



Build a Better Inpatient Dashboard with Microsoft Power BI

Presented by: Ian Proffer

Session 801 - Wednesday June 7, 1:00-3:30

2023 MUSE Inspire Conference

June 7-10 Gaylord Rockies Resort & Convention Center | Aurora, CO



Our agenda for today

- > Overview of Power BI applications and services
- > Using Power BI with Data Repository
- > Report design in detail
- > Hands-on: build a patient dashboard
- > Discussion and wrap-up



Introductions

- > A little about me and Acmeaware
- > A little about you
 - > Your role working with MEDITECH
 - > Your reporting experience



What is Power BI?

- > **Power BI** is a collection of software services, apps, and connectors that work together to turn your unrelated sources of data into coherent, visually immersive, and interactive insights. Power BI lets you easily connect to your data sources, visualize and discover what's important, and share that with anyone or everyone you want.
- > <https://docs.microsoft.com/en-us/power-bi/fundamentals/power-bi-overview>



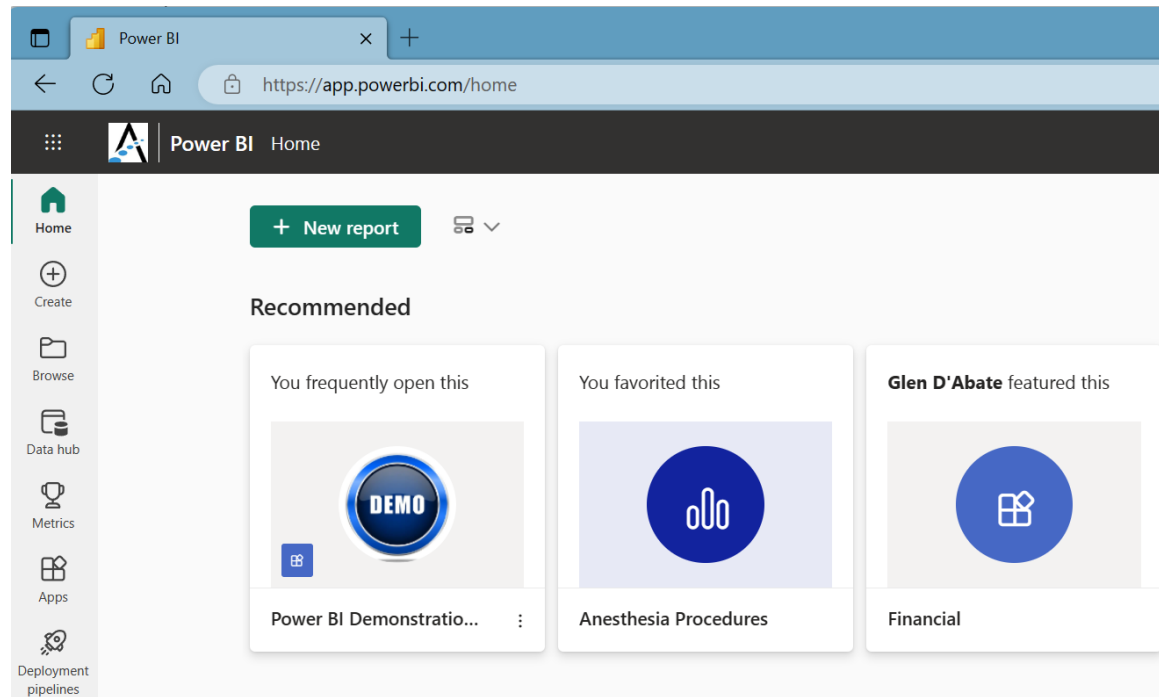
Power BI apps and services



Power BI Desktop

- > A Windows desktop application called **Power BI Desktop**

- > An online SaaS (Software as a Service) service called the **Power BI service**



Power BI apps and services

- > **Power BI Report Builder**, for paginated reports (think SSRS)
- > **Power BI Report Server**, an on-premises report server where you can publish your Power BI reports, after creating them in Power BI Desktop



Power BI Report Builder



Power BI Desktop



Power BI Desktop interface showing a dashboard for 'Patient Census Example'.

Summary Metrics:

- 60 Patients
- 5.5 Average of LOS

Filters:

- Location:
 - 1 West
 - Hospice (Inpatient)
 - Intensive Care Unit
 - Postanesthesia Care Unit
 - Post-partum
- Service:
 - Cardiac Care
 - Medicine
 - Rehabilitation
 - Transfer From Inpatient Stay
- Obs Pt?:
 - N
 - Y
- Sex:
 - F
 - M
 - U

Visualizations:

- Observation:** Pie chart showing 55 (N) and 5 (Y).
- Gender:** Pie chart showing 35 (F), 23 (M), and 2 (U).

