Modeling Rate of Change in Renal Function for Individual Patients: A Longitudinal Model Based on outinely Collected Data

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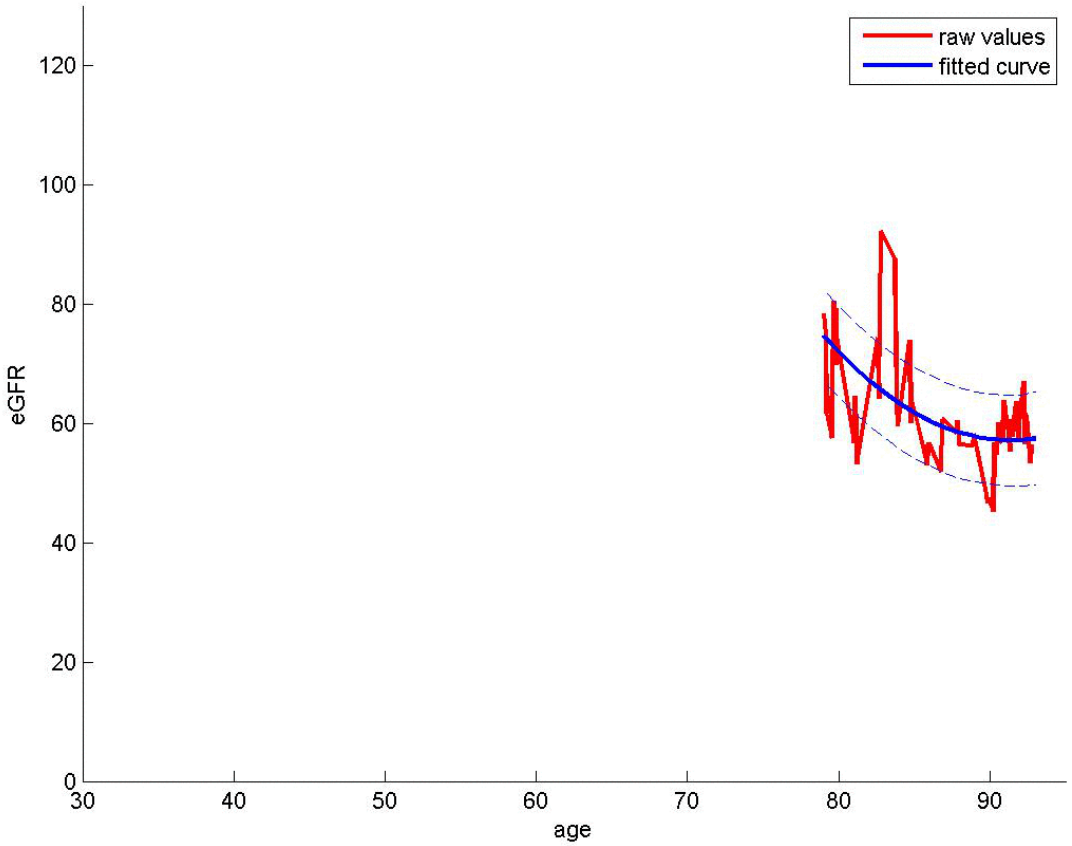
Modelling biomedical signals

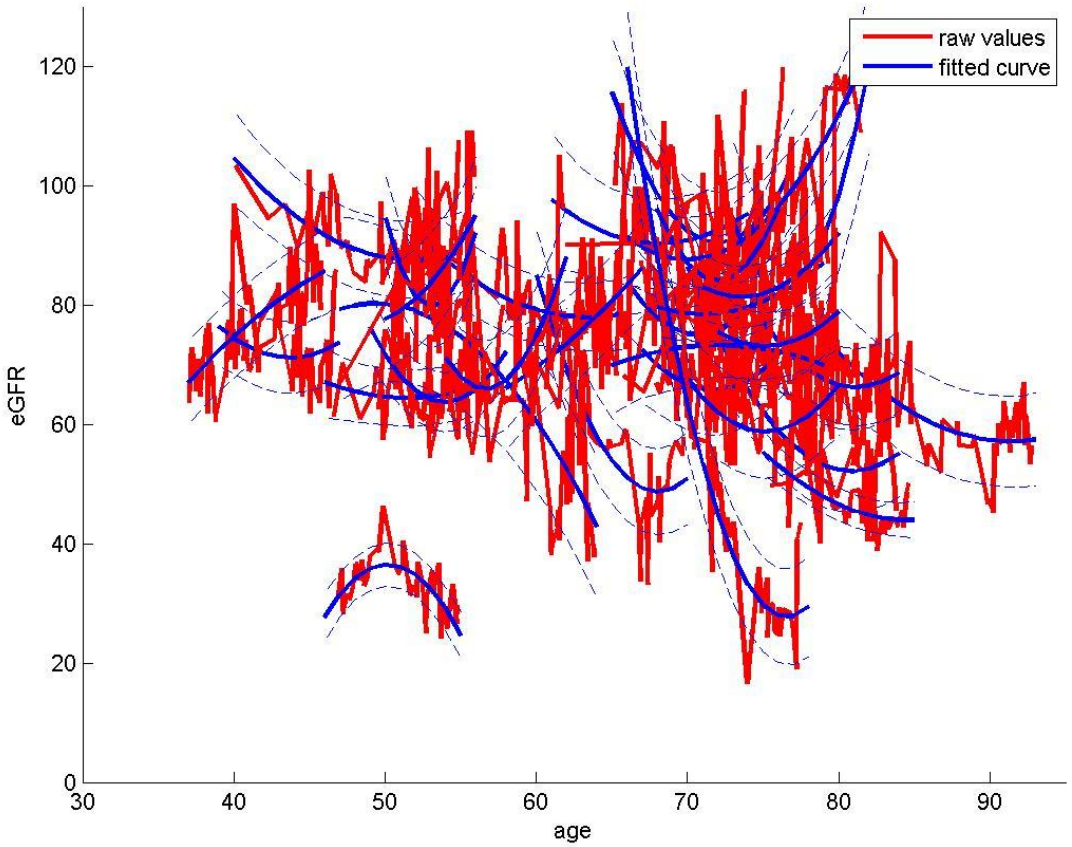
- Very noisy
  - Affected by daily fluctuation
    - Circadian rhythm (body's biological clock)
    - Foot intake, especially protein
    - Activities performed prior to the measurement being taken
  - Also affected by interventions
    - Medications
    - Co-morbidities

