**Problem Definition:** Hospital Readmission Prediction

**Problem Statement**

The hospital requires an AI system to predict patient readmission risk within 30 days of discharge. This predictive model will help healthcare providers identify high-risk patients who may need additional care, follow-up appointments, or modified discharge plans to reduce readmission rates.

**Objectives**

1. Primary Objective: Develop a machine learning model that accurately predicts 30-day readmission risk with at least 80% recall to minimize missed high-risk patients.

2. Secondary Objective: Create an interpretable model that provides actionable insights for healthcare providers to make informed clinical decisions.

3. Operational Objective: Integrate the prediction system seamlessly into existing hospital workflows with minimal disruption to clinical processes.

**Stakeholders**

1. Primary Stakeholders:

- Healthcare Providers (Doctors, Nurses): Need accurate predictions to make clinical decisions and allocate resources effectively

- Hospital Administrators: Require system to reduce readmission rates and associated costs

- Patients: Benefit from improved care quality and reduced likelihood of readmission

2. Secondary Stakeholders:

- Data Science Team: Responsible for model development, maintenance, and continuous improvement

- IT Department: Ensures system integration, security, and technical support

- Insurance Providers: Interested in cost reduction through lower readmission rates

- Regulatory Bodies: Ensure compliance with healthcare regulations (HIPAA, etc.)

Success Criteria

- Model Performance: Achieve F1-score > 0.75 and Recall > 0.80

- Clinical Adoption: 90% of healthcare providers find the system useful in clinical decision-making

- Operational Impact: Reduce 30-day readmission rates by at least 15% within 6 months of deployment

- Compliance: 100% adherence to healthcare data privacy regulations