Classification Analysis of Acute Respiratory Distress Syndrome (2)

Overall project description

Acute respiratory distress syndrome (ARDS) is defined as acute hypoxic respiratory failure (PaO2/FiO2<300 mmHg), bilateral chest infiltrates, and the absence of cardiac failure as the primary diagnosis. Treatment aimed at improving survival of this disease is complicated by its extreme heterogeneity. A new treatment thought to improve the disease outcome for patients is Extracorporeal membrane oxygenation (ECMO). Of interest is discovering what biomedical markers both before and after treatment predict the patient's outcome and whether ECMO changes these.

Data available

Data are available for 450 patients on biomarkers both before ECMO treatment (marked with a pretext PreECMO, e.g. PreECMO_RR) and for the first day after ECMO treatment (marked with a pretext Day1ECMO, e.g. Day1ECMO_RR).

- `Pt_ID` - A unique code for each patient.
- `Gender` - Patient Gender (m=Male, f=Female)
- `Indication` - A disease indicator with the following levels
  - ALF = acute lung failure
  - 1 = viral pneumonia
  - 2 = bacterial pneumonia
  - 3 = aspiration pneumonitis
  - 4 = ARDS Trauma
  - 5 = ARDS surgery
  - 6 = Chemo
  - 7 = other
- ECMO_Survival - a survival indicator, Y= survivor, N = non-survivor
- Hospital_Survival - a secondary survival indicator (ignored for this analysis), Y= survivor, N = non-survivor
- Duration_ECMO - Days of ECMO treatment
- The following variables all have two variants: PreECMO and Day1ECMO
  - RR - Respiratory rate
  - Vt - Tidal volume
  - FiO2 - Inspired fraction of oxygen
  - Ppeak - Peak airway pressure
  - Pmean - Mean airway pressure
  - PEEP - Positive end expiratory pressure

- PF - Arterial partial pressure of oxygen/inspired fraction of oxygen ratio
- SpO2 - Periperal oxygen saturation
- PaCO2 - Arterial partial pressure of carbon dioxide
- pH - Arterial pH
- BE - Arterial base excess
- Lactate - Arterial lactate
- NAdose - Noradrenaline dose
- MAP - Mean arterial pressure
- Creatinine -
- Urea -
- CK - Creatinine Kinase
- Bilirubin -
- Albumin -
- CRP - C reactive protein
- Fibrinogen -
- Ddimer -
- ATIII - Anti-thrombin III
- HB - Haemaglobin
- Leukocytes -
- Platelets -
- TNFa -
- IL6 -
- IL8 -
- siL2

Individual project details

How many individual projects are available in this area: 2

PreECMO data

Question(s) of interest
The main questions of interest are:

- Can we use the PreECMO biomedical markers to accurately predict ECMO survival?
- Do we need all PreECMO variables or just a subset to make accurate predictions?
- What is our expected future performance for these predictions?

Relevant courses
We strongly recommend that you have taken the following courses to undertake this project:

- Multivariate Methods (main dissertation).