Tables:

Patients by Location

Location	Patients	Avg LOS
1 West	54	6
Hospice (Inpatient)	2	3
Intensive Care Unit	1	9
Postanesthesia Care Unit	2	2
Post-partum	1	7
Total	60	5

Patients by Service

Service	Patients	Avg LOS
Cardiac Care	6	6
Medicine	52	5
Rehabilitation	1	9
Transfer From Inpatient Stay	1	4
Total	60	5

Patients by Attending

Attending	Patients	Avg LOS
Aaron Admit	1	4
Dr Drummond	1	4
Ed Caruso	1	8
James Layock	5	6
Johanna Artze	1	7
John Brach	1	2
Kristina...	7	...
Total	60	5

Patient Summary

Room	Bed	Name	AccountNumber	DOB	Gender	Admitted	Sum of LOS
071315	14	Edison,Denise	AC0000001817	08/23/1970	F	06/17/19 08:00	8
071315	15	Collins,James	AC0000001836	01/28/1978	M	07/01/19 14:00	4
071315	16	Landry,Michael	AC0000001863	01/05/1960	M	08/28/19 09:08	6
071315	17	Mack,Ada H.	AC0000001885	05/18/1968	F	09/09/19 14:29	4
071315	18	Joy,Minnie	AC0000001894	05/01/1947	F	09/06/19 13:37	7
071315	19	Connor,Shannon	AC0000001897	05/01/1947	F	09/06/19 15:12	7
071315	21	Tully,Emma	AC0000001898	05/01/1947	F	09/06/19 16:16	7
1 LD	3	Test,Forkate	AC0000001782	01/01/1984	F	02/08/19 10:53	7
1H	2	Jones,Monica	AC0000001867	05/01/1947	F	08/29/19 13:34	5
1H	3	Smith,Brett	AC0000001873	05/01/1947	U	09/03/19 13:08	0
1W	4A	Brown,Arthur	AC0000001816	06/09/1954	M	06/16/19 10:53	9
1W	6	Paltrow,Bruce K	AC0000001861	02/01/1945	M	08/26/19 09:42	8
2015AMI	23	bridges,auria	AC0000001784	04/05/1967	F	04/29/19 08:00	7
2015AMI	25	Smith,Anthony	AC0000001794		M	06/11/19 12:13	4
2015AMI	26	Dunn,Maizie	AC0000001859	01/01/1980	F	08/23/19 15:22	1
2015AMI	27	Prince,Myra	AC0000001878	05/01/1947	F	09/04/19 15:08	9
2015AMI	28	Price,Debra H.	AC0000001889	06/14/2001	F	09/09/19 14:30	4
Total							327

Visualizations Panel:

- Build visual: [Icons for various visual types]
- Filters: [Filters applied]
- Values: Add data fields here
- Drill through: [On/Off]
- Cross-report: [On/Off]
- Keep all filters: [On/Off]
- Add drill-through fields here

Data Panel:

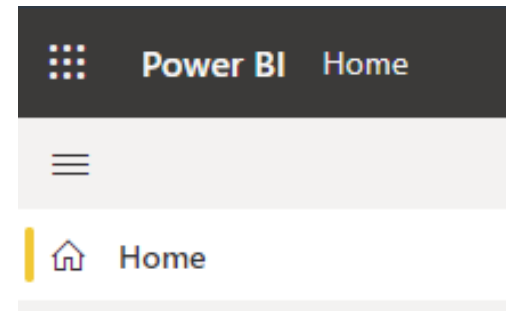
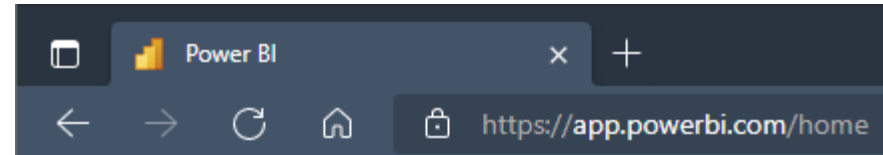
- Search: [Search box]
- Inpatient Census:
 - AccountNumber
 - Admitted
 - Attending
 - Bed
 - DOB
 - Inpatient.location
 - InpatientService
 - LOS
 - MedicalRecordNumber
 - Name
 - Obs Pt?
 - Room
 - Sex

Page 1 of 2



Power BI service

- > Where you publish dashboards and share them across your organization. Dashboards and reports connect to datasets that bring all the relevant data together in one place.
- > The service has some report creation abilities too but is more limited than Power BI Desktop.



https://app.powerbi.com/home

Power BI Home

Search

+ New report

New items saved to: My workspace

Recommended

You frequently open this

You frequently open this

You frequently open this

You frequently open this

You frequently open this

BAR Summary and Detail

Patient Census Example

Demo Visuals

PGC - OR Operational Dashb...

