

# 13Thai Cave Rescue story

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Deputy Secretary General  
The Medical Association of Thailand

13 ชีวิต  
ติดถ้ำ

**Prehospital Hypothermia Management  
for Thai Cave Rescue  
The Lesson Learned for Emergency Preparation Plan**

# “Operation The World Never Forget” The Medical Association of Thailand role for TCR



## Abstract:

The Hypothermia condition concerns a body core temperature of less than 35°C without a primary defect in the thermoregulatory system. It is a serious threat to prehospital patients, especially injured patients that can induce a vicious cycle of the synergistic effects of hypothermia, acidosis and coagulopathy that refer to the trauma triad of death. **To prevent and manage deterioration of a cold patient, Prehospital Hypothermia Management should start before the medical evacuation.**

Thai Cave Rescue-TCR demonstrated the significant of medical operation under limited data and difficult environment. **The aim of this discussion is to share the best practices and lesson learned for emergency preparation plan of Hypothermia protocol for combat medicine, based on actual practice of the “Operation the World Never Forget”** and provide an up-to-date systematic overview of the current available treatment modalities and the effectiveness of prehospital hypothermia management.

# "Operation The World Never Forget"

## The Medical Association of Thailand role for TCR

### *Prehospital Management of Anesthetized and Hypothermic Patients: The Thai Cave Rescue Protocol.*

The **After Action Review (AAR)** on Day 1 identified **hypothermia as the critical components**, resulted in the development of **Thai Cave Rescue Protocol** that addresses both medical and non-medical aspects as well as public communication.

**The Protocol focuses on three major steps: Triage, Stabilization, and Referral.** The Triage of hypothermic patients who received general anesthesia with only full-face mask could be complicated by the unclear patient identification, unclear doses of medications given during the transfer. Shivering process is a critical endogenous heat production but could be disrupted in **a severe hypothermic patient or impaired as a consequence of anesthetic-induced inhibition of thermoregulation.** Adequate and proper external and internal rewarm techniques are essential.

**Hypothermia increasing concern**, BT monitoring more frequent, intervention more comprehensive, hypothermia incidents decrease

*Lawthaweesawat C, et al. Prehospital Management of Anesthetized and Hypothermic Patients:  
The Thai Cave Rescue Protocol. (Manuscript under review)*

# “Operation The World Never Forget”

## The Medical Association of Thailand role for TCR



Dear Dr. Harris,

**Q1: What is Sedation protocol for this Operation?** I refer from your hand writing, the doses are right?

**A1: These doses are correct: Premedication: Alprazolam 0.5mg PO.**  
**+ Atropine 20mcg/kg IM.** [I think the atropine was a good idea to stop hyper salivation]  
**+ KETAMINE: Loading dose: 5mg/kg and Rescue does: 2.5mg/kg**  
 [But I would call this general anaesthesia not conscious sedation]

**A2: I made a very clear plan with the divers. How to decide if the child needs more ketamine. How to decide on the dose. How to give the injection.**  
 The British and “Eurodivers” did an amazing job and must be congratulated.

**Q3: Where-Where is the area that provide the Rescue dose ?**

**A3: The first check was in chamber 8 after the 350m dive. Most kids needed another dose somewhere in this chamber.** After that I am not sure exactly where the kids were inspected or re-dosed. The oximetry of the kids as never checked.

**Q4: Why- Why KETAMINE is the best option for this Operation?**  
 (Non-Anesthesiologists might concern and want to know)

**A4: I think ketamine is the only viable option as it maintains respiration, blood pressure and some airway responses in the unconscious patient.** All other drugs are a problem in this regard.

Thank you all for your support and advice during the rescue. I felt like my Thai colleagues were looking after me in a very difficult time. Thank you Dr. Lawthaweesawat for the temperature information.

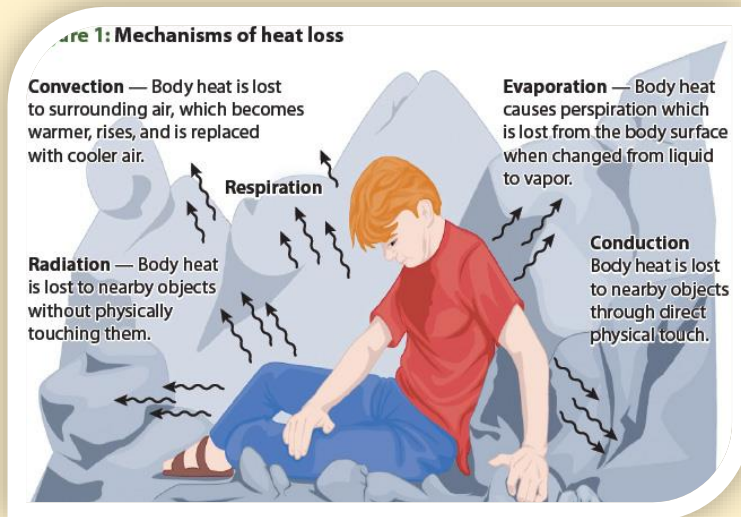
Your friend  
 Harry

**Prehospital Hypothermia Management for Thai Cave Rescue:  
 Lesson learn for Emergency Preparation Plan**

# Prehospital Hypothermia Management for Thai Cave Rescue

## The Lesson Learned for Emergency Preparation Plan

The Hypothermia condition concerns a body core temperature of less than 35°C without a primary defect in the thermoregulatory system. It is a serious threat to prehospital patients, especially injured patients that can induce a vicious cycle of the synergistic effects of **hypothermia, acidosis and coagulopathy** that refer to the trauma **triad of death**



