The North American Malignant Hyperthermia Registry

MALIGNANT HYPERTHERMIA BIOPSY and DIAGNOSTIC CONSULTATION REPORT

INSTRUCTIONS FOR USE

This form is only to be used by the staff of an MH diagnostic center.

1. Use this form for each patient referred to you for MH evaluation, if they undergo muscle biopsy.

2. If any adult relatives wish to be registered by name, separate consent forms for participation in the Registry must be signed by that relative. If you wish to register a minor under the age of 18, a consent form must be signed by one of the minor's parent or guardian.

3. The Center Director must review and sign this form verifying accuracy before it is submitted to the Registry.

4. Please make a photocopy of the completed form for your records.

5. Submit original completed form to:
The North American Malignant Hyperthermia Registry
University of Florida
Department of Anesthesiology
1600 SW Archer Road, PO Box 100254
Gainesville, FL 32610

I certify that the information contained in this report is complete and accurate.

_____ _ _ _ _/ _ _ /_ _

Biopsy Center Director Signature year month day

MH BIOPSY AND DIAGNOSTIC CONSULTATION REPORT

Version 9.6
May 2014

Complete this form for each patient referred for MH susceptibility evaluation. The MH muscle biopsy center director must review the completed form before it is returned to the NAMHR.

1. MH muscle biopsy center code number:
   see final page for code numbers
   ____ ____

PATIENT IDENTIFICATION

2. North American MH Registry Number for this patient (if previously assigned)

   ____ ____ ____ ____ ____

3. Any previous North American MH Registry numbers associated with the patient. That is, AMRA, RSR, (formerly AKA), close relative's reports, etc.
   a. ____ ____ ____ ____ ____ Comment _____
   b. ____ ____ ____ ____ ____ Comment
   _____
   c. ____ ____ ____ ____ ____ Comment
   _____
   _____

4. Patient's Initials

   _____ _____ _____
   first middle last

5. Has consent been obtained to enter patient's name into the Registry?
   check one
   ( ) yes
   ( ) no

   If yes, please complete a-g on following page.

   Note: **DO NOT COMPLETE IF CONSENT HAS NOT BEEN OBTAINED**

   a. Patient's name. This is the primary subject

   _____ _____ _____
   last first middle

b. Patient's previous name

_____ _____ _____
last first middle

c. Patient's maiden name _____
last

d. Patient's Address

_____
street address

_____ _____ _____
city state/province zip/postal code

_____
country

e. Phone number
(Home) (_____) _____ - _____
(Work) (_____) _____ - _____

f. Patient e-mail address _____

g. Date of patient's birth

___ ___ ___ ___ \ ___ ___ \ ___ ___
year month day

DEMOGRAPHIC INFORMATION

6. Sex
check one
( ) male
( ) female

7. Weight

____.__ kilograms OR ____ lbs

8. Height

_____ cms OR ____ ft ___ inches

9. Year of patient's birth

__ __ __ __

10. Race:

check as many as apply

( ) Caucasian
( ) Hispanic
( ) African-American
( ) Native American
( ) Hawaiian or Pacific Islander
( ) African
( ) East Asian
( ) South Asian
( ) Middle Eastern
( ) other *(specify):*_____

11. Body Build

check one

( ) Normal
( ) Muscular
( ) Postpartum
( ) Lean
( ) Obese
( ) Other *(specify):*_____

12. State or province of patient's residence

__ __

FAMILY IDENTIFICATION

13. Does the primary subject have minor children or siblings under the age of 6 and does this minor child's parent or guardian consent to the child being in the Registry?

check one

( ) yes
( ) no

If yes, please complete below for all children under the age of 6

a. **name**

_____ _____ _____
last first middle

Date of birth

__ __ __ __ \ __ __ \ __ __
year month day

Is this the child or the sibling of the biopsied patient?

check one

( ) child

( ) sibling

b. **name**

_____ _____ _____

last first middle

Date of birth

___ ___ ___ ___ \ ___ ___ \ ___ ___

year month day

Is this the child or the sibling of the biopsied patient?

check one

( ) child

( ) sibling

c. **name**

_____ _____ _____

last first middle

Date of birth

___ ___ ___ ___ \ ___ ___ \ ___ ___

year month day

Is this the child or the sibling of the biopsied patient?

check one

( ) child

( ) sibling

d. **name**

_____ _____ _____ last first middle

Date of birth

___ ___ ___ ___ \ ___ ___ \ ___ ___

year month day

Is this the child or the sibling of the biopsied patient?

check one

( ) child

( ) sibling

e. **name**

_____ _____ _____
last first middle

Date of birth
___ ___ ___ ___ \ ___ ___ \ ___ ___
year month day

Is this the child or the sibling of the biopsied patient?
check one
( ) child
( ) sibling

14. Has consent been obtained to enter the names of children or siblings ages 6 through 17, or ages 18 and over, of the biopsied patient into the Registry?

