

DON'T JUST SURVIVE.
THRIVE.

Healthcare Analytics

[Waiting List Analysis]

Presented By
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ABOUT ME

SOUMYADEEP DHAR

SKILLS

- Excel
- SQL
- Python
- ETL
- Power Bi

DESCRIPTION

CURRENTLY DOING
VIRTUAL INTERNSHIP
AT CODEBASICS

Understanding the Healthcare Ecosystem

The healthcare ecosystem extends beyond hospitals and doctors to include :

- Public health agencies
- Insurance providers
- Pharmaceutical companies
- Technology systems
- Patients (at the center)

Effective management = Aligning all parts to deliver accessible, affordable, high-quality care



Inpatient vs Outpatient: Understanding the Difference



🛏️ **Inpatient :** A patient **who is admitted to a hospital or healthcare facility and stays overnight** (or longer) for treatment, surgery, or observation



🏠 **Outpatient :** A patient who receives medical care or treatment but **does NOT stay overnight in the hospital or healthcare facility.** They arrive, get treated, and go home the same day.

PROBLEM STATEMENT

Healthcare Waiting List Analysis ⏳



Overall Objective

- Track current status of patient waiting list
- Analyze historical monthly trend of waiting list in Inpatient & Outpatient categories
- Detailed specialty level & age profile analysis

