



NHS Data Analysis Results

July 2024





Presented by
Beata Faitli
LSE Career Accelerator student



Content

1. Background and context
2. Key insights
3. Recommendations

BACKGROUND AND CONTEXT

- The analysis covered a 30-month reporting period from 01/2020 to 06/2022
- The analysis included 3 datasets provided by the NHS for appointment data and twitter data
- The data analysis was enriched with further twitter data, patient population data, staffing data, COVID-19 and weather data for additional insights



Context of the time-period

March 2020

**First
Lockdown
due to
COVID-19**

Dec 2020

**Vaccination
programs
begin**

Nov 2021

**Omicron
variant surge**

March 2022

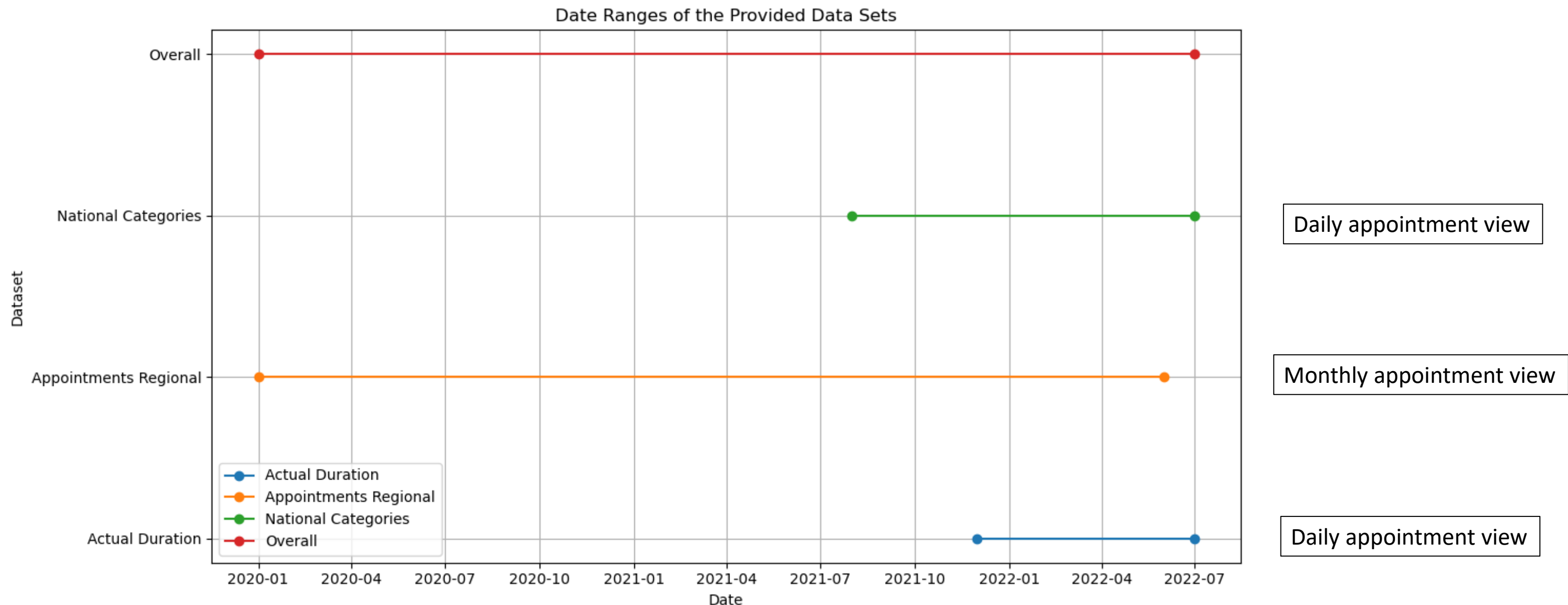
**COVID-19
restrictions
phased out
NHS catching
up with
postponed
elective and
routine care**

July 2022

**NHS
structure
changed to
the
Integrated
Care Board
replacing the
CCGs**

Limitations of the available data

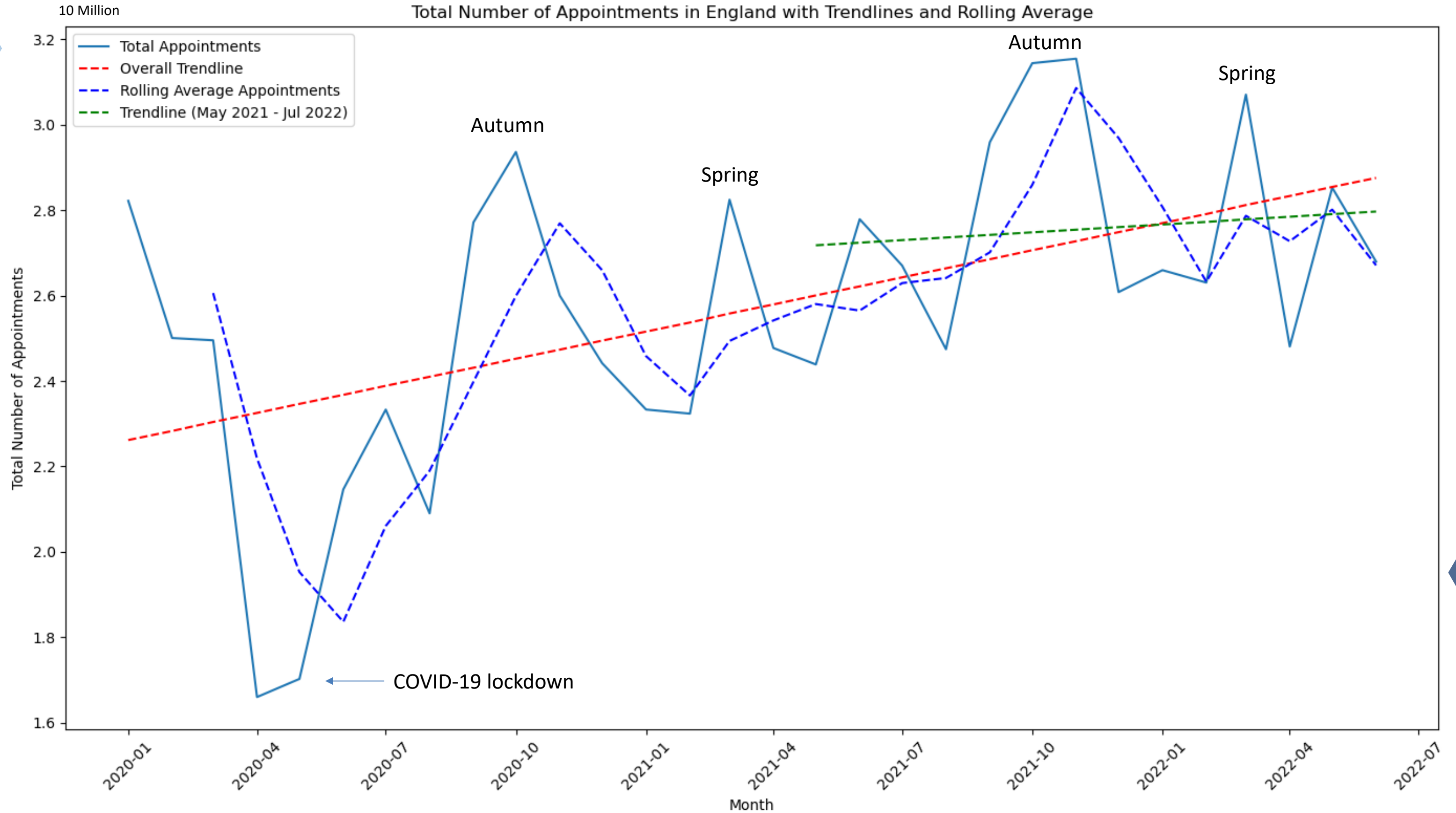
- The provided files covered different timeframes and metrics and varied between daily and monthly views
- Although reliable sources were used for the additional data caution is advised in interpreting results from these data points.
- Data cleaning and accuracy was ensured on all files used in the analysis.



