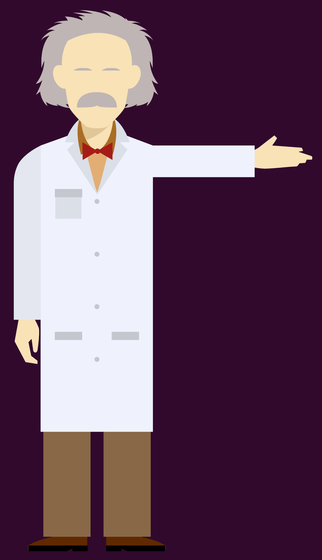
PRESENTER
Richard Evans



LLMs outperform human experts generating priors for Bayesian Glioblastoma Survival Analyses

Background

• Small, underpowered trials make frequentist inference unreliable.
• Bayesian analyses incorporate *prior information* which improves inference but sometimes uses subject matter **expert** opinion.

• **Experts** are often overconfident, overemphasize memorable research or patients, are anchored in their initial training, and find it hard to translate their knowledge into density parameters.
• It is exceptionally time consuming to elicit information from medical experts.

Solution

• LLM priors replace expert opinion priors

Methods

• Bayesian Cox proportional-hazards model
• Six priors generated by LLMs and validated by a Radiation Oncologist

Prompt

I described the disease and the patient characteristics and stated the two treatments and the variable types (e.g., censoring, time-to-event)

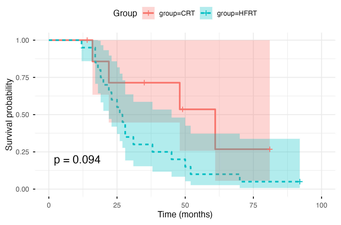
I stepped the LLMs through their responses:

1. A review of the information on HFRT and CRT trials in the glioblastoma literature.

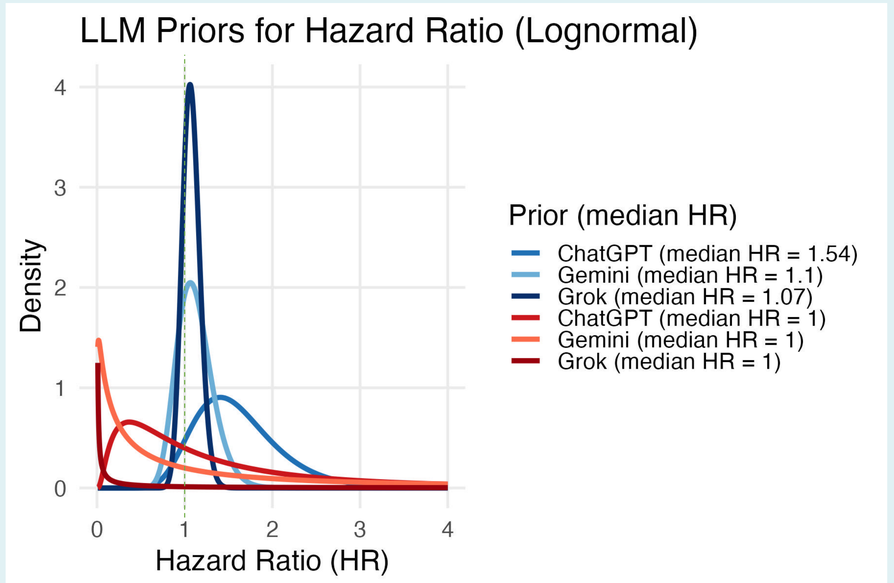
2. An informative log-normal prior for the hazard ratio

3. A justification of the informative prior using the information on HFRT and CRT trials in the glioblastoma literature.

4. A non-informative log-normal prior for the hazard ratio



• 28 Adult GBM patients: 8 CRT, 20 HFRT
• Two variables: censoring and time-to-death in months



Prior	Pr(HR > 1)	Median HR	2.5% CI	97.5% CI
ChatGPT (noninf)	0.973	2.748	0.987	9.477
ChatGPT	0.976	2.712	1.006	9.555
Gemini	0.974	2.713	0.995	10.036
Grok	0.975	2.713	1.007	9.547
None (Classic KM)		2.457	0.828	7.291

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