BAR Summar

Recent Favorites My apps

Filter by keyword Filter

	Name	Type	Opened	Location	Endorsement	Sensitivity
	OR Utilization-Demo	Report	4 days ago	Acmeaware PBI De...	—	—
	Acmeaware PBI Demo	Workspace	4 days ago	Workspaces	—	—
	Patient Census Example	Report	4 days ago	My workspace	—	—
	Patients by Diagnosis	Dataset	4 days ago	My workspace	—	—
	My workspace	Workspace	4 days ago	Workspaces	—	—
	PB101-Lab Demo	Report	4 days ago	My workspace	—	—
	PB101-Lab Demo	Dataset	4 days ago	My workspace	—	—

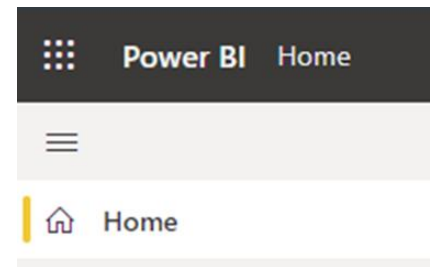


Working with Power BI

1. Connect to data sources and build your data model
2. Design your report visualizations
3. Share (publish) your report to the cloud



Power BI Desktop

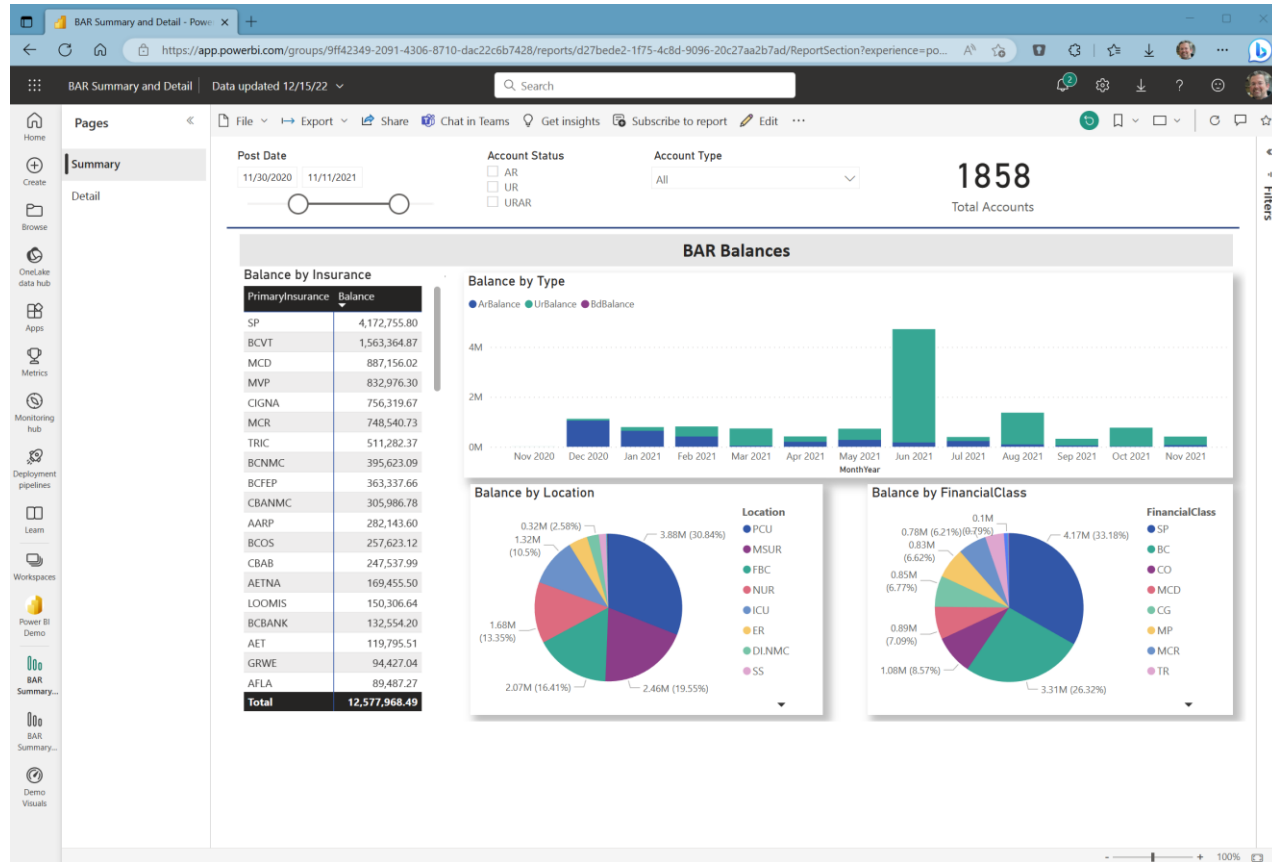
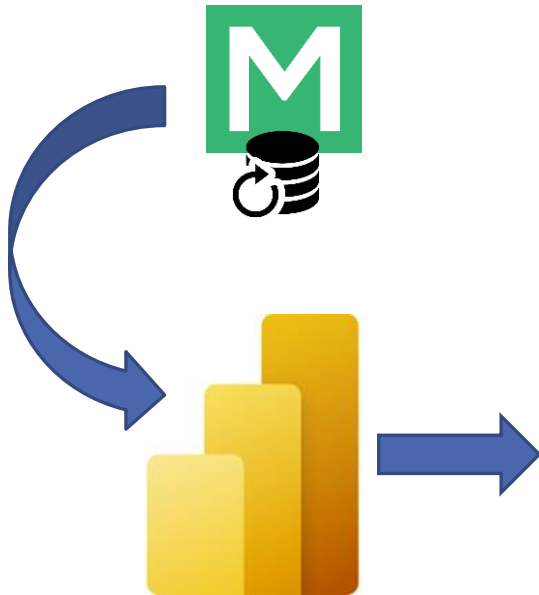


Questions and discussion

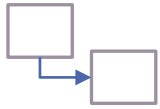


- > About the Power BI applications and services

Using Power BI with DR



Considerations for DR



What type of data model suits your needs?



