VANDERBILT UNIVERSITY MEDICAL CENTER

Protocol: Adult Burn Palliative Care

Category: Clinical Practice
Approval Date: _____
Due for review: _____

Applicable to
☒VUH □ Children's □ DOT □ VMG Off-site locations □ VMG □ VPH □ Other

Team Members Performing						
□ All faculty & staff	☒Faculty & staff providing direct patient care or contact	☒MD	☒House Staff	☒ APRN/PA	☒RN	☐LPN
□ Other:						

Content Experts	
Stephen Gondek, MD Interim Director – Burn Center	Liza Weavind, MD Director, BICU
Mohana Karlekar, MD Palliative Care	

I. Population 2
II. Indications: 2
III. Predicted Mortality: 2
IV. Indications for Palliative Care Consultation..... 3
V. Procedures for Comfort Measures Only 4
VI. References:..... 5
VII. Appendix A: Revised Baux Score Predicted Mortality:..... 6
VIII. Appendix B: NBR Mortality by Age/TBSA.....7

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 surgery[1]. 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 major burns meeting the requirements for Resuscitation Protocol (>20% TBSA) or admitted to the Burn Intensive Care Unit

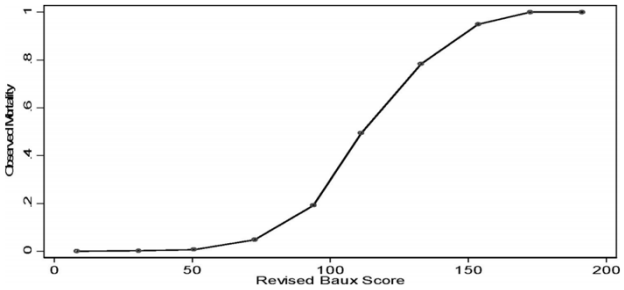
III. Predicted Mortality

Burn specific mortality is most commonly 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, which should be used for all patients undergoing resuscitation. Modern burn surgery and critical care has substantially improved outcomes for burn patients, with the LD50 Baux Score now well exceeding 100. All patients will have a burn specific mortality calculated on admission and discussed in ICU rounds as part of the normal resuscitation protocol. 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, this mortality should be included in the discussion and any 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)

Original Baux Score[3]
%Mortality = Age + TBSA

Revised Baux Score[2]
Baux Score = Age + TBSA + 17*Inhalational Injury

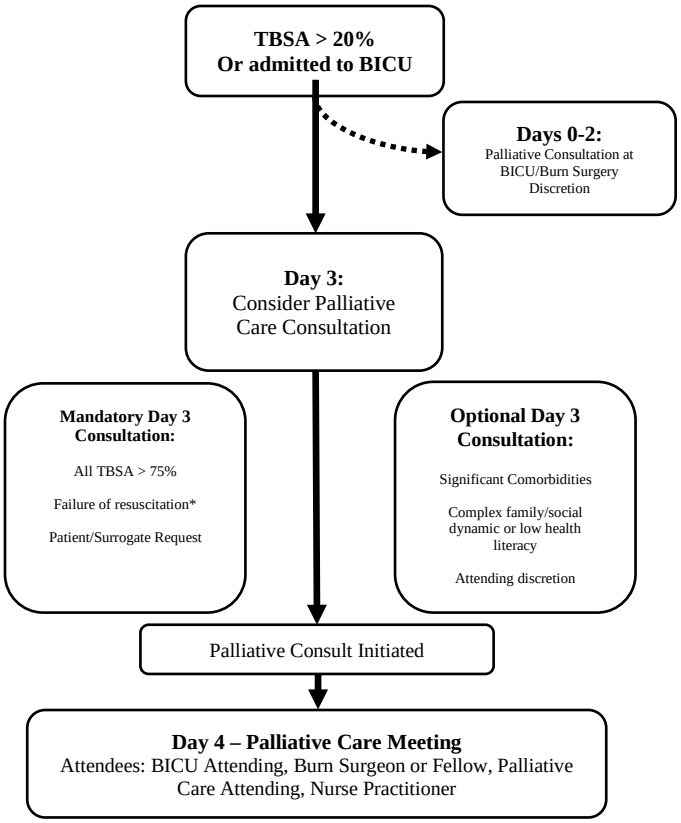
Nomogram in Appendix A



IV. Indications for Palliative Care Consult

Palliative Care consultation should be considered in all patients that are undergoing resuscitation or are admitted to the BICU, but is only mandatory in the setting of very severe burns (TBSA >75%), patients failing their resuscitation or by patient/surrogate request. Palliative Care consultation should not be viewed as 'consultation for withdrawal of care', but rather as consultation for assistance in management patient comfort, goals of care and expectations of care.

Ideally, palliative care consultation will occur in identified patients on hospital day (HD) 3 with a plan for a meeting between palliative care, the burn team and the patient/surrogate on HD4.



V. 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 from an in-house provider is recommended (most commonly the Trauma Surgery Attending).

