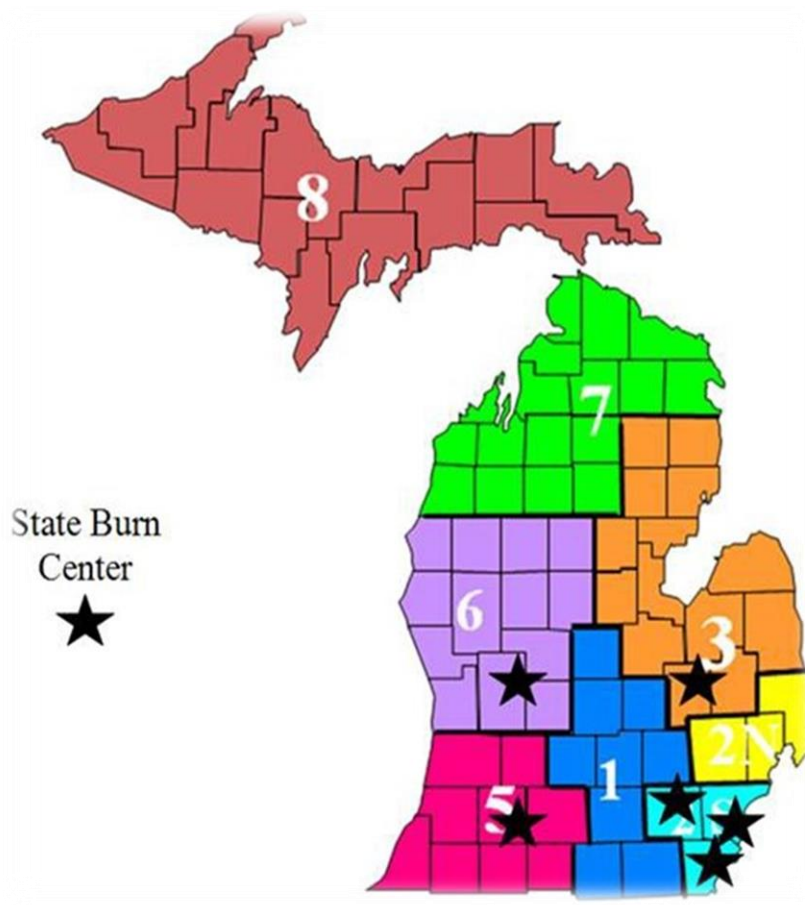




# **BURN MASS CASUALTY INCIDENT (BMCI) SURGE PLAN**



**State Burn Coordinating Center (SBCC)**

**Phone #: 734-936-2876**

**Fax #: 734-232-4892**

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## **Introduction**

The following Burn Mass Casualty Incident (BMCI) Surge Plan has been developed in an effort to expand the ability to provide burn care, to safeguard and prioritize the utilization of limited resources. The Michigan Department of Health and Human Services (MDHHS) recognizes that no one state has the capability to meet the identified increased capacity needs of a significant incident involving large numbers of burn patients. This plan incorporates the utilization of “adjusted environments of care,” by planning for the provision of stabilizing care for burn patients in facilities that are not normally associated with providing definitive care to burn patients. The ability to standardize the care that will be provided in hospitals that do not provide definitive burn care has been agreed upon in an endeavor to safeguard critical resources and, ultimately, improve outcomes for patients.

This plan incorporates the use of burn stages to provide context for the scope of an incident and should not be viewed as prescriptive. Given even the limited availability of definitive burn care at the national level, it is understood that even a “relatively minor” incident may indicate a need for accessing resources from one or more of the planning partners to ensure the best possible outcomes for patients. This document should be viewed as a guide for planning a coordinated response in a mass casualty burn environment as defined by the burn stages outlined in this text.

This plan outlines the use of a long acting silver impregnated dressing to treat burn patients. The identification of this type of dressing is meant to serve as a guide for health care partners. It is understood that the choice of which brand of product to use should and will be based on current practices. The choice to use a silver impregnated dressing for this type of MCI is critical to this plan’s success. Use of this type of dressing significantly reduces the number of patient care hours needed per burn victim and reduces the need for specialty trained nursing care, both of which are critical elements to the success of any plan directed at increasing surge capacity.

It is not the intention of the document to suggest patient care practices at Michigan recognized burn centers.

This plan develops non-traditional burn care resources to provide surge capacity during a MCI and to protect those facilities with definitive burn care capacity from being overwhelmed through the use of offsite triage and stabilization. By developing this type of surge capacity, facilities can maximize the use of critical definitive care resources.

The purpose of this plan is to assist local jurisdictions and regional Healthcare Coalitions (HCC) in planning for and providing a uniform coordinated response to a BMCI when the incident has exceeded local resources.

This plan has been designed as an adjunct to local preparedness efforts. It defines what constitutes a BMCI. It also provides guidance to each regional HCC in providing a uniform assessment of current capacity to care for burn patients and an assessment of burn surge capabilities.

This plan applies to all levels of government to include the local, regional, state and/or multi-state level. It provides guidance for:

- Uniform triage of burn patients
- Categorization of hospital resources
- Critical burn surge supplies based on regional population and projected surge capacity needs
- Staff and training readiness for patient care
- A communication model for the management of BMCI

Efforts are ongoing to coordinate the capacity to care for patients during a BMCI. The MDHHS, Division of Emergency Preparedness and Response (DEPR) participates with the Great Lakes Healthcare Partnership (GLHP) as part of medical and public health preparedness (*Appendix U*). These Health and Human Services (HHS) Region V partners are also working to adopt a similar organizational approach to managing the surge of burn patients from a MCI.

The extent of injury seen in patients involved in a BMCI will vary in degree, criticality and, as such, the extent and intensity of care, resources required will vary significantly. This is critical in assessing existing burn capacity as it relates to the development of resources identified by any state. MDHHS DEPR utilized the planning assumption of 60% of the Health Resources and Services Administration (HRSA) benchmark of 50 patients per million populations will sustain a 30% Total Body Surface Area (TBSA) injury (on average)<sup>1</sup> as a planning paradigm.

It is also understood that federal assets may not be readily available and the need for both self-reliance and the assistance of the partners developed within the GLHP may be critical to optimize patient outcomes.

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<sup>1</sup> U.S. Department of Health and Human Services, Health Resources and Services Administration, Special Programs Bureau. National Bioterrorism Hospital Preparedness Program, Catalog of Federal Domestic Assistance (CFDA) 93.003; 2004.

## **Authority**

The Hospital Preparedness Program (HPP) cooperative agreement, as authorized by section 319C-1 of the Public Health Service (PHS) act, as amended by the Pandemic and All-Hazards Preparedness Act (PAHPA)<sup>2</sup> (P.L. 109-417) and the Emergency Medical Services (EMS) and Trauma Systems Section under Part 209 of PA 368 of 1978. Pandemic and All-Hazards Preparedness Act (PAHPA), Public Law No. 109-417. <sup>22,33</sup>

PAHPRA is the Pandemic and All-Hazards Preparedness Reauthorization Act of 2013 (PAHPRA)<sup>4</sup> (Public Law 113-5).<sup>1</sup> Bill H.R. 307 was signed into law to reauthorize the Pandemic and All-Hazards Preparedness Act of 2006 (PAHPA) (Public Law 109-417) and to develop new authorities to sustain and strengthen national preparedness for public health emergencies involving CBRN agents, including emerging infectious disease threats (e.g., pandemic influenza). <sup>44</sup> Pandemic and All-Hazards Preparedness Reauthorization Act of 2013 (PAHPRA), Public Law 113-5.

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<sup>2</sup> <http://www.phe.gov/preparedness/legal/pahpa/pages/default.aspx>. Accessed June 11, 2017

<sup>3</sup> <http://www.phe.gov/Preparedness/legal/pahpa/Pages/pahpra.aspx>. Accessed, June 11 2017

<sup>4</sup> <http://www.phe.gov/Preparedness/legal/pahpa/section201/Documents/section201-guidance.pdf>. Accessed June 11, 2017

## **Definition of a Burn Mass Casualty Incident**

For the purposes of this plan, qualitative factors that may cause a local jurisdiction to declare an emergency or disaster may include, but are not limited to mass casualties involving:

- Inhalation injuries
- Size, depth and location of the burn area
- Chemical or radiological contamination/exposure
- Presence of other trauma related injuries which compound the intensity of care and resources required for ongoing patient care
- Casualty transport resources
- Co-existence of other major BMCIs in other areas of the State or multi-state region

### **Burn Mass Casualty Incident Stages**

During a **Burn Stage I** incident, state burn centers and burn centers in neighboring states will manage as many patients who meet the Burn Center Referral Criteria (*Appendix F*) as available resources permit. Once it is recognized that the potential for the event to exceed local resources exists, then the regional Medical Coordination Center (MCC) and the local Emergency Operations Center (EOC), with the assistance of the State Burn Coordinating Center (SBCC), should begin to coordinate medical response efforts with the Community Health Emergency Coordination Center (CHECC) and the State Emergency Operations Center (SEOC) (*Appendix C*).

Burn Surge Facilities (BSFs) will be utilized as needed to care for and house other burn patients pending transfer to recognized burn centers. For Burn Stage I incidents, it is expected that all burn casualties will be transferred within 24-48 hours to burn centers in Michigan and if needed neighboring states. If the existing burn center resources are exhausted, patients will be referred utilizing the process outlined in Burn Stage II.

During a **Burn Stage II** incident, state burn centers will manage as many patients as possible given the resources available for patients meeting the Burn Center Referral Criteria (*Appendix F*). When burn center bed capacity has been exceeded, or transport is not feasible, regional BSFs may be utilized to provide care and to house patients. The SBCC, CHECC and the SEOC will facilitate the coordination of other burn resources with the GLHP, as well as the American Burn Association National Network of burn centers, using the BMCI Response Protocol.

During a **Burn Stage III** incident, state burn centers will provide care for as many patients as they have resources to support care that meet the Burn Center Referral Criteria



*(Appendix F)*. When burn center bed capacity has been exceeded or transport is not feasible, regional BSFs may be utilized to care for and house patients. The process for the transfer of patients out of state utilizing the GLHP will begin once all in state resources are exhausted. This process will be coordinated through established incident command structure.

Mass Casualty	Definition	Plan
<p><b>Stage I</b></p>	<p><b>Any event in which local trauma/burn resources are overwhelmed with patients (example: 10-24 patients):</b></p> <ul style="list-style-type: none"> <li>• Have ≥30% TBSA burn</li> <li>• Meet Burn Center Referral Criteria (<i>Appendix F</i>).</li> <li>• Qualitative or quantitative nature of injuries exceed local capacity to provide effective care.</li> </ul>	<ul style="list-style-type: none"> <li>• Individual health care facilities will manage the patients.</li> <li>• Regional MCC will communicate with MDHHS CHECC who contacts the SEOC with the SBCC.</li> <li>• The CHECC will communicate with the SBCC who provides consultation and coordinates bed availability for the impacted healthcare facilities.</li> <li>• State burn centers and burn centers in neighboring states in close proximity to the incident will manage as many patients as resources permit. Burn patients are defined at those casualties that meet Burn Center Referral Criteria (<i>Appendix F</i>).</li> <li>• BSFs may be utilized as needed to briefly care for patients until transferred to a recognized burn center.</li> </ul>
<p><b>Stage II</b></p>	<p><b>Any event in which regional trauma/burn resources are overwhelmed with patients (example: 25 – 100 patients):</b></p> <ul style="list-style-type: none"> <li>• Have ≥ 30% TBSA burn</li> <li>• Qualitative or quantitative nature of injuries exceeds defined capacity of the region.</li> </ul>	<ul style="list-style-type: none"> <li>• Individual health care facilities will manage patients.</li> <li>• Regional MCC will communicate with MDHHS CHECC, who contacts the SEOC, with the SBCC.</li> <li>• The CHECC will communicate with the SBCC who provides consultation and coordinates bed availability for the impacted healthcare facilities.</li> <li>• State burn centers and burn centers in neighboring states in close proximity to the incident will manage as many patients as resources permit. Burn patients are defined at those casualties that meet Burn Center Referral Criteria (<i>Appendix F</i>).</li> <li>• BSFs may be utilized as needed to briefly care for patients until transferred to a recognized burn center.</li> <li>• If existing burn center resources are exhausted, patients will be referred utilizing process outlined in Burn Stage III (see below).</li> </ul>
<p><b>Stage III</b></p>	<p><b>Any event in which state trauma/burn resources are overwhelmed with patients (example: &gt; 100 patients or the potential to have &gt; 100 patients exists):</b></p> <ul style="list-style-type: none"> <li>• Have ≥ 30% TBSA burn</li> <li>• Qualitative or quantitative nature of injuries exceeds defined capacity of the state.</li> </ul>	<ul style="list-style-type: none"> <li>• Individual health care facilities will manage patients.</li> <li>• Regional MCC will communicate with MDHHS CHECC who contacts the SEOC, with the SBCC.</li> <li>• CHECC in coordination with SEOC supports local MCC and EOCs, respectively.</li> <li>• SBCC assists BSFs and works with MCCs and CHECC to facilitate coordination of other burn resources with Great Lakes Healthcare Partnership and the American Burn Association (ABA) national network of burn centers.</li> <li>• State burn centers will manage as many patients as resources permit who meet Burn Center Referral Criteria (<i>Appendix F</i>) and assist near-by BSFs as able.</li> <li>• If ABA is unavailable or transport is not feasible, BSFs will be utilized to house patients. BSFs will care for and house patients until transport to a more distant burn center can be achieved (preferably within 72 hours). If needed, patients may be transferred to more distant BSFs in Michigan and neighboring states.</li> </ul>

## **Concept of Operations**

In the event of a BMCI, the 13 BSFs should plan to provide initial treatment and stabilization for burn victims triaged as meeting the criteria for a referral to a burn center. Planning projections should be based on a population ratio of 50 casualties per million, or a minimum of 25 patients.<sup>55</sup> This capacity planning should incorporate the development of non-traditional burn bed resources to include:

- Initial and ongoing training in burn triage
- Categorization of injuries
- Patient care
- Supply caches capable of supporting patient care for at least 72 hours

In order to successfully create an operational statewide plan, four basic premises must be uniformly understood and incorporated into each response plan for BMCIs. The four basic concepts of operational importance are:

1. Regional MCCs which serves as a Multi-Agency Coordination System (MACS) within each HCC to support the burn centers, BSFs and local EOCs.
2. Utilization of a SBCC.
3. Maximum utilization of the state's six burn centers.
4. Establishment of regional BSFs.

These defined resources will support each region's ability to coordinate regional care and movement of burn patients during a BMCI. Once the regional MCC has determined the scope of the BMCI and the needs of the patients, they will contact the CHECC to provide pertinent information and seek assistance. This may include a request for support to coordinate the care and placement of the burn patients. Essential Elements of Information (EEI) form (*Appendix E*) may include:

- Number of patients impacted (may be an estimate).
- An EMResource bed query being initiation.
- Status of any communications from the local EOC about medical health needs (as available).
- The status of the regional MCC activation indicating current staff and any other information which may be pertinent to the incident.

Upon notification the CHECC will evaluate the incident based on information provided through local and regional partners and the potential to have a statewide impact. The

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<sup>5</sup> U.S. Department of Health and Human Services, Health Resources and Services Administration, Special Programs Bureau. National Bioterrorism Hospital Preparedness Program, Catalog of Federal Domestic Assistance (CFDA) 93.003:2004

CHECC would activate and proceed with further state level communications including the SEOC. The decision to activate the BMCI plan will be based on multiple factors including the number of patients impacted, severity of injuries and burn center bed availability. The CHECC will be in communication with the SBCC, who will assess the status of burn bed capacity statewide. After incident data has been reviewed, the CHECC would continue communications with the regional MCC to discuss activation the State of Michigan MCI Burn Surge Plan.

With activation, the CHECC and the SBCC will formalize communications. The SBCC will identify stages based on:

### **Burn Stage I**

- Any event in which local trauma/burn resources are overwhelmed with patients (example: 10-24 patients).

### **Burn Stage II**

- Any event in which regional trauma/burn resources are overwhelmed with patients (example: 25-100 patients).

### **Burn Stage III**

- Any event in which state trauma/burn resources are overwhelmed with patients (example: Exceeds 100 patients).
- Location of Incident
- Medical Needs of the Patients
- Bed Availability
- Transport Time

Once the BMCI plan is activated, the decision to activate a BSF is based on criteria outlined in this plan. Below is a summary of some of the decision making that would be utilized by the CHECC and SBCC:

During a **Burn Stage I** incident:

- State burn centers and burn centers in close proximity to the incident including neighboring states will manage as many patients who meet the Burn Center Referral Criteria (*Appendix F*) as available, resources permit.
- BSFs will be utilized, as needed, to care for and house other burn patients, pending transfer to recognized burn centers.
- For Burn Stage I incidents, it is expected that all burn casualties will be transferred within 24-48 hours to burn centers in Michigan. If needed, neighboring states, if

available.

- If the existing burn center resources are exhausted, patients will be referred utilizing the process outlined in Burn Stage II.

During a **Burn Stage II** incident:

- State burn centers will manage as many patients as possible given the resources available for patients meeting the Burn Center Referral Criteria (*Appendix F*).
- When burn center bed capacity has been exceeded, or transport is not feasible, regional BSFs may be utilized to provide care and to house patients.
- Aside from those activities already initiated under Burn Stage II, the SBCC, CHECC and the SEOC will facilitate the coordination of other burn resources with the GLHP, as well as the American Burn Association (ABA) National Network of burn centers through their regional coordinator network.

**Once the plan has been activated, the SBCC will be responsible for:**

- Activating internal response disaster team.
- Notifying and coordinating with ABA to identify burn centers outside Michigan capable of receiving patients.
- Based on communication with the CHECC, activate BSFs within Michigan.
- Coordinate the triage of all burn patients to in-state and neighboring State burn centers and, if necessary, to in-state and neighboring state BSFs – sending and receiving.
- Support BSFs in the care of burn casualties during the initial 72 hours following the initial incident.
- Provide nurses and surgeons to assist in the secondary triage of burn casualties at the BSFs, if necessary through telemedicine and/or on-site visits.
- Pediatric strike teams and supplies can be deployed to assist in the stabilization and care of children in a BMCI through the activation of air ambulance services.
- Pediatric patients would be transferred to a burn center for definitive care as quickly as bed availability permits.
- Coordinate, in conjunction with the MCCs and the CHECC the triage, transfer and tracking of burn casualties to out-of-state burn centers.
- Communicate to the similar entity SBCC located within the GLHP as needed when patient management requires resources outside of Michigan.

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## **Organization and Assignment of Responsibilities**

### **Regional Medical Coordination Centers (MCC)**

A regional MCC (*Appendix W*) is activated when medical care coordination is needed in response to a real or potential MCI. This is outlined in Tier 2 in the Medical Surge Capacity and Capability <sup>66</sup>. The MCC functions on behalf of the regional HCC supporting Healthcare Organizations (HCOs) and assists the local and state incident management system with medically related coordination and resource allocation. The core component of the MCC operation must remain consistent, recognizing regional variations exist based on resources and assets available.

**The primary functions of the MCC are to support their HCO's and assist incident management officials with:**

- Serving as a support to hospitals, local EOCs, other regional HCCs and provide timely information to the CHECC. The SEOC is kept informed via the CHECC.
- Situational awareness of the HCOs within the HCC.
- Current availability of regional medical resources.
- Coordination of requests and receipt of intra and extra-regional medical resources EEI (*Appendix E*).
- Casualty Transportation System (CTS).
- Serving as the primary mechanism for medical communications with the CHECC (ESF #8)<sup>7</sup> consistent with Regional Preparedness/Response Plans.