### HEAT BALANCE

The human body produces heat through metabolism and exercise. In order to maintain a constant temperature, **that heat production must balance out the multiple ways in which the body can lose heat to the environment:**

- **Conduction**
- **Convection**
- **Radiation**
- **Evaporation**

# Prehospital Hypothermia Management for Thai Cave Rescue

## The Lesson Learned for Emergency Preparation Plan

### CLASSIFICATION of hypothermia based on core temperature:

Stage	Core Temperature	Axillary Temperature	Signs & Symptoms <sup>6, 7, 8</sup>
Mild	32-35°C	30.5-35°C	Alert Vigorous shivering.
Moderate	30-32°C	28.5-32°C	Reduced level of consciousness Shivering diminishes Loss of fine motor control Loss of coordination Blue lips - Cyanosis
	28-30°C	26.5-30°C	Shivering Stops Fixed dilated pupils
Severe	25-28°C	23.5-28°C	Unconscious Shivering has stopped Rigid muscles Appears Dead Potential arrhythmias
	20-25°C	18.5-25°C	Cardiac Arrest
Profound	<20°C	<18.5°C	No detectable vital signs

Conscious	Shivering	<b>Passive Rewarming</b> Remove wet clothing and dry Insulate from all heat loss High Sugar food and drink Encourage movement	
	Not Shivering	<b>Active Rewarming</b> Minimise movement Cut away wet clothing and gently dry Gently warm – heat packs and creating a warm environment Insulate from all heat loss	
Unconscious	No Vital Signs	Do not move: Treat as a Spinal Casualty	
		<b>Vital Signs detected and Definitive Care &lt; 3hrs</b> Continue ventilations only	<b>No Vital Signs detected or Definitive Care &gt; 3hrs</b> CPR for up to 30 mins

# Prehospital Management of Hypothermia An Up-to-Date Overview

AIM OF STUDY: To provide an up-to-date systematic overview of the **currently available treatment modalities and their effectiveness** for prehospital hypothermia management.

DATA SOURCES: Databases PubMed, Embase and MEDLINE were searched using the terms: "**Hypothermia**", "accidental hypothermia", "Emergency Medical Services" and "**Prehospital**"

**RESULTS:** The literature search produced **903 articles, 51 articles** focused on passive insulation and/or active heating.

## ➤ Shivering hypothermic patients:

- Endogenous heat production from shivering, will likely be able to rewarm themselves with only insulation.

## ➤ Non-shivering hypothermic patient:

### External Rewarm:

- Active warming is indicated as a will not rewarm spontaneously.
- Active external rewarming interventions include heat packs; chemical or electrical heated blankets; and forced air warming.

### Internal Rewarm:

- All intravenous fluids must be reliably warmed before infusion. **[40-42°C]**

# Prehospital Management of Hypothermia for Combat Medicine



## External Rewarm:

- **Heater Blanket** ...Generate the body heat as normal.
- **Foil Blanket** ...Prevent the body heat loss, the whole body fully wrapped.
- **Hot Air Blower** ...Rewarm specific area: Head & Hand if pulse oximeter waveform analysis error.

## Internal Rewarm:

### 1. Hypothermia & Hypotension :

**Warm 0.9% NSS IV.** Loading 100ml then IV. drip until hemodynamic stable +**New bag** before refer by air ambulance

### 2. Hypoglycemia : Start 5%D NSS IV. Drip

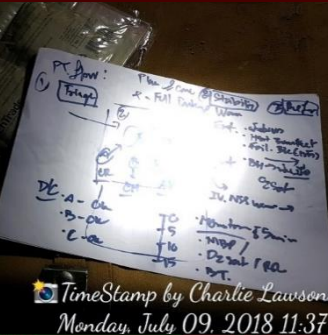
- **Body Temperature[Ear] Monitor every 5 mins** at least **30 mins or until BT>35°C** in rewarm process

