# Revised Baux score and updated Charlson comorbidity index associated with mortality in burn patients

A severe burn injury induces significant systemic physiological imbalances. This may lead to subsequent complications, organ failure and death. In the United Kingdom, severe burn injuries (covering at least 15% of total body) leading to substantial hospitalisation or death remains high at 5.4% of all serious traumatic injuries.

Age and percentage of total body surface area burned are important factors that predict the chance of recovery in burn injuries and these have been used since the 1930s which led to a development of the Baux Score in 1961. The Baux score is defined as the sum of age in years and percent body burn, to predict percent mortality after trauma. However, advances in burn care have rendered the predictions of this score too pessimistic. Additionally, this 1961 developed score does not include the effects of inhalation injury. Thus in addition to age and total body surface area burned, inhalation injury was subsequently incorporated into the revised Baux score. Further, it is now known that patients' recovery depends on physiological reserve, which decreases with increasing age and other comorbidities. A now criticism of the revised Baux score used to predict the chance of recovery from burn injuries is that it does not account for comorbidities and therefore mortality is underestimated in the elderly and/or intensive care patients as poorer outcomes are highly likely in patients with more comorbidities.

| Score acronym | Score full name |
|---|---|
| BOBI | Belgian Outcome in Burn Injury |
| ABSI | Abbreviated Burn Severity Index |
| APACHE II | Acute Physiology and Chronic Health Evaluation II |
| SOFA | Sequential Organ Failure Assessment |
| Updated CCI | Updated Charlson Comorbidity Index |
| Revised Baux | |

We used several scoring systems: BOBI; ABSI; APACHE II; SOFA; updated CCI and revised Baux score, that are often used by clinicians to predict mortality in patients with severe burn injuries admitted to intensive care. These scores were used to establish the relationship of (i) severity of burn injury, (ii) comorbid status and (iii) any associated systemic physiological disturbance.
We found patients with more severe burns, as measured by the revised Baux score, were more likely to develop multiple organ dysfunction and thus related with inpatient mortality and found it to be superior to the other scoring system used to predict mortality (BOBI, ABSI, APACHE II and SOFA). In addition to the revised Baux score, we further showed the updated CCI used to predict inpatient mortality in general hospital population was also associated with inpatient mortality in

burns intensive care patients. This observed association of the updated CCI with inpatient mortality is likely due to our study patient selection. These patients were those with more severe burn injuries in whom comorbidities are more likely to contribute to mortality.

In conclusion, our data suggest that the revised Baux score and the updated CCI are together associated with inpatient mortality in patients admitted to intensive care with burn injuries affecting 15% TBSA. This emphasises the importance of comorbidities in the prognosis of patients with severe burn injuries.

*Dr.* ***Sundhiya Mandalia***
*Divisional Senior Statistician*
*Division of Planned Care, Surgery and Clinical Support*
*Chelsea and Westminster Hospital*

## Publication

Revised Baux score and updated Charlson comorbidity index are independently associated with mortality in burns intensive care patients
Heng JS, Clancy O, Atkins J, Leon-Villapalos J, Williams AJ, Keays R, Hayes M, Takata M, Jones I, Vizcaychipi MP.
*Burns. 2015 Nov*