
# Data warehousing and Business Intelligence - IT3021

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Assignment 2

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## Data Source

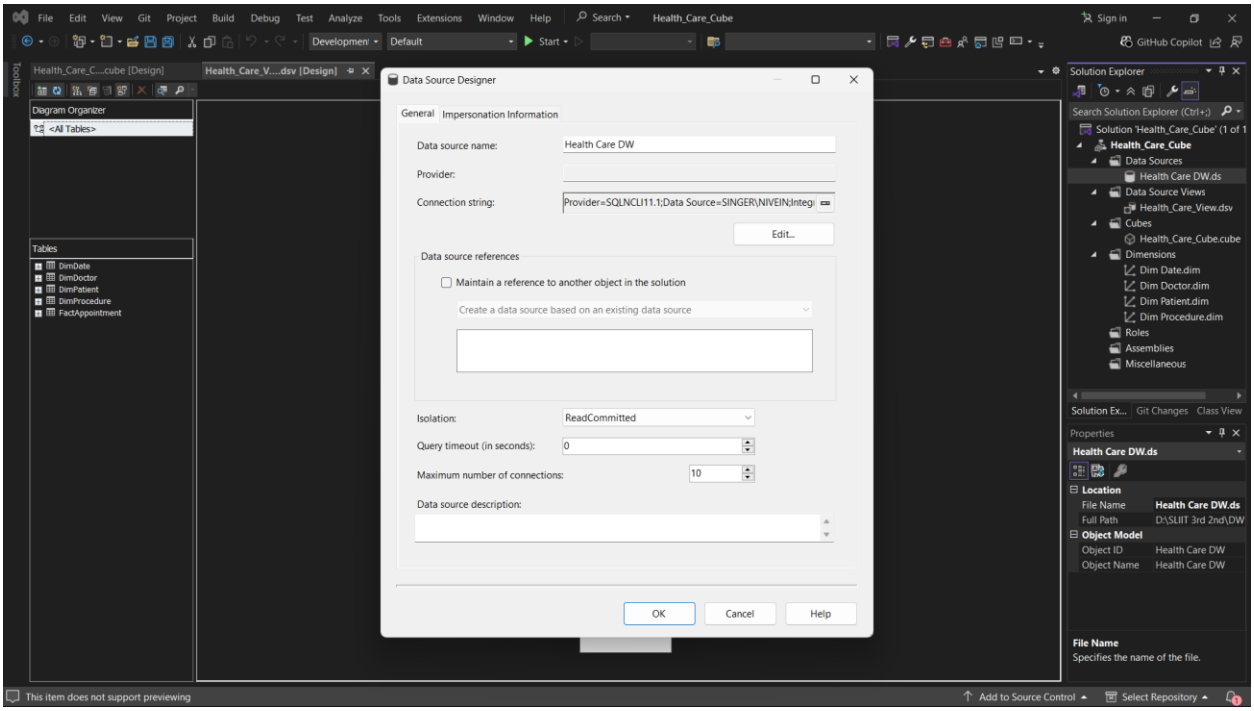
This dataset captures information related to healthcare appointments, billing, doctors, medical procedures, and patients in a hospital or clinic environment. It is modeled after a real-world OLTP (Online Transaction Processing) system where daily transactions such as patient registrations, medical consultations, procedure scheduling, and billing are recorded. These data are been loaded to a staging database and then loaded to the data warehouse.

## Entities and Their Purpose

1. **DimPatien**
    - Stores personal and contact details of the patients.
    - Attributes: PatientID, FirstName, LastName, Email
2. **DimDoctor**
    - Contains professional and contact information of doctors.
    - Attributes: DoctorID, DoctorName, Specialization, DoctorContact
3. **FactAppointment**
    - Represents a patient's appointment with a doctor.
    - Calculate the time for the procedures.
4. **DimMedical Procedure**
    - Holds details about procedures assigned during appointments (e.g., blood tests, scans).
    - Attributes: ProcedureID, ProcedureName, ProcedureType, Cost.
5. **DimDate**
    - Includes the dates where the appointments and procedures are done.

## SSAS Cube Implementation

- First, I loaded my data in the data warehouse to the Data Source Designer.
- Next, I created the Data ware house view.
- Then I started to use the implement the cube by using the wizard. Mentioned the relevant fact tables and dimension tables as well.