Should you use Import or DirectQuery to connect?



How will you query the data? Views, stored procedures, or embedded expressions?



For sharing in the cloud, you'll need the Power BI Gateway.



How will you handle scheduling data refreshes?

Connecting to SQL Server

Import



- > Data cached on desktop and in Power BI service
- > 1 GB limit for non-premium
- > Data is compressed for efficiency
- > Full use of DAX (data access expressions) function library
- > Data sources require periodic refresh

DirectQuery

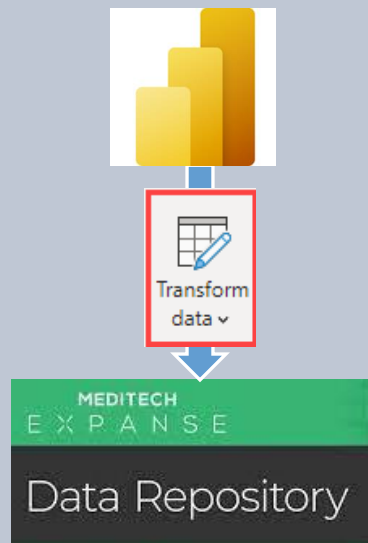


- > Always uses current data
- > Scalable, no 1GB limitation
- > Significantly slower than data import mode
- > Cannot combine data in Power Query
- > Many DAX functions unavailable

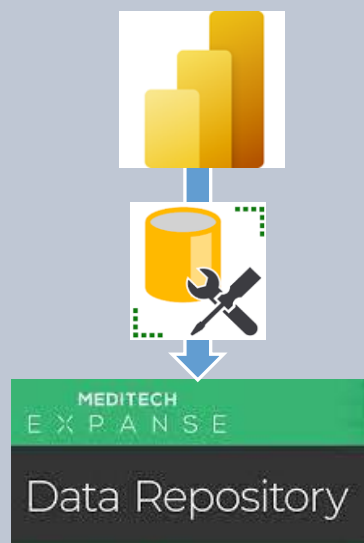
Accessing DR data with Power BI

Or...how to populate your data model.

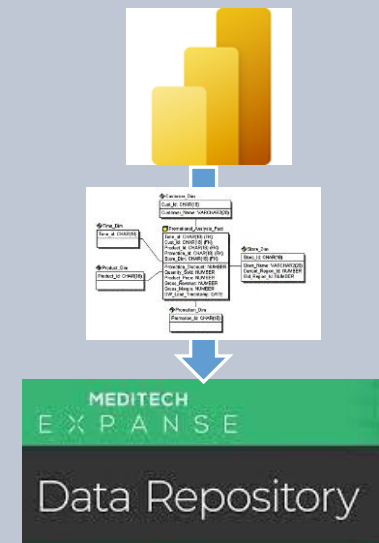
Direct to DR tables (No)



Via SQL object (Yes)



Via data mart (Yes)



Then and now



1. Write TSQL stored procedures in Management Studio
2. Develop .rdl (report template) in SSDT/Visual Studio
3. Deploy report from SSDT to Report Server
4. Users view reports from web portal (Report Manager)



Power BI Desktop

1. Import and transform data, develop visualizations and reports with PBI Desktop
2. Publish and share reports to the PBI service (cloud) OR to PBI Report Server (local/on-premises)
3. Users view reports from PBI service, mobile device, or on-premise PBI Server

Old school...

