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# Purpose and Scope

The Disaster Available Supplies in Hospitals (DASH) Burn Supply Module (BSM) is designed to help hospitals plan for a large number of burn patients presenting to their facility. This module will help hospitals plan for supplies based on their size, role in the community, and whether they routinely provide inpatient burn care. These supplies should be adequate for basic initial dressings and care. This module and the assumptions can serve as a valuable starting point not only for facility planning but also planning for regional caches of materials as well as state interface and actions when Strategic National Stockpile (SNS) activation is required during a mass burn incident. Based on regional resources and threats, hospitals may elect to stock additional materials.

This module only assists with planning logistics for the care of the burn wounds. Completion of the Hospital Pharmacy Module (HPM) and Trauma Supply Module (TSM) is *required* to ensure adequate pain and other medications are available as well as airway, intravenous fluid administration supplies, and instruments. As with all DASH Tool modules, the recommended supplies are designed to encompass most projected mass casualty incidents, but catastrophic incidents may exceed the resources available.

# Planning Considerations

Burn planning must also involve activities that are beyond the scope of this module. While the BSM provides recommendations about quantities of supplies to have on hand, users must understand that patients can be harmed if the recommended products are used incorrectly. Major burn care is unfamiliar to most hospitals and this module requires coordinated planning with your referral burn providers to ensure that any regional preferences for dressings or treatments are considered.

Hospitals must also ensure staff are trained in how stocked supplies should be used and have access to expert support and guidance during both planning and response. Relevant resources are listed in the Additional Resources section that may be helpful for facility, healthcare coalition, and state planners. Additional planning considerations to support use of the BSM include the following:

- Burn planning must be done in a regional manner and is required by the Hospital Preparedness Program cooperative agreement. Many regional and state plans augment dedicated burn unit beds with surge plans, including overflow to “burn surge facilities” (usually in relation to the hospital trauma level).
- Hospitals, particularly smaller facilities that do not provide surgical services, may risk having to dispose of burn care supplies when they out-date. When possible, materials should be able to be rotated through stock to minimize expense to the facility. Less expensive/more commonly used materials or those with longer shelf lives may be considered when supply rotation is difficult to accomplish.
- Storage and rotation of the burn care materials should ideally be centralized (e.g., dedicated carts). Note that if centralization of all burn supplies is desired, some duplication with trauma supplies is necessary (e.g., sharp/blunt scissors, basins, scalpels). Use of dedicated storage carts may be helpful as well as personnel to routinely inventory the supplies. Electronic tracking of outdates can help to ensure rotation or purchase prior to expiration.
- Staff should complete burn management training (such as Advanced Burn Life Support) as well as training and exercising on the facility and regional burn response plans appropriate to their role.
- Just-in-time/quick reference materials are critical to have available, particularly for providers who do not frequently care for burns. These reference materials should address:
  - Care team considerations and personal protective equipment (PPE)

- Initial stabilization and fluid management
- Burn cleaning and dressing
- Triage information

- Homecare instructions for burn care that are consistent with the hospital's follow-up and care recommendations should be readily available.
- Burn experts must be available to consult with facilities caring for burn patients they may not normally manage. This consultation may need to come from outside the region if regional resources and staff are overwhelmed with the local incident. The American Burn Association (ABA) website lists current phone numbers for each burn region as well as a 24/7 disaster response contact.
- A regional system for decision-making about which patients should be cared for in specialty facilities is needed (e.g., Medical Operations Coordination Center [MOCC]) so that burn patients can receive initial resuscitation at any hospital and be transferred to an appropriate facility within 48 hours to start their definitive care.
- Early activation of SNS burn assets (e.g., large quantities of silver-impregnated burn dressings, etc.) should be considered in a mass burn incident. All hospitals should know how to contact their state or local health department to initiate the request for SNS assets during a burn disaster that exceeds locally obtainable resources.

## What items are/are not included in the Burn Supply Module?

The ABA has resources for mass casualty burn care that provide best practices across the contingency and crisis care spectrum. Users should review these and other guidelines for further reference.