### **State Burn Coordinating Center (SBCC)**

MDHHS Bureau of EMS, Trauma and Preparedness (BETP) has contracted with one healthcare facility to act as the SBCC. This facility is the University of Michigan Health System Burn Center and is responsible for assisting the regional MCCs, CHECC and the SEOC in managing a BMCI in which the resources of any given region or the state are exceeded. The SBCC must be an American College of Surgeons (ACS) certified hospital demonstrating expertise in the care of burn patients; as well as the ability to provide staff assistance to MCCs from beyond their geographic region, the state, or other states involved with the management of a coordinated plan for BMCIs.

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<sup>6</sup> <https://www.phe.gov/Preparedness/planning/mscc/Documents/mscctier2jan2010.pdf>. Accessed June 12, 2017.

<sup>7</sup> <https://www.fema.gov/pdf/emergency/nrf/nrf-esf-08.pdf>. Accessed June 12, 2017

**In considering a facility for selection as the SBCC the following capabilities are considered as criteria for designation:**

- Around-the-clock on call coverage by a burn surgeon and burn disaster response support team.
- Telemedicine capabilities.
- Interoperable communications that include Michigan Public Safety Communications System (MPSCS) (800 MHz radio).
- ABA verification as a burn center.
- Michigan Health Alert Network (MIHAN) participation.
- Ability to serve in the role and continue to care for patients (under catastrophic conditions).
- The SBCC has web publication capabilities. This resulted in the Emergency Burn Triage and Management web page found at [www.MichiganBurn.org](http://www.MichiganBurn.org).

**To further support Michigan's planning for a BMCI, the SBCC has duties outside of incident response including:**

- Assist in the development of training protocols for personnel at designated BSFs and burn centers.
- Coordinate the maintenance and updating of burn related protocols at the BSF and regional HCCs.
- Develop and maintain a process for recording burn casualty reports associated with a MCI in which they are activated.
- Coordinate the rotation and updating of burn supply caches located within BSFs or other central locations.
- Coordinate the procurement of critical burn surgery supplies, such as skin Allograft and wound care products. Maintain a database of supply sources and contacts.
- Work with suppliers outside the state and coordinate supply distribution to other in-state burn centers.
- Demonstrate proficiency in the utilization of the MIHAN as well as other web-based resources to facilitate distribution of documents, protocols and databases needed for BMCI preparedness.
- Maintain documentation for potential reimbursement.
- Assist with education, training and exercises.
- Act as a liaison with coordinating burn centers from other states including the GLHP, on an ongoing basis, in support of inter-state planning activities.



## Michigan Burn Centers

Michigan currently has six healthcare facilities recognized as burn centers (*Appendix N*). They routinely accept burn referrals and are able to provide definitive care for burn patients, as defined by the American College of Surgeons<sup>88</sup>. These centers continue to serve their primary role during a BMCI, but will work in conjunction with the SBCC to manage the flow of burn surge patients to ensure the optimal use of the state's definitive burn care capacity.

## Burn Surge Facilities

The eight regional HCCs, working with the DEPR have established 13 hospitals to serve as a BSFs (*Appendix M*) strategically located throughout the eight regional HCCs (*Appendix V*).

Each regional HCC who has a burn center identified one BSF (the exception being Region 2 South due to the population density has two BSFs in addition to the three burn centers.) The Regions without a burn center identified two BSFs. The identification of these BSFs allowed for the development and education of the staff within the HCO, which may not typically treat burn patients beyond initial stabilization and transport, to provide care for initial 24-72 hours post incident.

**BSFs are hospitals that can care for burn patients based on the three defined Burn Stage (BS) responses:**

### Burn Stage I

- Any event in which local trauma/burn resources are overwhelmed with patients (example: 10-24 patients).

### Burn Stage II

- Any event in which regional trauma/burn resources are overwhelmed with patients (example: 25-100 patients).

### Burn Stage III

- Any event in which state trauma/burn resources are overwhelmed with patients (example: Exceeds 100 patients).

Each burn surge stage has been created based on an analysis of existing burn resources either currently in existence within each HCC, or based on the enhancement of the

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<sup>8</sup> American College of Surgeons. (2014). Optimal care of the injured patient. (pp 100-1) (<https://www.facs.org/~media/files/quality%20programs/trauma/vrc%20resources/resources%20for%20optimal%20care.ashx>). Accessed June 12, 2017

resources as provided for within this plan. The burns stages are linked to the HCC through the MCCs ability to respond to the burn stage with available resources. Assistance from other HCCs may be necessary and would be designated through collaboration between the SBCC and the CHECC.

Given the expectation that established state burn centers may initially be overwhelmed and transportation limited, BSFs should be responsible for the initial evaluation and stabilization of burn patients and preparation for transfer, if necessary, during the initial 72 hours. BSFs should have 24-hour coverage with 15 nurses and five physicians, American Burn Life Support (ABLS)-trained at a minimum. Patients treated and discharged by BSFs should be referred to a burn center for complications and any needed long-term follow-up.

**BSF Basic Selection Criteria:**

- BSFs are preferably Level I or II trauma centers. Telemedicine capabilities are desirable.
- In absence of a Level I or II trauma center, BSFs should, at a minimum, meet the general requirements of a Level III trauma center.
- BSFs must have 24 hour nursing care for burn patients. Sufficient numbers of nurses and physicians should be ABLS-trained such that an ABLS-trained nurse or physician should (at a minimum) be able to lead the care provided to patients.
- Each BSF should have at a minimum 15 nurses and five physicians ABLS-trained to be available in-house during a BMCI.
- BSFs will function as the initial stabilization, evaluation and transport staging center with support of the region's MCC and the CHECC if a BMCI occurs.

All eight HCCs have at least one ACS verified Level I or II trauma center that is not a burn center, but would be best suited to provide this level and complexity of patient care. The goal is a multilateral increase in short-term capabilities across the regions, state and ultimately throughout the GLHP. It is expected that the BSFs will need to care for some burn patients during the initial 72 hours to ensure the Michigan burn center resources are identified for the highest acuity burn casualties. The BSF will receive distance consultation support from the SBCC during this phase. It is expected that the SBCC will provide on-site burn consultation at the BSF for the secondary triage of burn casualties after the incident and as appropriate and able. All BSFs in the state should be prepared to receive burn casualties as triaged by the SBCC.

## **Patient Treatment Recommendations within the BSF**

A BMCI will tax all impacted hospitals. Care is focused on initial stabilization to include:

- Airway, Breathing, Circulation (ABCs)
- Fluid resuscitation (*Appendix J*)
- Pain management
- Wound care. Priority is to minimize patient pain, infection potential and to decrease time demands on health care staff until definitive burn care is available.
  - Wound care will typically be limited to the application of silver based long acting dressings. These types of dressings can be applied to burn wounds and left on without having to change them for three to five days.
  - Similar burn wounds as well as grossly contaminated wounds will require more frequent daily dressings with Silver sulfadiazine cream (Silvadene) or other anti-microbial preparations.
  - Facial burns will be treated with anti-bacterial ointment (Bacitracin/Neosporin) whichever the facility has on hand.
  - Scalp and facial hair should be shaved daily.
  - Scalp wounds should be covered with Silver sulfadiazine (Silvadene) cream.

(For complete treatment recommendations, refer to *Appendix I*)

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## **Patient Transport**

A critical element of this, or any healthcare response plan for a MCI, is the underlying assumption of the ability and availability of resources to transport patients to facilities that are able to provide optimal care based on the nature of the injuries. When planning for patient transport, it is important to assure that there is enough redundancy to cover the multiple transports that will occur during a BMCI (*Appendix K*).

In order to maximize the ability to provide patient transfer to optimize patient care, MDHHS DEPR and the HCCs are working to create Ambulance Strike Teams and other innovative casualty transport system (CTS) mechanisms. In an event that is categorized as Burn Stage I, a local EOC can request deployment of one or more regional ambulance strike teams or utilize other CTS that are available, as provided within each of the regional HCCs Preparedness Plan. If an incident is categorized as a Burn Stage II or Burn Stage III, then the coordination of a request for regional Ambulance Strike Teams should be considered through consultation between the incident's MCC, CHECC and SEOC.

It is anticipated that any Burn Stage II incident and many Burn Stage III incidents could warrant activation of the National Disaster Medical System (NDMS). NDMS is a federal resource involving a nationwide network of civilian and military hospitals that may be mobilized to support major disasters and MCIs. NDMS uses military aircraft to transfer patients from the affected areas to distant locations across the nation. In addition, NDMS can deploy specialized Disaster Medical Assistance Teams (DMATs) to provide basic medical care within the area impacted by the disaster. The CHECC maintains primary responsibility to collaborate with the SEOC conducting on-going assessments for the need for NDMS. In the event the SEOC activates NDMS based on a request, the CHECC and SEOC will work with the regional MCCs and local EOCs, respectively, to promote an effective and timely response.

### **Documentation of Casualties**

To utilize resources appropriately and keep from overwhelming the BSFs, careful documentation of all burn casualties is a priority. The following four forms as well as the information placed on the BMCI database will be utilized throughout the incident:

- Essential Elements of Information (*Appendix E*)
- Initial Burn Casualty Report Form (*Appendix P*)
- Follow-up Burn Casualty Report Form (*Appendix Q*)
- Burn Surge Facility Casualty Census Form (*Appendix R*)

The SBCC monitors all incident documentation to assist in the development of an ongoing plan of care for patients as well as an after action report at the conclusion of the incident for lessons learned and corrective actions.

Patients being transferred must have specific paperwork and information with them. See *Appendix S* for complete list.

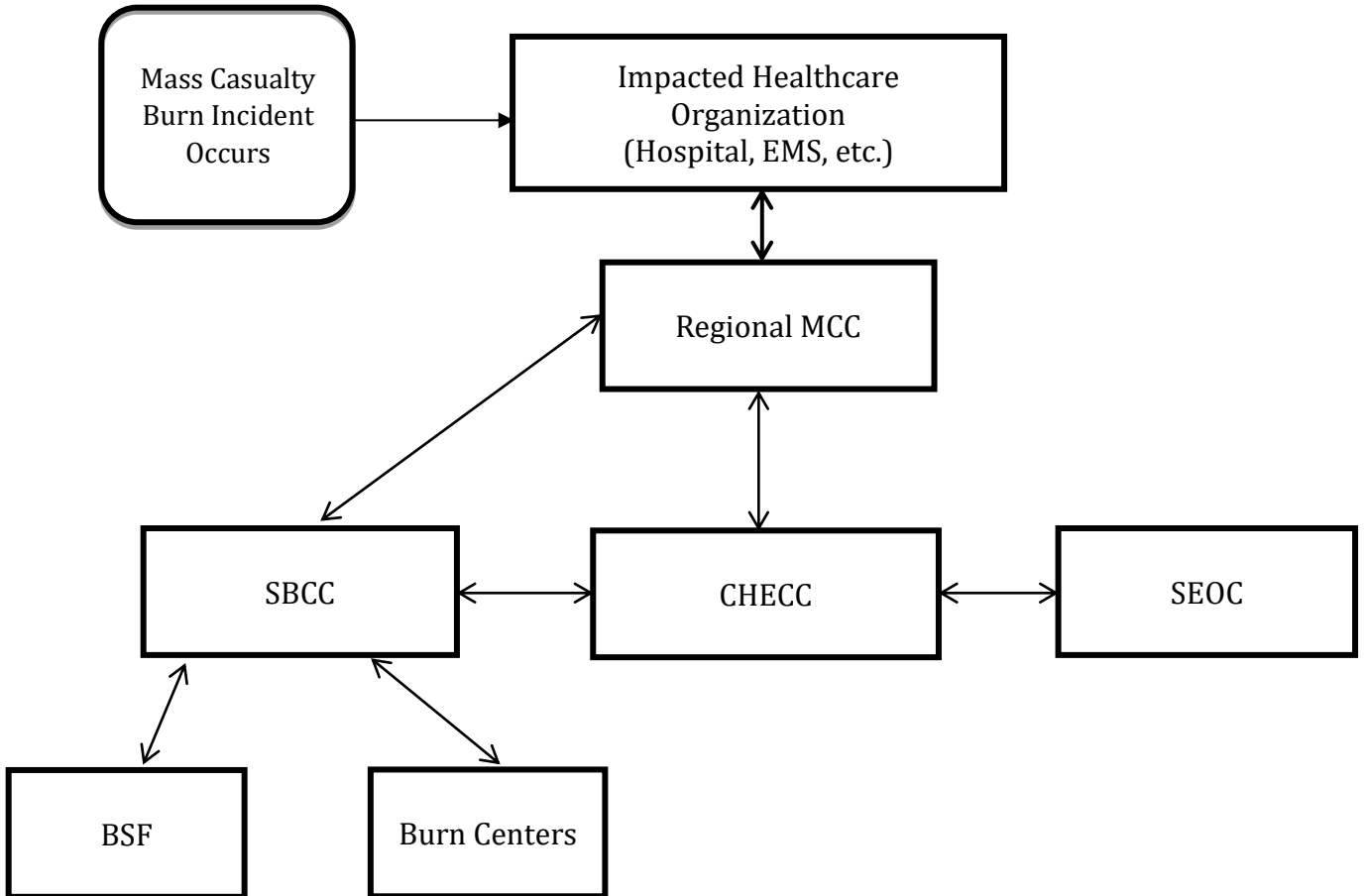
Long transfers (two hours or greater) by ground, must use a MI-Burn EMS Inter-facility Transfer Note form (*Appendix T*). This information provides the EMS personnel with tips to keep the patient stable during transport and a reminder of necessary communications with both the sending and receiving hospitals. The form also provides the phone numbers of the burn centers for quick reference. There is also a worksheet to calculate necessary supplies prior to transport. The form provides information to the receiving hospital team in the form of a brief report: including vital signs, medications given, airway placement, ventilator support, and intake and output during the transfer.

# **Appendices**

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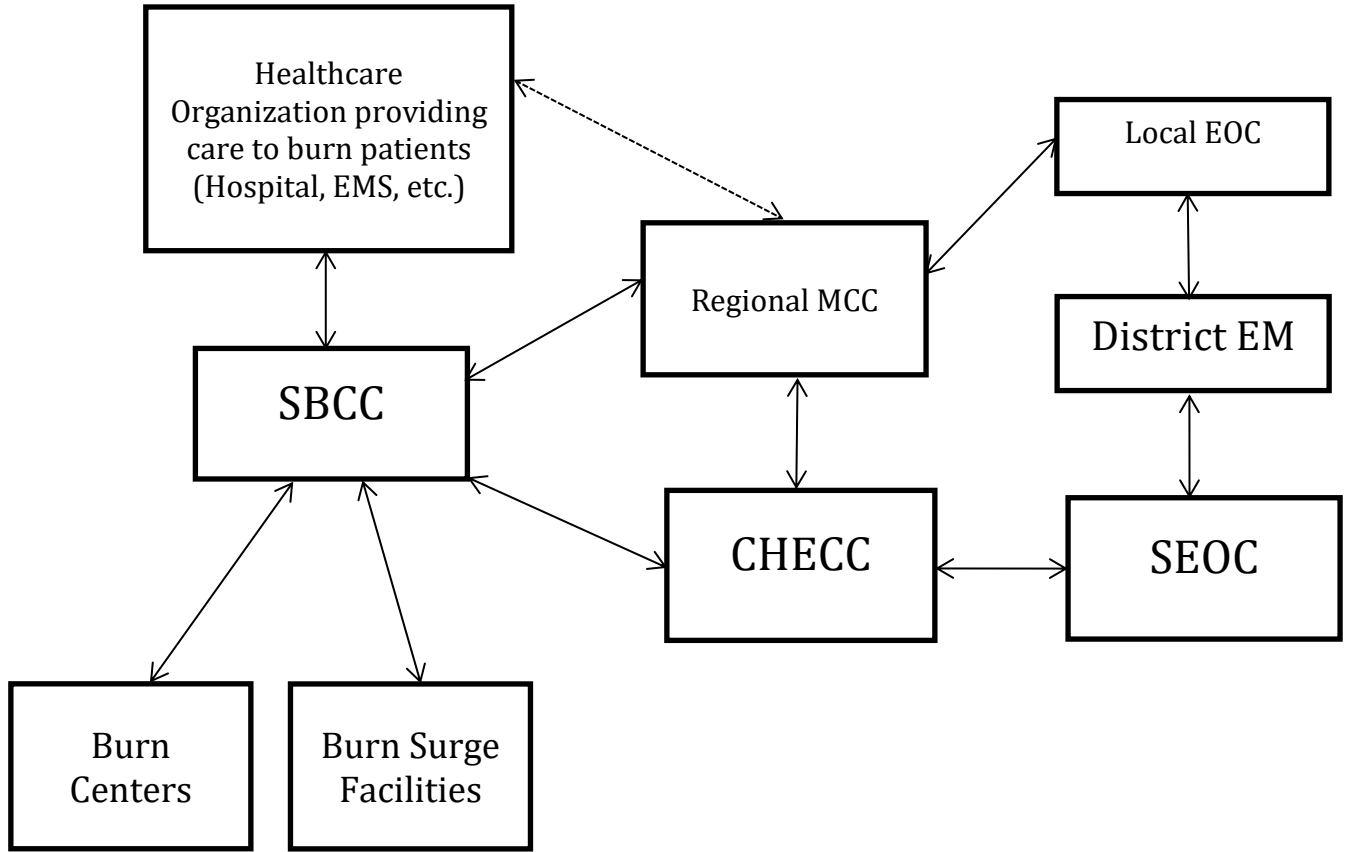


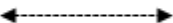
## Appendix A: SBCC Activation Communications Pathway



**BSF** – Burn Surge Facility  
**CHECC** – Community Health Emergency Coordination Center  
**EMS** – Emergency Medical Services  
**MCC** – Medical Coordination Center  
**SBCC** – State Burn Coordinating Center  
**SEOC** – State Emergency Operations Center

