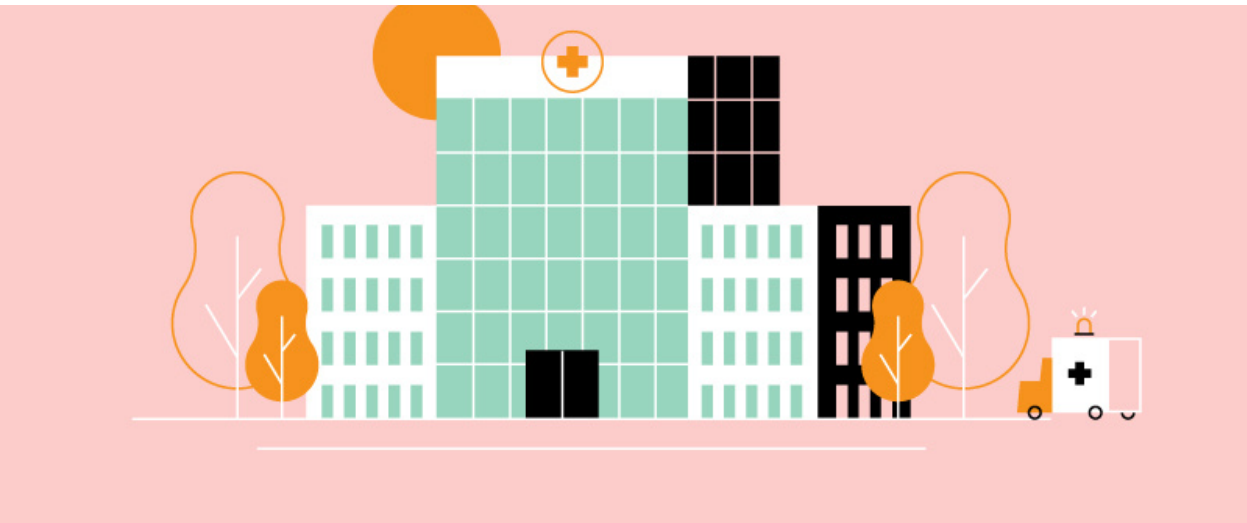

Patient Emergency Room Visit Report

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Background

Emergency departments (EDs) are on the front lines of healthcare, and their ability to serve a high volume of patients is critical for efficient operations and hospital satisfaction. Long wait times, growing patient satisfaction rates, and service imbalance can be huge challenges for clinic management. To address these challenges, this report presents an analysis of clinic data to provide insights into patients' demographics, appointment trends, and medical service performance. The object is to identify key trends and areas for improvement to streamline clinic operations.

Data Source and Methodology

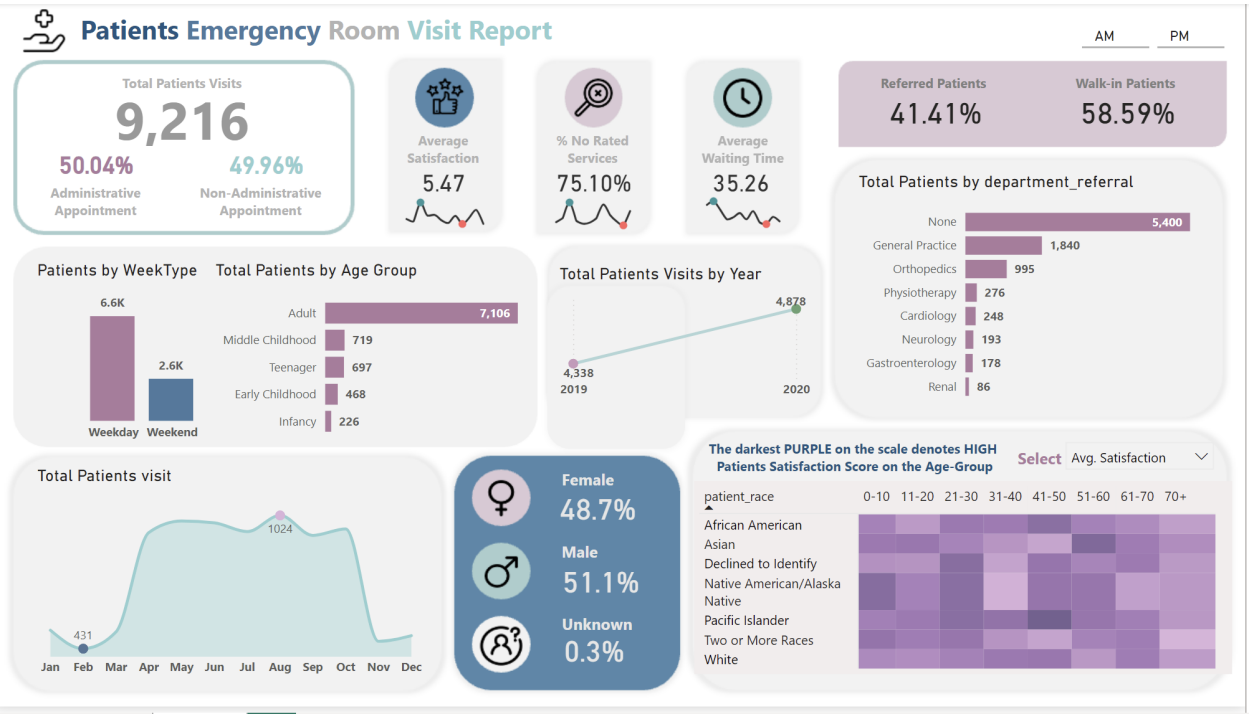
The data is from a dataset containing records of patients' emergency visits. Each record includes Patient ID, age, gender, race, satisfaction score, wait time, and more from 2019 to 2020. The data was produced and visualized using PowerBI.

