

This BPR Brief is an abridged version of the **Best Practice Recommendations for the Prevention and Management of Burns**. In alignment with a global health-care perspective, Wounds Canada is committed to provide support to patients to help them adapt to and self-manage their condition in the face of social, physical and emotional challenges. This document uses the **Wound Prevention and Management Cycle (WPMC)** (Figure 1) as the basis for clinical decision making. For clinicians, this document is meant as a cue for treatment; it provides non-inclusive examples listed below each recommendation. For policy makers, it highlights (in ***bold italics***) actions and policies that support best practice.

Wounds Canada follows a population health strategy for wound care that enables us to address the entire range of individual and collective factors that determine health, including:

- Better health: health of the general population improved; behavioral, social, economic and environmental determinants addressed; preventative care rewarded
- Better health care: patient-centred, reliable, safe, evidence-based treatment; care managers co-ordinate total health-care delivery; evidence-based treatment with outcome tracking
- Better value: costs and cost improvements monitored; readmissions to hospital reduced; early interventions to reduce per patient cost implemented; unnecessary or duplicate procedures eliminated; information management technologies utilized

For more information on content, levels of evidence or tools related to a particular recommendation, click on the links provided.

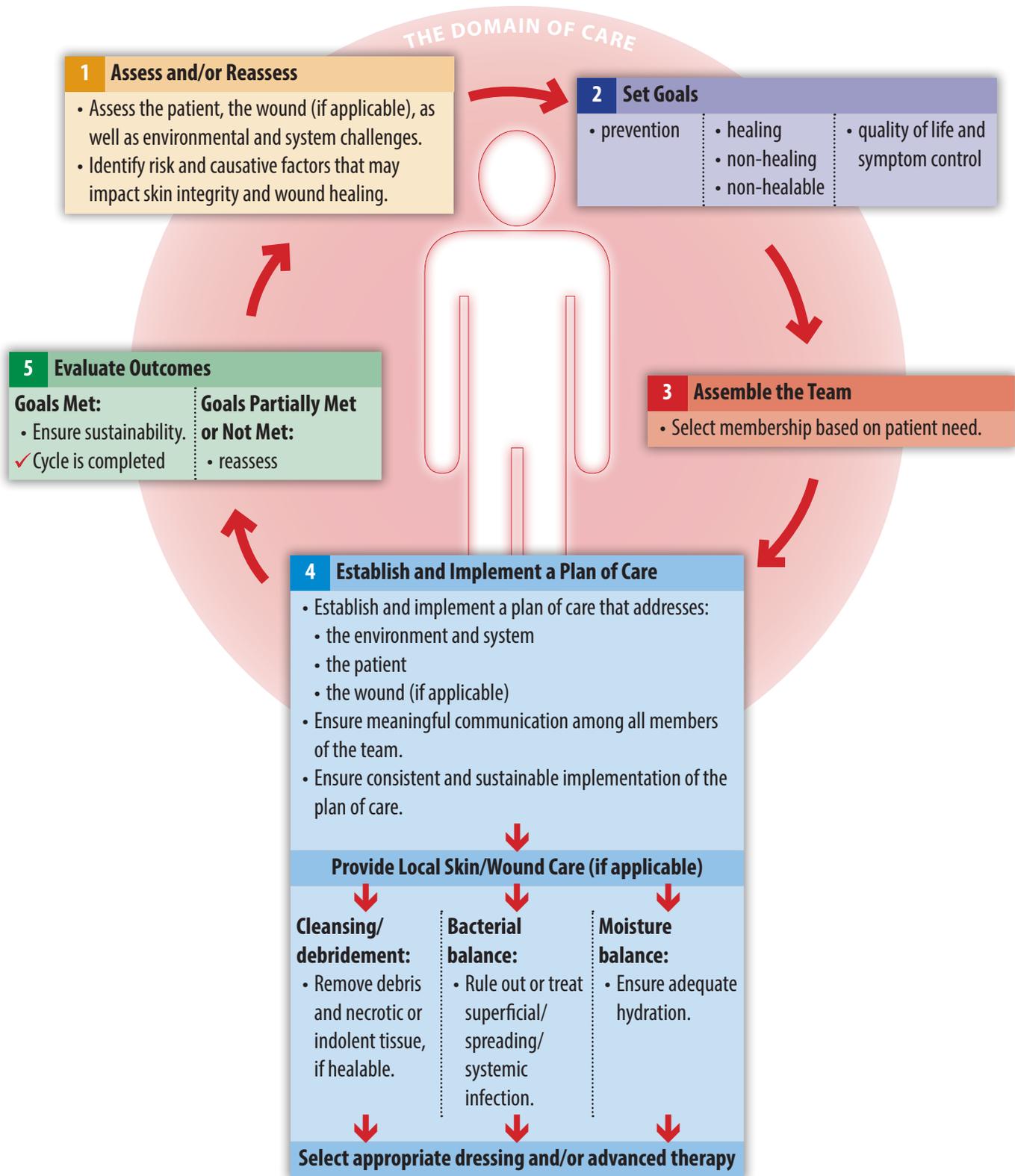
We strongly recommend that before using this BPR Brief the user read the full best practice recommendation (BPR) document. To obtain a copy of the full document, go to: [www.woundscanada.ca/docman/public/health-care-professional/bpr-workshop/1308-bpr-for-the-prevention-and-management-of-burns/file](http://www.woundscanada.ca/docman/public/health-care-professional/bpr-workshop/1308-bpr-for-the-prevention-and-management-of-burns/file).