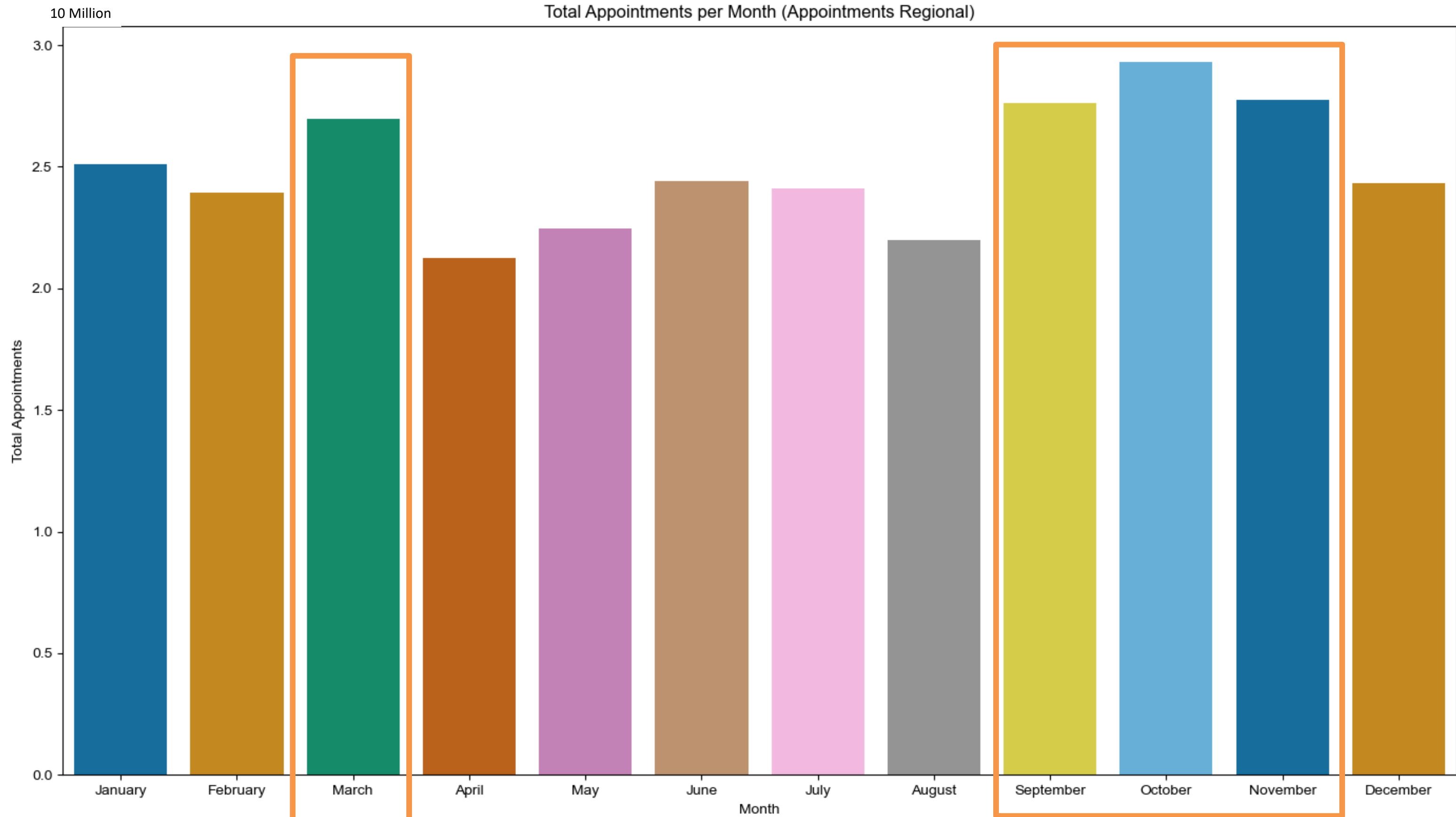
Has there been adequate staff and capacity in the networks?



