

Hospital Readmission Analysis Report

1. Executive Summary

The overall readmission rate for the hospital is 47.72%, which is significantly higher than industry benchmarks (typically 15-20% for Medicare patients). Key findings indicate that elderly patients (70-80 age group) have the highest readmission rates (49.59%), and certain diagnoses like hematologic disorders (code 282) show readmission rates as high as 82.89%. Recommendations include targeted interventions for high-risk patient groups, enhanced discharge planning, and improved care coordination for patients with multiple comorbidities.

2. Readmission Analysis

2.1 Hospital-wide Readmission Rate

```
SELECT  
  
    CAST(SUM(CASE WHEN readmitted_flag = '<30' OR readmitted_flag =  
'>30' THEN 1 ELSE 0 END) AS DECIMAL) * 100 / COUNT(*) AS  
    ReadmissionRate
```

```
FROM fact.visits
```

Output :

```
ReadmissionRate
```

```
-----  
47.72440363197
```

Insights: The hospital's overall readmission rate of 47.72% is considerably higher than national benchmarks

2.2 Readmission by age group

```

SELECT
    a.age_group,
    COUNT(*) AS total_visits,
    SUM(CASE WHEN f.readmitted_flag IN ('<30', '>30') THEN 1 ELSE 0 END) AS
readmissions,
    CAST(
        SUM(CASE WHEN f.readmitted_flag IN ('<30', '>30') THEN 1 ELSE 0 END) * 100.0
        / COUNT(*)
        AS DECIMAL(10,2)
    ) AS readmission_rate_percent
FROM fact.visits f
JOIN dim.age a
    ON f.age_key = a.age_key
GROUP BY a.age_group
ORDER BY readmission_rate_percent DESC;

    ON f.age_key = a.age_key
GROUP BY a.age_group
ORDER BY readmission_rate_percent DESC;

```

Output

age_group	total_visits	readmissions	readmission_rate_percent
[70-80)	27328	13553	49.59
[80-90)	18072	8911	49.31
[60-70)	23647	11352	48.01

[20-30)	1742	822	47.19
[40-50)	10123	4698	46.41
[50-60)	18172	8372	46.07
[30-40)	3944	1762	44.68
[90-100)	3034	1249	41.17
[10-20)	715	287	40.14
[0-10)	162	30	18.52

2.3 Readmission by age, gender, and race

```

SELECT
    a.age_group,
    r.race,
    g.gender,
    COUNT(*) AS total_visits,
    SUM(CASE WHEN f.readmitted_flag IN ('<30', '>30') THEN 1 ELSE 0 END) AS
readmissions,
    CAST(
        SUM(CASE WHEN f.readmitted_flag IN ('<30', '>30') THEN 1 ELSE 0 END) * 100.0
        / COUNT(*) AS DECIMAL(10,2)
    ) AS readmission_rate_percent
FROM fact.visits f
JOIN dim.age a
    ON f.age_key = a.age_key
JOIN dim.race r
    ON f.race_key = r.race_key

```

JOIN dim.gender g

ON f.gender_key = g.gender_key

GROUP BY

a.age_group,

r.race,

g.gender

ORDER BY

readmission_rate_percent DESC,

total_visits DESC;

age_group race gender
total_visits readmissions readmission_rate_percent

[90-100)	Hispanic	Female	15
9	60.00		
[90-100)	Hispanic	Male	10
6	60.00		
[30-40)	Other	Male	38
21	55.26		
[80-90)	Hispanic	Male	58
32	55.17		
[20-30)	Caucasian	Female	680
363	53.3		

Insights: Hispanic female patients in the 90 -100 age group have the highest chances of readmission Rate at 60%

3. Clinical Diagnosis Pattern

3.1 Top Primary Diagnoses driving Readmission

```
SELECT
TOP 10
    d1.diagnosis_code AS primary_diagnosis,
    COUNT(*) AS total_cases,
    SUM(CASE WHEN f.readmitted_flag IN ('<30','>30') THEN 1 ELSE 0 END) AS readmissions,
    CAST(
        SUM(CASE WHEN f.readmitted_flag IN ('<30','>30') THEN 1 ELSE 0 END) * 100.0
        / COUNT(*) AS DECIMAL(10,2)
    ) AS readmission_rate_percent
FROM fact.visits f
JOIN dim.diagnosis d1 ON f.diagnosis1_key = d1.diagnosis_key
GROUP BY d1.diagnosis_code
HAVING COUNT(*) > 20
ORDER BY readmission_rate_percent DESC;
```

primary_diagnosis	total_cases	readmissions	readmission_rate_percent
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282	76	63	82.89
494	25	19	76.00
V58	232	166	71.55
693	24	17	70.83
250.41	97	66	68.04
277	34	23	67.65
250.42	95	64	67.37
567	63	42	66.67
443	120	79	65.83
250.6	1269	816	64.30

Insights:

- Diagnosis Code 282 has the highest readmission rate of 82.89%
- Code 494 has the second-highest rate of 76%

