Targeted Temperature Management / Post-Arrest Temperature Control

Section Editor: seat open
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Disclaimer: This protocol is an educational reference intended to support — not replace — institutional policy, pharmacy and therapeutics review, and individual clinical judgment. Verify current dosing, contraindications, and local formulary/practice constraints before adopting into an EMR or using in patient care. **This protocol leans heavily on an internal MemorialCare Best Practice Advisory Committee (BPAC) discussion deck from August 20, 2024**, which was itself a *discussion draft* proposing a system-wide shift away from routine cooling to 33°C toward a fever-prevention ("temperature control") default. Confirm whether that discussion reached a finalized local Policy & Procedure before treating the target/duration below as settled practice.

Overview

Targeted temperature management (TTM) — previously called "therapeutic hypothermia" — refers to maintaining a comatose post-cardiac-arrest patient's core temperature at or below normothermia (32–37.5°C) for at least 24 hours. The evidence base has shifted substantially: early trials (2002) suggested a large benefit from cooling to 33°C, but the larger, more rigorous TTM2 trial (2021) and pooled analyses found **no** mortality or neurologic benefit of 33°C over careful normothermia with fever avoidance. Current European Resuscitation Council/ESICM guidance reflects this: recommend preventing fever, insufficient evidence to mandate cooling to 32–36°C.

Table 1. Trial evidence summary

TRIAL	YEAR	POPULATION	COMPARISON	RESULT
TTM	2013	OHCA, any rhythm (n=939)	33°C vs. 36°C, both ×28h, temp ≤37.5°C ×72h	No difference in mortality or neuro outcome
HYPERION	2019	OHCA/IHCA, non-shockable (n=581)	33°C ×24h vs. normothermia (36.5–37.5°C)	Better neuro outcome with 33°C (10.2% vs 5.7% good outcome) — the outlier favoring hypothermia
TTM2	2021	OHCA, any rhythm (n=1850)	33°C vs. normothermia (≤37.5°C) with early fever treatment	No difference in mortality (50% vs 48%) or mRS 4–6 (55% vs 55%)
TTM + TTM2 pooled	2022	Individual patient data (n=2800)	33°C vs. 36°C/normothermia	No difference, including shockable vs. non-shockable subgroups
HACA-InHosp	2022	IHCA, any rhythm (n=249)	32–34°C ×24h vs. no active TTM (avoid fever >37.5°C)	No difference in mortality or favorable outcome

TRIAL	YEAR	POPULATION	COMPARISON	RESULT
Taccone et al.	2023	OHCA, non-shockable — IPD meta-analysis of TTM2 + HYPERION	33°C vs. normothermia	No significant difference in unfavorable outcome (90.0% vs 89.2%)

The one trial favoring 33°C (HYPERION) has not been replicated by the larger pooled analyses — this is why current practice is trending toward fever prevention as the default, reserving deeper hypothermia for case-by-case exceptions rather than routine use.

Steps

01 Identify Candidates

- All comatose adults with return of spontaneous circulation (ROSC) after cardiac arrest — both shockable and non-shockable initial rhythms.
- Typical exclusions: known comorbid disease making 180-day survival unlikely; pre-arrest Cerebral Performance Category 3 or 4; admission temperature < 30°C.

02 Choose the Temperature Target Strategy

- Given the lack of consistent evidence for a mortality/neurologic benefit of cooling to 32–34°C, the current direction (per the evidence in Table 1 and the local BPAC discussion) favors a **"temperature control" strategy: maintain ≤ 37.5°C for a minimum of 24 hours**, with moderate hypothermia (33°C) reserved as an exception rather than the default — the specific criteria for that exception were flagged as an open discussion item locally and need to be finalized by the Section Editor.
- Whichever target is chosen, maintain it for **at least 24 hours** once achieved.

03 Avoid Targets Below 36°C When Any of These Apply

- Pregnancy
- Known intrinsic bleeding diathesis (e.g., hemophilia, von Willebrand)
- Acute intracranial bleeding and/or major head trauma
- Active significant bleeding
- Suspected or confirmed acute stroke
- Systolic BP < 80 mmHg despite fluids, vasopressor(s), and possibly inotropes/IABP
- Delay > 6 hours from ROSC to cooling initiation

04 Monitor Core Temperature Continuously

- Axillary or oral temperatures are **inadequate** for TTM — use a core monitoring method (bladder, esophageal, or pulmonary artery catheter).

