

# Predictive models for survival in advanced cancer: A systematic review

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Introduction	Results
<ul style="list-style-type: none"><li>Predictive models of survival often consist of a combination of clinical and laboratory variables that aim to accurately deliver prognostic information</li><li>The ability to accurately predict survival in advanced cancer patients is important for patients, their families, clinicians, and researchers</li><li>However, there remains substantial uncertainty surrounding survival prediction, and efforts to identify important prognostic factors that may reduce this uncertainty are underway</li></ul>	<ul style="list-style-type: none"><li>The literature search returned 1,671 articles, of which 29 studies were deemed eligible</li><li>Patient and study characteristics:<ul style="list-style-type: none"><li>Most common sites of primary tumours were gynaecologic/prostate/ gonadal/ovary, respiratory/lung, kidney/urinary system, and breast</li><li>Most common locations of metastasis were bone, liver, and lung</li><li>All studies were published between 2006 and 2015</li></ul></li><li>Survival model characteristics:<ul style="list-style-type: none"><li>All prognostic models consisted of 3 to 11 prognostic factors</li><li>Performance status (PS), metastasis-related factors, and several laboratory variables were identified as common prognostic factors included in survival prediction models</li><li>Cox proportional hazards/regression analysis was the most common method used to develop and validate prognostic models</li><li>24 prognostic models were either temporally, internally, or externally validated</li></ul></li><li>Performance of included models:<ul style="list-style-type: none"><li>The median c-index was 0.656 (range: 0.58 to 0.83)</li><li>Overall, 11 of 29 studies included models that have reasonable or strong predictive ability<ul style="list-style-type: none"><li>One study reported a c-index greater than 0.80, indicating a strong model for predicting survival in advanced cancer patients</li><li>10 studies reported a c-index greater than or equal to 0.70 but less than 0.80, signifying reasonable prognostic models</li><li>16 studies reported a c-index greater than or equal to 0.60 but less than 0.70, and two studies reported a c-index less than 0.60, thus considered neither reasonable nor strong</li></ul></li></ul></li></ul>
Objective	
<ul style="list-style-type: none"><li>To identify and appraise evidence-based prognostic models that predict the survival of advanced cancer patients, and to ascertain variables that may affect the predictive ability of these models</li></ul>	
Methods	Discussion
<ul style="list-style-type: none"><li>A literature search of Cochrane Central, Embase, and Medline was conducted</li><li>Studies were included if:<ul style="list-style-type: none"><li>Models were designed for metastatic cancer patients</li><li>A primary or secondary outcome was to design or validate a prognostic or survival model consisting of three or more prognostic factors</li></ul></li><li>Studies were excluded if:<ul style="list-style-type: none"><li>The sole focus was on biological and molecular markers</li><li>A concordance index (c-index) was not explicitly reported</li></ul></li></ul>	<ul style="list-style-type: none"><li>Patient characteristics that have been underrepresented should be more extensively researched to allow for the most informed care of patients that suffer through these conditions</li><li>A trend suggests that more recent models are better at predicting survival</li><li>The number of prognostic factors included in each model was independent of the c-index</li><li>There is a need for further investigation into variables other than PS, metastasis, and laboratory variables that may predict survival<ul style="list-style-type: none"><li>There is a lack of inclusion of patients' self-reported prognostic factors and treatment-related factors in current prognostic models</li></ul></li><li>Internal validation followed by external validation of all models may be a necessary step to ensure accuracy and generalize the models to the general population of patients</li><li>Despite the few models that exhibit good predictive ability, the majority of currently available models are not sufficiently reasonable, nor strong in their ability to predictive survival</li><li>The lack of consistency in the prognostic factors included in models has resulted in no one model being accepted, standardized, and commonly used internationally</li></ul>
Conclusion	
<ul style="list-style-type: none"><li>A combination of clinical and laboratory variables are often used in predictive models of survival in advanced cancer patients</li><li>Further investigation into the utility of patients' self-reported functioning or patient-reported PS and treatment-related factors as prognostic predictors is suggested to improve accuracy in the ability of prognostic models to predict survival</li></ul>	

**Acknowledgement:** We thank the generous support of Bratty Family Fund, Michael and Karyn Goldstein Cancer Research Fund, Joey and Mary Furfari Cancer Research Fund, Pulenzas Cancer Research Fund, Joseph and Silvana Melara Cancer Research Fund, and Ofelia Cancer Research Fund.