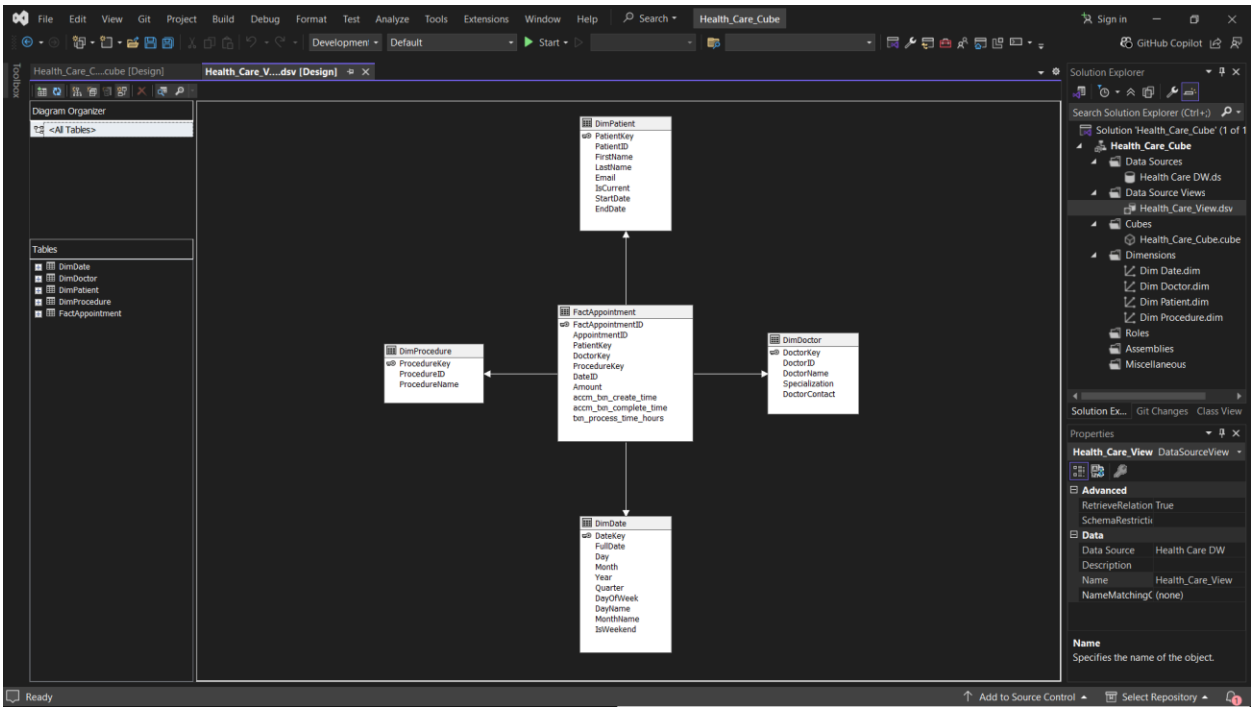

File Edit View Git Project Build Debug Format Test Analyze Tools Extensions Window Help
Health_Care_Cube
Sign in
GitHub Copilot
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Diagram Organizer
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Tables
DimDate
DimDoctor
DimPatient
DimsProcedure
FactAppointment
DimPatient
PatientKey
PatientID
FirstName
LastName
Email
IsCurrent
StartDate
EndDate
FactAppointment
FactAppointmentID
AppointmentID
PatientKey
DoctorKey
ProcedureKey
DateID
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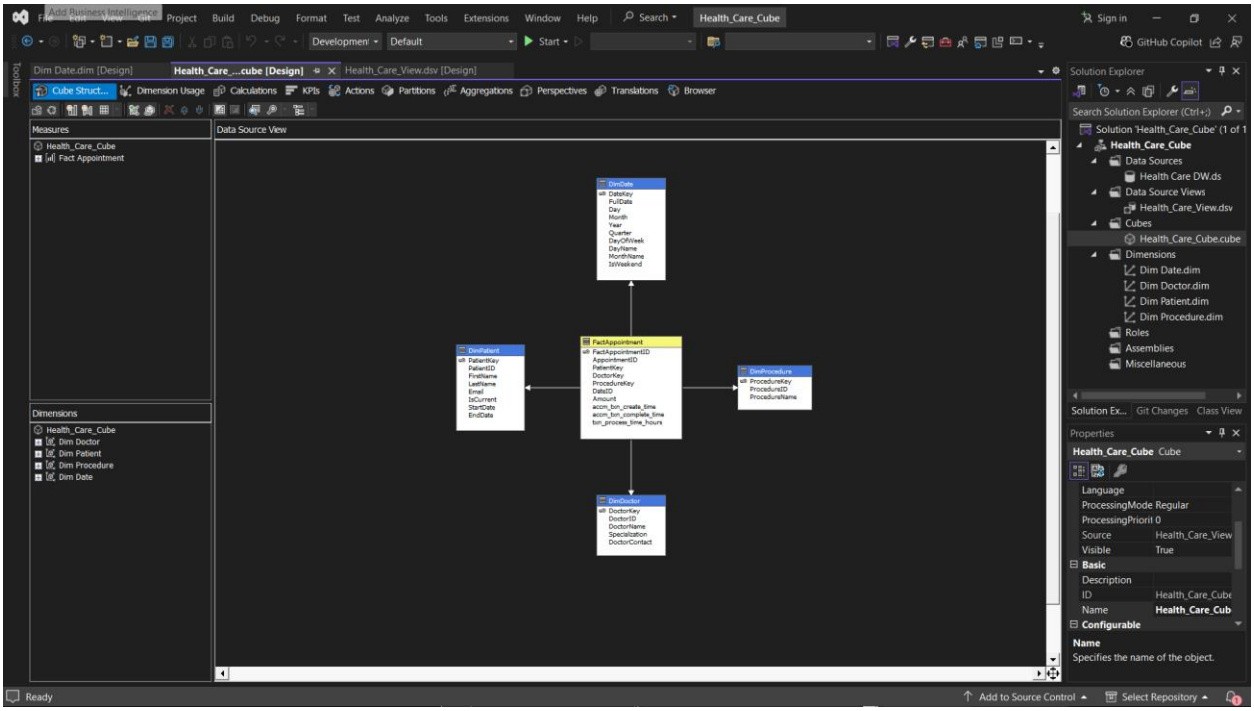
txn_process_time_hours
DimProcedure
ProcedureKey
ProcedureID
ProcedureName
DimDoctor
DoctorKey
DoctorID
DoctorName
Specialization
DoctorContact
DimDate
DateKey
FullDate
Day
Month
Year
Quarter
DayOfWeek
DayName
MonthName
IsWeekend
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'Health_Care_Cube' (1 of 1
Health_Care_Cube
Data Sources
Health Care DW.ds
Data Source Views
Health_Care_View.dsv
Cubes
Health_Care_Cube.cube
Dimensions
Dim Date.dim
Dim Doctor.dim
Dim Patient.dim
Dim Procedure.dim
Roles
Assemblies
Miscellaneous
Properties
Health_Care_View DataSourceView
Advanced
Data
Data Source Health Care DW
Description
Name Health_Care_View
Name
Specifies the name of the object.
Ready
Add to Source Control
Select Repository


Health_Care_Cube
Sign in
GitHub Copilot
Dim Date.dim [Design]
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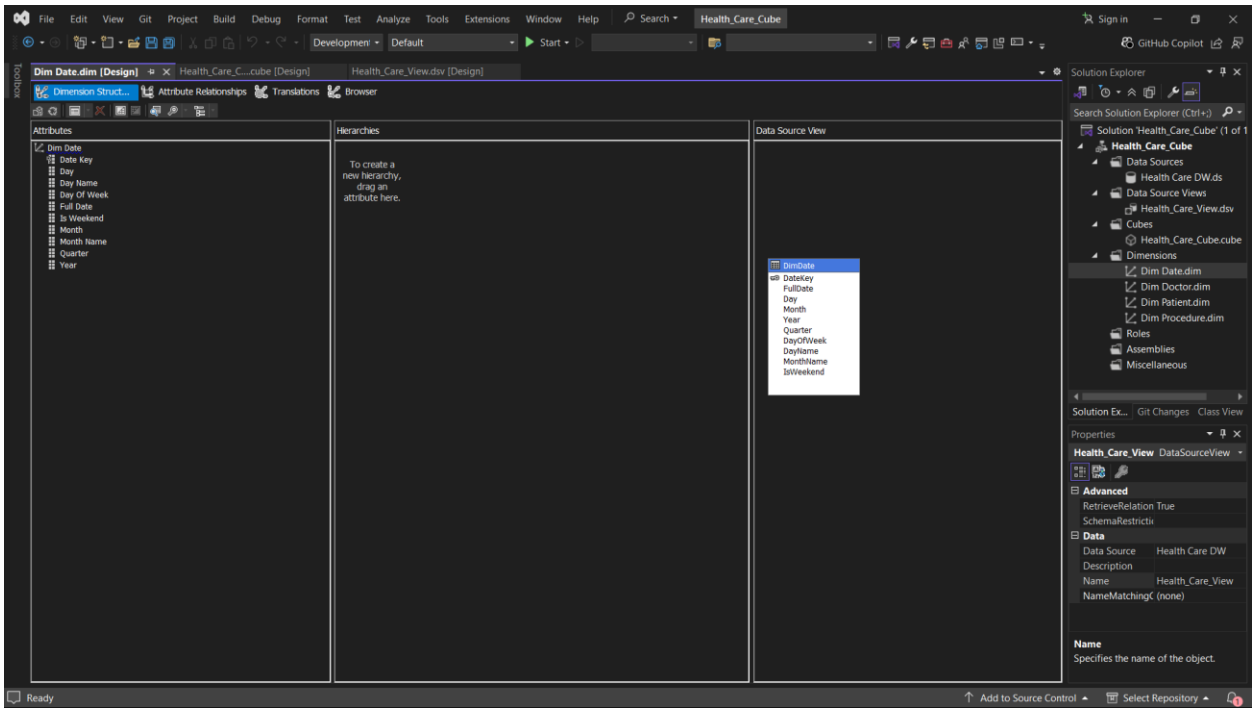
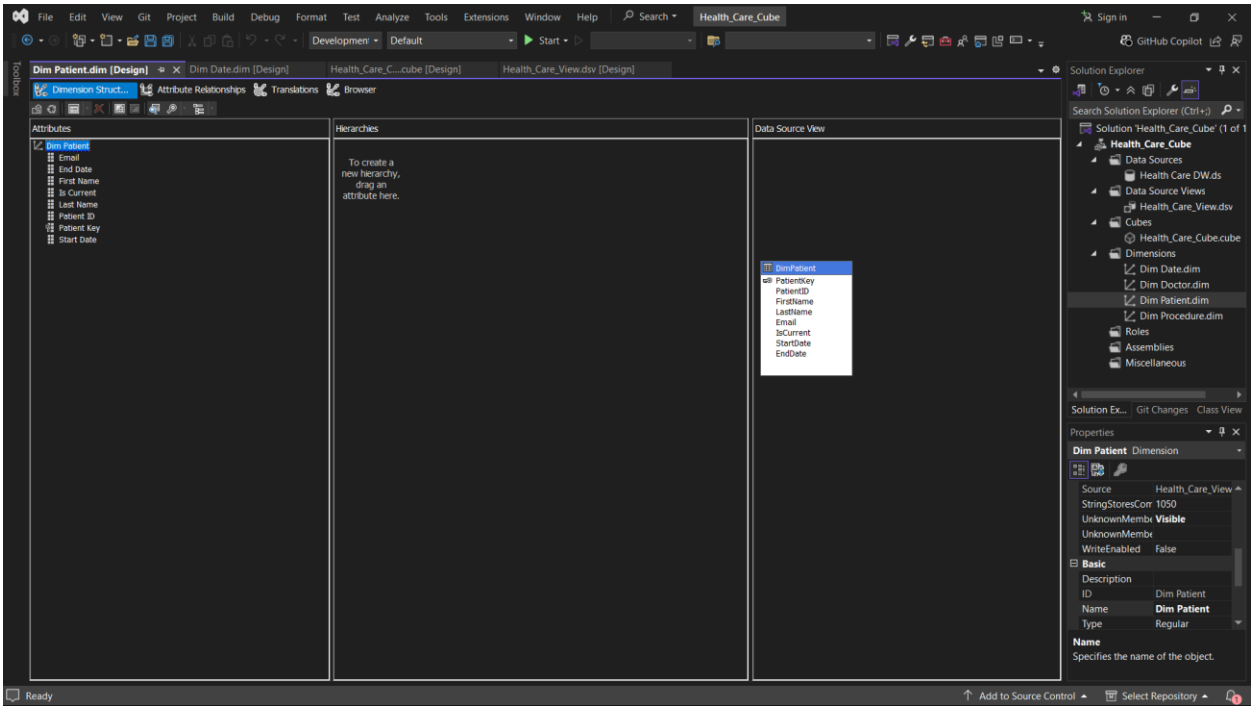
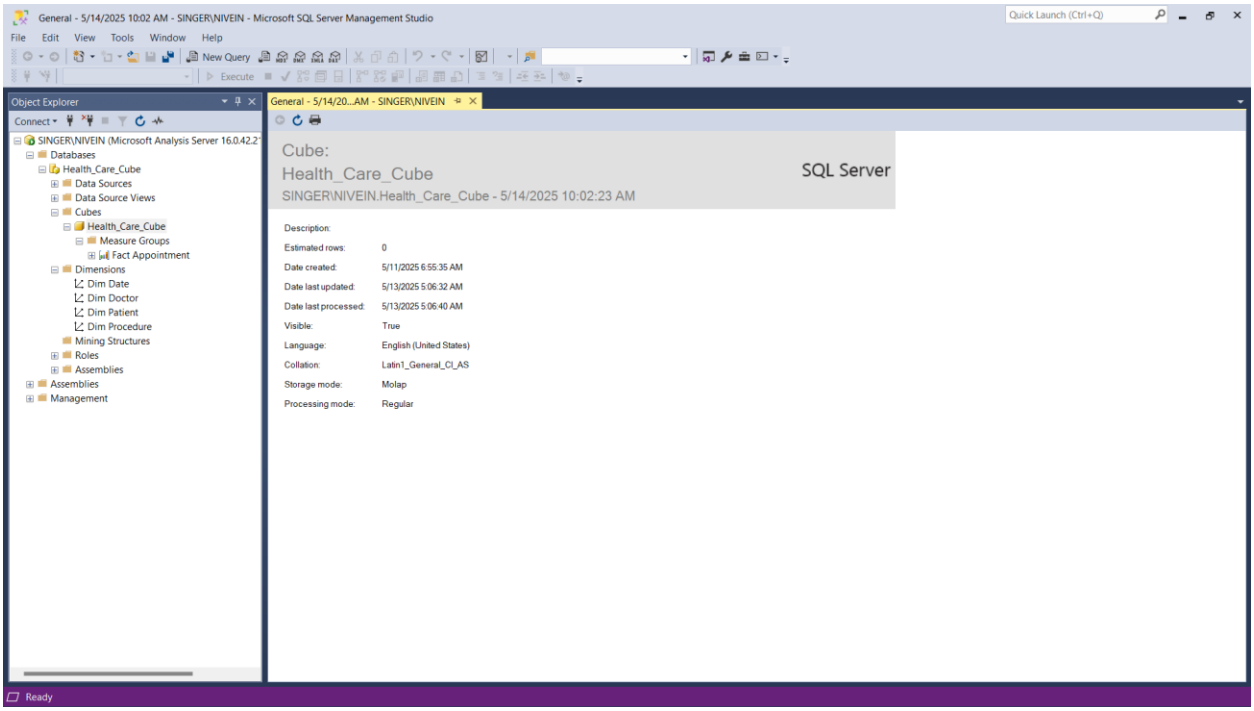
Cube Struct...
Dimension Usage
Calculations
KPIs
Actions
Partitions
Aggregations
Perspectives
Translations
Browser
Measures
Health_Care_Cube
Fact Appointment
Data Source View
Dimensions
Health_Care_Cube
Dim Doctor
Dim Patient
Dim Procedure
Dim Date
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'Health_Care_Cube' (1 of 1
Health_Care_Cube
Data Sources
Health Care DW.ds
Data Source Views
Health_Care_View.dsv
Cubes
Health_Care_Cube.cube
Dimensions
Dim Date.dim
Dim Doctor.dim
Dim Patient.dim
Dim Procedure.dim
Roles
Assemblies
Miscellaneous
Properties
Health_Care_Cube Cube
Language
ProcessingMode Regular
Source Health_Care_View
Visible True
Basic
Description
Configurable
Name
Specifies the name of the object.
Ready
Add to Source Control
Select Repository

