

Guideline: Adult Burn Palliation Guideline

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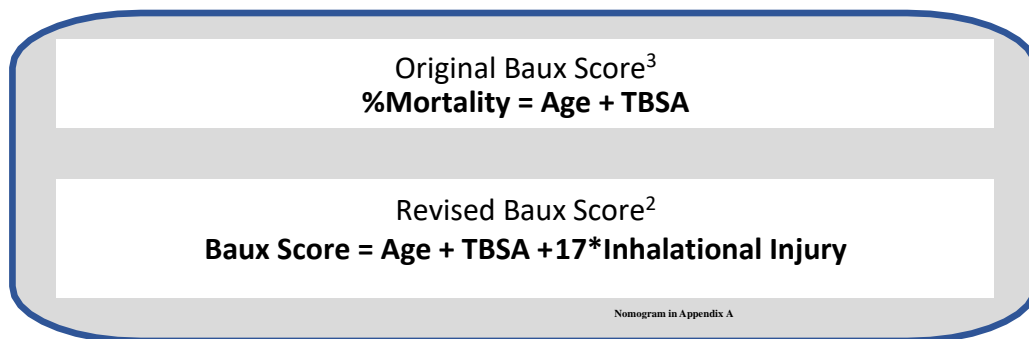
I. Population:

Adult burn patients with major burns (typically considered >20%TBSA) represent a major physiologic stress and injury burden. Care of these patients is complex and requires a long-term interdisciplinary approach beyond burn critical care and burn surgery¹. While length of stay has decreased over the last several decades, a typical rule of thumb is 1 day admission per %TBSA. Patients and their families often have difficulty envisioning successful recovery in the setting of major burns and should be counseled regarding long term recovery. Peer support is useful in the long term, but goals of care decisions are largely made prior to its availability.

II. Indications:

All burn patients admitted that meet the palliative care triggers.

III. Predicted Mortality



Burn specific mortality is most accounted for using the revised Baux score. The original Baux score, described anecdotally by Professor Serge Baux in 1961, has been revised using the national burn repository data to the modern Revised Baux score. Modern burn surgery and critical care have substantially improved outcomes for burn patients, with the LD50 Baux Score now exceeding 100 at most burn centers. It is important, however, to remember that for our elderly population (>60) a revised Baux score > 100 is associated with a 69% mortality rate.¹⁰ Additionally, mortality data can be roughly confirmed using the Age and TBSA mortality data provided by the National Burn Repository (Appendix B).

In a recent study published in the Journal of Burn Care and Research, looking at predictors of death among the elderly population, they found that in patients > 60 had an average mortality rate of 9.4% for all comers compared to 2.0% in patients <60. In the patients > 60 who died their average age was 75 and their average Baux score was 113. For older patients that survived the first 72 hours, most died from complications related to their baseline comorbidities.⁷

Another study looking at predictors of death in burn patients found that complications increased mortality rate.⁸ Presence of an identified complication (other than death) increased the odds ratio of death by 3.023. This study also

found the following:

- The most common complications were pulmonary and infectious.
- The most important complications that were found to contribute to an increase in mortality were:
 - Cardiovascular
 - Neurologic
 - Renal
 - Pulmonary
- All complications were more common with an associated inhalation injury

IV. Evaluating Risk of Mortality in Burn Patients

All patients will have a burn specific mortality calculated on admission, as well as a frailty score, and should be discussed on rounds. **Burn specific mortality** will be calculated using the **revised Baux score**² as a framework for discussion, although providers should understand that this method is limited and does not directly account for patient comorbidities. Predicted mortality using the revised Baux score is calculated using a logit transformation (Log transformation of the Odds Ratio) and as such must be obtained using a calculator, or the provided nomogram. (Appendix A). In the event that the patient or their surrogate are considering withdrawal of care or comfort measures only, the burn specific mortality should be included in the discussion. Provider concerns about the accuracy of the predicted mortality should be discussed as well (i.e. patient comorbidities, special circumstances). Additionally, mortality data can be roughly confirmed using the Age and TBSA mortality data provided by the National Burn Repository (Appendix B)

In the setting of patients admitted with Toxic Epidermal Necrolysis (TENS) a Severity-of-Illness Score for Toxic Epidermal Necrolysis (SCORTEN) should be calculated within 24 hours of admission. Scores of 4 or greater are associated with a mortality rate of approximately 60% and those with a score of 5 a mortality rate >90. The score can be calculated using the following table (Appendix C).

