**4.2 ML for ICU & ICU for ML**

Ari Ercole

[ae105@cam.ac.uk](mailto:ae105@cam.ac.uk)

MIMIC-III

<https://www.nature.com/articles/sdata201635#:~:text=MIMIC%2DIII%20>('Medical%20Information,a%20large%20tertiary%20care%20hospital.

**Use of machine learning to analyse routinely collected intensive care unit data: a systematic review**

<https://ccforum.biomedcentral.com/articles/10.1186/s13054-019-2564-9>

RCT in ML

* ICU is dangerous
  + No gold standards, ML allowing decision policies
  + Optimal decision policies

**ICU**

* Organ failure or system failure
  + Heart, lung, kidney, immune system etc.
* Determining whether organ is failing or responding to treatment
  + Blood tests
  + Physiology
    - Catheters
    - BP
  + Radiology – for diagnosis
  + Ventilators, dialysis machines, infusion pumps etc.

**ICU data**

* Big data
  + Continuous physiology
  + Others possible
  + Daily biochemistry
  + Daily hematology
  + Usually regular (~6.00am)
  + Semi-informative sampling but irregular (on average of every 4 hours)
    - Point of care measurements
    - Routine imaging

**Interoperability**

* Syntactic interoperability
  + Specialist hospital and general hospital may record diagnosis at different granularity/ system
    - Many-to-one relationship, one-to-many relationships, or no relationship[
    - Hierarchical
  + SNOMED International
    - Harmonizing the difficult ontologies
* Semantic interoperability