**Included** in the BSM are materials for initial burn care and dressings (note that dressing changes are recommended twice daily unless silver-impregnated dressings are used, but less frequent/no dressing changes may be appropriate in disaster situations with expert burn consultation). Additional necessary supplies for patient management are found in other DASH Tool modules as described.

NOTE: The variety of supplies listed offer flexibility of planning with some minimums recommended in each category. Facilities should plan for an overall strategy of care (e.g., bacitracin + burn gauze dressings + tubular gauze vs. mafenide acetate + petrolatum gauze + gauze sponges + kerlix) based on the services offered, materials commonly used, and staff training.

- Resuscitation – including airway management, fluid resuscitation, tetanus prophylaxis, and analgesia (possibly including escharotomy) – included in Trauma and Pharmacy Modules.
- Wound cleaning and debridement of easily removed dead tissue/large blisters (e.g., antiseptic cleanser, washcloths, iris scissors, forceps, basins) – included in Trauma Supply Module.
- Topical agent – Applied to the surface of the cleaned burn. Note that in large burns when transfer to a burn center is immediately available a sterile sheet with a "space blanket" around it to minimize heat loss may be the most expedient management. Mafenide acetate cream is the ABA preferred topical agent for mass burn care. Silver sulfadiazine is second

[1]*MOCCs are coordination elements at the sub-state, regional, state, or federal levels that facilitate patient movement and resource allocation during response to a major incident. For more information, please review the MOCC Toolkit or MOCC/Patient Load-Balancing: Summary of Lessons Learned during COVID-19.*

choice, bacitracin is third, and other antibiotic ointments (e.g., "triple" antibiotic ointment) and skin lubricants (such as Aquaphor or A&D ointment) that do not provide antibiotic effect are last choice (though they may be safely used with silver-impregnated burn dressings that have inherent antibacterial properties). Because each topical has specific uses, the BSM recommends that 20% of predicted need be met with each of the three primary topicals with the remaining 40% chosen from those agents at the discretion of the facility based on local preference/practice.

- Dressing – Dressings must not leave residual when removed from the burn.
  - Silver-impregnated dressings are optimal and should be applied as soon as possible, but are more expensive (e.g., Acticoat, Mepilex Ag, Silverlon). Note that silver-impregnated dressings are stocked in the SNS and may be requested in a mass burn disaster.
  - Petrolatum gauze (e.g., Adaptic), Xeroform, or other impregnated dressings may be used and then covered with laparotomy pads or other gauze sponges to absorb burn fluids.
  - Sterile surgical gauze burn dressings may be applied directly over topicals. These should be at least 8 ply to absorb burn fluids.
- Bandages – Tubular net dressings (loose net weave, not tube gauze) are excellent but require the appropriate size wire hangers for application. Smallest sizes are good for digits, sizes in the 5-10 range are for extremities, and sizes 11 and above are recommended for the trunk. Fast-wicking fluff woven gauze such as Kerlix can also be used and is likely to be the default bandage at most facilities. Elastic (ACE) bandages may also be used as a back up to these supplies and are listed in the Trauma Supply Module.

**Not included** in the DASH Tool:

- Definitive surgical supplies for burn debridement and ongoing care
- Skin grafting/harvesting equipment and materials
- Nutritional support

# Assumptions

## Patient Considerations

- Note that patients are assumed for dressing purposes to be 75kg and have a 40% total body surface area (TBSA) burn for inpatients and 5% TBSA burn for outpatients. Thus, each outpatient "counts" as 1/8 inpatient dressing supply needs. The 40% TBSA threshold has prior been used to reflect a critical burn with higher degree of mortality, likelihood for intubation, and prolonged inpatient care than smaller burns.
- The 40% TBSA assumption may be too high based on conclusions by Herndon (Total Burn Care, chapter 5) that found patients usually died or suffered <30% TBSA burns in mass burn incidents. This may allow flexibility for more inpatient or outpatient dressings or dressing changes.
- Note that calculation of analgesia requirements, airway management, and number of urinary catheters, etc. needed has been validated against the number of trauma patients receiving those interventions to ensure adequate projected supply. The assumptions for number of burn patients are:

