

GETTING STARTED WITH POWER BI

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INTRODUCTION

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CONFLICT OF INTEREST STATEMENT

- I, Russel Loski confirm that I do not have any financial, professional, or personal affiliations that could influence or bias my participation in this project.
- I am committed to providing objective and unbiased services, adhering to the highest standards of integrity and transparency.
- I have no relationships with pharmaceutical companies, medical device manufacturers, or other organizations that could pose a conflict of interest.
- I pledge to disclose any potential conflicts that may arise in the future and to act in the best interest of the healthcare organization and its patients.

INTRODUCTION TO POWER BI



GOAL OF ANALYTICS SOFTWARE

- Clean up data
- Make it easier for less technical users access data
- Test various hypotheses from the data
- Share the results with others

MULTIPLE DATASOURCES



SURVEY

- What analytics software do you use?

ANALYTICS TOOLS SURVEY



ACCESS TO FREE (OR TRIAL) ANALYTICS TOOLS

TOOL

- Power BI
- Tableau
- QlikSense
- SAP

LINK

- <https://www.microsoft.com/en-us/download/details.aspx?id=58494>
- <https://www.tableau.com/trial/tableau-software>
- <https://www.qlik.com/us/trial/download-qlikview>
- <https://www.sap.com/products/try-sap.html>

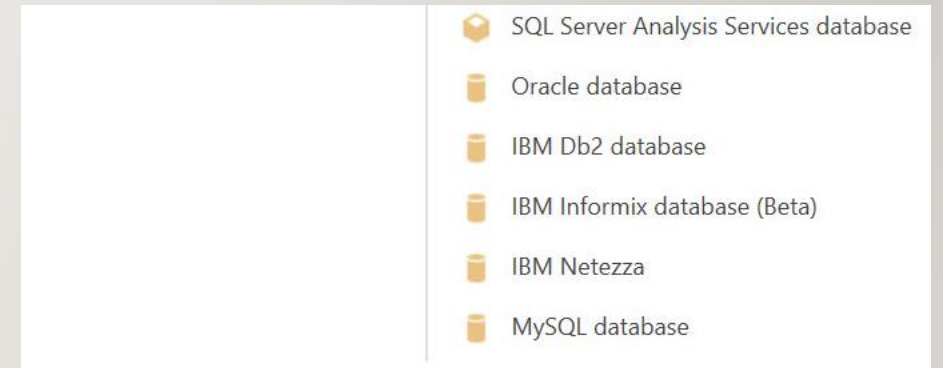
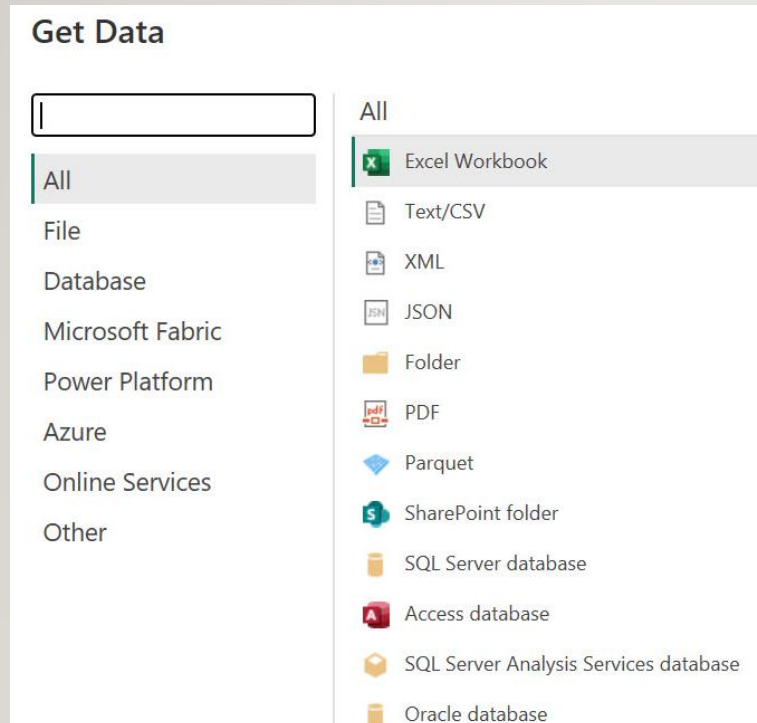
WHAT IS NEEDED TO MAKE SENSE OF THIS?

Rndrng_Privr_Crdntls	DO	Bene_Avg_Age	74
Rndrng_Privr_Gndr	F	Bene_Age_LT_65_Cnt	
Rndrng_Privr_Ent_Cd	I	Bene_Age_65_74_Cnt	156
Rndrng_Privr_City	Fort Worth	Bene_Age_75_84_Cnt	90
Rndrng_Privr_State_Abrvtn	TX	Bene_Age_GT_84_Cnt	
Rndrng_Privr_Mdcr_Prtcptg_Ind	Y	Bene_Feml_Cnt	194
Tot_Benes	300	Bene_Male_Cnt	80
Tot_Srvcs	1676	Bene_Race_Wht_Cnt	250
Tot_Sbmted_Chrg	\$ 168,700.85	Bene_Race_Black_Cnt	
Tot_Mdcr_Alowd_Amt	\$ 124,523.31	Bene_Race_API_Cnt	
Tot_Mdcr_Pymt_Amt	\$ 96,800.99	Bene_Race_Hspnc_Cnt	
Tot_Mdcr_Stdzd_Amt	\$ 96,200.38	Bene_Avg_Risk_Scre	0.8