**Appendix B: On-going Notification Communications Pathway**

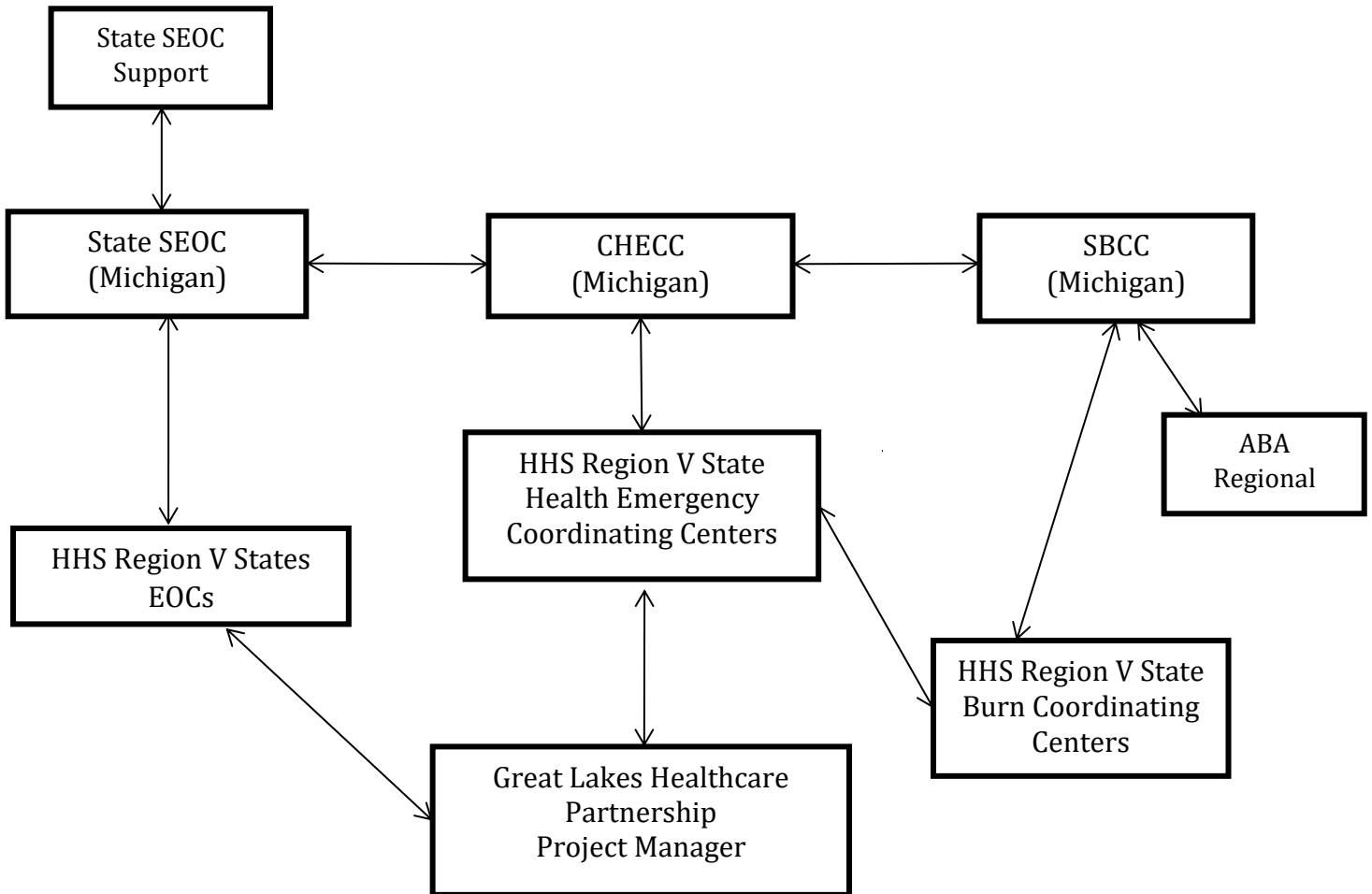


The dotted line  indicates communication between the impacted entity and the MCC for assistance other than supplies

- CHECC** - Community Health Emergency Coordination Center
- EM** - Emergency Manager
- EMS** - Emergency Medical Services
- EOC** - Emergency Operations Center
- MCC** - Medical Coordination Center
- SBCC** - State Burn Coordination Center
- SEOC** - State Emergency Operations Center

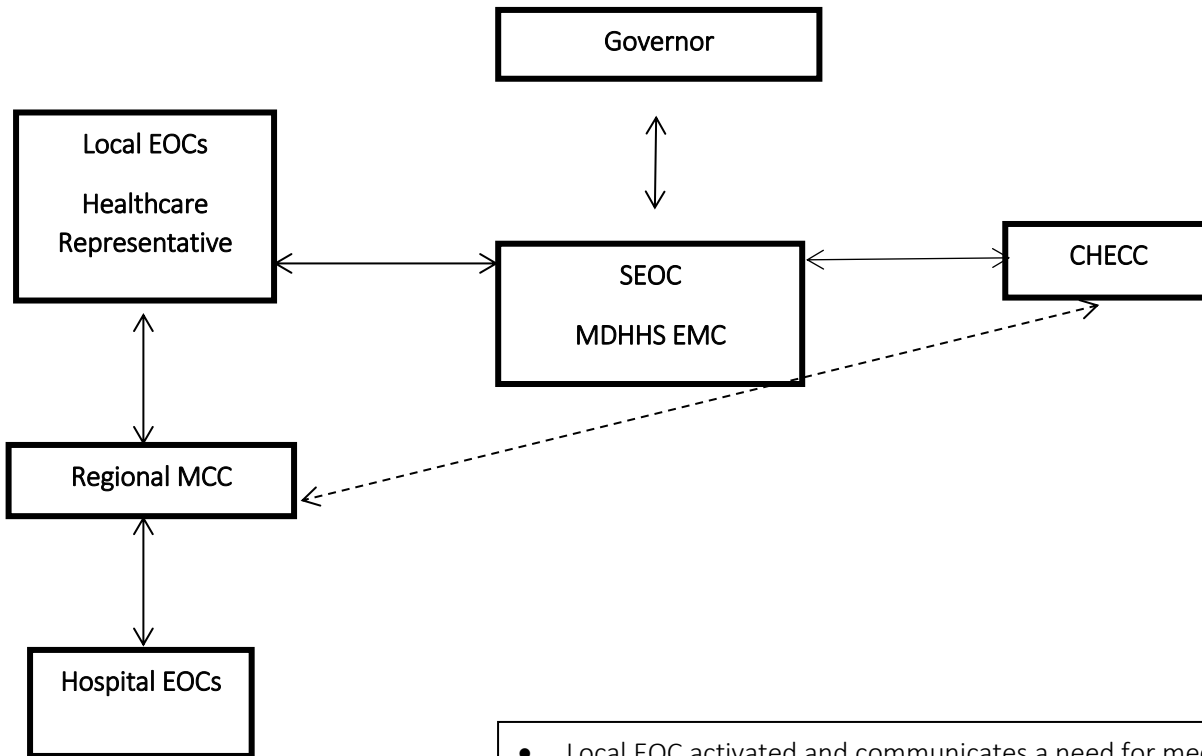
**Appendix C: Communication Pathway with the Great Lakes Healthcare Partnership**

**When Burn Capacity Exceeds Michigan Resources**



**CHECC** – Community Health Emergency Coordination Center  
**HHS** – Health and Human Services  
**SBCC** – State Burn Coordinating Center  
**SEOC** – State Emergency Operations Center

## Appendix D: Medical Communications Pathway during Emergency Response



- Local EOC activated and communicates a need for medical/public health resources to SEOC
- MDHHS EMC communicates needs to CHECC
- CHECC communicates with medical/public health subject matter experts to obtain information. Must include local public health department and Regional MCC
- The hospital EOC communicates status of the hospital resources to the regional MCC
- Regional MCC provides this information as requested to the local EOC healthcare representative

**CHECC** – Community Health Emergency Coordination Center  
**EOC** – Emergency Operations Center  
**EMC** – Emergency Management Coordinator  
**MCC** – Medical Coordination Center  
**MDHHS** – Michigan Department of Health and Human Services  
**SEOC** – State Emergency Operations Center

## Appendix E: Elements of Essential Information (EEI) Report

### Burn Mass Casualty Incident Surge Plan

**\*\*\* URGENT \*\*\*\*\* URGENT \*\*\*\*\* URGENT \*\*\*\*\* URGENT \*\*\*\*\***

Below is the information necessary to provide to the Communication Agency upon requesting assistance from the State Burn  
Coordinating Center **FAX #:734-232-4892**

Date: \_\_\_\_\_ Time of Call: \_\_\_\_\_ Deployed Agency Fax #: \_\_\_\_\_

#### Essential Elements of Information Report

<p>1. Requesting Facility/Agency</p> <p><i>Authorized Agencies :</i></p> <ul style="list-style-type: none"> <li>Hospitals Emergency Operations Center</li> <li>Representative from BETP</li> <li>Regional Healthcare Coalition Coordinator</li> <li>Regional Healthcare Coalition Medical Director</li> </ul>	<p>Name: _____</p> <p>Title: _____</p> <p>Facility/Agency: _____</p> <p>Call Back #(s): _____</p> <p>Resource(s) Requested:</p> <p><input type="checkbox"/> <b>Burn Surge Supply Kit</b></p> <p><input type="checkbox"/> <b>Burn Surge Strike Team</b></p> <p><input type="checkbox"/> <b>Pediatric Surge Supply Kit</b></p>				
<p>2. Physician / Officer in Charge of Medical Management at the Facility/Scene <b>(If different from "1." above)</b></p>	<p>Facility: _____</p> <p>Name: _____</p> <p>Position/Title: _____</p> <p>Employer: _____</p> <p>Telephone #(s): _____</p>				
<p>3. Location of Incident (If applicable)</p> <div style="border: 2px solid red; padding: 5px; margin-top: 10px; width: fit-content;"> <p>LZ = Landing zone PL = Plain language</p> </div>	<p>Jurisdiction Name: _____</p> <p>Deployment Location: _____</p> <p>Or</p> <p>Delivery Point: _____</p> <p>LZ Location: _____</p> <p>LZ Lat/Long: _____</p> <p>Frequency, PL: _____</p> <p>LZ Contact ID: _____</p>				
<p>4. Estimated Number of Casualties</p>	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; text-align: center;">Pediatric</td> <td style="width: 50%; text-align: center;">Adult</td> </tr> </table>	Pediatric	Adult		
Pediatric	Adult				
<p>5. Number Intubated</p>	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; text-align: center;">Pediatric</td> <td style="width: 50%; text-align: center;">Adult</td> </tr> </table>	Pediatric	Adult		
Pediatric	Adult				
<p>6. Types of Injuries</p>	<table style="width: 100%; border: none;"> <tr> <td style="width: 25%; text-align: center;">Fire</td> <td style="width: 25%; text-align: center;">Thermal</td> <td style="width: 25%; text-align: center;">Chemical</td> <td style="width: 25%; text-align: center;">Explosion</td> </tr> </table>	Fire	Thermal	Chemical	Explosion
Fire	Thermal	Chemical	Explosion		
<p>7. Hot zone/Environmental Hazards</p>	<p>No Yes (Description)</p>				

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## **Appendix F: Burn Center Referral Criteria Mass Casualty Incident**

The criteria listed below should be viewed as providing guidance to medical staff in determining which patients should be considered for the cohort for transfer to a recognized burn center during a BMCI. *It should be noted that these criteria represent a departure from recommended considerations for situations which do not involve a MCI.*

### **BURN CENTER REFERRAL CRITERIA (Stage II/III Mass casualty)**

1. Partial thickness burns greater than 40% total body surface area (TBSA)
2. Circumferential full-thickness burns involving an extremity
3. Full-thickness burns greater than 5% TBSA
4. High voltage (>1000 volt) electrical burns
5. Burn injury in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality

*Based on excerpted from Guidelines for the Operations of Burn Centers<sup>99</sup> (Appendix G)*

**Note Regarding Inhalation Injury:** It is expected during Stage III (and possibly stage II) incidents that Intensive Care Unit (ICU) bed capacity at burn centers and BSFs will be overwhelmed during the initial period. In the absence of cutaneous burns meeting referral criteria, casualties with only smoke inhalation can be managed at any ICU-equipped and ventilator capable medical facility.

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<sup>9</sup> American College of Surgeons. (2014). Optimal care of the injured patient. (pp 100-1) (<https://www.facs.org/~media/files/quality%20programs/trauma/vrc%20resources/resources%20for%20optimal%20care.ashx>). Accessed June 12, 2017

## **Appendix G: American College of Surgeons Burn Unit Referral Criteria**

**Note: these criteria should be applied in situations where the incident does not result in a sufficient number of patients, based on either quantitative or qualitative measures, to be considered a BMCI.**

### **BURN UNIT REFERRAL CRITERIA <sup>10</sup>**

1. Partial thickness burns greater than 10% TBSA.
2. Burns that involve the face, hands, feet, genitalia, perineum, or major joints.
3. Third-degree burns in any age group.
4. Electrical burns, including lightning injury.
5. Chemical burns.
6. Inhalation injury.
7. Burn injury in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality.
8. Any patients with burns and concomitant trauma (such as fractures) in which the burn injury poses the greatest risk of morbidity or mortality. In such cases, if the trauma poses the greater immediate risk, the patient may be initially stabilized in a trauma center before being transferred to a burn unit. Physician judgment will be necessary in such situations and should be in concert with the regional medical control plan and triage protocols.
9. Burned children in hospitals without qualified personnel or equipment for the care of children.
10. Burn injury in patients who will require special social, emotional, or long-term rehabilitative intervention.

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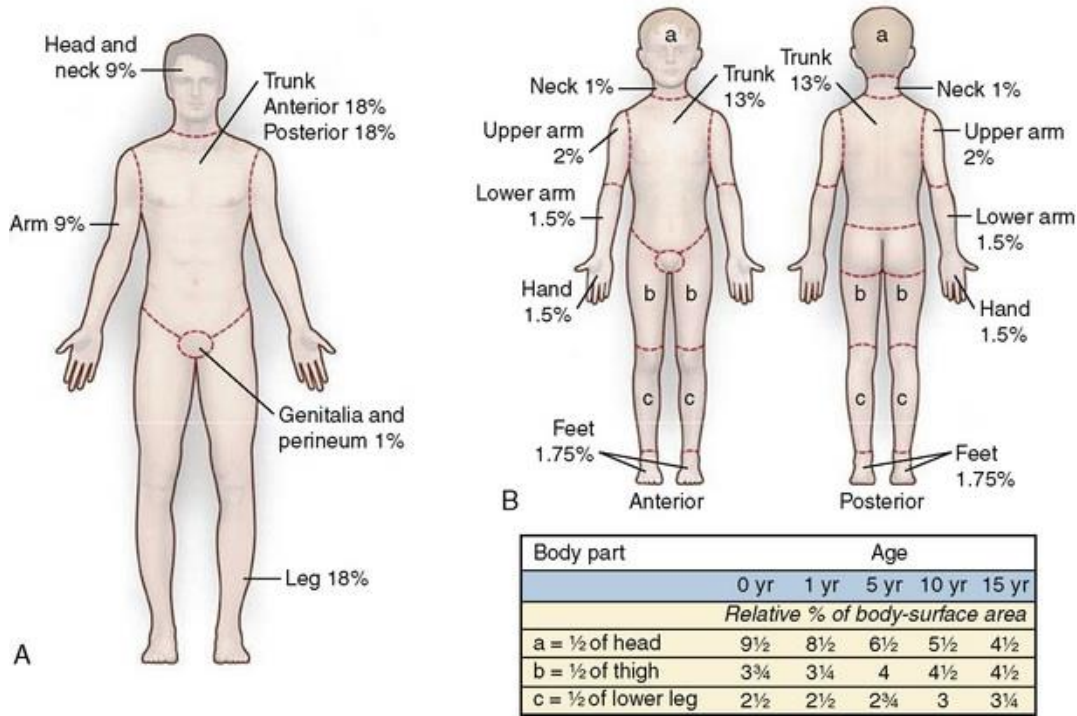
<sup>10</sup> American College of Surgeons. (2014). Optimal care of the injured patient. (pp 100-1) (<https://www.facs.org/~media/files/quality%20programs/trauma/vrc%20resources/resources%20for%20optimal%20care.ashx>). Accessed June 12, 2017



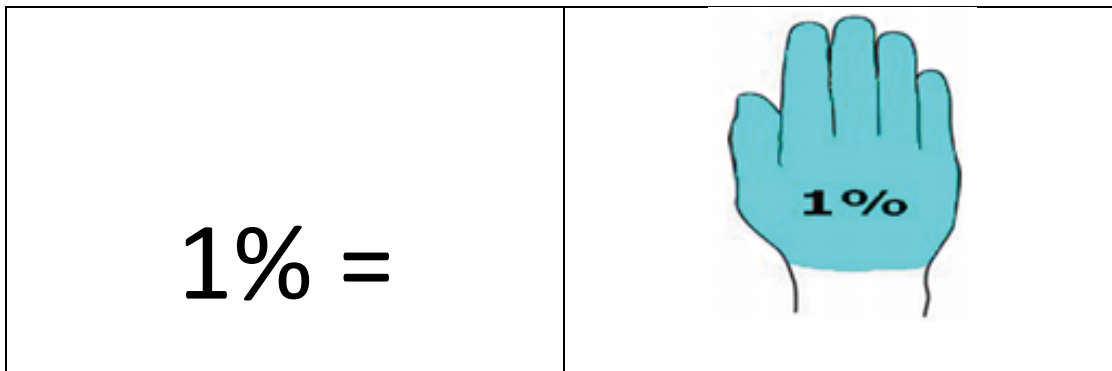
## Appendix H: The Rule of Nines and Lund-Browder Charts

The Rule of Nines (*Panel A*) is often used to estimate the surface area of a burn in adults. However this approach is less accurate in children. Lund-Browder charts (*Panel B*) use values for the legs and head that vary according to a patient's age.

**Chemical Burns: Hydrofluoric acid burns should be treated with calcium gluconate.**



### Rule of the Palm (Palm = 1%)



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## **Appendix I: Burn Surge Facility Treatment Considerations: Responsibilities during a BMCI**

### **Provide Initial First Aid:**

- A. Stop the burning process.
- B. Use standard precautions.
- C. Remove clothing or jewelry.
- D. Cool any burns that are warm to touch with tepid water and then pat dry
- E. Rinse liberally with tepid water if chemicals are suspected according to protocols, then dry.
- F. Cover with clean DRY sheet or bedding to prevent hypothermia.

### **Perform Primary Survey**

#### **A. Airway Maintenance with Cervical Spine Protection:**

1. Chin lift/jaw thrust with cervical spine precautions as needed.
2. Assess for signs of airway injury such as hypoxia, facial burns, carbonaceous sputum, stridor and nasal hair singeing.
3. Assess for history of a closed space fire.
4. Insert an oral pharyngeal airway or Endotracheal Tube (ETT) in the unconscious patient (intubate early).

#### **B. Breathing and Ventilation:**

1. Assess for appropriate rate and depth of respirations with adequate air exchange.
2. 100% (15 lpm) Fractured Inspired Oxygen (FiO<sub>2</sub>) non-rebreather face mask or endotracheal intubation until Arterial Blood Gas (ABG) result.
3. ABG with Carboxyhemoglobin (COHgb) level is required for suspected inhalation injury.
4. COHgb levels are decreased by ½ every 40 Minutes while on 100 % hi-flow FiO<sub>2</sub>. (COHgb level goal is <10 %).
5. Mechanical ventilation as needed.
6. If extensive facial burns or greater than 40% TBSA, intubation for airway protection prior to expected facial swelling is indicated.
7. Monitor pulse oximetry while checking COHgb level (as needed).
8. (\*Note: CO displaces O<sub>2</sub> on the hemoglobin causing a false 100% pulse oximetry reading, until CO levels are normal).
9. Head of bed (HOB) elevated.