## Introduction

Burns are injuries to the skin that occur when the skin or other tissues are damaged by contact with heat (scalds from liquids, grease or steam; contact burns; fire, flash or flame), electricity, radiation or chemicals. Burn injuries can be devastating and, without appropriate treatment, can result in slow healing, infection, scar formation and disfigurement, contractures, joint dysfunction, pain and psychological stress. Although the age-standardized rate of emergency room visits and hospitalizations related to fire/burn injuries has declined over time, burn injuries continue to be a concern in Canadian health-care systems.

**Disclaimer:** This document provides a clinical enabler for the recommendations outlined in the *Best Practice Recommendations for the Prevention and Management of Diabetic Foot Ulcers*. For more information on a particular recommendation or a copy of the full document go to: <https://www.woundscanada.ca/docman/public/health-care-professional/bpr-workshop/1308-bpr-for-the-prevention-and-management-of-burns/file>.

**Figure 1:** Wound Prevention and Management Cycle (WPMC)



For the complete version of Best Practice Recommendations for the Prevention and Management of Burns, visit [here](#).

## 1 Assess and/or Reassess

- Assess the patient, the wound (if applicable), as well as environmental and system challenges.
- Identify risk and causative factors that may impact skin integrity and wound healing.

**Assessment** must take place to determine the causes and factors that may impact skin integrity and wound healing. Patient assessment includes history and current health status, skin status (and wound status, if applicable), environmental factors and system factors. If, after the WPMC has been completed, the goals of care have not been fully met, reassessment must take place, followed by the rest of the recommendations in the WPMC steps. **Assessment tools need to be available and in use in all care settings, supported by staff education and policy.**

### 1.1 Select and use validated patient assessment tools.

**The use of validated and standardized patient and risk assessment tools is essential for identifying factors that may impede healing and quality of life and for providing direction for preventative care or management.**

- **Burn size:** The Lund and Browder chart, and Wallace's 'rule of nines' both estimate the total body surface area (TBSA) of a burn injury.
- **Burn severity:** The Hand Burn Severity (HABS) score was devised and validated to assess burn severity.
- **Wound assessment tools:** Currently there are no burn-specific wound assessment tools.
- **Mortality risk assessment:** The FLAMES score is a validated tool that can predict burn injury related mortality.
- **Scar assessment:** Examples of validated scar assessment scales include the Matching Assessment of Scars and Photographs, Patient and Observer Scar Assessment Scale, Satisfaction with Appearance Scale and Vancouver Burn Scar Assessment Scale.
- **Pain assessment:** Currently there are no burn-injury-specific pain assessment tools. Examples of validated pain assessment tools that could be used to assess for burn injury pain include the visual analogue scale, numeric rating scale, verbal rating scale, the Brief Pain Inventory and the McGill pain questionnaire, among others.
- **Anxiety assessment:** The Burn Specific Pain Anxiety Scale is a valid and reliable tool that provides a standardized approach for identifying burn patients with feelings of anxiety and worry who require further assessment and intervention.
- **Nutrition screening:** Examples of validated nutritional screening tools that could be considered for use with burn injury patients include the Subjective Global Assessment, the Malnutrition Screening Tool, the Nutrition Risk Screening-2002, the Malnutrition Universal Screening Tool, the Subjective Nutrition Assessment Questionnaire and the Canadian Nutrition Screening Tool.
- **Quality-of-life (QoL) assessment:** Examples of validated tools to assess burn-injury-related QoL include the Burn Specific Health Scale-Abbreviated, Burn Specific Health Scale-Revised, and Burn Specific Health Scale-Brief.
- **Coping assessment:** The Coping with Burns Questionnaire was developed to measure coping after discharge and is based on the theory of coping as a process.

## 1.2 Identify risk and causative factors that may impact skin integrity and wound healing.

According to the Canadian Hospitals Injury Reporting and Prevention Program (CHIRRP) database, in 2013 the five most common causes of burn injuries are:

- **Scalds (contact with hot water, steam, food, oil, grease, liquid glue or liquid wax):** Children < 1 year
- **Contact burns:** Children < 4 years, especially those < 1 year
- **Fire/flame/smoke:** Males aged 50–64, females aged 20–29
- **Electricity:** Males < 1 year and males aged 20–29
- **Sunburns (radiation):** Males and females aged 20–29

The two most common causes of burn injuries by etiology are:

- **Scalds:** Hot beverages (34.1%) and hot water (not tap water) (28.9%)
- **Contact burns:** Stoves/ovens (22%) and fireplaces/accessories (19.6%)

Although children and the elderly are most vulnerable to burn injury, those who cannot recognize or react to a dangerous burn-risk situation are at increased risk for burn injury, including persons with cognitive or mental impairment, impaired mobility and/or sensation, musculoskeletal or nervous system disorders, and/or mental illness.

