**Part 3: Critical Thinking**

**1. Ethics & Bias**

**Bias Impact**

* Biased training data (e.g., underrepresented groups) may lead to:
  + **Underestimation of risk** for minorities.
  + **Health disparities**: poorer care or missed follow-ups.

**Bias Mitigation Strategy**

* Apply **Reweighting or Sampling Techniques** (e.g., SMOTE for imbalanced groups).
* Monitor **performance across subgroups** (e.g., ethnicity, gender).
* Involve **diverse clinical experts** in model review.

**2. Trade-offs**

**Interpretability vs. Accuracy**

* High-accuracy models (e.g., deep learning) can be **black boxes**.
* In healthcare, clinicians prefer **transparent models** to justify decisions.
* **Trade-off**: Use explainable models (like decision trees) or **add XAI tools** (like SHAP for XGBoost).

**Limited Computational Resources**

* May not support heavy models (e.g., deep neural networks).
* Choose **lightweight models** (e.g., Logistic Regression, Random Forests).
* Optimize using **model pruning** or **quantization** to reduce size.