Data Scope

- 2018 – 2021

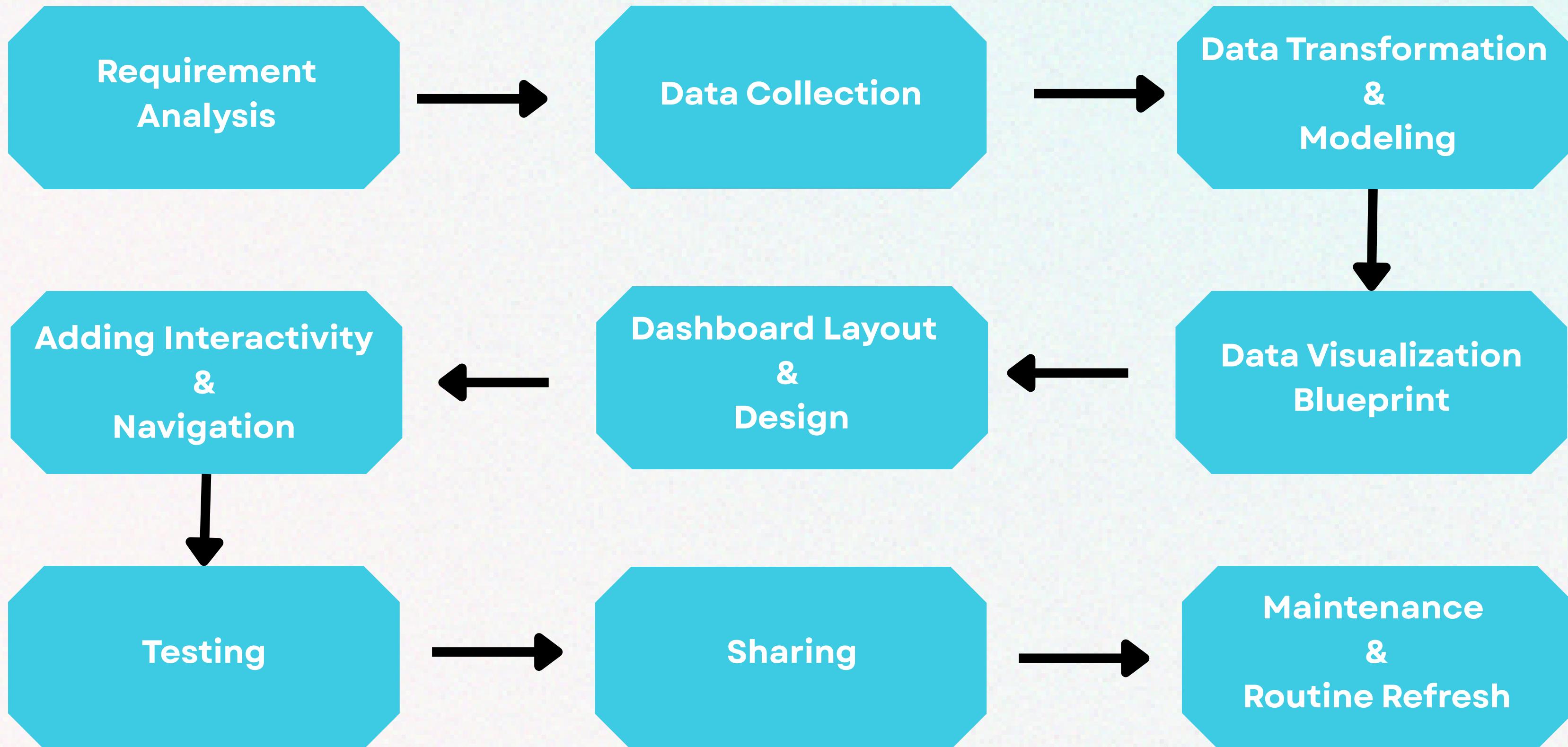
Metrics

- Average & Median Waiting List
- Current Total Wait List

View

- Summary Page
- Detailed Page for Granular Analysis

The process of creating a Dashboard in Power BI consist of following steps:



Step 1 : Requirements Analysis

Stakeholder Mapping

- Identify primary users
- Establish domain expert contacts
- Connect with decision makers

Establish Business Objectives

- Conduct discovery meetings
- Ask open-ended questions
- Clarify success criteria

Data Assessment

- Review available data sources
 - Column Description
 - Evaluate data quality
 - Assess volume & frequency
 - Check for missing values or Anomalies

Define Scope & Timeline

- Document key metrics & KPIs
 - Set calculation methods
 - Establish realistic deadlines
 - Define project boundaries



Step 2 : Data Collection



⬇ WORKFLOW STEPS

Data Description

- Unprocessed Patient Wait List data taken from the Healthcare industry , includes detailed records like Date, Specialty Name, Case Type, Age Profile etc.

Key Decisions

- This is the phase where you choose where to get all of your data.
- This step is crucial because it will specify how the dashboard will be refreshed following the solution's deployment.

📁 SOURCE

Google Drive

Step 3 : Data Transformation & Modeling

DATA TRANSFORMATION

- Data transformation is the process of tweaking your data's structure or adding extra steps to clean or prepare it for use. These transformations are carried out using Power BI's built-in Power Query Editor.
- Now for our purposes we will mainly see below steps:
 - Renaming Columns
 - Rearranging Columns
 - Appending 2 Tables
 - Replacing & trimming values



Step 3 : Data Transformation & Modeling

DATA MODELLING

- Data modelling is a way **to create relationship with one table to another**, so that we can fetch valuable information from them in our reporting layer.
- Lets jump into the Data Modelling View, which is located **at the left hand panel on Power BI**. We will be using All_Data from now onwards, so we can safely hide inpatient and outpatient data. We can also stop it from loading into the data model by disabling it from the power query editor. Just right click on the table name in power query and uncheck Enable Load
- Now since specialty name is one of the key attributes that we are looking in this project, lets focus on that column now. As you have seen in the data, we have a huge number of specialty available and using all of them in our report layer directly will create a clutter in our visualization. **A better approach would be to distribute them in buckets**. So to do this I have created a specialty mapping file which you will find in the downloaded resources.
Lets import that file in power bi to create the relationship with All_Data.
- Once you import this file, **Power BI should auto detect relationship and connect both the tables**. However if it does not then you can do it manually by following below steps:

1.

Go to the model view

2.