Total appointment trends

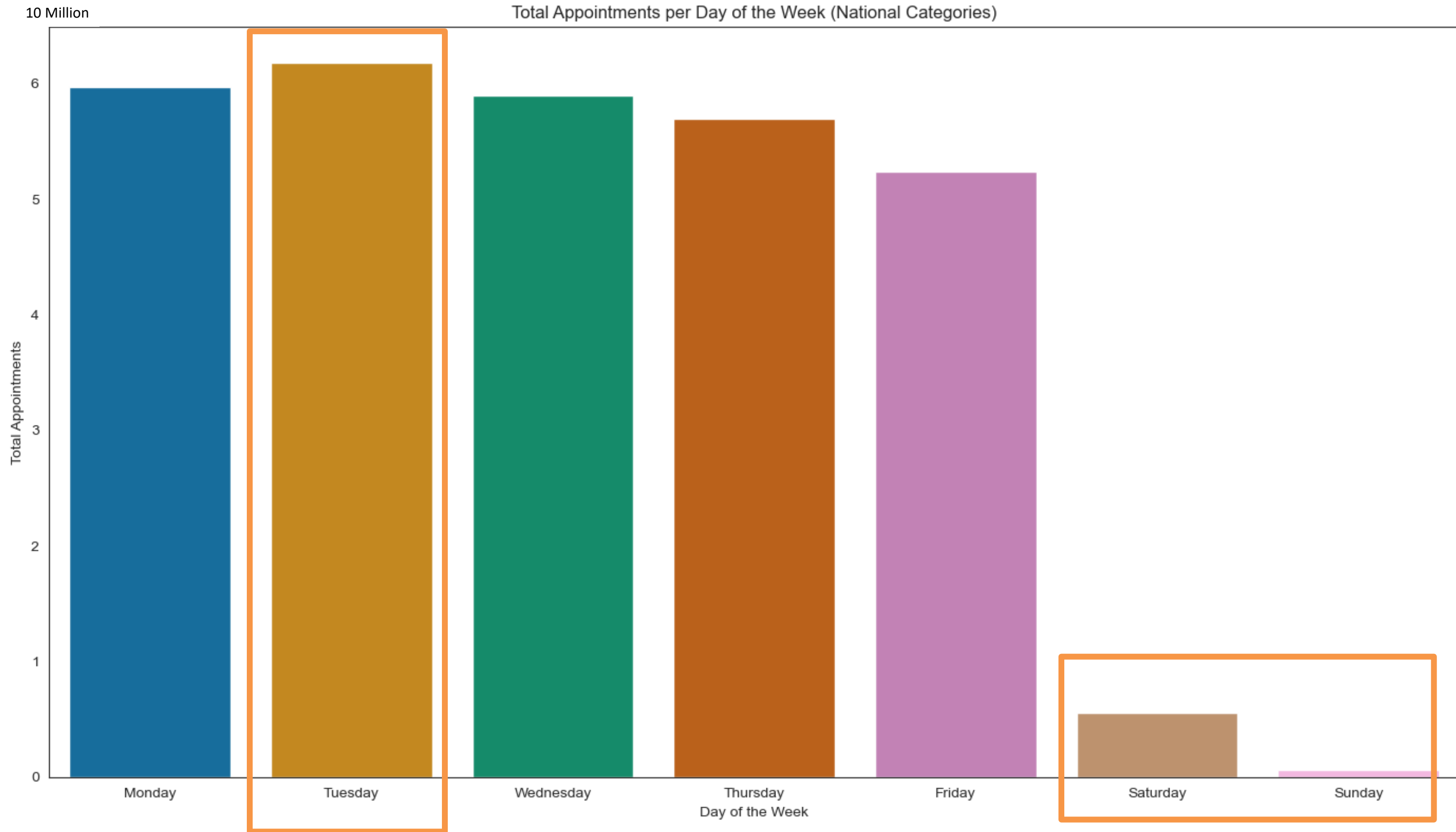


Total appointments by month



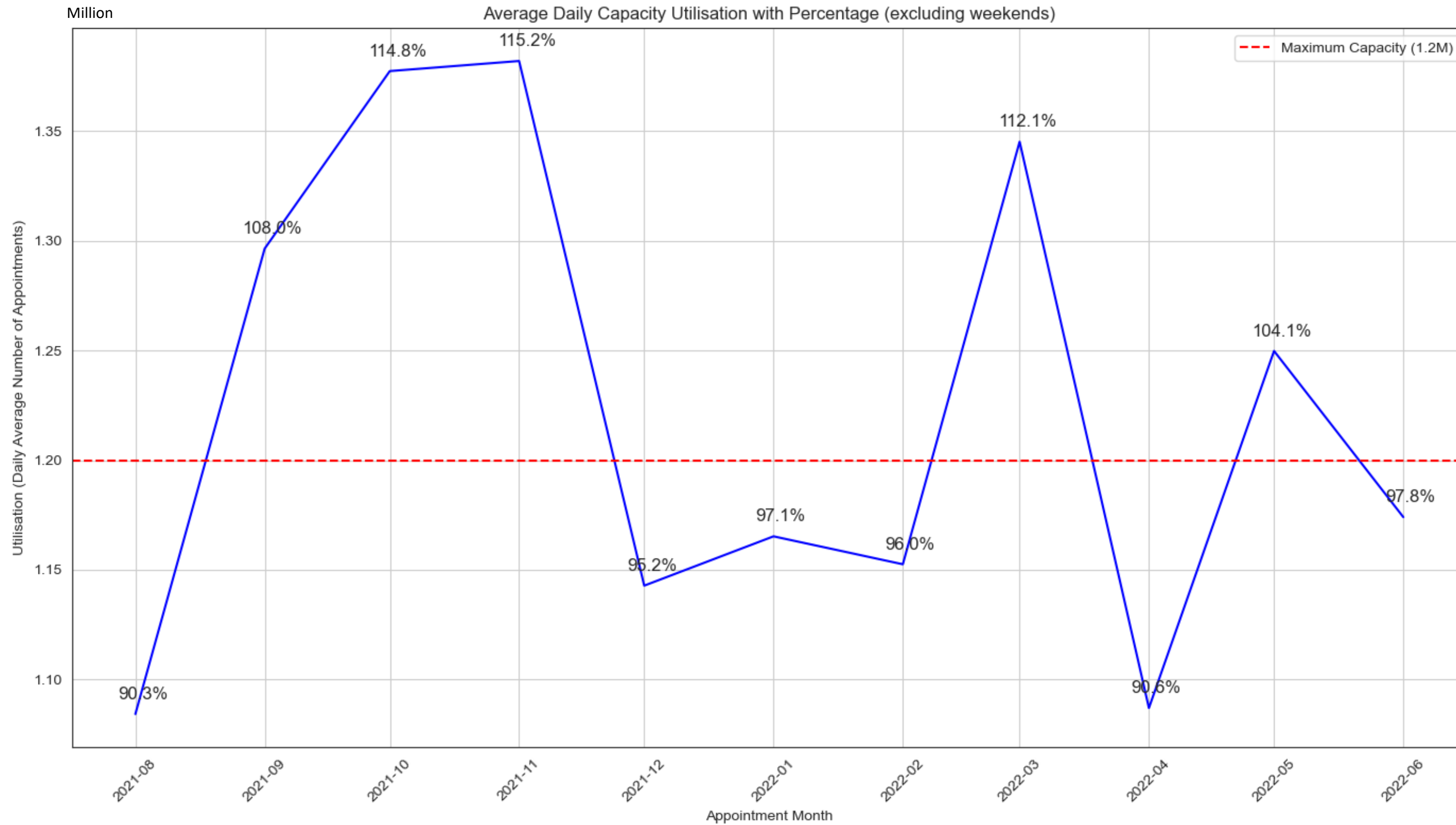
Total appointments by day

(between 08/2021-06/2022)