Significantly higher frailty scores have been studied and shown to be associated with burn non-survivors (score of 5.2 versus 4.4 in survivors). Patients with a frailty score averaging 5.34 are associated more often with the patient being admitted to a SNF (important to discuss with goals of care). Patients discharged to home tend to have lower frailty scores (4.1) as are those admitted to an acute rehab facility (4.0). This score is felt to give a more complete assessment of elderly patients and may assist in decision making. In a study by Romanowski, et al, independent of the patient's age the TBSA, presence of inhalation injury and higher frailty scores were all associated with death. It is important to remember that the patient's chronologic age often does not predict the patient's physiologic age.¹⁰

Frailty scores should be calculated on admission and documented in the history and physical using the following:

Table 1. Canadian Study on Health frailty score

Score	Description
1—Very fit	Robust, active, energetic, well-motivated, and fit.
2—Well	Without active disease, but less fit than people in category one.
3—Well with treated comorbid disease	Disease symptoms are well controlled compared with those in category four.
4—Apparently vulnerable	Although not frankly dependent, these people commonly complain of being “slowed up” or have disease symptoms.
5—Mildly frail	With limited dependence on others for instrumental activities of daily living.
6—Moderately frail	Help is needed with both instrumental and noninstrumental activities of daily living.
7—Severely frail	Completely dependent on others for the activities of daily living, or terminally ill.

V. Indications for Palliative Care Consultation

Palliative Care consultation should be considered in all patients meeting the palliative care triggers but is only mandatory in the setting of a family request.

Palliative Care consultation should not be viewed as a consultation for ‘withdrawal of care’, but rather as consultation for assistance in management of patient comfort, goals of care and expectations of care.

Ideally, palliative care consultation will occur in identified patients within 72 hours of admission, with a planned meeting between palliative care, the burn team and the patient (whenever possible)/surrogate on HD4. When possible, the burn team and the palliative care team will meet shortly before the formal family meeting to update all members of the team and to discuss the order of the meeting (aka burn provider will discuss the patients current medical state with the family, followed by palliative care discussing patient comfort, goals of care, etc.). It is important to let the palliative care team know that a family meeting will be taking place once they are involved to update them and to discuss timing of the meeting.

Palliative Care consultation is indicated in the following situations:

- End-of-life care (imminent or anticipated in the next days)
- Goals of care are conflictual, unclear or unarticulated (patient or family has difficulty expressing themselves, conflict between family, patient, and or **providers** regarding goals of care)
- Patient or family members request palliative care
- Prolonged hospitalization (> 1 month) with high risk based on their Burn Specific Mortality and pre-hospital co-morbidities
- SCORTEN ≥ 4
- Modified Baux score ≥ 100 (especially for patients > 60 years of age)
- Modified Baux score ≥ 70 and 2 or more of the following:
 - Impending or likely decisions to escalate intervention or treatment (e.g., amputation, tracheostomy, PEG, hemodialysis, CPR, vasopressors, further surgeries)
 - Family unclear about treatment options
 - Discord among family
 - Patients > 60 years of age
 - Lack of congruence between the medical plans with the patient's values
 - High burden of medical comorbidities impacting person's life (e.g., COPD, CHF, DM, dementia)
 - No longer meeting milestones with healing, engraftment, or therapy
 - Unclear treatment goals or goals of care poorly congruent with the patient's values
 - Frailty score on admission > 5

VI. Procedures for Comfort Measures Only

For all emergent cases, as judged by the attending provider, comfort measures only may be initiated in the setting of patient/surrogate choice or medical futility only after agreement between the Burn ICU attending and the Burn Surgery attending. In the setting that the attending represents both Burn ICU and Burn Surgery, it is recommended that an additional opinion be provided by another Burn attending.