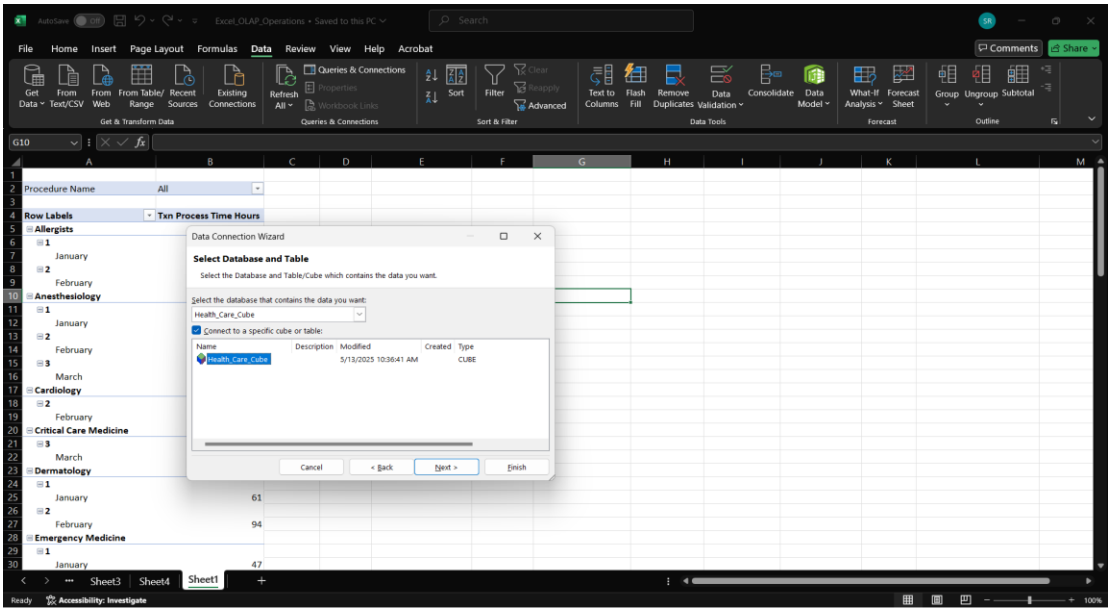

Dim Date.dim [Design]
Attributes
Hierarchies
Data Source View
To create a new hierarchy, drag an attribute here.
Dim Date
Date Key
Day
Day Name
Day Of Week
Full Date
Is Weekend
Month
Month Name
Quarter
Year
DimDate
DateKey
FullDate
Day
Month
Year
Quarter
DayOfWeek
DayName
MonthName
IsWeekend
Solution Explorer
Health_Care_Cube
Data Sources
Health Care DW.ds
Data Source Views
Health_Care_View.dsv
Cubes
Health_Care_Cube.cube
Dimensions
Dim Date.dim
Dim Doctor.dim
Dim Patient.dim
Dim Procedure.dim
Roles
Assemblies
Miscellaneous
Properties
Name
Specifies the name of the object.
Ready


Dim Patient.dim [Design]
Attributes
Hierarchies
Data Source View
To create a new hierarchy, drag an attribute here.
Dim Patient
Email
End Date
First Name
Is Current
Last Name
Patient ID
Patient Key
Start Date
DimPatient
PatientKey
PatientID
FirstName
LastName
Email
IsCurrent
StartDate
EndDate
Solution Explorer
Health_Care_Cube
Data Sources
Health Care DW.ds
Data Source Views
Health_Care_View.dsv
Cubes
Health_Care_Cube.cube
Dimensions
Dim Date.dim
Dim Doctor.dim
Dim Patient.dim
Dim Procedure.dim
Roles
Assemblies
Miscellaneous
Properties
Name
Specifies the name of the object.
Ready