# “Operation The World Never Forget”

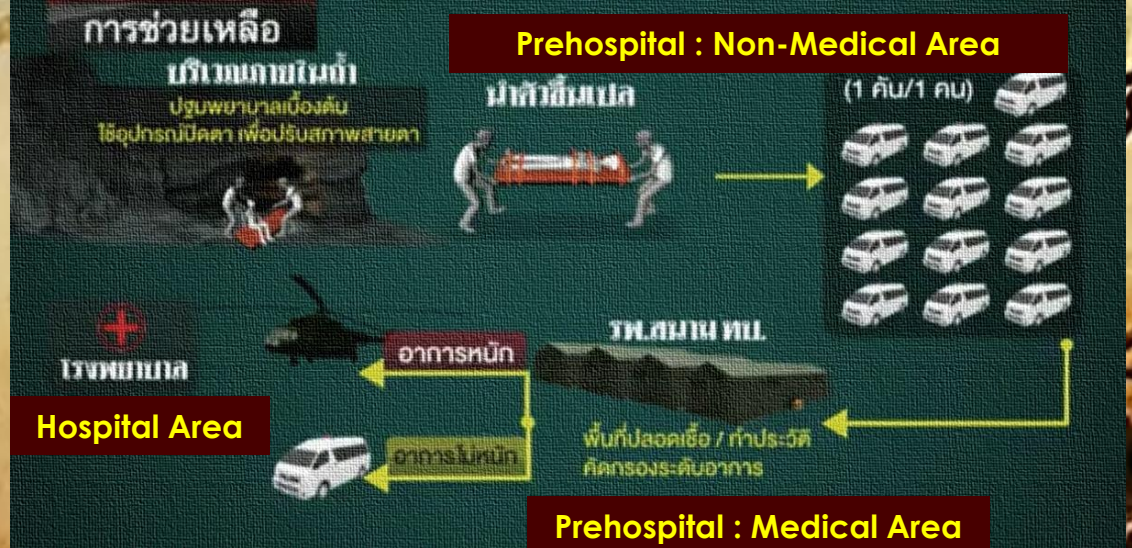
## The Medical Association of Thailand role for TCR



### Setup Hypothermia protocol for Combat Medicine



1. TRIAGE	2. STABILIZE	3. REFER
<p>Advance TRIAGE protocol</p> <ul style="list-style-type: none"> <li>• RED</li> <li>• Yellow</li> <li>• Green</li> </ul>	<p>A. AIRWAY - Anesthesiologist - Dr. Chanrit                      B. BREATHING - Chest Ped. - Dr. Chutima                      C. CIRCULATION - Cardio Ped. - Dr. Ankana</p>	<p>Discharge criteria OK by                      A. AIRWAY                      B. BREATHING                      C. CIRCULATION</p>
	<p>D. Hypothermia - Full Package Warm</p> <p>External                      1. Master Blanket / US Air Forcel... generate heat to body                      2. Foil blanket wrap at back and legs... prevent heat loss</p> <p>Internal                      1. Warm 0.9% NSS IV... Loading 100ml then IV drip                      2. Monitor BT (Skin or Oral temp.) @ 0-5-10-15... at least 30mins or until stable</p> <p>*Handoff communication: Doctor to Doctor (D2D)</p>	<p>*Handoff communication: Doctor to Doctor (D2D)</p>




# Prehospital Management for Thai Cave Rescue

## Army Field Hospital



# “Operation The World Never Forget”

## The Medical Association of Thailand role for TCR

1. TRIAGE	2. STABILIZE	3. REFER
<p>Advance TRIAGE protocol :</p> <ul style="list-style-type: none"> <li>• RED</li> <li>• Yellow</li> <li>• Green</li> </ul> <p><b>*Rapid Airway Assessment to a definitive care before remove wetsuit and change spinal board</b></p> <p><b>*Handoff communication: Doctor to Doctor[D2D]</b></p>	<p><b>A. Airway management</b> by Anesthesiologist : O2 facemask, Oral AW, Intubation if indicated by Succinyl 1.5mg/kg</p> <p><b>B. Breathing management</b> by Chest Med. : Ventilator setting : Tidal vol.7ml/kg, RR 20bpm,PEEP 5,Pmax 30</p> <p><b>C. Circulation management</b> by Cardio Ped. : Atropine, Levophed, Adrenaline and Defibrillator as PALS protocol * Cardiac &amp; Respiratory Monitor: NIBP+EKG &amp; O2Saturation+RR every 5 mins</p>  <p><b>D. Hypothermia management :</b></p> <p><b>External Rewarm:</b></p> <ol style="list-style-type: none"> <li>1. <b>Heater Blanket</b> [from US.Air Force]...Generate the body heat as normal.</li> <li>2. <b>Foil Blanket</b>...Prevent the body heat loss, the whole body fully wrapped.</li> <li>3. <b>Hot Air Blower</b>...Rewarm specific area: Head &amp; Hand if pulse oximeter waveform analysis error.</li> </ol> <p><b>Internal Rewarm:</b></p> <p><b>1. Hypothermia &amp; Hypotension :</b> <b>Warm 0.9% NSS IV.</b> Loading 100ml then IV. drip until hemodynamic stable +<b>New bag before refer</b> by air ambulance</p> <p><b>2. Hypoglycemia : start 5%D NSS IV.</b> drip *Body Temperature[Ear] Monitor every 5 mins at least 30mins or until BT&gt;35 c in rewarm process</p>	<p><b>Discharge criteria :</b></p> <ol style="list-style-type: none"> <li>A. Airway clearance by Anesthesiologist</li> <li>B. Breathing clearance by Chest Med.</li> <li>C. Circulation clearance by Cardio Ped.</li> <li>D. Hypothermia management : BT&gt;35 c stable in rewarm process</li> </ol> <p><b>*Handoff communication: Doctor to Doctor[D2D]</b></p>