| Hospital Trauma Level | Default Number of Patients |
|---|---|
| Burn Center | 25 inpatients and 75 outpatients |
| Trauma Level 1 and Level 2 | 15 inpatients and 45 outpatients |
| Trauma Level 3, Level 4, Level 5, and Not Designated Hospitals | 5 inpatient/stabilization patients and 20 outpatients |
| For facilities with trauma level 3-5 (or no designation) and more than 30 emergency department beds, the goal is raised to 15 inpatients and 45 outpatients as this size department reflects a higher volume of emergency services than an average small community hospital. | |

- For burn centers, these metrics are designed to incorporate burn incidents similar to the Rammstein Airshow Disaster and the Station Nightclub Fire, which generated about 25 critically injured patients per incident. It was not deemed reasonable to plan for incidents on the scale of the San Juanico Gas Explosion Disaster or the Formosa Fun Coast Dust Explosion Disaster given the unique nature of those incidents.
- Major trauma centers often receive combined burn and trauma injuries or may be the initial receiving centers for major burns in their area. They will also be expected to provide definitive care to inhalational injuries; thus, their planning numbers are increased. Smaller centers have an increased proportion of outpatients relative to inpatients to account for regional burn plans that may triage increased numbers of less critical burn patients to those facilities. When possible, burn centers should perform an evaluation of all outpatients within 24-48 hours to determine continued follow up needs.
- Centers that do not provide definitive burn care should place a priority on transfer of major burn patients to a center that can provide definitive care.

## Supply Considerations

- Dressing recommendations assume initial dressing supplies only. In mass casualty situations these dressings may need to be left on for the first 48 hours or until the initial definitive burn care is performed. Mafenide acetate and silver sulfadiazine dressings should be changed twice daily whenever possible, and this should be considered in regional planning for rapid re-supply.
- Silver sulfadiazine and mafenide acetate require more frequent dressing changes and heavier application. The BSM assumes that 1 oz covers 2.5% TBSA burn area due to the application thickness compared to bacitracin.
- Training on the appropriate use of topicals is required. For example, many topicals carry an allergy risk (e.g., bacitracin, sulfa-containing) or have risk of renal toxicity (e.g., neomycin/"triple" antibiotic ointment) when used on large burns. Bacitracin is preferred for facial burns and excellent for second degree burns but does not penetrate full thickness burns like mafenide and does not reduce pain like mafenide cream or silver sulfadiazine. Mafenide is painful on initial application, however.
- Dressing assumptions: 40% TBSA requires 8 oz bacitracin and 16 oz mafenide or silver sulfadiazine. 40% burn translates to roughly 640 square inches of coverage required (1% average 4x4 inch area or 16 square inches). Thus, 14 Adaptic 5x9 inch plus absorbent gauze or one 18x36 8ply burn gauze dressing secured with 10 roller gauze (Kerlix or equivalent) would be needed.
- If the facility is out of dressings in a burn disaster, plastic wrap (e.g., Saran™ wrap) may be used over a topical ointment (bacitracin, silver sulfadiazine) and secured with gauze wrap or tape as a temporary solution. Thus, this is included for all hospitals but does not "count" toward the total recommended dressings. Aquaphor, A&D, and similar ointments may have

a role in these situations to provide lubrication though they do not provide antibiosis and are not "counted" toward a facility meeting topical goals.