NOTE: **CONSENT MUST BE OBTAINED FROM EACH CHILD/SIBLING OVER 18 YEARS OF AGE FOR WHOM YOU ENTER THIS DATA (If the child/ sibling is deceased, the following data may be entered with the consent of the next of kin*. If the child is under 18 years of age, consent must be obtained from the child's parent or guardian).**

* check your local/state regulations regarding the definition of next of kin

check one ( ) yes
( ) no

If yes, complete below for all individuals for whom consent has been obtained

a. **name**

_____ _____ _____
last first middle

Date of birth
___ ___ ___ ___ \ ___ ___ \ ___ ___
year month day

Is this the child or the sibling of the biopsied patient?
check one
( ) child
( ) sibling

b. **name**

_____ _____ _____
last first middle

Date of birth

___ ___ ___ ___ \ ___ ___ \ ___ ___
year month day

Is this the child or the sibling of the biopsied patient?
check one
( ) child
( ) sibling

c. **name**

_____ _____ _____
last first middle

Date of birth
___ ___ ___ ___ \ ___ ___ \ ___ ___
year month day

Is this the child or the sibling of the biopsied patient?
check one
( ) child
( ) sibling

d. **name**

_____ _____ _____
last first middle

Date of birth
___ ___ ___ ___ \ ___ ___ \ ___ ___
year month day

Is this the child or the sibling of the biopsied patient?
check one
( ) child
( ) sibling

15. Has consent been obtained to enter the names of the parents of a biopsied patient? *check one* ( ) yes
( ) no
If yes, complete below

NOTE: **CONSENT MUST BE OBTAINED FROM EACH PARENT FOR WHOM YOU ENTER THIS DATA (If the parent is deceased, the following data may be entered regardless of consent status.)**

a. Mother of biopsied patient

_____ _____ _____
last first middle

Date of mother's birth
___ ___ ___ ___ \ ___ ___ \ ___ ___
year month day

Mother's maiden name _____
last

Father of biopsied patient

_____ _____ _____
last first middle

Date of father's birth
___ ___ ___ ___ \ ___ ___ \ ___ ___
year month day

16. Family History Table
Key to Family History table (below)

Relationship to Patient	Known Medical Problems
a. child	1. fatal MH
b. grandchild	2. survived fulminant MH event
c. brother/sister	3. possible MH event
d. half-sibling	4. MH family history (use only for those relatives with CHCT results)
e. niece/nephew	5. perioperative death - not thought to be MH
f. mother	6. perioperative death - etiology undetermined
g. maternal grandparent	7. S.I.D.S. or cot death
h. maternal aunt/uncle	8. Sudden death - unknown cause, age 1.5 to 45 yrs
j. maternal first cousin	9. heat stroke
k. maternal second cousin	10. neurolept malignant syndrome
m. maternal - other	11. myopathy
n. father	12. idiopathic creatine kinase elevation
o. paternal grandparent	13. CFIDS (Chronic Fatigue and Immune Dysfunction Syndrome)
p. paternal aunt/uncle	14. muscle pain, weakness or fever with exercise
q. paternal first cousin	15. episodic dark urine and muscle pain
r. paternal second cousin	16. diabetes
s. paternal – other	17. none of the above
t. relative by marriage	18. unknown

u. other blood relative

Please complete one row for each relative for whom relevant medical history is known.

Relative's Initials	Registry Number *Leave blank if relative not registered. Insert "?" if relative registered but number not known*	Relationship to Patient *Select one letter from left-hand column above.*	Sex *M=Male F=Female*	Medical Problems *Select one or ore numbers from right-hand or column above.*	CHCT Test Result *Write "pos", "neg", "equiv", "unknown" "not performed", "other"*	Genetic Result *Specify familial mutation or "neg", "not performed", or "other"*
___ ___ ___	___ ___ ___ ___ ___	____	____	____ ____ ____	___________	_________
___ ___ ___	___ ___ ___ ___ ___	____	____	____ ____ ____	___________	_________
___ ___ ___	___ ___ ___ ___ ___	____	____	____ ____ ____	___________	_________
___ ___ ___	___ ___ ___ ___ ___	____	____	____ ____ ____	___________	_________
___ ___ ___	___ ___ ___ ___ ___	____	____	____ ____ ____	___________	_________
___ ___ ___	___ ___ ___ ___ ___	____	____	____ ____ ____	___________	_________
___ ___ ___	___ ___ ___ ___ ___	____	____	____ ____ ____	___________	_________
___ ___ ___	___ ___ ___ ___ ___	____	____	____ ____ ____	___________	_________
___ ___ ___	___ ___ ___ ___ ___	____	____	____ ____ ____	___________	_________

FAMILY HISTORY

16a. Before this episode, was the patient's family history positive for:
check all applicable

( ) malignant hyperthermia
( ) masseter spasm
( ) intraoperative death not thought to be MH
( ) sudden infant death syndrome or cot death
( ) sudden death from unknown cause at < 45 year >1.5 years
( ) heatstroke
( ) neurolept malignant syndrome
( ) intolerance to heat
( ) chronic muscle pain
( ) frequent muscle cramps
( ) chronic muscle weakness
( ) exercise intolerance due to muscle pain, weakness or fever
( ) episodes of dark urine and muscle pain
( ) myopathies *specify type; write unknown if not known:*_____________________
( ) idiopathic creatine kinase elevation