05 Achieve and Maintain the Target

Available methods: cold (4°C) IV normal saline, ice packs (axillae, groin, neck), cooling blankets, cooling vests, intravascular devices (including ECMO where applicable). **Do not use prehospital cooling with rapid cold IV fluid infusion** — current guidance advises against this.

06 Sedate During Active Temperature Control; Manage Shivering

- Sedation is mandated during the active intervention period to prevent shivering, which both causes patient discomfort and works against temperature control.
- Even under a normothermia/fever-prevention strategy, be prepared to apply an active cooling device — **46% of the TTM2 trial's normothermia-arm patients still required device cooling** to stay ≤ 37.5°C.

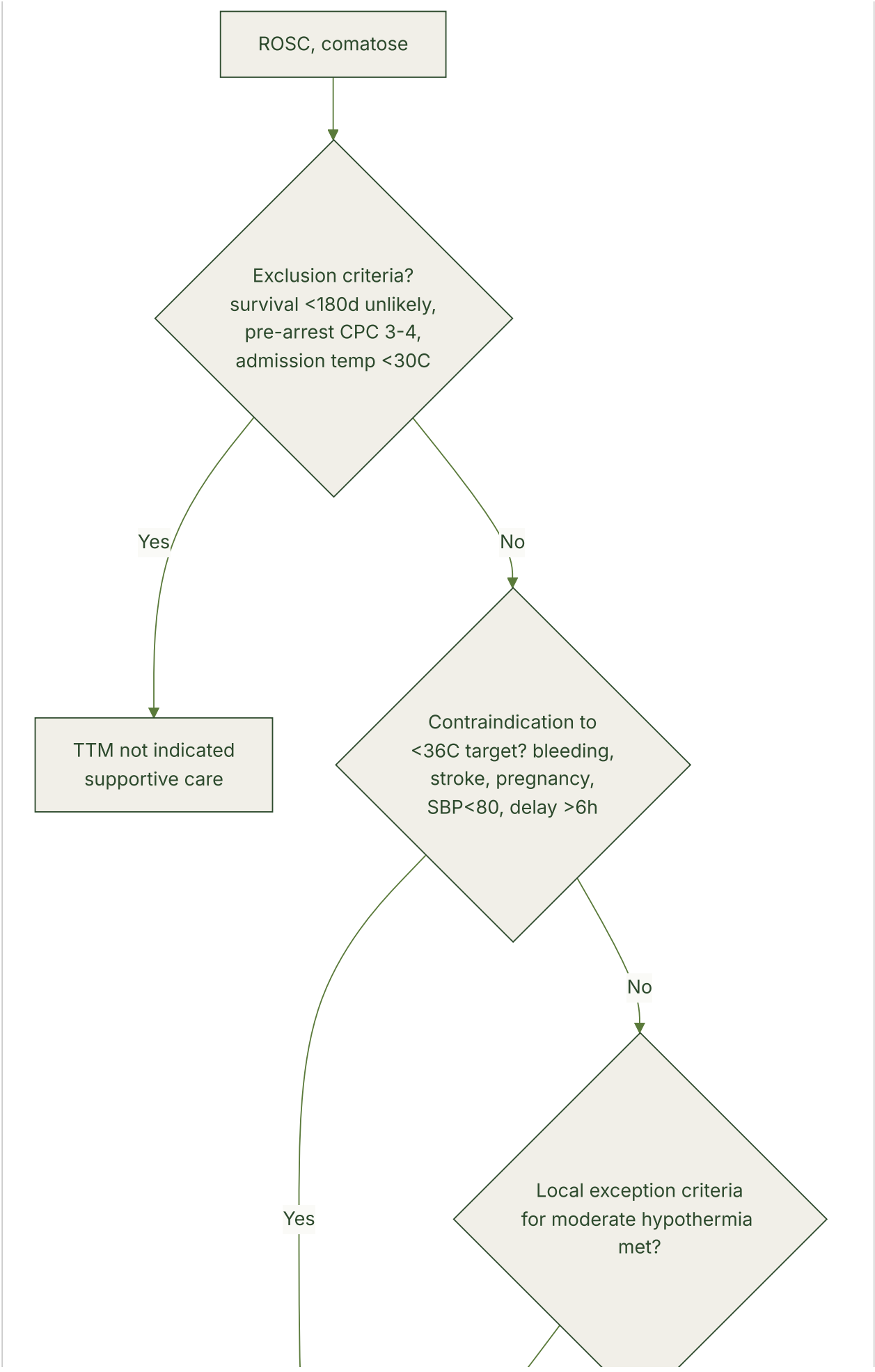
07 If Hypothermia Is Selected, Rewarm Slowly