Click on Specialty_Name column in All_Data

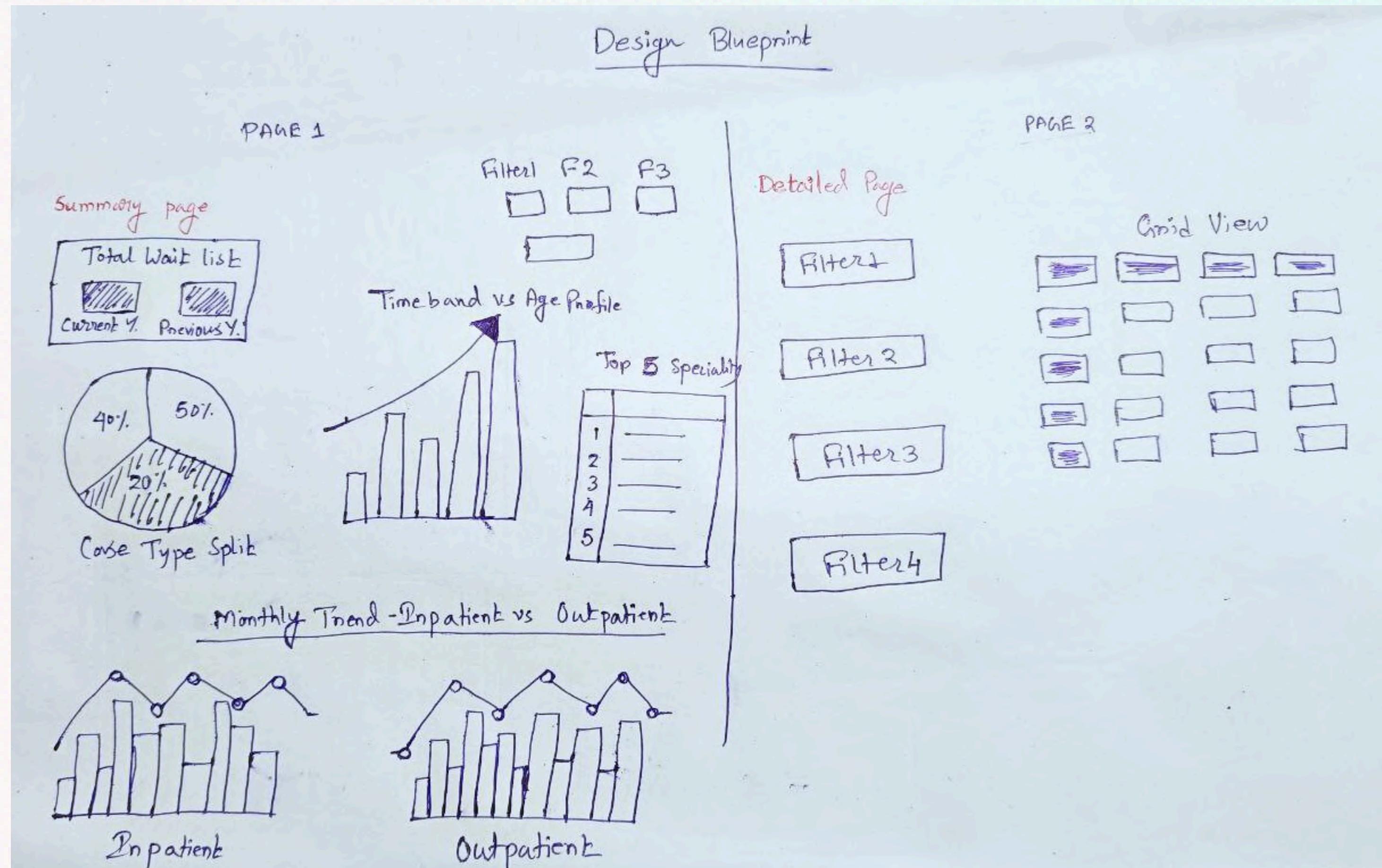
3.

Drag this column over the Specialty column in Mapping table

Now you should see a line connecting both the tables and an arrow pointing towards All_Data from Mapping table. This means that we have created a relationship between both the tables. The arrow signifies the filter context and tells you that now you can use columns from Mapping table to filter data in All_Data.

