CLEAR Checklist v1.0

Note: Use the checklist in conjunction with the main text for clarification of all items.
Yes, details provided; No, details not provided; n/e, not essential; n/a, not applicable; Page, page number

Section	No.	Item	Yes	No	n/a	Page
Title						
	1	Relevant title, specifying the radiomic methodology	☑	☐	☐	1
Abstract						
	2	Structured summary with relevant information	☑	☐	☐	2-3
Keywords						
	3	Relevant keywords for radiomics	☑	☐	☐	3
Introduction						
	4	Scientific or clinical background	☑	☐	☐	5
	5	Rationale for using a radiomic approach	☑	☐	☐	5-6
	6	Study objective(s)	☑	☐	☐	6
Method						
Study Design	7	Adherence to guidelines or checklists (e.g., CLEAR checklist)	☑	☐	☐	8
	8	Ethical details (e.g., approval, consent, data protection)	☑	☐	☐	7
	9	Sample size calculation	☑	☐	☐	6-7
	10	Study nature (e.g., retrospective, prospective)	☑	☐	☐	6
	11	Eligibility criteria	☑	☐	☐	6
	12	Flowchart for technical pipeline	☑	☐	☐	6
Data	13	Data source (e.g., private, public)	☑	☐	☐	6-7
	14	Data overlap	☐	☐	☑	
	15	Data split methodology	☑	☐	☐	9
	16	Imaging protocol (i.e., image acquisition and processing)	☑	☐	☐	8
	17	Definition of non-radiomic predictor variables	☑	☐	☐	7
	18	Definition of the reference standard (i.e., outcome variable)	☑	☐	☐	7
Segmentation	19	Segmentation strategy	☑	☐	☐	8
	20	Details of operators performing segmentation	☑	☐	☐	8
Pre-processing	21	Image pre-processing details	☑	☐	☐	8-9
	22	Resampling method and its parameters	☑	☐	☐	8-9
	23	Discretization method and its parameters	☑	☐	☐	8-9

Section	No.	Item	Yes	No	n/a	Page
	24	Image types (e.g., original, filtered, transformed)	☑	☐	☐	8-9
Feature extraction	25	Feature extraction method	☑	☐	☐	8
	26	Feature classes	☑	☐	☐	9
	27	Number of features	☑	☐	☐	9
	28	Default configuration statement for remaining parameters	☑	☐	☐	8
Data preparation	29	Handling of missing data	☑	☐	☐	7
	30	Details of class imbalance	☐	☐	☑	
	31	Details of segmentation reliability analysis	☑	☐	☐	9
	32	Feature scaling details (e.g., normalization, standardization)	☑	☐	☐	9
	33	Dimension reduction details	☑	☐	☐	9
Modeling	34	Algorithm details	☑	☐	☐	9
	35	Training and tuning details	☑	☐	☐	9
	36	Handling of confounders	☐	☐	☑	
	37	Model selection strategy	☑	☐	☐	9
Evaluation	38	Testing technique (e.g., internal, external)	☑	☐	☐	10
	39	Performance metrics and rationale for choosing	☑	☐	☐	10
	40	Uncertainty evaluation and measures (e.g., confidence intervals)	☑	☐	☐	10
	41	Statistical performance comparison (e.g., DeLong's test)	☑	☐	☐	10
	42	Comparison with non-radiomic and combined methods	☑	☐	☐	10
	43	Interpretability and explainability methods	☑	☐	☐	10
Results						
	44	Baseline demographic and clinical characteristics	☑	☐	☐	10-11
	45	Flowchart for eligibility criteria	☑	☐	☐	11
	46	Feature statistics (e.g., reproducibility, feature selection)	☑	☐	☐	11
	47	Model performance evaluation	☑	☐	☐	11-12
	48	Comparison with non-radiomic and combined approaches	☑	☐	☐	12-13
Discussion						
	49	Overview of important findings	☑	☐	☐	14
	50	Previous works with differences from the current study	☑	☐	☐	14
	51	Practical implications	☑	☐	☐	14-15
	52	Strengths and limitations (e.g., bias and generalizability issues)	☑	☐	☐	15

Section	No.	Item	Yes	No	n/a	Page
Open Science						
Data availability	53	Sharing images along with segmentation data [n/e]	☐	☑	☐	
	54	Sharing radiomic feature data	☑	☐	☐	16
Code availability	55	Sharing pre-processing scripts or settings	☑	☐	☐	8-9
	56	Sharing source code for modeling	☑	☐	☐	16
Model availability	57	Sharing final model files	☑	☐	☐	16
	58	Sharing a ready-to-use system [n/e]	☐	☐	☑	

Kocak B, Baessler B, Bakas S, Cuocolo R, Fedorov A, Maier-Hein L, Mercaldo N, Müller H, Orlhac F, Pinto Dos Santos D, Stanzione A, Ugga L, Zwanenburg A. CheckList for EvaluAtion of Radiomics research (CLEAR): a step-by-step reporting guideline for authors and reviewers endorsed by ESR and EuSoMII. Insights Imaging. 2023 May 4;14(1):75. doi: 10.1186/s13244-023-01415-8

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TRIPOD Checklist: Prediction Model Development and Validation