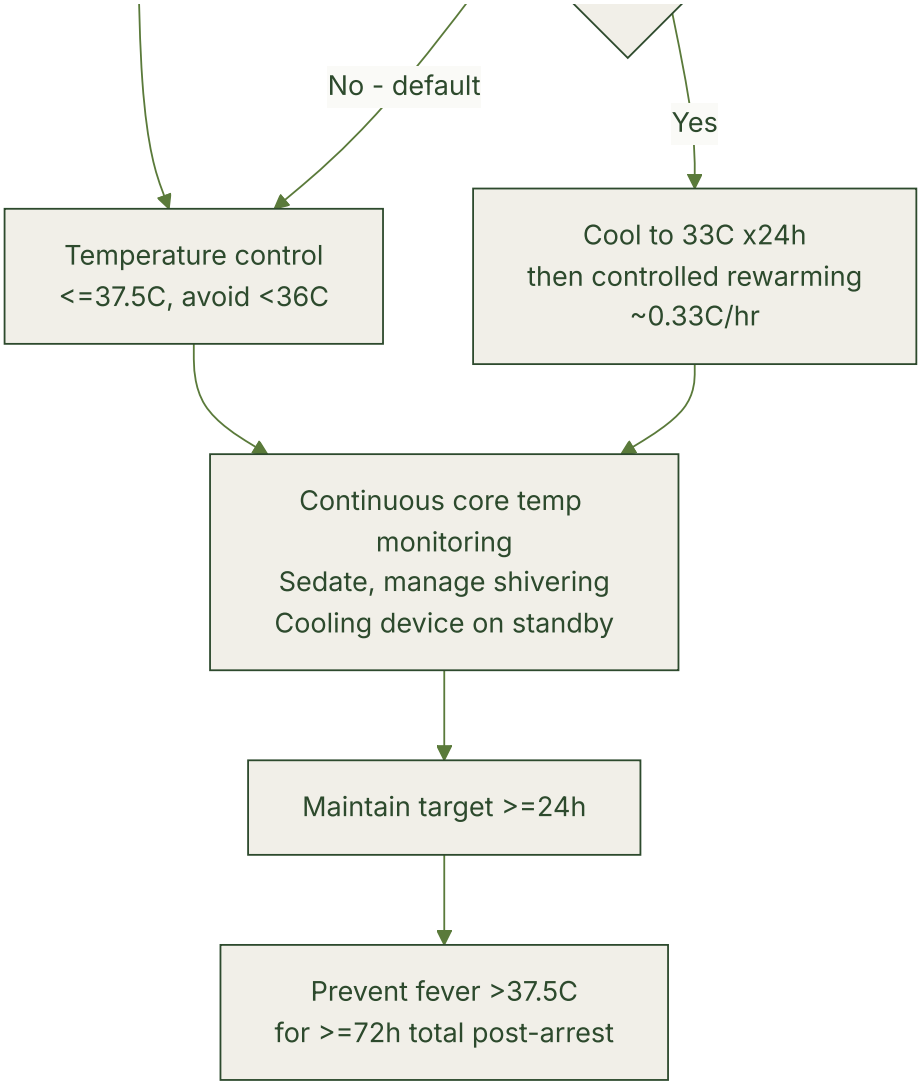
- Maintain the hypothermic target until the planned intervention window ends, then rewarm in controlled increments (the TTM2 protocol used roughly one-third of a degree per hour) rather than rapid rewarming.
- After rewarming, maintain a normothermic target (roughly 36.5–37.7°C) through at least 72 hours post-arrest for patients who remain sedated or comatose.

08 Prevent Fever for the Full Post-Arrest Window

- Regardless of which target strategy was used, prevent fever (> 37.5°C) for **at least 72 hours** in patients who remain comatose — this is the one piece of current guidance stated with more confidence than the specific cooling target itself.

