



## **ISBI Burn Center Assessment Program**

### **The ISBI Recommendations for Burn Centers**

(updated January 2026)

#### **Organization and Delivery of Burn Care**

Recommendation 1 - All regions should establish an organized care system for burn injured persons, encompassing acute, chronic, and rehabilitative burn care. The burn centre should have active and direct involvement in the delivery of burn care in the jurisdiction it pertains to, including pre-hospital care/transport, mass casualty preparedness, and education/support of community hospitals that provide burn care. The latter includes education of peripheral hospitals on the burn centre referral criteria.

#### **First aid**

Recommendation 2 - First aid begins with the initial responder (defined as a civilian or an emergency medical technician) at the accident site and concludes with the commencement of primary care at a healthcare facility; however, global knowledge of adequate first aid is insufficient, highlighting the need for public education to enhance first responder effectiveness.

Recommendation 3 - The first step in first aid is to remove the individual from all potential sources of burns, including heat, flames, live electrical sources, and chemicals, while ensuring the safety of the patient, responder and bystanders. For heat or flame injuries, the burn wound should be optimally cooled with clean running water adjusted to the individual's comfort for 15 to 20 minutes, after which the patient should be kept warm until primary medical attention is obtained. No direct contact with ice should be used due to the risk of frostbite.

Recommendation 4 - In cases of chemical injuries, the responder must ensure their safety, identify the chemical agent, adhere to specific protocols if available, and remove contaminated clothing while thoroughly lavaging the affected area with water for up to 45 minutes, separately irrigating any affected eyes. If the chemical is in powder form, remove the excess before washing. For electrical injuries, the responder should prioritize their safety, disconnect the power source or use non-conductive material to separate the victim from it, initiate cardiopulmonary resuscitation (CPR) if necessary, and cool any burns under clean running water for 15- 20 minutes without applying ice directly.

Recommendation 5 - Burn victims should be transported to the nearest medical or burn care facility, depending on the locoregional system guidelines, with limbs elevated to minimize edema and the patient positioned between lying and sitting if inhalation burns are suspected. If trained

personnel are present, a clinical assessment should be conducted following the ABCDE method (Airway, Breathing, Circulation, etc.). If available, non-adherent dressings should be applied to the burn site during transport and dressings not be tight. Silver sulfadiazine can be used for primary protection of the wound.

### Initial Assessment and Stabilization

Recommendation 6 - The initial evaluation of burn patients in the burn center should adhere to standard first aid and the emergency assessment of Airway, Breathing, Circulation, Disability, and Exposure (ABCDE), followed by a structured approach as outlined in Advanced Burn Life Support (ABLS) and Emergency Management of Severe Burns (EMSB) course materials

Recommendation 7 - The burn centre should screen for child and elder abuse and neglect, and have close communication with child protection services.

Recommendation 8 - Burn injury evaluation should estimate total body surface area (TBSA%) using a standardized method and identify characteristics warranting immediate referral to a specialized burn centre. Resuscitation should be initiated promptly and adjusted according to patient parameters to prevent over- or under-resuscitation. Tetanus immunization status should be evaluated and addressed if indicated.

### Smoke Inhalation Injury: Diagnosis and Treatment

Recommendation 9 - Inhalation injury should be suspected in patients with a history of exposure to combustion products in an enclosed space, decreased consciousness, soot in the oral cavity, or facial burns. For upper airway burns, patients should be positioned semi-upright, with intubation or tracheostomy if the airway is compromised. For patients suspected of or diagnosed with carbon monoxide poisoning high-flow 100% oxygen for at least six hours should be administered.

### Burn Shock Resuscitation

Recommendation 10 - Adult patients with burns greater than 20% total burn surface area (TBSA), and pediatric patients with burns greater than 10-15% TBSA, should be formally resuscitated with salt-containing fluids; requirements should be based on body weight and percentage burn.

Recommendation 11 - When intravenous fluid administration is feasible, an initial rate of 2-4 mL/kg body weight per percent of total body surface area (TBSA) burned should be delivered within the first 24 hours post-injury, with caution to avoid over-resuscitation (initiate fluid administration at the rate calculated by the formula:  $(2-4 \text{ mL of Ringer's Lactate(RL)}) \times (\text{weight in kg}) \times (\text{TBSA in } \%) / 16$  and adjust as needed).. Fluid rates in every 1-2 hours must be assessed, guided by hourly urine output and other indicators of organ perfusion.