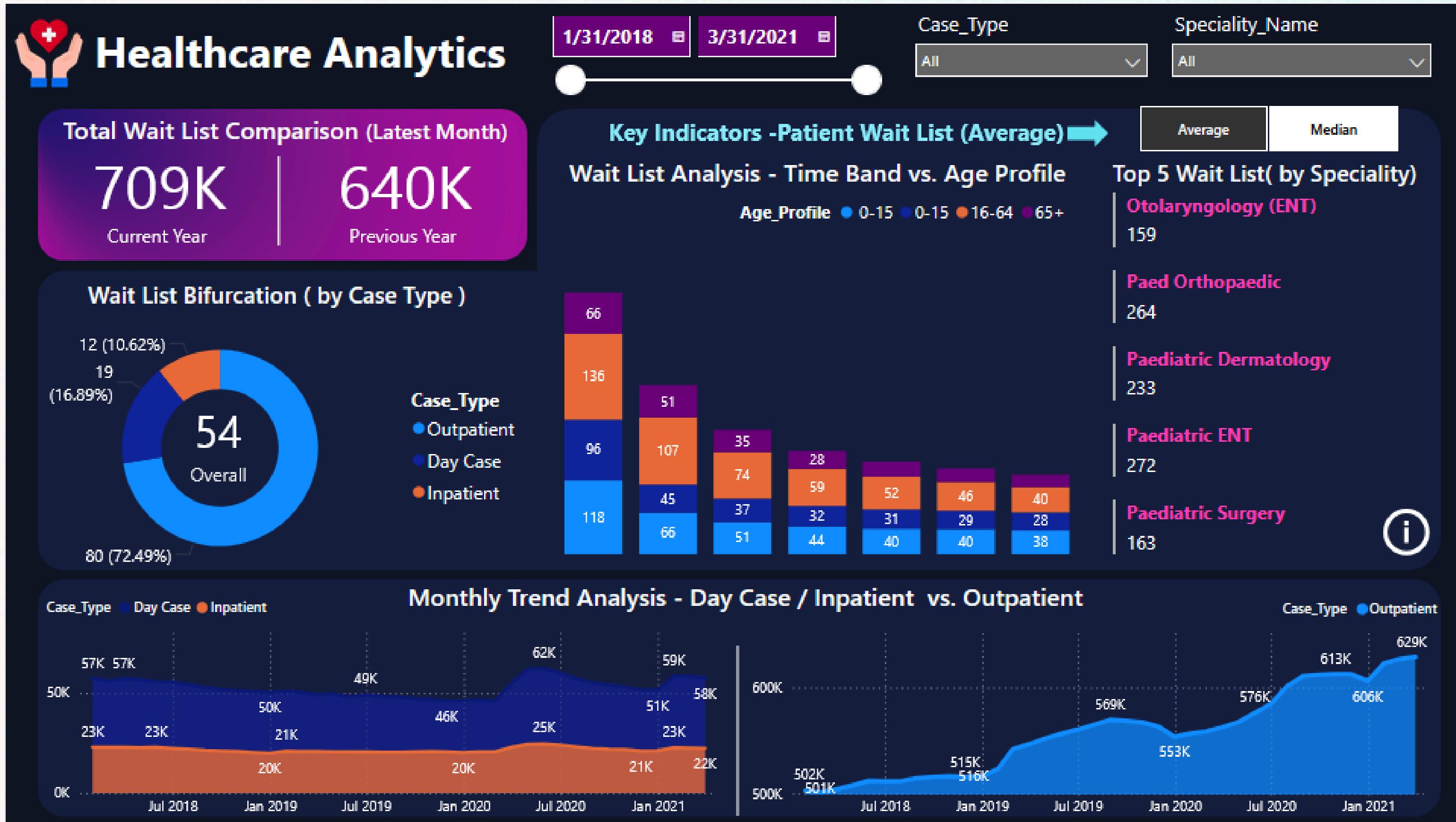


Step 4 : Visualization Blueprint



Step 5 : Dashboard Layout & Design

Summary Page



Step 5 : Dashboard Layout & Design

Detailed View

Inpatient :- A patient who got admitted in a hospital for more than one day.

Outpatient :- A patient who receives medical treatment without being admitted to a hospital.

Day Case :- A patient who got admitted in a hospital for one day.

