Mr. Craig Smith, Dr. Alex McMahon, Dr. Al Ross, Prof. Gareth Inman, Dr. Donald Lyall, Ms. Mariel Goulart, Dr. Mark Gormley, Dr. Tom Dudding, Dr. ARCAGE Study Group, Dr. Paul Brennan, Dr. Shama Virani, Prof. David Conway.

**Aim**

Head and Neck Cancer (HNC) incidence is on the rise, often diagnosed at late stage and associated with poor prognoses. Risk prediction tools have a potential role in improving HNC prevention and early detection.

**Method**

Informed by a review of existing models and the results of a Scottish cancer registry analysis, a clinical HNC risk prediction model with behavioural/demographic predictors was developed via multivariable logistic regression analyses in the IARC-ARCAGE European case-control study; and then externally validated in the UK Biobank cohort. Model performance was tested via discrimination and calibration metrics.

**Results**

The development dataset (HNC-cases=1926; controls=2043) model including sociodemographic, smoking, and alcohol variables had moderate discrimination, with an Area Under Curve (AUC) value of 0.75 (95%CI; 0.74-0.77), with good calibration. Validation dataset (participants=384,616; HNC-cases=1177) model had an AUC of 0.62 (95%CI; 0.61-0.64).

**Conclusion**

This HNC risk prediction model had moderate performance in the development population and acceptable performance in the validation dataset. Demographics and risk behaviours are strong predictors of HNC, and this model may be a helpful tool in primary dental care settings to promote prevention and determine recall intervals for dental examination. Future addition of HPV serology or genetic factors could further enhance individual risk prediction.