

 **Conclusion**

Survival analysis in NICE Technology Appraisals (TAs) needs improvement, with inconsistent model selection and insufficient validation. The extrapolation approach used in submissions is still being determined and cannot accurately capture the complex hazard function. The use of flexible survival modeling techniques with an adjustment of background mortality is recommended by NICE.

 **Background**

- Economic evaluations in healthcare involve comparing the costs and health outcomes of different interventions, often using quality-adjusted life-years, which depend on time-to-event data like survival in oncology.
- Trials are often shorter than the desired evaluation timeframe for practical reasons, necessitating the extrapolation of survival data to bridge the gap and avoid approval delays.
- NICE in England evaluates healthcare technology submissions, including clinical and cost-effectiveness evidence from companies. An independent group reviews this, and NICE's Appraisal Committee delivers the final determination, addressing any concerns and reporting the outcome.
- NICE's Decision Support Unit (DSU) released Technical Support Documents 14 and 21 to improve the consistency of survival analysis in Technology Appraisals (TAs). The document provides guidance on selecting survival modeling approaches, but it's unclear if these recommendations are consistently applied in current NICE submissions.^{1,2}

 **Objective**

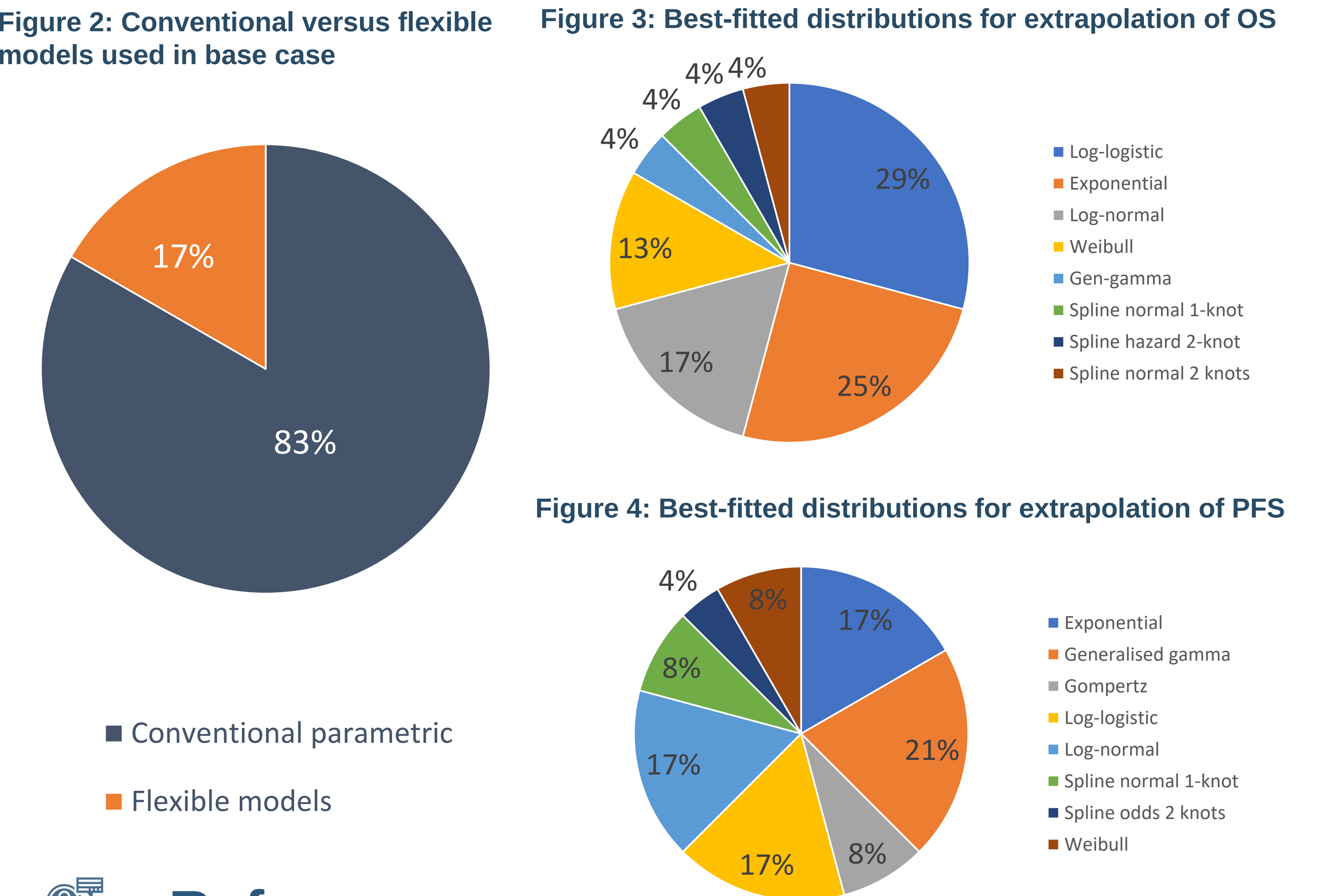
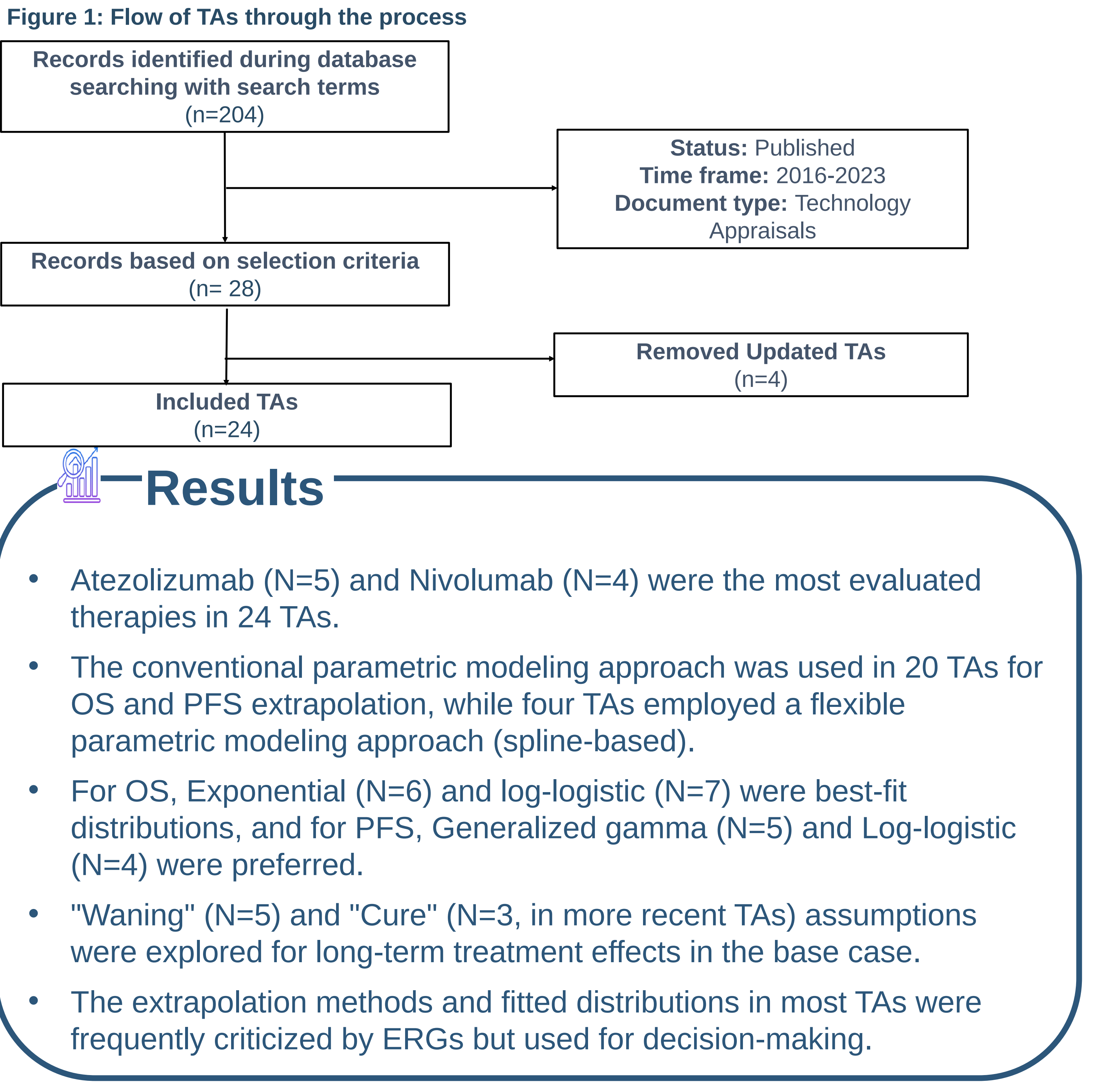
This research examined the extrapolation modeling methods in NICE's Technology Appraisals (TAs) for NSCLC therapies post-2016.