Algorithm


ROSC, comatose
Exclusion criteria? survival <180d unlikely, pre-arrest CPC 3-4, admission temp <30C
Yes
No
TTM not indicated supportive care
Contraindication to <36C target? bleeding, stroke, pregnancy, SBP<80, delay >6h
Yes
No
Local exception criteria for moderate hypothermia met?



EMR Order Set

PHYSICIAN ORDERS

- Temperature control/TTM order set trigger.
- Target temperature selection: default ≤ 37.5°C (temperature control); 33°C selectable only as a documented exception per local criteria.
- Duration order: minimum 24 hours at target; fever-prevention extension to 72 hours for patients remaining comatose.
- Sedation order for the active intervention period.

NURSING ORDERS

- Continuous core temperature monitoring device order (bladder/esophageal/PA catheter) — axillary/oral temperature explicitly insufficient.
- Shivering assessment scale, structured field.
- Cooling device setup/standby order, regardless of target strategy.

PHARMACY ORDERS

- Sedation/analgesia dosing for the intervention window; antishivering medication per local protocol.

Build notes — target temperature and exception justification should be a structured, not free-text, field so the rate of 33°C-exception use can be tracked as a metric once this rolls out.

Adoption Notes

- **This protocol's core recommendation (default to temperature control rather than routine 33°C cooling) reflects an internal discussion that was still in progress as of the August 2024 BPAC meeting** — confirm with Emergency Medicine, Pulmonary/Critical Care, Cardiology, and Neurosciences leadership whether a final system-wide Policy & Procedure was adopted, and what the finalized 33°C-exception criteria are, before building this into a live order set.
- Ensure cooling device availability and staff familiarity even under a normothermia-default strategy, given the ~46% device-use rate seen in the TTM2 normothermia arm.
- Champion: pairs well with a joint EM/critical care/neuroscience post-arrest care committee, mirroring the BPAC structure already in place locally.

Success Metrics & Monitoring

Proportion of ROSC-comatose patients receiving temperature control, time to target temperature, fever incidence (> 37.5°C) during the protocol window, cooling-device utilization rate, and survival/neurologic outcome at discharge (CPC or modified Rankin Scale). Track via the critical care database and post-arrest care registry; review quarterly.

Suggested Reading

1 Dankiewicz J, Cronberg T, Lilja G, et al. Hypothermia versus Normothermia after Out-of-Hospital Cardiac Arrest. *N Engl J Med*. 2021;384(24):2283–2294. doi:10.1056/NEJMoa2100591. The pivotal TTM2 trial — no benefit of 33°C over careful normothermia; primary driver of the current shift away from routine hypothermia.

2 Lascarrou JB, Merdji H, Le Gouge A, et al. Targeted Temperature Management for Cardiac Arrest with Nonshockable Rhythm. *N Engl J Med*. 2019;381(24):2327–2337. doi:10.1056/NEJMoa1906661. The HYPERION trial — the one major trial favoring 33°C, in a non-shockable-rhythm population; not replicated by later pooled analyses.

3 Greif R, Bray JE, Djärv T, et al. 2024 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations. *Circulation*. 2024;150:e1–e100 (article number CIR.0000000000001288). doi:10.1161/CIR.0000000000001288. Current ILCOR consensus umbrella for post-arrest care generally.

4 Taccone FS, et al. Individual patient data meta-analysis of the HYPERION and TTM2 trials in non-shockable-rhythm cardiac arrest. *JAMA Neurology*. 2023 (exact volume/pages as cited in the local MemorialCare BPAC source deck — **full citation not independently verified against the local BPAC source deck**).

5 LA County EMS Agency. Targeted Temperature Management Guideline, Reference No. 320.1 (revised 2023-01-01). Regional EMS reference for the exclusion/contraindication criteria used in Steps 1 and 3.

6 MemorialCare Physician Society. Post-Arrest Temperature Management BPAC Meeting (internal deck), August 20, 2024. Source of the trial summary table and the proposed local shift toward a temperature- control default — a discussion draft, not confirmed final policy.

Revision History

VERSION	DATE	EDITOR	SUMMARY
0.1	2026-07-19	FunctionalHealth editorial team	Initial version grounded in the TTM source folder, including an internal MemorialCare BPAC discussion deck

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