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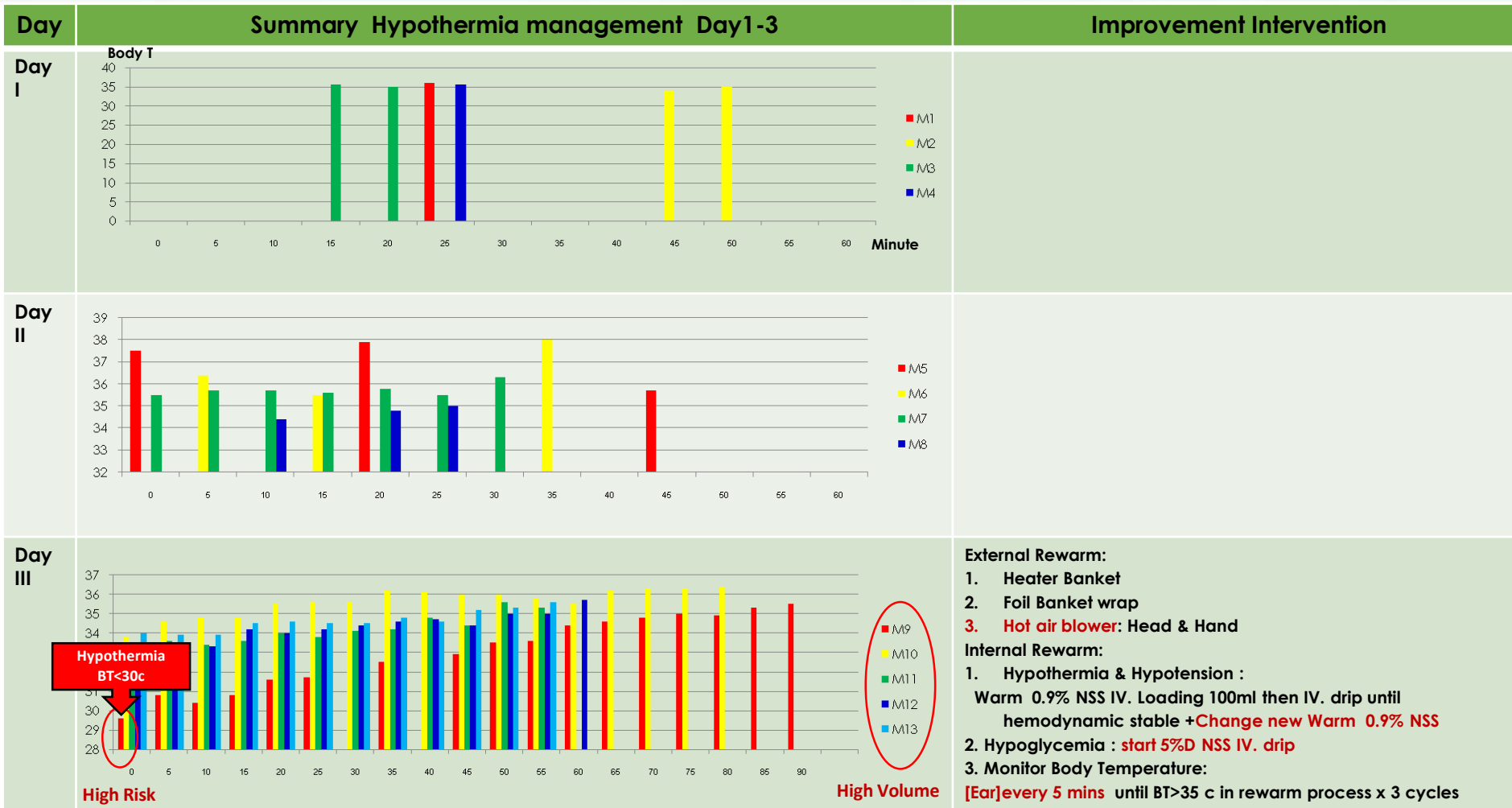
### Wild Boar [High risk BT<30c]

