PROJECT REPORT — Patient Care & Revenue Analytics

Transforming healthcare insights through data-driven decisions

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Toolset: Microsoft Excel, Pivot Tables, Pivot Charts, Data Modeling

Dataset: 54,967 hospital patient records (source: Kaggle)

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1 Executive Summary

This project analyzes clinical, financial, and operational performance using a real-world healthcare dataset. Through data cleaning, transformation, and interactive dashboards, the project provides actionable insights that improve:

✔ Hospital revenue optimization
✔ Patient care quality and risk mitigation
✔ Staff utilization & operational efficiency

The final solution includes **three dynamic dashboards** linked with navigation buttons for seamless user experience.

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2 Dataset Overview

Attribute Type	Examples
Patient Demographics	Age, Gender, Blood Type
Clinical Information	Medical Condition, LOS, Medication, Test Results
Hospital & Doctor Data	Hospital, Room No., Doctor, Admission Type
Financial	Insurance Provider, Billing Amount

Dates	Admission Date, Discharge Date

Original Size: 55,501 rows × 15 columns
Cleaned Size: 54,967 rows (534 duplicates removed)

📌 Dataset Source: Kaggle (Prasad Healthcare Dataset)

3️⃣ Data Preparation & Feature Engineering

Step	Outcome
Standardized formats	Dates, billing amounts, numeric fields corrected
Duplicate removal	534 exact duplicates dropped
WHO-based Age Brackets	Adolescents, Adults, Middle Age, Older Adults
Risk Level Score	High / Medium / Low based on medical condition severity
Length of Stay (LOS)	=Discharge Date − Admission Date
Year extraction	For time intelligence in pivots
Null check	Zero blank or missing values found

✨ Result: Fully analytics-ready structured dataset

4️⃣ Dashboard 1 — Revenue & Financial Analysis

Key Insights

- High-risk patients contribute **16.37% revenue**

- Avg billing per patient: **₹25,544.31**
- Major hospitals dominate 80% of yearly revenue
- Older age groups incur higher medical expenses

📊 **Include these visuals here:**

1. Revenue by Medical Condition per Year *(Pivot Chart)*
2. Revenue by Age Bracket per Year
3. Revenue by Insurance Provider
4. Top 15 Hospitals by Billing
5. Revenue by Admission Type

📌 **Dashboard Screenshot** — include “Dashboard1_Revenue.png”

5️⃣ Dashboard 2 — Clinical Outcomes & Patient Risk

Key Insights

- Average LOS: **15.5 days**
- High-risk patients: **16.63%** of total population
- **33.54%** abnormal test results indicate patient complexity
- Cancer and hypertension → highest LOS

📊 **Include visuals here:**

1. LOS by Medical Condition
2. Readmission Proxy by Age Brackets

3. Volume by Risk Level
4. Medication Usage by Condition
5. Test Result Outcomes by Condition

📌 **Dashboard Screenshot** — add “Dashboard2_Clinical.png”

6️⃣ Dashboard 3 — Operational Efficiency & Patient Flow

Key Insights

- Doctor-to-patient ratio: **0.46:1**
- Emergency admissions: **33%**
- Top rooms constantly full ⟶ capacity bottlenecks
- Improved discharge processes seen recently

📊 **Insert visuals here:**

1. Most Utilized Rooms
2. Doctor Caseload by Year
3. Emergency Admission Trends
4. Hospital Capacity per Month
5. Discharge Pattern Analysis

📌 **Dashboard Screenshot** — add “Dashboard3_Operations.png”

7️⃣ Key Performance Indicators (KPIs)

Category	KPI	Value
Finance	Avg Billing per Patient	₹25,544.31
Finance	Revenue from High-Risk Conditions	16.37%
Clinical	Avg Length of Stay	15.5 days
Clinical	High-Risk Patient Percentage	16.63%
Clinical	Abnormal Test Results	33.54%
Operations	Emergency Admission %	33%
Operations	Bed Utilization Index	5.84
Operations	Doctor-to-Patient Ratio	0.46 : 1

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8 Value Delivered

✔ Increased visibility into revenue sources & cost drivers
✔ Improved ability to manage clinical risks proactively
✔ Better staffing & resource allocation insights
✔ Easy-to-use dashboards for leadership decision making

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9 Future Enhancements

🚀 Expand capability beyond descriptive analytics:

- Predict LOS and readmission using ML models
- Anomaly detection for patient test results

- Deeper insurance claim analytics
- Power BI migration for richer interactivity

🔟 Conclusion

This project demonstrates strong capability in:

💡 Data transformation
📈 Excel BI visualization
📊 Healthcare data storytelling
🎯 Operational insight generation

Positioning for mid-level data analyst roles with domain-oriented analytics.

📌 Appendix

➡️ Add all pivot table screenshots if needed
➡️ Include formulas used for calculated columns and KPIs