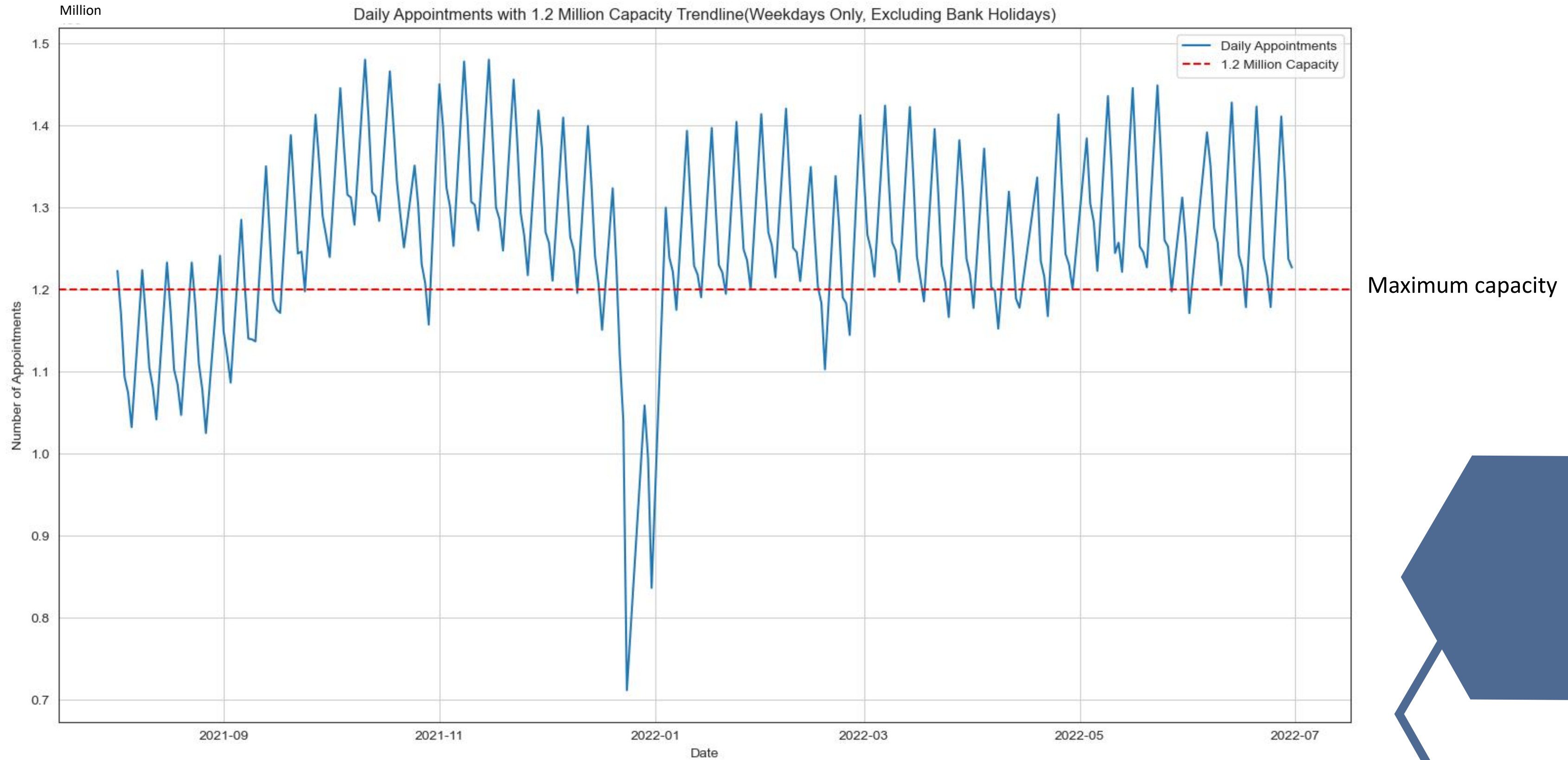


Average daily capacity excluding weekends

Note: Capacity ranged between 65.5%-84% when weekends are included