### C. Circulation with Hemorrhage Control:

1. Vital Signs
  - a. Heart rate
  - b. Blood pressure
  - c. Capillary refill
  - d. Temperature
  - e. Skin color of unburned skin
2. Cardiac monitoring as needed
  - a. May be needed if there is an electrical injury, concurrent trauma or cardiac issues
3. Oral resuscitation can be used in the following patients:
  - a. Patient is not intubated
  - b. Injury is not electrical
  - c. No other injuries
4. Heplock IV (as needed) if taking adequate fluids by mouth.
5. If patient is intubated
  - a. Start maintenance fluids – large bore peripheral IV in non-burned, upper extremities
  - b. Place a soft feeding tube. (preferably post-pyloric)
6. Initiate resuscitation fluids as soon as possible using ABA guidelines.
7. Pediatric patients with burns > 10% TBSA require resuscitative fluids and maintenance fluids.
8. Pediatric patients less than 10 kg require Dextrose 5% in Lactated Ringers (D5LR) at maintenance rate if not taking adequate PO or are intubated. Pediatric calculation for maintenance fluid formula:
  - a. For the first 10 kg of body weight: 4 mL per kg per hour
  - b. For the second 10 kg of body weight: 2 mL per kg per hour
  - c. For the remaining kg of body weight up to 30kg: 1mL per kg per hour
9. Labs on admission and then as dictated by medical condition
  - a. Arterial Blood Gas (ABG)
  - b. Carboxyhemoglobin (COHb) level, always add this to a blood gas
  - c. Electrolyte panel
  - d. Complete Blood Count (CBC)
  - e. Cardiac panel for electrical injuries.
  - f. Electrocardiogram (EKG) for electrical injury or cardiac history
  - g. Chest X-Ray if intubated, inhalation injury suspected or underlying pulmonary condition
  - h. Tetanus prophylaxis unless given in the last 5 years

**D. Disability:**

1. Neurologic checks every 4-8 hours and prn.
  - a. Goal is an alert and oriented patient.
  - b. If altered neurological status consider the following:
    - i. Associated injury
    - ii. CO poisoning
    - iii. Substance abuse
    - iv. Hypoxia
    - v. Pre-existing medical condition
2. Determine level of consciousness. Consider using the "AVPU" method:
  - a. A- Alert
  - b. V- Responds to verbal stimuli
  - c. P- Responds to painful stimuli
  - d. U- Unresponsive

**E. Exposure:**

1. Remove all clothing and jewelry.
2. Initially place a clean, dry sheet over the wounds until a thorough cleaning is done.
3. Keep patient normothermic, especially during wound care. This may be accomplished by:
  - a. Keeping patient covered
  - b. Covering the patients head
  - c. Warming the room
  - d. Warming IV fluids

**Secondary Survey****A. History:**

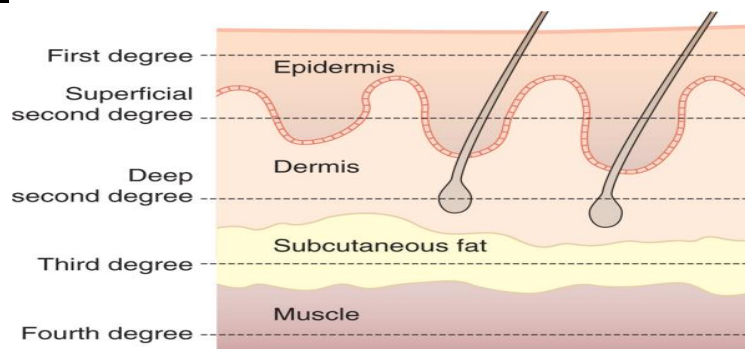
1. Obtain circumstances of injury
2. Obtain medical history.
  - A – Allergies
  - M – Medications
  - P – Previous illness, past medical history
  - L – Last meal or fluid intake
  - E – Events/environment related to the injury

**B. Complete Physical Examination:**

1. 1. Head to toe exam
  - a. If eye involvement or facial burns, consult an Ophthalmologist
2. Determine extent/size of the burn by calculating the TBSA burn using one of the following methods:

- a. Rule of Nines
  - b. Lund-Browder chart
  - c. Rule of the Palm (Palm = 1%)
3. Determine the depth of the burn
- a. DO NOT include Superficial (1st degree) burns when calculating TBSA
  - b. Superficial partial thickness (2nd degree)
    - i. Involves the epidermis and a thin layer of dermis
    - ii. Red, blistered, moist, blanches
  - c. Deep partial thickness (2nd degree)
    - i. Involves the entire epidermis and variable portion of the dermis
    - ii. Red, blistered and edematous
  - d. Full thickness (3rd degree)
    - i. Involves the destruction of the entire epidermis and dermis
    - ii. White, brown, dry, leathery with possible coagulated vessels

### **Degree of Burns**



### **C. Assess Need for Escharotomies:**

Monitor the following signs and symptoms in deep partial or full thickness, circumferential burn injuries which may indicate a circulation deficit requiring decompression by incision of burn wound:

1. Cyanosis of distal unburned skin on a limb
2. Unrelenting deep tissue pain
3. Progressive parasthesias
4. Progressive decrease or absence of pulses
5. Inability to ventilate in patients with deep circumferential burns of the chest

### **D. Comfort:**

1. Frequent pain/sedation assessment
  - a. Every hour
  - b. Before and after pain/sedation medications given
2. Use age appropriate pain scales for pediatric patients

3. Give whatever pain medication is required and available (IV is the preferred route in TBSA >20%)
  - a. Narcotic/Analgesic IV/PO
  - b. Ativan/Versed IV/PO

#### **E. Wound Care:**

1. Assess and monitor the wound for:
  - a. Change in wound appearance
  - b. Change in size of wound
2. Signs or symptoms of infection
3. Wound care should include:
  - a. Washing the wounds with soap and warm tap water using a wash cloth
  - b. Remove water by patting dry
4. Wound care related to the face and scalp should be performed every day and use the following:
  - a. Silver sulfadiazine (Silvadene)cream (scalp)
  - b. Bacitracin (face)
  - c. Scalp and facial hair should be shaved daily
5. All blisters should be debrided, except for the following:
  - a. Intact blisters on hands and feet. The exception would be if the blister is impeding range of motion to the joints
6. Ears are poorly vascularized and at risk for chondritis
  - a. Topical sulfamylon cream should be used; if unavailable, use Silvadene
  - b. Make sure to plug the ear canal due to the toxicity of sulfamylon to the auditory canal
  - c. Avoid external pressure including pillows and constrictive dressings to ears and nose
7. For extensive and severe burns to the face:
  - a. Apply a thin layer of Silvadene cream, approximately a nickels thickness or enough to cover the wound, so that it doesn't dry out prior to the next dressing change. Cover with a fine mesh gauze dressing and finish the wrap with dry gauze dressing. The purpose of the gauze dressing is to keep the cream from rubbing off before the next dressing change
  - b. Avoid creams near the eyes.
8. For moderate facial burns:
  - a. Bacitracin or another antibiotic ointment without dressing can be used
9. If fingers and toes are burned:
  - a. Dress and wrap separately to promote range of motion and prevent webbing of the digits
10. Genitalia and perineal burns require:

- a. A greasy gauze and/or lubricant between the labia and in the foreskin to prevent adhesions
  - b. A foley is never indicated to maintain patency
  - c. A foley should be used to monitor urine output in the severely injured patients
11. Elevate burned extremities above the level of the heart to minimize edema
12. If applying an Acticoat dressing:
- a. Activate the silver ions in the dressing by submerging in water and wringing out excess moisture
  - b. Apply a single layer of the dressing over burn wounds so that all areas are covered
  - c. Water should be used to keep the Acticoat and overlying gauze moist to maintain the dressing's antimicrobial activity. (DO NOT use saline because it deactivates the silver's antimicrobial ability)
  - d. Should be held in place with water-moistened gauze dressing
  - e. Dressings should be kept damp at all times to ensure constant activation of the silver ions
  - f. Dressing does not need to be changed for 5-7 days
    - i. The overlying gauze can be changed as necessary
    - ii. If signs of infection appear, remove dressing to assess wound
  - g. Record the date of the application

**F. Ongoing Resuscitation (as needed):**

- 1. Monitor urine output
  - a. Adjust fluids to keep urine output between the following:
    - i. Adults: 30-50 ml/hour
    - ii. Pediatrics: 1- 2 ml/kg/hour
- 2. Additional fluid needs can occur with:
  - a. Very deep burns
  - b. Inhalation injury
  - c. Associated injuries
  - d. Electrical injury
  - e. Delayed resuscitation
  - f. Prior dehydration
  - g. Alcohol or drug dependence
  - h. Small children
- 3. Children, the elderly and patients with preexisting cardiac disease are particularly sensitive to fluid management
- 4. If Myoglobin in the urine (burgundy color):
  - a. Maintain urine output of 100 ml/hour for adults and 4 mL/kg/hour for



pediatrics

- b. Place a foley
  - c. Increase fluid rate (Lactated Ringers) to achieve urine output as targeted in (a)
  - d. Diuretics are not indicated with myoglobinuria
  - e. Mannitol may be used as a last resort to maintain urine output.
  - f. Intravenous sodium bicarbonate may be administered to maintain an alkaline urine (pH > 6)
5. For circumferential burns to extremities:
- a. Perform pulse checks every one hour to determine need for emergent escharotomy.
  - b. Monitor by palpation or Doppler exam for:
    - i. Decreased sensation
    - ii. Severe deep tissue pain
    - iii. Diminished distal pulses
    - iv. Slowed capillary refill
    - v. After 24-48 hours, decrease frequency of pulse checks to every 2 hours if stable
    - vi. Elevate extremities above the level of the heart

#### **G. Nutrition:**

1. Obtain dry weight on admission
2. Dietary consult, as needed
3. Regular high calorie, high protein diet if able to take PO
4. If intubated, begin tube feeding at full strength increasing to goal rate.
  - a. Soft feeding tubes are preferred over hard nasogastric tube
  - b. Ensure stool softeners are ordered to prevent constipation due to pain medications

#### **H. Mobility:**

1. Physical Therapy/Occupational Therapy consult, as needed.
  - a. In a disaster, therapists may just splint patients in functional positions as needed
2. HOB elevated at all times, as allowed by spinal clearance
3. Ear burns:
  - a. No external pressure should be applied
  - b. No pillows or blankets under the head
4. Neck burns:
  - a. Maintain the head in a neutral position
  - b. No pillows or blankets under the head flexing the neck forward

5. Axilla burns:
  - a. Keep arms extended to decrease contractures
  - b. Elevate burned extremities above the level of the heart to decrease swelling
6. If legs are burned, apply ace wraps when OOB (Out of Bed)
  - a. Encourage active range of motion hourly, when awake
  - b. Wrapping should be distal to proximal
7. Encourage activities of daily living
  - a. Patient should have enough pain control to perform these activities.
8. Early mobility is encouraged as patient is able

**I. Infection Prevention and Control:**

1. Utilize universal precautions
2. If wounds are exposed:
  - a. Apply gown, mask, surgical hat and gloves to protect patient
3. No prophylactic systemic antibiotics are required for the burn injuries

**J. Psychosocial:**

1. Explain any procedures
2. Involve patient and family
3. Consider Social Worker consultation
4. Offer Spiritual Care

## **Appendix J: BMCI: Fluid Resuscitation**

### **I. Burn Resuscitation Protocol**

[www.michiganburn.org](http://www.michiganburn.org)

- A. Document patient's TBSA burn using Lund-Browder diagram (Rule of Nines Diagram). Include only partial and full-thickness burns.
- B. Obtain weight or close estimate.

### **II. First 24 Hours Post Burn**

- A. TBSA < 20%  
Maintenance IVF only until taking adequate oral intake.
- B. TBSA > 20% and Weight > 30kg
  - 1. Calculate estimated fluid needs:
    - a) 2 cc of LR X kg of body weight X %TBSA burned:
      - administer half of calculated amount over the first 8 hours post burn
      - administer half of calculated amount over next 16 hours
    - b) If urine output < ½ cc/kg/hour (goal is 30-50 cc/hour):
      - increase LR infusion by 1/3 of the hourly calculated fluid requirement
    - c) If urine output > 70 cc/hour:
      - dip urine to exclude glucosuria
      - decrease LR infusion by 1/3 of the hourly calculated fluid requirement
- C. TBSA > 20% and Weight < 30kg
  - 1. Calculate estimated fluid needs:
    - a) 3 cc of LR\*\* X kg of body weight X % TBSA burned
      - administer half of calculated amount over the first 8 hours post burn
      - administer half of calculated amount over next 16 hours
    - b) In addition to burn fluid requirements, also infuse maintenance IVF (calculated total for 24 hours):
      - 100 cc X first 10 kg of body weight
      - 50 cc X next 10 kg of body weight
      - 20 cc X next 10 kg of body weight
    - c) If urine output < 1 cc/kg/hour:
      - increase LR infusion by 1/3 of the hourly calculated fluid requirement
    - d) If urine output >> 1 cc/kg/hour:
      - decrease LR infusion by 1/3 of the hourly calculated fluid requirement
- D. Place enteral feeding tube as soon as possible for all burns > 20% TBSA.
- E. Consider cardiac output monitoring device placement for intubated patients with TBSA > 30%, age > 50 years and/or inhalational injury.

### III. Treatment of Low Urine Output

- A. In adult patients with continued low urine output despite increased fluid rates:
  - 1. Place cardiac output monitoring device for monitoring
    - a) If central pressures normal to high with low urine output:
      - start low dose Dobutamine @ 5 mcg/kg/min
      - titrate to effect
    - b) If central pressures are low with low urine output:
      - continue fluid resuscitation at increased rate

### IV. After 24 Hours Post Burn

- A. Serum Na<sup>+</sup> and K<sup>+</sup> should be checked at least BID on the second burn day.
- B. Adjust type of fluid by the serum Na<sup>+</sup> level.
- C. After 24 hours of crystalloid, if fluid requirements high, consider 5% albumin infusion (discuss with Attending physician).
- D. Goal is to decrease IVF rate to one half of rate infused over the previous 16 hours.
  - 1. If patient >30 kg, urine output goal of ½ cc/kg/hour (maximum 50 cc/hour)
  - 2. If patient <30 kg, urine output goal of 1 cc/kg/hour

## Appendix K: Triage Decision Table

Michigan Burn Mass Casualty – Tiered Triage <sup>1111</sup>

<i>AGE</i>	<i>% Total Body Surface Area Burn + 10 for Inhalation Injury</i>									
	0 – 10	11 – 20	21 – 30	31 – 40	41 – 50	51 – 60	61 – 70	71 – 80	81 – 90	91 +
<2	Very High	Very High	Very High	High	Medium	Medium	Medium	Low	Low	Very Low
2 – 5	Survivable	Very High	Very High	High	High	High	Medium	Medium	Low	Low
5 – 19.9	Survivable	Very High	Very High	High	High	High	Medium	Medium	Low	Low
20 – 29.9	Survivable	Very High	Very High	High	High	Medium	Medium	Low	Low	Very Low
30 – 39.9	Survivable	Very High	Very High	High	Medium	Medium	Medium	Low	Very Low	Very Low
40 – 49.9	Survivable	Very High	Very High	Medium	Medium	Medium	Low	Very Low	Very Low	Expectant
50 – 59.9	Survivable	Very High	Very High	Medium	Medium	Low	Very Low	Very Low	Expectant	Expectant
60 – 69.9	Very High	Very High	Medium	Medium	Low	Very Low	Very Low	Expectant	Expectant	Expectant
70+	Very High	Medium	Medium	Low	Very Low	Expectant	Expectant	Expectant	Expectant	Expectant

**Definitions:**

**Survivable:** Survival and good outcome expected without requiring initial admission.

**Very High:** Survival with good outcome highly expected.

**High:** Survival and good outcome expected with limited/short term initial admission and resource allocation (LOS less than or equal to 14 days, one-two surgical procedures)

**Medium:** Survival and good outcome expected with aggressive care and comprehensive resource allocation, including initial admission (greater than/equal to 14 days), resuscitation and multiple surgeries.

**Low:** Survival and good outcome low even with long-term, aggressive treatment and resource allocation.

**Very Low:** Survival and outcome poor even with unlimited resources.

**Expectant:** Survival less than 10% even with unlimited, aggressive treatment

<sup>11</sup> ABA Chart 2011 modified to fit Michigan MCI Burn Surge Plan 2016

**Appendix L: Michigan Mass Casualty Burn Plan Resource  
Activation/Utilization Guidelines**

**Probable = Prepare for Activation**

**Possible = It could happen**

**Red = Definite**

**Yellow = Probable**

**Green = Possible**

**White = Unlikely**

<b>Agency / Entity</b>	<b>Burn Stage I (10-24 Casualties)</b>	<b>Burn Stage II (25-100 Casualties)</b>	<b>Burn Stage III (&gt;100 Casualties)</b>
<b>Burn Centers</b>			
Burn centers within incident region.	Utilization definite	Utilization definite	Utilization definite
Burn centers in neighboring MI regions	Utilization probable	Utilization definite	Utilization definite
Burn centers in distant MI regions	Utilization possible	Utilization probable	Utilization definite
Burn centers in neighboring states within 150 Miles	Utilization unlikely	Utilization probable	Utilization definite
Burn centers in neighboring states beyond 150 Miles	Utilization unlikely	Utilization possible	Utilization probable
Burn centers in non-FEMA V states	Utilization unlikely	Utilization unlikely	Utilization possible

<b>Agency / Entity</b>	<b>Burn Stage I (10-24 Casualties)</b>	<b>Burn Stage II (25-100 Casualties)</b>	<b>Burn Stage III (&gt;100 Casualties)</b>
<b>Burn Surge Facilities (BSF)</b>			
BSF in neighboring MI regions	Brief utilization possible	Utilization probable	Utilization definite
BSF in distant MI regions	Utilization unlikely	Utilization unlikely	Utilization possible
BSF (or equivalent) in neighboring states within 150 Miles	Brief utilization possible	Utilization probable	Utilization probable
BSF (or equivalent) in neighboring states beyond 150 Miles	Utilization unlikely	Utilization unlikely	Utilization possible
BSF (or equivalent) in non-FEMA 5 states	Utilization unlikely	Utilization unlikely	Utilization unlikely
<b>Community Hospitals</b>			
Hospitals within 25 Miles	Utilization definite	Utilization definite	Utilization definite
Hospitals within 25- 50 Miles	Utilization probable	Utilization probable	Utilization probable
Hospitals beyond 50 Miles	Utilization unlikely	Utilization unlikely	Utilization unlikely

Agency / Entity	Burn Stage I (10-24 Casualties)	Burn Stage II (25-100 Casualties)	Burn Stage III (>100 Casualties)
<b>Multi-Agency Coordination Entities</b>			
MI State Burn Coordination Center	Activation probable	Activation definite	Activation definite
SEOC	Activation possible	Activation definite	Activation definite
CHECC	Activation probable	Activation definite	Activation definite
Regional MCC serving incident	Activation definite	Activation definite	Activation definite
Neighboring MCC	Activation probable	Activation definite	Activation definite
Distant MCC	Activation possible	Activation possible	Activation probable
Local EOC serving incident	Activation definite	Activation definite	Activation definite
EOC in neighboring counties	Activation possible	Activation probable	Activation definite
EOC in distant counties	Activation unlikely	Activation possible	Activation possible