Recommendation 12 - If IV administration is not practical, oral fluid intake equivalent to 15% of body weight per day for two days is advised, using locally available fluids. To ensure adequate salt intake, add a 5-gram salt tablet (or equivalent) for each litre of fluid consumed. When practical,

monitoring the adequacy of resuscitation can be conducted by urine output with the goals of 0.5ml/kg/h for adults (30-50ml/hr) and 1.0 ml/kg/h for pre-schoolers.

### Escharotomy and Fasciotomy in Burn Care

Recommendation 13 - Escharotomy is indicated when circumferential or near-circumferential full thickness eschar compromises distal circulation in the extremities, restricts ventilation on the trunk, or in cases of intra-abdominal hypertension (IAH) or abdominal compartment syndrome (ACS). If Escharotomy does not adequately relieve IAH or ACS, laparotomy should follow. Incisions should be made longitudinally along the affected area near neurovascular bundles, extending from normal skin to normal skin or, if not feasible, from the joint above to the joint below. Incision depth should be limited to reaching healthy tissue at the base. For major burns, those who require fluids >250ml/kg, and deep periorbital burns must have an ophthalmologist assess the ocular pressures to avoid orbital compartment syndrome.

Recommendation 14 - Fasciotomy is rarely indicated as a primary procedure in burns, except in high-voltage electrical injuries. It is typically performed upon confirmation or suspicion of compartment syndrome, especially within the first six hours, and is particularly warranted in cases of very deep burns, regardless of etiology.

Note: These recommendations should consider guidelines for more distant transfers, more than 6 hours, by land or waterways, which can be planned via telemedicine with the Burn Center of territorial reference or to where the transfer will take place.

### Wound Care

Recommendation 15 - Cleansing with gentle washing using non-sterile water and regular soap is the most important component of burn wound cleansing and should be performed at least daily. The beneficial effect of using antiseptics or antimicrobial agents for cleansing is unclear.

Recommendation 16 - Superficial partial thickness burns and donor sites of split-thickness skin grafts benefit from different types of dressings which all depend on the preferences, availability and cost, and nature of the wound. Type (temporary or semi-permanent) and frequency of dressing are decided according to the wound condition and availability of these products. All open wounds should be covered with a dressing. If available, biologic dressings are preferred to non-biologic dressings

### Topical agents in burn care

Recommendation 17 - Topical antimicrobials, mainly silver containing forms, are recommended for the management of most burn wounds to mitigate complications such as infection and graft failure due to infection. However, it is important to note that many of these agents can impair the healing process. The selection, concentration, and duration of use should be judiciously determined to balance the risk of infection against the potential for delayed healing.

Recommendation 18 - Topical antiseptic solutions, including sodium hypochlorite or hypochlorous acid, should be considered as the primary treatment options, followed by topical antibiotic ointments. Nevertheless, it is essential to remain cognizant of the risks associated with

the development of bacterial resistance and the potential increase in nosocomial infections linked to the use of these ointments

### Infection Prevention and Control

Recommendation 19 - Hand hygiene guidelines should be taught, implemented, and monitored as part of contact precautions, along with maintaining a clean hospital environment, to prevent infection spread. Strict adherence to infection control practices, including physical isolation in private rooms, use of gowns and gloves during patient contact, handwashing before and after each patient, and utilizing laminar airflow isolation rooms, significantly reduces the risk of burn wound infections from nosocomial bacteria. Otherwise consider exclusive isolated wards for the treatment of burns with a strict protocol for the flow and management of such patients.

### Antibiotic Stewardship

Recommendation 20 - Avoid the use of prophylactic systemic antibiotics for acute burns, and develop, implement, and monitor a local antibiotic stewardship program to ensure appropriate antibiotic use.

### Infections in burns: Part 1—Sepsis

Recommendation 21 - Sepsis in burn patients must be diagnosed and managed differently than in the general population, given major burns induce a systemic inflammatory response syndrome (SIRS). Continuous monitoring for subtle signs is crucial for patients with burns exceeding 15-20% total body surface area (TBSA).

Recommendation 22 - Diagnosis of sepsis relies on pronounced indicators, including abnormal temperature, tachycardia, tachypnea, confusion, hemodynamic instability, vasopressor dependence, elevated fluid requirements, thrombocytopenia, base deficit, hyperglycemia, and nutritional intolerance, along with a culture-positive infection or clinical response to antimicrobials. Rapid recognition and prompt empirical treatment of sepsis are vital for improving outcomes. Antimicrobial coverage should be tailored according to the identified pathogen and its sensitivity profile, while prophylactic systemic antibiotics should be avoided.