Daily capacity excluding weekends and bank holidays

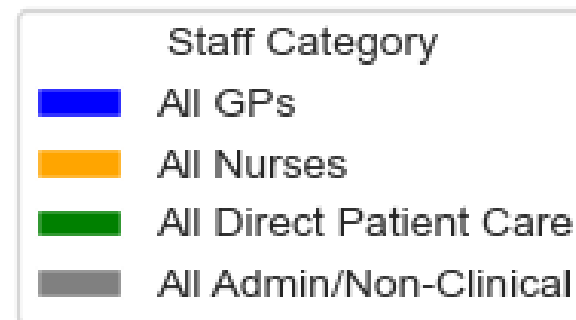
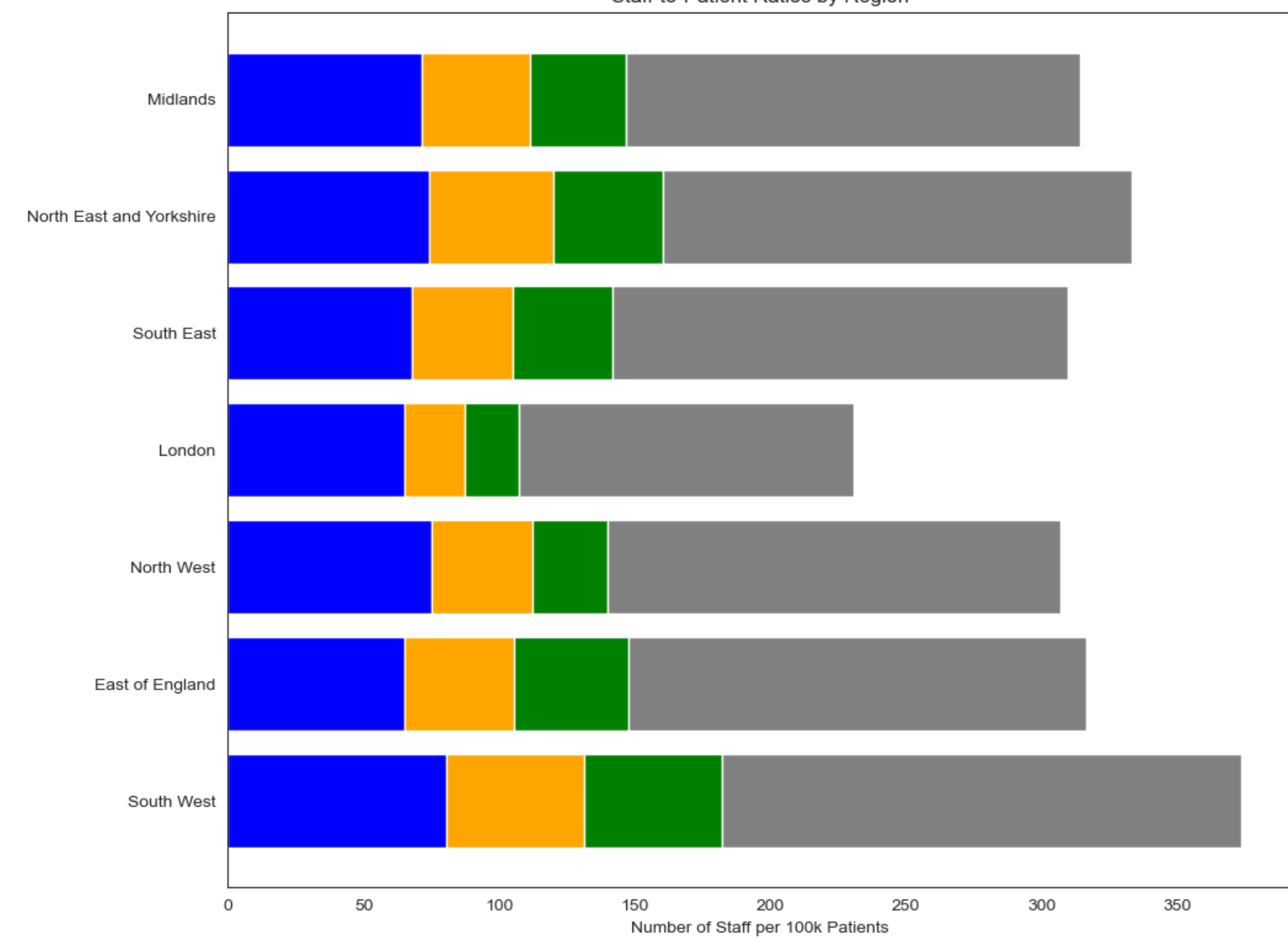
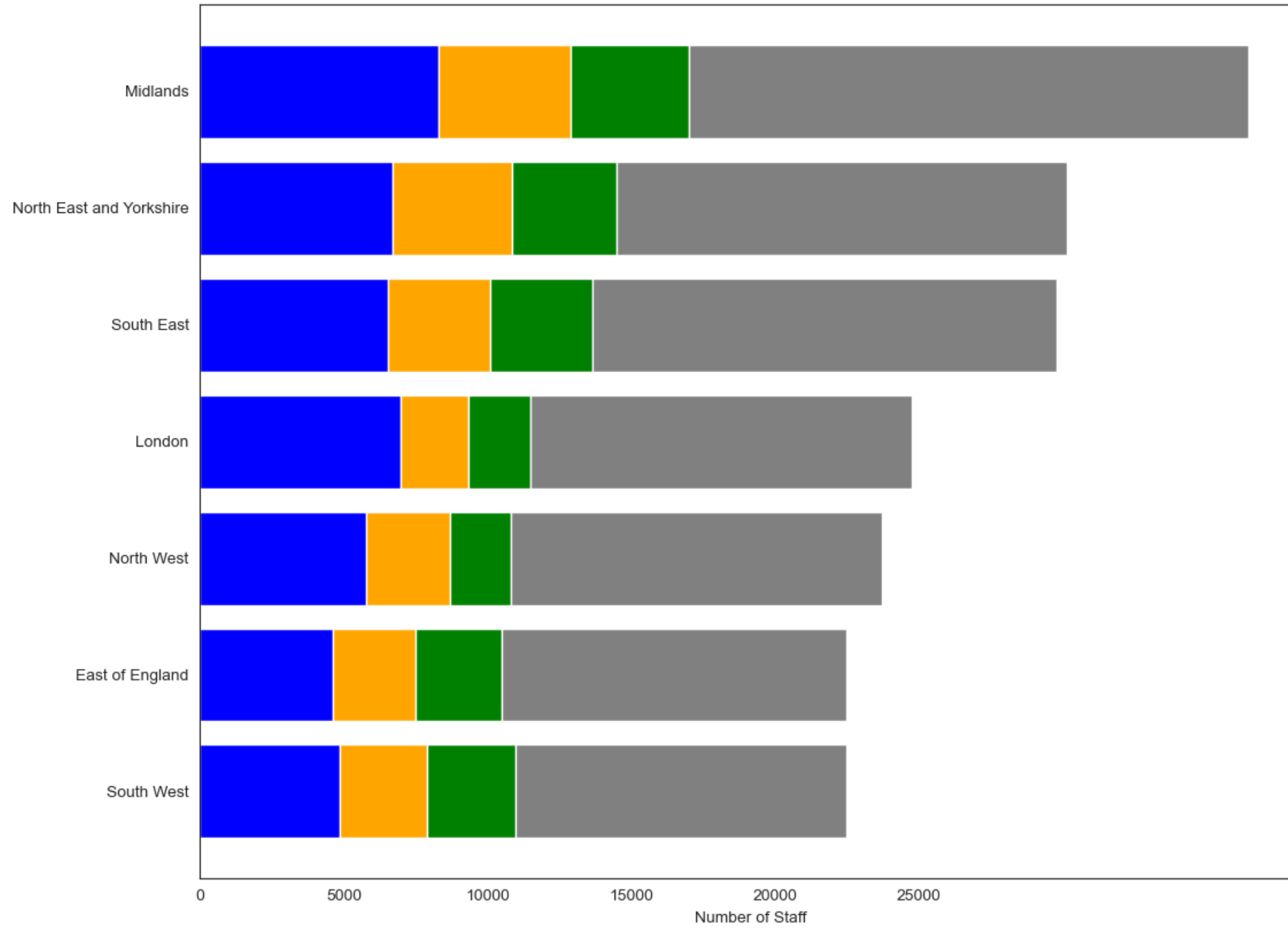