If all agree that treatment should focus on comfort only or that lifesaving/sustaining measures should be withdrawn, the case may be brought to the attention of the Burn Director or the Burn ICU Medical Director if additional input would help with the final decision. Additionally, a palliative care consult can be obtained to offer an additional opinion.

For all non-emergent cases, if a BICU or Burn Surgery provider feels that comfort measures only is an appropriate medical decision, and that the patient or their surrogate would like to pursue this, it should be discussed with both the BICU and Burn Surgery attendings. If all are in agreement that treatment should focus on

comfort only or that lifesaving/sustaining measures should be withdrawn, the case may be brought to the attention of the Burn Director or the Burn ICU Medical Director if additional input would help with the final decision. Additionally, a palliative care consult can be obtained to offer an additional opinion.

Remember, a “Comfort Care Orders”
order set exists on EPIC.

For both emergent and non-emergent cases, once they have been appropriately reviewed and a family discussion has occurred (whenever possible), a separate note will be created reviewing the decision-making process by the primary attending. This should include predicted mortality, factors affecting the accuracy of the predicted mortality (i.e. significant comorbidities), factors affecting the decision to withdraw life sustaining measures, events leading to the decision, details of the family meeting conversation, and confirmation that the case has been reviewed by all attending providers involved in the care of the patient as well as any additional involvement by palliative care, the Burn director or the Burn ICU Medical Director.

Consideration in the non-emergent cases should be discussed regarding the use of a hospice scatter bed (or hospice in place). Any hospital bed can be converted into a hospice bed. This takes place when a patient, or their family, chooses hospice care but the patient is too unstable to transport to home or a hospice facility. Patients will receive hospice care from the existing staff that they’re familiar with and family members will receive their elected benefits. A hospice vendor will partner with clinical staff and assist in supporting the family for end of life and bereavement care. The Palliative Carer team is available assist with the logistics of hospice in place during routine hours (Monday through Friday, 8AM to 4:30 PM) following consultation. Below is the Hospice Scatter Bed Quick Start Guide link.

[https://www.vumc.org/eolcare/sites/vumc.org/eolcare/files/Hospice Scatterbed Tip Sheet eStar.pdf](https://www.vumc.org/eolcare/sites/vumc.org/eolcare/files/Hospice%20Scatterbed%20Tip%20Sheet%20eStar.pdf)