GETTING DATA

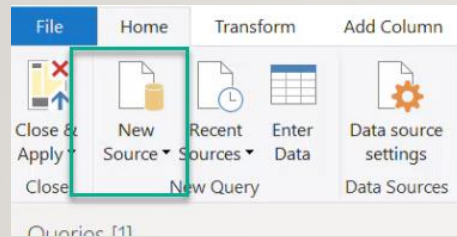


DOZENS OF DATASOURCES

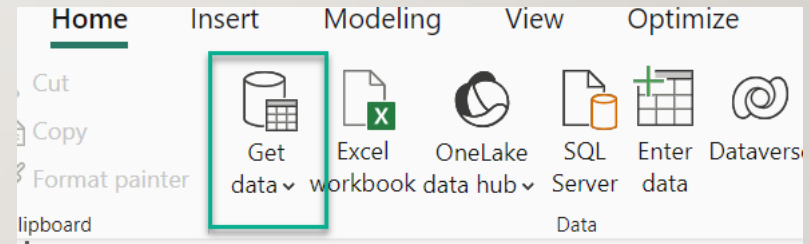


TWO BUTTONS TO GET DATA

- Power Query



- Power BI



IMPORT CSV FILE

- <https://data.cms.gov/provider-summary-by-type-of-service/medicare-physician-other-practitioners/medicare-physician-other-practitioners-by-provider>
- The Medicare Physician & Other Practitioners by Provider dataset provides information on use, payments, submitted charges and beneficiary demographic and health characteristics organized by National Provider Identifier (NPI).

CSV LOAD

- Reads file and splits the columns based on delimiter
- Names columns from first row
- Guesses at the data type for each column

	123 Rndrng_NPI	AB C Rndrng_Privr_Last_Org_Name	AB C Rndrng_Privr_First_Name	AB C Rndrng_Privr_MI
1	1003000126	Enkeshafi	Ardalan	
2	1003000134	Cibull	Thomas	L
3	1003000142	Khalil	Rashid	
4	1003000423	Velotta	Jennifer	A
5	1003000480	Rothchild	Kevin	B

All Properties

APPLIED STEPS

- Source
- Promoted Headers
- ✕ Changed Type

IMPORT EXCEL

- [CMS Program Statistics - Medicare Part A & Part B - All Types of Service | CMS Data](#)
- The following sheets are interesting
 - MDCR SUMMARY AB 5: State and fairly clear; remove the barrier rows; can join to the csv table
 - MDCR SUMMARY AB 4: clear categories to report on; the minus is that the barrier rows provide important context to understand the categories
 - MDCR SUMMARY AB 6: Similar to the previous
 - The other three have this issues of the first two, adding the necessity to translate the crosstab

IMPORT DATA FROM EXCEL

- Select table to load

Navigator

Display Options ▾

▲

CPS MDCR SUMMARY AB 2021.xlsx [12]

☐

☐

MDCR SUMMARY AB 1

☐

☐

MDCR SUMMARY AB 2

☐

☐

MDCR SUMMARY AB 3

☐

☐

MDCR SUMMARY AB 4

☐

☐

MDCR SUMMARY AB 5

☐

☐

MDCR SUMMARY AB 6

☐

☐

Table of Contents

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☐

_xlnm.Print_Titles

☐

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_xlnm.Print_Titles1

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_xlnm.Print_Titles3

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_xlnm.Print_Titles5

☐

☐

Medicare Part A and Part B Summary Uti...

☐

☐

Medicare Part A and Part B Summary Uti...

☐

☐

Demographic Characteristic (MDCR SU...

☐

☐

Area of Residence (MDCR SUMMARY AB...

☐

☐

Type of Entitlement and Amount of Prog...

Area of Residence (MDCR SUMMARY AB 5)

Preview downloaded on Saturday, August 31, 2024

Area of Residence	Total Original Medicare Part A and/or Part B Enrollees	Total
BLANK		null
All Areas		36356380
United States		35681342
BLANK		null
Alabama		528983
Alaska		105831
Arizona		767513
Arkansas		430724
California		3436742
Colorado		518796
Connecticut		363399
Delaware		171134
District of Columbia		70224
Florida		2359900
Georgia		953980
Hawaii		145637
Idaho		215741
Illinois		1507029
Indiana		775334
Iowa		465570
Kansas		414903
Kentucky		526061

Load

Transform Data

Cancel

IMPORT DATA FROM EXCEL

- Data transformed

	ABC Area of Residence	123 Total Original Medicare Part A and/or Part B Enrollees	ABC 123 Total Medicare Part A and/or Part B Enrollees
1	BLANK	null	
2	All Areas	36356380	
3	United States	35681342	
4	BLANK	null	
5	Alabama	528983	
6	Alaska	105831	
7	Arizona	767513	
8	Arkansas	430724	
9	California	3436742	
10	Colorado	518796	
11	Connecticut	363399	
12	Delaware	171134	
13	District of Columbia	70224	

PROPERTIES
Name
Area of Residence (MDCR SUMMARY AB)
[All Properties](#)
APPLIED STEPS
Source
Navigation
FilterNullAndWhitespace
Removed Bottom Rows
Removed Top Rows
Removed Other Columns
Promoted Headers
X Changed Type