## Appendix M: Michigan Burn Surge Facilities

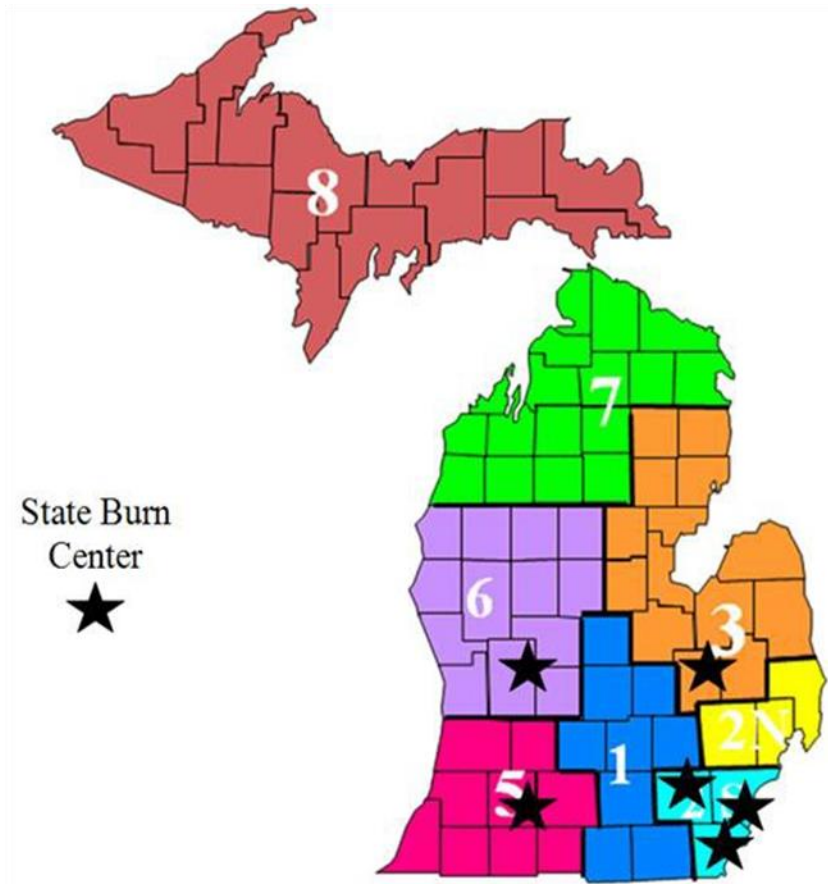
<p><b>Region 1</b>            *Sparrow Hospital            1215 E. Michigan Avenue            Lansing, MI 48909            517-364-1000</p>	<p>Henry Ford Allegiance Health            205 N. East Avenue            Jackson, MI 49201            517-788-4800</p>
<p><b>Region 2N</b>            *McLaren Oakland            50 N. Perry Street            Pontiac, MI 48342            248-338-5000</p>	<p>Beaumont Health – Royal Oak            3601 W. 13 Mile Road            Royal Oak, MI 48073            248-898-5000</p>
<p><b>Region 2S</b>            *Henry Ford Hospital            2799 W. Grand Blvd #109            Detroit, MI 48202            313-916-2600</p>	<p>St Joseph Mercy Hospital            5301 E. Huron River Drive            PO Box 992            Ann Arbor, MI 48106            734-712-3456</p>
<p><b>Region 3</b>            *St. Mary’s of Michigan            800 S. Washington Avenue            Saginaw, MI 48601-2524            989-907-8000</p>	
<p><b>Region 5</b>            *Borgess Medical Center            1521 Gull Road            Kalamazoo, MI 49048            269-226-7000</p>	
<p><b>Region 6</b>            *Mercy Health St. Mary’s Health Care            200 Jefferson Street S.E.            Grand Rapids, MI 49503            616-685-5000</p>	
<p><b>Region 7</b>            *Munson Medical Center            1105 Sixth Street            Traverse City, MI 49684            231-935-5000</p>	<p>*McLaren Northern Michigan Regional            Hospital            416 Connable Avenue            Petoskey, MI 49770            800-248-6777</p>
<p><b>Region 8</b>            *UP Health System - Marquette            580 W. College Avenue            Marquette, MI 49855            906-228-9440</p>	<p>*UP Health System - Portage            500 Campus Drive            Hancock, MI 49930            906-483-1000</p>

\*BSF with Burn Supply Cache

## Appendix N: Michigan Burn Centers

Facility Name	City	Region	Normal Capacity	Surge Capacity
University of Michigan Health Systems*	Ann Arbor	2S	Adult/Pediatric 16 beds	35 Flex
Children's Hospital of Michigan*	Detroit	2S	Pediatric 10 beds (2 -ICU, 8 Floor)	3 ICU 12 Floor
Detroit Receiving Hospital*	Detroit	2S	Adult 12 beds	12 ICU 18 Floor
Hurley Medical Center	Flint	3	Adult 15 beds	13 Flex
Bronson Methodist Hospital	Kalamazoo	5	Adult 8 beds	12 Flex
Spectrum Health System	Grand Rapids	6	Adult/Pediatric 8 beds	12 Flex

\*ACS Burn Verified Hospitals



## **Appendix O: American College of Surgeons Verified Michigan Trauma Centers**

*Last updated: 2/1/2018*

<b>REGION</b>	<b>VERIFIED INSTITUTION</b>	<b>CITY</b>	<b>LEVEL</b>
1	Henry Ford – Allegiance	Jackson	II
1	Sparrow Hospital	Lansing	I
2N	Henry Ford – Macomb	Clinton Township	II
2N	McLaren Macomb Hospital	Mt Clemens	II
2N	McLaren Oakland	Pontiac	II
2N	St. Joseph Mercy Oakland	Pontiac	II
2N	Beaumont Health	Farmington Hills	II
2N	Beaumont Health	Royal Oak	I
2N	Beaumont Health	Royal Oak	II (Ped)
2N	Beaumont Health	Troy	II
2N	Providence Hospital and Medical Center	Southfield	II
2S	C. S. Mott Children’s Hospital	Ann Arbor	I (Ped)
2S	St. Joseph Mercy Hospital	Ann Arbor	II
2S	University of Michigan Health System	Ann Arbor	I
2S	Children’s Hospital of Michigan	Detroit	I (Ped)
2S	Detroit Receiving Hospital	Detroit	I
2S	Henry Ford Hospital	Detroit	I
2S	Sinai-Grace Hospital	Detroit	II
2S	St. John Hospital and Medical Center	Detroit	II
2S	St. John Hospital and Medical Center	Detroit	II (Ped)
2S	Beaumont Health – Dearborn	Dearborn	II
2S	Beaumont Hospital – Trenton	Trenton	II
3	Hurley Medical Center	Flint	I
3	Hurley Medical Center	Flint	II (Ped)
3	Genesys Regional Medical Center	Grand Blanc	II
3	McLaren Lapeer Region	Lapeer	II
3	MidMichigan Medical Center	Midland	II
3	Covenant Healthcare	Saginaw	II
3	Covenant Healthcare	Saginaw	II (Ped)
3	St. Mary’s of Michigan	Saginaw	II
5	Borgess Medical Center	Kalamazoo	II
5	Bronson Methodist Hospital	Kalamazoo	I
6	Mercy Health St. Mary’s Campus	Grand Rapids	II
6	Spectrum Health – Butterworth	Grand Rapids	I
6	Spectrum Health – Helen DeVos Children’s	Grand Rapids	I (Ped)
6	Mercy Health Muskegon – Hackley Campus	Muskegon	II
7	Munson Medical Center	Traverse City	II
8	UP Health System – Marquette	Marquette	II
8	UP Health System – Portage	Hancock	III

## Appendix P: Initial Casualty Report Form

<b>NAME:</b>		
<b>AGE:</b>	<b>GENDER:</b> Male        Female	
<b>DATE and TIME OF INJURY:</b>		
<b>INJURY MECHANISM:</b>		
<b>INHALATION INJURY EXPOSURE:</b>		
• Enclosed Space	<b>Yes</b>	<b>No</b>
• Toxic Chemical Exposure	<b>Yes</b>	<b>No</b>
• Facial Burns	<b>Yes</b>	<b>No</b>
• Intubation /Mechanical Ventilation	<b>Yes</b>	<b>No</b>
<b>Total Body Surface Area Burned:</b>		
• Partial Thickness %		
• Full Thickness %		
<b>Body regions burned:</b>		
• Circumferential torso burn	<b>Yes</b>	<b>No</b>
• Circumferential extremity burn	<b>Yes</b>	<b>No</b>
• Decreased peripheral perfusion	<b>Yes</b>	<b>No</b>
<b>Concurrent Trauma</b>	<b>Yes</b>	<b>No</b>
<b>Injuries:</b>		
<b>Co-Morbidities/Past Medical History:</b>		
<b>Wound Management (Dressings):</b>		
<b>Institutional Location (BSF, ICU/Floor):</b>		
<b>Contact Information:</b>		

## Appendix Q: Follow-up Casualty Report Form

<b>NAME:</b>			
<b>AGE:</b>		<b>GENDER:</b> Male        Female	
<b>DATE and TIME OF INJURY:</b>			
<b>DATE and TIME OF CURRENT REPORT:</b>			
<b>INJURY MECHANISM:</b>			
<b>Total Body Surface Area Burned:</b>			
• Partial Thickness %			
• Full Thickness %			
• Circumferential torso burn		Yes	No
• Circumferential extremity burn		Yes	No
• Decreased peripheral perfusion		Yes	No
<b>Date and Time of most recent wound evaluation:</b>			
<b>Current burn wound dressing/management</b>			
<b>Date and Time of last burn dressing change:</b>			
<b>Procedures performed? (Escharotomies, other emergent procedures)?</b>			
<b>RESUSCITATION RESPONSE:</b>			
<b>Total fluid volume received since initial injury:</b>			
<b>Total fluids over last 24 hours:</b>			
<b>Current fluid administration rate:</b>			
<b>Urine output over last 24 hours?</b>		<b>Last 4 hours?</b>	
<b>Current V/S: HR ____ B/P ____ RR ____ Temp C ____</b>			
<b>PULMONARY STATUS</b>			
<b>Current SaO2:</b>		<b>Current FiO2:</b>	
<b>Intubated:</b>		Yes	No
<b>Ventilator Settings:</b>			
<b>COMPLICATIONS:</b>			
<b>Number of Casualties at your Location?</b>			
<b>Priority for transfer among your current Burn casualties?</b>			
<b>Institutional Location (BSF, ICU/Floor):</b>			
<b>Contact Information:</b>			

## **Appendix R: Burn Surge Facility Casualty Census Form**

Fax this from to the SBCC Fax # 734-232-4892

*(Please complete this form in addition to report form for each individual casualty)*

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Date of Mass Casualty Incident: \_\_\_\_\_

Facility: \_\_\_\_\_

Contact Information: \_\_\_\_\_

	Name	Age	TBSA	Intubated (Y/N)	
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

**Continued on/from additional form? Y / N**

**Page: \_\_\_\_ of \_\_\_\_**

## **Appendix S: Information That Needs to Transfer With a Burn Patient**

- A. Information/face sheet with patient name/identifier
- B. Emergency Medical Treatment and Active Labor Act (EMTALA) paperwork
- C. SBCC Report Forms
  - 1. Initial casualty report form
  - 2. Follow-up casualty report form
- D. CD with radiologic imaging completed
- E. MI-Burn EMS Inter-facility Transfer Form

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## Appendix T: Michigan Burn EMS Inter-facility Form

Sending Facility Name:				Phone #:			
Destination Facility Name:				Phone #:			
Patient Name/Identifier:				DOB:		M	F
Date:		Pick up time:			Drop off time:		
Calculated Fluid Needs:			Oxygen:		Medication:		
IV Fluids: 0.9%NS LR Other(Specify):							
Flow Rate ml/hr:				Location of IVs:			

Time	P	RR	B/P	SpO2	Medication/Procedure/Notes	Amt/Size

Vent Settings:				Airway Size:		Secured @		cm
Time	Mode	Volume	Rate	PEEP	FiO2	ETCO2	Average Peak Pressure	
<b>Pickup:</b>								
<b>Destination:</b>								

<b>Total Intake</b>	<b>Total Output</b>

**Notes:**

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EMS Transporting Unit:	Paramedic Name:
Paramedic Signature:	Paramedic Cell Phone #:
Receiving RN/MD/DO/NP/PA Signature:	

- QUICK TIPS:**
- Completion of Worksheet – Refer to back of form
  - Keep patient warm
  - Transport needs of fluids/medications/Oxygen
  - Monitor urine output. Patient has a foley?
  - Hourly updates given to receiving hospital

# Worksheet for Transport

<b>Calculate Transport Time to Destination:</b> consider road conditions, obstacles, weather.	
<b>Calculate Amount of Fluid needed</b>	
<b>Calculate Oxygen needed</b>	
<b>Medications needed:</b>	
<b>Narcotics</b>	
<b>Sedation</b>	
<b>Paralytics</b>	

<b>Michigan Burn Centers</b>		
<b>University of Michigan Health Systems</b> <i>(State Burn Coordinating Center)</i>	Adult & Pediatric	734-936-9631
Children's Hospital of Michigan	Pediatric	313-745-5678
Detroit Receiving Hospital	Adult	313-745-3078
Hurley Medical Center	Adult & Pediatric	810-262-9188
Bronson Methodist Hospital	Adult	269-341-6022
Spectrum Health System	Adult & Pediatric	616-391-9025

## **Appendix U: Great Lakes Healthcare Partnership**

The Great Lakes Healthcare Partnership (GLHP) represents a coalition of healthcare preparedness planners from the HHS Region V jurisdictions of: The City of Chicago, Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin, who are responsible for the Hospital Preparedness Program under the Assistant Secretary for Preparedness and Response (ASPR) within the federal Department of Human Services (DHHS). This group works together to develop a series of initiatives aimed at promoting multi-state and HHS V cooperation in planning for disasters requiring a healthcare response.

This BMCI Plan represents an acknowledgement by the GLHP membership, that a response to a major MCI situation, especially one involving the need for the provision of highly specialized burn related care, redefines the concept of local preparedness in a disaster environment. While there is little argument against the conceptual case for all disasters being “local”, the context of what “local” really means in today’s environment is being challenged and redefined.

In more general terms, disaster responses occur when the available resources of a locality are, or have the potential to be, overwhelmed. By definition, specialized medical care such as burn care, involves a finite capacity for delivery. Therefore, the availability and provisions for delivering that care can easily be jeopardized due to limited resources.

The GLHP gives the opportunity to draw from out-state resources when in-state resources have been exhausted.

### **HSS Region V**

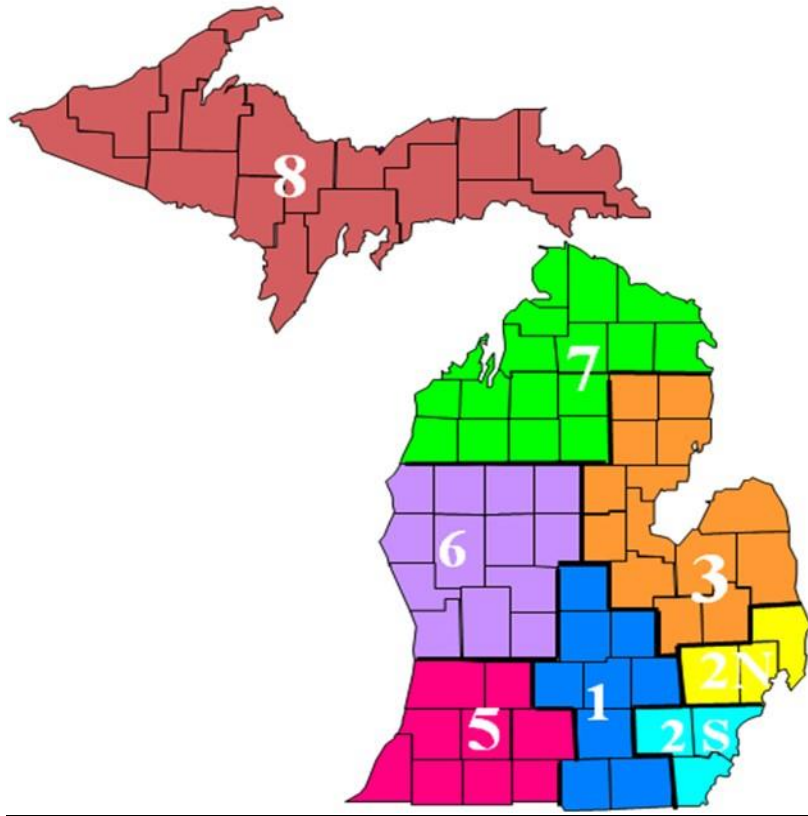


## Great Lakes Healthcare Partnership Resources

*Last updated: 9/1/2017*

<b><u>IL</u></b>	Loyola University Medical Center	Maywood	10 ICU 11 Step Down
<b>Chicago</b> <b><u>IL</u></b>	Sumner L. Koch Burn Center	Chicago	6 ICU 12 Step Down
<b>Chicago</b> <b><u>IL</u></b>	University of Chicago Burn Center	Chicago	16 Beds
<b><u>IL</u></b>	Regional Burn Center	Springfield	10 Beds
<b><u>IN</u></b>	St. Joseph Medical Center Regional Burn Center	Fort Wayne	12 Beds
<b><u>IN</u></b>	Indiana University Medical Center Burn Center Eskenazi Memorial Hospital	Indianapolis	6 Beds
<b><u>IN</u></b>	Riley Children's Hospital	Indianapolis	8 Beds
<b><u>MN</u></b>	Hennepin County Medical Center Burn Center	Minneapolis	17 Beds
<b><u>MN</u></b>	Regions Hospital Burn Center	St. Paul	18 Beds
<b><u>MN</u></b>	Dwan Burn Center	Duluth	15 Beds
<b><u>OH</u></b>	Miami Valley Hospital Regional Adult Burn Unit	Dayton	12 Beds
<b><u>OH</u></b>	Ohio State University Hospital Adult Burn Center	Columbus	18 Beds
<b><u>OH</u></b>	Nationwide Children's Hospital	Columbus	14 Beds
<b><u>OH</u></b>	Children's Hospital Medical Center of Akron	Akron	12 Beds
<b><u>OH</u></b>	The University Hospital Burn Center	Cincinnati	9 Beds
<b><u>OH</u></b>	Shriners Hospital for Children	Cincinnati	14 Beds
<b><u>OH</u></b>	MetroHealth Medical Center	Cleveland	14 Beds
<b><u>OH</u></b>	St. Vincent's Hospital Burn Center	Toledo	10 Beds
<b><u>WI</u></b>	University of Wisconsin Hospitals and Clinics	Madison	15 beds
<b><u>WI</u></b>	Columbia St. Mary's Hospital Regional Burn Center	Milwaukee	12 Beds

## Appendix V: Regional Healthcare Coordinators



### **Region 1:**

Matt Price  
Region 1 HCC Coordinator  
Office: 517-324-4404  
[d1rmrc-matt@sbcglobal.net](mailto:d1rmrc-matt@sbcglobal.net)

### **Region 2N:**

Rick Drummer  
Region 2N HCC Coordinator  
Office: 248-759-4748  
[rdrummer@region2north.com](mailto:rdrummer@region2north.com)

### **Region 2S:**

Amy Shehu  
Region 2S HCC Coordinator  
Office: 734-728-7674  
[ashehu@2south.org](mailto:ashehu@2south.org)

### **Region 3:**

Rob Kelly  
Region 3 HCC Coordinator  
Office: 989-758-3712  
[Rob.kelly@cmich.edu](mailto:Rob.kelly@cmich.edu)

### **Region 5:**

Bill Bennett  
Region 5 HCC Coordinator  
Office: 269-337-6600  
[richard.winters@med.wmich.edu](mailto:richard.winters@med.wmich.edu)

### **Region 6:**

Mike Gregg  
Region 6 HCC Coordinator  
Office: 231-728-1967  
[mgregg@mcmca.org](mailto:mgregg@mcmca.org)

### **Region 7:**

Mark Becmer  
Region 7 HCC Coordinator  
Office: 989-731-4975  
[rc@mir7hcc.com](mailto:rc@mir7hcc.com)

### **Region 8:**

Jon Stone  
Region 8 HCC Coordinator  
Office: 906-273-2125  
[jon.stone@r8hcc.org](mailto:jon.stone@r8hcc.org)

## **Appendix W: Regional Medical Coordination Centers (MCC)**

Region 1 M CC:  
(517) 324-4404  
D1rmrc@sbcglobal.net

Region 2N MCC:  
(248) 267-0535  
RMCC@region2north.com

Region 2S MCC:  
(734) 727-7289  
email@2south.org

Region 3 MCC:  
(989) 583-6820  
HCC@groups.cmich.edu

Region 5 MCC:  
(269) 337-2500  
communication@aircare.org

Region 6 MCC:  
(855) 734-6622  
Region6MCC@mcmca.org

Region 7 MCC:  
(989) 732-5141  
Region7BTC@gmail.com

Region 8 MCC:  
(906) 237-2125  
R8MCC@r8hcc.org

## **Appendix X: Burn Surge Facility Training**

It is essential to the success of this plan that nurses and physicians staffing BSFs are trained in basic burn care. At a minimum, it is expected that each BSF will have at least 15 nurses and five physicians on staff that have successfully completed the ABA on-line ABLIS Course. This course covers essential fundamentals of emergency burn care and is felt to be an efficient and effective educational program.

