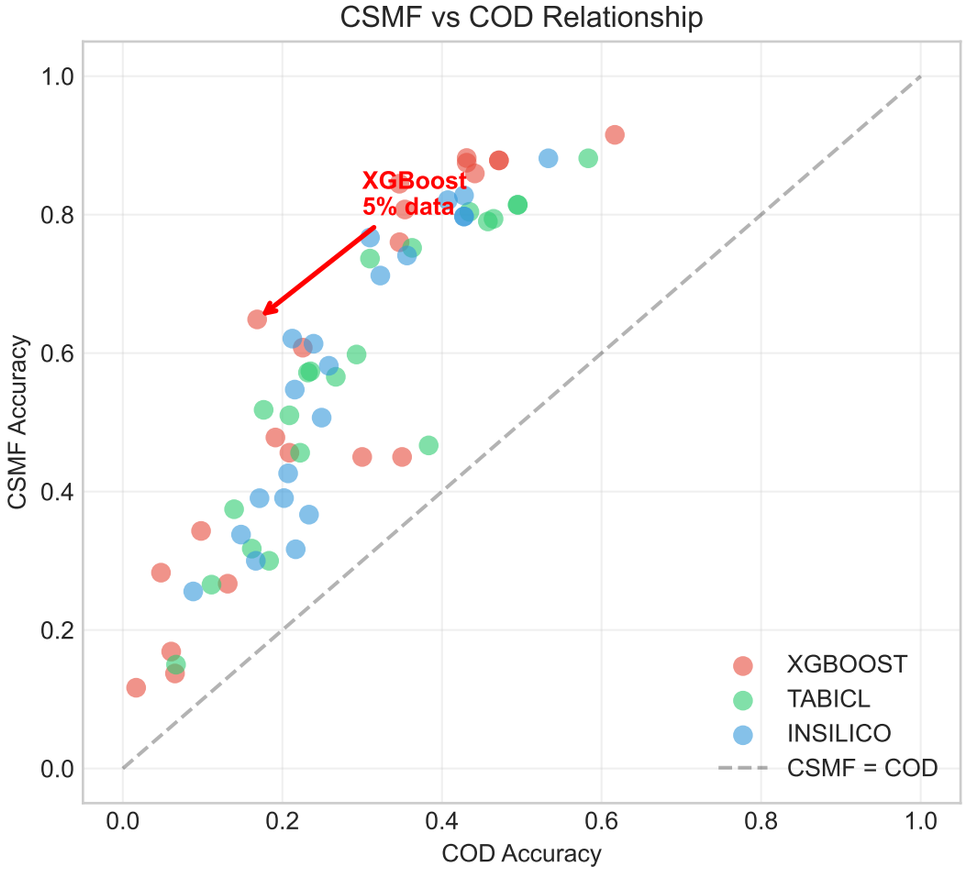
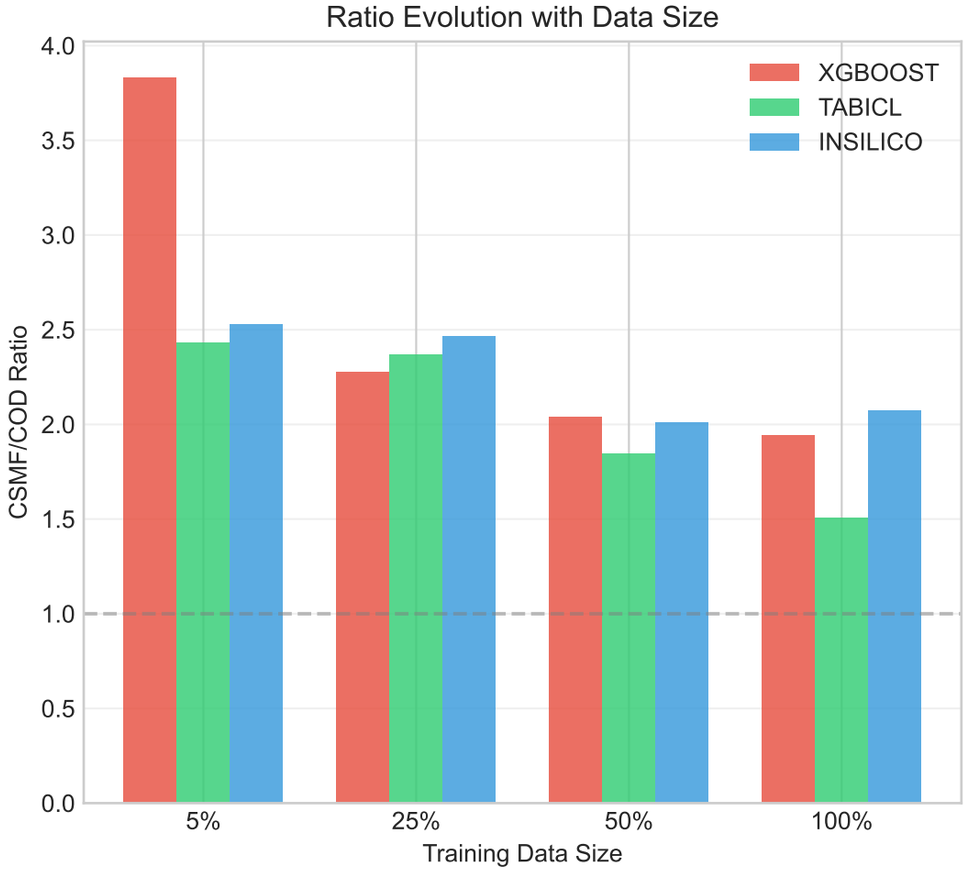
Error Pattern Analysis: The Root of CSMF/COD Imbalance



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ERROR PATTERN TYPES

1. CONVERGENT (XGBoost)
   All errors → Few common classes
   [A, B, C, D, E, F, G, H] → [A, A, A, B, A, B, A, A]
   Result: High CSMF, Low COD

2. DIVERGENT (TabICL)
   Errors → Random scatter
   [A, B, C, D, E, F, G, H] → [B, D, A, F, C, H, E, G]
   Result: Balanced CSMF/COD

3. CALIBRATED (InSilico)
   Errors → Follow probabilities
   [A, B, C, D, E, F, G, H] → [A, B, A, C, B, D, A, C]
   Result: Balanced CSMF/COD
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MEDICAL ANALOGY

XGBoost = Inexperienced Doctor
- Only knows common diseases
- Diagnoses everything as flu/pneumonia
- Population stats OK, individuals wrong

TabICL = Medical Student
- Consults different books each time
- Inconsistent diagnoses
- Sometimes right, sometimes random

InSilico = Experienced Physician
- Knows disease prevalence
- Educated guesses follow statistics
- Balanced accuracy at both levels