IMPORT EXCEL FROM WEB

- [2020 Population Estimates FIPS Codes \(census.gov\)](#)
- <https://www2.census.gov/programs-surveys/popest/geographies/2020/state-geocodes-v2020.xlsx>

IMPORT JSON

- Import from Sandbox
- [Getting Started \(cms.gov\)](https://cms.gov)

	ABC 123 address	ABC 123 birthDate	ABC 123 deceasedDateTime	ABC 123 extension	ABC 123 gender
1	List	1999-06-01	1981-03-17	List	female
2	List	1999-06-01	1981-03-17	List	male
3	List	1999-06-01	1981-03-17	List	female
4	List	1999-06-01	1981-03-17	List	male
5	List	1999-06-01	1981-03-17	List	male
6	List	1999-06-01	1981-03-17	List	male
7	List	1999-06-01	1981-03-17	List	female
8	List	1999-06-01	1981-03-17	List	male
9	List	1999-06-01	1981-03-17	List	female
10	List	1999-06-01	1981-03-17	List	female
11	List	1999-06-01	1981-03-17	List	female

PROPERTIES

Name

Patient 020f1f88-db6f-4aa6-92fb-d796d9

All Properties

APPLIED STEPS

- Source
- Transformed Column
- Expanded Column1
- Expanded meta
- Split Column
- Changed Type

PREPARING DATA WITH POWER QUERY



CONTENTS

- Remove columns
- Cleanup data types
- Show add column by example
- Create lookup table
- Replace value

