# Sepsis Survival Minimal Clinical Records Prediction

## Milestone 1: Project Initialization and Planning Phase

### Activity 1: Define Problem Statement

Problem Statement: A project to predict sepsis survival using minimal patient records. This involves developing a model that can accurately predict survival outcomes based on limited data such as age, vital signs, and initial lab results.
Example: "A 60-year-old patient with limited recorded data such as age, channel number and basic lab results presents a challenge for predicting sepsis survival."
**Sepsis Survival Minimal Clinical Records Problem Statement Report: Click Here**

### Activity 2: Project Proposal (Proposed Solution)

Develop a machine learning model that uses minimal patient records to predict sepsis survival. The goal is to provide accurate predictions quickly and efficiently, even with limited data available.

**Proposed Solution:** Use a dataset including minimal records like age, vital signs, and basic lab results to build and validate a predictive model. This will help in making quick decisions in clinical settings.
**Sepsis Survival Minimal Clinical Records Project Proposal Report: Click Here**

### Activity 3: Initial Project Planning

Outline key objectives, define scope, and identify stakeholders (e.g., healthcare providers, data scientists).
Set timelines, allocate resources, and determine the overall strategy for data collection, preprocessing, and model development.
**Sepsis Survival Minimal Clinical Records Project Planning Report: Click Here**

## Milestone 2: Data Collection and Preprocessing Phase

The Data Collection and Preprocessing Phase involves executing a plan to gather relevant sepsis survival minimal records prediction application data from Kaggle, ensuring data quality through verification and addressing missing values. Preprocessing tasks include cleaning , encoding, and organizing the dataset for subsequent exploratory analysis and machine learning model deployment.

### Activity 1: Data Collection Plan, Raw Data Sources Identified, Data Quality Report

Identify and gather relevant data from sources like hospital records or public healthcare datasets. Ensure data quality through verification and address any missing values.
**Example:** Use a publicly available healthcare dataset that includes minimal records necessary for prediction.
**Sepsis Survival Minimal Clinical Records Data Collection Report:** Click Here

### Activity 2: Data Quality Report

Verify the dataset's quality by addressing missing values and maintaining adherence to ethical guidelines.
Ensure the dataset is reliable for predictive modeling.

**Sepsis Survival Minimal Clinical Records Data Quality Report:** Click Here

### Activity 3: Data Exploration and Preprocessing

Analyze the dataset to understand patterns, distributions, and outliers.
Preprocess the data by cleaning, encoding categorical variables, and scaling numerical values to enhance data quality.
**Sepsis Survival Minimal Clinical Records Data Exploration and Preprocessing Report:** Click Here

## Milestone 3: Model Development Phase

The Model Development Phase entails crafting a predictive model for loan approval. It encompasses strategic feature selection, evaluating and selecting models (Random Forest, Decision Tree, KNN, XGB), initiating training with code, and rigorously validating and assessing model performance for informed decision-making in the lending process.

### Activity 1: Feature Selection Report

Choose specific features relevant to predicting sepsis survival, such as age, heart rate, blood pressure, and basic lab results.
Evaluate the importance and impact of these features on predictive accuracy.

**Sepsis Survival Minimal Clinical Records Feature Selection Report:** Click Here

### Activity 2: Model Selection Report

Choose suitable models (e.g., KNN, GaussianNB, Decision Tree, Logistic Regression, Random Forest) for sepsis survival prediction.
Consider the strengths of each model in handling complex relationships, interpretability, and overall performance.
**Sepsis Survival Minimal Clinical Records Model Selection Report: Click Here**

### Activity 3: Initial Model Training Code, Model Validation and Evaluation Report

Train the selected models on the dataset and validate their performance. Assess model performance using metrics like accuracy, precision, recall, and F1-score.

**Sepsis Survival Minimal Clinical Records Model Development Phase Template: Click Here**

## Milestone 4: Model Optimization and Tuning Phase

The Model Optimization and Tuning Phase involves refining machine learning models for peak performance. It includes optimized model code, fine-tuning hyperparameters, comparing performance metrics, and justifying the final model selection for enhanced predictive accuracy and efficiency.

### Activity 1: Hyperparameter Tuning Documentation

Fine-tune the hyperparameters of the selected models to optimize their performance
Example: Adjust the number of trees in Random Forest or the depth of the Decision Tree.

### Activity 2: Performance Metrics Comparison Report

Compare the performance metrics of the baseline and optimized models.
Highlight the enhanced performance achieved through hyperparameter tuning.

### Activity 3: Final Model Selection Justification

Justify the selection of the final model based on its accuracy, ability to handle complexity, and performance after tuning.
Ensure the model aligns with the project's objectives of predicting sepsis survival using minimal records.

**Sepsis Survival Minimal Clinical Records Model Optimization and Tuning Phase Report: Click Here**

## Milestone 5: Project Files Submission and Documentation

For the documentation, Kindly refer to the link. Click Here

## Milestone 6: Project Demonstration