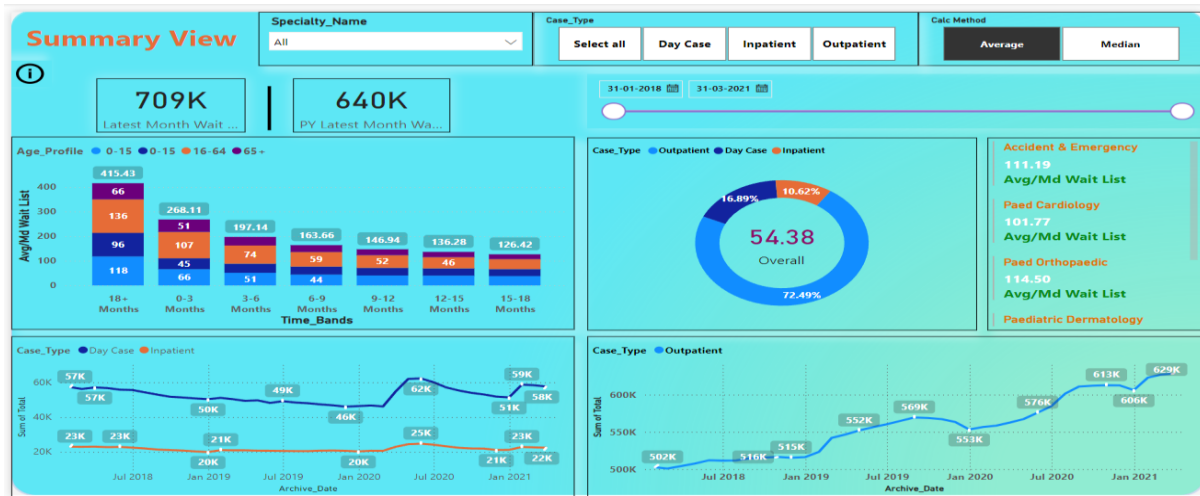


# Healthcare Data Analysis - Patient Wait List Dashboard

Tracking and Analysing Patient Waiting Lists in Inpatient, Outpatient, and Day Cases (2018-2021)

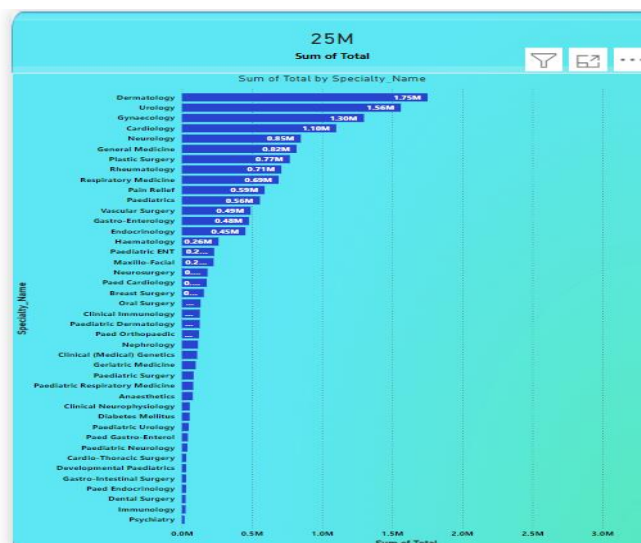
Presented by: Harshad Kamble



**Detailed**

Case\_Type: Select all, Day Case, Inpatient, Outpatie... | Age\_Profile: All | Specialty\_Name: All | Calc Method: Average, Median