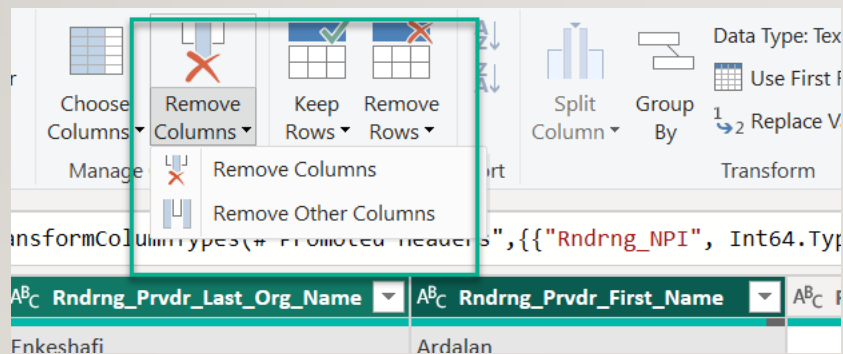
REMOVE COLUMNS

- Select columns that you want to keep
- Select columns that you want to remove

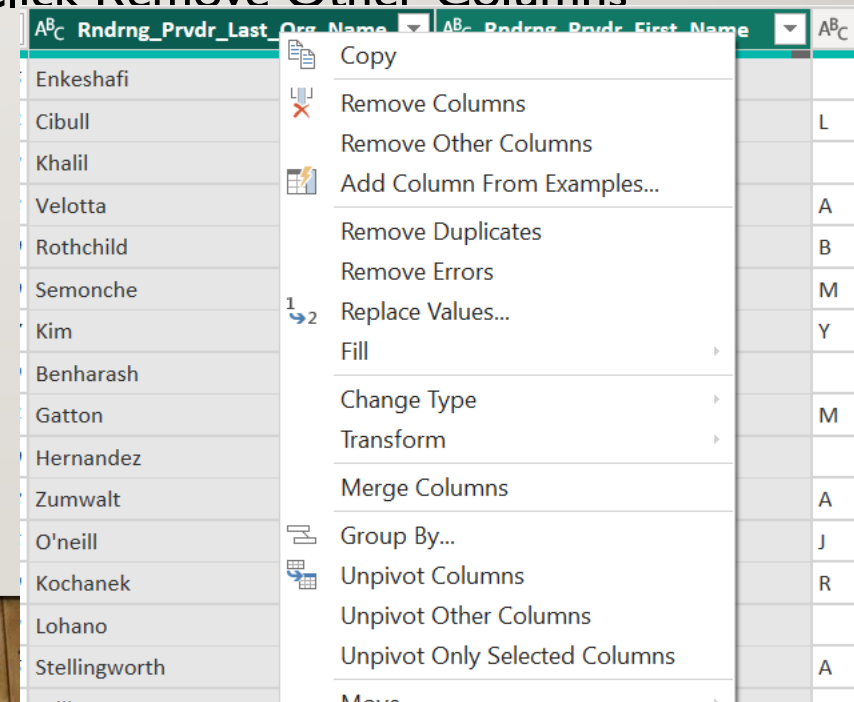
REMOVE COLUMNS

- After select columns
- Click Remove Columns
- Either

- Remove Columns
- Remove other Columns



- Right click column header
- Click Remove Column
- Click Remove Other Columns

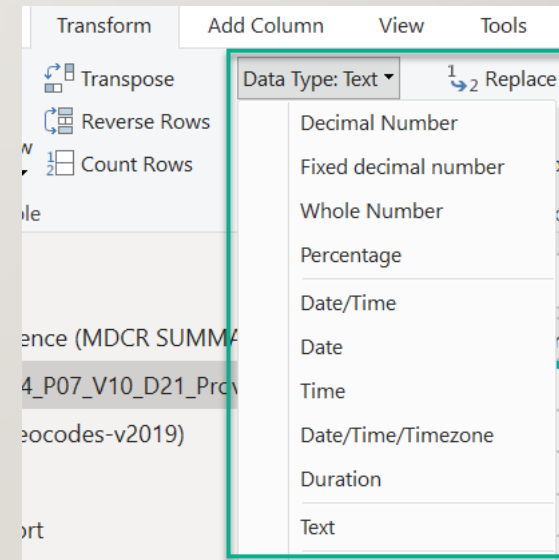
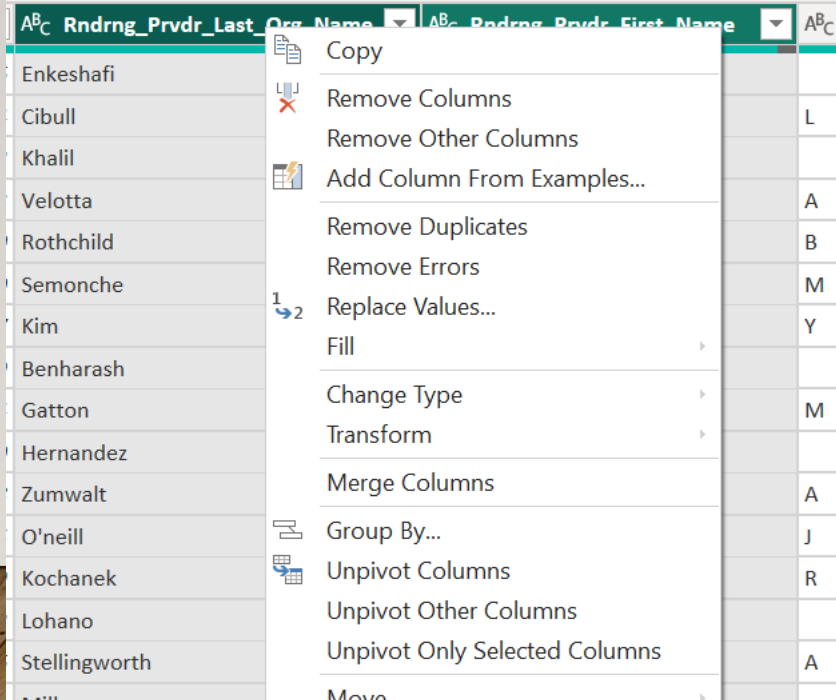


CLEAN UP TYPES

- Power BI doesn't always choose the best data types
- Can select columns and let Power BI determine data types
- Can select columns and assign a data type

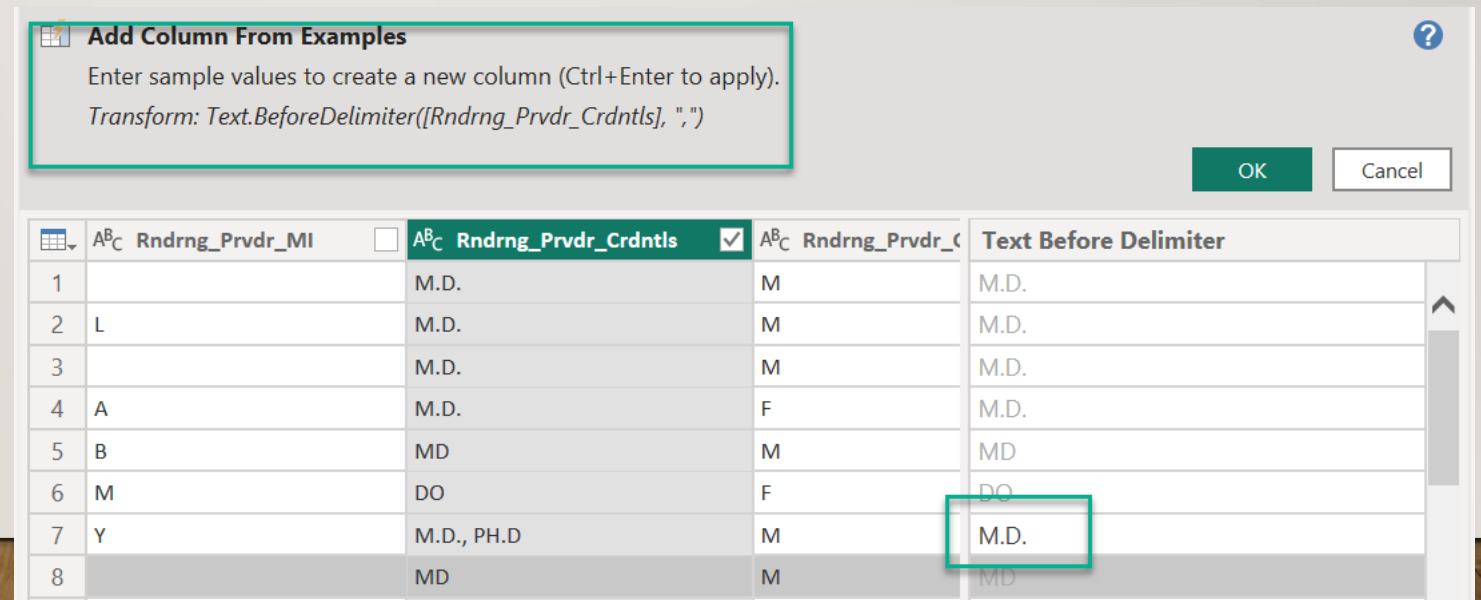
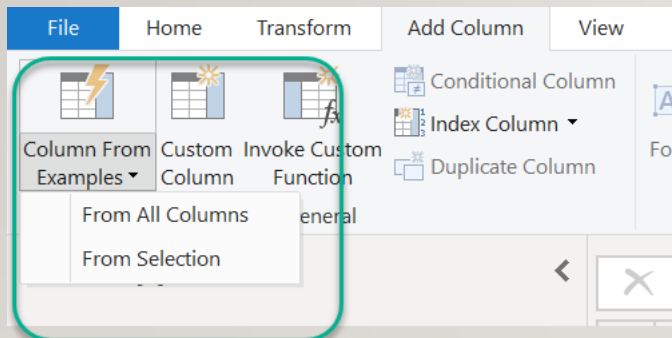
CHANGE TYPE