⬅

Filter Criteria

Archive Date
 -

Case Type
 All

Specialty Name
 All

Age Profile
 All

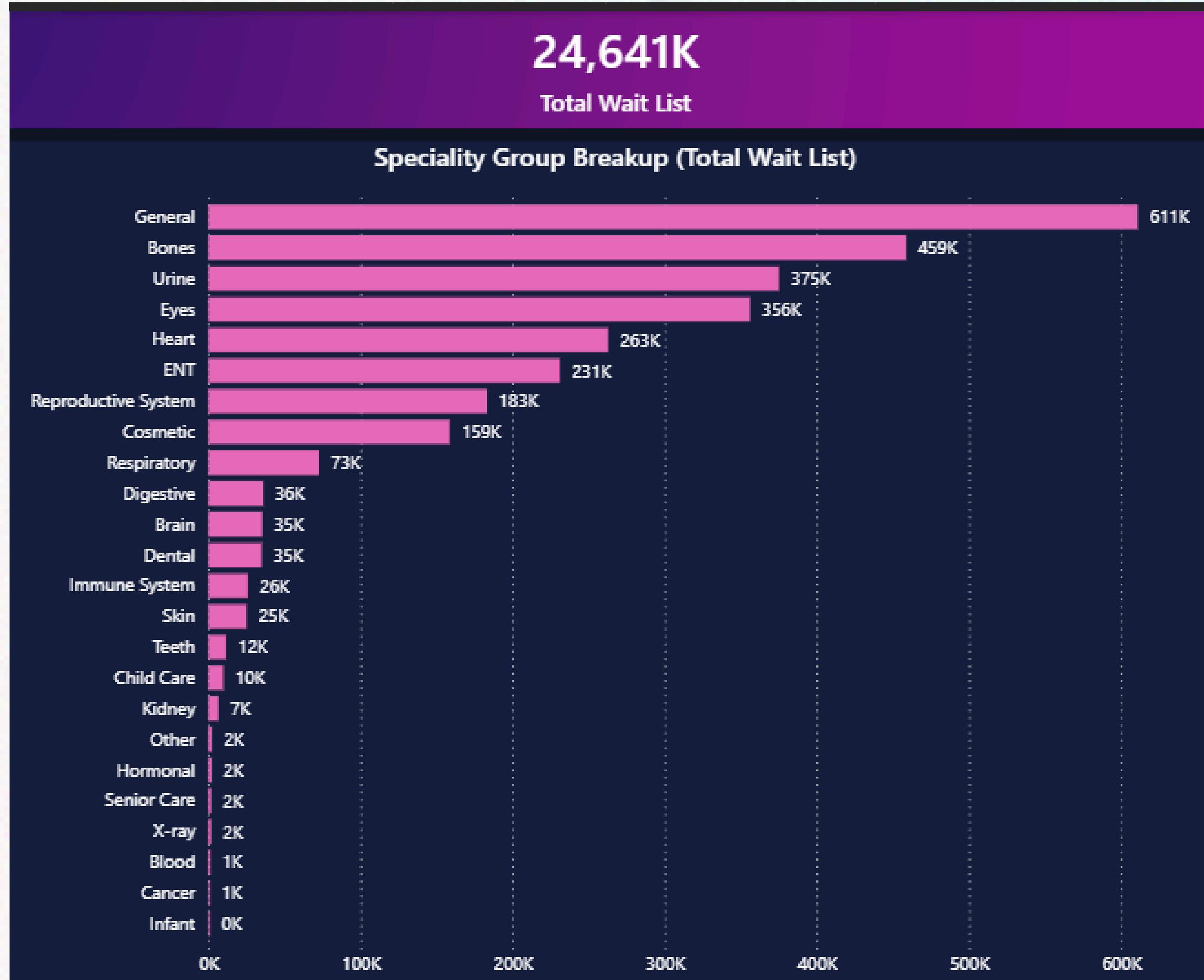
Time Bands
 All

Detailed Grid View

Archive Date	Day Case	Inpatient	Outpatient	Total
<input type="checkbox"/> Wednesday, January 31, 2018 <input type="checkbox"/> <input type="checkbox"/> Anaesthetics <input type="checkbox"/> 0-15 0-3 Months 12-15 Months 15-18 Months 3-6 Months 6-9 Months 9-12 Months <input type="checkbox"/> 16-64 0-3 Months 12-15 Months 15-18 Months 18+ Months 3-6 Months 6-9 Months 9-12 Months <input type="checkbox"/> 65+	57,267 57,267 22,937 1,949 18 5 1 1 3 3 5 1,458 442 74 73 419 195 150 105 473	22,937 22,937 502,482 582,686 80,204 1,949 18 5 1 1 3 3 5 1,458 442 74 73 419 195 150 105 473	502,482 582,686 80,204 1,949 18 5 1 1 3 3 5 1,458 442 74 73 419 195 150 105 473	582,686 80,204 1,949 18 5 1 1 3 3 5 1,458 442 74 73 419 195 150 105 473
	Total	2,059,882	845,348	21,735,739
				24,640,969

Step 5 : Dashboard Layout & Design

Tooltip Page



Key Measures

- **Latest Month Wait List** = CALCULATE(SUM(All_Data[Total]),All_Data[Archive_Date] = MAX(All_Data[Archive_Date])) + 0
- **PY Latest Month Wait List** = CALCULATE(SUM(All_Data[Total]),All_Data[Archive_Date] = EDATE(MAX(All_Data[Archive_Date]),-12)) + 0
- **Median Wait List** = MEDIAN(All_Data[Total])
- **Average Wait List** = AVERAGE(All_Data[Total])
- **Avg/Med Wait List** = SWITCH(VALUES('Calculation Method'[Calc Method]),"Average",[Average Wait List],"Median",[Median Wait List])
- **Dynamic Title** = SWITCH(VALUES('Calculation Method'[Calc Method]),"Average","Key Indicators - Patient Wait List (Average)","Median","Key Indicators - Patient Wait List (Median)")
- **NoDataLeft** = IF(ISBLANK(CALCULATE(SUM(All_Data[Total])),All_Data[Case_Type]<>"Outpatient")),"No data for selected criteria","",")
- **NoDataRight** = IF(ISBLANK(CALCULATE(SUM(All_Data[Total])),All_Data[Case_Type] = "Outpatient")),"No data for selected criteria","",")

