

Table 3. Characteristics of included studies – Assessment of survival prognosis

Study	Participants	Instrument	Follow-up	Outcome measures	Comments	Risk of bias (per outcome measure)*
Bartels, 2016	<p>N at baseline: N=110</p> <p>Age (mean, SD): Not reported</p> <p>Sex (n): Not reported</p> <p>Median survival time (range): 5.7 months (range: 0.3–68.3 months)</p> <p>Type of treatment (n): Radiotherapy+surgery: 58 Radiotherapy: 52</p>	<p>Model: Bartels 2011</p> <p>Predictors:</p> <ul style="list-style-type: none"> - Gender (female vs male) - Lung carcinoma (vs breast/prostate carcinoma) - Kidney carcinoma (vs breast/prostate carcinoma) - Other carcinoma (vs breast/prostate carcinoma) - Curatively intended treatment of primary tumor - Cervical location of the metastasis - KPS (10-20) - KPS (30-40) - KPS (50-70) - KPS (80) <p>Outcome:</p> <ul style="list-style-type: none"> - Survival (continuous) 	The outcome was measured until >10 months	<p>Discrimination: Harrel's C-index</p> <p>Calibration: Calibration slope</p>	<p>Prospective data-collection from September 2009 until January 2013 from neurosurgical department of the Radboud University Medical Center and Canisius Wilhelmina Hospital (n=87)</p> <p>Prospective data-collection in 2012 from neurosurgical department at The Haaglanden Medical Center The Hague (n=23)</p> <p>Note that development of the model was performed in data that was partly collected at the neurosurgical department of the Radboud University Medical Center as well, but before the start of this study.</p> <p>No missing data reported.</p>	Low

<p>Bollen, 2016</p>	<p>N at baseline: N=1379</p> <p>Age (mean, SD): 64.6 (12.4) years</p> <p>Sex (%): Male: 52%</p> <p>Median survival time (95%CI): 5.1 (4.6 to 5.6) months</p> <p>Type of treatment (n, %): Radiotherapy: 1141 (83%) Surgery + radiotherapy: 109 (8%) Only surgery: 33 (2%) Conservative treatment: 96 (7%)</p> <p>Primary tumors (n,%):</p>	<p>Model: Tokuhashi 2005 (not further specified) Bauer and Wedin 1995 (not further specified) Tomita 2001 (not further specified) Linden 2005 (not further specified) Rades 2013 (not further specified) Bollen 2014 (not further specified)</p>	<p>Follow-up (median, 95%CI) 6.7 (5.6 to 7.7) years</p> <p>Minimum follow-up: 2.3 years</p> <p>Maximum follow-up: 12.3 years</p> <p>The outcome was measured until >2 years</p>	<p>Discrimination: Harrel's c-statistic</p>	<p>Retrospective data-collection Leiden University Medical Center and Medical University of Graz between January 2000 and December 2010.</p> <p><i>'The model by Bollen (2014) was created on the basis of a large percentage of patients also included in this study. Therefore, an additional analysis based on external data only was conducted for this model.'</i></p> <p><i>6 patients were lost to follow-up</i></p>	<p>High due to retrospective data collection.</p> <p>Additionally it is unclear whether analysis of outcome is based on the original (external validation) or new (no validation) calculated HRs.</p>
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	<p>Breast cancer: 388 (28%)</p> <p>Lung cancer: 318 (23%)</p> <p>Prostate cancer: 259 (19%)</p> <p>Kidney cancer: 90 (7%)</p> <p>Colon cancer: 75 (5%)</p> <p>Other: 16 (18%)</p>					
Bindels, 2025	<p>N at baseline: N=953</p> <p>Age (mean, SD): 65.9 (10.9) years</p> <p>Sex (%): Male: 56.1%</p> <p>Survival time: 50.3% at 12 months (479/953)</p> <p>Type of treatment (n, %):</p>	<p>Model: Overview of the variables included in each model see Appendix.</p> <p>Bollen 2014 (Classification system)</p> <p>Mizumoto 2008 (Scoring system)</p> <p>Modified Bauer 2008 (Scoring system)</p> <p>NESMS 2015 (Scoring system)</p> <p>Original Bauer 1995 (Scoring system)</p> <p>OSRI 2013 (Scoring system)</p>	<p>Follow-up: The outcome was measured at 3, 6 and 12 months respectively</p>	<p>Discrimination: AUC</p> <p>Calibration: slope</p>	<p>Patients were identified from three prospective registries.</p> <ul style="list-style-type: none"> • PRESENT: referred to Radiation Oncology between 2016-2021 • GSTSG: referred to Orthopedic Surgery between 2016-2018 • MTRON: referred to Orthopedic Surgery between 2018-2021 <p>patients of at least 18 years of age and referred for a metastatic spine tumor, irrespective of the treatment modality administered after referral. If patients were included in more than 1 registry, only data from the registry where they provided informed consent first was used.</p>	Low

<p>Radiotherapy only: 636 (66.7%)</p> <p>Surgery + radiotherapy: 198 (20.8%)</p> <p>Only surgery: 75 (7.9%)</p> <p>No local treatment: 44 (4.6%)</p> <p>Primary tumors (n,%):</p> <p>Breast cancer: 209 (21.9%)</p> <p>Lung cancer: 244 (25.6%)</p> <p>Prostate cancer: 184 (19.3%)</p> <p>Colon and rectal cancer: 55 (5.8%)</p> <p>Malignant myeloma: 53 (5.6%)</p> <p>Unknown origin: 49 (5.1%)</p> <p>Other: 69 (7.2%)</p>	<p>PathFx 2020 (Algorithm)</p> <p>Revised katagiri 2014 (Scoring system)</p> <p>Revised Tokuhashi 2005 (Scoring system)</p> <p>SORG-MLA 2019 (Algorithm)</p> <p>Tomita 2001 (Scoring system)</p> <p>Van der Linden 2005 (Scoring system)</p>				
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