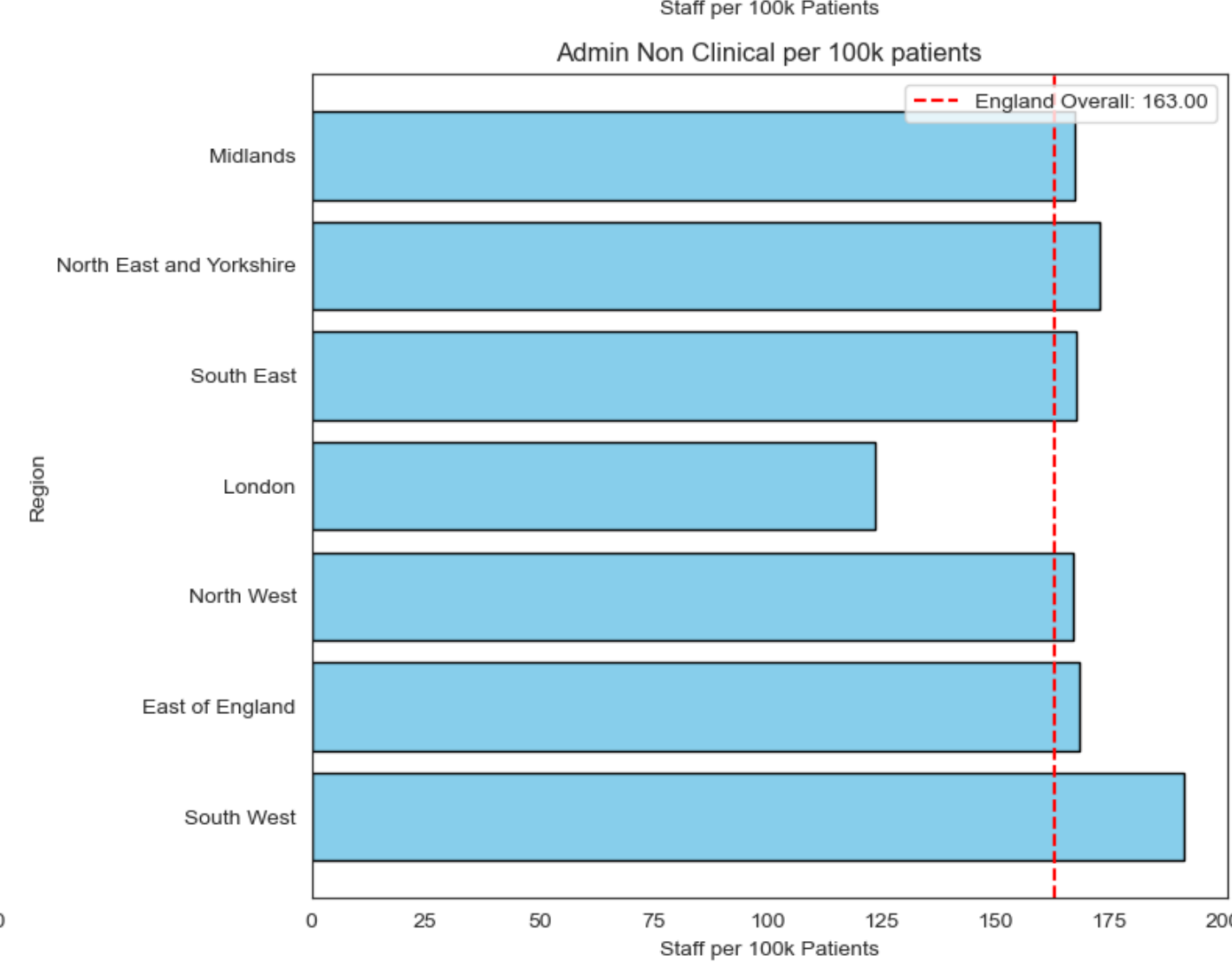
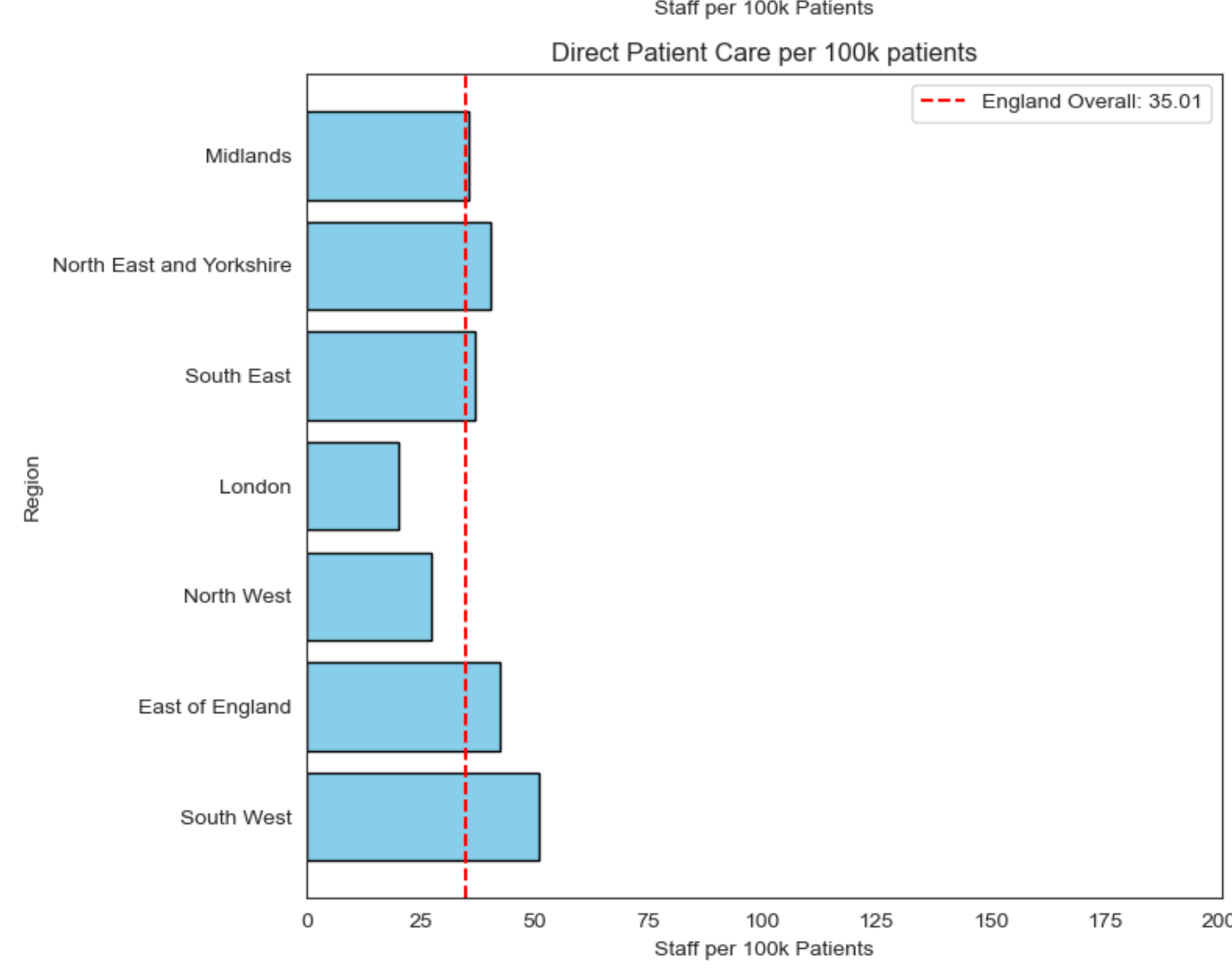