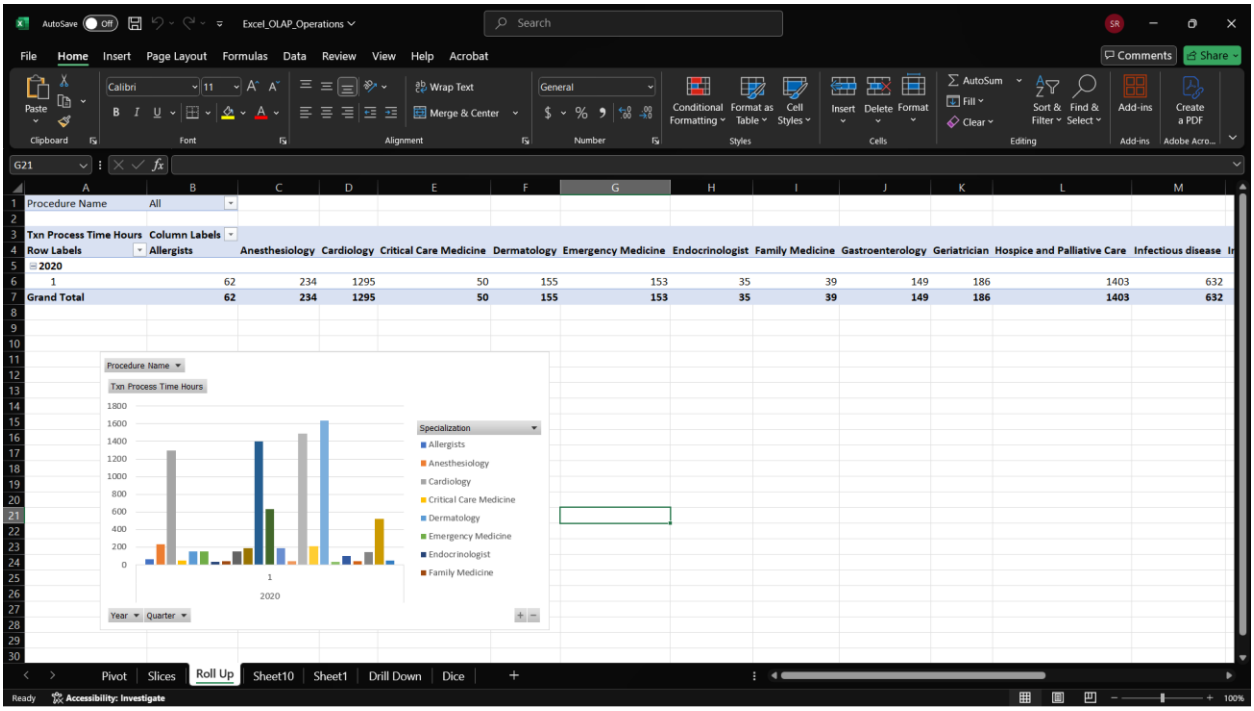

## OLAP operations

- After loading the data into the cube I use the excel to create the pivot tables using the cube that I have implemented.



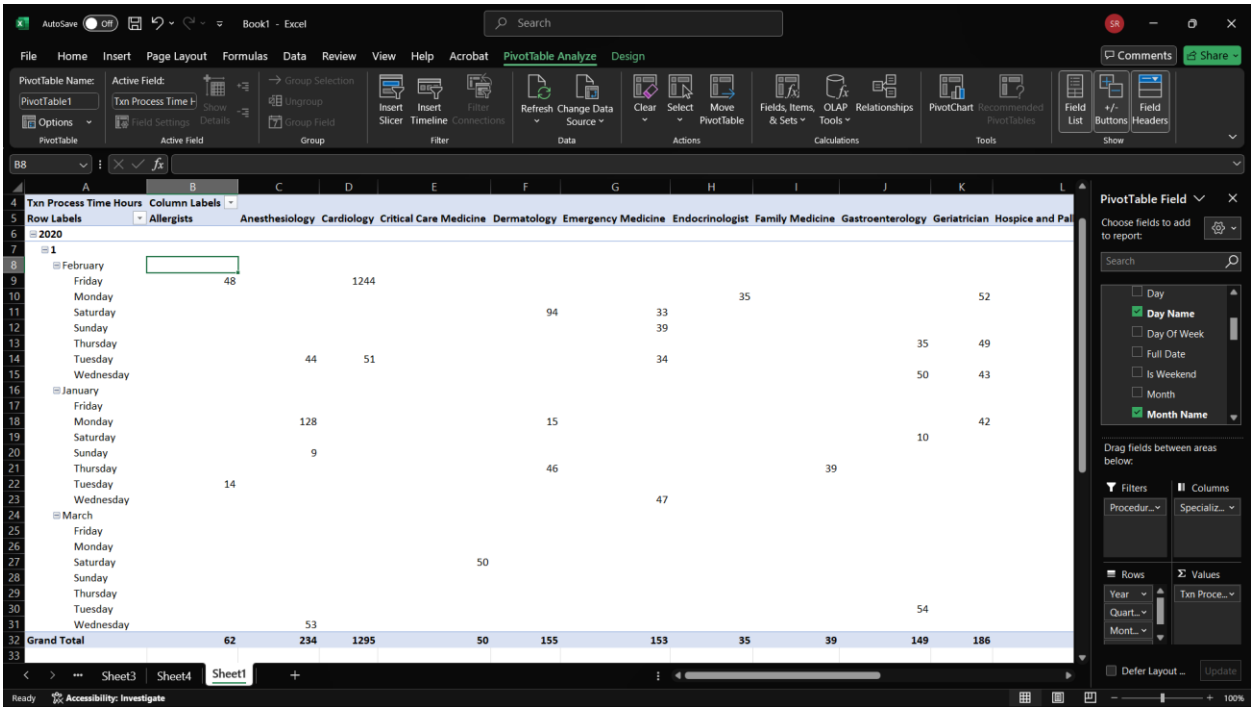
1. Roll-Up

   - Here I first used Year and Quarter as rows. Then I drag Month under the Quarter.

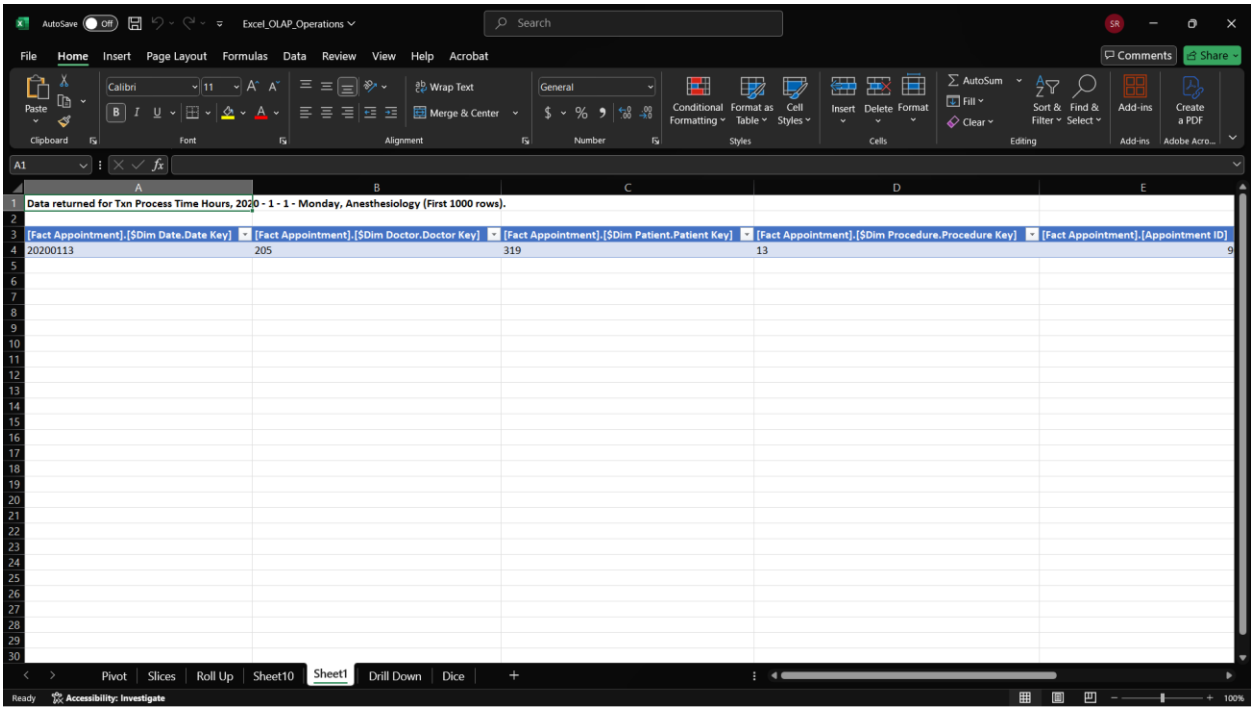


2. Drill-Down

- Here I have used Year – Quarter – Month – Day to visualize the data.



