

# Modelling Uncertainty in the Risk of Intensive Care Unit Readmission I: Data Extraction and Modelling

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## 1 SCOPE AND AIMS

This document provides a written overview of the first phase of the project. The aims of this phase were twofold:

1. To extract a dataset from the MIMIC-III database of surgical ICU patients, consisting of a clearly defined outcome measure (ICU readmission), and a range of predictors.
2. To compare the performance of a range of published models for the prediction of ICU readmission risk and identify the best model to take forward. This will form the prediction model at the core of a system for quantifying uncertainty and dealing with missing data.

## 2 INTRODUCTION

### 2.1 ICU readmission

### 2.2 Readmission prediction models

## 3 METHODS

### 3.1 Data Source

### 3.2 Inclusion criteria

### 3.3 Outcome measure

### 3.4 Candidate models

### 3.5 Model comparisons

### 3.6 Recalibration

### 3.7 Novel model

## 4 RESULTS

### 4.1 Descriptive statistics

### 4.2 Discrimination

### 4.3 Calibration

## 5 DISCUSSION

### 5.1 Model performance

### 5.2 Next steps

## REFERENCES