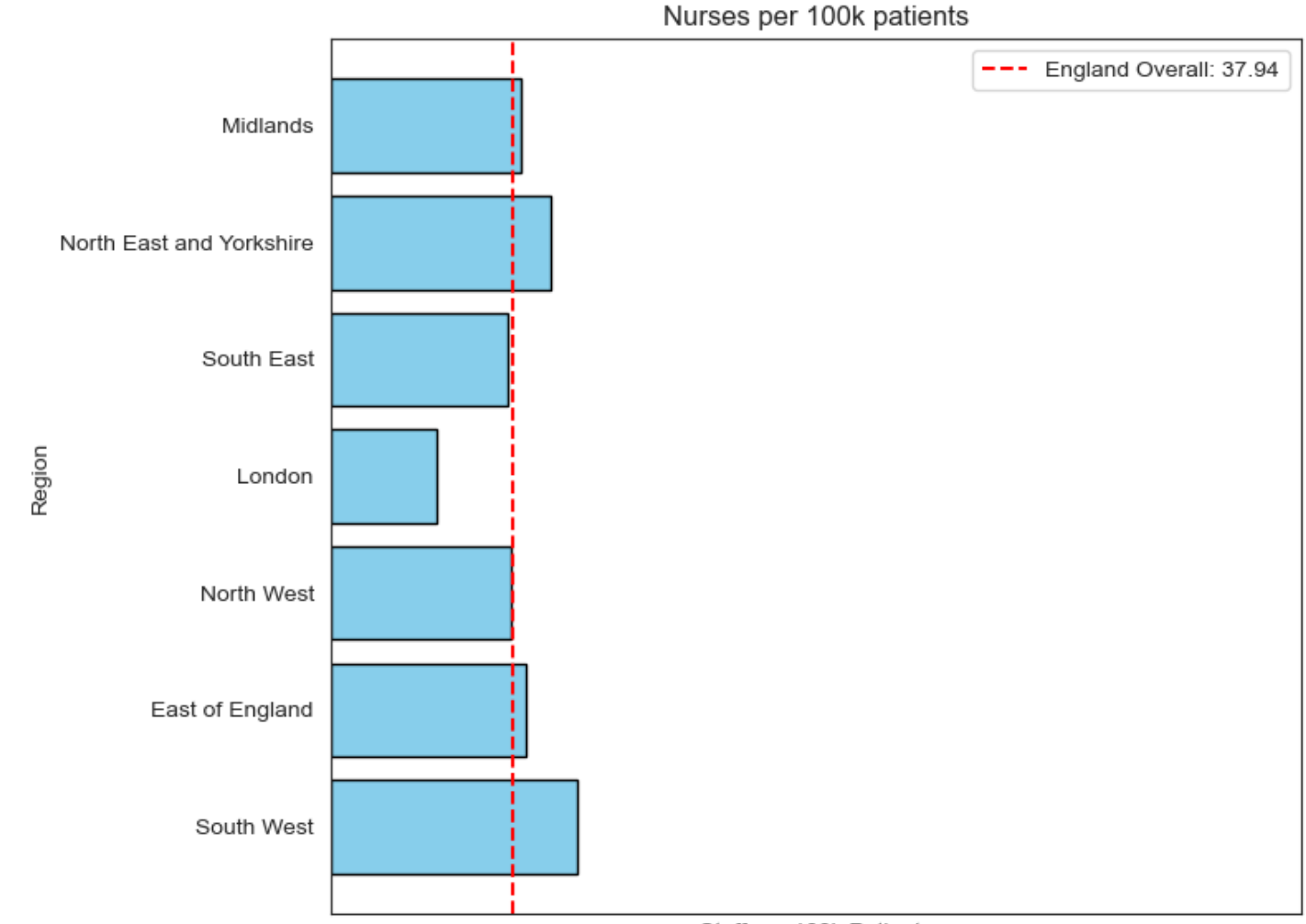
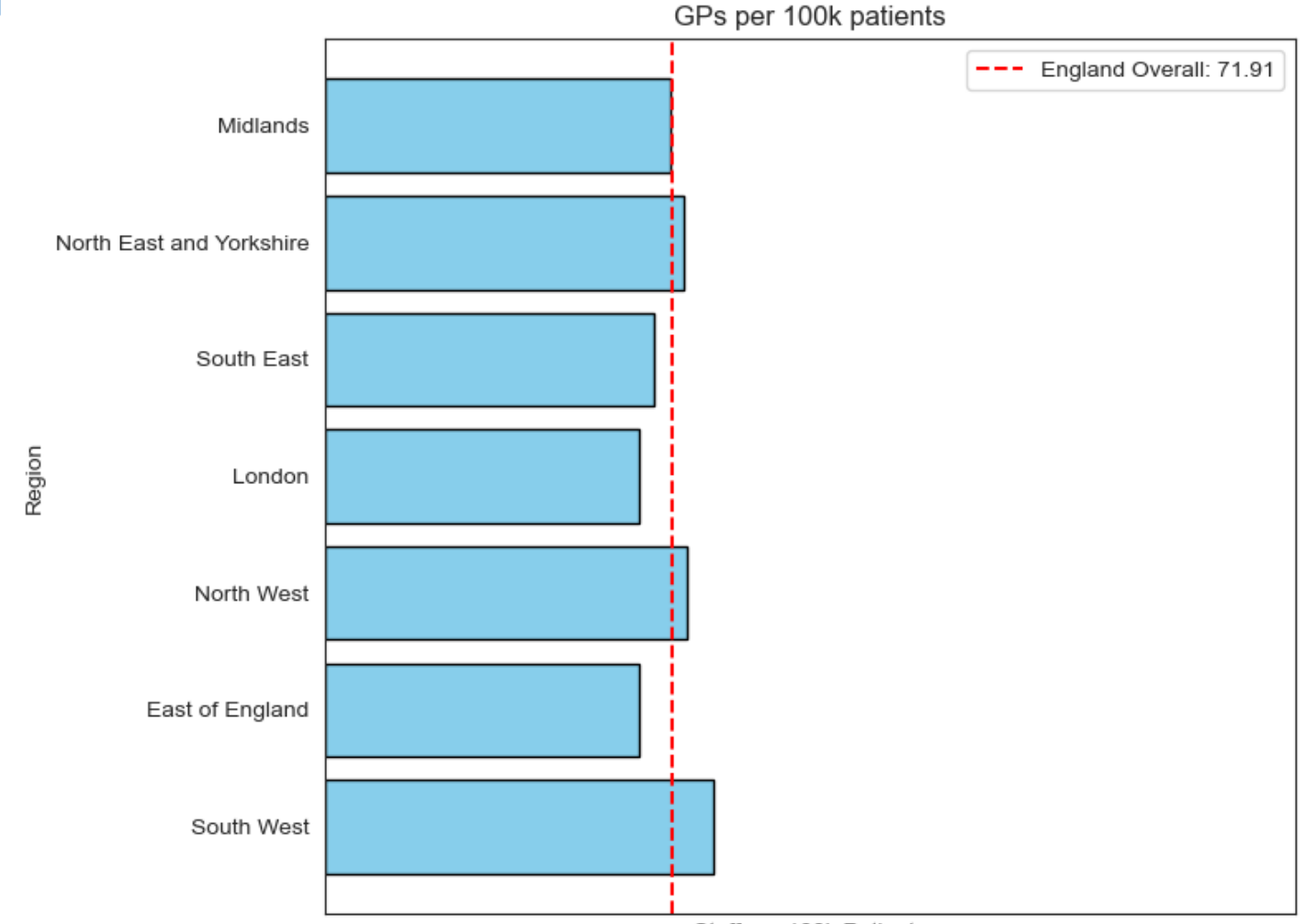
Regional Staffing levels