Acute

Facility Patient Total: 60

Location								
PACU_1								Location Total: 2
Account	Name	DOB	Sex	Room	Bed	Service	Admit Date	Obs Pt?
AC0000001833	AUREUS,MARCUS	4/5/67	M	PACU	10	Medicine	07/01/2019 01:00	N
AC0000001835	Auburn,Al	4/5/67	M	PACU	15	Medicine	07/05/2019 04:00	N
Labor/Delivery Post-partum								Location Total: 1
Account	Name	DOB	Sex	Room	Bed	Service	Admit Date	Obs Pt?
AC0000001782	Test,Forkate	1/1/84	F	1 LD	3	Medicine	02/08/2019 10:53	N
Intensive Care Unit *								Location Total: 1
Account	Name	DOB	Sex	Room	Bed	Service	Admit Date	Obs Pt?
AC0000001783	bridges,auria	4/5/67	F	CQM.ICU	9	Medicine	04/27/2019 08:00	N
Hospice (Inpatient)								Location Total: 2
Account	Name	DOB	Sex	Room	Bed	Service	Admit Date	Obs Pt?
AC0000001867	Jones,Monica	5/1/47	F	1H	2	Medicine	08/29/2019 13:34	N
AC0000001873	Smith,Brett	5/1/47	M	1H	3	Medicine	09/03/2019 13:08	N
1 WEST								Location Total: 54
Account	Name	DOB	Sex	Room	Bed	Service	Admit Date	Obs Pt?
AC0000001781	newly,adam	4/5/67	M	ACUTE.CERT	37	Medicine	02/07/2019 07:00	N
AC0000001794	Smith,Anthony		M	2015AMI	25	Transfer From Inpatient Stay	06/11/2019 12:13	N
AC0000001817	Edison,Denise	8/23/70	F	071315	14	Medicine	06/17/2019 08:00	N
AC0000001821	Denata,Renata	4/5/67	F	2015STK	7	Medicine	06/16/2019 08:00	N
AC0000001828	Axon,Portia April	4/5/67	F	2015STK	14	Medicine	06/17/2019 08:00	N
AC0000001836	Collins,James	1/28/78	M	071315	15	Medicine	07/01/2019 14:00	N
AC0000001843	Stroman,Al	4/5/67	M	2015STK	21	Medicine	07/11/2019 04:00	N
AC0000001853	Newton,Mae	7/8/90	F	ACUTE.CERT	32	Medicine	07/31/2019 01:00	N



New school! Much better.

Select your filters below.

- Location**
- 1 West
 - Hospice (Inpatient)
 - Intensive Care Unit
 - Postanesthesia Care Unit
 - Post-partum

- Service**
- Cardiac Care
 - Medicine
 - Rehabilitation
 - Transfer From Inpatient Stay

- Obs Pt?** ▼
- N
 - Y

- Sex** ▼
- F
 - M

60

Patients

5.3

Average of LOS

Patients by Location

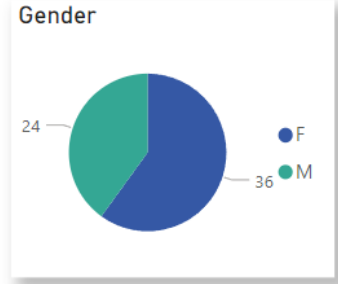
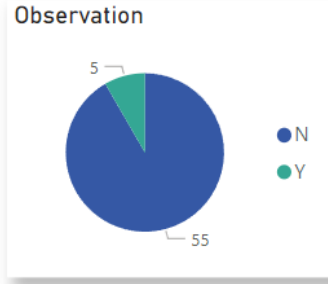
Location	Patients	Avg LOS
1 West	54	5
Postanesthesia Care Unit	2	6
Post-partum	1	6
Hospice (Inpatient)	2	7
Intensive Care Unit	1	8
Total	60	5

Patients by Service

Service	Patients	Avg LOS
Cardiac Care	6	5
Medicine	52	5
Rehabilitation	1	8
Transfer From Inpatient Stay	1	3
Total	60	5

Patients by Attending

Attending	Patients	Avg LOS
Aaron Admit	1	3
Dr Drummond	1	3
Ed Caruso	1	7
James Layock	5	7
Johanna Artze	1	6
John Brach	1	1
Kate Jenkins-Brown	7	6
Meditech Mt	43	5
Total	60	5



Patient Summary

Room	Bed	Patient	Acct #	DOB	Sex	Admitted	LOS
CQM.CERT	15	Whiteside,Kara	AC0000001860	10/11/1952	F	08/23/19 16:16	0
071315	21	Tully,Emma	AC0000001898	05/01/1947	F	09/06/19 16:16	6
ACUTE.CERT	53	Toomey,Shawn	AC0000001875	06/01/1970	M	09/03/19 05:00	9
CRT19	7	Thompson,Sally	AC0000001919	08/19/1946	F	09/15/20 14:37	1
CQM.CERT	13	Thompson,Andrew	AC0000001852	05/03/1985	M	07/29/19 13:16	5
1 LD	3	Test,Forkate	AC0000001782	01/01/1984	F	02/08/19 10:53	6
ACUTE.CERT	60	Summers,Allan H.	AC0000001884	04/16/1982	M	09/09/19 14:28	3
2015AMI	38	Summers,Allan H.	AC0000001905	04/16/1982	M	09/09/19 16:53	3
2015STK	21	Stroman,Al	AC0000001843	04/05/1967	M	07/11/19 04:00	3
CRT19	4	Steele,Debra H.	AC0000001888	07/27/1983	F	09/09/19 14:30	3
1H	3	Smith,Brett	AC0000001873	05/01/1947	M	09/03/19 13:08	9
2015AMI	25	Smith,Anthony	AC0000001794		M	06/11/19 12:13	3
2015STK	13	Short,Al	AC0000001866	04/05/1967	M	08/29/19 01:00	4
ACUTE.CERT	41	Saunders,Michelle	AC0000001824	02/18/1998	F	06/15/19 15:00	9
CQM.CERT	12	Ridgells,Patricia Proctor	AC0000001815	11/11/1988	F	06/10/19 13:00	4
ACUTE.CERT	52	Pry,Myra	AC0000001879	05/01/1947	F	09/04/19 15:52	8
2015AMI	27	Prince,Myra	AC0000001878	05/01/1947	F	09/04/19 15:08	8
2015AMI	28	Price,Debra H.	AC0000001889	06/14/2001	F	09/09/19 14:30	3



