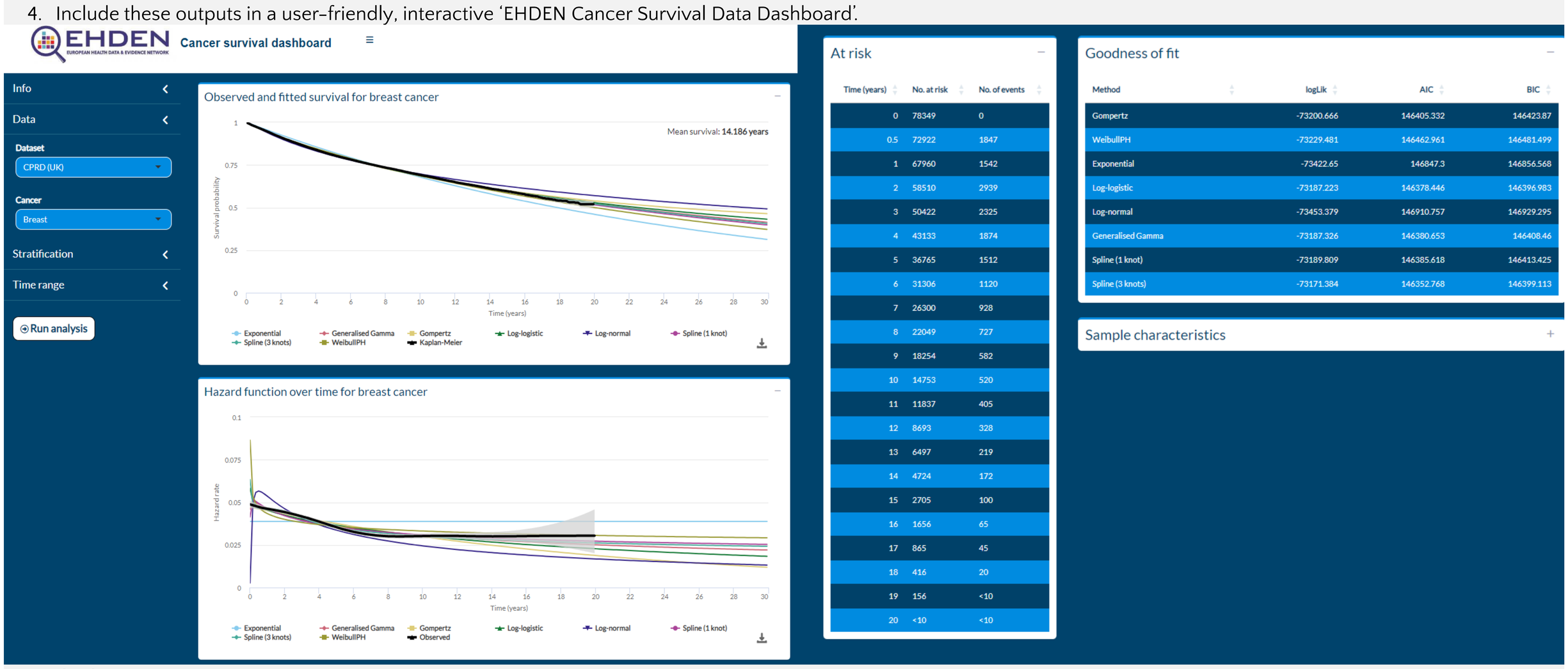
We have developed an **EHDEN Cancer Survival Dashboard**, allowing users to quickly examine **survival data** and explore **long-term projections**

Predicting long term cancer survival for Health Technology Assessment: A multinational cohort study across Europe

Introduction: In cancer health technology assessments (HTA), extrapolations are used to estimate survival beyond observed trial data. This is used in economic evaluations, which typically assess cost effectiveness over a lifetime. However, this is a key source of decision uncertainty because it involves forecasting the future based on shorter-term observed data. Real-world evidence can help address this uncertainty. For example, country-specific, real-world survival data for patients receiving the current standard of care could be used to validate the trial-based survival extrapolations typically used in HTA processes. Here, we describe an EHDEN use.

Aims: Using data from 14 databases mapped to the OMOP-CDM from the European Health Data & Evidence Network (EHDEN) from seven European countries (UK, Norway, Switzerland, Spain, the Netherlands, Finland and Portugal) we aimed to:

1. Develop and assess data quality of phenotypes for the identification of breast, pancreas, prostate, colorectal, lung, stomach, liver, and head and neck cancer.
2. Estimate overall survival of the studied cancers, stratifying by age and sex.
3. Fit parametric survival models to assess fit of distributions across observed data and allow for extrapolations of the studied cancers.
4. Include these outputs in a user-friendly, interactive 'EHDEN Cancer Survival Data Dashboard'.



Methods

- Inclusion criteria: Patients aged ≥18 with primary diagnoses of breast, pancreatic, prostate, colorectal, lung, stomach, liver, or head and neck cancer.
- Study period: 1st January 2000 to 31st December 2019, followed-up from diagnosis to death, database exit, or end of study.
- Curve fitting: Six standard (generalised gamma, lognormal, loglogistic, exponential, Weibull, Gompertz) and two flexible parametric models (Restricted Cubic Splines with one and three internal knots).
- Assessment: Akaike information criterion (AIC) and visual inspections used to assess model fit and validity of predicted survival.
- Outcome of Interest: Restricted mean survival time (RMST) difference between observed (Kaplan-Meier) and predicted (parametric) estimates at 10 years.

Results

- An interactive R Shiny cancer survival dashboard was developed. Users of the dashboard can select a database from a dropdown menu, and then explore the survival models fitted for the eight different cancers with age and sex adjustments/stratifications.
- Generally, flexible spline models performed best in terms of model fit (AIC) and performance (difference in observed versus predicted RMST).
- For standard parametric models, the best performing models differed by cancer and database however in general, lognormal, loglogistic, and generalised gamma models performing best across included cancers and databases.

Discussion

- This use case demonstrates a potential benefit of EHDEN and OHDSI tools to address priority areas of HTA agencies and industry.
- To our knowledge this is the first study to examine which distributions fit RWD best across multiple cancers, databases, and countries.
- This could have real benefits to HTA agencies as these results may be used to rule out implausible distributions and reduce uncertainty in the decision-making process (although this should be done on a case-by-case basis).
- Further research investigating generalisability of results for use in HTA is required, specifically regarding adjustment approaches (e.g. cancer stage and treatment).

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