Case Studies

<u>Scenario 5:</u> AI-Assisted Detection of Pediatric Bone Fractures

Background: An AI tool is being developed to assist radiologists in detecting bone fractures in pediatric patients using X-ray images. Pediatric bone fractures are relatively rare compared to the vast number of normal X-ray images taken for other reasons, such as routine check-ups or minor injuries that do not result in fractures. Additionally, certain racial groups, such as Asian children, may have smaller bone structures, which can affect the visibility and detection of fractures compared to Caucasian children.

Development and Training: The dataset for training the AI tool contains a large number of normal X-ray images and a relatively small number of fracture images. The proportion of racial minorities such as Asian children in the dataset is small.

<u>Questions to consider:</u>

- 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*