### 1.2.1 Physical

**Primary Survey:** evaluate all people with burn injuries requiring or receiving assessment by a health-care professional first using the ABCDEF mnemonic, listed in the order of priority, to identify any life-threatening injuries:

- **Airway:** Assess for airway obstruction and for injuries that are physically restricting breathing.
- **Breathing:** Evaluate breathing and ventilation. Watch for chest movement, auscultate and percuss to detect any conditions impeding ventilation.
- **Circulation:** Assess for signs of bleeding, hypovolemia and burn shock.
- **Disability:** Complete a neurological assessment to establish the patient's level of consciousness, pupil size/symmetry/reaction and evidence of spinal cord injury or compartment syndrome.
- **Exposure:** Expose the patient's skin to more accurately determine the area of burn injury.
- **Fluid resuscitation:** Assess the need for fluid resuscitation to combat the profound loss of intravascular fluid into the interstitial space.

**Secondary survey** begins once the primary survey has been completed and resuscitation is successfully underway. It includes:

- A head-to-toe examination to rule out secondary injuries
- Completion of a systematic and detailed history of the patient's general health
- The identification of specific issues related to the burn injury
- A wound (burn injury) assessment
- Quality-of-life (QoL) assessment: Burn injuries may have profound physical/aesthetic, psychological, social and vocational consequences. To optimize the rehabilitation of a burn survivor, it is important to assess for the predictors of health-related quality of life (HRQoL).

### 1.2.2 Environmental: Socio-economic, care setting, potential for self-management

Assess income, employment and working conditions, food security, environment and housing, early childhood development, education and literacy, social support and connectedness, health behaviours and access to health care. It is critical to provide a culturally sensitive environment for care.

### 1.2.3 Systems: Health-care support and communication

Consider the patient's access to funding, availability of services and wound-related products, diagnostic services, service delivery personnel and co-ordination of care, all of which vary widely from province/territory to province/territory, from one interprovincial/interterritorial region to another, and even from one service delivery site to another.

## 1.3 Complete a wound assessment, if applicable.

When assessing a burn injury, it is important to determine the underlying cause/mechanism of burn injury, burn depth and size, and severity of the burn injury. Assessment of the burn can help the clinician to determine the ability of the burn to heal, plan treatment, facilitate communication, monitor treatment and predict and verify outcomes. Regardless of the mechanism of injury, the pathophysiology of a full-thickness burn wound involves a local and systemic response.

Locally, a burn may be divided into three zones:

### **Zone of coagulation**

- Center of the wound—had the most contact with the burn source
- Irreversible full-thickness tissue damage with no tissue perfusion
- Tissue appears white or charred and will not recover

### **Zone of stasis**

- Surrounds the zone of coagulation
- Deep partial-thickness injury with decreased tissue perfusion
- Tissue appears red initially and later white and may blanch with pressure
- Petechial hemorrhages may be present
- With good management, tissue will likely recover

### **Zone of hyperemia**

- At the periphery of the wound
- Superficial partial-thickness injury with good tissue perfusion
- Tissue appears red, blanches with pressure and will likely recover

Burns can also be characterized by depth of injury (Table 1) and severity (Table 2).