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 life-saving/sustaining measures should be withdrawn, the case should be brought to the attention of both the Burn Director AND the Burn ICU Director. If either of these individuals are directly involved in the care of the patient discussed, and appropriate uninvolved surrogate attending will be identified and asked to review the case.

Once the case has been appropriately reviewed and a family discussion has occurred, 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 the Burn and BICU directors.

References

1. Ray DE, Karlekar MB, Crouse DL, et al. Care of the critically ill burn patient. An overview from the perspective of optimizing palliative care. *Ann Am Thorac Soc*. 2017;14(7):1094-1102.
2. Osler T, Glance LG, Hosmer DW. Simplified estimates of the probability of death after burn injuries: extending and updating the baux score. *J Trauma*. 2010;68(3):690-697.
3. Baux S. Contribution a l'Etude du traitement local des brulures thermigues etendues. Paris: These; 1961

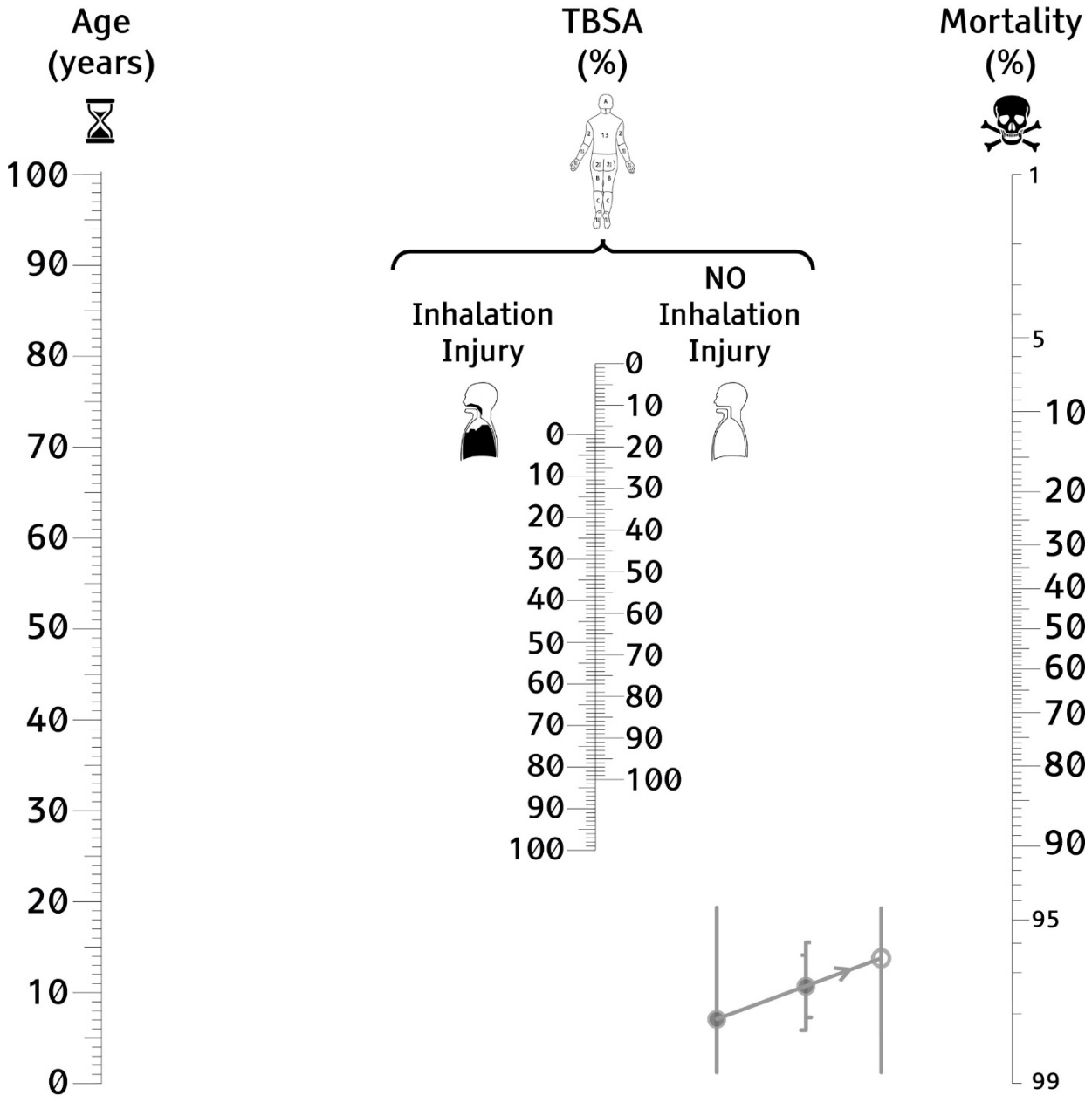
Appendix A: Revised Baux Score Predicted Mortality Nomogram

Revised Baux Score Nomogram

Predicted Mortality (%):

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

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



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

after: Osler T et. al., J Trauma. 2010; 68: 690-7

Appendix B: NBR Mortality by Age/TBSA

Table 9

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

	Burn Size (% TBSA)										
Age Group	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)