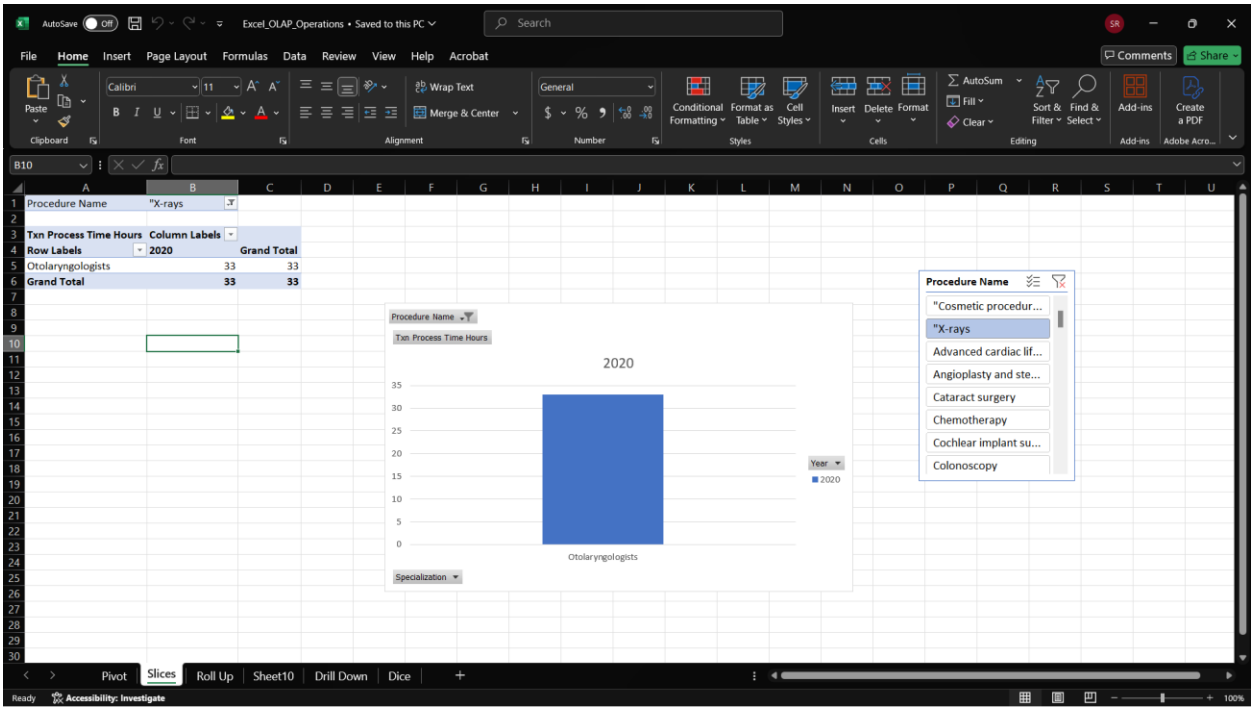
| Txn Process Time Hours | Column Labels | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Row Labels | Allergists | Anesthesiology | Cardiology | Critical Care Medicine | Dermatology | Emergency Medicine | Endocrinologist | Family Medicine | Gastroenterology | Geriatrician | Hospice and Pal |
| 2020 | | | | | | | | | | | |
| 1 | | | | | | | | | | | |
| February | | | | | | | | | | | |
| Friday | 48 | | 1244 | | | | | | | | |
| Monday | | | | | | | 35 | | | 52 | |
| Saturday | | | | | 94 | 33 | | | | | |
| Sunday | | | | | | 39 | | | | | |
| Thursday | | | | | | | | | 35 | 49 | |
| Tuesday | | 44 | 51 | | | 34 | | | | | |
| Wednesday | | | | | | | | | 50 | 43 | |
| January | | | | | | | | | | | |
| Friday | | | | | | | | | | | |
| Monday | | 128 | | | 15 | | | | | 42 | |
| Saturday | | | | | | | | | 10 | | |
| Sunday | | 9 | | | | | | | | | |
| Thursday | | | | | 46 | | | 39 | | | |
| Tuesday | 14 | | | | | | | | | | |
| Wednesday | | | | | | 47 | | | | | |
| March | | | | | | | | | | | |
| Friday | | | | | | | | | | | |
| Monday | | | | | | | | | | | |
| Saturday | | | | 50 | | | | | | | |
| Sunday | | | | | | | | | | | |
| Thursday | | | | | | | | | | | |
| Tuesday | | | | | | | | | 54 | | |
| Wednesday | | 53 | | | | | | | | | |
| Grand Total | 62 | 234 | 1295 | 50 | 155 | 153 | 35 | 39 | 149 | 186 | |



| Data returned for Txn Process Time Hours, 2020 - 1 - 1 - Monday, Anesthesiology (First 1000 rows). | | | | |
|---|---|---|---|---|
| [Fact Appointment].[$Dim Date.Date Key] | [Fact Appointment].[$Dim Doctor.Doctor Key] | [Fact Appointment].[$Dim Patient.Patient Key] | [Fact Appointment].[$Dim Procedure.Procedure Key] | [Fact Appointment].[Appointment ID] |
| 20200113 | 205 | 319 | 13 | 9 |

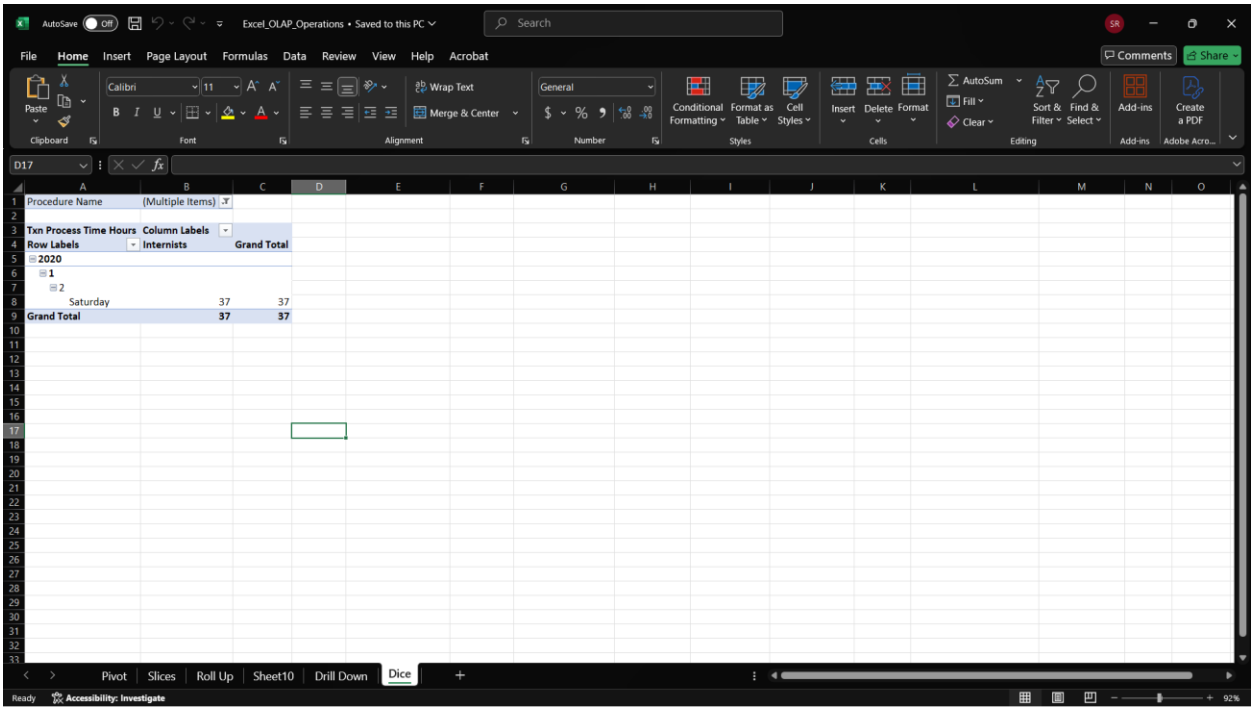
3. Slice

- Here I have used Procedure name to filter the pane.