**Table 1:** Characteristics of Burn Types According to Depth

Classification	Depth of Injury	Appearance	Sensation	Most Common Cause of Injury	Outcome
<b>Superficial (first degree)</b>	<ul style="list-style-type: none"> <li>Epidermis</li> </ul>	<ul style="list-style-type: none"> <li>Intact skin</li> <li>Blanchable erythema and mild edema</li> <li>Brisk capillary refill</li> <li>No blisters</li> </ul>	<ul style="list-style-type: none"> <li>Tactile and pain sensations intact</li> </ul>	<ul style="list-style-type: none"> <li>Scalds from spilled liquids (low viscosity)</li> <li>Electrical flash</li> <li>Sunburn</li> </ul>	<ul style="list-style-type: none"> <li>Healing within 3–5 days</li> <li>No scarring</li> </ul>
<b>Superficial partial-thickness (second degree)</b>	<ul style="list-style-type: none"> <li>Epidermis with partial-thickness loss of dermis</li> <li>Dermal appendages intact</li> </ul>	<ul style="list-style-type: none"> <li>Blanchable erythema</li> <li>Brisk capillary refill</li> <li>Intact or ruptured thin-walled serum-filled blisters (blisters may increase in size)</li> <li>If ruptured blisters, tissue is pink or red and moist</li> </ul>		<ul style="list-style-type: none"> <li>Scalds from spilled liquids (low viscosity) or steam</li> <li>Electrical flash</li> <li>Brief exposure to flame</li> <li>Brief contact with hot object</li> <li>Sunburn</li> </ul>	<ul style="list-style-type: none"> <li>Healing within 14–21 days</li> <li>No scarring</li> </ul>
<b>Deep partial-thickness (deep second degree)</b>	<ul style="list-style-type: none"> <li>Epidermis with deep partial-thickness loss of dermis</li> <li>Underlying structures are not exposed</li> <li>Some dermal appendages intact</li> </ul>	<ul style="list-style-type: none"> <li>Non-blanchable erythema</li> <li>Sluggish capillary refill</li> <li>Intact or ruptured thick-walled serum-filled blisters (blisters may increase in size)</li> <li>If ruptured blisters, tissue is blotchy/mottled, cherry red/blanched white and dry</li> </ul>	<ul style="list-style-type: none"> <li>Deep pressure sensation intact</li> <li>Pinprick sensation absent</li> <li>Variable pain sensation</li> </ul>	<ul style="list-style-type: none"> <li>Scalds from spilled liquids (low and high viscosity) or steam</li> <li>Exposure to flame</li> <li>Contact with hot object</li> </ul>	<ul style="list-style-type: none"> <li>Prolonged healing</li> <li>May require skin grafting</li> <li>Scarring</li> <li>Contractures</li> </ul>
<b>Full-thickness (third degree)</b>	<ul style="list-style-type: none"> <li>Full-thickness skin loss</li> <li>Underlying structures are not exposed</li> <li>Dermal appendages destroyed</li> </ul>	<ul style="list-style-type: none"> <li>Non-blanchable</li> <li>Capillary refill absent</li> <li>If present, blisters will be thin-walled and will not increase in size</li> <li>Tissue leathery, pale, mottled and cherry red/brown in colour and dry</li> <li>Eschar may be present</li> <li>Thrombosed vessels visible</li> <li>Edema</li> </ul>	<ul style="list-style-type: none"> <li>Insensitive to pain and pressure</li> </ul>	<ul style="list-style-type: none"> <li>Scalds from liquid immersion</li> <li>Exposure to flame</li> <li>Prolonged contact with hot object</li> <li>Chemicals</li> <li>Electricity</li> </ul>	<ul style="list-style-type: none"> <li>Prolonged healing</li> <li>Requires skin grafting</li> <li>Considerable scarring and contractures</li> </ul>
<b>Full-thickness (fourth degree)</b>	<ul style="list-style-type: none"> <li>Full-thickness skin and tissue loss</li> <li>Exposed or directly palpable underlying structures</li> <li>Dermal appendages destroyed</li> </ul>	<ul style="list-style-type: none"> <li>Non-blanchable</li> <li>Tissue leathery, pale, mottled, red/brown/white in colour and dry</li> <li>Eschar may be present</li> <li>Thrombosed vessels visible</li> </ul>	<ul style="list-style-type: none"> <li>Insensitive to pain and pressure</li> </ul>	<ul style="list-style-type: none"> <li>Prolonged liquid immersion scald</li> <li>Prolonged contact with hot flame, hot objects, or chemicals</li> <li>Electricity</li> </ul>	<ul style="list-style-type: none"> <li>Prolonged healing</li> <li>Amputation possible</li> <li>Requires skin grafting</li> <li>Scarring</li> <li>Contractures</li> </ul>

For the complete version of Best Practice Recommendations for the Prevention and Management of Burns, visit [here](#).

**Table 2:** Determination of Burn Severity

Burn Severity	Depth and Area of Injury	Suggested Treatment Setting
<b>Minor (non-complex)</b>	<ul style="list-style-type: none"> <li>▪ Partial-thickness involving &lt; 15% of TBSA (adults &lt; 40 years)</li> <li>▪ Partial-thickness involving &lt; 10% of TBSA (children and adults &gt; 40 years)</li> <li>▪ Full-thickness involving &lt; 2% of TBSA (not on face, eyes, ears, hands, feet or perineum)</li> </ul>	Outpatient
<b>Moderate</b>	<ul style="list-style-type: none"> <li>▪ Partial-thickness involving 15–25% of TBSA (adults)</li> <li>▪ Partial-thickness involving 10–20% of TBSA (children and older adults)</li> <li>▪ Full-thickness burns involving 2–10% of TBSA (not on face, eyes, ears, hands, feet or perineum)</li> <li>▪ Excluding high-voltage electrical burns and burns with inhalation injury or major trauma</li> </ul>	Inpatient hospital (not a specialized burn centre)
<b>Major (complex)</b>	<ul style="list-style-type: none"> <li>▪ Partial-thickness involving more than 25% TBSA (adults)</li> <li>▪ Partial-thickness involving more than 20% TBSA (children &lt; 10 years or adults &gt; 50 years)</li> <li>▪ Full-thickness burns involving more than 10% of TBSA</li> <li>▪ Burns involving the face, eyes, ears, hands, feet or perineum</li> <li>▪ Burns caused by caustic chemicals, high-voltage electricity</li> <li>▪ Burns with inhalation injury or major trauma</li> </ul>	Specialized burn centre

## 2 Set Goals

- |              |  |                                       |
|--------------|--|---------------------------------------|
| • prevention | • healing<br>• non-healing<br>• non-healable | • quality of life and symptom control |
|--------------|--|---------------------------------------|

Goals of care need to revolve around the patient. Achieving goals will depend on the interplay of the patients' health status and lifestyle, the availability of resources and the knowledge and ability of care partners to provide optimal interventions. If these factors are not taken into consideration the goals of care may be unrealistic and unrealizable. The team should aim to set goals according to the **SMART principle**: **S**pecific, **M**easurable, **A**ttainable, **R**elevant and **T**imely.