- Right click column header
- Click change type
- Choose type
- Click the Data type dropdown
- Select the new datatype



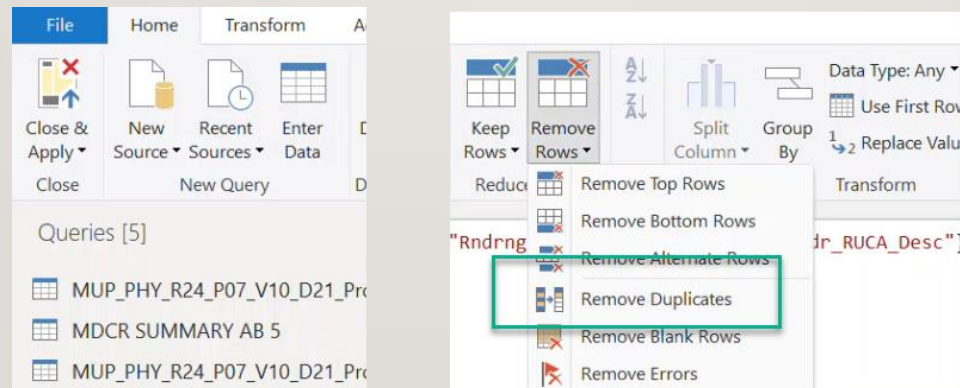
COLUMN BY EXAMPLE

- Uses the values in the row or just one column in row
- Look for a function not if then pattern



CREATE A LOOKUP TABLE

- Create a new table with a reference to existing
- Remove all columns but ones you want in new table
- Remove duplicates

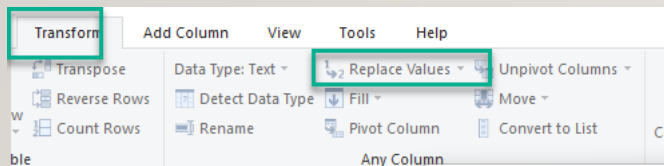


MOVE COLUMN DATA TO NEW TABLE

- Some columns work best as a lookup
- Create a new query based on the existing query
- Remove all columns but the lookup column
- Remove duplicates
- Add index (optional)
- Then merge with the original and leave the index column value
- Star schema
- I can apply this pattern to multiple tables

REPLACE VALUE

- Some values don't fit pattern
 - Non-numeric in column
 - Nulls you want to replace with value
 - Consistency
- From the Transform tab, click Replace Value



×

Replace Values

Replace one value with another in the selected columns.

Value To Find

ABC

MD

Replace With

ABC

M.D.

Advanced options

☒ Match entire cell contents

☐ Replace using special characters

Insert special character

OK

Cancel

DATA MODELING

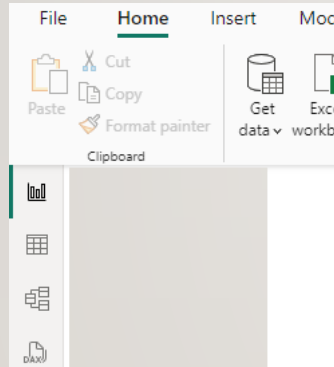


CONTENTS

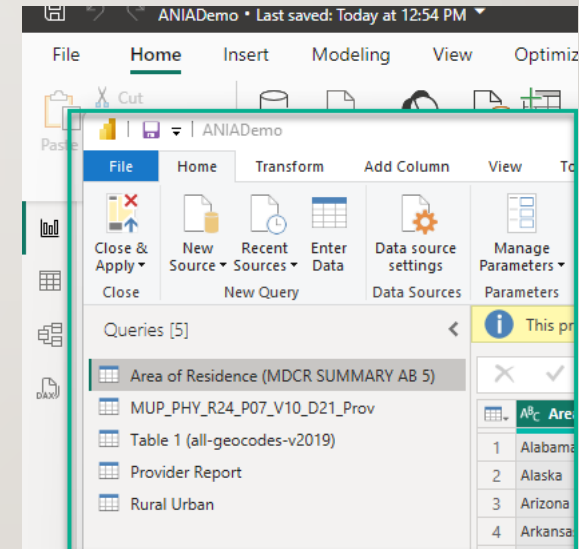
- Relationships
- Hierarchy
- Change behaviors of columns
 - How they aggregate
 - Format
 - Sorting