### Infections in burns: Part 2—Pneumonia

Recommendation 23 - Intubated burn patients with inhalation injury or burns exceeding 15-20% total body surface area are at significant risk for pneumonia and require close monitoring. If feasible, bronchoalveolar lavage (BAL) or subglottic specimens should be collected for microbiological diagnosis. Upon clinical diagnosis of pneumonia before pathogen isolation, antibiotic therapy may be necessary. Furthermore, ventilator-associated pneumonia (VAP) prevention bundles should be utilized for mechanically ventilated burn patients.

### Infections in burns: Part 3—Urinary tract infection

Recommendation 24 - Catheters should be inserted only for appropriate indications, especially in the acute resuscitative period for adults with burns exceeding 20% and pediatric patients with burns greater than 15%, to monitor resuscitation response, and they should remain in place only

as long as necessary. When feasible, consider alternatives to indwelling urethral catheterization, such as external catheters or diaper-like methods for selected patients.

#### Infections in burns: Part 4—Wound infection

Recommendation 25 - The gold standard for diagnosing invasive burn wound infection is clinical, however histological evidence of microbial invasion in viable, non-burned skin biopsies cultures should be confirmatory in the treatment. Infection surveillance is conducted by obtaining swabs from the burn wound surface after the removal of dressings and topical agents, followed by cleaning the area. Burn centers should routinely monitor the microbial profiles of burn wound colonization, the antimicrobial susceptibility of implicated microorganisms, and trends in the nosocomial spread of these pathogens.

Recommendation 26 - In large burn wounds, fungal infections are associated with increased mortality, necessitating rapid diagnosis, aggressive debridement of infected areas, and systemic antifungal therapy.

#### Management of indwelling catheters

Recommendation 27 - The appropriate vascular access device should be selected based on its intended application, taking into account patient characteristics and the clinical context for catheter placement. To reduce the risk of bloodstream infections, central vascular catheter care bundles should be implemented, and organizational processes established for monitoring the outcomes of vascular access devices.

#### Electrical burns

Recommendation 28 - Electrical burns require a voltage-based, multidisciplinary management strategy. Low-voltage injuries (<1,000 V) warrant prompt ECG evaluation to detect conduction disturbances, with subsequent treatment following standard thermal burn protocols and short-term cardiac monitoring when clinically indicated. High-voltage injuries (>1,000 V), given their propensity for deep tissue necrosis, mandate early assessment for rhabdomyolysis (serum CK, renal function tests, urinalysis for myoglobin) and aggressive fluid resuscitation to prevent renal injury, along with meticulous serial neurologic and vascular examinations for evolving compartment syndrome. When compartment pressures rise or distal perfusion is threatened, timely escharotomy or fasciotomy is essential; however, the extent of tissue loss in electrical trauma often necessitates early plastic surgical intervention, including the use of regional, distant, or free flaps to restore coverage, protect exposed neurovascular structures, and preserve limb function. In cases of major arterial damage or flow compromise, vascular surgical reconstruction may be required to achieve limb salvage and optimize healing potential. During the subacute phase, close extremity-focused monitoring—encompassing perfusion assessment, flap viability checks, and surveillance for progressive muscle necrosis—is critical to maintain limb integrity and guide further staged interventions. Given the risk of delayed sequelae such as neuropathy, contractures, chronic pain, and late vascular complications, coordinated long-term follow-up and multidisciplinary rehabilitation remain central to achieving maximal functional recovery.

#### Chemical burns

Recommendation 29 - Immediate removal of the chemical agent is crucial to prevent further skin injury and absorption. Medical staff must ensure the use of appropriate personal protective equipment (PPE). Following removal, burn wound care should begin with irrigation using cool running water to eliminate residual chemicals prior to dressing application. pH paper if/when available should be employed to confirm neutral pH during irrigation. Chemical agents can cause unique systemic and pulmonary effects, potentially with delayed onset, which must be considered in managing patients with chemical burns. Specific countermeasures should be applied, and caution is advised when using neutralizing agents to avoid exothermic reactions.

### Surgical Management of the Burn Wound

Recommendation 30 - An appropriately trained, prepared and equipped operating room burn team (nurses, technicians and anaesthesiologists) is essential for any center treating serious burn injuries with excisional surgery. A surgical plan should be determined by: the extent, site and depth of the burn injury; the general physical state of the patient; and the resources of the team treating the patient.