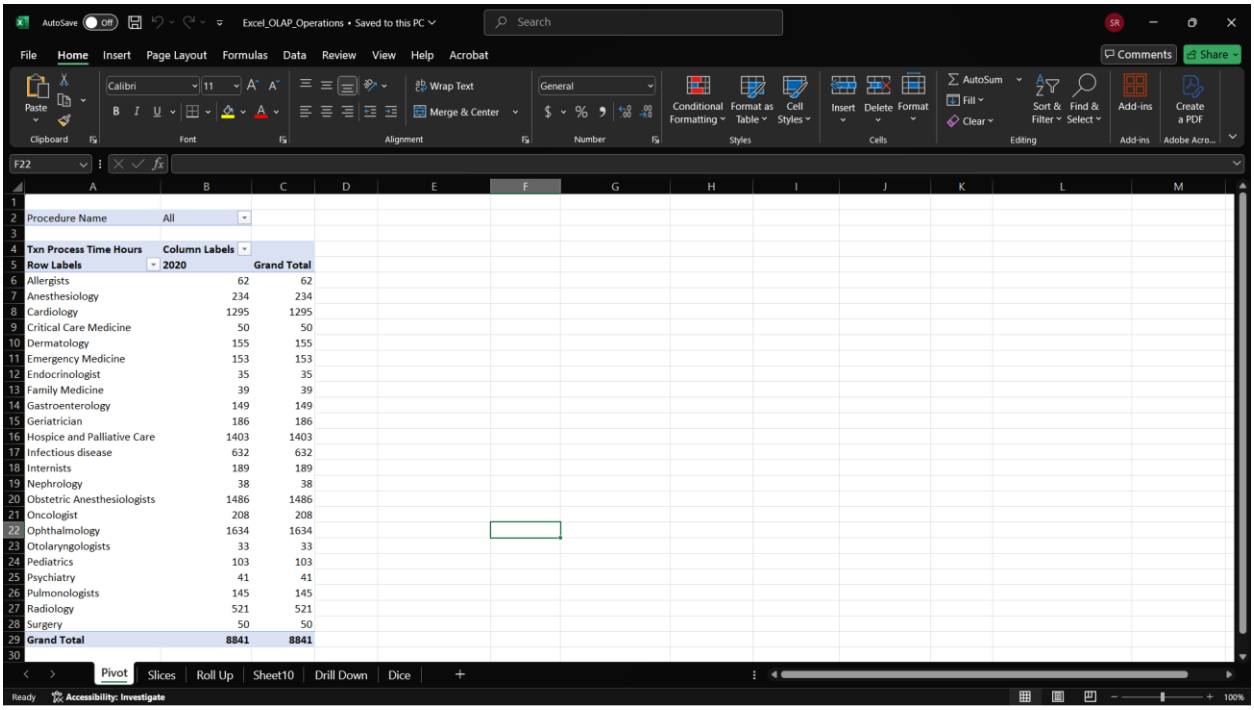
4. Dice

- Here I have used Year as rows and Doctor Specialization as Columns and used Procedure Name as the filter.



5. Pivot

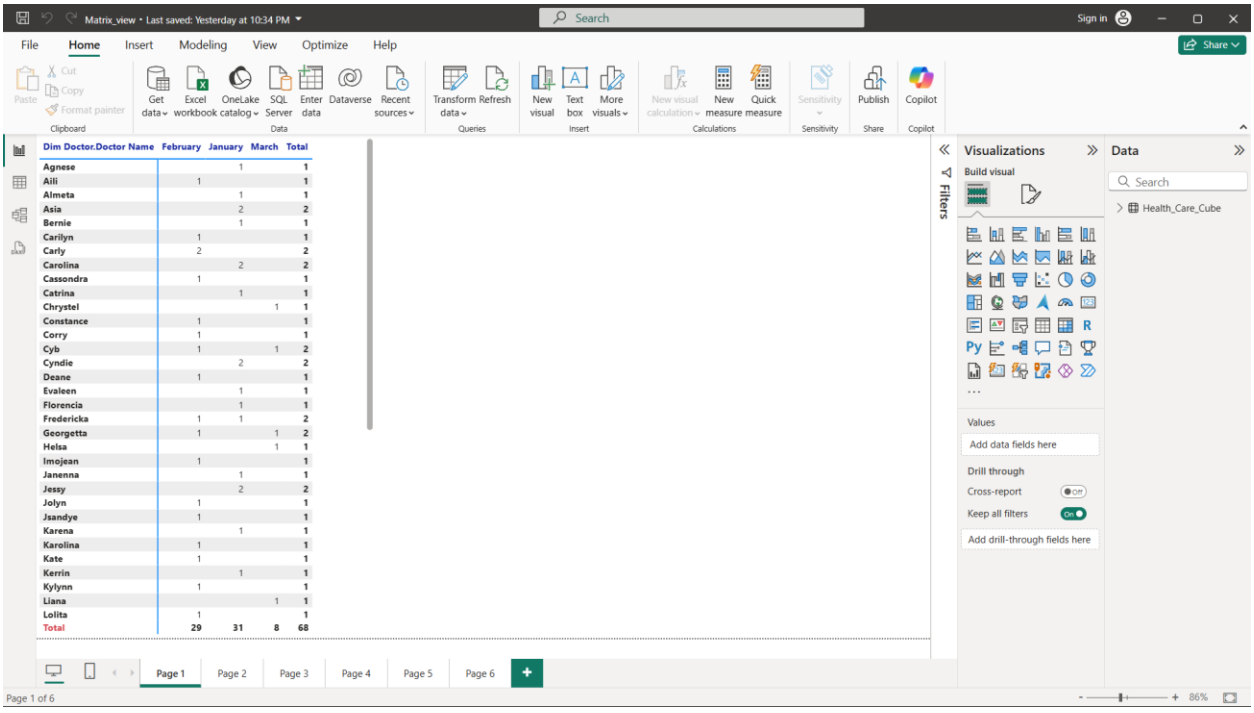
- Here I have used Doctor Specializtion as the columns and Year for the rows.



| Procedure Name | All | |
|---|---|---|
| | | |
| Txn Process Time Hours | Column Labels | |
| Row Labels | 2020 | Grand Total |
| Allergists | 62 | 62 |
| Anesthesiology | 234 | 234 |
| Cardiology | 1295 | 1295 |
| Critical Care Medicine | 50 | 50 |
| Dermatology | 155 | 155 |
| Emergency Medicine | 153 | 153 |
| Endocrinologist | 35 | 35 |
| Family Medicine | 39 | 39 |
| Gastroenterology | 149 | 149 |
| Geriatrician | 186 | 186 |
| Hospice and Palliative Care | 1403 | 1403 |
| Infectious disease | 632 | 632 |
| Internists | 189 | 189 |
| Nephrology | 38 | 38 |
| Obstetric Anesthesiologists | 1486 | 1486 |
| Oncologist | 208 | 208 |
| Ophthalmology | 1634 | 1634 |
| Otolaryngologists | 33 | 33 |
| Pediatrics | 103 | 103 |
| Psychiatry | 41 | 41 |
| Pulmonologists | 145 | 145 |
| Radiology | 521 | 521 |
| Surgery | 50 | 50 |
| Grand Total | 8841 | 8841 |

# PowerBI Reports

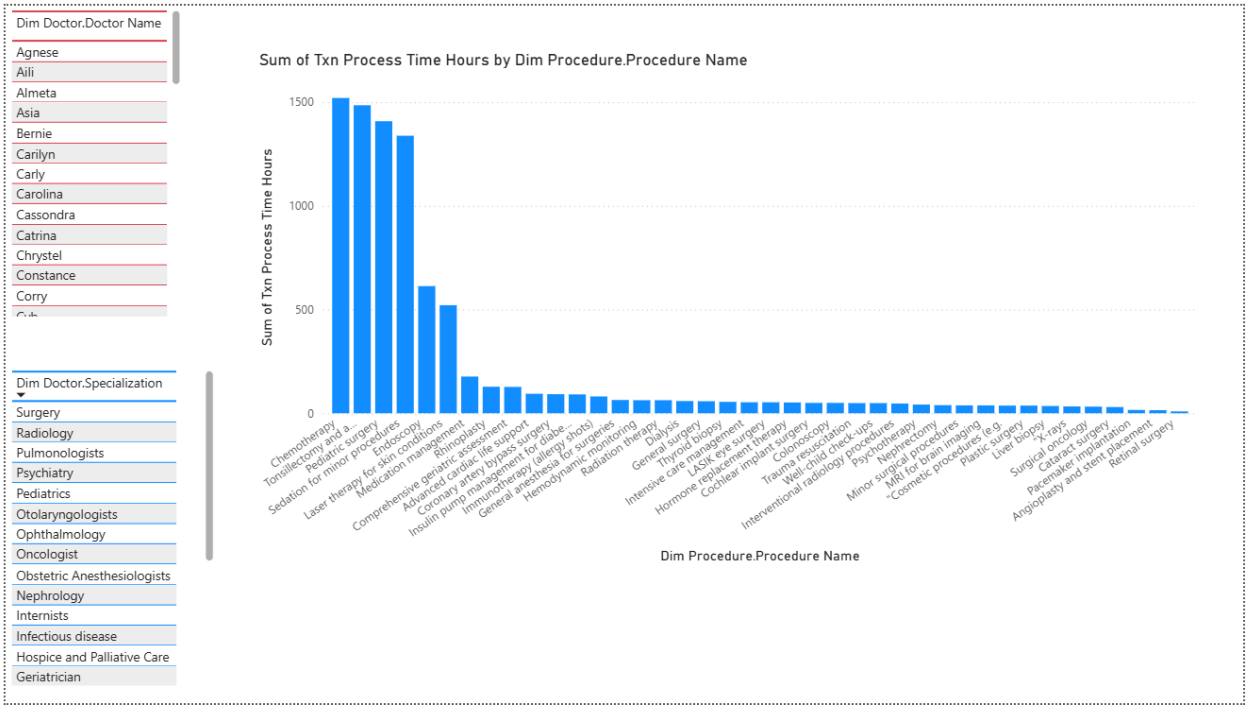
1. Report 1
   - Used Matrix visual to display detailed data.


