A Data Analytics Case Study for Improved Patient Care

Goal: Focusing on improving patient care while reducing unnecessary readmissions.

Scenario: The hospital has seen a spike in readmission rates, leading to increased healthcare costs and indicating potential quality of care issues. The administration is concerned about the impact on patient outcomes and the hospital's reputation.

The **task** is to analyse hospital admission data to identify patterns and factors associated with high readmission rates.

Problem statement: Addressing high readmission rates is crucial for enhancing patient care quality, optimizing hospital resource allocation, and complying with healthcare regulations. Identifying the underlying causes can lead to targeted interventions, improved patient outcomes, and potentially significant cost savings.

Column Name	Renamed Column	Description
encounter_id	EncounterID	Unique identifier of an encounter
patient_id	PatientID	Unique identifier of a patient
race	Race	Demographic information
gender	Gender	Demographic information
age	Age	Demographic information
weight	-	Patient's weight (mostly missing)
time_in_hospital	Duration	Length of hospital stay in days
medical_speciality	Speciality	Speciality of the admitting physician
num_lab_procedures	LabProcedures	Number of lab tests performed
num_procedures	Procedures	Number of procedures (ither than lab tests) performed
num_medications	Medications	Number of distinct medications prescribed
number_outpatient	TotalOutpatient	Number of outpatients visits in the year preceding the encounter
number_emergency	TotalEmergency	Number of emergency visits in the year preceding the encounter
number_inpatient	TotalInpatient	Number of inpatients visits in the year preceding the encounter
diag_1 to diag_5	Diagnosis1 to Diagnosis5	Primary and Secondary diagnosis codes
number_diagnosis	TotalDiagnosis	Number of diagnoses entered into the system
X1 to X25	Drug1 to Drug25	Indicators for various medications (specifics not provided)
change	Change	Indicates if there was a change in diabetic medications (Yes = change, No = no change)
diabetesMed	DiabetesMed	Indicates if any diabetic medication was prescribed (Yes, No)
readmitted	Readmitted	Indicates if the patient was readmitted (<30 days = 1, else = 0)

Data Cleaning Recommendations:

Based on the data review, here are the cleaning steps required to ensure the dataset is ready for analysis and visualisation in the dashboard:

Count BLANK or NULL values

=COUNTBLANK(Raw_data[encounter_id])

Tool used: Excel (Power Query)

- Rename column header appropriately
- Remove null and duplicate values
- Standardise text value
- Consistent date formats
- Correct data types

Renaming Each header column appropriately

= Table.RenameColumns(#"Removed Columns",{{"time_in_hospital", "Duration"}, {"medical_specialty", "Speciality"}, {"num_lab_procedures", "LabProcedures"}, {"num_procedures", "Procedures"}, {"num_medications", "Medications"}, {"number_outpatient", "TotalOutpatient"}, {"number_emergency", "TotalEmergency"}, {"number_inpatient", "TotalInpatient"}, {"diag_1", "Diagnosis1"}, {"diag_2", "Diagnosis2"}, {"diag_3", "Diagnosis3"}, {"diag_4", "Diagnosis4"}, {"diag_5", "Diagnosis5"}, {"number_diagnoses", "TotalDiagnosis"}, {"X1", "Drug1"}, {"X2", "Drug2"}, {"X3", "Drug3"}, {"X4", "Drug4"}, {"X5", "Drug5"}, {"X6", "Drug6"}, {"X7", "Drug7"}, {"X8", "Drug8"}, {"X9", "Drug9"}, {"X10", "Drug10"}, {"X11", "Drug11"}, {"X12", "Drug12"}, {"X13", "Drug13"}, {"X14", "Drug14"}, {"X15", "Drug15"}, {"X16", "Drug16"}, {"X17", "Drug17"}, {"X18", "Drug18"}, {"X19", "Drug19"}, {"X20", "Drug20"}, {"X21", "Drug21"}, {"X22", "Drug22"}, {"X23", "Drug23"}, {"X24", "Drug24"}, {"X25", "Drug25"}, {"change", "Change"}, {"diabetesMed", "DiabetesMed"}, {"readmitted", "Readmitted"}})

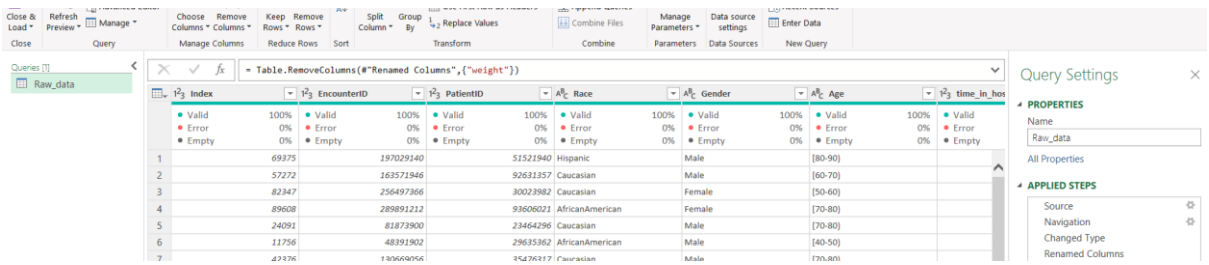
Removing “Weight” column as it only contains few inconsistent values and rest is NULL values.