The Data dictionary shows as follows:

Column Name	Data Type	Description
date	String	The date of the patient's record entry (format: Month Year).
patient_id	String	A unique identifier for each patient (format: xxx-xx-xxxx).
patient_gender	String	The gender of the patient (M for Male, F for Female).
patient_age	Integer	The age of the patient in years.

patient_sat_score	Integer	The satisfaction score of the patient.
patient_race	String	The race of the patient.
patient_admin_flag	Boolean	A flag indicating whether the patient is an admin (True/False).
patient_waittime	Integer	The wait time of the patient in minutes.
department_referral	String	The department to which the patient was referred.
Full Name	String	The full name of the patient.
Moment	String	The time of day the record was created (AM/PM).
Age Bracket	String	The age bracket of the patient (ranges: 0-10, 11-20, 21-30, 31-40, 41-50, 51-60, 61-70).
Age Group	String	The age group of the patient (e.g., Infancy, Middle Childhood, Teenager, Adult).

Findings and Visuals



Patient Visit Overview

We can see from the dashboards, the total patient visit in these 2 years is 9,216. The number of Patients visit emergency rooms at daytime is 4,632 while at night is

4,584, showing a balanced mix of daytime and nighttime visits. Among those patients, overall percentage of appointment with administration is 50.04%, and non-administrative appointment is 49.96%, as for specific time period, daytime shows 49.35% vs. 50.65%, while night time shows 50.74% vs. 49.26%, which indicates the number of patients with appointment is slightly higher during the night compared to the daytime. (Details show in the dashboard mentioning in the appendix)

From weektype distribution view, overall patients visiting on weekdays (6.6k) are far higher than those visiting on weekends (2.6k) no matter is daytime or nighttime, however, for average visit number, we can indicate that emergency room is busier on weekends.

Trend analysis shows total patient visits increased from 4,338 in 2019 to 4,878 in 2020, indicating a growing patient base.

Appointment Types

Appointment type is divided by referral and walk-in. Generally, 41.41% of the total visits were referred patients, while 58.59% of the total visits were walk-in patients, and the distribution pattern is no big difference in day and night time, indicating more patients visit the clinic without any appointment.

Patient Demographics

I divided patients age into 5 groups, 0-2 years is infancy, 2-6 years is early childhood, 6-12 years is teenager, 12-18 years is middle childhood, and age which is more than 18 is adult. We can see the patient distribution in these age groups shows an extreme increasing trend followed by increase of age from 226 to 7,106.

The gender distribution is nearly balanced distribution with overall female percentage of 48.7 and male percentage of 51.5 (the rest 0.3% is unknown gender).

Patient Satisfaction

In general, the average satisfaction score is 5.47 out of 10, with a peak score in March (5.93) and a bottom in September (5.30), while for the daytime, the average satisfaction score is 5.45 with a highest score in February and a lowest score in

January, and for the nighttime, the average satisfaction score is 5.50 with a highest score in March and a lowest score in December.

The heatmap indicates that patient satisfaction varies across different age groups, with the darkest purple representing the highest satisfaction scores. We can see as age increases, the average satisfaction score represents a down trend, and for native patients that are 31-40 years old show the most unsatisfaction.

Average Waiting Time

Overall, the average waiting time is 35.26min, which is significantly lower than the average wait time in US emergency rooms (ERs) (around two hours and 25 minutes), specifically, the heatmap shows the 70+ age group in native residents have highest waiting time.

Department Referrals

Regarding department referrals, most visits did not require a referral (5,400), but there was a notable number of referrals to general practice, orthopedics, physiotherapy, cardiology, neurology, gastroenterology, and renal departments, especially general practice with 1,840 visits.