( ) diabetes
( ) Type 1
( ) Type 2
( ) none of the above
( ) unknown
( ) other specify _____

MEDICAL HISTORY

17. Does the patient have any of the following complaints?
check all applicable
( ) muscle weakness interferes with daily activity at least once/week
( ) muscle cramps interfere with daily activity at least once/week
( ) cola colored urine
( ) heat stroke or heat prostration
( ) oral (or rectal/axillary equivalent) fever>38.6 ◦ C or 101.4 ◦ F at least 6 times/year without medical cause
( ) recent generalized infection
If there was infection, how long ago was it? _ _ _ (*days*)
( ) recent use of cholesterol lowering drugs
If so, which drug _____, and when was it last ingested? _ _ _ (*days*)
( ) a regular regimen of physical activity?
If so, when was the last work-out? _ _ _ (*days*)
( ) ingestion of any medicine to improve muscular performance
( ) intolerance to heat
( ) exercise intolerance due to muscle pain, weakness or fever
( ) diabetes
( ) Type 1
( ) Type 2
( ) other (*specify*) _____
( ) none of the above
( ) unknown

18. Has patient ever had physical findings of:
check all applicable
( ) increased muscle tone
( ) decreased muscle tone
( ) generalized muscle weakness
( ) myopathy *specify type; write unknown if not known:*_____
( ) ptosis
( ) strabismus
( ) hiatal hernia
( ) inguinal hernia
( ) umbilical hernia

( ) undescended testes
( ) clubbed foot
( ) joint hypermobility
( ) kyphoscoliosis (moderate or severe; curve >45°)
( ) pectus carinatum
( ) winged scapulae
( ) skeletal fractures (more than 2)
( ) gallstones
( ) kidney stones
( ) laryngeal papillomas
( ) other *(specify):*_____
( ) none of the above
( ) unknown

ANESTHETIC HISTORY

19. How many times was this patient anesthetized prior to this evaluation?

__ __ ( ) unknown but > 0 ( ) unknown
Skip to question 35 if the response is zero

20. How many were general anesthetics?

__ __ ( ) unknown but > 0 ( ) unknown

21. Indicate the number of anesthetics with the following agents
__ __ volatile agents without succinylcholine
__ __ volatile agents with succinylcholine
__ __ succinylcholine without other known triggering agents

22. Year of most recent anesthetic (excluding present evaluation)
__ __ __ __ ( ) unknown

23. Were unusual metabolic responses noted during prior anesthetics?
check one ( ) yes
( ) no
( ) unknown

23a. Were unusual metabolic or muscular responses noted during prior anesthetics?
check one ( ) no
( ) yes
( ) unknown

24. Was there delayed awakening from previous general anesthetics?
check one ( ) yes
( ) no
( ) unknown

25. How many anesthetics were suspect for possible MH (director's opinion)?
__ __

26. How many fulminant MH episodes occurred (director's opinion)?
__ __

Skip to question 35 if the answer to questions 25 and 26 are zero

27. If the patient experienced possible or fulminant MH, answer questions a-w.
Report the anesthetic that was most suspect for MH

a. Date of possible or fulminant MH episode: ___ ___ ___ ___ \ ___ ___ \ ___ ___
year month day

( ) unknown

NOTE: If consent for the patient has not been obtained only enter the year.

b. Patient weight at time of incident
____.__ kilograms OR ____ lbs

c. Height
_____ cms OR ____ ft ___ inches

d. State or province of patient's residence at time of incident.
__ __

e. Location of incident

i. Hospital _____
ii. City _____
iii. State or Province ____ _____

f. Type of procedure scheduled
check all applicable

( ) cardiothoracic
( ) dental
( ) ear, nose, or throat
( ) eye
( ) general surgery
( ) laparoscopic surgery
a) abdominal
b) pelvic
c) other (specify) _____
( ) gynecology
( ) neurosurgery
( ) thoracoscopic surgery (thoracic)
( ) oral surgery
( ) orthopedic
( ) plastic surgery
( ) radiology
( ) obstetrics
( ) urology
( ) vascular

( ) transplant – Transplant type_____
( ) unknown ( ) other *(specify):*_____

g. Was the procedure an emergency?
check one
( ) yes
( ) no
( ) unknown

g (a). Was the procedure performed outside a hospital?
check one
( ) no
( ) yes
( ) ambulatory surgery center
( ) office
( ) unknown

g (b). Did this adverse reaction occur without exposure to anesthetic?
check one
( ) no
( ) yes
( ) unknown

g (c). Was the environment hot when this reaction occurred?
check one
( ) no
( ) yes
If yes how hot? __ __ . __ C or __ __ __ . __ F

h. Was any infection present at the time of this surgery?
check one ( ) yes
( ) no
( ) unknown

i. If infection was present, what organisms were known to be present?
_____

j. Premedication and anesthetic agents utilized (before reaction occurred):
check all applicable