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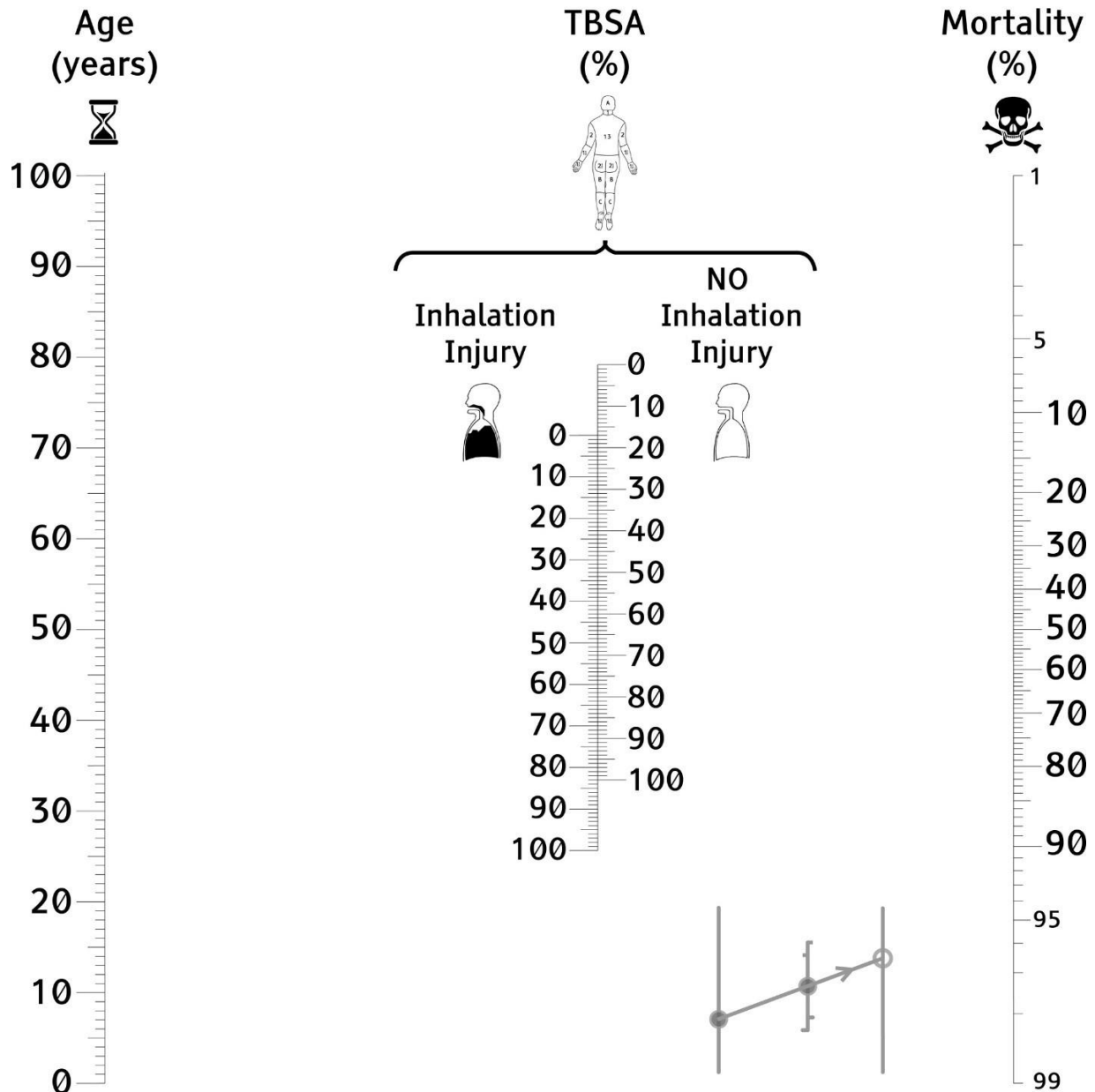
Appendix A: Revised Baux Score Predicted Mortality Nomogram

Revised Baux Score Nomogram

Predicted Mortality (%):

$$\text{Inhalation injury: } = \frac{e^{-8.8163 + (0.0775 \cdot (\text{Age} + \text{TBSA} + 17))}}{1 + e^{-8.8163 + (0.0775 \cdot (\text{Age} + \text{TBSA} + 17))}}$$

$$\text{NO inhalation injury: } = \frac{e^{-8.8163 + (0.0775 \cdot (\text{Age} + \text{TBSA}))}}{1 + e^{-8.8163 + (0.0775 \cdot (\text{Age} + \text{TBSA}))}}$$



Instructions:
 Draw a straight line connecting Age and TBSA
 Use the appropriate TBSA scale for inhalation injury present/absent
 Intersection of line with Mortality axis indicates predicted mortality

Appendix B: NBR Mortality by Age/TBSA



MORTALITY RATE BY AGE GROUP AND BURN SIZE
(EXPRESSED AS THE NUMBER OF DEATHS OVER THE TOTAL NUMBER OF PATIENTS IN THAT GROUP)

