



Non-hospital Medical and Surgical
Facilities Accreditation Program

ACCREDITATION STANDARDS

Malignant Hyperthermia

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Introduction

The malignant hyperthermia (MH) accreditation standard is intended for all Class 1 general anesthesia facilities and any other non-hospital facility where MH triggering agents are used and/or required in accordance with NHMSFAP Emergency Cart accreditation standards. Triggering agents include but are not limited to volatile anesthetics such as desflurane, sevoflurane, isoflurane, and/or the depolarizing muscle relaxant succinylcholine.

Facilities with succinylcholine on site (i.e. class 2 facilities with an anesthesiologist on staff who chooses to keep succinylcholine on site), where succinylcholine is only stocked for emergency purposes and where the facility has no other volatile agents available, are required to have a malignant hyperthermia kit/cart with the required amount of dantrolene in accordance with the NHMSFAP Malignant Hyperthermia accreditation standard.

This standard is based upon the recommendations of the Malignant Hyperthermia Association of the United States (MHAUS) and the Canadian Anesthesiologists' Society guidelines.

Malignant hyperthermia

| No. | Description | Reference | Risk | Change | Asmt. |
|---------------|---|-----------|------|--------|-------|
| MHE1.0 | MALIGNANT HYPERTHERMIA | | | | |
| MHE1.1 | Medications for the treatment of malignant hyperthermia are stocked in a MH kit/cart. | | | | |
| MHE1.1.1 | <p>M Dantrolene sodium.</p> <p>Guidance: The facility must have a minimum of 36 vials of dantrium sodium (20 mg/vial). Following an MH event, the anesthesia department must be advised to use non-triggering agents only until notified that the facility has replenished its MH kit/cart to have a full supply (minimum 36 vials) of dantrium sodium.</p> | | C | | P, F |
| MHE1.1.2 | <p>M Sterile water for injection USP (without a bacteriostatic agent).</p> <p>Guidance: Each 20 mg vial of dantrolene should be reconstituted by adding 60 mL of sterile water for injection USP (without bacteriostatic agent) and the vial shaken until the solution is clear. 100 mL vials of sterile water are recommended instead of sterile water bags to avoid the accidental IV administration of this hypotonic solution. If sterile water bags are used, they must be clearly labelled "not for IV administration" and stored away from any other bags intended for IV use. If 100 mL vials of sterile water vials are stocked, there are at minimum 22 vials in the kit. If sterile water bags are stocked, the minimum total volume of sterile water in the kit is 2200 mL.</p> | | C | | P, F |
| MHE1.1.3 | <p>M Sodium bicarbonate (8.4%).</p> <p>Guidance: 50 mL vials x 5 are stocked in the MH kit/cart.</p> | | C | | P, F |
| MHE1.1.4 | <p>M Dextrose 50%.</p> <p>Guidance: 50 mL vials x 2 are stocked in the MH kit/cart.</p> | | C | | P, F |

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| MHE1.1.5 | <p>M Calcium chloride (10%).</p> <p>Guidance: 10 mL vials x 2 are stocked in the MH kit/cart.</p> | | C | | P, F |
| MHE1.1.6 | <p>M Regular insulin.</p> <p>Guidance: A 100 units/mL vial of regular insulin is stored in the refrigerator. The MH kit/cart contains a cognitive aid (e.g. laminated card) that clearly states where other required malignant hyperthermia treatment medications and supplies are located (e.g. refrigerator, freezer).</p> | | C | | P, F |
| MHE1.1.7 | <p>M Lidocaine for injection (2%).</p> <p>Guidance: Lidocaine (2%) 100 mg/5 mL vials x 3 or lidocaine 100 mg/10 mL x 3 preloaded syringes are stocked in the MH kit/cart. Manufacturer pre-filled syringes are preferred. ACLS protocols, as prescribed by the American Heart Association, should be followed when treating all cardiac derangements caused by MH. Lidocaine or procainamide should not be given if a wide-QRS complex arrhythmia is likely due to hyperkalemia; this may result in asystole.</p> | | C | | P, F |
| MHE1.2 | General equipment and supplies for the treatment of malignant hyperthermia are stocked in a MH kit/cart. | | | | |
| MHE1.2.1 | <p>M Charcoal filters.</p> <p>Guidance: Two pairs of activated charcoal filters (e.g. Vapor-Clean™). The activated charcoal filters are attached to the inspiratory and expiratory ports of the anesthesia machine to quickly reduce the concentration of gas (< 5 ppm) from the anesthesia machine. In this situation, even though the anesthetic gas has been discontinued when the MH was first suspected, the activated charcoal filters may become saturated after one hour; therefore, a replacement set of filters should be substituted after each hour of use.</p> | | C | | P, F |