In addition to the on-line ABLIS Course, BSFs will have the opportunity to send their personnel to a state supported ABLIS hands-on training at an ACS verified burn center as available.

Other opportunities for training could include rotating BSF nurses through regional burn centers to gather actual clinical experience in dealing with severe burns. These activities can be coordinated by the respective regional HCC.

## **Appendix Y: Exercising**

At least every two years, MDHHS BETP will plan to conduct a tabletop exercise incorporating a BMCI scenario. The SBCC will participate working with BETP to fill the designated role in the exercise. Each HCC will be expected to participate and may initiate additional exercises consistent with their respective regional exercise corrective action improvement plan. It is anticipated that regional participation should include the Regional Medical Director, Regional Healthcare Coordinator, Regional Epidemiologist, Michigan State Police Emergency Management and Homeland Security Division (EMHSD) District Coordinator and representatives from regional hospitals (especially burn centers and BSFs), EMS and local emergency management coordinators.

Additional functional and full-scale exercises will be considered as resources permit.



## **Appendix Z: Supplies**

To determine supply caches, assumptions were made regarding the MCI patient population. Projections were calculated based on an average sized adult, with 60% of the MCI patient population sustaining a 30% TBSA burn injury. The total number of estimated patients is 30 patients per million populations (i.e. 60% of the federal benchmark 50 patients per million populations). The supplies per patient have been determined based on the number injured as well as the hospitals already having a surplus on hand.

Silver based long acting dressing (Burn/3) – three 16 x 16 inch sheets per patient

Silver sulfadiazine (Silvadene) Dressing - one jar per patient

### **Regional Supply Caches**

Recommendations regarding the purchase and stockpiling of burn supplies for the treatment of burn patients in the mass casualty environment are predicated on:

- There will be limited availability of essential supplies and bed space in burn centers.
- There will be constraints on human resources.
- The need for short term care to be managed by medical staff not traditionally trained in specialized burn wound care.
- Adjusted standards of care will be provided during surge and crisis situations.

As a consequence, a conscious decision is being made to utilize supplies that will simplify patient care provided in a mass casualty environment, thus minimizing the staff training needed to care for burn injuries. This is especially critical in an environment where staff resources will already be stretched beyond capacity.

### **Supply Staging**

Based on this model using a silver based long acting dressing and silver sulfadiazine cream, MDHHS, BETP will need to maintain a stock of 132 cases (16 x 16 inch) of the silver based long acting dressing and 474 jars of silver sulfadiazine (Silvadene) cream. In order to maintain a balance between ensuring that supplies will be readily available in case of a MCI and being able to rotate stock into normal use to avoid losses due to product expiration:

- 30% of the total stock will be deployed to regional BSFs
- 10% will be staged at Michigan Medicine Survival Flight
- 10% at Spectrum Health Aero Med
- 50% will be maintained through the SBCC

Once a year, the supplies stored at the regional BSFs, Survival Flight and Aero Med will be rotated through as coordinated by the SBCC. The use of this product rotation schedule is intended to make the purchase of a silver based long acting dressing and silver sulfadiazine cream, a one-time cost, by avoiding product loss due to expiration.

## **Burn Mass Casualty Kits Located at the BSFs**

### **Inventory and Stock Check**

- The supplies in the Burn Mass Casualty kits are intended only for use during a mass casualty event and not for day-to-day clinical operations.
- Acticoat must be kept in its original boxes and packaging. An expired package has been provided to each facility for an example of what the product looks like. These examples are clearly marked “Expired.”
- A stock check is taken in the first week of every month and recorded on the Supply Checklist form (*Appendix AA*).
- Any anomalies in stock volume should be reported to the SBCC for resolution and replacement immediately.
- Receipt and Storage of Stock Orders.
- All deliveries must be acknowledged on the Stock Checklist.
- All stock received should be placed into the Burn Mass Casualty kit and managed as defined above.
- Good housekeeping principles must be applied to stock management so that items are kept in an orderly manner.
- BSFs that need to reorder supplies, during a BMCI, need to use *Appendix BB*.

### **Product Recalls**

- The BETP and SBCC must be notified immediately (if they are not already aware) of product recalls. An assessment will be made of the criticality of the recall and appropriate action taken.
- For Stock Management purposes all recalled products are removed from all areas and disposed of or returned to the manufacturer as instructed. Document on the Stock Management Worksheet the disposition of this product as ‘recalled product.’

### **Pediatric Supplies and Burn Surge Strike Teams**

There are five air ambulance services within the State of Michigan that have signed Memorandums of Understanding (MOU) with MDHHS to provide triage and stabilization support in case of a pediatric BMCI. Each of the air ambulance services has a supply bag or go-kit that is stocked with pediatric supplies such as IVs, Interosseous needles and driver, airway management including a Glidescope and other items. When activated for a pediatric

BMCI, the go-kit is loaded on to the aircraft and taken to the BSF to provide pediatric supplies. Flight crews assist in the stabilization of the most critical patients and in coordination with the SBCC transfer the patients to the designated burn center.

Pediatric Burn Surge Strike Teams may be requested by the BSF, these team members would be transported by aircraft after the flight crew arrives to assist in triage and stabilization. The teams could be made up of a senior burn nurse, pediatric critical care nurse or Emergency Medicine senior resident or fellow or senior pediatric surgical resident or fellow. Team members should be pre-identified for rapid deployment.

## Appendix AA: State of Michigan Burn Mass Casualty Supply Kit

Date		Checked by			
		Institution			
Item	Supplied by	Expiration Date	Quantity	Date Ordered	Date Received
Silvadene • 2 boxes (12 jars)	SBCC				
Acticoat • 5 cases (60 sheets)	Smith & Nephew				
Book of Contacts 2018	SBCC				
Training CDs (10)	SBCC				
Printed Training Manual	SBCC				
Fluid cards (20)	SBCC				
Triage Charts • Laminated (1) • Non-Lam. (10)	SBCC				
MI Regions Map (1)	SBCC				
Jump Drive (1)	SBCC				
Kit Management Protocol paper	SBCC				
Smith & Nephew Insert	SBCC				
Patient Management Worksheet (2)	SBCC				
Database Tutorial (1)	SBCC				
BSF Casualty Census Form (2)	SBCC				
Initial Burn Casualty Report Form (2)	SBCC				
Follow up Burn Casualty Report Form (2)	SBCC				
Copy of Michigan Burn Plan Version # 23 & Pediatric Attachment Version # 6	SBCC				
EMS Inter-facility Transfer Forms (15)	SBCC				

Please complete the first week of each Month and return to:

Sarah Parviz at [separviz@med.umich.edu](mailto:separviz@med.umich.edu)

## **Appendix BB: Supply Re-order Form**

Date \_\_\_\_\_

**Requisitioned by:**

Name: \_\_\_\_\_

Hospital or Facility: \_\_\_\_\_

Address 1: \_\_\_\_\_

Address 2: \_\_\_\_\_

City, State, Zip code: \_\_\_\_\_

Phone: \_\_\_\_\_

Email: \_\_\_\_\_

To re-order stock, please complete this sheet and return it to Sarah Parviz in the SBCC via fax (734-232-4892) or email (separviz@med.umich.edu).

Code/Ref No.	Description	Qty. Required	SBCC USE ONLY	
			Qty. Issued	Issued By

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## Acronyms

Acronym	Description
ABA	American Burn Association
ABC	Airway, Breathing, Circulation
ABG	Arterial Blood Gas
ABLS	American Burn Life Support
ACS	American College of Surgeons
BETP	Bureau of EMS Trauma and Preparedness
BSF	Burn Surge Facility
CBC	Complete blood count
CHECC	Community Health Emergency Coordination Center
CO	Carbon monoxide
COHb	Carboxyhemoglobin
D5LR	Dextrose 5% in lactated ringers
DEPR	Division of Emergency Preparedness and Response
DHHS	Department of Health and Human Services
DMAT	Disaster Medical Assistance Team
EI	Elements of Essential Information
EKG	Electrocardiogram
EM	Emergency Manager
EMHSD	Emergency Management and Homeland Security Division
EMS	Emergency Medical Services
EMTALA	Emergency Medical Treatment and Active Labor Act
EOC	Emergency Operations Center
ESF #8	Emergency Support Function #8: Public Health and Medical Services Annex
ETT	Endo-tracheal tube
FEMA	Federal Emergency Management Agency
FiO2	Fractured Inspired Oxygen
GLHP	Great Lakes Healthcare Partnership
HCC	Healthcare Coalition
HCO	Healthcare Organization
HHS	Health and Human Services
HPP	Hospital Preparedness Program
ICS	Incident Command System
ICU	Intensive Care Unit
IV	Intravenous
Kg	Kilogram
Lpm	Liters per minute
LR	Lactated ringers
LZ	Landing Zone
MACS	Multi-Agency Coordination System
MCA	Medical Control Authority
MCC	Medical Coordination Center

Acronym	Description
MCI	Mass Casualty Incident
MDHHS	Michigan Department of Health and Human Services
MIHAN	Michigan Health Alert Network
mL	Milliliter
MPSCS	Michigan Public Safety Communication System
MOU	Memorandum of Understanding
MSCC	Medical Surge Capacity and Capability
MSP	Michigan State Police
NDMS	National Disaster Medical System
NIMS	National Incident Management System
NPO	Nothing by mouth
O2	Oxygen
PAHPA	Pandemic and All-Hazards Preparedness Act
PAHPRA	Pandemic and All-Hazards Preparedness Reauthorization Act
PHS	Public Health Service
PL	Plain language
PO	By mouth
SBCC	State Burn Coordinating Center
SEOC	State Emergency Operating Center
TBSA	Total Body Surface Area



## Contributors

Jenny Atas, MD  
HCC Medical Director  
Region 2 South

Don Edwards, DO  
HCC Medical Director HCC  
Regions 1 and 8

Jerry Evans, MD, MMM  
HCC Medical Director  
Region 6

Bill Fales, MD  
HCC/EMS Medical Director  
Region 5

Anne Fast, BSN, RN (Retired)  
Program Coordinator/Training Manager  
State Burn Coordinating Center  
University of Michigan

Deb Harkins, BSN, MBA, RN  
Manager (Former)  
Trauma Burn Program

Theresa Jenkins, BSN, RN  
Trauma Coordinator  
Region 1  
MDHHS

Karla Klas, BSN, RN, CCRP  
Manager (Former)  
Trauma Burn Program

Lauren Korte, BAS, RRT, NHDP-BC  
Medical Surge Planner  
Department of Emergency Preparedness  
and Response  
MDHHS

Michelle Mora, RN, EMT-P  
Trauma Coordinator (Former)  
EMS and Trauma  
MDCH

Jeff Nigl,  
HCC Medical Director (Former)  
Region 3

Linda Scott, MA, BSN  
Bureau Director  
EMS, Trauma, and Preparedness

Robin Shivley, EMT-P  
Manager (Retired)  
EMS and Trauma  
MDCH

Robert Takla, MD  
HCC Medical Director (Former)  
Region 2 North

Stewart Wang, MD, PhD, FACS  
Medical Director  
State Burn Coordinating Center  
University of Michigan

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**Attachment 1: Pediatric Burn Mass Casualty Incident**

**VERSION #6**



## **Pediatric Burn Surge Attachment**

During an incident it would be important to rapidly deploy pediatric medical expertise and supplies to any medical facility experiencing the influx of a large number of pediatric burn patients.

Such assistance will be provided in the form of Burn Surge Strike Teams equipped with a cache of airway and vascular access supplies suitable for pediatric patients. Five flight services around Michigan have agreed to transport these Burn Surge Strike Teams to the scene, the local medical facility or the nearest Burn Surge Facility (BSF) in support of the triage, treatment and transport of patients. Activation and dispatch of these Burn Surge Strike Teams will be done at the direction of the SBCC medical director in consultation with the Community Health Coordinating Center (CHECC). The strike teams will assist with initial stabilization, advanced airway management and intravenous (IV) and interosseous (IO) access for the pediatric patient. The configuration of the team will be dependent on the incident: it will include the pilot/driver and a flight nurse as well as one or more of the following:

- Additional flight nurse or paramedic
- Senior burn nurse
- Pediatric Critical Care Nurse
- Physician:
  - Flight Physician
  - Pediatric Emergency Medicine Senior Resident or Fellow
  - Senior Emergency Medicine Resident or Fellow
  - Senior Level Pediatric Surgical Resident or Fellow
  - Pediatric Critical Care Fellow

The purpose of this appendix is to provide guidance for the care of the pediatric patients injured in a Burn Multi Casualty Incident (BMCI). The goals of this plan are to:

- Provide highest level of care for a large number of pediatric burn patients
- Expand ability to provide burn care
- Prioritize use of limited resources
- Support Michigan healthcare facilities caring for a surge of pediatric burn patients.

This document outlines the plan and resources that have been developed to provide care for pediatric patients involved in a BMCI including:

- Initial resuscitation
- Fluid management
- Airway control
- Mechanical ventilation
- Pain control
- Wound assessment and management

The pediatric patient is more vulnerable to weather conditions and toxic exposures because they are shorter and therefore closer to the ground. Their motor skills and cognitive reasoning may put them in harm’s way because they cannot fully comprehend the dangers and the need to escape from a situation. They may even gravitate towards the danger out of curiosity. They may become frightened of the first responders because of PPE gear as well as the fact that they are strangers. They may become separated from other family and will need assistance and supervision. They are also more vulnerable from a physiologic status:

**Table # 1**

Pediatric Characteristic	Special risk during disaster
Respiratory	Higher minute volume increases risk from exposure to inhaled agents.
Gastrointestinal	Higher risk for dehydration from vomiting and diarrhea after exposure to contamination.
Skin	Higher body surface area increases risk for skin exposure. Skin is thinner and more susceptible to injury from burns, chemicals and absorbable toxins. Evaporation loss is higher when skin is wet or cold, so hypothermia is more likely.
Endocrine	Increased risk for thyroid cancer from radiation exposure.
Thermoregulation	Less able to cope with temperature problems, with higher risk for hypothermia.
Developmental	Lower ability to escape environmental dangers or anticipate hazards.
Psychological	Prolonged stress from critical events. Susceptible to separation anxiety.

## **Basic Treatment Considerations**

Children have a greater surface area per unit of body multi than adults and require relatively greater amounts of resuscitation fluid. Children have a higher percentage of Body Surface Area (BSA) devoted to the head relative to the lower extremities.

- The ratio of BSA: is highest at birth and diminishes as the child grows.
- The large head also contributes to larger heat loss.
- Pediatric skin is thinner and more permeable; toxins, if present will be absorbed faster and exert greater systemic effects.
- Smaller children have limited glycogen stores which can be rapidly depleted under stress; they should receive a maintenance fluid of D5LR, in addition to resuscitation fluids. (Refer to page 11 of *Pediatric BMCI Surge Appendix*)

### **Vital Signs at Various Ages**

**Table # 2**

<b>Age</b>	<b>Heart Rate (beats/min)</b>	<b>Blood Pressure (mm Hg)</b>	<b>Respiratory Rate (breaths/min)</b>
Premature	120-170	55-75/35-45	40-70
0-3 mo.	100-150	65-85/45-55	35-55
3-6 mo.	90-120	70-90/50-65	30-45
6-12 mo.	80-120	80-100/55-65	25-40
1-3 yr.	70-110	90-105/55-70	20-30
3-6 yr.	65-110	95-110/60-75	20-25
6-12 yr.	60-95	100-120/60/75	14/22

**\*\*\*It is important to keep the patient NPO until assessment has been completed\*\*\***

## **Special Airway Considerations for the Pediatric Patient**

### **AIRWAY**

Anatomical differences to be aware of:

- The tongue is relatively large compared with the oropharynx, which may create an obstruction
- The larynx is higher and more anterior in the neck, the vocal cords are at a more antero-caudal angle
- The epiglottis is omega shaped and soft
- The narrowest portion of the airway is the cricoid ring, not the vocal cords
- Significant burns to the nasal passage of infants < 6 months can cause airway compromise due to obligatory nose breathing

### **Intubation**

Emergently intubate:

- Burns to mouth and/or nose
- Stridor, wheezing, respiratory distress, hypoxia
- Altered mental status with inability to protect airway

Urgent evaluation of airway:

- Carbonaceous sputum
- Facial burns
- Cough with distress, stridor or hypoxia
- Prolonged closed space heat exposures
- Large burns >20%

Early intubation, if airway control is needed, is vital to prevent a future difficult intubation scenario.

- Keep Patient NPO
- Administer 100% Oxygen
- Elevate HOB
- Appropriate size Endo-Tracheal Tube (ETT)
- Appropriate securing device
  - Commercial device
  - Tape/Twill tape/Trach ties
- Naso-Gastric Tube (NGT)/Oral Gastric Tube (OGT) inserted

The following table can be used for reference and to assist with the induction for intubation.

### **Rapid Sequence Intubation Agents**

**Table # 3**

<b>Agent</b>	<b>Dosage</b>	<b>Duration of Action</b>	<b>Comment</b>
<b>Induction</b>			
Etomidate	0.2 – 0.4 mg/kg	10-15 minutes	Rapid onset 30-60 sec, peaks in 1 minute
Versed	0.1 -0.2 mg/kg	30-60 minutes	
Fentanyl	1 – 5 mcg/kg	1-2 hours	
<b>Paralytics</b>			
Rocuronium	1mg/kg	30 – 60 minutes	Rapid onset
Succinylcholine	1 – 2 mg/kg	3 - 5 minutes	If < 24 hours since injury
Vecuronium	0.1 mg/kg	30-90 minutes	



The following tables can be used for reference to assist with appropriate equipment and tube sizes.

