Functional Requirements Document (FRD)

Project: Chroniq RFM Healthcare segmentation

1. Functional Overview

This document outlines the system functionality required to implement the Chronic Care Risk Stratification project.

The system will ingest structured patient-level data and segment individuals into risk tiers using RFM logic. The resulting insights will be visualized through an interactive Power BI dashboard and exportable analytical tools.

2. Input Data Requirements

Data Sources:
- patients.csv → ID, Name, Age, Gender, Insurance, Region
- visits.csv → Patient ID, Visit Date, Visit Cost
- vitals.csv → Patient ID, Blood Pressure, Glucose Level
- diagnosis.csv → Patient ID, Condition Code

Preprocessing Steps:
- Merge datasets by Patient ID
- Handle nulls (e.g., Age = -1 → Blank)
- Generate readable labels for Gender and Insurance
- Final output: final_patient_rfm.csv

3. RFM Segmentation Logic

Each patient is scored based on:
- Recency: Days since last visit (MAX(Visit_Date))
- Frequency: Number of visits in the last 12 months
- Monetary: Total medical cost from visit records

Risk Tier Logic:

- High Risk: R > 90 days, F > 10, M > $10,000
- Medium Risk: R 30–90 days, F 5–10, M $5k–$10k
- Low Risk: R < 30 days, F < 5, M < $5,000

Final Output Column: Segment_Label

4. System Outputs

- Patient RFM segmentation in final dataset
- Calculated fields:

  Recency_Days, Frequency_Count, Total_Expenditure

  Segment_Label, Age_Cleaned, Gender_Label, Insurance_Label
- Power BI Dashboard (.pbix) containing:
  1) Executive Overview
  2) Segment Deep Dive
  3) Patient Drill-Down
  4) Ad Hoc Explorer
- Export capability from Ad Hoc page (CSV/Excel)

5. Functional Modules

- Page 1 – Executive Overview: KPIs, Segment Pie, Line Trends, Distribution View
- Page 2 – Segment Deep Dive: Segment Profile Table, Avg Visits/Cost/Age, Gender/Insurance Split
- Page 3 – Patient Drill-Down: Filter by ID, view individual profile and info cards
- Page 4 – Ad Hoc Explorer: Self-serve filters and exportable table by segment, age, gender, region

6. Filters and Parameters

- Segment_Label
- Gender_Label
- Insurance_Label
- Region_Label
- Age_Cleaned (numeric slider)
- Total_Visits (numeric slider)
- Total_Expenditure (numeric slider)

7. Functional Acceptance Criteria

1) All calculated fields present and correctly formatted
2) RFM logic yields accurate segmentation
3) Power BI pages function independently and interactively
4) All visuals react to filters appropriately
5) Export functionality works from Ad Hoc Explorer