### 2.1 Set goals for prevention, healing, non-healing and non-healable wounds.

#### 2.1.1 Identify goals based on prevention or healability of wounds

Burn injury prevention should be considered a primary safety goal for all people. Where burn injury already exists, the most common goals must relate to the overall healing ability. Timeframes to accomplish goals are dependent on the depth and severity of the burn and may include:

- Wound closure, stabilization or prevention of deterioration
- Reduction in the amount of necrotic tissue
- Reduced bacterial burden or prevention of increased bacterial burden
- Establishment or maintenance of an appropriate amount of wound moisture
- Decreased number of dressing changes
- Prevention of scarring or improved scar quality
- Limb preservation
- Improved nutrition and hydration

#### 2.1.2 Identify quality-of-life and symptom-control goals

A comprehensive patient, wound, environment and systems assessment will also allow for the development of goals related to the impact of the burn injury on the patient's daily life. Such goals may include:

- Reducing/managing pain
- Reducing/managing wound-related itch
- Maintaining or improving joint range of motion and function of the injured area
- Reducing contracture
- Restoring independence
- Returning to work, home, school or leisure activities
- Reducing anxiety and/or psychological stress
- Improving coping mechanisms

### 3 Assemble the Team

- Select membership based on patient need.

**Prevention, assessment and management of burn injuries require the collaboration of an integrated team to optimize the patient's overall health and well-being.** The team must work closely and collaboratively to address the complex physical, emotional and social impacts of surviving a burn injury, and create and implement a sustainable plan of care based on the identified goals.

#### 3.1 Identify appropriate health-care professionals and service providers.

Team members may include first responders, anesthesiologists, burn nurses, burn surgeons, emergency room clinicians, occupational therapists, pharmacists, physical therapists, physicians, registered dietitians, infectious disease specialists, respiratory therapists, social workers and/or psychiatrists/psychologists, speech and language pathologists and spiritual care practitioners.

#### 3.2 Enlist the patient and their family and caregivers as part of the team.

The success of a plan of care for the prevention and management of burn injuries hinges on the collaboration of the person with the burn injury (or at risk), their support system and communication among the team involved in the development of the plan of care.

For pediatric patients, parents or legal guardians need to be part of the care-planning team and for those with cognitive impairment, the assignee of their Power of Attorney for Personal Care.

#### 3.3 Ensure organizational and system support.

**Wounds Canada's resources and education align with a population health management model. This model encourages the proactive management of a total population at risk for adverse outcomes through a variety of individual, organizational and cultural interventions to improve patient, clinical and financial outcomes. The interventions are based on a risk-stratified needs assessment of the population, supported by a comprehensive governance infrastructure.**

**Successful burn injury programs are designed and evaluated in collaboration with clinical practice leaders, educators, policy makers and administrators at a local, regional, provincial/territorial and national level. To support this model and secure successful outcomes, decision makers must:**

- **Use globally recognized risk classifications to identify risk, support prevention and develop management strategies by allocating appropriate resources such as resources, patient education and clinical visits.**
- **Develop and implement policies (federal, provincial/territorial, regional and institutional) based on current evidence that acknowledge and designate human, material and financial resources to support the team in the development of a burn prevention and management program.**
- **Work with community and other partners to develop a process to facilitate patient referral and access to local health professionals with specialized knowledge in burn management.**
- **Work with community and other partners to advocate for strategies and funding for all aspects of burn prevention.**
- **Audit all aspects of the service to ensure that local practice meets accepted national and international standards of care.**

## 4 Establish and Implement a Plan of Care

- Establish and implement a plan of care that addresses:
  - the environment and system
  - the patient
  - the wound (if applicable)
- Ensure meaningful communication among all members of the team.
- Ensure consistent and sustainable implementation of the plan of care.

### Provide Local Skin/Wound Care (if applicable)

#### Cleansing/ debridement:

- Remove debris and necrotic or indolent tissue, if healable.

#### Bacterial balance:

- Rule out or treat superficial/spreading/systemic infection.

#### Moisture balance:

- Ensure adequate hydration.

### Select appropriate dressing and/or advanced therapy

The development and implementation of a sustainable plan of care must be based on the identified goals and be collaboratively created with the patient, their family and care partners, and relevant health-care team members.

**4.1 Identify and implement an evidence-informed plan to correct the causes or co-factors that affect skin integrity, including patient needs (physical, emotional and social), the wound (if applicable) and environmental/system challenges.**

### Burn Prevention

Identify risk factors, provide education and heighten awareness of individual risk. Encourage people to practice strategies to decrease their level of burn injury risk at home, work or play.

## Management – Primary Survey

After ensuring personal safety, the top priority of care for patients who have experienced a burn injury is to stop the burning process by:

- removing the heat source for patients who have experienced a thermal injury
- turning off the electricity supply for those with electrical burns
- brushing off dry chemicals or diluting liquid chemicals with water for those who have experienced chemical burns
- removing the patient from the source of radiation for those with radiation burns

In conjunction with the treatment of life-threatening injuries, most burn injuries need to be cooled. Thermal burns should be cooled with clean, tepid running water or wet towels/compresses to stop the burning process, limit tissue damage, minimize swelling, cleanse the wound and aid in pain control. Very cold water and ice **should not** be used to cool burn injuries as they can cause local vasoconstriction, which can increase tissue damage, and because their use can contribute to hypothermia.