\*\*Cuffed endotracheal tubes should be used if available

### Equipment and Supplies

**Equipment Sizes: Up to 20Kg**

**Tables # 4**

Weight	3 kg	5 kg	10 kg	15 kg	20 kg
<b>ETT</b>	3-3.5	3.5-4.0	4-4.5	4.5-5.0	5.0-5.5
<b>L Blade</b>	Miller 0-1	Miller 0-1	Miller 0-1	Miller 1-2	Miller 2
<b>Suction</b>	6-8 Fr	8-10 Fr	10 Fr	10 Fr	10 Fr
<b>NG Tube</b>	5-8 Fr	5-8 Fr	8-10 Fr	10-12 Fr	12-14 Fr
<b>Foley</b>	6-8 Fr	6-8 Fr	8-10 Fr	10-12 Fr	10-12 Fr
<b>Chest Tube</b>	10-12 Fr	12-16 Fr	16-20 Fr	20-24 Fr	24-32 Fr
<b>LMA (cuff)</b>	1 (4 mL)	1.5 (7 mL)	2 (10 mL)	2 (10 mL)	2-2.5 (14 mL)

**Equipment Sizes: greater than 20kg**

**Table # 5**

Weight	20 -25 kg	30 kg	40 kg	> 50 kg
<b>ETT</b>	5.5-6.0 cuff	6.0-6.5 cuff	7.0-7.5 cuff	7.5-8.0 cuff
<b>L Blade</b>	Mil/Mac 2	Mil/Mac 2-3	Mil/Mac 3	Mil/Mac 3
<b>Suction</b>	10 Fr	10 Fr	12 Fr	12-14 Fr
<b>NG Tube</b>	12-14 Fr	14-26 Fr	14-16 Fr	16-18 Fr
<b>Foley</b>	12 Fr	12 Fr	12-14 Fr	12-14 Fr
<b>Chest Tube</b>	28-32 Fr	28-32 Fr	32-40 Fr	32-40 Fr
<b>LMA (cuff)</b>	2.5 (17 mL)	3 (20 mL)	3 (20 mL)	4-6 (30-50 mL)

## **Ventilator Management**

Pediatric patients have smaller and more delicate lungs that are susceptible to barotrauma. Children have a unique respiratory physiology; they have higher minute ventilation per kg than adults. Because they have a higher respiratory rate than adults they are exposed to greater dosages of toxins that may be present during a BMCI and will suffer the effects of these agents much more rapidly than adults. They also will potentially absorb more of the substance before it is cleared or diffused from the respiratory tissues. Many chemical agents have a high vapor density and are heavier than air, which means that they “settle” close to the ground, in the air space used by children.

### **Initial Ventilator Settings**

**Table # 6**

	<10 kg	10-40 kg	>40 kg
<b>Mode</b>	<b>Pressure Control</b>	<b>Pressure Control</b>	<b>Pressure Control</b>
<b>Rate</b>	<b>40</b>	<b>28</b>	<b>16</b>
<b>PIP</b>	<b>15-20 cm H2O</b>	<b>15-20</b>	<b>20</b>
<b>PEEP</b>	<b>5-8 cm H2O</b>	<b>5-8</b>	<b>5-8</b>
<b>FiO2</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
<b>Inspiratory time</b>	<b>0.3 seconds</b>	<b>0.7 seconds</b>	<b>1 second</b>

Inspiratory pressure may be increased **slowly** to get good chest rise and equal breath sounds. Too much pressure could cause a pneumothorax, which is why pressures are increased slowly for equal chest rise.

- Effective ventilator changes for:
  - Poor Oxygenation: increase FiO2, increase PIP
  - High CO2: increase rate, increase PEEP  
(Make changes separately to identify which change improved ventilation or oxygenation).
- Burn patients undergoing fluid resuscitation typically require higher ventilator pressures.
- For patients with circumferential burns of the torso/abdomen escalating ventilator pressures may indicate the need for escharotomies.

**\*\*\*If considering escharotomy contact the SBCC\*\*\***

**734-936-2876**

## **Sedation:**

Ongoing sedation for care while waiting for and during transport should be considered. Does the patient need to be restrained? Consider the use of arm immobilizer as well as soft restraints, whichever method is presently used by the transport teams.

**Table # 7**

<b>Agent</b>	<b>Age</b>	<b>Dosage</b>	<b>Max Doses</b>
<b>Versed</b>	GA $\leq$ 32 weeks	0.03 mg/kg/hr.	0.06mg/kg/hr.
	> 32 weeks	0.06 mg/kg/hr.	0.12mg/kg/hr.
Loading dose	1 month – 18 yrs.	0.05 – 0.2 mg/kg	Given slow IV over 2-3 minutes
Continuous IV		0.06 – 0.12 mg/kg/hr.	0.36 mg/kg/hr.; titrate to effect
<b>Morphine</b>	< 50kg	0.01 mg/kg/hr.	0.04 mg/kg/hr.
	$\geq$ 50 kg	1.5 mg/hr.	
<b>Fentanyl</b>	< 50 kg	Load: 1 – 10 mcg/kg <5 mcg/kg 3-5 minutes >5mcg/kg 5-10 minutes	1 - 10 mcg/kg hr.

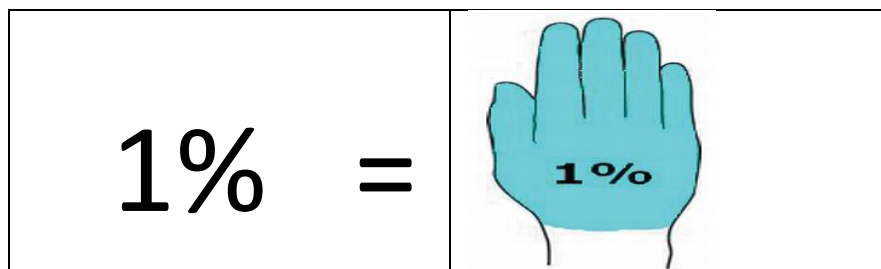
## **Burn Assessment**

Assessing the patient's burns and estimating the area involved is important for the resuscitation phase of care. This can be done in several ways. Two methods are the palm method and the Lund-Browder chart. It is important to note that only partial and full thickness burns are to be included in the Total Body Surface Area (TBSA) estimation.

**The Palm Method** - Is an extremely easy and is very helpful when the burns are scattered over the body. With this method and using the PATIENT'S hand as a guide, the palmar surface is equal to 1% of the patient's body.

**Diagram # 1**

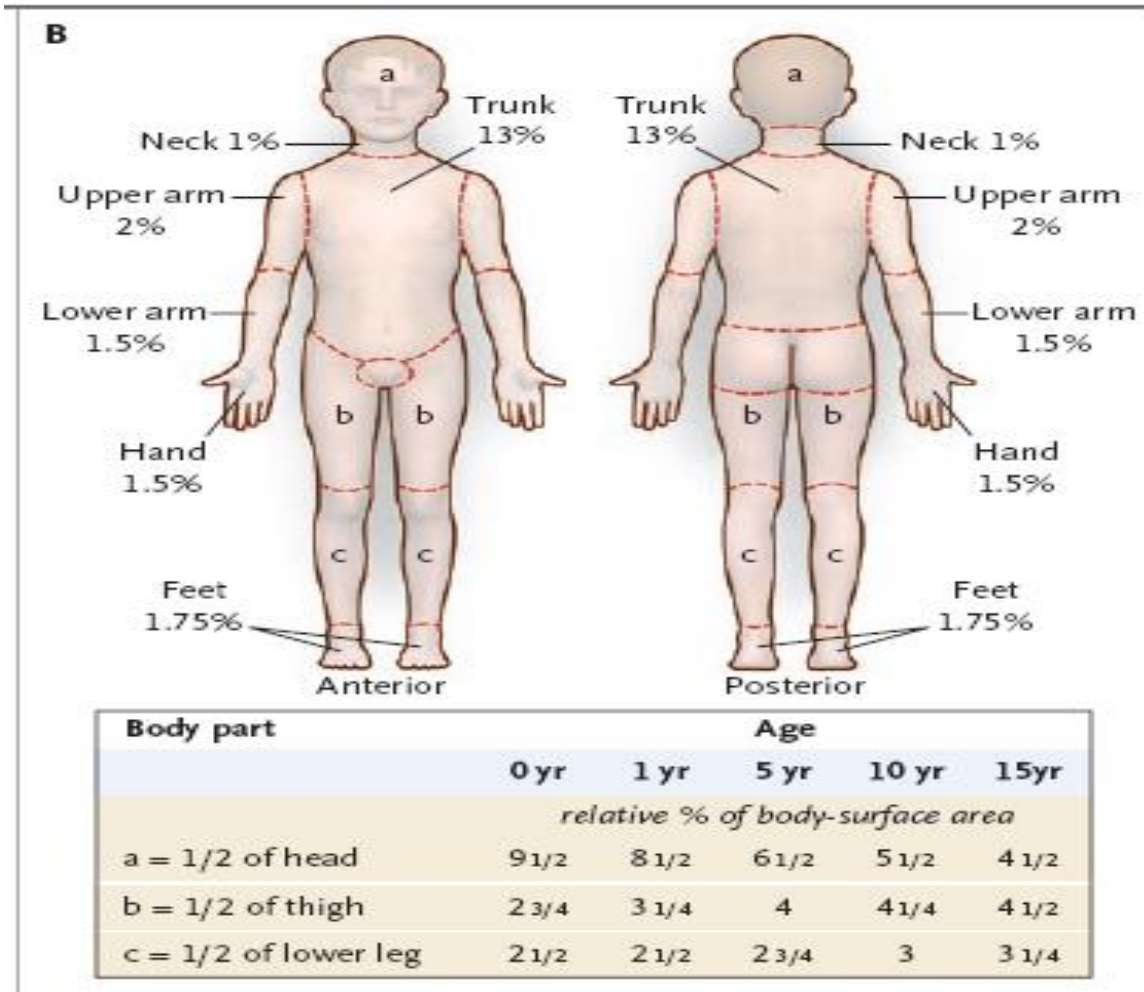
### **The Palm Method**



**Lund and Browder Chart** - If used correctly, is the most accurate method for determining TBSA burns in pediatrics. It compensates for the variation in body shape with age and therefore can give an accurate assessment of burns area in children.

**Diagram # 2**

**Lund-Browder Chart**



## **Fluid Resuscitation**

Pediatric patients can compensate and maintain their heart rate during the early phases of hypovolemic shock, which can mislead the practitioner into under-resuscitating the patient. Then the patient will crash without warning. Vital signs, including heart rate, respiratory rate and blood pressure vary with age. Temperature regulation is harder for the child related to the thinner skin, body surface area to multi ration and the usual lack of subcutaneous tissue. This is why it is so important to keep the child warm, especially during the resuscitation phase.

If IV access cannot be obtained, intraosseous (IO) access should be used.

1. **Initial starting points** for fluid resuscitation for pediatric patients (rate to be adjusted once TBSA is calculated)
  - a.  $\leq 5$  years: 125 ml Lactated Ringers (LR) per hour
  - b. 6-13 years old: 250 ml LR per hour
  - c.  $\geq 14$  years: 500 ml LR per hour
2. **Pediatric patients with burns  $\geq 15\%$  TBSA require resuscitative fluids in addition to maintenance fluids.** (see Table for exemplar Calculations)
  - a. 4ml **Lactated Ringers** x Kg x TBSA (only partial and full thickness burns) is the estimated resuscitation fluid requirement for the first 24 hours.
  - b. For patients under 1 year of age give Dextrose 5% Lactated Ringers (D5LR) at a maintenance rate in addition to the fluid resuscitation.
  - c. Divide total by 2 and administer this amount in the first 8 hours from the time of injury. The remaining half to be given over the next 16 hours.
  - d. If the patient remains in a BSF after fluid resuscitation has been completed, run maintenance IV fluids until adequate PO intake is maintained.
3. Urine Output target is 1-2 ml/kg/hr. (Adjusting rate of resuscitation fluid in response)
  - a. Low urine output for two (2) consecutive hours:
    - i. Patient is less than or equal to 30 kg: urine output is  $< 1$  mL/kg/hr. or  
Patient is greater than 30 kg: urine output is  $< 0.5$  mL/kg/hr.
      1. Increase fluid rate by 15%
      2. Notify physician
      3. Repeat x 1 if urine output remains low
    - ii. If urine output remains inadequate after two (2) 15% escalations start Albumin infusion if not already done
    - iii. If urine output remains low x two (2) consecutive hours after Albumin infusion started, notify attending physician or fellow
    - iv. Start dopamine drip
  - b. High urine output for two (2) consecutive hours
    - i. Patient is  $< 30$  kg: urine output  $> 2$  mL/kg/hr.
    - ii. Patient is  $> 30$  kg: urine output is  $> 1$  mL/kg/hr.

1. Dip urine to exclude glycosuria.

**Table # 8**

<b>Exemplar Burn Resuscitation Fluid Calculations</b>				
<b>Patient Weight</b>	<b>TBSA burn</b>	<b>Calculation</b>	<b>Estimated 24h Resuscitation Total (NOT including maintenance fluids)</b>	<b>Fluid type (dependent on patient weight)</b>
8 kg	20%	3 x 8 x 20	480 ml	D5 LR
8 kg	40%	3 x 8 x 40	960 ml	D5 LR
8 kg	60%	3 x 8 x 60	1,440 ml	D5 LR
8 kg	80%	3 x 8 x 80	1,920 ml	D5 LR
<b>10 kg</b>	20%	3 x 10 x 20	600 ml	LR
<b>10 kg</b>	40%	3 x 10 x 40	1,200 ml	LR
<b>10 kg</b>	60%	3 x 10 x 60	1,800 ml	LR
<b>10 kg</b>	80%	3 x 10 x 80	2,400 ml	LR
20 kg	20%	3 x 20 x 20	1,200 ml	LR
20 kg	40%	3 x 20 x 40	2,400 ml	LR
20 kg	60%	3 x 20 x 60	3,600 ml	LR
20 kg	80%	3 x 20 x 80	4,800 ml	LR
<b>30 kg</b>	20%	3 x 30 x 20	1,800 ml	LR
<b>30 kg</b>	40%	3 x 30 x 40	3,600 ml	LR
<b>30 kg</b>	60%	3 x 30 x 60	5,400 ml	LR
<b>30 kg</b>	80%	3 x 30 x 80	7,200 ml	LR
40 kg	20%	3 x 40 x 20	2,400 ml	LR
40 kg	40%	3 x 40 x 40	4,800 ml	LR
40 kg	60%	3 x 40 x 60	7,200 ml	LR
40 kg	80%	3 x 40 x 80	9,600 ml	LR
<b>50 kg</b>	20%	3 x 50 x 20	3,000 ml	LR
<b>50 kg</b>	40%	3 x 50 x 40	6,000 ml	LR
<b>50 kg</b>	60%	3 x 50 x 60	9,000 ml	LR
<b>50 kg</b>	80%	3 x 50 x 80	12,000 ml	LR

**\*\*\* Give HALF(1/2) of the estimated 24 hour resuscitation fluid total OVER THE FIRST 8 HOURS post-injury, in addition to maintenance fluids\*\*\***

### Clinical Features of Dehydration

Table # 9

Feature	Mild (<5%)	Moderate (5% to 10%)	Severe (>10%)
Heart rate	Normal	Slightly increased	Rapid, weak
Systolic BP	Normal	Normal to orthostatic, >10 mmHg change	Hypotension
Urine output	Decreased	Moderately decreased	Marked decrease, anuria
Mucous membranes	Slightly dry	Very dry	Parched
Anterior fontanel	Normal	Normal to sunken	Sunken
Tears	Present	Decreased, eyes sunken	Absent, eyes sunken
Skin	Normal turgor	Decreased turgor	Tenting
Skin perfusion	Normal capillary refill (<2 seconds)	Capillary refill slowed (2-4 seconds); skin cool to touch	Capillary refill markedly delayed (>4 seconds); skin cool, mottled, gray

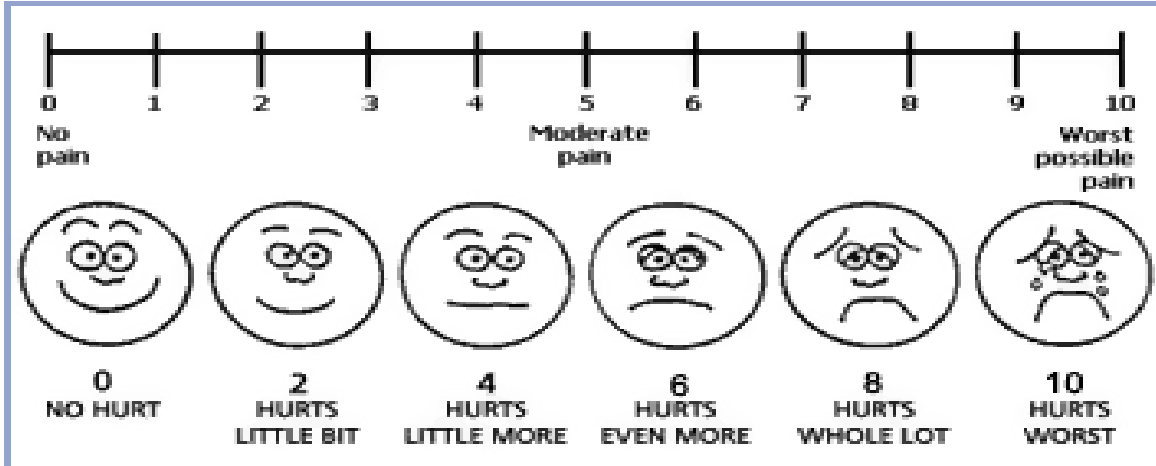
### PAIN MANAGEMENT

The patient should only be given medication through IV access or IO access when available. (Oral or IM route can have a variable absorption rate).

- Fentanyl 0.5 - 1 mcg/kg/dose Every 5 minutes with a Max of 2 mcg/kg/hour OR
- Morphine 0.05 – 0.1 mg/kg dose. May repeat to 0.2 mg/kg/hr. max dose.
- Oral pain medication should be reserved either for patients with very minor burns or patients with no other options for pain control.

Diagram # 3

Verbal Assessment Tool for Pediatric Pain.



Non-Verbal Pain Assessment Tool

\*\*This is a behavioral pain assessment scale for use in non-verbal patients unable to provide reports of pain. Instructions: Rate patient in each category, add together document total pain score.

