Solution Guide - Hospital Administration Analysis

This Solution Guide presents clear, structured answers to all questions across the Basic, Medium, and Advanced levels of the case study. Each explanation is based on actual patterns observed in the dataset, supported by the pivot tables, calculations, and visual insights developed in Excel. The goal of this document is to translate the raw analytical outputs into meaningful interpretations highlighting trends, relationships, and operational insights that can help hospital administrators understand the drivers of readmission and overall patient outcomes.

BASIC LEVEL INSIGHTS:

1. Age and Readmissions
Readmission rates rise steadily with increasing age. Younger patients rarely return, while middle-aged and older adults show significantly higher risk due to chronic illnesses and greater medical complexity.

2. Length of Stay by Specialty
Specialties managing complex or long-term conditions, such as pulmonary and rehabilitation disciplines, show longer hospital stays. Routine medical areas show shorter stays, reflecting faster treatment cycles and simpler cases.

3. Emergency Visits and Readmissions
Patients with a higher number of previous emergency visits tend to show higher readmission rates. This pattern suggests unstable health conditions or gaps in outpatient care.

4. Diabetes and Readmission
a considerable proportion of diabetic patients experience readmission within 30 days. This indicates the difficulty of maintaining consistent glycemic control and the long-term nature of diabetes management.

5. Medication Change
Patients who recently had their diabetic medication adjusted show slightly higher readmissions. This may reflect a period of clinical transition where symptoms fluctuate or medication response is still stabilizing.

MEDIUM LEVEL INSIGHTS:

1. Readmission Trends over Time
Patterns in synthetic admission dates indicate certain months have slightly higher readmission volume, which may correspond to seasonal changes, respiratory illness periods or operational variations within the hospital.

2. Comorbid Conditions
Patients with multiple diagnoses generally experience longer stays and a greater likelihood of returning. Higher comorbidity scores strongly correlate with increased care complexity.

3. Discharge Disposition
Patients discharged home without structured follow-up show the highest readmission rates. Transfers to skilled facilities tend to result in more stable recoveries and fewer returns.

4. Demographics and Clinical Interventions
Certain demographic groups receive more procedures, tests or medications. These differences may reflect distinct clinical needs, but they can also point toward potential healthcare disparities.

5. Diagnosis and Utilization Patterns
Different primary diagnoses are associated with unique patterns of emergency, outpatient and inpatient usage. Conditions with higher severity or recurrence naturally lead to more frequent hospital encounters.

6. Weight and Diagnosis Combinations
where weight data is available, higher weight combined with certain diagnoses correlates with increased readmission risk, suggesting the need for specialized management strategies.

7. Medication Patterns across Specialties
Medication indicator variables reveal distinct prescribing habits by specialty. Some clusters of medications appear in higher-risk groups, hinting at treatment complexity or polypharmacy concerns.

8. Patient Satisfaction and Readmission
Lower satisfaction scores generally align with higher readmission likelihood. Dissatisfaction may relate to unclear care instructions, limited communication or unmet expectations during discharge.

ADVANCED LEVEL INSIGHTS:

1. Predictive Modelling
A predictive model would likely identify prior emergency visits, number of diagnoses, age, length of stay and medication count as the most influential predictors of readmission risk.

2. Patient Segmentation
Segmentation reveals distinct patient groups, such as complex chronic patients, frequent hospital utilizers and low-risk episodic cases. These groups help shape targeted care strategies.

3. Financial Impact of Readmissions
Avoidable readmissions contribute significantly to hospital financial strain. Preventable cases often relate to gaps in follow-up care, while unavoidable cases reflect the expected course of certain illnesses.

4. Social Determinants of Health
Demographic patterns, including race and socioeconomic indicators, show measurable links to readmission outcomes. External factors like access to care and home environment affect recovery quality.

5. Follow-Up Program Design

a structured follow-up program focused on high-risk patients is likely to reduce readmissions. Effective elements include medication counselling, early follow-up appointments and proactive monitoring for complications.