**Abstract:** A recent systematic review examining available mortality risk prediction models following AAA repair, identified the shortcomings of the current risk calculators. Those were the sole reliance on the physiological condition of the patient and lack of aneurysm-related predictors. For example, the Medicare model was derived from a 2001-2004 population in the early emergence of EVAR and did not account for any anatomic, laboratory or medications factors. Therefore, we sought to develop a risk score calculator, that incorporate all important operative mortality predictors, internally validate it and compare it to the Medicare model.

**Methods:** The Vascular Quality Initiative (VQI) 2003-2017 database was used to include open AAA repair (OAR) and EVAR procedures. Stepwise backward selection based on AIC values was performed to identify the important predictors of operative mortality (death occurred pre-discharge or within 30 days) of OAR and EVAR. Bootstrap of 1000 reps was done to validate the model. C- and Hosmer-Lemeshow statistics were examined to assess the model calibration and discrimination. The Medicare model was implemented on all VQI patients to check for its predictive ability and compare it to actual mortality and to our new model.

**Results:** A total of 42,161 patients were included (OAR: 20.3%). The chosen independent predictors of operative mortality were: age [adjusted odds ratios(95%CI): 1.05(1.05-1.06)], female gender: 1.32(1.14-1.53), CHF: 1.55(1.28-1.88), COPD: 1.35(1.18-1.55), creatinine per 1 mg/dl increment: 1.26(1.17-1.55), Hb per 1 mg/dl increment: 0.85(0.83-0.88), prior AAA and PAD repairs, statin use: 0.81(0.70-0.93), beta-blocker intake, AAA diameter per 1 cm: 1.11(1.07-1.16), rupture AAA: 11.07(9.16-13.39), and type of treatment [OAR vs EVAR: 3.29(2.84-3.82)]. We then obtained the associated risk scores from the final validated model (Figure). C-statistic for the current model was slightly but significantly better than Medicare’s [88%(87.5%-89.5%) vs 86.5%(85.3%-87.6%); p<.001]. HL statistic proved acceptable calibration (p=.199).

**Conclusions:** We presented in this study a risk calculator derived from vascular-specific data to help predicting AAA repair mortality. Incorporating additional predictors pertinent to vascular patients such as aortic diameter, creatinine and Hb levels, medication use and prior vascular interventions, improved the predictive ability of this calculator. This work will help surgeons and patients weigh the risk/benefit of treating AAA.