3.2 Top Diagnosis Pairs (diag_1 × diag_2)

SELECT TOP 10

d1.diagnosis_code AS primary_diag,

d2.diagnosis_code AS secondary_diag,

COUNT(*) AS total_cases,

SUM(CASE WHEN f.readmitted_flag IN ('<30','>30') THEN 1 ELSE 0 END) AS
readmissions,

CAST(

```

SUM(CASE WHEN f.readmitted_flag IN ('<30','>30') THEN 1 ELSE 0 END)
* 100.0

/ COUNT(*) AS DECIMAL(10,2)

) AS readmission_rate_percent

FROM fact.visits f

JOIN dim.diagnosis d1 ON f.diagnosis1_key = d1.diagnosis_key

JOIN dim.diagnosis d2 ON f.diagnosis2_key = d2.diagnosis_key

GROUP BY d1.diagnosis_code, d2.diagnosis_code

HAVING COUNT(*) > 15

ORDER BY readmission_rate_percent DESC;

```

primary_diag	secondary_diag
total_cases	readmissions readmission_rate_percent

V57	403	21	19
90.48			
682	250.7	16	14
87.50			
493	799	19	16
84.21			
577	250.6	19	16
84.21			
428	250.4	25	21
84.00			

482	277	23	19
82.61			
250.42	403	40	33
82.50			
491	250.01	17	14
82.35			
V58	197	17	14
82.35			
493	584	17	14

4. Hospital Utilization Patterns

4.1 Readmission Rate by Length of Stay in Hospital

```

SELECT time_in_hospital,
COUNT(*) AS total_visits,
SUM(CASE WHEN f.readmitted_flag IN ('>30' , '<30') THEN 1 ELSE 0 END) AS
READMISSIONS,
  CAST(
    SUM(CASE WHEN f.readmitted_flag IN ('<30','>30') THEN 1 ELSE 0 END) * 100.0
    / COUNT(*) AS DECIMAL(10,2)
  ) AS readmission_rate
FROM fact.visits
GROUP BY time_in_hospital
ORDER BY time_in_hospital

```

time_in_hospital total_visits READMISSIONS readmission_rate

```

-----
14      1095      557      50.87
13      1257      605      48.13
12      1529      777      50.82

```


11	1936	957	49.43
10	2477	1287	51.96
9	3186	1653	51.88
8	4605	2380	51.68
7	6159	3127	50.77
6	7916	4006	50.61
5	10534	5252	49.86
4	14647	7266	49.61
3	18674	8706	46.62
2	18054	8310	46.03
1	14870	6153	41.38

Insights:

- A clear trend emerges where longer hospital stays correlate with higher readmission rates, peaking at 51.96% for 10-day stays.
- Shorter stays (1 day) have the lowest readmission rate at 41.38%, suggesting that these represent less complex cases.

4.2 Emergency Visits vs Readmission

```
SELECT
  f.number_emergency,
  COUNT(*) AS total_visits,
  SUM(CASE WHEN f.readmitted_flag IN ('<30','>30') THEN 1 ELSE 0 END) AS readmissions,
  CAST(
    SUM(CASE WHEN f.readmitted_flag IN ('<30','>30') THEN 1 ELSE 0 END) * 100.0
    / COUNT(*) AS DECIMAL(10,2)
  ) AS readmission_rate
FROM fact.visits f
GROUP BY f.number_emergency
ORDER BY f.number_emergency DESC;
```

number_emergency	total_visits	readmissions	readmission_rate

76	2	2	100.00
64	2	2	100.00
63	2	2	100.00
54	2	2	100.00
46	2	2	100.00

4.3 Total Utilization Score and Readmission

utilization_score = num_lab + num_procedures + num_medications

```
SELECT
  (f.num_lab_procedures
   + f.num_procedures
   + f.num_medications) AS utilization_score,

  COUNT(*) AS total_visits,

  SUM(CASE WHEN f.readmitted_flag IN ('<30','>30') THEN 1 ELSE 0 END) AS readmissions,

  CAST(
    SUM(CASE WHEN f.readmitted_flag IN ('<30','>30') THEN 1 ELSE 0 END) * 100.0
    / COUNT(*) AS DECIMAL(10,2)
  ) AS readmission_rate
FROM fact.visits f
GROUP BY
  (f.num_lab_procedures
   + f.num_procedures
   + f.num_medications)
ORDER BY utilization_score DESC;
```

utilization_score total_visits readmissions readmission_rate

	utilization_score	total_visits	readmissions	readmission_rate
179	1	1	100.00	
170	1	0	0.00	
168	1	0	0.00	
163	1	1	100.00	
162	2	2	100.00	
160	1	1	100.00	
159	4	2	50.00	
157	4	0	0.00	
156	4	1	25.00	
155	1	0	0.00	
154	2	1	50.00	

153	3	3	100.00
152	5	1	20.00

Insights :

Patients with the highest utilization scores (>160) frequently show very high readmission rates, often 100%, suggesting that extreme resource utilization identifies particularly complex patients.