Section	Item		Checklist description	Reported on Page Number/Line Number	Reported on Section/Paragraph
Title and abstract					
Title	1	D;V	Identify the study as developing and/or validating a multivariable prediction model, the target population, and the outcome to be predicted.	P1/1-3	Title
Abstract	2	D;V	Provide a summary of objectives, study design, setting, participants, sample size, predictors, outcome, statistical analysis, results, and conclusions.	P2/46-84	Abstract
Introduction					
Background and objectives	3a	D;V	Explain the medical context (including whether diagnostic or prognostic) and rationale for developing or validating the multivariable prediction model, including references to existing models.	P5-6/141-176	Introduction/1-2
	3b	D;V	Specify the objectives, including whether the study describes the development or validation of the model or both.	P6/177-183	Introduction/3
Methods					
Source of data	4a	D;V	Describe the study design or source of data (e.g., randomized trial, cohort, or registry data), separately for the development and validation data sets, ifapplicable.	P6/187-188; P9/287-288	Materials and Methods/1,7
	4b	D;V	Specify the key study dates, including start of accrual; end of accrual; and, if applicable, end of follow-up.	P6/187-188; P7/230-240	Materials and Methods/1,3
Participants	5a	D;V	Specify key elements of the study setting (e.g., primary care, secondary care, general population) including number and location of centres.	P6/187-188	Materials and Methods/1
	5b	D;V	Describe eligibility criteria for participants.	P6-7/194-210	Materials and Methods/1
	5c	D;V	Give details of treatments received, if relevant.	P6/187-194; P7/223-229	Materials and Methods/1,2
Outcome	6a	D;V	Clearly define the outcome that is predicted by the prediction model, including how and when assessed.	P7/230-243	Materials and Methods/3
	6b	D;V	Report any actions to blind assessment of the outcome to be predicted.	P7/232-233	Materials and Methods/3
Predictors	7a	D;V	Clearly define all predictors used in developing or validating the multivariable prediction model, including how and when they were measured.	P7/217-222; P8-9/264-284	Materials and Methods/2,5-6
	7b	D;V	Report any actions to blind assessment of predictors for the outcome and other predictors.	P8/264-271	Materials and Methods/5
Sample size	8	D;V	Explain how the study size was arrived at.	P6-7/194-210	Materials and Methods/1

Missing data	9	D;V	Describe how missing data were handled (e.g., complete-case analysis, single imputation, multiple imputation) with details of any imputation method.	P7/227-229	Materials and Methods/2
Statistical analysis methods	10a	D	Describe how predictors were handled in the analyses.	P10/328-338	Materials and Methods/10
	10b	D	Specify type of model, all model-building procedures (including any predictor selection), and method for internal validation.	P9/296-307; P10/316-320	Materials and Methods/8-9
	10c	V	For validation, describe how the predictions were calculated.	P9/304-307	Materials and Methods/8
	10d	D;V	Specify all measures used to assess model performance and, if relevant, to compare multiple models.	P10/320-325	Materials and Methods/9
	10e	V	Describe any model updating (e.g., recalibration) arising from the validation, if done.	P10/321-324	Materials and Methods/9
Risk groups	11	D;V	Provide details on how risk groups were created, if done.	P9-10/309-313	Materials and Methods/8
Development vs. validation	12	V	For validation, identify any differences from the development data in setting, eligibility criteria, outcome, and predictors.	P9/288-290	Materials and Methods/7
Results					
Participants	13a	D;V	Describe the flow of participants through the study, including the number of participants with and without the outcome and, if applicable, a summary of the follow-up time. A diagram may be helpful.	P10-11/342-350; Fig. 1A	Results/1
	13b	D;V	Describe the characteristics of the participants (basic demographics, clinical features, available predictors), including the number of participants with missing data for predictors and outcome.	P11/347-350	Results/1
	13c	V	For validation, show a comparison with the development data of the distribution of important variables (demographics, predictors and outcome).	P11/353-357	Results/2
Model development	14a	D	Specify the number of participants and outcome events in each analysis.	P11/349-350	Results/1
	14b	D	If done, report the unadjusted association between each candidate predictor and outcome.	P13/419-425	Results/7
Model specification	15a	D	Present the full prediction model to allow predictions for individuals (i.e., all regression coefficients, and model intercept or baseline survival at a given time point).	P11/375; P13/426-429	Results/3,7
	15b	D	Explain how to the use the prediction model.	P11-12/369-380; P13/425-429	Results/3, 4, 7
Model performance	16	D;V	Report performance measures (with CIs) for the prediction model.	P12/380-390; P13/429-439	Results/4, 7
Model-updating	17	V	If done, report the results from any model updating (i.e., model specification, model performance).	P13/433-435	Results/7
Discussion					
Limitations	18	D;V	Discuss any limitations of the study (such as nonrepresentative sample, few events per predictor, missing data).	P15/501-512	Discussion/4

Interpretation	19a	V	For validation, discuss the results with reference to performance in the development data, and any other validation data.	P14/450-456; P14/467-472	Discussion/1, 2
	19b	D;V	Give an overall interpretation of the results, considering objectives, limitations, and results from similar studies, and other relevant evidence.	P14/457-465; P14-15/476-485	Discussion/2, 3
Implications	20	D;V	Discuss the potential clinical use of the model and implications for future research.	P14/472-475; P15/489-500; P16/517-523	Discussion/2, 3, 5
Other information					
Supplementary information	21	D;V	Provide information about the availability of supplementary resources, such as study protocol, Web calculator, and data sets.	P11/356-357; P13/439-442	Results/2
Funding	22	D;V	Give the source of funding and the role of the funders for the present study.	P16/531-539	Funding

* Items relevant only to the development of a prediction model are denoted by D, items relating solely to a validation of a prediction model are denoted by V, and items relating to both are denoted D;V. We recommend using the TRIPOD Checklist in conjunction with the TRIPOD Explanation and Elaboration document.

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*As the checklist was provided upon initial submission, the page number/line number reported may be changed due to copyediting and may not be referable in the published version. In this case, the section/paragraph may be used as an alternative reference.