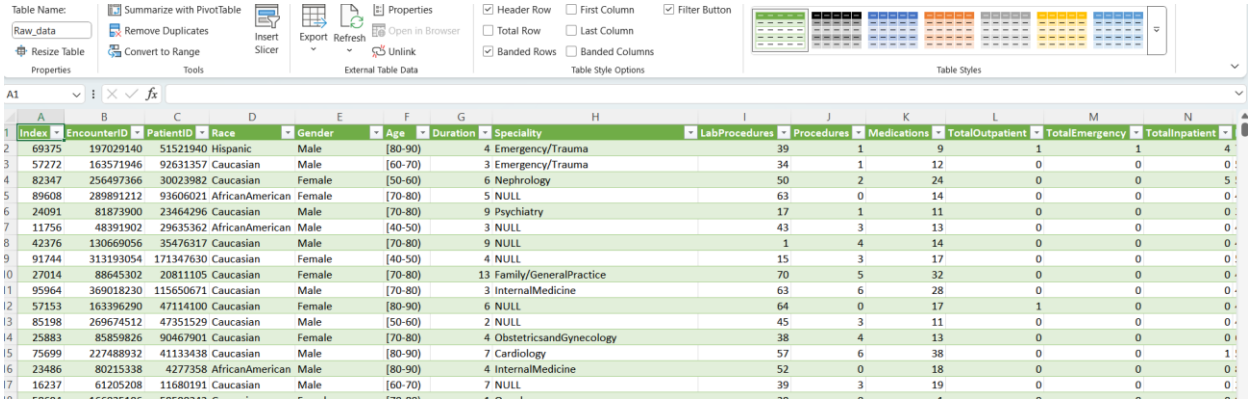
= Table.RemoveColumns(#"Replaced Value1",{"weight"})

Remove “Index” column from the data (reason: irrelevant column)

Replace “None” to “No” from column X1 & X2 to consistent the data values to the rest of the medications

= Table.ReplaceValue(#"Changed Type","None","No",Replacer.ReplaceText,{"X1"})





Index	EncounterID	PatientID	Race	Gender	Age	Duration	Speciality	LabProcedures	Procedures	Medications	TotalOutpatient	TotalEmergency	TotalInpatient
69375	197029140	51521940	Hispanic	Male	[80-90)	4	Emergency/Trauma	39	1	9	1	1	4
57272	163571946	92631357	Caucasian	Male	[60-70)	3	Emergency/Trauma	34	1	12	0	0	0
82347	256497366	30023982	Caucasian	Female	[50-60)	6	Nephrology	50	2	24	0	0	5
89608	289891212	93606021	AfricanAmerican	Female	[70-80)	5	NULL	63	0	14	0	0	0
24091	81873900	23464296	Caucasian	Male	[70-80)	9	Psychiatry	17	1	11	0	0	0
11756	48391902	29635362	AfricanAmerican	Male	[40-50)	3	NULL	43	3	13	0	0	0
42376	130669056	35476317	Caucasian	Male	[70-80)	9	NULL	1	4	14	0	0	0
91744	313193054	171347630	Caucasian	Female	[40-50)	4	NULL	15	3	17	0	0	0
27014	88645302	20811105	Caucasian	Female	[70-80)	13	Family/GeneralPractice	70	5	32	0	0	0
95964	369018230	115650671	Caucasian	Male	[70-80)	3	InternalMedicine	63	6	28	0	0	0
57153	163396290	47114100	Caucasian	Female	[80-90)	6	NULL	64	0	17	1	0	0
85198	269674512	47351529	Caucasian	Male	[50-60)	2	NULL	45	3	11	0	0	0
25883	85859826	90467901	Caucasian	Female	[70-80)	4	ObstetricsandGynecology	38	4	13	0	0	0
75699	227488932	41133438	Caucasian	Male	[80-90)	7	Cardiology	57	6	38	0	0	1
23486	80215338	4277358	AfricanAmerican	Male	[80-90)	4	InternalMedicine	52	0	18	0	0	0
16237	61205208	11680191	Caucasian	Male	[60-70)	7	NULL	39	3	19	0	0	0