 **Methodology**

- The methods used for the review followed similar reviews of NICE TAs.^{2,3}
- “NSCLC” or “non-small cell lung cancer,” were used as search terms on the NICE website, with the status of “published,” and the published year of 2016-2023.
- The initial TA and the updated ones were counted as one TA.
- A data extraction form was created by the review team to ensure that the necessary information was extracted to meet the aims and objectives of the review.
- The published documents were reviewed and summarized, focusing on the survival modeling approach, fitted statistical distributions, long-term treatment effect, and NICE's final recommendation on the extrapolation approach.

Table 1: List of Technology Appraisals included

NICE TA	Intervention	Type of model	OS extrapolation	PFS extrapolation	Cure fraction assumption	Waning Assumption
TA403	Ramucirumab	Parametric	Log-logistic	Generalised gamma	No	No
TA411	Necitumab	Parametric	Log-logistic	Log-logistic	No	No
TA406	Crizotinib	Parametric	Weibull	Generalised gamma	No	No
TA190	Pemetrexed for the maintenance	Parametric	Exponential	-	No	No
TA529	Crizotinib	Parametric	Exponential	Log-normal	No	No
TA531	Pembrolizumab	Parametric	Exponential	Exponential	No	No
TA584	Atezolizumab	Parametric	Weibull	Weibull	No	No
TA628	Lorlatinib	Parametric	Exponential	Exponential	No	No
TA638	Atezolizumab	Parametric	Log-logistic	Log-logistic	No	No
TA643	Entrectinib	Parametric	Exponential	Exponential	No	No
TA655	Nivolumab	Parametric and splines	spline hazard 2-knot	spline 1-knot normal	No	Yes
TA683	Pembrolizumab with pemetrexed	Parametric	Log-normal	Weibull	No	No
TA705	Atezolizumab	Parametric	Weibull	Generalised gamma	No	No
TA713	Nivolumab	Parametric and splines	Log-normal	spline 1-knot normal	No	No
TA724	Nivolumab	Parametric and splines	spline normal 2 knots	spline odds 2 knots	Yes	No
TA760	Selpercatinib	Parametric and splines	spline 1-knot normal	Gompertz	No	No
TA770	Pembrolizumab with pemetrexed	Parametric	Log-logistic	Log-normal	No	Yes
TA781	Sotorasib	Parametric	Log-normal	Log-normal	No	Yes
TA789	Tepotinib	Parametric	Log-logistic	Log-logistic	No	No
TA802	Cemiplimab	Parametric	Log-normal	Log-normal	No	No
TA812	Pralsetinib	Parametric	Exponential	Generalised gamma	No	No
TA818	Nivolumab	Parametric	Log-logistic	Generalised gamma	No	Yes
TA823	Atezolizumab	Parametric		Log-logistic	Yes	No
TA855	Mobocertinib	Parametric	Gen-gamma	Exponential	No	Yes



 **References**

- Latimer N. NICE DSU Technical Support Document 14: undertaking survival analysis for economic evaluations alongside clinical trials—extrapolation with patient-level data. 2011. Available from: https://www.ncbi.nlm.nih.gov/books/NBK395885/pdf/Bookshelf_NBK395885.pdf.
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- Kearns B, Ara R, Willoo A, et al. Good practice guidelines for the use of statistical regression models in economic evaluations. Pharmacoeconomics. 2013;31(8):643–52.

 **Disclosure**

SP, BS and AS the authors, declare that they have no conflict of interest