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| MHE1.2.2 | <p>M Additive pins and transfer sets and/or syringes.</p> <p>Guidance: Two sterile access/transfer sets (e.g. Mini-Spike® IV additive pins x 2 and Multi-Ad fluid transfer sets x 2, BD Cornwall™ Disposable Syringe System x 2) and/or 60 mL syringes x 5 to dilute the dantrolene sodium are stocked in the MH kit/cart.</p> | | C | | P, F |
| MHE1.2.3 | <p>M IV cannula 18G.</p> <p>Guidance: At minimum, four (4) 18G cannulas are stocked in the MH kit/cart.</p> | | C | | P, F |
| MHE1.2.4 | <p>M IV cannula 20G.</p> <p>Guidance: At minimum, four (4) 20G cannulas are stocked in the MH kit/cart.</p> | | C | | P, F |
| MHE1.2.5 | <p>M IV cannula 22G.</p> <p>Guidance: At minimum, four (4) 22G cannulas are stocked in the MH kit/cart.</p> | | C | | P, F |
| MHE1.2.6 | <p>M Pressure bag.</p> | | H | | P, F |
| MHE1.2.7 | <p>M Disposable cold packs.</p> <p>Guidance: At minimum, four (4) disposable cold packs are stocked in the MH kit/cart.</p> | | C | | P, F |
| MHE1.2.8 | <p>M Large sterile Steri-Drape™.</p> <p>Guidance: For rapid drape of wound, a large sterile Steri-Drape™ is stocked in the MH kit/cart.</p> | | C | | P, F |

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| MHE1.2.9 | <p>M Large clear plastic bags.</p> <p>Guidance: At minimum four (4) large clear plastic bags and four (4) small plastics bags for ice are stocked in the MH kit/cart.</p> | | C | | P, F |
| MHE1.2.10 | <p>M Small plastic bags.</p> <p>Guidance: At minimum four (4) large clear plastic bags and four (4) small plastics bags for ice are stocked in the MH kit/cart.</p> | | C | | P, F |
| MHE1.2.11 | <p>M Foley catheter.</p> <p>Guidance: At minimum, one (1) foley catheter is stocked in the MH kit/cart.</p> | | C | | P, F |
| MHE1.2.12 | <p>M Foley catheter insertion kit.</p> | | C | | P, F |
| MHE1.2.13 | <p>M Sterile gloves.</p> | | C | | P, F |
| MHE1.2.14 | <p>M Urine meter.</p> <p>Guidance: At minimum, one drainage bag with urine meter (e.g. urometer®) is stocked in the MH kit/cart. A basic drainage bag does not satisfy this requirement.</p> | | C | | P, F |
| MHE1.2.15 | <p>M Refrigerated cold saline solution.</p> <p>Guidance: At minimum, 3000 mL normal saline for IV cooling is stored in the refrigerator. The MH kit/cart contains a cognitive aid (e.g. laminated card) that clearly states where other required MH treatment medications and supplies are located (e.g. refrigerator, freezer).</p> | | C | | P, F |
| MHE1.2.16 | <p>M Bucket.</p> <p>Guidance: A bucket for ice is stocked in the MH kit/cart.</p> | | C | | P, F |