Archive_Date	Day Case	Inpatient	Outpatient	Total
Total	2059882	845348	21735739	24640969
31 January 2018	57267	22937	502482	582686
28 February 2018	56180	22859	500800	579839
31 March 2018	57095	22963	504111	584169
30 April 2018	56731	22683	507507	586921
31 May 2018	55795	22801	511904	590500
30 June 2018	55617	22397	511415	589429
31 July 2018	54244	21912	511675	587831
31 August 2018	52911	21278	514585	588774
30 September 2018	51725	20993	515547	588265
31 October 2018	51287	20714	516363	588364
30 November 2018	50760	20229	515360	586349
31 December 2018	50324	19880	516162	586366
31 January 2019	51087	20940	523225	595252
28 February 2019	50345	20860	541899	613104
31 March 2019	49367	20852	546630	616849
30 April 2019	49655	20640	551965	622260
31 May 2019	48156	20609	556411	625176
30 June 2019	49168	20503	560251	629922
31 July 2019	48395	20412	564829	633636
31 August 2019	47984	20406	569498	637888



## Project Overview:-

- **Problem Statement:**

Managing patient wait times is crucial for healthcare efficiency. Extended waitlists impact both patient satisfaction and operational effectiveness.

- **Objective :-**

Develop a Power BI dashboard to:

- Track the current waitlist status.
- Analyse monthly trends across Inpatient, Outpatient, and Day Case categories.
- Provide detailed specialty-level and age-profile analysis to aid resource planning.

- **Scope:** Data from 2018 to 2021, covering various patient types.( Inpatient, Outpatient, Day case).

### Key terms:-

**Inpatient:-** a patient who stays in a hospital while under treatment (more than 1 Day ).

**Outpatient:** A patient who receives medical Treatment without being admitted to a hospital.

**Day Case:-** Patient got admitted for 1 Day only

---

## Tools used & Steps taken :-

**Tools :-** Power BI, Power query.

**Steps taken:-**

### 1 ) Methodology – Data Collection & Import :-

***Data imported using Folder connection in Power BI, Because have multiple files for each day case.***

*Get data > folder connection "Path" > combine & load*

***Specialty mapping table imported using Text/CSV.***

*Get data > Text / CSV > combine & transform*

*Here, I go as "combine & transform" because, in data preview the column names I want are taken as row, So, in power query, In table's dropdown option, I applied "use first row as header" and then "Close & apply".*

---

### 2) Methodology – Data Transformation & Modeling

#### **Power Query Transformation:**

- Recheck Column names in both tables and Data type of each column to ensure that datasets have correct datatype.
- Renamed columns (e.g., Specialty to Specialty\_Name), to ensure tables get appended correctly.
- Added Case\_Type for Outpatient data, Because it don't have Case\_Type column.
- Trimmed Time Band values and replaced missing values in Age Profile and Time Band with "No inputs." to avoid duplicates caused because of human errors and case sensitive nature of Power BI.

#### **Data Modelling:-**

- Combined tables in **Append Queries as New** and created a unified dataset for analysis.
  - **Hiding Unnecessary Tables:-** Original tables were hidden to avoid redundancy in report view ( using model tab).
-

### 3) So, for visualisation of the data, in my summary page blueprint,

1) At top left, have count of Total waiting list for current month & waiting list for Last year of same month, so that to have reference point as in how performing than last year. And new measure for this created using DAX functions.

2) Then, developed visualization of slicers for highlighting Avg/ median wait list for Different attributes like,

(1) Case\_Type (2) Time band & Age Profile (3) Speciality\_Name (4) Archive\_Date

3 ) Created Toggle mechanism for Average & Median metrics using DAX for ease of interactivity.

### ***Key DAX Formulas used for new measures according to requirements:-***

#### **1) Latest Month Wait List:-**

DAX

Latest Month Wait List = CALCULATE( SUM(All\_Data[Total]), (All\_Data[Archive\_Date] = MAX(All\_Data[Archive\_Date]))

**Explanation:** This calculates the total waitlist for the latest date in the dataset.

#### **2) Previous Year's Wait List:**

DAX

PY Latest Month Wait List = CALCULATE( SUM(All\_Data[Total]), (All\_Data[Archive\_Date] = EDATE(MAX(All\_Data[Archive\_Date]), -12))

**Explanation:** This retrieves the waitlist count for the same month in the previous year using the EDATE function.

As, I represent visuals for average wait list, but in case of outliers I created median waitlist, So, in order to add two metrics in same chart we created toggle mechanism, using which it becomes easy to switch between any of metric.