Recommendation 31 - Early excision and wound closure is the standard of care where resources permit. Tangential excision is the standard method of burn wound excision. Fascial excision may be indicated in deep burns. In a resource-limited setting (RLS), conservative wound management, staged removal of separated slough, and delayed split skin grafting may be the most realistic approach, provided wound care is sufficient to prevent overt infection. In high-voltage electrical injuries, urgent surgery (fasciotomy when necessary) may be limb/life-saving, and is necessary to allow the highest chance for limb salvage.

Recommendation 32 - After burn wound excision and debridement, the wound should be promptly covered with an autograft or appropriate skin substitute, with measures taken to minimize blood loss and consideration given to blood bank resources before major excisions

### Nutrition

Recommendation 33 - Nutritional support, preferably enteral, should be initiated on the day of admission during the acute phase of recovery, with no requirement for an 8-hour NPO period before surgery in cases of major burns, provided the patient has a cuffed endotracheal tube. A high-protein diet should be prioritized, with adults receiving 1.5 to 2 g/kg/day of protein and children 3 g/kg/day. Nutritional plans should be tailored by a dietician according to the patient's age, comorbidities, and burn severity; in settings where a dietician is not available, the aforementioned guidelines should be followed.

### Metabolic manipulation

Recommendation 34 - Maintain core body temperature and reduce heat loss in burns  $\geq 20\%$  TBSA in adults or  $\geq 15\%$  in pediatric patients, unless contraindicated. Provide calories primarily from carbohydrates and proteins, adjusted for individual needs using WHO charts and indirect calorimetry. Keep blood glucose below 180 mg/dL with insulin. Consider administration of a nonselective beta-blocker to lower heart rate to 75% of admission rate (<100-110 bpm), with monitoring.

### Pain control

Recommendation 35 - Burn-related pain is a multifaceted experience involving physical pain, emotional distress, anxiety, delirium, and situational factors. Effective pain management and monitoring are essential for optimizing recovery. Pain control should be regularly assessed using scoring systems, with patient self-reports preferred, and behaviour-based scales applied when self-reporting is not feasible due to mental status or age.

Recommendation 36 - Management should address all types of pain: background, breakthrough, procedural, perioperative, and chronic. While opioids are gold-standard for acute severe pain, a multimodal approach incorporating non-opioid analgesics, NSAIDs, and nonpharmacologic methods (virtual reality, distraction, etc..) is recommended. Neuropathic changes, which contribute to post-burn distress, should also be addressed.

### Sedation

Recommendation 37 - Anxiety and agitation are common in burn patients and are linked to poor clinical outcomes. Treatment should begin with non-pharmacologic interventions when feasible, but sedatives may be necessary. When sedation is required, protocols and scales should guide dosing, aiming for the lowest effective dose. Light sedation (allowing the patient to follow simple commands) is preferred, unless contraindicated. Burn patients should also be closely monitored for delirium.

### Blood transfusion

Recommendation 38 - Blood transfusions are infrequently indicated during acute burn resuscitation unless significant blood loss from trauma is present. Transfusions are more likely needed during or after major excisions or sepsis. In-hospital transfusions should be based on clinical assessment, with families informed of associated risks. Administer one unit at a time to maintain hemoglobin levels above 7 g/dL, reassessing before any subsequent units. Blood type must be confirmed and cross-matched prior to transfusion, except in emergencies such as massive hemorrhage.

Recommendation 39 - In cases of massive surgical blood loss, consider administering plasma and platelets in a 1:1:1 ratio, if resources permit. Blood substitutes are not validated for burns and may only be used in life-saving situations for patients refusing transfusions.

### Deep venous thrombosis

Recommendation 40 - Due to the risk of deep venous thrombosis (DVT) after burns, adult burn patients and pediatric patients who have undergone puberty should be assessed for DVT risk. Those at moderate to high risk should receive chemoprophylaxis, primarily with low molecular weight heparin; if unavailable, heparin and other physical or medical strategies may be employed in resource-limited settings, barring contraindications. Early mobilization is crucial, as it enhances strength and may reduce the risk of DVT.

### Management/Prevention of Burn Scars

Recommendation 41 - Superficial burns (wounds that heal in <2 weeks) require topical emollients/humectants, sun protection, and massage after healing. Deep dermal burns (wounds that heal in >3 weeks) require aggressive and monitored scar-prevention therapies associated with appropriate pain relief and combined with early positioning regimens and physiotherapy for joint mobilization to prevent hypertrophic scarring and joint contractures. These measures are required in addition to topical emollients, sun protection and massage after healing.

