Introduction:
Burns Inhalation injury (BI) is suggested to significantly impact burns mortality. Yet, there is inconsistent evidence of how this is influenced by its bronchoscopically graded severity. This study evaluated the effect of different bronchoscopic BI grades on mortality.

Methods:
A retrospective, single-centre cohort study of all patients admitted to the London Burns centre intensive care unit (BICU) over 12 years. Demographic data, burn and BI characteristics, and ICU-related parameters were collected. A bronchoscopy expert retrospectively graded BI using bronchoscopy images and reports. The primary outcome was mortality. Secondary outcomes were hospital and ICU length of stay measures. The impact of pneumonia after 48 hours was determined. Univariate and multivariable Cox’s proportional hazards regression analyses informed factors predicting mortality.

Results:
BI was diagnosed in 84 of 231 (36.4%) critically ill burns patients. Median (IQR) total body surface area burned (TBSA) was 20% (10 to 40). Overall, mortality risk was significantly increased by BI (45.2% vs 23.8%, p<0.001) and pneumonia (27.2% vs 11.3%, p<0.001). Median survival time with BI was significantly lower than without BI (94 vs 131 days, Log-rank test p=0.002). More severe grades of BI (2/3) had significantly increased risk of mortality (adjusted HR=2.14, 95%CI: 1.12-4.09, p=0.022) compared with lower grades (1) (adjusted HR=0.58, 95% CI: 0.18-1.86, p=0.363) (Fig. 1). Facial burns (adjusted HR=3.13, 95%CI: 1.69-5.79, p<0.001), higher TBSA (adjusted HR=1.05, 95%CI: 1.04-1.06, p<0.001) and older age (adjusted HR=1.04, 95%CI: 1.02-1.07, p<0.001) also independently predicted mortality; though, pneumonia did not.

Conclusion:
Moderate to severe bronchoscopically graded BI significantly increased mortality in critically ill burns patients. Facial burns, higher TBSA and age also independently predicted mortality. Further studies on the diagnostic accuracy, reliability and impact of bronchoscopically grading BI are recommended.
Kaplan-Meier log survival plots of the different grades of Burns Inhalation injury (BI)