DATA MODELING VIEW

- Data Modeling is done in Data Model view



- Power Query view



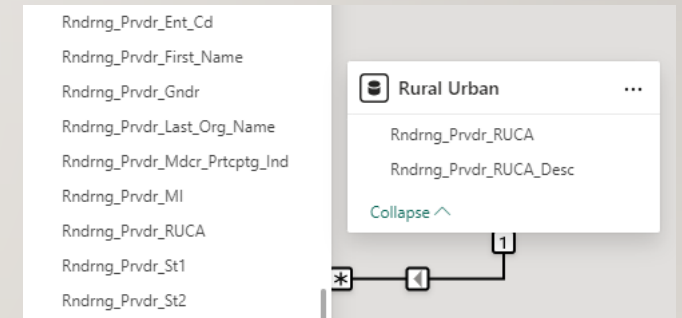
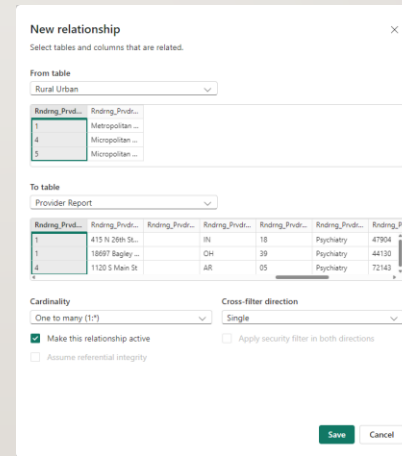
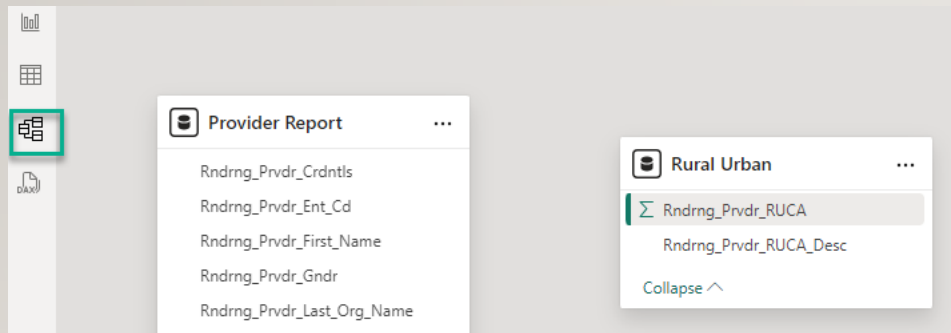
RELATIONSHIPS

- This will drive
 - Group by
 - Filtering
- Manage in the Data Model (aka Report Design)

ADDING RELATIONSHIP

- Select Data Model tab
- Select column from table in relationship drag to matching column in other table

- Following should display
- Click save to show relationship

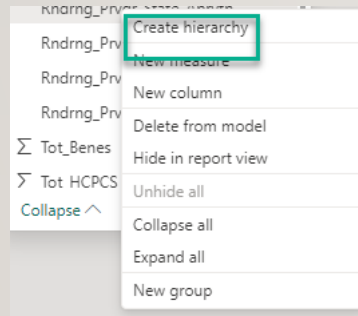


HIERARCHIES

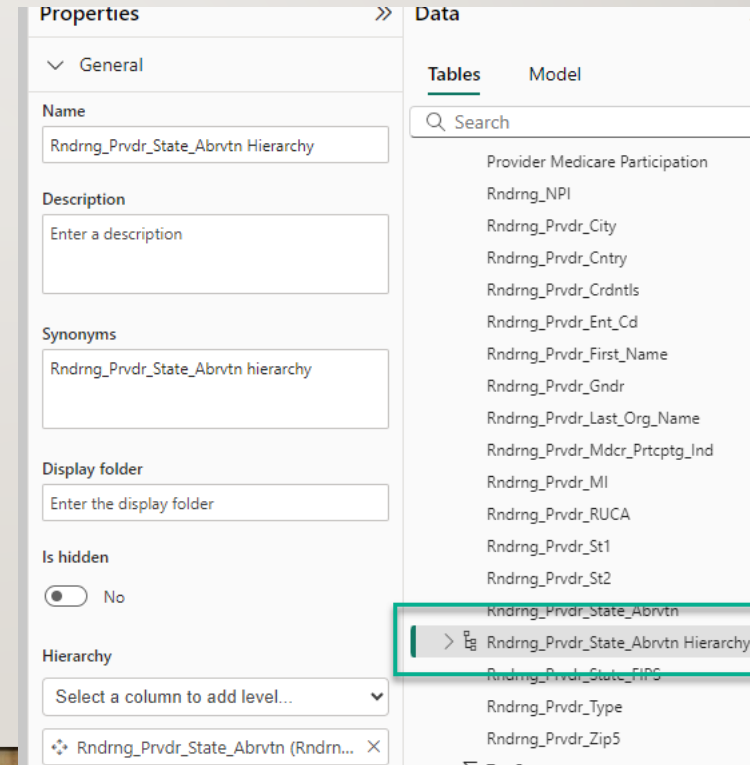
- Makes it easy to report on one column rolling up to another column
- Geography: City rolls up to State which rolls up to Country
- Org chart: Employee is in a Group in a Division in a company
- Date: Days roll up to Month which roll up to Year

CREATING HIERARCHY

- Create a hierarchy
- Right click one column in hierarchy
- Click Create hierarchy



- Creates hierarchy in table



EDIT HIERARCHY

- Edit hierarchy: Name, add columns, etc
- Finish adding columns
- Make sure order is correct
- Click Apply Level Changes

Properties >> **Data** >>

General

Name: Rndrng_Privr_State_Abrvtn Hierarchy

Description: Enter a description

Synonyms: Rndrng_Privr_State_Abrvtn hierarchy

Display folder: Enter the display folder

Is hidden: ☐ No

Hierarchy

Select a column to add level...