( ) sodium citrated citric acid (Bicitra)
( ) cimetidine (Tagamet)
( ) famotidine (Pepcid)
( ) lansoprazole (Prevacid)
( ) ranitidine (Zantac)
( ) metoclopramide (Reglan)
( ) omeprazole (Prilosec)
( ) atropine
( ) glycopyrrolate (Robinul)
( ) scopolamine (Hyoscine)
( ) dolasetron (Anzemet)
( ) droperidol (Inapsine)

( ) hydroxyzine (Vistaril)
( ) ondansetron (Zofran)
( ) promethazine (Phenergan)
( ) diphenhydramine (Benedryl)

( ) clonidine (Duraclon)
( ) dexmedetomide
( ) ketorolac (Toradol)
( ) acetaminophen (Tylenol)

( ) diazepam (Valium)
( ) lorazepam (Ativan)
( ) midazolam (Versed)

( ) etomidate (Amidate)
( ) ketamine (Ketalar)
( ) propofol (Diprivan)

( ) alfentanil (Alfenta)
( ) fentanyl (Sublimaze)
( ) fentanyl and droperidol (Innovar)
( ) meperidine (Demerol)
( ) morphine
( ) remifentanyl (Ultiva)
( ) sufentanil (Sufenta)
( ) hydromorphone (Dilaudid)

( ) unknown
( ) ***NO*** *potent volatile anesthetic*
( ) sevoflurane (Ultane)
( ) desflurane (Suprane)
( ) isoflurane (Forane)
( ) nitrous oxide

( ) nalbuphine (Nubain)
( ) naloxone (Narcan)

( ) atracurium (Tracrium)
( ) cisatracurium (Nimbex)
( ) rocuronium (Zemuron)
( ) vecuronium (Norcuron) ( ) pancuronium (Pavulon)
( ) other NMB
( ) **IM** succinylcholine (Anectine)
( ) **IV** succinylcholine (Anectine)
( ) ***NO*** *succinylcholine*
( ) edrophonium (Tensilon)
( ) neostigmine (Prostigmin)
( ) physostigmine (Antilirium)

( ) bupivacaine (Marcaine)
( ) levo-bupivacaine
( ) choroprocaine (Nesacaine)
( ) cocaine
( ) etidocaine (Duranest) ( ) lidocaine (Xylocaine)
( ) mepivacaine (Carbocaine)
( ) prilocaine (Citanest) ( ) procaine (Novocain)
( ) ropivacaine (Naropin)
( ) tetracaine (Pontocaine)

( ) epinephrine
( ) ephedrine
( ) neosynephrine

( ) other *(specify):*_____

k. Anesthesia induction time
__ __.__ (*in hours, express parts of an hour using decimal points*)
(*example – 3 minutes = 0.05*)

1. General anesthetic induction method
check one
( ) inhalation

( ) intravenous
( ) other *(specify)*:_____
( ) not applicable

m. Anesthesia duration
__ __.__ __ *(hours and minutes since induction)*

n. Type of anesthetic prior to adverse metabolic or muscular reaction to anesthesia
check all applicable
( ) monitored anesthesia care (local standby)
( ) regional anesthesia
( ) spinal anesthesia
( ) epidural anesthesia
( ) general anesthesia **without** endotracheal intubation
( ) general anesthesia **with** endotracheal intubation
( ) tourniquet use
( ) tourniquet use
elapsed time after the start of anesthesia tourniquet was inflated
__ __.__ __ *(hours and minutes since induction)*
elapsed time after final release of tourniquet
__ __.__ __ *(hours and minutes since induction)*

Patient Monitoring Utilized

o. Monitoring utilized (before reaction occurred):
check all monitoring used

( ) blood pressure monitor
( ) electrocardiograph
( ) stethoscope
( ) arterial catheter
( ) central venous catheter
( ) pulmonary artery catheter
( ) end-tidal PCO_2
( ) pulse oximeter
( ) bladder (Foley) catheter

temperature probes:
( ) axillary
( ) bladder
( ) esophageal
( ) nasopharyngeal
( ) rectal
( ) skin - electronic
( ) skin - liquid crystal
( ) tympanic
( ) other monitoring *(specify):*_____

p. If a liquid crystal temperature probe was used, did it accurately trend with core temperatures?
check one
( ) yes
( ) no

q. Was a forced air or I.V. warming device in use?
check one
( ) yes
( ) no
( ) unknown

Documentation of the Reaction

r. Abnormal signs judged to be inappropriate by the attending anesthesiologist or other physician:

***RANK* in order of appearance. *NUMBER* do not check. *WRITE ZERO* if sign did not occur.** *(a number may be used more than once if signs were noted simultaneously)*