Table # 10

FLACC SCALE (FACE, LEGS, ACTIVITY, CRY, CONSOLABILITY)			
	0	1	2
FACE	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant frown, clenched jaw, quivering chin
LEGS	Normal position OR Relaxed	Uneasy, Restless, Tense	Kicking Or Legs drawn up
ACTIVITY	Lying quietly Normal position Moves easily	Squirming, Shifting back and forth, Tense	Arched, Rigid or Jerking
CRY	No cry (Awake or Asleep)	Moans or Whimpers Occasional complaint	Crying Steadily, Screams or Sobs, Frequent complaints
CONSOLABILITY	Content Relaxed	Reassured by occasional touching, hugging or talking, Distractible	Difficult to console or comfort

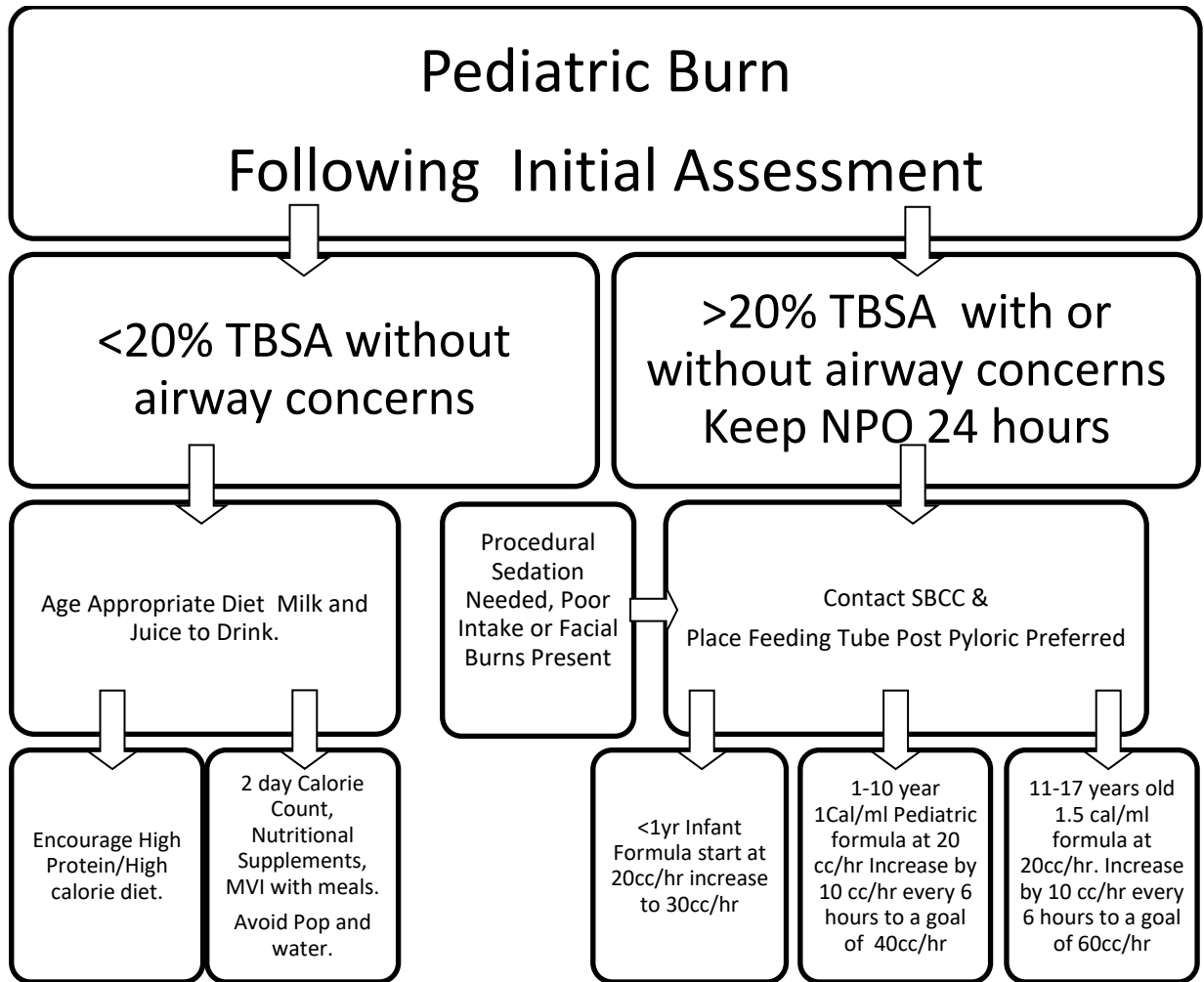


**\*\*\* It is important to keep the patient NPO (nothing by mouth) until assessments have been completed\*\*\***

**NUTRITION**

Nutrition in a pediatric patient should be considered early in the treatment phase. Place enteral feeding tube as early as possible in all patients with burns  $\geq 20\%$  TBSA. If none are available or if the patient is awake and alert and able to drink and eat encourage patient to do so.

**Diagram # 4**



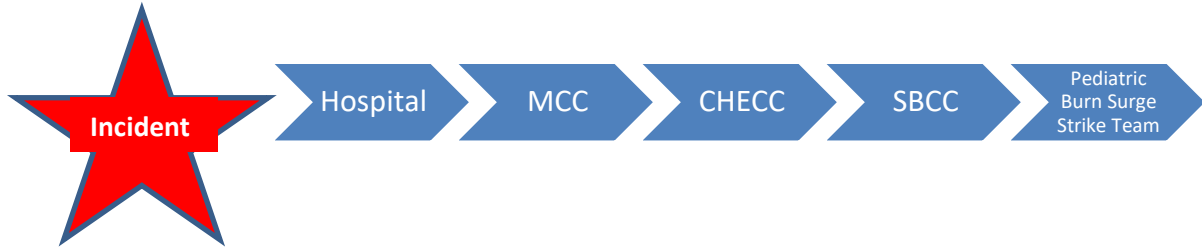
- If patient has an NG/OG, check residuals Q 4 hr. If residuals are more than 3 times the hourly rate stop the tube feedings and notify physician
- Consult dietitian for appropriate formula

**Table # 12****Nutritional Guidelines for Birth to 1 yr. old**

<b>Age</b>	
Birth - 1 month	2-3 ounces (6-90 mL) per feeding breast or bottle every 2-3 hours
2-4 months	3-4 ounces (90-120 mL) per feeding every 3-4 hours
4-6 months	4-5 ounces (120-150 mL) per feeding, four or more time daily Begins baby food, usually rice cereal
6-8 months	6-8 ounces (180-240 mL) per feeding, four times daily Eats baby food such as rice cereal, fruits and vegetables
8-10 months	6 ounces (180 mL) per feeding, four times a day Soft finger foods
10-12 months	6-8 ounces (180-240mL) per feeding, four times a day Soft table foods, uses spoon and cup with lid
Formulas	Milk Based: Enfamil, Enfacare & Similac Soy Based: Prosobee & Isomil

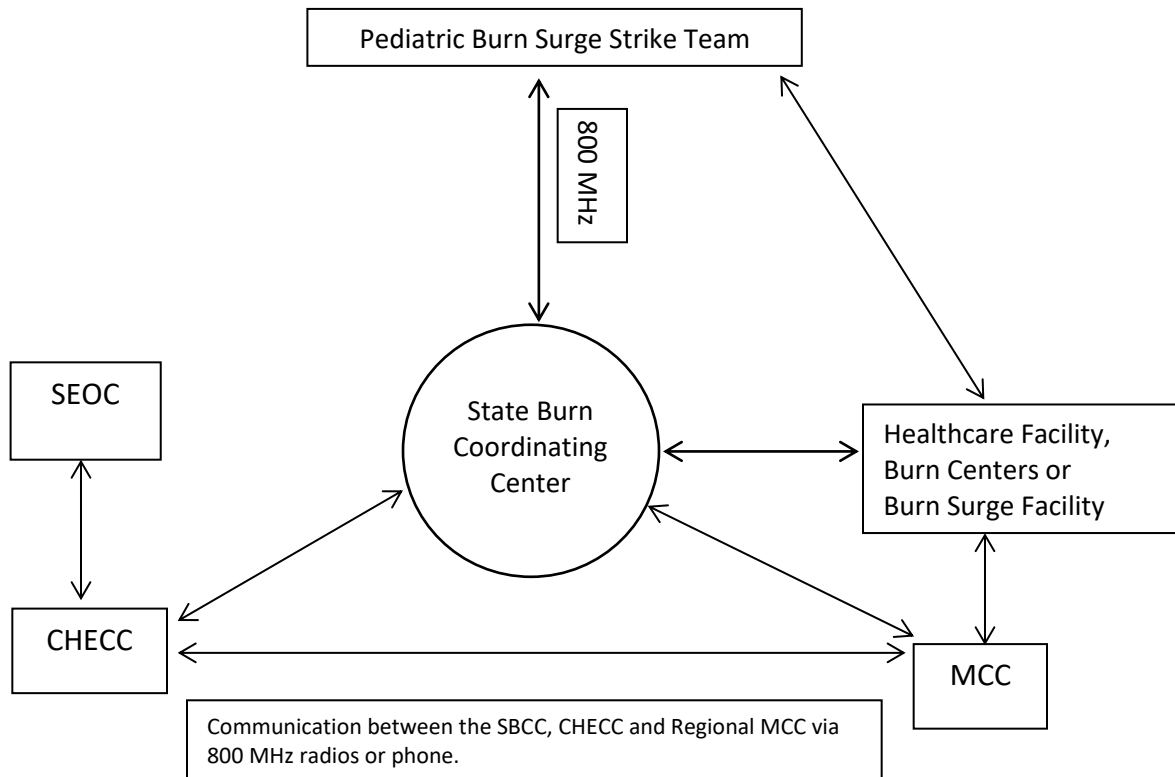
## Communication Activation Model

**Diagram # 5  
Initial Communication**



Gathering incident specific information is critical to communication both vertically and horizontally with the agencies involved. For communication with the Pediatric Burn Surge Strike Team deployed to assist with pediatric patients, the SBCC will ask the Healthcare/Burn Surge Facility for Elements of Essential Information (EEI) (*Appendix B – The Michigan State Multi-Casualty Incident Burn Plan*). This will provide the Pediatric Burn Surge Strike Team with basic information regarding patient quantity and injuries. All air ambulance services have 800 MHz radios and OPHP 1 is the fallback frequency. Direct phone communications will also occur.

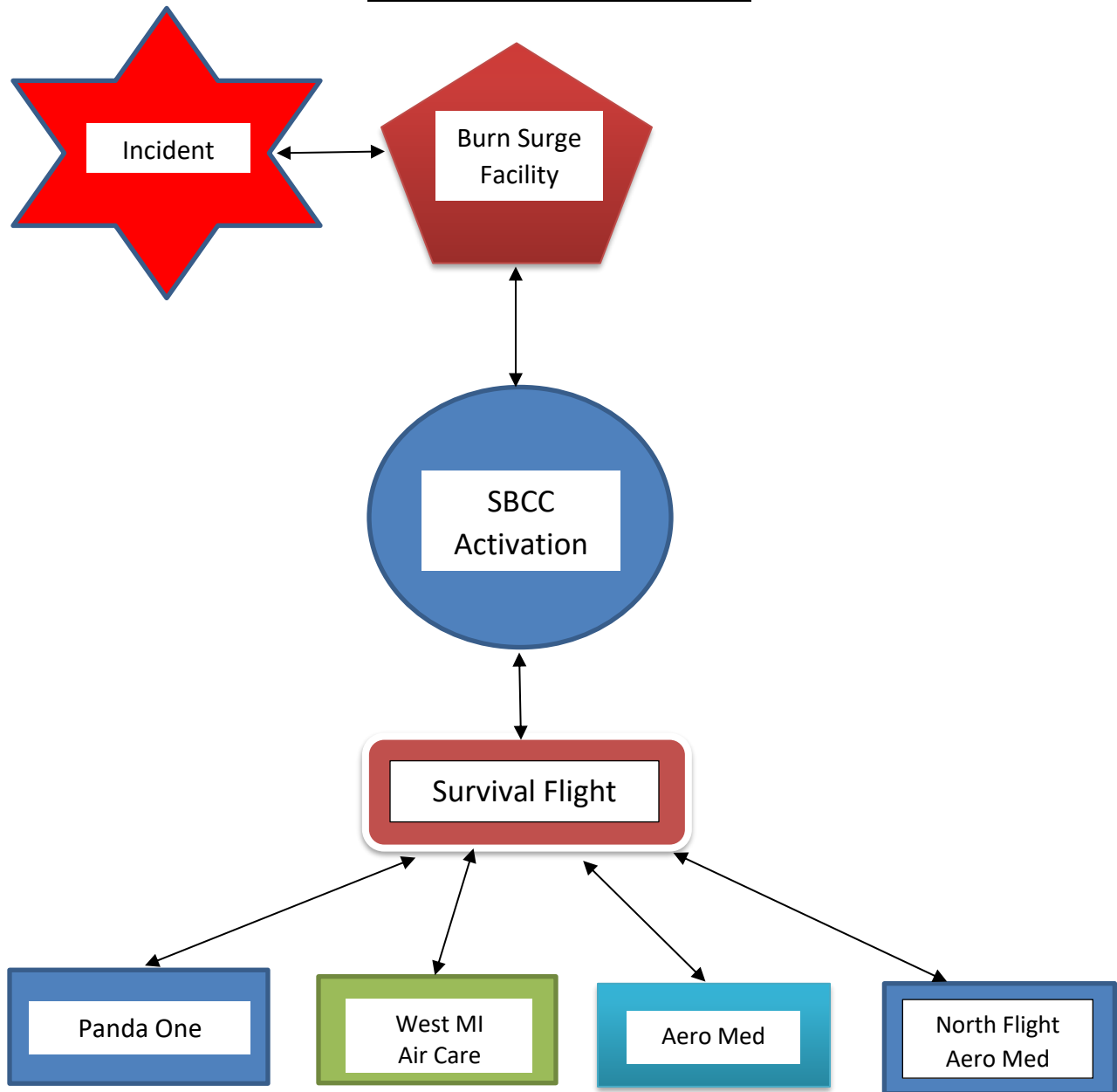
**Diagram # 6  
On-going Communication Incident**



Special Event frequencies for the 800 MHz radios will be determined and provided by the CHECC. All air ambulance services have Special Event frequencies.

Diagram # 7

Air Ambulance Activation



With the activation of the SBCC, the Medical Director will contact Survival Flight dispatch. They in turn will notify the closest air ambulance service and put them on stand-by. The closest air service will be dispatched to the impacted hospital or burn surge facility to assist with stabilization of patients, transport of Burn Surge Strike Team members and then begin the transfer of the most critical patients to burn centers. Critical pediatric patients will be the first transferred out. Other air ambulance services could be activated to assist in the transfer of the most critical to burn centers.

All air ambulance services would be notified of the burn mass casualty incident for situational awareness. The next closest air ambulance would be placed on stand-by for dispatch to assist with patient transport. Close communication would need to take place between survival dispatch and the air ambulances in the air and landing. Outside landing zones may have to be set-up by trained local personnel for safety of the flight crews.

## **References**

Pediatric Disaster CBRNE Incidents - Quick Medical Reference Guide. Developed by Region 2 South Healthcare Coalition in conjunction with the Michigan Department of Community Health (MDCH) Office of Public Health Preparedness (OPHP) utilizing the Department of Health and Human Services (HHS), Office of the Assistant Secretary for Preparedness and Response (ASPR) Hospital Preparedness Program Cooperative Agreement Number U3REPO90218-01-00 funding.

University of Michigan – Department of Pharmacy Services; IV Guidelines for Brandon Newborn ICU:

<http://med.umich.edu/surgery/burn/BrandonIVDripGuide.pdf>

University of Michigan – Department of Pharmacy Services; PICU IV Guidelines

[http://med.umich.edu/surgery/burn/PICU\\_IV\\_InfusionChart.pdf](http://med.umich.edu/surgery/burn/PICU_IV_InfusionChart.pdf)

## Annex 1: Peds GO-KIT Supply List

Version 6

19 April, 2018

Item	Each
Broselow tape	1
<b>Resuscitation</b>	
<b>Foleys</b>	
6 Fr.	4
8 Fr.	4
10 Fr.	4
<b>OG/NGT tubes</b>	
6 Fr.	4
8 Fr.	4
10 Fr.	4
<b>IV catheters</b>	
24 ga.	20
22 ga.	20
1 in. silk tape	4
Tegaderm 2 3/8 x 2 3/4"	20
<b>Intra-Osseous EZ-IO</b>	
Sets: 15 ga. x 15 mm	10
15 ga. x 25 mm	15
15 ga. x 45 mm	5
Driver for EZ-IO	1
<b>Airway</b>	
2.5 uncuffed ETT	4
3.0 uncuffed ETT	4
3.5 cuffed ETT	4
4.0 cuffed ETT	4
4.5 cuffed ETT	4
5.0 cuffed ETT	4
5.5 cuffed ETT	4
6.0 cuffed ETT	4
6.5 cuffed ETT	4
7.0 cuffed ETT	4
7.5 cuffed ETT	4
8.0 cuffed ETT	4
6 Fr. Stylet	7
10 Fr. Stylet	5
Capnometers: < 15 kg	12
>15 kg	12
Peep Valves	12
Pop-off valves	8

Item	Each
Adult Ambu bag	1
Pediatric Ambu bag	
Pediatric Cric tray (3.5)	1
Neo trach (3.5) uncuffed	2
Peds cric tray	1
Peds trach (4) uncuffed	2
Introducer, perc trach	1
<b>Resuscitation Masks</b>	
Size 1 – neonatal	6
Size 2 – infant	6
Size 3 – toddler	6
Size 4 – child	6
Size 5 – small adult	6
Non-rebreather mask – peds	10
Twill tape/tie	1
<b>Nasal Cannula</b>	
Infant	10
Pediatric	10
<b>Suction Catheters</b>	
6 Fr.	10
8 Fr.	10
<b>Laryngoscopes</b>	
Laryngoscope handle – Med.	1
0 Miller blade	4
1 Miller blade	4
2 Miller blade	4
3 Miller blade	4
4 Miller blade	4
1 Macintosh blade	4
2 Macintosh blade	4
3 Macintosh blade	4
4 Macintosh blade	4
GlideScope Ranger	
GlideScope Ranger: Baton 3-4	1
Includes 10 each 3 & 4 blades	
GlideScope Ranger: Baton 1-2	1
Includes 10 each 1 & 2 blades	

## Annex 2: Acronyms

<b>Acronym</b>	<b>Term</b>
BMCI	Burn Mass Casualty Incident
BETP	Bureau of EMS, Trauma, and Preparedness
BSA	Body Surface Area
BSF	Burn Surge Facility
CHECC	Community Health Emergency Coordination Center
CO <sub>2</sub>	Carbon dioxide
Cric	Cricothyrotomy
D5LR	Dextrose 5% Lactated Ringers
ETT	Endotracheal tube
F <sub>i</sub> O <sub>2</sub>	Fracture inspired oxygen
Fr.	French
ga.	gauge
GA	Gestational age
hr.	hour
IO	intraosseous
IVF	Intravenous fluid
IV	intravenous
kg	Kilograms
LR	Lactated Ringers
mcg	micrograms
mg	milligrams
mL	milliliter
mm	millimeter
NPO	Nothing per mouth
PEEP	Positive end expiratory pressure
PERC	Percutaneous
PIP	Peak inspiratory pressure
PO	per mouth
SBCC	State Burn Coordinating Center
TBSA	Total body surface area
trach	Tracheostomy tube
yr.	years

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Stewart Wang, MD, PhD  
Medical Director  
State Burn Coordinating Center  
University of Michigan

Lauren Korte, BAS, RRT  
Medical Surge Planner  
Bureau of EMS, Trauma, and Response

Stuart Bradin, DO, FAAP, FACEP  
Pediatric Emergency Medicine Physician  
University of Michigan

Meagan Loken, BSM, RN, CPN  
Children's Hospital of Michigan

Dawn Cloutier, BSN, RN,  
Program Manager, Trauma, Burn & Injury  
Prevention  
Children's Hospital of Michigan

Stacey Noel, MD  
Pediatric Emergency Medicine Physician  
University of Michigan

Matthew Denenberg, MD  
Medical Director Pediatric Emergency Dept.  
Helen DeVos Children's Hospital

Sarah Parviz  
Administrative Coordinator  
State of Michigan Burn Coordinating Center  
University of Michigan

K. Don Edwards, DO  
Medical Director  
Region 1 and 8 Healthcare Coalitions

Heather Schaewe, MSN, RN  
Children's Hospital of Michigan

Anne Fast, BSN, RN (Retired)  
Program Manager/Training  
State of Michigan Burn Coordinating Center  
University of Michigan

Dr. Jackie Scott, DVM, PhD  
Director (Retired)  
Bureau of EMS, Trauma and Preparedness

Natalie Fisher, BSN, RN, CPN  
Manger 5 East/IV Team  
Children's Hospital of Michigan

Linda Scott, MA, BSN  
Director  
Bureau of EMS, Trauma and Preparedness

Michelle Halley, MD, FAAP  
Pediatric Critical Care  
Bronson Healthcare Group

Christina Shanti MD  
Burn Unit Medical Director  
Children's Hospital of Michigan

Tracy Hotsford, MSN, RN, AGONS-BC, PCCN  
Burn Program Coordinator  
Spectrum Health Regional Burn Center

Lisa Vitale, BSN, RN, CPN  
Burn Program Coordinator  
Children's Hospital of Michigan