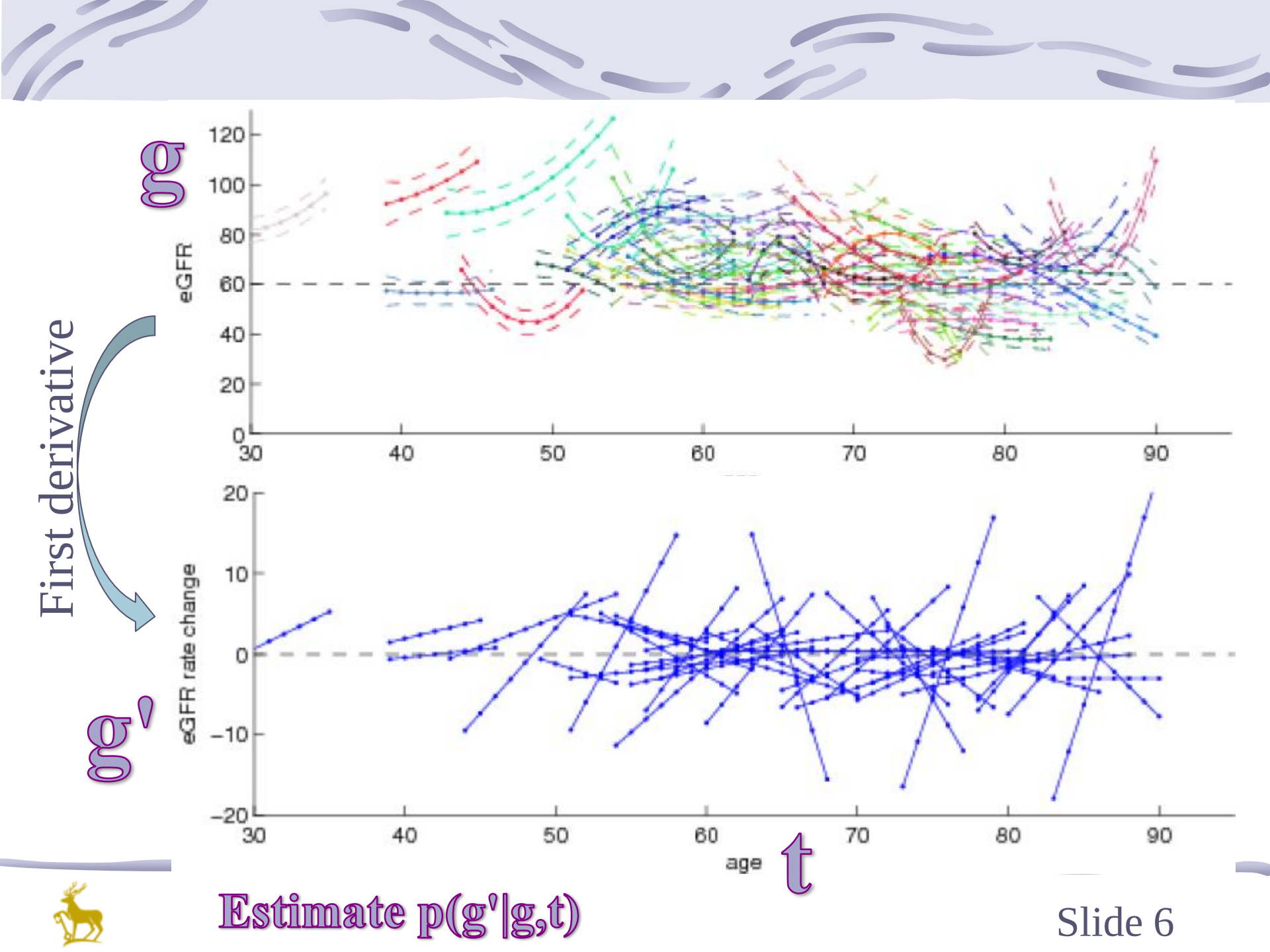
Renal function

- Measured by estimated glomerular filtration rate (eGFR), which is a function of a serum creatinine that can be measured from a blood sample
- The rate of change of eGFR is crucially important for general physicians to refer to specialists
  - Take the difference of 2 consecutive eGFR and make decision
- Our objective: Give a better estimate of the rate of change of eGFR

Let's look at the data




raw values
fitted curve
eGFR
age
0
20
40
60
80
100
120
30
40
50
60
70
80
90



Estimate p(g'|g,t)