

Cost-effectiveness analysis of tumour-treating fields in combination with adjuvant temozolomide for treating patients with newly diagnosed glioblastoma in Singapore

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Introduction

- Glioblastoma is an aggressive and malignant form of glioma with significant morbidity and mortality.
- Tumour-treating fields (TTFields) are electric fields that exert physical forces to disrupt critical cellular processes which leads to the death of cancer cells. TTFields in combination with adjuvant temozolomide (TMZ) have demonstrated improved progression-free survival (PFS) and overall survival (OS) in patients with newly diagnosed glioblastoma (ndGBM).
- This study aims to assess the cost-effectiveness of TTFields plus TMZ compared with TMZ alone for treating patients with ndGBM in Singapore.

Methods

- A three-state partitioned survival model (Figure 1) was developed from a healthcare system perspective over a 20-year time horizon.
- Digitised Kaplan-Meier OS and PFS data from the EF-14 trial were used and extrapolated using standard parametric extrapolations for both endpoints. In the base-case analysis, log-normal distributions were selected for both treatment arms based on their statistical and visual fit to the observed EF-14 KM data, and their clinical plausibility (Figure 2).
- Health state utilities were obtained from published literature and direct medical costs (including drug and device cost, disease management, adverse events and terminal care) were sourced from public healthcare institutions in Singapore.
- Sensitivity and scenario analyses were conducted to assess model uncertainties.

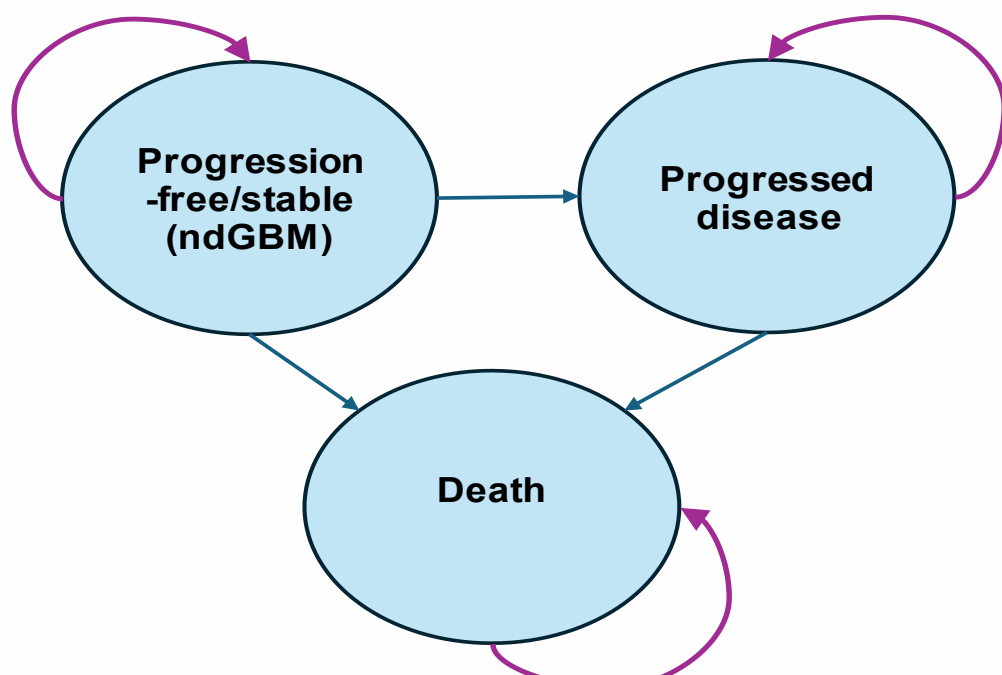


Figure 1. Model structure

Results

- Compared with TMZ alone, TTFields plus TMZ was associated with a base-case incremental cost-effectiveness ratio (ICER) of S\$627K per quality-adjusted life year (QALY) gained.
- In scenario and sensitivity analyses, the ICER results were most sensitive to the cost of TTFields, followed by the choice of parametric functions for extrapolation of the survival curves (Table 1) and utility values.
- The ICERs remained high across all analyses, ranging from S\$483K to S\$760K per QALY gained.

