# TBI Prognosis: A mobile application to estimate mortality and morbidity following traumatic brain injury

Christian Iorio-Morin MD, PhD; David Fortin MD, FRCS(C)
University of Sherbrooke

## Introduction

Traumatic Brain Injury (TBI) is a significant public health problem and a leading cause of worldwide mortality and morbidity. Although effective evidence-based guidelines are available to help with management, the first question clinicians and family face is whether or not it is appropriate to intervene at all. Accurate prognosis estimation can inform decision-making by identifying patients likely to benefit from aggressive medical and surgical management, as opposed to those for whom treatment withdrawal should rather be considered. In practice, prognostic assessment and patient stratification should be performed within the first few hours of hospital admission to guide management and avoid secondary brain injury propagation if treatment is indicated. This highlights a need for an accurate, quick and easy-to-use point-of-care prognosis estimator.

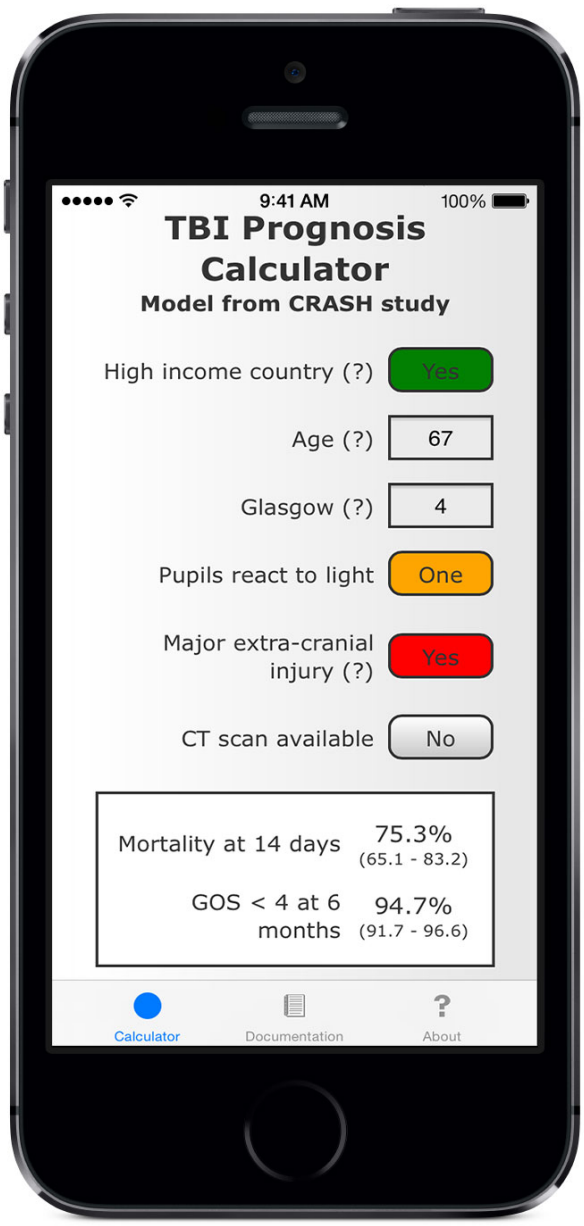
## Methods

The medical literature was reviewed to identify existing and validated prognostic models of mortality and morbidity following TBI. After approbation by the original model authors, a mobile application incorporating the selected models was developed.

## Results

We identified a series of four MRC CRASH trial-derived models (BMJ 2008;336:425) as the most extensively validated TBI prognosis tools available. These were integrated into a mobile application that we called "TBI Prognosis", which allows quick and **interactive estimation of 14-days mortality and 6-months mortality and morbidity** using the patient's age, Glasgow coma score, pupils reactivity, presence of concomitant major extra-cranial injury, optional CT scan variables and the socio-economic status of the country as surrogates. **The application was programmed both for iOS- and Android-compatible devices** and released as free applications in the platforms' respective distribution channels.

**iPhone version of TBI Prognosis**




An interactive prognosis estimator using the MRC CRASH trial-derived models

## Conclusions

Prompt and accurate prognosis estimation in TBI is essential. Mobile applications have the potential to enable easier and quicker point-of-care access to validated models, providing relevant information to inform management and family counseling. We hope clinicians will find "TBI Prognosis" useful as a guide in their decision-making process.

## Learning Objectives

- Review existing TBI prognosis models
- Understand the impact prognosis estimation can have on TBI management
- Understand how mobile technology can improve access to existing models

## References

Predicting outcome after traumatic brain injury: practical prognostic models based on large cohort of international patients. MRC CRASH Trial Collaborators et al.. BMJ. 2008 Feb 23;336(7641):425-9. doi: 10.1136/bmj.39461.643438.25.

Effect of intravenous corticosteroids on death within 14 days in 10008 adults with clinically significant head injury (MRC CRASH trial): randomised placebo-controlled trial. Roberts et al.. Lancet. 2004 Oct 9-15;364(9442):1321-8. doi:10.1016/S0140-6736(04)17188-2