Chemical burns require copious irrigation with tepid water or an appropriate antidote to remove the corrosive agent and stop the burning process. This irrigation process may be lengthy, e.g., 15–120 minutes, and should continue until the patient stops complaining of discomfort and the tissue pH normalizes. Electrical burns should not be irrigated.

All people with burn injuries who require care by a health professional, should then be provided care using the **ABCDEF mnemonic**, listed in the order of priority, to treat any life-threatening injuries:

- **Airway:** If the patient has an airway obstruction or an injury that is physically restricting breathing, attain and maintain an airway.
- **Breathing:** If the patient is not breathing, immediately initiate cardiopulmonary resuscitation (CPR). In addition, treat any conditions impeding ventilation.
- **Circulation:** If the patient is bleeding or has hypovolemia or burn shock, treat accordingly.
- **Disability:** If the patient presents with an altered level of consciousness, it is imperative to treat the underlying cause, e.g., hypoxia secondary to carboxyhaemoglobin level or hypovolemia. In addition, a fasciotomy may be required to treat compartment syndrome affecting a limb.
- **Fluid resuscitation:** For patients with major (complex) burns, e.g., TBSA > 10–15%, fluid resuscitation is key to combating the profound loss of intravascular fluid into the interstitial space, which can lead to organ dysfunction and death, and should be initiated as soon as possible after injury (ideally pre-hospitalization).

To access the American Burn Association's criteria for transfer of a patient to a burn unit, visit <http://ameriburn.org/wp-content/uploads/2017/05/burncenterreferralcriteria.pdf>.

## Management – Secondary Survey

Once care has been provided to address life-threatening situations/conditions revealed during the primary survey, treatment of secondary issues begins. This includes the correction of any modifiable comorbidities noted during the detailed patient history that may negatively impact wound healing and general burn injury recovery.

## Management – Burn Pain

The type and intensity of pain must be taken into consideration.

**Table 3:** Management of Burn Pain

Cause of Pain	Management Strategies
<b>Background pain</b>	▪ Acetaminophen, non-steroid anti-inflammatory drugs (NSAIDs), morphine, methadone
<b>Procedural pain</b>	▪ Acetaminophen, morphine, transmucosal fentanyl, anxiolytics and general anesthesia for initial wound care
<b>Post-operative pain</b>	▪ Acetaminophen, NSAIDs, morphine, nitrous oxide, ketamine, transmucosal fentanyl, peripheral blocks, patient-controlled analgesia

Consider non-pharmacological interventions that may also be of assistance with pain management.

**Quality-of-life (QoL):** Once psychosocial issues such as anxiety, depression and post-traumatic stress disorder are identified, appropriate interventions, referrals and education need to occur. Treatment and intervention options may include coping self-efficacy, cognitive behavioural therapy, medications to treat anxiety and depression, and peer support groups.

**Nutrition:** Metabolic and nutritional management plays a vital role in the management of burn injuries. Proportionate to the severity of the injury, patients with major burn injuries often experience oxidative stress, intense inflammatory response and a long hypermetabolic and catabolic response. Such patients require the initiation of nutritional therapy, preferably by the enteral route, within 12 hours of the burn injury.

**Physical therapy:** Therapeutic exercise with the burn survivor should be goal oriented and directed at reducing the effects of immobilization, maintaining or improving function and strength and elongating scar tissue. Then, rehabilitative exercise should include stretching, strengthening, cardiovascular training and functional activities. Positioning and splinting of the burn patient become increasingly important as the TBSA increases. Larger TBSA burns will require specialized sleep surfaces along with positioning devices within the patient's bed environment. Minor burn injuries may simply require a supportive splint for the affected area.

## 4.2 Optimize the local wound environment: Cleansing, debriding, managing bacterial balance and managing moisture balance.

Local wound management strategies should be part of the plan of care and fit within the context of the overall healability of the burn injury. To optimize the local wound environment, clinicians must consider wound cleansing and debridement, management of bacterial burden and moisture control.

### 4.2.1 Cleansing

Cleansing solutions commonly used in wound management include sterile normal saline, sterile water, potable tap water, commercial wound cleansers and liquid antiseptics. Such cleansing solutions may be appropriate in the management of burn injuries depending on the goals of care.

Expert opinion recommends that sterile solutions be used for acute burn injury management and in situations where underlying structures are exposed, to cleanse tunnels or sinuses, where the patient is immune-compromised or is suffering from a current wound infection (or has a history of recurrent wound infections), or in situations where potable tap water is inaccessible or the environment in which the wound is being cleansed is less than hygienic. (See Wounds Canada's [Product Pickers](#), below.)

### 4.2.2 Debriding

Debridement serves to remove microbes, foreign bodies, debris and non-viable tissue from a wound to promote wound closure. Like with wound cleansing, the appropriate method of debridement needs to be determined based on the needs of the patient and the wound, the environment, available resources and the scope of practice of the person completing the debridement.

