                         | (+) Most rapid and accurate reflection of gold standard  
(-) Moderate risk of downward dislocation to stomach; leading to an increase in time lag and slight drop in registered core temperature (1-3°C) which is unlikely to be noticed immediately (because the deviation from the "true" core will be relatively small). Can be prevented by precise insertion to a depth of 32-38cm.  
(-) Potential interference of diagnostic/therapeutic procedures (transesophageal echocardiography, gastroscopy, insertion of gastric tubes/feeding probes, etc.)  
(-) Occasionally problematic probe insertion procedure |
| Bladder                       | Fair/High***      | 20 minutes (range 10-60)*                     | (+) Fairly easy probe insertion procedure  
 (+) Low risk of dislocation  
 (+) Combination with procedure (catheter insertion) that needs to take place anyway  
 (-) Relatively long time lag  
 (-) Readings affected by rate of dieresis (which may be low in some patients after cardiac arrest)  
 (-) Probe movement into saline-filled balloon at tip of catheter, affecting temperature readings |
| Rectum                        | Fair/High***      | 15 minutes (range 10-40)**                   | (+) Quick and easy probe insertion procedure  
 (-) High risk of dislocation (but dislocation is likely to be noticed quickly because the difference with “true” core temperature is large)  
 (-) Relatively long time lag |
| Tympanic Membrane             | Moderate/Fair     | 10 minutes (range 5-20) Cannot be used with cooling devices | (+) Quick and easy probe insertion procedure  
 (-) High risk of dislocation (but dislocation is likely to be noticed quickly because the difference with “true” core temperature is large)  
 (-) Relatively long time lag |
| Axilla, groin, other peripheral sites | Completely inaccurate | No correlation with gold standard | (-) Should not be used to guide hypothermia treatment; during hypothermia such readings are inaccurate |

*In case of severe shock, oliguria, etc.  
**In case of severe shock  
***Usually high in maintenance phase when temperature is stable
Therapeutic Hypothermia Supply Cart

**TOP SHELF**
- Cart restocking list
- Hypothermia protocol
- Glucometer and testing supplies

**DRAWER 1**
- Syringes
- Tubes for blood draws
- Needles for blood draws
- ABG kits

**DRAWER 2**
- IV insertion kit
- IV tubing
- Piggyback tubing
- PCA tubing
- Lactated Ringers
- Normal Saline

**DRAWER 3**
- Arterial line insertion kit
- Pressure tubing
- 3-way stop-cock
- Normal Saline
- Pressure bag
- ABG kit

**DRAWER 4**
- Suction tubing
- Oral suction tube
- Pulse oximeter probe
- PICC line or Central line insertion kit
- Multipurpose pads (pacer/defib)

**DRAWER 5**
- Foley
- Esophageal/rectal probes
- Nasogastric tube
- Doppler and gel

**DRAWER 6**
- Arctic Sun® backup temperature cable
- ArcticGel™ Pads X-Small
- ArcticGel™ Pads Small
- ArcticGel™ Pads Medium
- ArcticGel™ Pads Large
- Universal Pads
Patient Transport / End Therapy

- Press the Stop button
- Empty Pads
- Disconnect pads (pinch, push pull)
- Reconnect pads (blue to blue / white to white)

If device was left on:
- Verify protocol settings (adjust if necessary)
- Press the green Start button

If device was turned off:
- Power back up
- Press Continue Current Patient
- Verify protocol settings (adjust if necessary)
- Press the green Start button

Initiate Treatment

Select Treatment Option
(Hypothermia or Normothermia)
Verify protocol settings
(adjust if necessary)
Press Start

Blue: System Information
Yellow: Patient Information
Yellow Dotted Line: Target Temperature
Solid Blue Line: Water Temperature
Solid Yellow Line: Patient Temperature

(A) patient temperature,
(B) water temperature,
(C) target temperature
Using the Helpline

In order to accurately provide assistance over the phone, the clinical resource will need current information relative to patient status, and Arctic Sun® Temperature Management System specifics (see examples below). This may require the caller to be in front of the Arctic Sun® Temperature Management System to respond to questions that will help with the trouble-shooting procedures. Knowing that this can be a stressful time due to the patient’s condition and intense clinical scenario, we appreciate your patience. Our clinical staff take calls 24/7 for the US and Canada and are committed to providing safe, effective therapeutic temperature management.