___ masseter spasm: mouth cannot be fully opened but intubation possible
___ masseter spasm: teeth clamped shut, intubation via direct visualization impossible
___ generalized muscular rigidity
___ cola colored urine
___ tachypnea
___ hypercarbia
___ cyanosis
___ skin mottling
___ sinus tachycardia
___ ventricular tachycardia
___ ventricular fibrillation
___ elevated temperature
___ rapidly increasing temperature
___ sweating
___ excessive bleeding
___ hypertension > 20% of baseline
___ other *(specify):*_____

s. Signs: Maximum values and times
fill in the blanks
__ __.__ __ time first adverse sign noted (***after induction***)
(hours and minutes since induction)
__ __.__ __ time second adverse sign noted ***(after induction)***
(hours and minutes since induction)

__ __.__ maximum temperature noted (°C) **OR**
__ __.__ maximum temperature noted (°F)
__ __.__ __ time maximum temperature noted ***(after induction)***
(hours and minutes since induction)
__ __ __ __ maximum end-tidal PCO_2 noted (mmHg)
__ __.__ __ time maximum end-tidal PCO_2 noted ***(after induction)***
(hours and minutes since induction)

t. Type of ventilation used at the time hypercarbia was first observed:
check one
( ) spontaneous
( ) assisted
( ) controlled
( ) not applicable
( ) unknown

u. Laboratory Evaluation used during the reaction.
Fill in the blanks for all lab tests obtained

Most abnormal arterial blood gas after MH was suspected:
__.__ __ FiO_2
__.__ __ pH

__ __ __ PCO_2
__ __ __ PO_2
__ __.__ BE (mEq/L) (specify ±)
__ __ Bicarbonate (mEq/L)
__ __ __ __ Time ***(after induction)***
(hours and minutes since induction)

__ __ __ liters/minute ventilation at the time of this blood gas.

peak lactic acid
__.__ mmol/L

peak K^+
__ __.__ mEq/L or mmol/L

peak post-op creatine kinase*
__ __ __, __ __ __ U/L
__ __ hours after induction

first creatine kinase*
__ __ __, __ __ __
__ __ hrs after induction

last creatine kinase*
__ __ __, __ __ __
__ __ hrs after induction

***(recommended intervals for creatine kinase determination are 0, 6, 12, 24 hours after adverse reaction)**

serum myoglobin
__ __ ,__ __ __ ng/ml
__ __ hours after induction

urine myoglobin
__ __ ,__ __ __ mg/L
__ __ hours after induction

PT (prothrombin time)	INR	PTT (partial thromboplastin time)
__ __ seconds	__.__	__ __ seconds
laboratory upper limit of normal __ __ __ seconds		laboratory upper limit of normal __ __ __ seconds
platelet count __ __ __ , __ __ __		fibrinogen __ __ __ __ mg/dl

v. Monitoring utilized (**after** reaction occurred):
check all monitoring used

( ) blood pressure monitor
( ) electrocardiograph
( ) stethoscope
( ) arterial catheter
( ) central venous catheter
( ) pulmonary artery catheter
( ) end-tidal PCO_2
( ) pulse oximeter
( ) bladder (Foley) catheter

temperature probes:
( ) axillary
( ) bladder
( ) esophageal
( ) nasopharyngeal
( ) rectal
( ) skin – electronic
( ) skin - liquid crystal
( ) tympanic
( ) other monitoring *(specify)*:_____

w. Treatment given for possible or fulminant MH
check all treatments utilized; fill in the blanks
( ) Volatile anesthetics discontinued
__ __.__ __ Time (***after induction***)
(hours and minutes since induction)
( ) Anesthesia machine changed
( ) Anesthesia circuit changed
( ) Hyperventilation with 100% oxygen
( ) Dantrolene (type)
( ) Dantrium
( ) Revonto
( ) Ryanodex
__ __ __.__ Initial dose (mg)
__ __.__ __ Time of first dose (***after induction***)
(hours and minutes since induction)

__ __ __ __.__ Total dose (mg)

__ __.__ __ Time of last dose (***after induction***)
(hours and minutes since induction)

( ) Active cooling
( ) Fluid loading
( ) Furosemide
( ) Mannitol
( ) Bicarbonate
( ) Glucose, insulin
( ) Amrinone
( ) Bretylium
( ) Vasopressor
( ) Lidocaine
( ) Procainamide
( ) CPR
( ) Defibrillation
( ) other *(specify)* _____
( ) none of the above

28. Mark any of the following that were noted after dantrolene was given:
( ) Decrease in heart rate.
( ) Decrease in end-tidal carbon dioxide or carbon dioxide tension in blood.
( ) Decrease in temperature.
If none were noted, please skip to question 35

29. How many minutes after dantrolene administration was the maximum decrease in this sign noted and what was the magnitude of this change?
Heart rate
(_ _ _) minutes
(_ _) (beats/min)
Carbon dioxide
(_ _ _) minutes
(_ _) (mmHg or torr)
Temperature
(_ _ _) minutes
(__ __.__ ºC) or (__ __ __ ºF)

30. Were any problems noted with the dantrolene administration?
check one
( ) yes
( ) no
If no, please skip to question 32

31. What were the observed dantrolene complications?
check all applicable
( ) phlebitis
( ) excessive secretions
( ) gastrointestinal upset
( ) hyperkalemia
( ) muscle weakness