- Prevention of hypothermia is critical. Aside from space blankets included in the Trauma Supply Module, the facility will need to have means of keeping patients warm (blankets, plastic wrap, increased ambient heat, etc.). The facility should also have some means of providing warm IV fluids.
- Fluid resuscitation assumes Parkland formula for the first 24 hours and then 150% of maintenance shifting to usual maintenance fluids. Oral rehydration should always be considered an option. Thus, facilities may wish to stock oral rehydration solution or similar products.
- Analgesia requirements may be substantial. The Hospital Pharmacy Module predicts twice the casualties for trauma and thus should accommodate twice the analgesia doses for the burn patients. Multi-modal pain relief strategies should be employed.
- Regional plans should include request of SNS assets for a mass burn incident as soon as possible. The SNS contains large quantities of silver-impregnated dressings and other items (including silver-based roller dressings).
- Inhalational injuries may occur or dominate (e.g., MGM Grand Hotel Fire). Airway resources included in the Trauma Supply Module account for initial inhalational injury treatment.
- The emphasis should be on commonly available and used materials rather than specialty products that may never be used or staff do not know how to use. Hospitals should set par levels so enough is always available.
- The supplies address thermal burns. Chemical and radiation burns may require additional care measures and considerations. Cold induced injury (frostbite) and electrical injuries are also not considered but may present to any facility.

# Suggested Next Steps

If not already done so, users should also complete the Hospital Pharmacy and Trauma Supply Modules to determine recommended quantities of complementary pharmaceutical and trauma supplies that may be needed following a mass burn incident. The outputs of the module may be used to determine reasonable stock levels of burn supplies for the hospital to have available in consultation with your regional burn referral center. The results may also be used to discuss regional needs at the healthcare coalition level as well as augmentation and replenishment through both the normal supply chain and the SNS.

# Questions and Comments

We welcome questions about the BSM methodology and suggestions to improve its utility at askasprtracie@hhs.gov. Please note that due to the limitations of Tableau, it is not possible to add certain functions to the DASH Tool.

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# Additional Resources[1]

American Burn Association. (2020). Disaster Response.

> This webpage includes links to various resources designed to help manage burn capabilities in the event of a mass casualty incident. The page is updated regularly and includes links to resources such as disaster plans, guidelines for providing care in austere conditions, and Burn Disaster Regional Emergency Hotline numbers.

American Burn Association. (2020). Guidelines for Burn Care Under Austere Conditions: Surgical and Nonsurgical Would Management.

> This presentation summarizes adaptation and modification of usual burn wound practices during austere or disaster environments as described in the Guidelines for Burn Care Under Austere Conditions: Surgical and Nonsurgical Wound Management.

ASPR. (2021). Strategic National Stockpile. U.S. Department of Health and Human Services.

> This page provides an overview of the Strategic National Stockpile, including information on its history, products, request procedures, and training and exercise resources.

ASPR TRACIE. (2025). Burns Topic Collection. U.S. Department of Health and Human Services, Administration for Strategic Preparedness and Response.

> The resources in this Topic Collection can help healthcare facility staff plan for burn casualties as a result of structural fires, blast emergencies, or chemical burns caused by terrorist attacks or hazardous materials incidents.

ASPR TRACIE. (2024). Burn Mass Casualty Incidents: Triage, Assessment, and Treatment Considerations. U.S. Department of Health and Human Services, Administration for Strategic Preparedness and Response.

> This tip sheet offers an initial approach to burn injury evaluation and resuscitation at hospitals that do not normally provide burn care.

[1] NOTE: Hyperlinked resources were reviewed and updated in January 2025.

ASPR TRACIE. (2020). Healthcare Coalition Burn Surge Annex Template. U.S. Department of Health and Human Services, Administration for Strategic Preparedness and Response.

The 2019-2023 HPP Funding Opportunity Announcement (FOA) requires healthcare coalitions to develop a complementary coalition-level burn annex to their base medical surge/trauma mass casualty response plan. Clinicians can tailor this burn-focused operational annex template to complement their response plans.

ASPR TRACIE. (2021). Step-by-Step Guide to Implementing the Coalition Burn Surge Annex TTX Template. U.S. Department of Health and Human Services, Administration for Strategic Preparedness and Response.

Healthcare coalitions can use this guide to enhance operational area awareness and capability to effectively address the needs of burn victims as part of a whole community emergency response framework. It can also be used to satisfy FOA requirements for the Hospital Preparedness Program (HPP) Cooperative Agreement.