<table>
<thead>
<tr>
<th>Patient-related questions:</th>
<th>Arctic Sun® Device-related questions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current core temperature</td>
<td>Type of temp probe</td>
</tr>
<tr>
<td>Current or Recently</td>
<td>Target Temp, Water Temp,</td>
</tr>
<tr>
<td>Administered Medications</td>
<td>Flow Rate</td>
</tr>
<tr>
<td>Protocol specifics</td>
<td>Number &amp; Size of ArcticGel™ Pads</td>
</tr>
<tr>
<td>Hemodynamic Status</td>
<td>Treatment Mode</td>
</tr>
</tbody>
</table>

For Urgent Clinical Support: 1-866-840-9776  
Customer Service: 1-877-267-2314

321 South Taylor Ave., Suite 200  
Louisville, Colorado 80027 USA  
www.medivance.com

Phone: 866.840.9776  
303.926.1917

Fax: 720.880.5400

E-mail: customerservice@medivance.com
# Conversion and Pad Weight Charts

## ArcticGel™ Pad Weights

<table>
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<tr>
<th></th>
<th>317-05 (Small)</th>
<th>317-07 (Medium)</th>
<th>317-09 (Large)</th>
<th>317-00 (Universal)</th>
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<tbody>
<tr>
<td>Empty</td>
<td>3.1 lbs</td>
<td>3.2 lbs</td>
<td>3.6 lbs</td>
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<tr>
<td></td>
<td>1.41 kg</td>
<td>1.45 kg</td>
<td>1.64 kg</td>
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<tr>
<td>With water</td>
<td>4.6 lbs</td>
<td>4.7 lbs</td>
<td>5.3 lbs</td>
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<td>2.09 kg</td>
<td>2.14 kg</td>
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## °C to °F Conversion Table

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</tbody>
</table>

°C to °F Conversion Table:

\[ \text{\( \text{°C} \times \frac{9}{5} + 32 = \text{°F} \)} \quad \text{or} \quad \text{\( (\text{°F} - 32) \times \frac{5}{9} = \text{°C} \)} \]

For Urgent Clinical Support: 1-866-840-9776
Customer Service: 1-877-267-2314
Module 2 and 3 References

Indications for Use: The Arctic Sun® Temperature Management System is intended for monitoring and controlling patient temperature.

Warnings

• Do not use the Arctic Sun® Temperature Management System in the presence of flammable agents because an explosion and/or fire may result.

• Do not use high frequency surgical instruments or endocardial catheters while the Arctic Sun® Temperature Management System is in use.

• Do not place ArcticGel™ Pads over transdermal medication patches as warming can increase drug delivery, resulting in possible harm to the patient.

Cautions

• The Arctic Sun® Temperature Management System will monitor and control patient core temperature based on the temperature probe attached to the system. The clinician is responsible for correctly placing the temperature probe and verifying the accuracy and placement of the patient probe at the start of the procedure.

• The displayed temperature graph is for general information purposes only and is not intended to replace standard medical record documentation for use in therapy decisions.

• The Arctic Sun® Temperature Management System is for use only with the ArcticGel™ Pads.

• Do not place ArcticGel™ Pads on skin that has signs of ulceration, burns, hives or rash.

• Do not allow circulating water to contaminate the sterile field when patient lines are disconnected.

• Periodically check that pads remain moist and adherent. Replace pads when the hydrogel no longer uniformly adheres to the skin. Replacing the pads at least every 5 days is recommended.

• If accessible, examine the patient’s skin under the ArcticGel™ Pads often especially those at higher risk of skin injury. Skin injury may occur as a cumulative result of pressure, time and temperature. Do not place bean bag or other firm positioning devices under the ArcticGel™ Pads. Do not place positioning devices under the pad manifolds or patient lines.

• The rate of temperature change and potential the final achievable patient temperature is affected by many factors. Treatment application, monitoring and results are the responsibility of the attending physician.

• Due to underlying medical or physiological conditions, some patients are more susceptible to skin damage from pressure and heat or cold. Patients at risk include those with poor tissue perfusion or poor skin integrity due to diabetes, peripheral vascular disease, poor nutritional status, steroid use or high dose vasopressor therapy. If warranted, use pressure relieving or pressure reducing devices under the patient to protect from skin injury.

• Do not allow urine, antibacterial solutions or other agents to pool underneath the ArcticGel™ Pads. Replace pads immediately if these fluids come into contact with the hydrogel.

• Do not place ArcticGel™ Pads over the electrosurgical grounding pads. The combination of heat sources may result in skin burns.

Please consult package insert for more detailed safety information and instructions for use.
Clinical Training & Education
PROGRAM MANUAL

Please consult product inserts and labels for any indications, contraindications, hazards, warnings, cautions and directions for use.

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1111-51 R10/12 THP P11/12 1.5M

Federal Law (USA) restricts this device to sale by or on the order of a physician.