So, first I created new measures for Average & median waitlist using Dax

#### **3)Average and Median Wait List:**

Dax

Average Wait List = AVERAGE(All\_Data[Total])

Median Wait List = MEDIAN(All\_Data[Total])

**Explanation:** Created for toggle functionality between Average and Median in summary visuals to account for outliers.

**Average Wait List** helps assess the typical time patients spend waiting for treatment, considering all case types (Inpatient, Outpatient, and Day Case) and specialties.

**Median wait list** provide a more robust view of the typical patient experience by **reducing influence** of outliers (i.e. a few patients, case type with significantly long wait times).

before creating toggle button, I created blank table to hold value of the metrics that I want to toggle (i.e. Average & Median) by,

Create new table > Table name("Calc method") > row 1 ("Average") & row 2 ("median") > ok

& Then I created Slicer using "Calc\_method" Table.

Then created **Dynamic Metric Toggle**,

#### 4) Dynamic Metric Toggle:-

Dax

```
Avg/Med Wait List = SWITCH(VALUES('Calculation Method'[Calc_Method]),  
"Average", [Average Wait List], "Median", [Median Wait List])
```

**Explanation:** SWITCH and VALUES functions allow toggling between Average and Median wait list values.

---

#### 4) Now, go through dashboard design of Summary, detailed and DrillDown Page

##### Summary Dashboard Design:-

##### Summary Page Layout:

- **KPIs (Latest Month Wait List v/s Previous Year(PY) Month Wait List):-** created using Latest Month Wait List and PY Latest Month Wait List measures.
- **Slicers:** Filters for Case\_Type, Archive\_Date and Specialty
- **Toggle Button:-** To toggle between Average and Median Wait list.
- **Visuals:**
  1. **Donut Chart:** Displays Case Type distribution using Avg/Med Wait List measure.
  2. **Stacked Bar Chart:** Shows Age Profile vs. Time Band wait list.
  3. **Top 5 Specialty Grid:** Multi-row card visual with a filter to display only the top 5 specialties.  
To display only Top 5 specialties used,  
Filters > select "Speciality\_Name > Show items (Top 5) > By value (Avg/Med wait list)
  4. **Line charts:-** showcasing total monthly waitlists by Case Type.

##### Detailed Analysis Page – Granular Insights

- **Detailed Analysis Page Setup:**
  - 1) **Matrix visual:-** Organized by Specialty, Age Profile, Time Band, and Case Type allows in-depth filtering.
  - 2) **Slicers:-** Added for Specialty, Age Profile, and Case Type, Archive\_Dates for specific drill-downs.
- **Granular Insights:** High wait times in certain specialties and age groups inform potential resource reallocation.

## **DrillDown Page:-**

**Chart:-** using Mapping Specialty ( Specialty Group ) by Sum of Total waitlist.

**Cards:-** total count of Waitlist and bars showing count for each specialty group.

And used as tooltip for line chart by,

*Select Line chart in Summary page > General > Tooltip > Select Drilldown*

It accordingly shows Total Waitlist and Waitlist by Speciality\_Name as the point of cursor on line chart and it becomes easy for getting reference point.

## **For more asthetic dashboard view, designed dashboard and Added Page Navigation to Buttons:-**

Select the button and > **Format** pane > **Action** > Toggle the **Action** switch to **On** >

Under **Type** > select **Page Navigation**. And selected page to navigate

---

## **5) And lastly added some changes according to requirements:-**

1) while interacting with latest dates in "PY Latest Month list" it shows "Blank".

So, added "+0" to logic of measure of "PY latest year month list".

