**PAMBAYESIAN: Patient Managed decision-support using Bayesian Networks**

**Goal:**
- To create a new generation of intelligent medical decision support systems for direct patient use with real-time monitoring for chronic conditions, based on expert-built Bayesian Networks.
- To increase patient independence and decrease reliance on direct consultation.
- To allow more autonomous care at home and reduce associated health care cost.

**Case Studies:**
- Gestational Diabetes:
  - To help pregnant women with diabetes, in partnership with their health practitioners.
  - To manage both lifestyle and appropriate pharmacotherapy.
- Musculoskeletal problems:
  - To help patients with inflammatory joint disease.
  - To optimise care of fluctuating disease.
- Atrial Fibrillation:
  - To help patients with irregular heartbeat and reduce the risk of stroke due to blood clots forming in the heart.

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**Graphical probabilistic models with causal dependencies**

**Some of our Bayesian network applications:**
- Predict the likelihood of acute traumatic coagulopathy in the Emergency Department [1].
- Predict the likelihood of survival for an injured soldier in successive stages of the patient’s care [2].
- Determine whether a prisoner is suitable for release based on the risk of serious re-offence [3].
- Compare risks of alternative medical diagnosis [4].
- Many more general applications include operational risk, transport safety, sports prediction, legal arguments and forensic evidence interpretation [5].

**Questions answered by Bayesian Networks:**

- **Decision:** Given these symptoms and the patient attributes, what is the best treatment?
- **Risk:** If I do nothing, what is the probability that my symptoms will get worse in the next 24 hours?
- **Intervention:** What are the chances that increasing this medication now will treat the current symptoms?
- **Counterfactual:** If I hadn’t taken this medication last week, what is the probability that I would have gotten well on my own?
- **Explanation:** Why am I being told that there is an 80% chance that this course of treatment will manage my illness?

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