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<p><b>Advance TRIAGE protocol :</b></p> <ul style="list-style-type: none"> <li>• RED</li> <li>• Yellow</li> <li>• Green</li> </ul> <p><b>Triage zone @04.10PM</b></p> <ul style="list-style-type: none"> <li>• Responsive to painful stimuli</li> <li>• E3V2M4</li> <li>• AW + Breathing normal</li> </ul> <p><b>Move to Yellow Zone @04.16PM</b></p> <ul style="list-style-type: none"> <li>• Off Full face mask</li> <li>• Off Wet suit</li> <li>• Spinal board</li> <li>• Eye protection</li> <li>• O2 Facemask 10 LPM</li> </ul>	<p><b>A. Airway management</b> by Anesthesiologist : <b>Oral AW+Suction clear AW+O2 facemask</b> with bag 10LPM</p> <p><b>B. Breathing management</b> by Chest Med. : Spontaneous Breathing</p> <p><b>C. Circulation management</b> by Cardio Ped. : IV. Fluid as protocol * Cardiac &amp; Respiratory Monitor: NIBP+EKG &amp; O2Saturation+RR <b>every 5 mins</b></p> <p><b>D. Hypothermia management :</b> <b>External Rewarm:</b></p> <ol style="list-style-type: none"> <li>1. <b>Heater Blanket</b> [from US.Air Force]...Generate the body heat as normal.</li> <li>2. <b>Foil Blanket</b>...Prevent the body heat loss, the whole body fully wrapped.</li> <li>3. <b>Hot Air Blower</b>...Rewarm specific area: Head &amp; Hand if pulse oximeter waveform analysis error</li> </ol> <p><b>Internal Rewarm:</b></p> <ol style="list-style-type: none"> <li>1. <b>Hypothermia &amp; Hypotension :</b> <b>Warm 0.9% NSS IV.</b> Loading 100ml then IV. drip until hemodynamic stable + <b>New bag before refer</b> by air ambulance rate 120ml/hr [Total IVF 1500ml,Lung no wheezing ,Foley cath. urine 600ml]</li> <li>2. <b>Hypoglycemia : start 5%D NSS IV. drip 40ml/hr</b></li> </ol> <table border="1"> <thead> <tr> <th>Time</th> <th>BT</th> <th>NIBP</th> <th>HR</th> <th>RR</th> <th>O2 Sat</th> <th>DTX</th> </tr> </thead> <tbody> <tr><td>0</td><td>29.6</td><td></td><td></td><td>12</td><td>100</td><td>109</td></tr> <tr><td>5</td><td>30.8</td><td>172/124</td><td></td><td>12</td><td>98</td><td></td></tr> <tr><td>10</td><td>30.4</td><td>172/127</td><td>96</td><td>10</td><td>85</td><td></td></tr> <tr><td>15</td><td>30.8</td><td>142/96</td><td>85</td><td>12</td><td>98</td><td></td></tr> <tr><td>20</td><td>31.6</td><td>144/104</td><td>82</td><td>16</td><td>100</td><td></td></tr> <tr><td>25</td><td>31.7</td><td>160/104</td><td>78</td><td>22</td><td>100</td><td></td></tr