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| MHE1.2.17 | <p>M Ice.</p> <p>Guidance: An adequate supply of ice is located in a freezer within the facility and there is a way to crush the ice. The MH kit/cart contains a cognitive aid (e.g. laminated card) that clearly states where other required MH treatment medications and supplies are located (e.g. refrigerator, freezer).</p> | | C | | P, F |
| MHE1.2.18 | <p>M Temperature probe.</p> <p>Guidance: A temperature probe (e.g. nasopharyngeal, tympanic membrane, rectal) is immediately available for use. Immediately available is defined as being available for use without undue delay. The MH kit/cart contains a cognitive aid (e.g. laminated card) that clearly states where other required MH treatment medications and supplies are located (e.g. refrigerator, freezer).</p> | | C | | P, F |
| MHE1.2.19 | <p>M The MH kit/cart contains a cognitive aid that states the location of other required supplies.</p> <p>Guidance: The MH kit/cart contains a cognitive aid (e.g. laminated card) that clearly states where other required MH treatment medications (e.g. insulin) and supplies are located (e.g. ice, cold saline, temperature probe).</p> | | C | | P, F |
| MHE1.2.20 | <p>M The MH kit/cart contains a cognitive aid with the MHAUS MH Hotline phone number.</p> <p>Guidance: It is also recommended that the MHAUS MH Operating Room Poster "Emergency Therapy for Malignant Hyperthermia" be posted in each operating room.</p> | | C | | P, F |

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| MHE1.3 | <p>Laboratory testing supplies for the management of MH are stocked in the MH kit/cart.</p> <p>Guidance: The time it takes to stabilize and transfer a patient is unpredictable and facilities must be prepared to begin optimal evaluation and stabilization, therefore, the collection and monitoring of laboratory studies may be indicated. The specific laboratory studies ordered are determined by the treating physician and may include but are not limited to: electrolytes, renal function, thyroid function, glucose, markers for rhabdomyolysis, complete blood count (CBC), coagulation, arterial blood gases, blood cultures, and urine tests.</p> | | | | |
| MHE1.3.1 | <p>M Arterial blood gas kits.</p> <p>Guidance: At minimum, six (6) arterial blood gas kits are stocked in the MH kit/cart. If no immediate laboratory analysis is available on site, there is policy and procedures in place with the local hospital to analyze bloodwork drawn by the facility in the event of a malignant hyperthermia crisis. Facilities that choose to have point-of-care laboratory testing systems for blood chemistry (electrolytes) analysis, coagulation testing, and/or blood gas analysis require review and accreditation with the Diagnostic Accreditation Program (DAP).</p> | | H | | P, F |
| MHE1.3.2 | <p>M Urine collection container.</p> <p>Guidance: For myoglobin level testing.</p> | | C | | P, F |
| MHE1.3.3 | <p>M Urine analysis test strips.</p> <p>Guidance: Test strips for urine hemoglobin are stocked in the MH kit/cart.</p> | | C | | P, F |
| MHE1.4 | <p>Emergency medications and equipment supports the management of malignant hyperthermia.</p> | | | | |

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| MHE1.4.1 | <p>M The MH kit/cart is portable.</p> <p>Guidance: The rolling/mobile kit/cart transports the required medications, equipment and supplies to the location of the malignant hyperthermia crisis.</p> | | C | | P, F |
| MHE1.4.2 | <p>M The MH kit/cart is located in a common area immediately adjacent to the operating room(s).</p> <p>Guidance: The MH kit/cart is located near the operating room(s); it is not located in the operating room.</p> | | C | | P, F |
| MHE1.4.3 | <p>M The MH kit/cart is checked every surgical/procedural day to ensure the kit/cart is appropriately stocked.</p> <p>Guidance: The MH checklist is inclusive of all the items required in accordance with the NHMSFAP Malignant Hyperthermia accreditation standard.</p> | | C | | P, F |
| MHE1.4.4 | <p>M The MH kit/cart is checked before the start of the first case of the day.</p> | | C | | P, F |
| MHE1.4.5 | <p>M The duty of checking the MH kit/cart is rotated among all staff.</p> <p>Guidance: This practice will familiarize all clinical staff with the contents of the kit/cart so that in the event of an emergency, locating items in the kit/cart becomes second nature.</p> | | M | | P, F |
| MHE1.4.6 | <p>M The MH kit/cart medications are within their labelled expiry date.</p> | | C | | P, F |
| MHE1.4.7 | <p>M The MH kit/cart medications are accessible and organized.</p> | | C | | P, F |
| MHE1.4.8 | <p>M The MH kit/cart equipment and supplies are within their labelled expiry date.</p> | | C | | P, F |
| MHE1.4.9 | <p>M The MH kit/cart equipment and supplies are accessible and organized.</p> | | C | | P, F |