Walk through: Power BI Desktop

- > Report design in detail





Power BI Desktop terminology

- > Visualizations (or visuals)
- > Fields
- > Filters
- > Reports
- > Dashboards



Build a patient dashboard

- > Hands-on with Power BI Desktop



Inpatient Census

Select your filters below.

Location

- 1 West
- Hospice (Inpatient)
- Intensive Care Unit
- Postanesthesia Care Unit
- Post-partum

Service

- Cardiac Care
- Medicine
- Rehabilitation
- Transfer From Inpatient Stay

Obs Pt?

- N
- Y

Sex

- F
- M

60

Patients

5.3

Average of LOS

Patients by Location

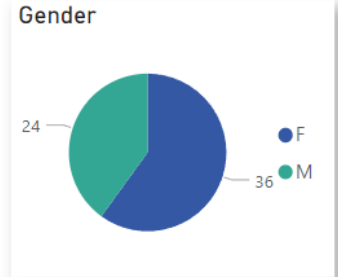
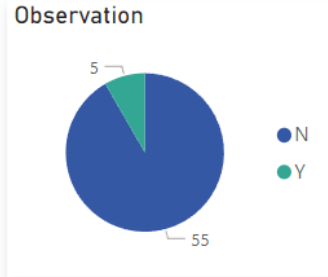
Location	Patients	Avg LOS
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Intensive Care Unit	1	8
Total	60	5

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Total	60	5

Patients by Attending

Attending	Patients	Avg LOS
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Dr Drummond	1	3
Ed Caruso	1	7
James Layock	5	7
Johanna Artze	1	6
John Brach	1	1
Kate Jenkins-Brown	7	6
Meditech Mt	43	5
Total	60	5



Patient Summary

Room	Bed	Patient	Acct #	DOB	Sex	Admitted	LOS
CQM.CERT	15	Whiteside,Kara	AC0000001860	10/11/1952	F	08/23/19 16:16	0
071315	21	Tully,Emma	AC0000001898	05/01/1947	F	09/06/19 16:16	6
ACUTE.CERT	53	Toomey,Shawn	AC0000001875	06/01/1970	M	09/03/19 05:00	9
CRT19	7	Thompson,Sally	AC0000001919	08/19/1946	F	09/15/20 14:37	1
CQM.CERT	13	Thompson,Andrew	AC0000001852	05/03/1985	M	07/29/19 13:16	5
1 LD	3	Test,Forkate	AC0000001782	01/01/1984	F	02/08/19 10:53	6
ACUTE.CERT	60	Summers,Allan H.	AC0000001884	04/16/1982	M	09/09/19 14:28	3
2015AMI	38	Summers,Allan H.	AC0000001905	04/16/1982	M	09/09/19 16:53	3
2015STK	21	Stroman,Al	AC0000001843	04/05/1967	M	07/11/19 04:00	3
CRT19	4	Steele,Debra H.	AC0000001888	07/27/1983	F	09/09/19 14:30	3
1H	3	Smith,Brett	AC0000001873	05/01/1947	M	09/03/19 13:08	9
2015AMI	25	Smith,Anthony	AC0000001794		M	06/11/19 12:13	3
2015STK	13	Short,Al	AC0000001866	04/05/1967	M	08/29/19 01:00	4
ACUTE.CERT	41	Saunders,Michelle	AC0000001824	02/18/1998	F	06/15/19 15:00	9
CQM.CERT	12	Ridgells,Patricia Proctor	AC0000001815	11/11/1988	F	06/10/19 13:00	4
ACUTE.CERT	52	Pry,Myra	AC0000001879	05/01/1947	F	09/04/19 15:52	8
2015AMI	27	Prince,Myra	AC0000001878	05/01/1947	F	09/04/19 15:08	8
2015AMI	28	Price,Debra H.	AC0000001889	06/14/2001	F	09/09/19 14:30	3