Biological, mechanical, hydrosurgical, chemical, autolytic and enzymatic debridement methods have all been reported in the literature as effective debridement options for burn injuries to various degrees, although most research focuses on surgical debridement of major burn injuries to facilitate wound coverage (either using xenografts, allografts, autografts or skin substitutes) and reconstruction. (See Wounds Canada's [Product Pickers](#), below.)

**Debriding Blisters:** If blisters are greater than 1 cm<sup>2</sup>, are filled with cloudy serous fluid or blood, are in an area where they are prone to break with routine activities or are impeding joint function, they should be deroofed. All blisters secondary to chemical burns should be deroofed.

### 4.2.3 Managing Bacterial Balance

Acute burn injury infections are one of the most serious complications, significantly contributing to morbidity and mortality. The result of the interruption in the skin's barrier, immune dysfunction and invasive procedures, management must focus on optimizing the host response, reducing the number or virulence of micro-organisms in the wound and optimizing the wound environment. Strategies to manage bacterial burden at the surface of the burn wound include prophylactic and therapeutic use of topical antiseptics and antimicrobials (Table 4).

**Table 4:** Common Topical Antimicrobials Used in Burn Management

Agent	Description
<b>Silver dressings*</b>	<ul style="list-style-type: none"> <li>▪ Silver-containing calcium alginates, foams, gels, gelling fibres and non-adherent synthetic contact layers</li> <li>▪ Some formulations kill bacteria within the dressing, others release silver into the wound bed</li> <li>▪ Broad spectrum</li> <li>▪ May be toxic in high concentrations to fibroblasts and keratinocytes or if not delivered in a sustained-release manner</li> <li>▪ Most require less frequent applications (with the exception of the silver gel)</li> </ul>
<b>Honey</b>	<ul style="list-style-type: none"> <li>▪ <i>Leptospermum</i>-honey-containing calcium alginates, gels and pastes</li> <li>▪ Biocidal effect is multifactorial</li> <li>▪ Broad spectrum</li> <li>▪ Low cytotoxicity</li> <li>▪ Most require less frequent applications (with the exception of the gel and paste)</li> </ul>
<b>PMHB</b>	<ul style="list-style-type: none"> <li>▪ Polyhexamethylene-biguanide-(PHMB)-containing ribbon gauze, gauze squares, transfer foam, foam, gel and non-adherent synthetic contact layer</li> <li>▪ Bacteria kill occurs largely in/on the dressing</li> <li>▪ Broad spectrum</li> <li>▪ Low cytotoxicity</li> <li>▪ Most require less frequent applications (with the exception of the PMHB gel)</li> </ul>
<b>Silver sulfadiazine (SSD) cream*</b>	<ul style="list-style-type: none"> <li>▪ Water-soluble cream containing 1% silver sulfadiazine</li> <li>▪ Bacteriostatic</li> <li>▪ Broad spectrum but lacks fungal and vancomycin-resistant enterococci activity</li> <li>▪ Cytotoxic effects on fibroblasts and keratinocytes and may delay healing of superficial burns</li> <li>▪ May create pseudo eschar</li> <li>▪ Requires frequent applications (more than once daily)</li> <li>▪ Avoid in patients with sulfonamide allergies</li> </ul>
<b>Mafenide acetate cream or solution</b>	<ul style="list-style-type: none"> <li>▪ Topical sulfonamide antibiotic available as 11% water-soluble cream or 5% solution</li> <li>▪ Broad spectrum but lacks antifungal activity, penetrates deeper than SSD</li> <li>▪ Cytotoxic effects on fibroblasts and keratinocytes and may impede wound healing</li> <li>▪ Painful on application and may cause local rash or skin irritation</li> <li>▪ May create pseudo eschar</li> <li>▪ Requires frequent applications (more than once daily)</li> <li>▪ May cause severe metabolic acidemia with compensatory hyperventilation when applied to large burns</li> </ul>

**\*A Note on Silver Dressings**

The 2018 International Society for Burn Injuries (ISBI) Practice Guidelines for Burn Care made the following recommendations for the use of silver as a topical agent: "Silver-containing compounds and dressings are effective topical antimicrobial agents. However, silver also has cytotoxic effects which may delay wound healing. Silver-based topical agents are appropriate for deeper burns (essentially those awaiting surgery)."

Common organisms in critically ill burn-injured patients with bacteremia include *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Klebsiella*, *Escherichia coli*, *Enterococcus* and *Acinetobacter* species. Such infections typically require surgical debridement of the involved tissue in conjunction with systemic broad-spectrum antimicrobials. The International Wound Infection Institute has created several enablers for optimal infection management that can be useful tools for clinicians. Resources can be found at [www.woundinfection-institute.com](http://www.woundinfection-institute.com).

#### 4.2.4 Managing Moisture Balance

**Moisture balance** within the wound base can be achieved through appropriate dressing selection and dressing change frequency (see Wounds Canada's [Product Pickers](#), below). Increased wound exudate can also be a sign of increased trauma or infection, so assess the wound closely prior to dressing selection.