( ) respiratory failure
( ) other *(specify)*:_____

32. Did the patient develop additional signs or symptoms after initial adequate treatment (recrudescence)? *check one*
( ) yes
( ) no
If no, please skip to question 35

33. What was the time of the recrudescence?
__ __ : __ __ time (hours after anesthetic induction)

34. Signs of recrudescence that were noted:
(judged to be inappropriate by the attending anesthesiologist or other physician)
RANK in order of appearance.
(*a number may be used more than once if signs were noted simultaneously*)
___ masseter spasm: mouth cannot be fully opened but intubation possible
___ masseter spasm: teeth clamped shut, intubation via direct visualization impossible
___ generalized muscular rigidity
___ cola colored urine
___ tachypnea
___ hypercarbia
___ cyanosis
___ skin mottling
___ sinus tachycardia
___ ventricular tachycardia
___ ventricular fibrillation
___ elevated temperature
___ rapidly increasing temperature
___ sweating
___ excessive bleeding
___ hypertension > 20% of baseline
___ other *(specify)*:_____

ADVERSE METABOLIC REACTION TO ANESTHESIA (AMRA) REPORT

35. If an AMRA Report was submitted, did you review it after pertinent anesthesia records were obtained?
check one
( ) yes
( ) no
If no, skip to question 57

AMRA number (if known) ___ ___ ___ ___ ___

36. Were errors found in the AMRA Report?
check one
( ) yes
( ) no *If yes, specify* _____

LABORATORY EXAM:

Serum Creatine Kinase

37. Creatine kinase at the time of evaluation:
___ ___ ___ , ___ ___ ___ U/L

38. Laboratory upper limit of normal for creatine kinase
___ ___ ___U/L

Muscle Biopsy

39. Was a MH diagnostic muscle biopsy indicated?
check one
( ) yes
( ) no
Note: If no, then skip to question 55

40. What was the reason for the MH diagnostic muscle biopsy?
check all applicable
( ) fulminant MH
( ) possible MH event (may include MMR), AMRA Report completed
( ) possible MH event (may include MMR), AMRA Report not completed
( ) family history of MH
( ) control
( ) negative genetic test
location _____
date _____
exons examined _____
_____
( ) other *(specify):*_____

41. Date of muscle biopsy

___ ___ ___ ___ \ ___ ___ \ ___ ___
year month day

42. Time of anesthetic induction for muscle biopsy

___ ___ : ___ ___ (military time)

43. Time muscle was excised

___ ___ : ___ ___ (military time)

44. Which muscle was biopsied?
check one
( ) vastus
( ) rectus abdominus
( ) gracilis
( ) other *(specify):*_____

45. Were any medications being taken at the time of biopsy?
check one
( ) yes
( ) no

If yes, specify type of medication:

Type of agent	Name of Drug	Hrs. before biopsy
calcium channel blocker	_____	____
neuroleptic agent	_____	____
adrenergic agent	_____	____
lipid lowering agent	_____	____
other	_____	____

46. Premedication and anesthetic agents utilized (for biopsy):
check all applicable

( ) sodium citrated citric acid (Bicitra)
( ) cimetidine (Tagamet)
( ) famotidine (Pepcid)
( ) lansoprazole (Prevacid)
( ) ranitidine (Zantac)

( ) metoclopramide (Reglan)
( ) omeprazole (Prilosec)

( ) atropine
( ) glycopyrrolate (Robinul)
( ) scopolamine (Hyoscine)

( ) dolasetron (Anzemet)
( ) droperidol (Inapsine)
( ) hydroxyzine (Vistaril)
( ) ondansetron (Zofran)
( ) promethazine (Phenergan)
( ) diphenhydramine (Benedryl)

( ) clonidine (Duraclon)

( ) dexmedetomidine
( ) ketorolac (Toradol)
( ) acetaminophen (Tylenol)

( ) diazepam (Valium)
( ) lorazepam (Ativan)
( ) midazolam (Versed)

( ) etomidate (Amidate)
( ) ketamine (Ketalar)
( ) propofol (Diprivan)

( ) alfentanil (Alfenta)
( ) fentanyl (Sublimaze)
( ) fentanyl and droperidol (Innovar)
( ) meperidine (Demerol)

( ) morphine
( ) remifentanyl (Ultiva)
( ) sufentanil (Sufenta)
( ) hydromorphone (Dilaudid)
( ) unknown
( ) nitrous oxide
( ) flumazenil (Romazicon)
( ) nalbuphine (Nubain)
( ) naloxone (Narcan)

( ) atracurium (Tracrium)
( ) cisatracurium (Nimbex)
( ) rocuronium (Zemuron)
( ) vecuronium (Norcuron) ( ) pancuronium (Pavulon)
( ) other NMB
( ) **IM** succinylcholine (Anectine)
( ) **IV** succinylcholine (Anectine)
( ) **NO** succinylcholine
( ) edrophonium (Tensilon)

( ) neostigmine (Prostigmin)
( ) physostigmine (Antilirium)
( ) pyridostigmine (Mestinon)

