

# Disparate Impact Analysis

**Disparate Impact:** A phenomenon where seemingly neutral policies or practices have a disproportionately negative effect on specific groups

## 4/5ths Rule

**Disparate Impact Ratio**

$$\frac{P(\hat{Y}=1|\text{Group}=\text{B})}{P(\hat{Y}=1|\text{Group}=\text{A})}$$

✓  $\geq 0.8$ : Fair

✗  $< 0.8$ : Suspected Disparate Impact

## Detection Methods

- Statistical Significance Testing (Chi-square test)
- Comparison of Performance Metrics by Group
- Intersectionality Analysis
- Tracking Changes Over Time
- Causal Analysis

## Examples in Medical AI

- Lower diagnosis rates for specific races
- Limited treatment access for elderly patients
- Under-treatment of female patients
- Lower recommendation grades for low-income patients