> <tr><td>30</td><td></td><td>156/101</td><td>81</td><td>13</td><td>99</td><td></td></tr> <tr><td>35</td><td>32.5</td><td>156/91</td><td>81</td><td>16</td><td>100</td><td></td></tr> <tr><td>40</td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>45</td><td>32.9</td><td>136/93</td><td>82</td><td>15</td><td>100</td><td></td></tr> <tr><td>50</td><td>33.5</td><td>153/100</td><td>81</td><td>14</td><td>100</td><td></td></tr> <tr><td>55</td><td>33.6</td><td>135/100</td><td>81</td><td>18</td><td>100</td><td></td></tr> <tr><td>60</td><td>34.4</td><td>155/93</td><td>81</td><td>16</td><td>100</td><td></td></tr> <tr><td>65</td><td>34.6</td><td>169/98</td><td>83</td><td>13</td><td>100</td><td></td></tr> <tr><td>70</td><td>34.8</td><td>134/89</td><td>74</td><td>13</td><td>95</td><td></td></tr> <tr><td>75</td><td>35</td><td>147/85</td><td>75</td><td>16</td><td>100</td><td></td></tr> <tr><td>80</td><td>34.9</td><td>134/92</td><td>73</td><td>21</td><td>99</td><td></td></tr> <tr><td>85</td><td>35.3</td><td>130/80</td><td>80</td><td>20</td><td>100</td><td></td></tr> <tr><td>90</td><td>35.5</td><td>139/85</td><td>85</td><td>18</td><td>99</td><td></td></tr> </tbody> </table>	Time	BT	NIBP	HR	RR	O2 Sat	DTX	0	29.6			12	100	109	5	30.8	172/124		12	98		10	30.4	172/127	96	10	85		15	30.8	142/96	85	12	98		20	31.6	144/104	82	16	100		25	31.7	160/104	78	22	100		30		156/101	81	13	99		35	32.5	156/91	81	16	100		40							45	32.9	136/93	82	15	100		50	33.5	153/100	81	14	100		55	33.6	135/100	81	18	100		60	34.4	155/93	81	16	100		65	34.6	169/98	83	13	100		70	34.8	134/89	74	13	95		75	35	147/85	75	16	100		80	34.9	134/92	73	21	99		85	35.3	130/80	80	20	100		90	35.5	139/85	85	18	99		<p><b>Discharge criteria :</b></p> <ol style="list-style-type: none"> <li>A. Airway clearance</li> <li>B. Breathing clearance</li> <li>C. Circulation clearance</li> <li>D. Hypothermia management : BT&gt;35 c</li> </ol> <p>*Handoff communication Doctor to Doctor[D2D]</p> <p><b>Full Discharge criteria @05.40PM</b></p> <p><b>Refer by Air Ambulance @06.04PM</b></p> <p><b>Admit in Chiangrai Prachanukroh Hospital @06.34PM</b></p> <ul style="list-style-type: none"> <li>• Good Conscious</li> <li>• BP 142/89 ,HR 77 ,RR 15</li> <li>• BT 36.4c</li> <li>• CXR: Normal</li> </ul>
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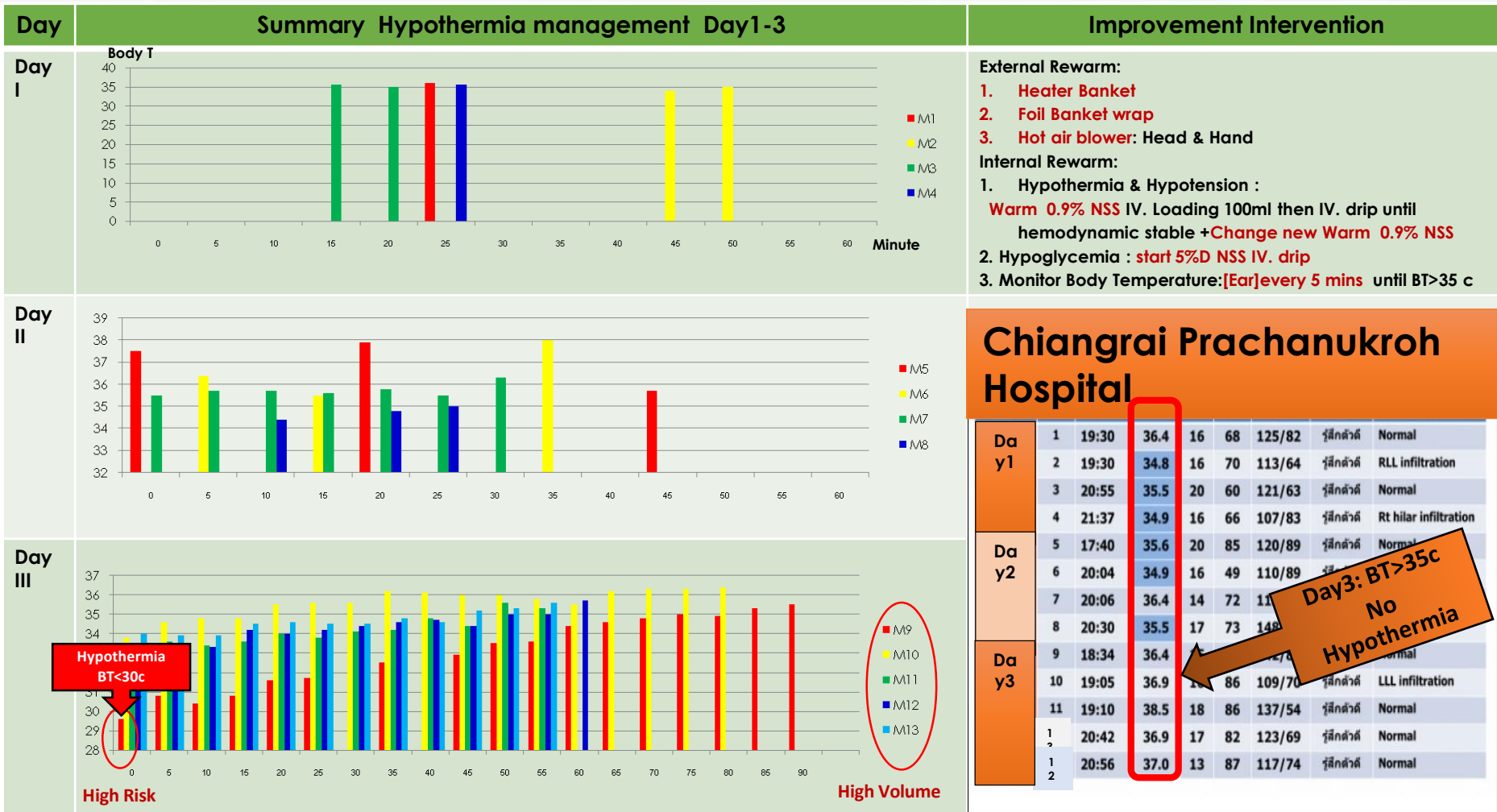
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## DATA Verification

