The quality of conduct and reporting of prognostic studies has received some criticism.[135,150,151] Surveys indicate that the vast majority of such studies appear to have been undertaken on an ad hoc or opportunistic basis without a defined research question or clear protocol for the design, conduct and analysis of the study. Common weaknesses include lack of information about whether outcomes, populations and test cut-off were defined before data were collected. Selective reporting of analyses is also a common problem.[150] Due to these anticipated deficiencies the proposed systematic review placed emphasis on assessment of quality of primary studies attempting to incorporate quality findings into the evidence synthesis.

Factors that need to be considered in the assessment of prognostic studies include: internal validity, external validity, statistical validity, evaluation of the model and the clinical usefulness of the model.[152–156] As there is an element of subjectivity in quality assessment, as well as a need for attention to detail as reporting methods and formats vary widely, disagreement between reviewers is not uncommon.

Previous work in the area of prognosis undertaken by Hayden *et al*.[106] and Sutcliffe *et al*.[104] provided a useful framework for appraising study quality of the included papers. The quality assessment instrument specific to the needs of this review was adapted from these published papers to assess biases in six domains: study population, attrition, prognostic factor measurement, outcome measurement, confounding measurement, and account and analysis. The quality assessment tool identified factors that needed to be taken into account when interpreting the results of the study.

Quality assessment form

Assessing quality of prognostic studies on the basis of framework of potential biases

First Author: Year: ID: Reviewer(s):

Potential bias	Items to be considered for assessment of potential opportunity for bias	Yes	Partly	No	Unsure	NA
Study population/ sample selection[a]	Inclusion and exclusion criteria are adequately described [including pretreatment, diagnosis (primary and metastases), start/finish date recruitment]					
	Baseline study sample [i.e. individuals entering the study and their key characteristics (where relevant) and sampling frame are adequately described]					
	Study sample represents population of interest on key characteristics, sufficient to limit potential bias to results					
Study attrition	Statement as to exclusions due to missing data:					
	Baseline variables					
	Loss to follow-up					
	Statement as to the possible effect on the results from missing data					
	Loss to follow-up is not associated with key characteristics					
Prognostic factor measurement	Clear definition of the prognostic factors measured is provided (e.g. imaging modality method, measurement and timing described)					
	Specified instrument and personnel for measurement of predictive factors					
	Continuous variables are reported or appropriate (i.e. not data-dependent) cut-off points are used and specified a priori[b]					
	Blinding: were estimators of risk factor status and of outcomes blinded?					
	The prognostic factor(s) of interest is (are) adequately measured in study participants to sufficiently limit potential bias					
Outcome	Is the outcome clearly defined?					
Confounding measurement and account	Do the authors address potential confounders?[c]					
Analysis	There is sufficient presentation of data to assess the adequacy of the analysis					
	The statistical analysis is appropriate for the study design, limiting potential for the presentation of invalid results					
	TOTAL NUMBER OF TICKS TO THE MAIN QUESTIONS (GREEN BOXES)					

NA, not applicable.

a Is the sampling frame clear (if unclear there is risk of bias), and is the method of sample selection susceptible to bias?

b Cut-off points decided prior to data analysis.

c In particular, if previous treatments were not taken into account in the analyses of potential predictive factors these could confound the validity of other predictive factors that might be identified.

Note: The above table was adapted from Sutcliffe *et al*.[104]