| Dim Doctor.Doctor Name | February | January | March | Total |
|---|---|---|---|---|
| Agnese | | 1 | | 1 |
| Aili | 1 | | | 1 |
| Almeta | | 1 | | 1 |
| Asia | | 2 | | 2 |
| Bernie | | 1 | | 1 |
| Carilyn | 1 | | | 1 |
| Carly | 2 | | | 2 |
| Carolina | | 2 | | 2 |
| Cassondra | 1 | | | 1 |
| Catrina | | 1 | | 1 |
| Chrystel | | | 1 | 1 |
| Constance | 1 | | | 1 |
| Corry | 1 | | | 1 |
| Cyb | 1 | | 1 | 2 |
| Cyndie | | 2 | | 2 |
| Deane | 1 | | | 1 |
| Evaleen | | 1 | | 1 |
| Florencia | | 1 | | 1 |
| Fredericka | 1 | 1 | | 2 |
| Georgetta | 1 | | 1 | 2 |
| Helsa | | | 1 | 1 |
| Imojean | 1 | | | 1 |
| Janenna | | 1 | | 1 |
| Jessy | | 2 | | 2 |
| Jolyn | 1 | | | 1 |
| Jsandye | 1 | | | 1 |
| Karena | | 1 | | 1 |
| Karolina | 1 | | | 1 |
| Kate | 1 | | | 1 |
| Kerrin | | 1 | | 1 |
| Kylynn | 1 | | | 1 |
| Liana | | | 1 | 1 |
| Lolita | 1 | | | 1 |
| Total | 29 | 31 | 8 | 68 |

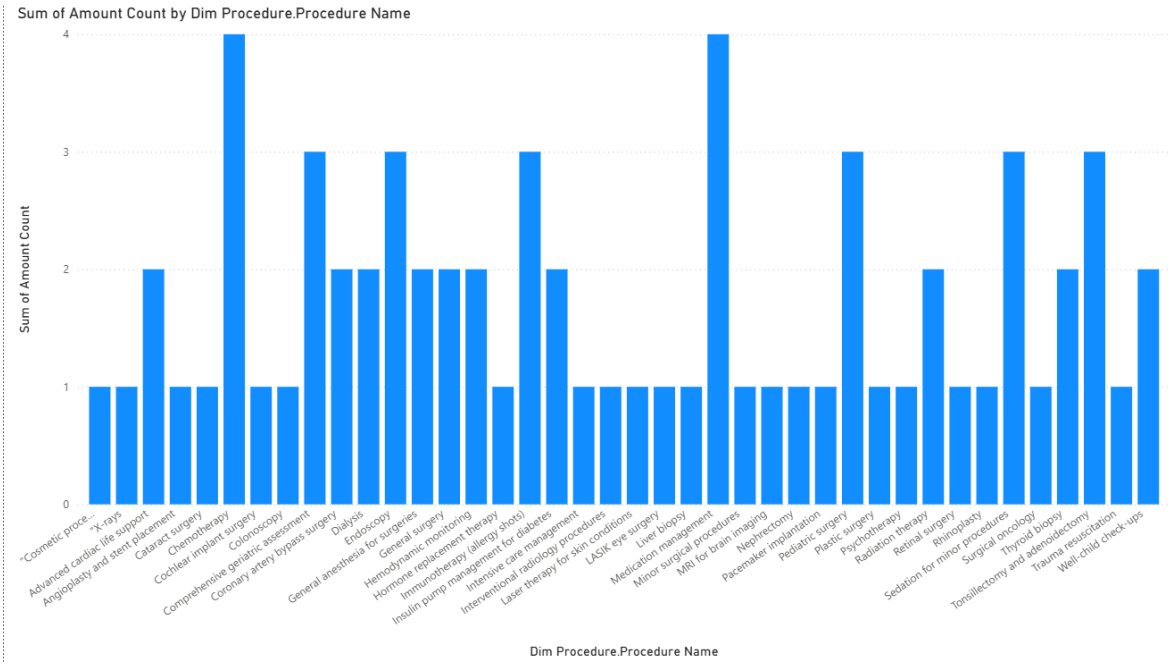
2. Report 2

➢ Here to create a report with multiple slicers I have used following visuals.



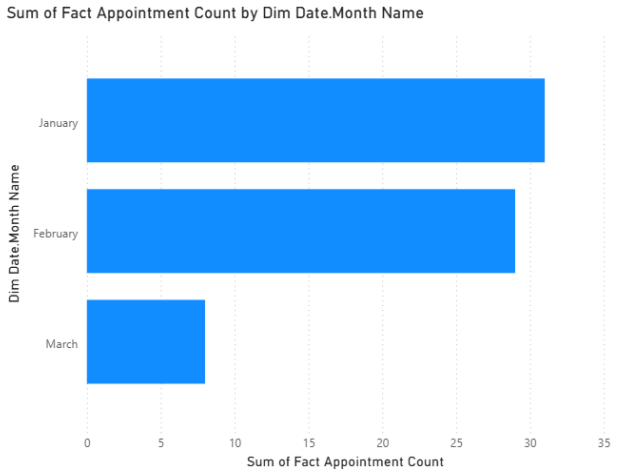

3. Report 3

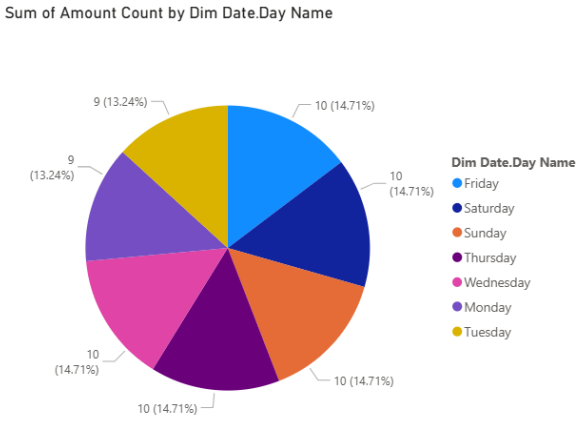
➢ To create a Drill down report I have used Amount count and Procedure Name for the first visualization and when we select a specific procedure Name it will drill down and shows us the Specialization of the doctor.

