

Case Studies

Scenario 2: AI System for Predicting Heart Disease Risk in the UK

Background: AI system is planned for predicting the risk of developing heart disease for people in the UK. The system will be used to identify high-risk individuals to whom lifestyle changes can be suggested to. Currently, such models are based upon simple characteristics such as diet, age, BMI and lifestyle. The AI system will attempt to exploit a wider range of data, such as ECG data and imaging data, for making more personalised risk assessments. The intention is for the system to automatically segment the left ventricle from cardiac MR images and use the segmentations to compute a range of functional metrics; these metrics will then be linked with outcome data to train a machine learning model to predict the risk of developing heart disease. The developers will also investigate incorporating non-imaging data such as BMI and age as extra input data to the system.

Development and Training: The data to train the AI system will come from a network of 3 London NHS hospitals, with a fourth NHS hospital's data held out for testing the system. Access to electronic health records of all patients is also possible.

Questions to consider:

- What dangers/risks of the use of AI for this problem can you identify at this stage?
- How would you go about addressing these?
- What fairness metric(s) do you think might be appropriate when assessing the AI tool for potential bias?

REMINDER - DEFINITIONS OF FAIRNESS

- *False Negative Rate (FNR): the rate at which positive cases are missed by the classifier*
- *Demographic parity - equal chance of being classified positive for each protected group*
- *Equalised odds - equal true positive rate (TPR) & false positive rate (FPR) for each protected group*
- *Equal opportunity - only equalise either FPR or FNR, not both*