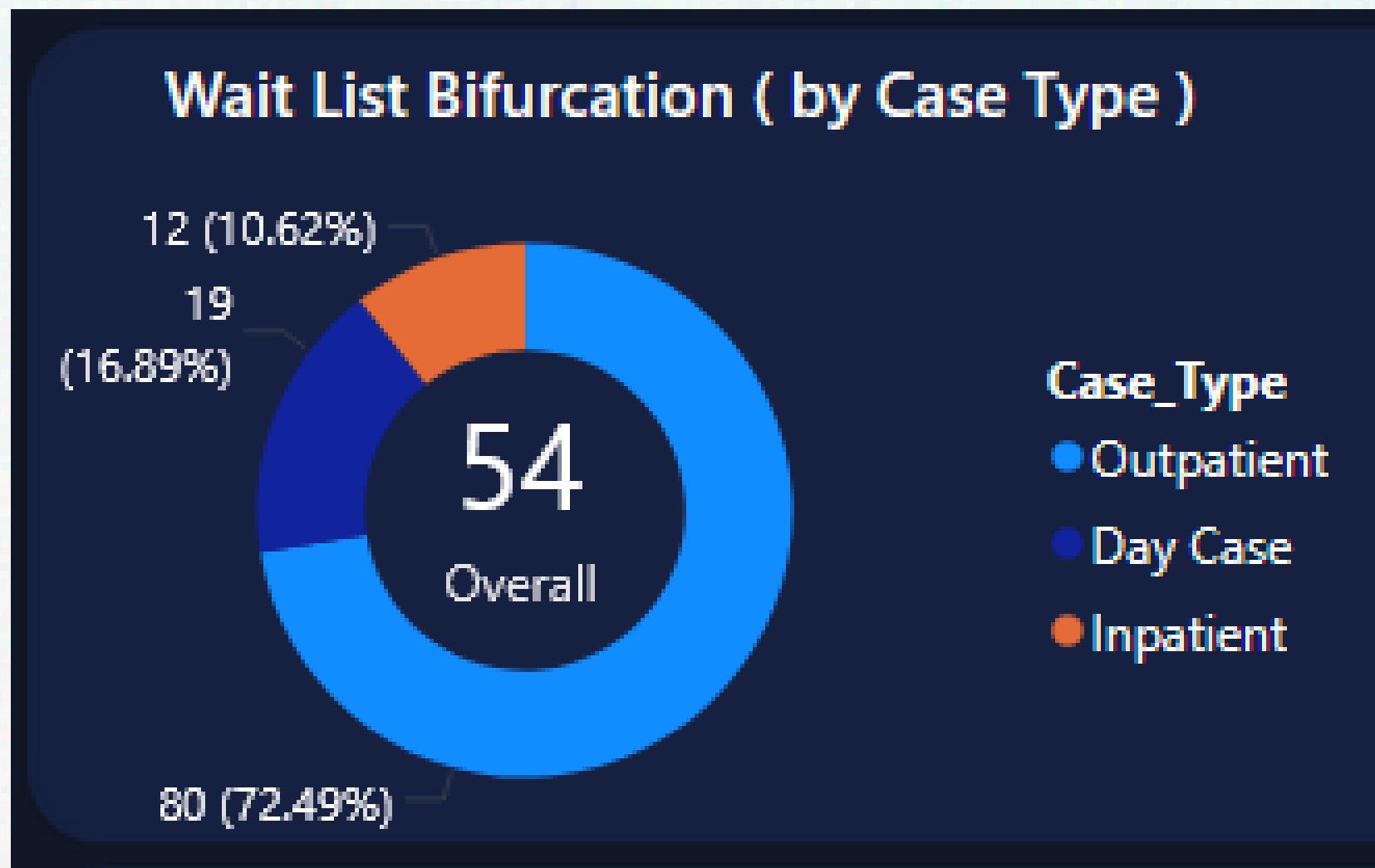
Insights

Key Performance Metrics

Wait List Growth Crisis The total wait list has grown by approximately **10.8% year-over-year (from 640K to 709K patients)**, indicating increasing demand or capacity constraints in the healthcare system.

Case Type Distribution

Outpatient Dominance: **72.49% of cases are outpatient**, representing the vast majority of healthcare encounters. **Inpatient cases account for just 16.89%, with day cases at 10.62%**. This suggests a shift toward less intensive care settings, possibly driven by efficiency initiatives or changes in treatment protocols.



Insights

Age-Related Patterns

Pediatric Concentration: The **0-15 age group** shows significant wait times across specialties, particularly in **Anaesthetics (1,949 patients)**. The **16-64 working-age population** has the highest **outpatient volume (1,458 patients)**, likely reflecting chronic condition management and preventive care needs.