### 4.3 Select the appropriate dressings and/or advanced therapy.

A good burn-injury **dressing** has the following characteristics (where indicated):

- Promotes autolytic debridement of non-viable tissue
- Protects against infection and environmental contamination/trauma
- Maintains a moist wound environment while containing or wicking away excess moisture
- Reduces evaporative losses
- Is non-adherent to protect delicate skin
- Contours easily and conforms to the wound bed
- Aids with splinting or immobilization
- Is esthetically pleasing
- Is easy to apply and remove
- Is painless on application and with wear and removal
- Is cost-effective (inclusive of the cost of the product, frequency of dressing change and the cost of health-care professional time)

Common dressings used in burn management can be found [here](#). For more information, see Wounds Canada's [Product Picker for Dressing Selection](#).

### 4.4 Engage the team to ensure consistent implementation of the plan of care.

To ensure the best experiences and outcomes for patients with burn injuries, it is imperative that health-care professionals involved in the care of people with burns keep abreast of current research and innovations in burn wound management.

#### Wounds Canada's Product Pickers

**Skin and Wound Clean-up:** helps users choose appropriate skin and wound cleansers as well as irrigating solutions

**Wound Dressing Formulary:** describes common wound dressings in generic categories and lists usage considerations

**Wound Dressing Selection Guide:** helps users choose appropriate primary and secondary dressings based on common clinical situations and wound care goals

## 5 Evaluate Outcomes

### Goals Met:

- Ensure sustainability.
- ✓ Cycle is completed

### Goals Partially Met or Not Met:

- reassess

### 5.1 Determine if the outcomes have met the goals of care.

***Routine reassessment using validated tools helps clinicians determine if the goals of the prevention and/or the treatment plan have been met. In addition, at discharge, the plan of care needs to be revisited and revised as needed to ensure that appropriate self-management strategies are in place to support the patient to sustain outcomes.***

### 5.2 Reassess patient, wound, environment and system if goals are partially met or unmet.

When the goals of care have not been met in a timely manner it is imperative to go back to Step 1 of the Wound Prevention and Management Cycle: Assess and/or Reassess. Careful re-assessment of the patient, their wound and environment and systems factors will most often reveal modifiable factors that can be addressed. Reassessment needs to consider gaps in care or the person's ability to adapt to their condition and engage in self-management.

### 5.3 Ensure sustainability to support prevention and reduce risk of recurrence.

***At discharge, people with or at risk for burn injuries and their care partners require information regarding the cause and risk factors for burn injuries as well as their risk for re-injury. Both formal and information educational methods are beneficial, including the use of standardized patient-education materials as well as individualized demonstration and review of prevention and management techniques.***

Specific teaching relevant to a newly closed burn injury includes:

- **Skin care:** For at least 12 months post closure, burn-injured skin requires daily (or more frequent) cleansing and moisturization (using an emollient). Products that are pH balanced, non-scented and non-sensitizing are preferred. Fragile tissue should be protected from the sun during this period as it is more prone to sunburn, and sun exposure may cause further pigmentation changes.
- **Burn itch:** Itchiness at the site of the burn injury is common post wound closure and can be worsened by heat, stress and physical activity. Keeping the tissue moisturized and the area cool, relaxation, distraction, and use of pressure garments are some non-pharmacological techniques for reducing itch. Topical and oral antihistamines may be required to manage itch.
- **Hypertrophic scarring:** Burn wounds heal with the formation of scar tissue. The amount of scar produced generally relates to the depth of the injury sustained. If not managed appropriately, the injured area may become hypertrophic. Scarring that crosses a joint can cause contracture and, as a result, decreased function of the area. The average length of time for a burn scar to mature can be two years or more. Treatment of hypertrophic burn scars involves a number of different modalities, including the application of pressure and silicone therapy and burn scar massage.

**Burn prevention is key** to both people with burn injuries and those at risk for such injuries, and **simple safety measures** can reduce the risk of burn injury.

For additional Wounds Canada resources go to: [www.woundscanada.ca/health-care-professional/resources-health-care-pros/boutique](http://www.woundscanada.ca/health-care-professional/resources-health-care-pros/boutique).

Care at Home Series:

- Burns: Preventing and Managing Skin Injuries
- Caring for Your Wound at Home: Changing a Dressing



---

**BPR BRIEFS****Burns****Production:**

Executive Editor: Sue Rosenthal  
Project Editor: Heather L. Orsted  
Assistant Editor: Katie Bassett  
Art Direction and Layout: Robert Ketchen

**Authors:**

Marc Jeschke  
Crystal McCallum  
Doug Baron  
Matthew Godleski  
Judy Knighton  
Shahriar Shahrokhi

---

**Wounds Canada**  
**P.O. Box 35569, York Mills Plaza**  
**North York, ON M2L 2Y4**  
**416-485-2292**  
**[www.woundscanada.ca](http://www.woundscanada.ca)**

© 2021 Canadian Association of Wound Care  
Printed in Canada · Last updated 2021 06 09 · 1955r1E

**Disclaimer:** This document provides a clinical enabler for the recommendations outlined in the Best Practice Recommendations for the Prevention and Management of Diabetic Foot Ulcers. For more information on a particular recommendation or a copy of the full document go to: <https://www.woundscanada.ca/docman/public/health-care-professional/bpr-workshop/1308-bpr-for-the-prevention-and-management-of-burns/file>.