( ) bupivacaine (Marcaine)
( ) levo-bupivacaine
( ) choroprocaine (Nesacaine)
( ) cocaine
( ) etidocaine (Duranest)
( ) lidocaine (Xylocaine)
( ) mepivacaine (Carbocaine)
( ) prilocaine (Citanest)
( ) procaine (Novocain)
( ) ropivacaine (Naropin)
( ) tetracaine (Pontocaine)

( ) epinephrine
( ) ephedrine
( ) neosynephrine

( ) other *(specify):*_____

46a. Type of anesthetic used for biopsy:
check all applicable
( ) monitored anesthesia care (local standby)
( ) regional anesthesia
( ) spinal anesthesia
( ) epidural anesthesia
( ) general anesthesia **without** endotracheal intubation
( ) general anesthesia **with** endotracheal intubation
( ) general anesthesia with a face mask
( ) general anesthesia with a laryngeal mask airway

HISTOLOGY

47. Was muscle histology performed?
check one
( ) yes
( ) no
If no, skip to question 48

48. The muscle histology result was:
check one
( ) normal
( ) abnormal
( ) equivocal
If normal, skip to question 48

49. What were the abnormal histologic findings?
check one
( ) diffusely distributed internal nuclei
( ) other *(specify abnormality, write pending if results not available)*
_____

50. Was muscle histochemistry performed?
check one
( ) yes
( ) no
If no, skip to question 51

51. The muscle histochemistry result was:
check one
( ) normal
( ) abnormal
( ) equivocal
If normal, skip to question 51

52. Specify results of muscle histochemistry:
check one
( ) moth-eaten fibers
( ) cores
( ) other *(specify abnormality, write pending if results not available)*
_____

CONTRACTURE TESTS

53. In your lab, when muscle is exposed to 3% halothane, what is the minimum contracture indicating MH susceptibility?
0. ___ ___ grams

54. To date, how many control patients has this lab evaluated with the 1989 Biopsy Standards protocol? ___ ___ ___ ___

55. MH Diagnostic Muscle Biopsy Results

check one

( ) positive -- MH susceptible
( ) negative -- not susceptible to MH
( ) equivocal -- MH susceptibility not determined
( ) control biopsy

56. Contracture Test Results

	TENSION IN GRAMS MEASURED FROM ZERO OF MEASURING SCALE		
HALOTHANE AT 3% (*Required*):	**Strip 1**	**Strip 2**	**Strip 3**
Hours between excision to completion of test (h).....	__ . __ __	__ . __ __	__ . __ __
Stimulation:			
duration (milliseconds).....	__	__	__
frequency (Hz).....	__ . __	__ . __	__ . __
voltage (volts)	__ __ . __	__ __ . __	__ __ . __
current (mA)	__ __	__ __	__ __
Was a length/tension curve done?			
check one.....	( ) no	( ) no	( ) no
.....	( ) yes	( ) yes	( ) yes
Pre-drug twitch tension (g)..... *(measure from baseline for twitch tension only)*	__ __ . __ __	__ __ . __ __	__ __ . __ __
Pre-drug tension 3% hal(g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Low point tension 3% hal(g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Contracture tension developed to 3% hal(g)	__ __ . __ __	__ __ . __ __	__ __ . __ __
Do you consider the tension developed to be abnormal? *check one*.....	( ) no	( ) no	( ) no
.....	( ) yes	( ) yes	( ) yes
Length (cm).....	__ . __ __	__ . __ __	__ . __ __
Wet Weight (g).....	. __ __ __	. __ __ __	. __ __ __

TENSION IN GRAMS MEASURED FROM ZERO OF MEASURING SCALE

	Strip 1	**Strip 2**	**Strip 3**
CAFFEINE ALONE (*Required*):			
Hours between excision to completion of test (h).....	__ . __ __	__ . __ __	__ . __ __
Stimulation:			
duration (milliseconds).....	__	__	__
frequency (Hz).....	__ . __	__ . __	__ . __
voltage (volts)	__ __ . __	__ __ . __	__ __ . __
current (mA)	__ __	__ __	__ __
Was a length/tension curve done?			
check one.....	( ) no	( ) no	( ) no
.....	( ) yes	( ) yes	( ) yes
Pre-drug twitch tension (g)..... *(measure from baseline for twitch tension only)*	__ __ . __ __	__ __ . __ __	__ __ . __ __
Predrug tension 0.5mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Plateau tension 0.5mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Predrug tension 1.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Plateau tension 1.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Predrug tension 2.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Plateau tension 2.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Predrug tension 4.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Plateau tension 4.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Predrug tension 8.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Plateau tension 8.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Predrug tension 32.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Plateau tension 32.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
CSC (mM).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
% response at 2mM.....	__ __ . __ __	__ __ . __ __	__ __ . __ __