Detailed Grid View				
Archive Date	Day Case	Inpatient	Outpatient	Total
Wednesday, January 31, 2018	57,267	22,937	502,682	582,686
	57,267	22,937	1,949	80,204
			18	18
			5	5
			1	1
			3	3
			3	3
			5	5
			1,458	1,458
			442	442
			74	74
			73	73
			419	419
			195	195
			150	150
			105	105
Total	2,059,882	845,548	21,735,759	24,640,969

Insights

Specialty-Specific Concerns

Top 5 Specialties by Wait List:

- **Paediatric Dermatology (233) and Paediatric ENT (272)** show substantial pediatric care backlogs
- **Paediatric Surgery (163)** indicates potential capacity issues for children requiring surgical intervention
- **Otolaryngology/ENT (159) and Paed Orthopaedic (264)** round out the top concerns

Top 5 Wait List(by Speciality)

Otolaryngology (ENT)

159

Paed Orthopaedic

264

Paediatric Dermatology

233

Paediatric ENT

272

Paediatric Surgery

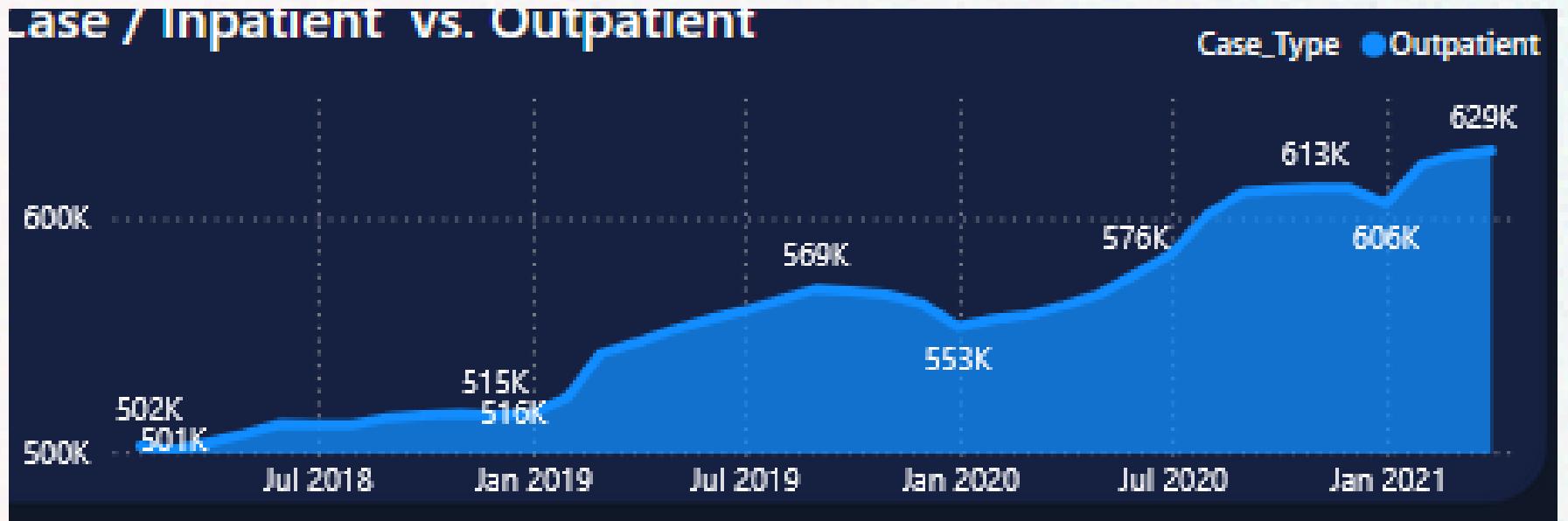
163



Insights

Temporal Trends

Case / Inpatient vs. Outpatient



Monthly Trend Analysis - Day

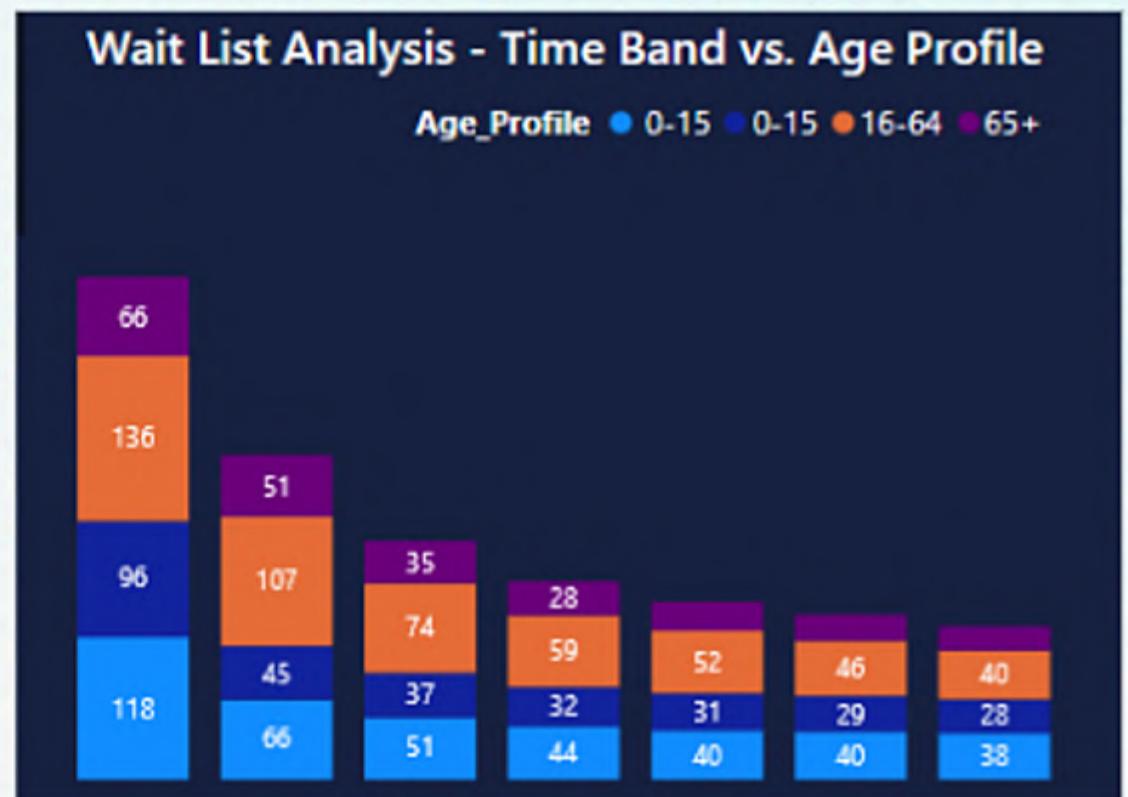


- **Sustained Growth:** The monthly trend analysis shows consistent growth in outpatient cases from approximately **500K (July 2018)** to **606K (January 2021)**. Inpatient cases have remained relatively stable around **50-60K**, suggesting the growth is primarily in outpatient services.
- **COVID-19 Impact:** There's a noticeable dip around **July 2020**, likely reflecting pandemic-related disruptions, followed by aggressive recovery and growth.

Insights

Time Band Analysis

The wait list analysis shows distribution across age profiles with peak waits in the **16-64 age bracket**, indicating working-age adults face the longest delays for care—potentially impacting workforce productivity and economic outcomes.