## Lesson learned for Quality Improvement process



**Data verification** is a process in which different types of **data** are checked for accuracy and inconsistencies after **data** migration is done. It helps to determine whether **data** was accurately translated when **data** is transferred from one source to another, is complete, and supports processes in the new system.

**1. TRIAGE**  
Advance TRIAGE protocol  
- RED  
- Yellow  
- Green

**2. REFER**  
Discharge criteria by Dr. AUBREY A. BARRAGRETT  
D. SUBARATON

**3. REFINER**  
Discharge criteria by Dr. AUBREY A. BARRAGRETT  
D. SUBARATON

Prory Mission for Red Zone Army Field Hospital

TimeStamp by Charlie Lawson  
Tuesday, July 10, 2018 11:55

**NO.1** Pragk Sutorn 14 years old  
Body Temp - Triage - At 09:30 AM  
Treatment 35.0°C Bed anxious  
Drug transferred 35.9°C Follow animal very well  
At hospital 36.4°C

**NO.2** Nuttawat Phakamang 24 years old  
BT Triage - At 09:30 AM  
Treatment - Full consciousness  
Drug transferred 34°C - On floor conscious  
At hospital 34.9°C - VS stable

**NO.3** Pibot Bui 15 years old  
BT Triage - At 09:30 AM  
Treatment - Full consciousness  
Drug transferred 36.5°C - On floor conscious  
At hospital 35.5°C - VS stable

**NO.4** Pansapal Somwangsi 16 years old  
BT Triage 35.2°C - changed 444 - keep warm → 36.5°C  
Treatment -  
Drug transferred 34.9°C  
At hospital - 35°C

**Wild Boar [High risk BT<30c]**

1. TRIAGE	2. STABILIZE	3. REFER
<b>Advance TRIAGE protocol:</b> - RED - Yellow - Green	<b>A. Airway management:</b> Direct laryngoscopy. Oral AWW section clear AWW 2 facemask with bag (OPM) <b>B. Breathing management:</b> Chest X-ray. Spontaneous breathing <b>C. Circulation management:</b> Central line. IV. Fluid as per protocol <b>D. Cardiac &amp; Resuscitation:</b> Administer PALS & CPCR as per protocol every 5 min <b>E. Hypothermia management:</b> - External Re-warm: 1. Reverse blanket (avoid dry heat). Cover the body heat as normal 2. Full blanket. Prevent the body heat loss. The whole body fully wrapped. - Internal Re-warm: 1. Reverse blanket (avoid dry heat). Cover the body heat as normal 2. Full blanket. Prevent the body heat loss. The whole body fully wrapped. 3. Hypothermia: heat 37.0-38.0°C. Stop fluids 4. Hypothermia: heat 37.0-38.0°C. Stop fluids 5. Hypothermia: heat 37.0-38.0°C. Stop fluids 6. Hypothermia: heat 37.0-38.0°C. Stop fluids	<b>Discharge criteria:</b> A. Airway clearance B. Breathing clearance C. Circulation clearance D. Hypothermia management E. VS stable F. Pain management G. Patient communication H. Patient consent I. Patient education J. Patient follow-up K. Patient safety L. Patient satisfaction M. Patient compliance N. Patient cooperation O. Patient participation P. Patient involvement Q. Patient engagement R. Patient activation S. Patient empowerment T. Patient participation U. Patient involvement V. Patient engagement W. Patient activation X. Patient empowerment Y. Patient participation Z. Patient involvement AA. Patient engagement AB. Patient activation AC. Patient empowerment

ที่	ชื่อคนไข้	วันที่	เวลา	อายุ	เพศ	โรค	อาการ	การตรวจ	ผลการตรวจ
1	คุณหญิงกมล งามดี	5	16:25	หญิง	36.3	ไข้สูง	ไข้สูง 38.5°C	16.37	37.5
2	คุณหญิงกมล งามดี	5	16:25	หญิง	36.3	ไข้สูง	ไข้สูง 38.5°C	16.37	37.5

ที่	ชื่อคนไข้	วันที่	เวลา	อายุ	เพศ	โรค	อาการ	การตรวจ	ผลการตรวจ
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2	คุณหญิงกมล งามดี	5	16:25	หญิง	36.3	ไข้สูง	ไข้สูง 38.5°C	16.37	37.5

# ICASM 2018 Sharing The Sky Safety


➤ **Best Practice Advice of the European Helicopter EMS (HEMS) and Air Ambulance Committee (EHAC) Medical Working Group** on how HEMS and Pre Hospital Critical Care teams may maximize the positive impact of their resources in the event of Major Incidents.

➤ *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*, Published: 15 August 2018  
<https://sjtrem.biomedcentral.com/articles/10.1186/s13049-018-0522-1>

# Emergency Preparation Plan [Non-Medical Emergency Services]

## Local Protocol for Major Incident Plans:

- ❑ Setup Priority: Triage /Stabilize/Refer
- ❑ Unit Orientation for all members and new staffs
- ❑ Handoff Communication : Doctor to Doctor[D2D]