TENSION IN GRAMS MEASURED FROM ZERO OF MEASURING SCALE

	Strip 1	**Strip 2**	**Strip 3**
Do you consider the tension developed to be abnormal? *check one*.....	( ) no	( ) no	( ) no
	( ) yes	( ) yes	( ) yes
If yes, at what concentration?	__ __	__ __	__ __
If yes, at what CSC?	__ __	__ __	__ __
If yes, at what % response?	__ __	__ __	__ __
Length (cm).....	__ . __ __	__ . __ __	__ . __ __
Wet Weight (g).....	.__ __ __	. __ __ __	. __ __ __
HALOTHANE 1% & CAFFEINE (*Optional*):	**Strip 1**	**Strip 2**	**Strip 3**
Hours between excision to completion of test (h).....	__ . __ __	__ . __ __	__ . __ __
Stimulation:			
duration (milliseconds).....	__	__	__
frequency (Hz).....	__ . __	__ . __	__ . __
voltage (volts)	__ __ . __	__ __ . __	__ __ . __
current (mA)	__ __	__ __	__ __
Was a length/tension curve done?			
check one.....	( ) no	( ) no	( ) no
.....	( ) yes	( ) yes	( ) yes
Pre-drug twitch tension (g)..... *(measure from baseline for twitch tension only)*	__ __ . __ __	__ __ . __ __	__ __ . __ __
Pre-drug tension 1% hal(g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Low point tension 1% hal(g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Contracture tension developed to 1% hal(g)..	__ __ . __ __	__ __ . __ __	__ __ . __ __
Predrug tension 0.25mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Plateau tension 0.25mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Predrug tension 0.5mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Plateau tension 0.5mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __

TENSION IN GRAMS MEASURED FROM ZERO OF MEASURING SCALE

	Strip 1	**Strip 2**	**Strip 3**
Predrug tension 1.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Plateau tension 1.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Predrug tension 2.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Plateau tension 2.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Predrug tension 4.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Plateau tension 4.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Predrug tension 32.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Plateau tension 32.0mM (g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
HCSC (mM).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Do you consider the tension developed to be abnormal? *check one*.....	( ) no	( ) no	( ) no
.....	( ) yes	( ) yes	( ) yes
If yes, at what concentration?	__ __	__ __	__ __
If yes, at what HCSC?	__ __	__ __	__ __
Length (cm).....	__ . __ __	__ . __ __	__ . __ __
Wet Weight (g).....	. __ __ __	. __ __ __	. __ __ __
HALOTHANE AT 2% (*Optional*):	**Strip 1**	**Strip 2**	**Strip 3**
Hours between excision to completion of test (h).....	__ . __ __	__ . __ __	__ . __ __
Stimulation:			
duration (milliseconds).....	__	__	__
frequency (Hz).....	__ . __	__ . __	__ . __
voltage (volts) __ __ . __ __ __ . __ __ __ . __			
current (mA) __ __ __ __ __ __			
Was a length/tension curve done? *check one*.....( ) no	( ) no	( ) no	( ) no
.....	( ) yes	( ) yes	( ) yes
Pre-drug twitch tension (g)..... *(measure from baseline for twitch tension only)*	__ __ . __ __	__ __ . __ __	__ __ . __ __

TENSION IN GRAMS MEASURED FROM ZERO OF MEASURING SCALE

	Strip 1	**Strip 2**	**Strip 3**
Pre-drug tension 2% hal(g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Low point tension 2% hal(g).....	__ __ . __ __	__ __ . __ __	__ __ . __ __
Contracture tension developed to 2% hal(g)..	__ __ . __ __	__ __ . __ __	__ __ . __ __
Do you consider the tension developed to be abnormal? *check one*.....			
	( ) no	( ) no	( ) no
	( ) yes	( ) yes	( ) yes
Length (cm).....	__ . __ __	__ . __ __	__ . __ __
Wet Weight (g).....	. __ __ __	. __ __ __	. __ __ __

TISSUE AND BLOOD STORAGE

57. Has additional muscle tissue been stored?
check one
( ) yes
( ) no
*If yes, specify Sample ID No:*_____

Location _____

58. Has an additional blood specimen been stored?
check one
( ) yes
( ) no
*If yes, specify Sample ID No:*_____

DNA TESTING

59. Was a genetic exam performed?
check one
( ) yes ( ) unknown
( ) no

60. Where was the genetic test done?

_____

60a. Is a sample of the DNA stored in the lab?
( ) yes
( ) no

61. When was the genetic test done?

_____

62. Which of the RYR1 exons were examined?
_____ _____
_____ _____
_____ _____
If unknown, check here ( )

63. Was any mutation associated with MH or central core disease present?
check one
( ) yes ( ) unknown
( ) no
If yes, specify _____

64. Were any other sequence variants identified?
check one
( ) yes
( ) no
If yes, specify _____

COMMENTS ON PATIENT (Optional)

_____

_____

_____

_____

Please mail original to:

The North American Malignant Hyperthermia Registry
University of Florida
Department of Anesthesiology
1600 SW Archer Road, PO Box 100254
Gainesville, FL 32610

MH BIOPSY CENTER CODE NUMBERS

Wake Forest University…….....……	06
Toronto General Hospital …….....	05
University of California at Davis.....	07
Uniformed Services University.....	16
University of Minnesota.....	24