

Supplemental Material 9 Variables included in individualised prediction models

	HPV status		TNM related variables				Other variables															
	HPV status	p16 status	T-stage	N-stage	M-stage	Overall stage	Smoking	Co-morbidity (ACE)	Age	Sex	Anaemia/haemoglobin	Performance status	Education	Age x pack years interaction	Marital status	Weight loss	P16 x Zubrod interaction	Treatment	CT-based Imaging features	Radiomics features/score	TIL level	MTV
Individualised prediction models																						
Fakhry 2017 OS model		✓	✓	✓			✓		✓		✓	✓	✓	✓								
Fakhry 2017 PFS model		✓	✓	✓			✓		✓			✓	✓	✓	✓	✓	✓					
Grønhøj-Larsen 2016 OS model	Combined		✓	✓			✓		✓									✓				
Grønhøj 2018 OS model	Combined		✓	✓	✓	✓		✓	✓	✓												
Grønhøj 2018 PFS model	Combined		✓	✓	✓			✓	✓	✓												
Rios Velazquez 2014	✓		✓	✓			✓	✓		✓	✓											
Beesley 2021 clinical model		✓	✓	✓			✓	✓	✓	✓	✓	✓										
Cheng 2021 clinical + radiomics model		✓	✓	✓		✓			✓	✓										✓		
Cheng 2021 clinical model		✓	✓	✓		✓			✓	✓												
Cheng 2021 clinical + radiomics (no HPV)			✓	✓		✓			✓	✓										✓		
Cheng 2021 clinical (no HPV)			✓	✓		✓			✓	✓												
Cheng 2021 clinical + MTV		✓	✓	✓		✓			✓	✓												✓
Cheng 2021 clinical + MTV (no HPV)			✓	✓		✓			✓	✓												✓
Choi 2020	✓		✓	✓																✓		
Mes 2020 clinical model				✓					✓	✓												
Mes 2020 clinical + radiomics model				✓					✓	✓										✓		

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Rasmussen 2019 HPV/p-16 model	Combined		✓	✓				✓	✓	✓		✓											
Rasmussen 2019 p-16 model		✓	✓	✓				✓	✓	✓		✓											
Ward 2014			✓				✓														✓		
Ma 2023 clinical model		✓	✓	✓			✓		✓	✓		✓											
Ma 2023 SSL model		✓	✓	✓			✓		✓	✓		✓							✓				
Ma 2023 MLL1		✓	✓	✓			✓		✓	✓		✓							✓				
Ma 2023 MLL2		✓	✓	✓			✓		✓	✓		✓							✓				
Ma 2023 MLL + oversampling		✓	✓	✓			✓		✓	✓		✓							✓				
Ma 2023 MLL + radiomics		✓	✓	✓			✓		✓	✓		✓								✓			

OS=overall survival, PFS: progression free survival; MTV=metabolic tumour volume; TIL=tumour infiltrating lymphocytes; SLL=single-label learning based model; MLL=multi-label learning based model (MLL1 and MLL2 differ in the β values set in the loss function).