#### Treatment of Established Hypertrophic Burn Scars

Recommendation 42 - All burn scars should receive pressure therapy with gels or silicone sheet therapy as the first line of prevention and treatment of hypertrophic burn scar. To avoid recurrence, an interdisciplinary team should be involved in the patient's care to minimize scar development. Reconstructive procedures should not be performed before scars' complete maturation, except when the reconstructive need is functionally impaired.

#### Rehabilitation

Recommendation 43 - A comprehensive rehabilitation program should include treatment strategies for maximizing function and minimizing the impact of scars. It is recommended that such programs include (but are not limited to): anti-contracture positioning, splinting/ casting, exercise, mobility, functional retraining, non-surgical scar management.

#### Pruritus Management

Recommendation 44 - Routine postburn care should encompass a comprehensive assessment of pruritus, evaluating its intensity, duration, and impact on activities of daily living. Following wound re-epithelialization, it is essential to promote skin hydration and minimize dryness through the frequent application of emollients. The use of pharmacologic treatments should be considered when available to alleviate significant postburn pruritus. Additionally, nonpharmacologic management, regardless of the availability of pharmacologic interventions, is appropriate. Effective nonpharmacologic approaches include skin cooling (e.g., application of cool cloths), massage combined with hydrating lotions, localized pressure, electro-physical therapies such as transcutaneous electrical nerve stimulation (TENS), and laser therapy.

#### Mobility, exercise and physical function

Recommendation 45 - Early initiation of mobility and ambulation is recommended for all burn survivors, regardless of burn size. Assistive devices may be used to enhance safety, feasibility, and independence. Exercise programs, including range of motion, strengthening, play therapy, and cardiovascular activities, should be followed. Rehabilitation should aim to restore function, targeting pre-injury status when possible. An interdisciplinary team, including occupational and/or physical therapy, should be involved from admission through recovery to optimize functional outcomes

#### Psychiatric disorders

Recommendation 46 - Patients should be screened for psychiatric and social risk factors affecting their safety and well-being. The following screenings are recommended: 1. Upon Admission:

Assess mechanism of injury (self-inflicted or due to abuse/neglect), social support, housing and food resources, and blood alcohol level. 2. During Hospitalization: Evaluate for depression, acute stress disorder (ASD), post-traumatic stress disorder (PTSD), anxiety, and substance use disorder. 3. Post-Discharge: Screen for depression, ASD/PTSD, anxiety, and substance use disorder within the first month, with follow-up as needed.

Recommendation 47 - Patients who test positive for psychiatric disorders should be provided treatment through the burn center, a hospital consultation service, or community providers. At a minimum, burn centers should have access to psychiatric consultation services and a list of community mental health providers.

### Outpatient burn care

Recommendation 48 - Burn centers should provide comprehensive outpatient care for minor burns and post-hospitalization follow-up for more severe injuries, including long-term monitoring of pediatric patients. Outpatient services should encompass wound and scar management, physical and occupational therapy, functional rehabilitation, surgical and non-surgical reconstruction, and psychosocial support. Given that burn scars mature over 6–18 months in adults and over longer periods in children, a structured burn reconstructive program should ensure continuous follow-up, with closer surveillance during periods of rapid pediatric growth to prevent functional limitations. Additionally, clear guidelines for safe outpatient care and interdisciplinary outreach should be established, particularly to support providers in remote areas.

### The burn team

Recommendation 49 - Burn care requires structured, protocol-driven interdisciplinary collaboration among the burn center and all relevant clinical departments—including anesthesia, intensive care, emergency medicine, burn surgeons, plastic and reconstructive surgeons, vascular surgeons, infectious diseases specialists, physiotherapists, and dietitians—with demonstrable coordination to optimize clinical outcomes. Nursing personnel, who constitute the backbone of the burn team and represent its most indispensable workforce component, play a central role in ensuring the continuity and quality of care across all phases of burn management. To sustain a consistently high standard of evidence-based practice, burn centers should implement and regularly update a comprehensive staff education and competency-development program, incorporating participation in national and regional professional meetings, structured institutional training, and research activities. Adequate and appropriately trained nurse staffing for both intensive care and acute care units is essential, and institutions must ensure continuous professional development, formalized competency assessment, and adherence to established clinical guidelines for all members of the multidisciplinary team.

### Quality Improvement

Recommendation 50 - A burn center's quality improvement program should include routine morbidity and mortality reviews with peer assessment and loop closure, supported by a

comprehensive registry benchmarked to burn-specific quality metrics. This program must also systematically identify improvement opportunities, analyze underlying causes, implement targeted corrective actions, and monitor the effectiveness of these interventions over time.