ASPR TRACIE. (2022). Medical Product Shortages and Scarce Resources. U.S. Department of Health and Human Services.

This page highlights resources ASPR TRACIE developed to help stakeholders prepare for and manage drug shortages and the allocation of scarce resources.

ASPR TRACIE. (2024). Partnering with the Healthcare Supply Chain During Disasters. U.S. Department of Health and Human Services.

This document provides an overview of the emergency planning and response considerations of healthcare supply chain owners, operators, and end users, as well as insights for healthcare coalitions working with healthcare supply chain partners on preparedness, response, and recovery. It aims to capture key changes during serious or catastrophic events, compared to normal supply chain operations, as well as planning and response contingencies.

Herndon, D., et al. (2012). Total Burn Care. (E-book only for 4th edition. Print version of 3rd edition may also be purchased.)

This book provides a comprehensive discussion on the management of burn patients from initial presentation to rehabilitation, with an emphasis on an integrated team approach to meet the clinical, social, and physical needs of burn patients.

Illinois Department of Public Health. (2016). ESF-8 Plan: Burn Surge Annex.

This plan supports the Illinois Department of Public Health Emergency Support Function-8 (ESF-8) Plan, by providing a functional annex for all stakeholders involved in an emergency response within the state of Illinois and/or adjacent states to provide appropriate burn medical care to patients in Illinois during a burn mass casualty incident. It guides the state level response and provides local medical services guidance on the care of burn patients, including patient movement, recommendations for care, and resource allocation during a burn mass casualty incident that overwhelms the local health care system.

Joint Trauma System Clinical Practice Guideline. (2016). Burn Care. U.S. Department of Defense, Center of Excellence for Trauma.

These clinical practice guidelines provide recommendations for care of burn casualties in deployed or austere settings.

Los Angeles County Department of Health Services. (2020). Burn Resource Center Required Equipment/Supplies/ Pharmaceuticals.

This checklist is intended for Burn Resource Centers to inventory and report quantities of required burn equipment, supplies, and pharmaceuticals.

Los Angeles County Emergency Medical Services Agency. (2017). Burn Resource Manual.

This manual both defines the role of a Burn Resource Center (BRC) and provides guidelines for the use of BRCs during a burn disaster in Los Angeles County. A burn care plan, appendices, and training resources make up this manual that may also serve as a model for other locales when developing burn bed surge plans.

State of Michigan Burn Coordinating Center. (2019). Emergency Burn Triage and Management. University of Michigan Trauma Burn Center.

This website offers a breadth of burn care information as well as free just-in-time training modules for hospital staff on the management of burn patients. The page includes links to the Michigan Burn Mass Casualty Plan and Michigan Burn Pediatric Annex.

Minnesota Department of Health. (2019). Minnesota Burn Surge Plan.

The plan lays out how the Minnesota Department of Health would coordinate care for a surge of burn injury patients. It can also be tailored by planners in other states.

Minnesota Department of Health. (2021). Patient Care Strategies for Scarce Resource Situations.

This card set can help facilitate an orderly approach to resource shortfalls at a healthcare facility. It is a decision support tool to be used by key personnel, along with incident management, who are familiar with ethical frameworks and processes that underlie these decisions. Information on burn treatment supplies begins on page 24.

Mehta, M. and Tudor, G. (2021). Parkland Formula. StatPearls.

This online activity describes the Parkland Formula and how to use it to calculate fluid resuscitation needs of critical burn patients.

Western Region Burn Disaster Consortium. (2021). Burn Mass Casualty Operations Plan.

This plan can serve as a template for healthcare coalitions, burn centers, state public health preparedness professionals, healthcare entities, and other stakeholders planning for a burn mass casualty incident. It identifies the necessary experts and specialized resources and includes information on patient transport, patient tracking and job action sheets, and other tools and processes to ensure a smooth response. Appendix H includes a Wound Care Supply Guideline for Burns taken from the Utah Crisis Standards of Care Guidelines, Appendix B: Burn Crisis Standards of Care.