Strategic Recommendations

- Address pediatric specialty bottlenecks through targeted capacity expansion
- Investigate outpatient growth drivers to determine if additional facilities or staffing are needed
- Implement wait time reduction strategies for the 16-64 demographic to minimize economic impact
- Monitor case type distribution trends to ensure appropriate resource allocation across care settings

Step 6 : Adding Interactivity

Now add interactivity in your dashboard like navigation buttons, chart alt display text and hovering info.



Navigation buttons



Hovering info



Chart alt display
text(Alternative Text)

Step 7 : Testing

Ensure to conduct an extensive **UAT** session which will identify any bugs or data issues

UAT (User Acceptance Testing)

- Final testing phase before going live
 - Real users test the dashboard
 - Validates it works for end users
 - Identifies bugs and data issues
- Once UAT is complete, you're ready to deploy to production



Step 8 : Sharing

Sharing is the process of distributing your completed healthcare dashboard to stakeholders, users, and decision-makers so they can :



- Access real-time data
- Make informed decisions
- Monitor key metrics
- Track performance
- Collaborate on insights

Sharing Methods :

- Power BI Service workspace
- Email subscriptions
- Mobile apps
- Embedded in systems

Step 9 : Routine Refresh & Maintenance

Congratulations! Your dashboard is live!

Now transition to BAU (Business As Usual):

- Establish routine data refresh schedule
- Implement regular maintenance procedures
- Monitor performance and usage
- Provide ongoing user support



THANKS FOR WATCHING

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Canva

presentation design