✦ Rndrng_Privr_State_Abrvtn (Rndrng_Privr_State_Abrvtn) X

Tables **Model**

Search

Provider Medicare Participation

Rndrng_NPI

Rndrng_Privr_City

Rndrng_Privr_Cntry

Rndrng_Privr_Crdntls

Rndrng_Privr_Ent_Cd

Rndrng_Privr_First_Name

Rndrng_Privr_Gndr

Rndrng_Privr_Last_Org_Name

Rndrng_Privr_Mdcr_Prtcptg_Ind

Rndrng_Privr_MI

Rndrng_Privr_RUCA

Rndrng_Privr_St1

Rndrng_Privr_St2

Rndrng_Privr_State_Abrvtn

Rndrng_Privr_State_Abrvtn Hierarchy

Rndrng_Privr_State_FIPS

Rndrng_Privr_Type

Rndrng_Privr_Zip5

Hierarchy

Rndrng_Privr_City

✦ Rndrng_Privr_State_Abrvtn (Rndrng_Privr_State_Abrvtn) X

✦ Rndrng_Privr_City (Rndrng_Privr_City) X

Apply Level Changes

COLUMN PROPERTIES

- Aggregation (Summarize by)

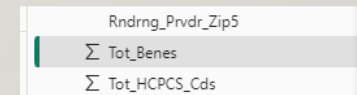
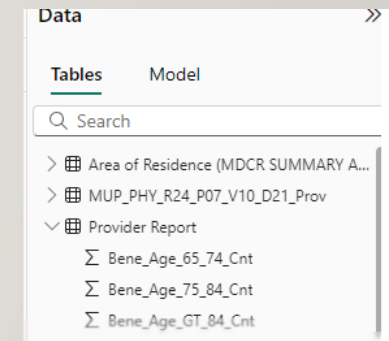
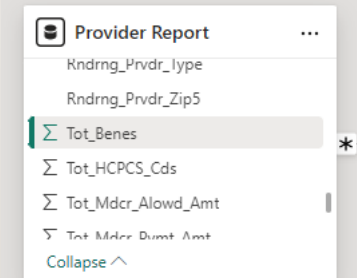
- SUM
- AVG
- None

- Hidden

- Description

- Sorting

- Select column in data model or data list



COLUMN PROPERTIES

General

- Name
- Description
 - Document
- Display folder
 - Aid navigation

Properties
▼ General
Name
Tot_Benes
Description
Enter a description
Synonyms
tot benes, Tot_Benes, benes
Display folder
Enter the display folder
Is hidden
☒ No

Formatting

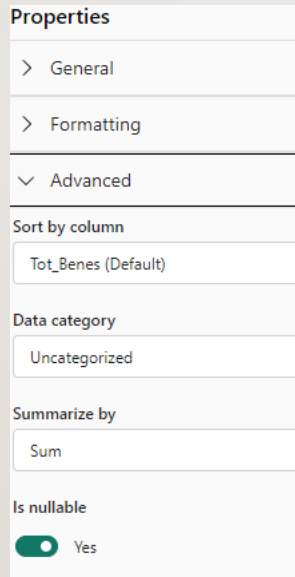
- Depends Data type
 - Currency sign
 - Thousands separator
 - Date Format

Properties
> General
▼ Formatting
Data type
Whole number
Format
Whole number
Percentage format
☒ No
Thousands separator
☒ No
Decimal places
0

COLUMN PROPERTIES

Advanced

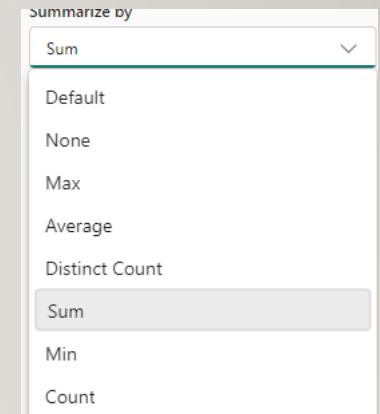
- Sort by column
 - Think Month names
 - Sort Months by order not alphabetic



The screenshot shows the 'Properties' dialog box with the 'Advanced' tab selected. It contains the following settings:

- Sort by column:** Tot_Benes (Default)
- Data category:** Uncategorized
- Summarize by:** Sum
- Is nullable:** Yes (indicated by a green toggle switch)

- Summarize by
 - None
Don't summarize
 - Sum
 - Min/Max
 - Count
 - And Distinct Count



The screenshot shows the 'Summarize by' dropdown menu with the following options:

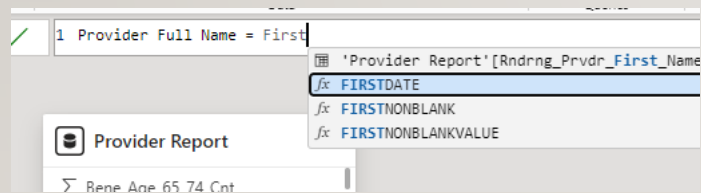
- Sum (selected)
- Default
- None
- Max
- Average
- Distinct Count
- Sum
- Min
- Count