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| MHE1.4.10 | M MH kit/cart checks are documented. | | L | | P, F |
| MHE1.5 | Periodic MH drills ensure that the facility is physically prepared and staff are ready to act in the event of a MH crisis. | | | | |
| MHE1.5.1 | M All personnel receive MH training. Guidance: Personnel includes physicians, dentists, oral maxillofacial surgeons, podiatric surgeons, nurses, and other staff. Training should occur at the following time points: orientation, changes in MH kit/cart medications and/or supplies; changes in roles and/or responsibilities; and changes in facility MH policy and procedures. This training is recorded in a log. | | M | | P, F |
| MHE1.5.2 | M Simulated MH drills are performed annually at a minimum. Guidance: A written evaluation (drill report) should be completed following each drill that includes any additional training needs or policy, procedures or practice changes identified in the evaluation of the simulated emergency drill as well as the action(s) taken. All personnel attendance/participation in emergency drills is recorded. It is recommended that MH drills be conducted every six months. | | M | | P, F |
| MHE1.6 | Policies and procedures contain all of the information necessary for the safety of patients, staff and visitors. Guidance: Policies and procedures ensure that activities/procedures are performed consistently and accurately by all personnel within the non-hospital facility. | | | | |

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| MHE1.6.1 | <p>M There is policy and procedures for laboratory analysis of bloodwork.</p> <p>Guidance: The policy and procedures outline the agreement with a local laboratory (e.g. hospital) to analyze bloodwork drawn by the non-hospital facility in the event of a MH crisis. This policy and procedure is not required if the facility has a point-of-care laboratory testing system for blood gas analysis, and is accredited with the Diagnostic Accreditation Program (DAP).</p> | | M | | P, F |

References

1. College of Physicians and Surgeons of Alberta. Non-hospital surgical facility: standards & guidelines - March 2016, v23 [Internet]. Edmonton, AB: College of Physicians and Surgeons of Alberta; 2016 [cited 2018 Nov 19]. 62 p.
2. College of Physicians and Surgeons of Ontario. Out-of-hospital premises inspection program (OHPIP) - program standards [Internet]. Toronto: College of Physicians and Surgeons of Ontario; 2013 [revised 2017 Oct; cited 2018 Nov 19]. 44 p.
3. Dobson G, Chow L, Flexman A, et al. Guidelines to the Practice of Anesthesia - Revised Edition 2019. Can J Anaesth. 2019 [cited 2019 Feb 26] Jan;66(1):75-108.
4. Malignant Hyperthermia Association of the United States [Internet]. Sherburne, NY: Malignant Hyperthermia Association of the United States; 2019. [cited 2018 Nov 19].

Revision history

| Date | Revisions |
|-------------------|---|
| June 28, 2019 | <p>Medications:</p> <ul style="list-style-type: none"> Updated to reflect current MHAUS guidelines <p>General equipment:</p> <ul style="list-style-type: none"> Updated to reflect current MHAUS guidelines (i.e. charcoal filters, pressure bag, disposable cold packs) Urinary catheter supplies added and/or revised Cognitive aids added <p>Laboratory testing supplies:</p> <ul style="list-style-type: none"> Changed to blood gas kits and urine myoglobin test strips only Agreement with local laboratory (i.e. hospital) to analyze bloodwork drawn by the facility in the event of an MH crisis <p>Other:</p> <ul style="list-style-type: none"> Substantial format changes and guidance added Some supplies have been removed |
| September 6, 2019 | <p>Laboratory testing supplies:</p> <ul style="list-style-type: none"> Correction to MHE1.3.3 guidance - Test strips for urine hemoglobin Added guidance to MHE1.3.2 - Urine collection container is for myoglobin level testing |
| December 16, 2021 | <p>Guidance update</p> <ul style="list-style-type: none"> MHE1.1.1 |
| April 1, 2026 | <p>Transcribed to new template (no content changes) (version 2.3)</p> |