Making an Informed Decision to Ensure an Efficient Patient Recruitment

Anaïs Debard[1], Sandrine Guilleminot[1], Marco Munda[2], Bruno Boulanger[2]

CONTEXT

Innovative Bayesian modeling helps project teams assess patient recruitment and make informed decisions

CURRENT SOLUTION

We predict that
- ✓ we won't recruit the target number of patients ON TIME
- ✓ BUT NEARLY!

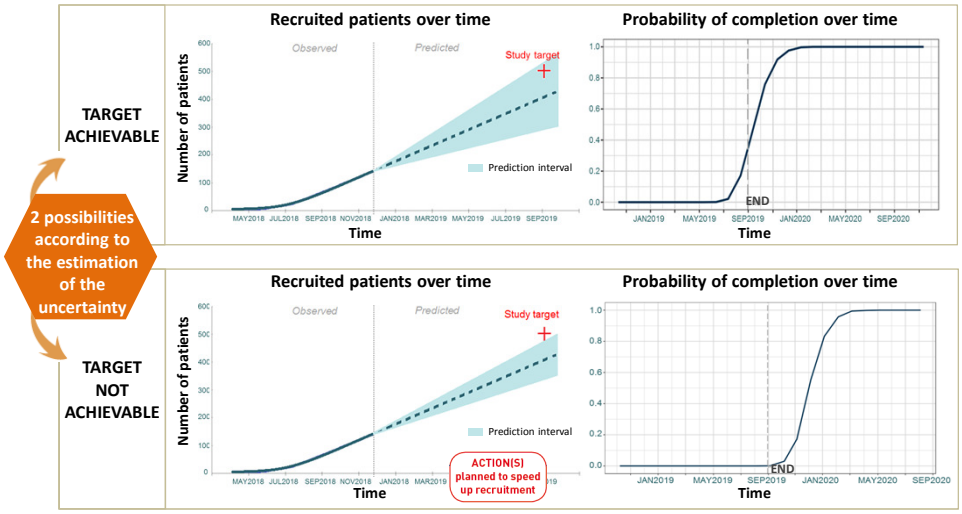
2 POSSIBLE NEXT STEPS

NO ACTION
Confident to achieve the target number of patients on time

ACTION(S)
Planned to speed up the recruitment

MODELING

Prediction interval over time & Probability of completion at any given date in the future

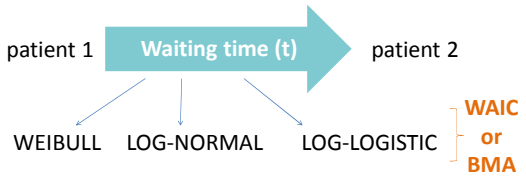


METHODOLOGY

At the core of the methodology are Bayesian model-based predictions

MODEL

TIME-TO-EVENT APPROACH



It allows to :
- ✓ include both observed and censored times to recruitment
- ✓ accommodate many different types of waiting time distributions (not only exponential)
  - Model selection (WAIC)
  - Average across the models (BMA)

SHARED FRAILTY MODEL FOR THE HAZARD RATE

The recruitment rate may vary between two centres

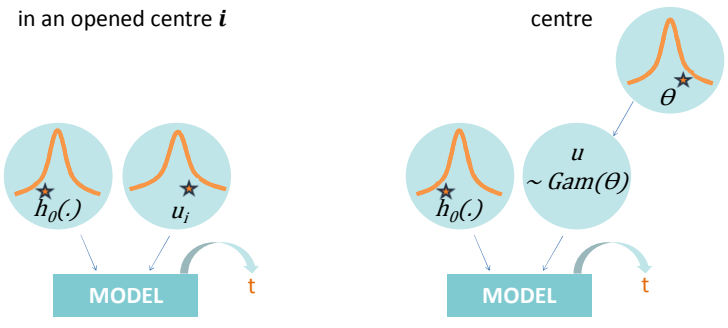
$$h(t) = h_0(t)\,u$$

- $h_0(t)$ denotes the baseline hazard rate,
- $u \sim \text{Gamma}(\theta)$, a centre-specific random effect (shared frailty term). The variance of U describes the centre-to-centre variability in recruitment rate

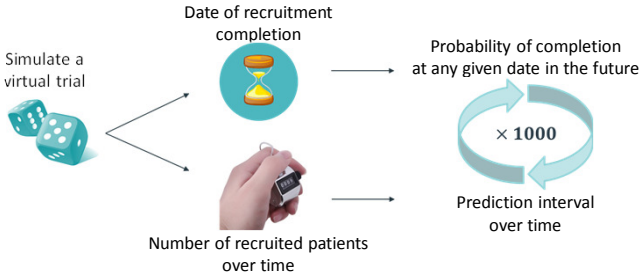
PREDICTIONS

Prediction of recruitment in an opened centre i

Prediction of recruitment in a new centre



From the predictive distribution, different metrics can be derived



VALIDATION ON A RETROSPECTIVE STUDY

STORY OF THE STUDY

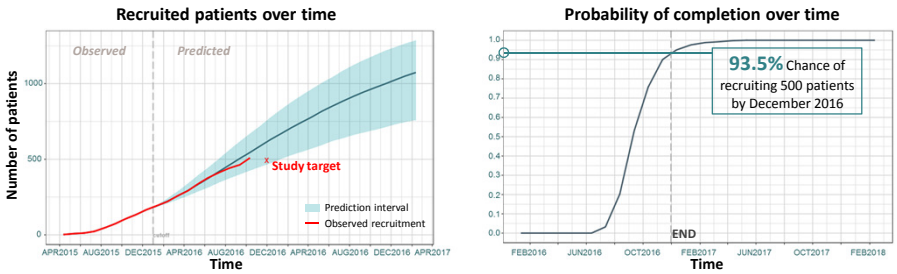
RECRUITMENT TARGET : 500 patients by 12/2016

02/2015 : Beginning of the recruitment
01/2016 : countries **added** to **speed up** the recruitment
10/2016 : **End** of the recruitment
➡ Finally, **> 500** recruited patients **without** the additional countries

Target achieved in advance without the additional countries

At that time, would we have made the same decision (addition of countries) according to the results of the Bayesian model ?

RESULTS – 01/2016



Conclusion : In January 2016, the results of the Bayesian model would have supported to do **no further action to speed up the recruitment**

[1]Servier
[2]Pharmalex

Abbreviations :
- WAIC : Watanabe-Akaike Information Criterion
- BMA : Bayesian Model Averaging