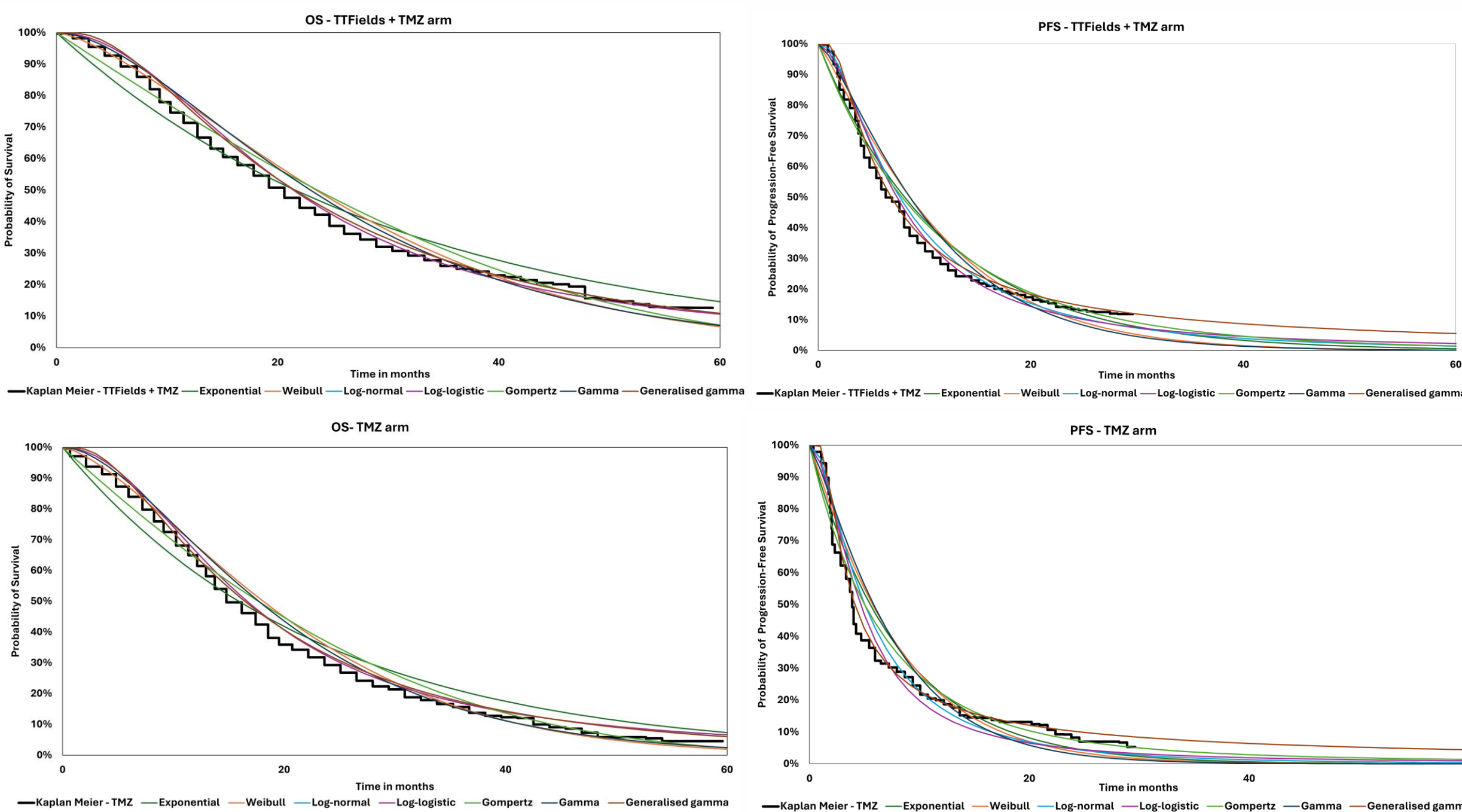


Figure 2. Observed and extrapolated OS and PFS

Table 1. Impact of alternative parametric survival distributions on the ICER

Parametric distribution used for OS and PFS for both treatment arms	ICER (S\$/QALY)	Change from base case
Log-normal (base case)	627K	-
Exponential	597K	-5%
Weibull	710K	+13%
Log-logistic	623K	-1%
Gompertz	760K	+21%
Gamma	701K	+12%
Generalised Gamma	648K	+3%

Conclusion

- At its current price, TTFields in combination with adjuvant TMZ does not represent a cost-effective treatment for ndGBM in Singapore.
- These findings align with international economic evaluations and would contribute to the evidence base to inform decision-making on resource allocation within Singapore's healthcare system.