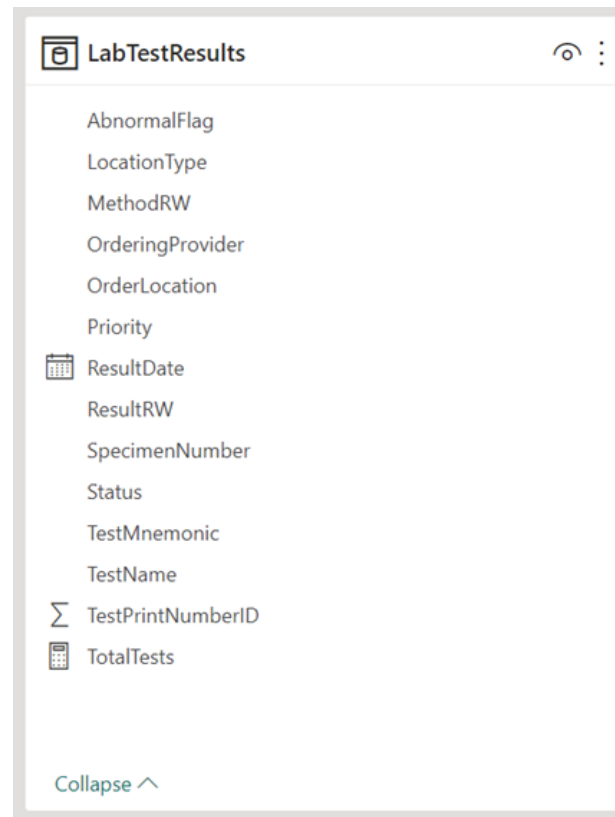
What is the data model?

- > *A data model* describes all the different data entities you have and the (potential) relationships between them.
- > The *model* in Power BI Desktop is comprised of data tables you define with one or more connections to any variety of data sources – but for us, primarily to the Data Repository SQL Server.



Data model examples

Should the data be “flat,” like a single table?



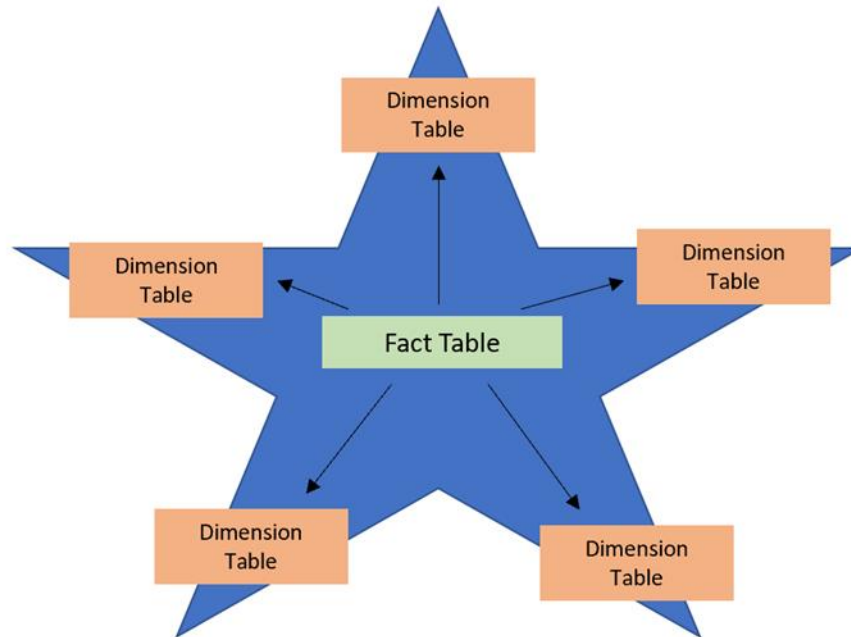
The image shows a screenshot of a data model for a table named "LabTestResults". The table is displayed in a list view with various attributes. The attributes are:

- AbnormalFlag
- LocationType
- MethodRW
- OrderingProvider
- OrderLocation
- Priority
- ResultDate (indicated by a calendar icon)
- ResultRW
- SpecimenNumber
- Status
- TestMnemonic
- TestName
- TestPrintNumberID (indicated by a summation symbol)
- TotalTests (indicated by a calculator icon)

At the bottom of the list, there is a "Collapse ^" button.