1. TRIAGE	2. STABILIZE	3. REFER
<p>Advance TRIAGE protocol:</p> <ul style="list-style-type: none"> <li>• RED</li> <li>• Yellow</li> <li>• Green</li> </ul> <p>*Rapid Airway Assessment to a definitive care before remove neck and change spinal board</p>	<p>A. Airway management by Anesthesiologist: O2 facemask, Oral AW, Intubation if Indicated by Succinyl 1.5mg/kg</p> <p>B. Breathing management by Chest Med.: Ventilator setting: Tidal vol:7ml/kg, RR:20bpm, PEEP:5, Pmax:30</p> <p>C. Circulation management by Cardio Ped.: Atropine, Levophed, Adrenaline and Defibrillator as PALS protocol *Cardiac &amp; Respiratory Monitor: NIBP-EXG &amp; O2saturation+HR every 5 mins</p>  <p>D. Hypothermia management: External Rewarm: 1. Heater Blanket (from US Air Force)...Generate the body heat as normal. 2. Foil Blanket...Prevent the body heat loss, the whole body fully wrapped. 3. Hot Air Blower...Rewarm specific areas: Head &amp; Hand if pulse oximeter waveform analysis error.</p> <p>Internal Rewarm: 1. Hypothermia &amp; Hypotension: Warm @ 9% NSS IV, Loading 100ml then IV drip until hemodynamic stable +New bag before refer by air ambulance 2. Hypoglycemia: start 8% DSS NSS IV, drip *Body Temperature[Ear] Monitor every 5 mins at least 30mins or until BT&gt;35 c in rewarm process</p>	<p>Discharge criteria: A. Airway clearance by Anesthesiologist B. Breathing clearance by Chest Med. C. Circulation clearance by Cardio Ped. D. Hypothermia management: BT&gt;35 c stable in rewarm process</p> <p>*Handoff communication: Doctor to Doctor[D2D]</p>

Prehospital Hypothermia Management for Thai Cave Rescue: Lesson learn for Emergency preparation plan

### Major Incident Plans

### Training

### Equipment

Integrated with the Major Incident plans of other local medical and non-medical emergency services.

Major Incident exercises should be conducted on a regular basis.

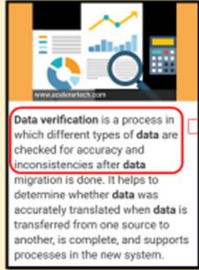
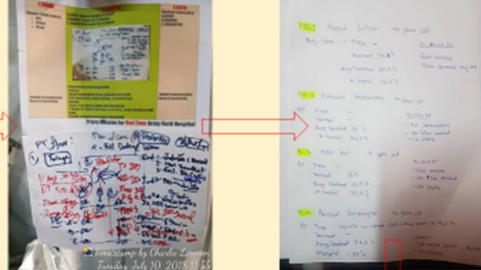

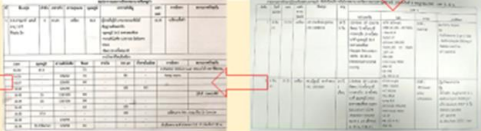
Risk evaluate of specific local scene hazards (temperature, immersion, etc)

### Efficient communication

Operational staff must ensure that they are familiar with the local Major Incident plans

Local Protocols to facilitate the organization and Documentation of Major Incidents

- ❑ Documentation of Major Incidents and DATA Verification process

DATA Verification	Lesson learned for Quality Improvement process
 <p>Data verification is a process in which different types of data are checked for accuracy and inconsistencies after data migration is done. It helps to determine whether data was accurately translated when data is transferred from one source to another, is complete, and supports processes in the new system.</p>	
	

Prehospital Hypothermia Management for Thai Cave Rescue: Lesson learn for Emergency Preparation Plan



## 1. Awareness of Hypothermia [Medical Emergency Services]

### Setup Hypothermia Protocol for Major Incident Plans:

#### External Rewarm:

1. *Heater Blanket ...Generate the body heat as normal.*
2. *Foil Blanket ...Prevent the body heat loss, the whole body fully wrapped.*
3. *Hot Air Blower ...Rewarm specific area: Head & Hand if pulse oximeter waveform analysis error.*

#### Internal Rewarm:

##### 1. *Hypothermia & Hypotension :*

*Warm 0.9% NSS IV. Loading 100ml then IV. drip until hemodynamic stable  
+New bag before refer by air ambulance*

##### 2. *Hypoglycemia :*

*Start 5%D NSS IV. drip*

#### **Body Temperature[Ear] Monitor**

*every 5 mins at least 30 mins or until BT>35 c in rewarm process*

## 2. Emergency preparation plan [Non-Medical Emergency Services]

### Setup Local Protocol for Major Incident Plans:

- Setup Priority: Triage /stabilize/Refer
- Unit Orientation for all members and new staffs
- Handoff Communication process
- Documentation of Major Incidents and DATA Verification process

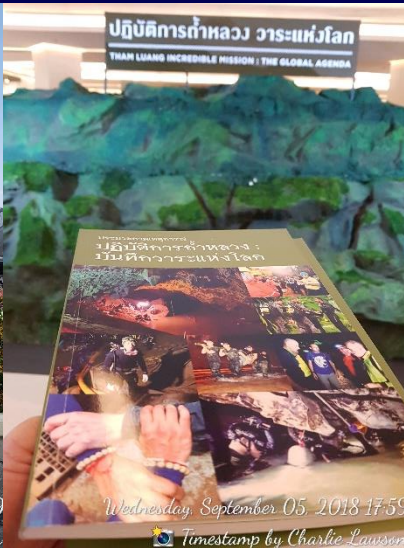
# Thank You All

## “Operation The World Never Forget”



Thursday, September 06, 2018 17:29

Timestamp by Charlie Lawson



Wednesday, September 05, 2018 17:59

Timestamp by Charlie Lawson



Monday, July 02, 2018 17:53





# Thank You All

## “Operation The World Never Forget”