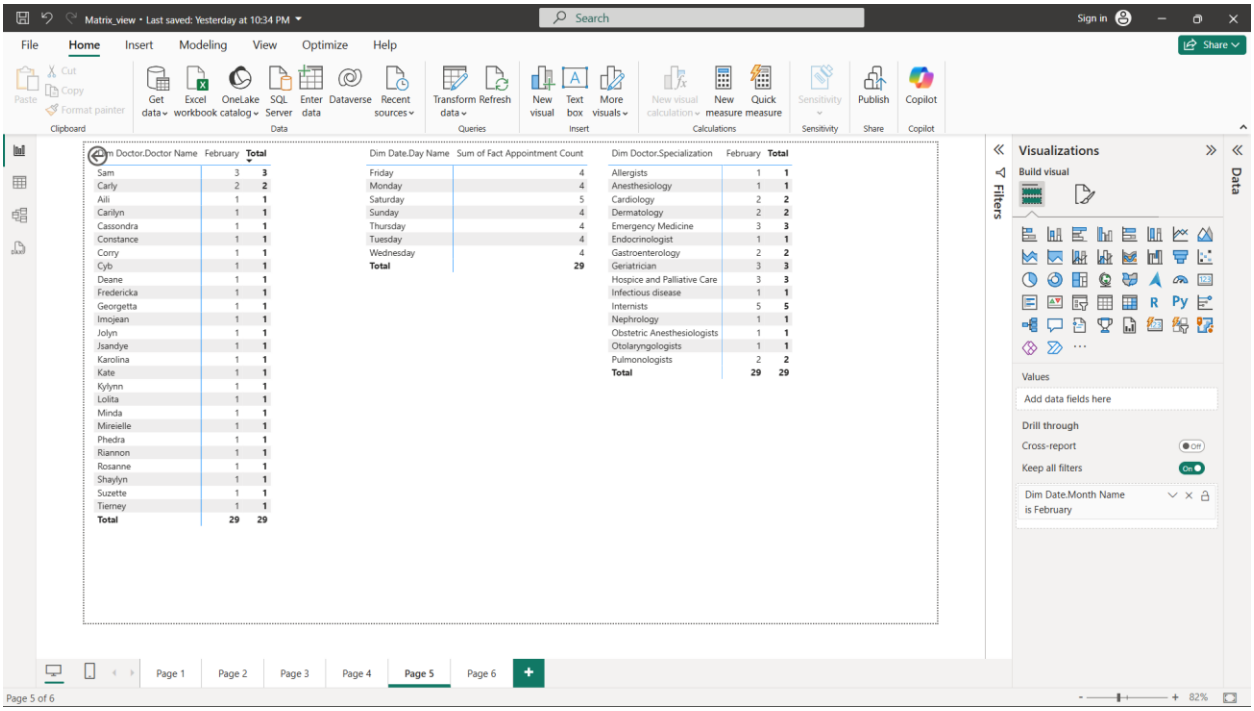


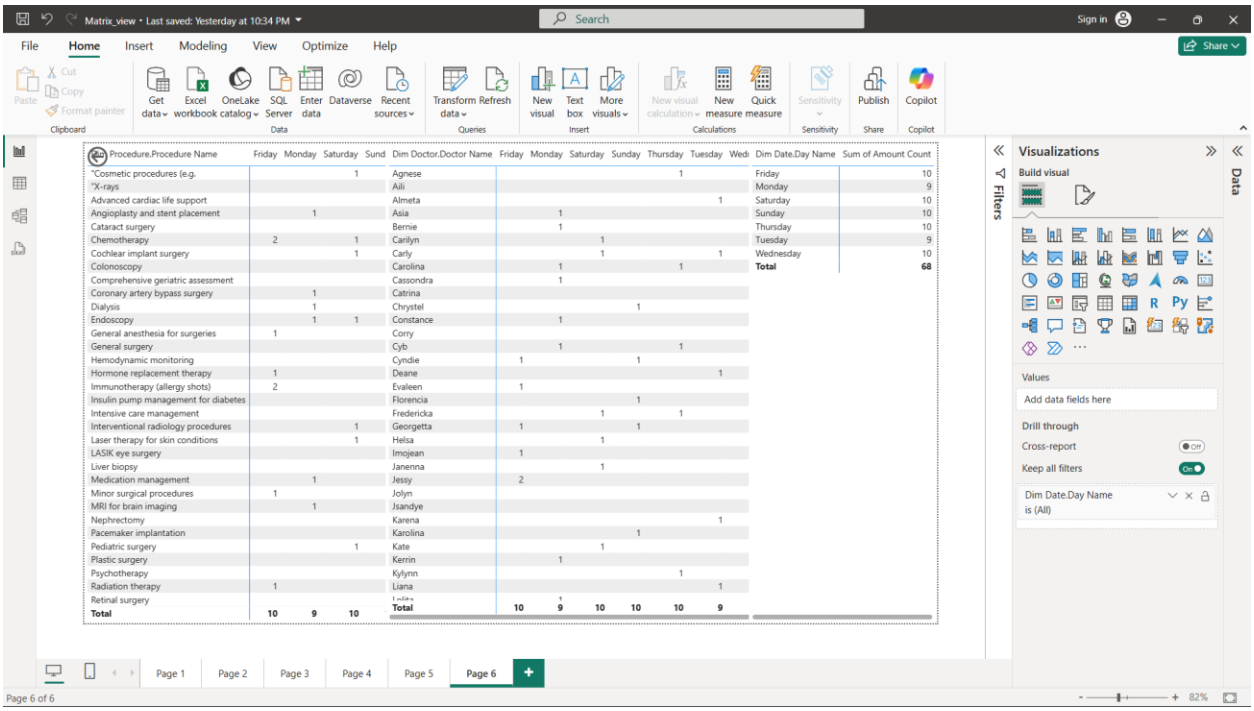
4. Report 4

   - Here I created a drill through process. I used Pie chart and Stacked Bar Chart. When we right click and drill through it moves us to two different pages, where I have visualize the data by a matrix view.






| Procedure.Procedure Name | Friday | Monday | Saturday | Sund |
|---|---|---|---|---|
| "Cosmetic procedures (e.g. | | | 1 | |
| "X-rays | | | | |
| Advanced cardiac life support | | | | |
| Angioplasty and stent placement | | 1 | | |
| Cataract surgery | | | | |
| Chemotherapy | 2 | | 1 | |
| Cochlear implant surgery | | | 1 | |
| Colonoscopy | | | | |
| Comprehensive geriatric assessment | | | | |
| Coronary artery bypass surgery | | 1 | | |
| Dialysis | | 1 | | |
| Endoscopy | | 1 | 1 | |
| General anesthesia for surgeries | 1 | | | |
| General surgery | | | | |
| Hemodynamic monitoring | | | | |
| Hormone replacement therapy | 1 | | | |
| Immunotherapy (allergy shots) | 2 | | | |
| Insulin pump management for diabetes | | | | |
| Intensive care management | | | | |
| Interventional radiology procedures | | | 1 | |
| Laser therapy for skin conditions | | | 1 | |
| LASIK eye surgery | | | | |
| Liver biopsy | | | | |
| Medication management | | 1 | | |
| Minor surgical procedures | 1 | | | |
| MRI for brain imaging | | 1 | | |
| Nephrectomy | | | | |
| Pacemaker implantation | | | | |
| Pediatric surgery | | | 1 | |
| Plastic surgery | | | | |
| Psychotherapy | | | | |
| Radiation therapy | 1 | | | |
| Retinal surgery | | | | |
| **Total** | **10** | **9** | **10** | |

| Dim Doctor.Doctor Name | Friday | Monday | Saturday | Sunday | Thursday | Tuesday | Wedı |
|---|---|---|---|---|---|---|---|
| Agnese | | | | | 1 | | |
| Aili | | | | | | | |
| Almeta | | | | | | 1 | |
| Asia | | 1 | | | | | |
| Bernie | | 1 | | | | | |
| Carilyn | | | 1 | | | | |
| Carly | | | 1 | | | 1 | |
| Carolina | | 1 | | | 1 | | |
| Cassondra | | 1 | | | | | |
| Catrina | | | | | | | |
| Chrystel | | | | 1 | | | |
| Constance | | 1 | | | | | |
| Corry | | | | | | | |
| Cyb | | 1 | | | 1 | | |
| Cyndie | 1 | | | 1 | | | |
| Deane | | | | | | 1 | |
| Evaleen | 1 | | | | | | |
| Florencia | | | | 1 | | | |
| Fredericka | | | 1 | | 1 | | |
| Georgetta | 1 | | | 1 | | | |
| Helsa | | | 1 | | | | |
| Imojean | 1 | | | | | | |
| Janenna | | | 1 | | | | |
| Jessy | 2 | | | | | | |
| Jolyn | | | | | | | |
| Jsandye | | | | | | | |
| Karena | | | | | | 1 | |
| Karolina | | | | 1 | | | |
| Kate | | | 1 | | | | |
| Kerrin | | 1 | | | | | |
| Kylynn | | | | | 1 | | |
| Liana | | | | | | 1 | |
| Lolita | | 1 | | | | | |
| **Total** | **10** | **9** | **10** | **10** | **10** | **9** | |

| Dim Date.Day Name | Sum of Amount Count |
|---|---|
| Friday | 10 |
| Monday | 9 |
| Saturday | 10 |
| Sunday | 10 |
| Thursday | 10 |
| Tuesday | 9 |
| Wednesday | 10 |
| **Total** | **68** |