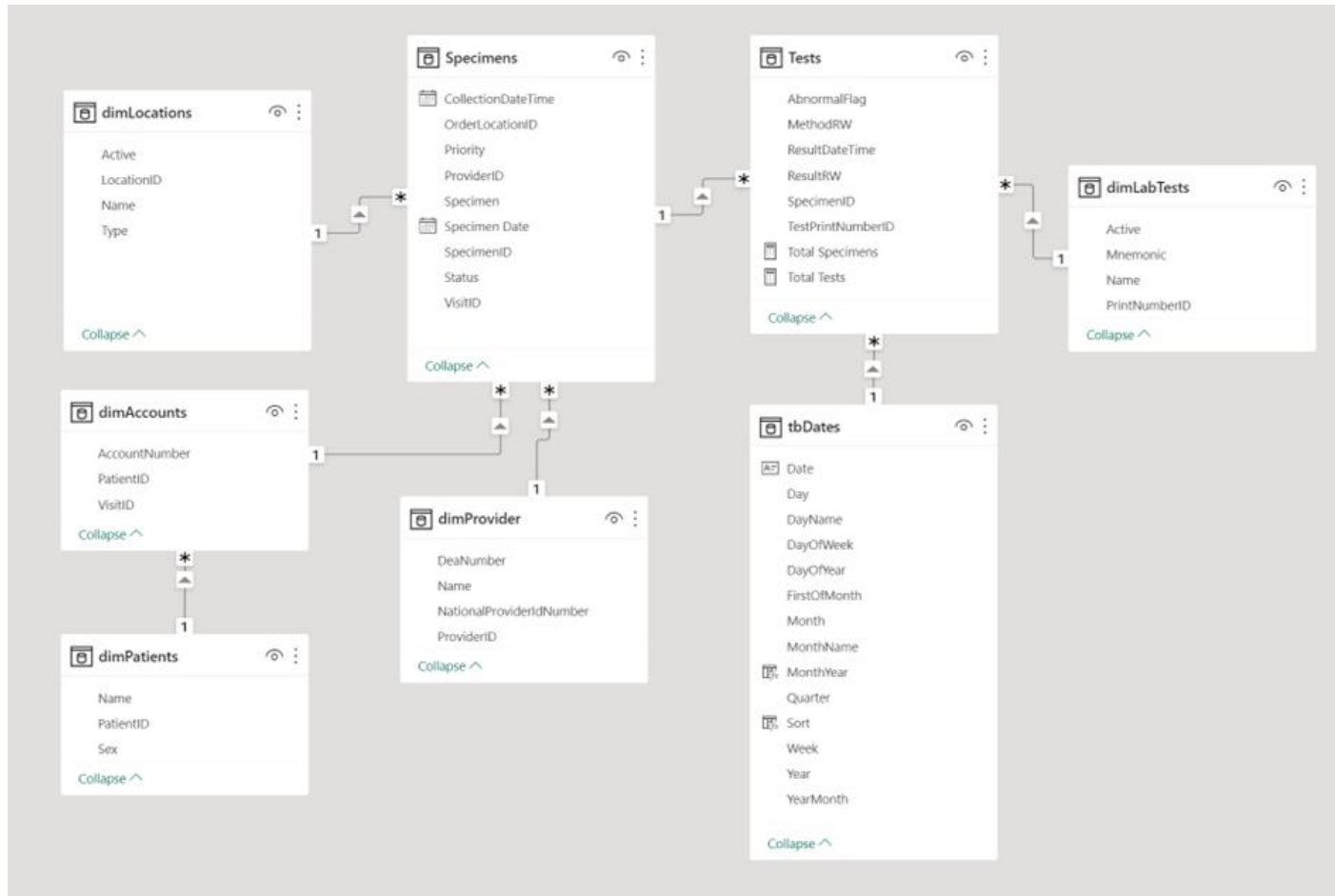
Data model examples

Should I use a star schema?



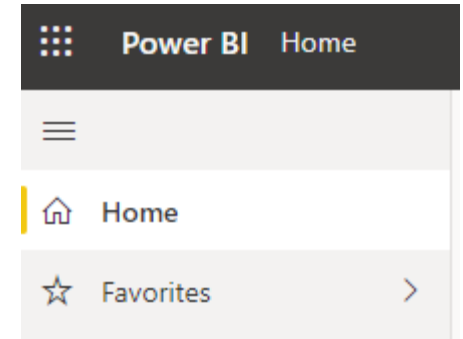
Data model examples

How about a snowflake schema?



Power BI online - user experience

- > Workspaces
 - > share the ownership and management of dashboards, reports, and datasets
 - > Use roles to determine permissions (manage, edit, view)
- > Apps
 - > Package related workspace reports to focus your users.
 - > Permissions granted per App for easier management, and can be further sub-divided into roles within and app
- > Dashboards
 - > Single-page canvas of tiles used to “tell the story”
 - > Allows drill-through to App or Workspace



Power BI online

Power BI Apps

Search

Get apps

Apps are collections of dashboards and reports in one easy-to-find place.

View Sort Filter by keyword Filter

App Name	Description	Owner	Created
Financial	Financial Dashboards & Reports	Glen D'Abate	11/18/22, 10:00:04 AM
Power BI Demonstration Reports	Power BI Demonstration Reports	Ian Proffer	1/23/23, 3:05:44 PM
Executive Team	AcmeWare Executive Team Reports & Das...	Glen D'Abate	5/17/23, 6:50:30 AM



A little on licensing

- > <https://learn.microsoft.com/en-us/power-bi/fundamentals/service-features-license-type?msclkid=168e10b8bce811ec9447447ea6f0bcde>
- > <https://learn.microsoft.com/en-us/power-bi/consumer/end-user-license#licenses>
- > <https://powerbi.microsoft.com/en-us/pricing/>



Open discussion

- > What questions do you have?
- > Do you have any real world DR problems I can help solve?



2023 MUSE Inspire Conference

June 7-10 Gaylord Rockies Resort & Convention Center | Aurora, CO



Our conference education sessions:

- 1044** - Migrating Reports to Expanse: Can we talk?
(Thursday at 3:10)
- 1039** – Reimagine DR Reports with Power BI (Friday at 2:10)
- 1046** - OR Utilization Analysis (Saturday @8:30)



Microsoft Power BI



Keep in touch!

Me: iproffer@acmeware.com

Our website: <https://acmeware.com>