Conclusion and Recommendations

Key Insights

The analysis of clinic data over two years reveals several key insights. Total patient visits numbered 9,216, with a balanced split between daytime and nighttime visits. Administrative appointments were slightly more common at night (50.74%) than during the day. Weekday visits (6,600) far outnumbered weekend visits (2,600), although emergency rooms were busier on weekends. Patient visits increased from 4,338 in 2019 to 4,878 in 2020, showing growth in the patient base.

41.41% of visits were referred patients, while 58.59% were walk-ins. The majority of patients were adults (7,106), with a balanced gender distribution of female and male. Average patient satisfaction was 5.47 out of 10, with the highest scores in March and the lowest in September. Satisfaction decreased with age, particularly among native patients aged 31-40 years. The average waiting time was 35.26

minutes, significantly lower than the national average for US emergency rooms, with the longest waits in the 70+ age group among native residents.

Most visits (5,400) did not require a referral, but there were significant referrals to general practice (1,840), orthopedics, physiotherapy, cardiology, neurology, gastroenterology, and renal departments.

Recommendations

1. **Optimize Weekend Staffing**: Adjust staffing levels to handle busier emergency rooms on weekends.
2. **Targeted Adult Services**: Expand and improve services for the large adult patient base.
3. **Improve Satisfaction for Older Age Groups**: Focus on increasing satisfaction among older patients, particularly those aged 31-40 and 70+.
4. **Reduce Nighttime Administrative Burden**: Streamline administrative processes at night for better efficiency.
5. **Increase Referral Service Awareness**: Enhance awareness and streamline referral processes for timely care.

Appendix

- Project details and Interaction Dashboard:

https://github.com/lxyisla1129/Patients-Emergency-Room-Visit-Report

- Specific DAX code:

```
# Total Patients
Total Patients = COUNTROWS('Patient Dataset')
# Administrative Visits vs. Non-administrative Visits
% Administrative Schedule =
DIVIDE(
COUNTROWS(
```

```
FILTER(
'Patient Dataset',
'Patient Dataset'[patient_admin_flag]=TRUE())
), [Total Patients])

% None - Administrative Schedule =
    DIVIDE(
        COUNTROWS(
            FILTER(
                'Patient Dataset',
                'Patient Dataset'[patient_admin_flag]=FALSE())
        ), [Total Patients])

# Female Visits vs. Male Visits
% Female Visit =
    DIVIDE(
        CALCULATE(
            [Total Patients],
            'Patient Dataset'[patient_gender] = "F"),
            [Total Patients]
    )
% Male Visit =
    DIVIDE(
        CALCULATE(
            [Total Patients],
            'Patient Dataset'[patient_gender] = "M"),
            [Total Patients]
    )

# Referred Visits vs. Walk-In Visits
% Referred Patients =
    VAR _FilterPatients =
    CALCULATE(
        [Total Patients],
        'Patient Dataset'[department_referral] <> "none"
    )
```

```
    RETURN
    DIVIDE(
        _FilterPatients,
        [Total Patients]
    )
% Un Referred Patients =
    VAR _FilterPatients =
    CALCULATE(
        [Total Patients],
        'Patient Dataset'[department_referral] = "none"
    )
    RETURN
    DIVIDE(
        _FilterPatients,
        [Total Patients]
    )

# Average Satisfaction Score
Average Satisfaction Score =
    CALCULATE(
        AVERAGE('Patient Dataset'[patient_sat_score]),
        'Patient Dataset'[patient_sat_score] <> BLANK()
    )

# Average Waiting Time
Average Wait Time = AVERAGE(('Patient Dataset'[patient_waittime]

# Age Bracket
Age Bracket =
SWITCH(
    TRUE(),
    'Patient Dataset'[patient_age] <= 10, "0-10",
    'Patient Dataset'[patient_age] <= 20, "11-20",
    'Patient Dataset'[patient_age] <= 30, "21-30",
    'Patient Dataset'[patient_age] <= 40, "31-40",
    'Patient Dataset'[patient_age] <= 50, "41-50",
```

```
    'Patient Dataset'[patient_age] <= 60, "51-60",
    'Patient Dataset'[patient_age] <= 70, "61-70",
    "70+")

# Age Group
Age Group =
    VAR _PatientAge = 'Patient Dataset'[patient_age]
RETURN
IF (
    _PatientAge <= 2, "Infancy",
    IF(
        _PatientAge<=6, "Early Childhood",
        IF(
            _PatientAge<=12, "Middle Childhood",
            IF(
                _PatientAge<=18, "Teenager",
            "Adult"
            )
        )
    )
)
```

- Guidance:

https://www.youtube.com/watch?v=U5ZKjZsZX64