

# Bayesian Hospital - Documentation

## Team

Barcelona GSE Data Science Center Omiros Papaspiliopoulos, Aleix Ruiz de Villa, Reid Falconer, Max Zehhauser and Nandan Rao

## Platform

We have used BigQuery from Google Cloud Platform to manage and process MIMIC's data. Some links that may be useful

- MIMIC's documentation: <https://mimic.physionet.org/>
- MIMIC's database schema <https://mit-lcp.github.io/mimic-schema-spy/>
- Code repository: <https://github.com/MIT-LCP/mimic-code>
- Visualization tool: <http://hdsr.uwaterloo.ca/visualization-tool/>

## Uploading data to Big Query

The best way to upload data is following step by step the tutorial from MIMIC' github repository <https://github.com/MIT-LCP/mimic-code/tree/master/buildmimic/bigquery>

**Important:** Call your BQ Dataset **MIMIC3\_V1\_4** so that the rest of the scripts are compatible.

## Connect to BigQuery via R

For this you can use the 'BQ connection example.R' file. First time you use it, it asks you for your google authorization and saves a file in your disk to remember it. **Note:** If you

use any type of code repository, be careful to ignore this file, otherwise you will upload your credentials to your repository.

## Build Tables

In order to build the required tables for the modelling process and applications follow the steps outlined below:

1. Run the ‘build-bq-tables/shifting\_stability.R’ script. This will create a table called ICUSTAYS\_TRANS\_COLLAPSED in BigQuery Dataset (MIMIC3\_V1\_4).
2. Execute the ‘build-bq-tables/join\_depts.sql’ query in BigQuery. This step (along with steps 3, 4 and 5) require you to set a destination table for the query results. Call your BQ table CHARTEVENTS\_DEPTS.
3. Execute the ‘build-bq-tables/merge\_categories.sql’ query in BigQuery. Call your BQ table CHARTEVENTS\_DEPTS\_CATS.
4. Execute the ‘build-bq-tables/chart\_time\_collapsing.sql’ query in BigQuery. Call your BQ table CHARTEVENTS\_DEPTS\_CATS\_TS\_COLLAPSED.
5. Run the ‘build-bq-tables/chart\_time\_collapsing\_final.sql’ query in BigQuery. Call your BQ table CHARTEVENTS\_DEPTS\_CATS\_TS\_COLLAPSED\_FINAL.

## Data Exploration App

For running this Shiny App, you just need to open and run the RStudio project (‘app.Rproj’) in the folder ‘exploration-app’.

## Model Building

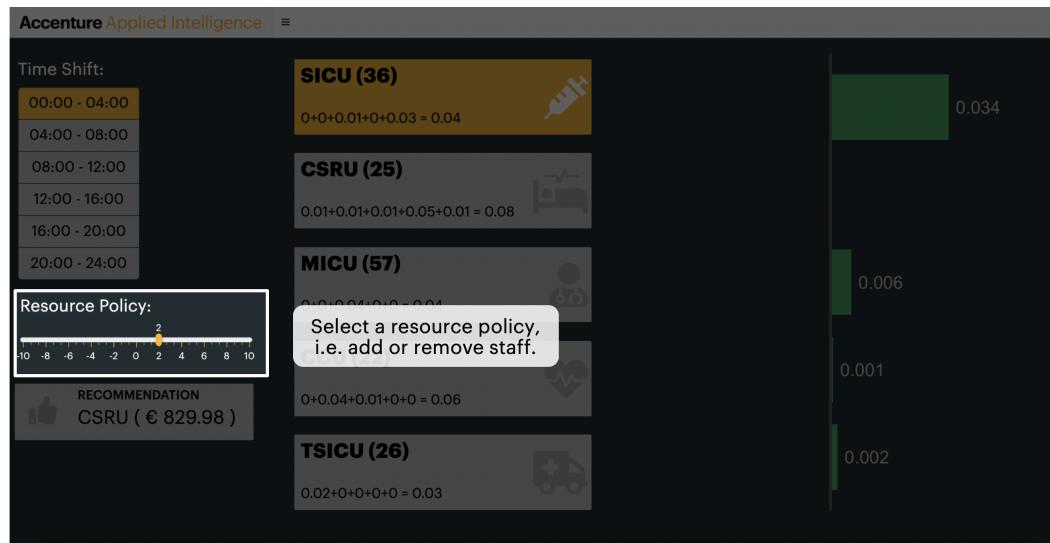
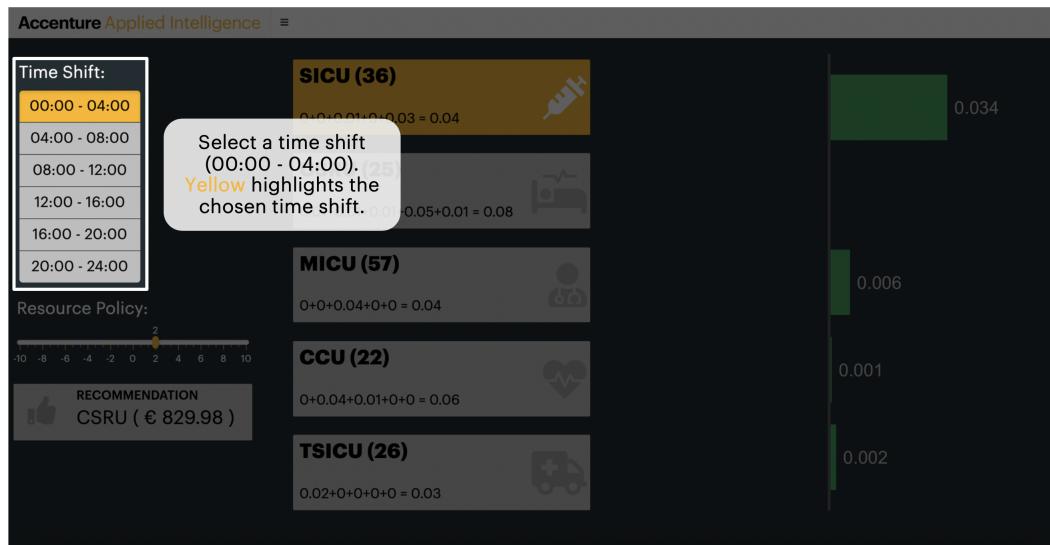
For building the models that will be later on used by the outflow-app, open the bayesian-hospital RStudio project in the main folder and then execute:

- ‘model-building/data/final-data-retrieval.R’ to save summarized data locally
- ‘model-building/build\_model.R’ to build and save the models in ‘model-building/model/’

# Outflow App

To run the application, one needs to open and run the RStudio project in the folder ‘outflow-app’ (precise instructions are provided in ‘outflow-app/README.md’). The application illustrates the effect of a chosen resource policy on the intensive care units outflow and recommends the best unit on which to apply the resource policy selected (along with its economic impact)<sup>1</sup>.

## Application Tutorial



<sup>1</sup>The economic effect is simply the net outflow multiplied by €10 000. This can be easily modified in the ‘outflow-app/global.R’ script (line 19).