PY Latest Month Wait List = CALCULATE( SUM(All\_Data[Total]), (All\_Data[Archive\_Date] = EDATE(MAX(All\_Data[Archive\_Date]), -12)) + 0

2) while interacting with Case\_Type Filter, Line chart of outpatient got blank when selecte Inpatient and Daycase, to avoid I formatted slicer's interactions using,

**Format > Edit interactions & according to requirements formatted visuals.**

---

## **Key Findings and Insights**

### **KPIs & and other visuals for analysis :-**

- **KPIs:**

#### **Latest Month Waitlist Total & PY Latest Month Wait List:-**

The **Latest Month Waitlist** KPI showing **709K** and the **Previous Year (PY) Same Month Waitlist** KPI at **640K** indicate a **significant increase** in the number of patients on the waitlist compared to the same month last year.

It can be interpret as,

An increase of **69K patients** from the previous year suggests that either demand for services has grown, or there has been a decrease in operational efficiency, potentially leading to longer wait times.

This increase may indicate that current healthcare resources, such as staffing, facilities, or budget, are struggling to meet patient demand effectively.

The growth trend could mean that without adjustments, the facility may experience even longer wait times, reducing patient satisfaction and potentially impacting care outcomes.

**Median Waitlist:** By including median wait times, the report reduces the impact of outliers.

---

- **Slicers:**

**Case\_Type:** Allows filtering by Inpatient, Outpatient, and Day Case, offering insights into waitlist distribution across categories.

**Time Band & Age Profile:** Identifies age-specific trends or bottlenecks in time-to-care based on age demographics.

**Specialty\_Name:** Enables drill-down analysis of waitlists by specialty, helping assess which departments are over- or under-utilized.

---

- **Specialty Name Analysis (Top 5)**

**Top 5 Specialties:** Reviewing these specialties highlights high-demand areas like Accident & emergency, Paed cardiology, Paed Orthopaedic, Paedatric dermatology, Paedatric ENT, with high count of Average waitlist.

So, **it interpret as** to prioritize resources or streamline processes for these Specialities.

**Recommendations:** Focus on specialties with consistently high wait times for process optimization, such as adjusting resource allocation or scheduling practices.

---

## **Line Chart Insights**

- **Monthly Trend Analysis:** The line chart shows fluctuations in waitlists over time across case types (inpatient, outpatient, day case).

### **Insights:**

There are peaks from July month this trends indicates times of high patient increase, valuable for planning staff shifts or resource needs for month showing peaks in next year management.

And by comparing inpatient vs. outpatient trends, there is need of intervention for outpatient waitlist by increasing resources and more facilities.

---

## **Pie Chart Analysis**

**Case Type Distribution:** Provides a proportional view of Inpatient, Outpatient, and Day Case categories, showing Outpatient case types contribute most to the waitlist by one to one comparing case types.

**Outpatient with 72.85%** higher percentages indicate resource issues, demand mismatches, here the suggestion is a need for targeted process improvements.

---

## **Detailed Drilldown Page Insights:-**

- **Granular Analysis:**

**Matrix Visual:** Combines Archive Date, Specialty\_Name, Age\_Profile, and Time Band, broken down by Case\_Type. Provides granular data insights, e.g., specific bottlenecks in age or specialty groups.

**Drill-Down by Specialty:** Enables viewing waitlists at detailed levels by Specialty group, exposing peak areas like Orthopaedic specialty group within specialties.

---

## **Conclusion:-**

- **Overall Findings:** High wait times in “Accident & emergency, Paed cardiology, Paed Orthopaedic, Paediatric dermatology, Paediatric ENT” specialties and “0-15”, “16-65” age profiles indicate these areas where the hospital can benefit from process improvements.
- **Recommendations:**
  - Allocate more resources to high-demand specialties and case types.
  - Use median-based wait times to mitigate the impact of outliers, ensuring fairer metrics for patient wait times.
  - Evaluate staffing or operational hours, particularly in high-demand areas, to bring down waitlists.
  - Identify if any inefficiencies in patient processing, discharge planning, or intake procedures are contributing to higher waitlists.
  - Offering more outpatient or day-case services can help alleviate waitlist pressure on inpatient services, balancing resource distribution.