Age Group	Burn Size (% TBSA)										
	0.1 - 9.9	10 - 19.9	20 - 29.9	30 - 39.9	40 - 49.9	50 - 59.9	60 - 69.9	70 - 79.9	80 - 89.9	> 90	Total
Birth - .9	0.0	0.6	1.4	7.1	20.0	0.0	0.0	0.0	0.0	50.0	0.3
Died/Total	1/2269	2/315	1/71	2/28	2/10	0/5	0/2	0/1	0/0	1/2	9/2703
1 - 1.9	0.0	0.4	0.0	0.0	3.9	11.1	16.7	22.2	33.3	66.7	0.2
Died/Total	1/8791	5/1424	0/248	0/87	2/51	2/18	3/18	2/9	1/3	2/3	18/10652
2 - 4.9	0.1	0.4	0.2	2.5	4.0	8.1	15.7	13.6	55.0	63.2	0.6
Died/Total	13/9926	6/1534	1/405	6/237	6/149	7/86	11/70	3/22	11/20	12/19	76/12468
5 - 15.9	0.1	0.4	0.7	0.4	3.1	3.0	7.1	9.5	21.4	50.0	0.6
Died/Total	15/13352	10/2250	5/758	2/517	9/287	5/167	10/140	10/105	21/98	13/26	100/17700
16 - 19.9	0.2	0.4	1.1	1.6	3.3	5.8	10.5	17.1	21.7	54.5	0.9
Died/Total	12/6359	4/1088	4/373	3/190	4/120	5/86	6/57	7/41	5/23	24/44	74/8381
20 - 29.9	0.2	0.5	1.0	3.1	7.4	10.7	16.1	34.5	48.4	69.8	1.2
Died/Total	32/21143	20/3695	12/1159	16/511	23/312	21/196	33/205	40/116	45/93	81/116	323/27546
30 - 39.9	0.2	1.0	1.7	6.8	11.0	13.3	32.0	36.9	62.4	78.2	1.7
Died/Total	45/18252	32/3355	19/1104	36/528	34/309	25/188	47/147	38/103	53/85	86/110	415/24181
40 - 49.9	0.4	1.0	3.9	7.4	16.4	27.0	38.0	52.2	77.5	82.9	2.2
Died/Total	75/18774	35/3358	42/1086	41/554	52/317	60/222	54/142	48/92	62/80	87/105	556/24730
50 - 59.9	0.7	2.9	9.3	19.2	33.5	40.6	54.4	56.3	78.3	81.9	3.9
Died/Total	141/19057	97/3298	99/1063	95/496	113/337	89/219	74/136	80/142	83/106	95/116	966/24970
60 - 69.9	1.4	5.6	15.7	31.5	56.7	61.3	78.2	83.3	85.7	87.7	6.3
Died/Total	170/12121	125/2235	110/702	107/340	131/231	114/186	79/101	65/78	48/56	64/73	1013/16123
70 - 79.9	2.9	10.9	30.7	56.2	77.4	79.0	93.2	74.4	87.5	83.7	10.7
Died/Total	179/6117	133/1220	123/401	131/233	113/146	64/81	55/59	29/39	35/40	36/43	898/8379
80 or Greater	5.1	24.2	59.1	73.1	80.0	84.2	83.3	88.1	93.3	91.4	17.9
Died/Total	192/3799	201/829	176/298	122/167	84/105	64/76	35/42	37/42	28/30	32/35	971/5423
Total	0.6	2.7	7.7	14.4	24.1	29.8	36.4	45.4	61.8	77.0	3.0
Died/Total	876/139960	670/24601	592/7668	561/3888	573/2374	456/1530	407/1119	359/790	392/634	533/692	5419/183256

Total N= 183,256 (Excluding 38,263 Unknown/Missing)

Appendix C - SCORTEN

Severity-of-Illness Score for Toxic Epidermal Necrolysis (SCORTEN)

Risk Factor*	Points	
	0	1
Age	< 40 years	≥ 40 years
Associated cancer	No	Yes
Heart rate (beats/minute)	< 120	≥ 120
Serum blood <u>urea</u> nitrogen	≤ 28 mg/dL (10 mmol/L)	> 28 mg/dL (10 mmol/L)
Detached or compromised body surface	< 10%	≥ 10%
Serum bicarbonate	≥ 20 mEq/L (≥ 20 mmol/L)	< 20 mEq/L (< 20 mmol/L)
Serum glucose	≤ 250 mg/dL (≤ 13.88 mmol/L)	> 250 mg/dL (> 13.88 mmol/L)

The more risk factors present, the higher the SCORTEN score, and the higher the mortality rate.

- 0-1 = 3.2% (CI: 0.1 to 16.7)
- 2 = 12.1% (CI: 5.4 to 22.5)
- 3 = 35.3% (CI: 19.8 to 53.5)
- 4 = 58.3% (CI: 36.6 to 77.9)
- ≥ 5 = > 90% (CI: 55.5 to 99.8)

CI = confidence interval.