

Example 1: Y (Ground Truth): whether person has Hyperlipidernia, A (protected): gender

Separation	
$P(\text{diabetes} = \text{YES} \mid \text{Hyperlipidernia} = \text{YES}, \text{Gender} = \text{Female})$	0.646
$P(\text{diabetes} = \text{YES} \mid \text{Hyperlipidernia} = \text{YES})$	0.646

Sufficient	
$P(\text{Hyperlipidemia} = \text{YES} \mid \text{diabetes} = \text{YES}, \text{Gender} = \text{Female})$	0.492
$P(\text{Hyperlipidemia} = \text{YES} \mid \text{diabetes} = \text{YES})$	0.533

This example shows that the model has separation but is not sufficient

Example 2: Y (Ground Truth): region, A (protected): gender

Separation	
$P(\text{Hyperlipidernia} = \text{YES} \mid \text{region} = \text{countryside}, \text{Gender} = \text{Female})$	0.438
$P(\text{Hyperlipidernia} = \text{YES} \mid \text{region} = \text{countryside} = \text{YES})$	0.479

Sufficient	
$P(\text{region} = \text{countryside} \mid \text{Hyperlipidernia} = \text{YES}, \text{Gender} = \text{Female})$	0.497
$P(\text{region} = \text{countryside} \mid \text{Hyperlipidernia} = \text{YES})$	0.497

This example shows that the model does not have separation but is sufficient