Insights:

- Patients with no emergency visits show the lowest readmission rate at 45.46%, still quite high but significantly lower than patients with any emergency utilization.
- Having just one emergency visit increases the readmission rate to 60.63%, a jump of 15.2 percentage points compared to those with no emergency visits.
- Each additional emergency visit correlates with progressively higher readmission rates, reaching 100% for patients with 10 emergency visits.
- A particularly notable increase occurs between 0 and 1 emergency visits, suggesting that having any emergency utilization substantially increases readmission risk.

5. High Risk Cohort

5.1 Diabetic Medication

```

SELECT
  m.diabetes_med_flag AS diabetes_med_status,
  COUNT(*) AS total_visits,

  SUM(CASE WHEN f.readmitted_flag IN ('<30','>30') THEN 1 END) AS total_readmissions,

  CAST(
    SUM(CASE WHEN f.readmitted_flag IN ('<30','>30') THEN 1 END) * 100.0 /
    COUNT(*) AS DECIMAL(10,2)
  ) AS readmission_rate_percent

FROM fact.visits f

```

```
JOIN dim.medication_flags m
  ON m.medication_flag_key = f.medication_flag_key
```

```
GROUP BY m.diabetes_med_flag
ORDER BY readmission_rate_percent DESC;
```

diabetes_med_status	total_visits	total_readmissions	readmission_rate_percent
Yes	186	116	62.37
No	131	74	56.49

Insights:

- patients on diabetes medications have a higher readmission rate (62.37%) compared to those not on diabetes medications (56.49%)

Max Glucose Serum Flag

```
SELECT
  m.max_glu_serum AS glucose_flag,
  COUNT(*) AS total_visits,

  SUM(CASE WHEN f.readmitted_flag IN ('<30','>30') THEN 1 END) AS readmissions,

  CAST(
    SUM(CASE WHEN f.readmitted_flag IN ('<30','>30') THEN 1 END) * 100.0 /
    COUNT(*) AS DECIMAL(10,2)
  ) AS readmission_rate_percent
```

```
FROM fact.visits f
JOIN dim.medication_flags m
  ON m.medication_flag_key = f.medication_flag_key
```

```
GROUP BY m.max_glu_serum
ORDER BY readmission_rate_percent DESC;
```

glucose_flag	total_visits	readmissions	readmission_rate_percent
>300	140	90	64.29
>200	74	46	62.16
Norm	103	54	52.43

Insights:

The glucose level analysis shows a clear relationship between hyperglycemia and readmission risk:

- Severely elevated glucose (>300): 64.29% readmission rate
- Moderately elevated glucose (>200): 62.16% readmission rate
- Normal glucose: 52.43% readmission rate

High-Risk Cohort Combining ALL Three: DiabetesMed × Glucose × A1C

```
SELECT
    m.diabetes_med_flag,
    m.max_glu_serum,
    m.A1Cresult,

    COUNT(*) AS total_visits,
    SUM(CASE WHEN f.readmitted_flag IN ('<30','>30') THEN 1 END) AS
readmissions,

    CAST(
        SUM(CASE WHEN f.readmitted_flag IN ('<30','>30') THEN 1 END) *
100.0 /
        COUNT(*) AS DECIMAL(10,2)
    ) AS readmission_rate_percent

FROM fact.visits f
JOIN dim.medication_flags m
    ON m.medication_flag_key = f.medication_flag_key

GROUP BY
    m.diabetes_med_flag,
    m.max_glu_serum,
    m.A1Cresult

ORDER BY readmission_rate_percent DESC;
```

diabetes_med_flag	max_glu_serum	A1Cresult	
total_visits	readmissions	readmission_rate_percent	

Yes	>300	>7	11
9	81.82		
No	>200	Norm	9
7	77.78		
No	>200	>7	9
7	77.78		
No	>300	>7	4
3	75.00		
Yes	Norm	>8	14
10	71.43		
Yes	>200	>8	24
17	70.83		
No	>300	>8	43
28	65.12		
Yes	Norm	>7	17
11	64.71		
Yes	>200	Norm	8
5	62.50		
Yes	>300	>8	80
50	62.50		
No	Norm	>7	16
8	50.00		
No	Norm	>8	16
8	50.00		
Yes	>200	>7	11
5	45.45		
Yes	Norm	Norm	20
9	45.00		
No	Norm	Norm	20
8	40.00		
No	>200	>8	13
5	38.46		

No	>300	Norm	1
NULL	NULL		
Yes	>300	Norm	1
NULL	NULL		

Insights

- When all three metabolic signals are abnormal (glucose >300, A1C >7, diabetes meds = Yes), risk increases to 81%.
- Several combinations with no medication but abnormal glucose/A1C also show high risk, possibly reflecting undiagnosed or untreated diabetes progression.
- A1C values >8 appear repeatedly among high-readmission groups, indicating long-term poor glycemic control is a major driver.
- This combined view suggests that multi-factor metabolic instability is one of the strongest predictors of repeat hospitalization.