CALCULATED COLUMN

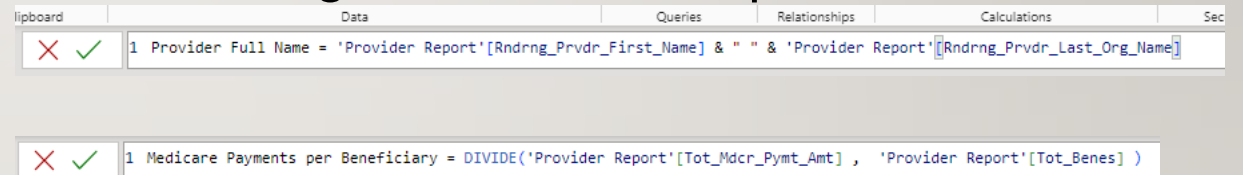
- Can calculate in different places
 - SQL
 - Power Query
 - In Modeling
- In the Modeling pane, use DAX

CALCULATED COLUMN – ADD FULL NAME

- Right Click Table
- Change name
- Begin typing formula
- Note help (IntelliSense)



- Finish expression
- Click green check to complete



VISUALIZING DATA



CONTENTS

- Slicers
- Basic table
 - Show how the items that are numbers are aggregated
- Matrix if I can
- Column chart

SLICER

- Tool to select what columns
- Can view all
- Can change how the slicer looks

MATRIX

- Drag the Geography hierarchy to the page (note error)
- Change to Matrix in visualization pane
- Put the provider type in the columns
- Then take the cost per patient in the data

CHANGE TO A DIFFERENT CHART TYPE

- Change to different types
 - May need to adjust where each element shows

MEASURES

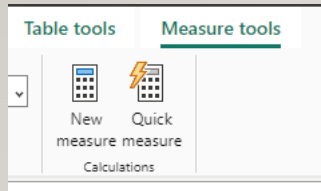


MEASURES TO BUILD

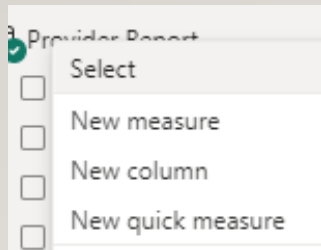
- Quick measures
- Weighted average
- Median rather than mean

QUICK MEASURE

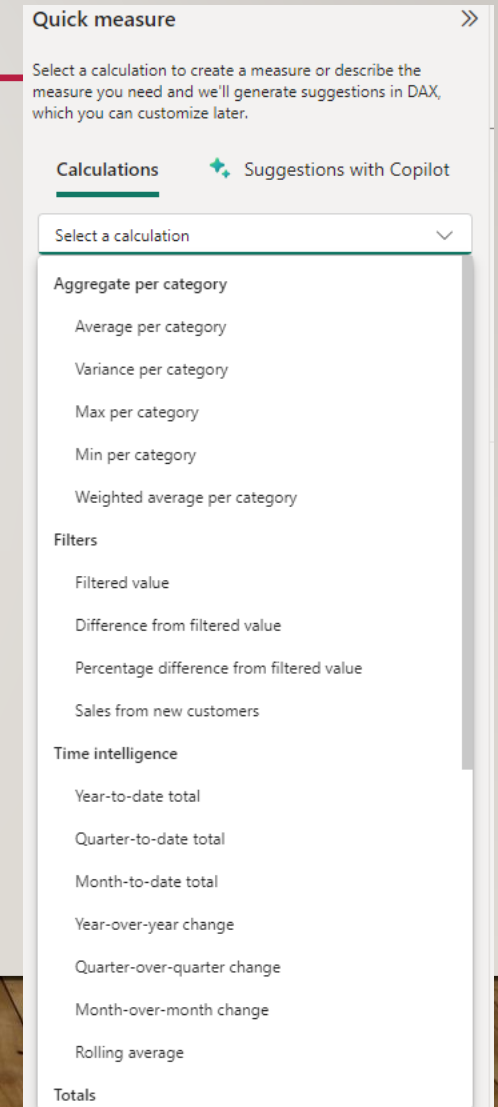
- Choose quick measure
- From menu bar



- Right click table

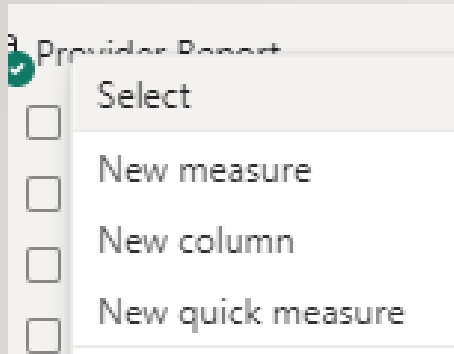


- Choose measure type
- Follow directions



OTHER MEASURES

- Add measure



- Enter code
- Click green check

DEPLOYING

DEPLOYING REPORTS

- You can get a free service, but you can't share reports
- Must have a Pro Account to share (\$10 a month)

PUBLISHING REPORT

- Click the Publish button on the Home tab
- Enter email address that has access to Power BI (now Fabric) portal

KEEPING DATA UP TO DATE

- Need to make sure that the portal has access to data

SUMMARY



SUMMARY

- Saw advantage of joining data from multiple sources
- Looked at different file types
- Cleansed data using Power Query
- Modeled the data in Power BI modeling pane
- Developed simple visuals using Power BI
- Added more complex measures
- Deployed the report to the Power BI service

CONTACT – SEND EMAIL FOR GITHUB LINK

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- <https://www.linkedin.com/in/russloski>



REFERENCES

- Home – SQLBI: <https://www.sqlbi.com/>
- Guy in a Cube (Power BI Training and More): <https://guyinacube.com/>
- Home – RADACAD: <https://radacad.com/>
- Dashboard in a Day (pragmaticworks.com):
<https://pragmaticworks.com/courses/dashboard-in-a-day>