Note: Staffing data covers 07/2022 values

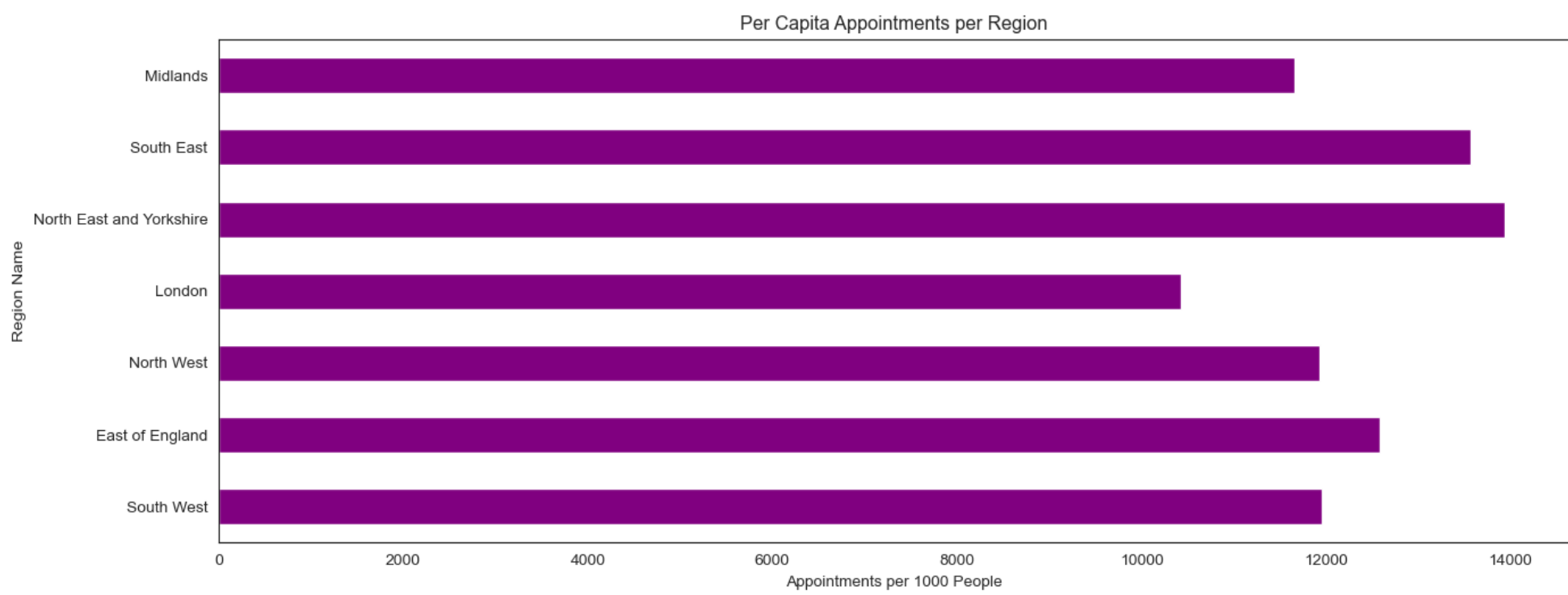
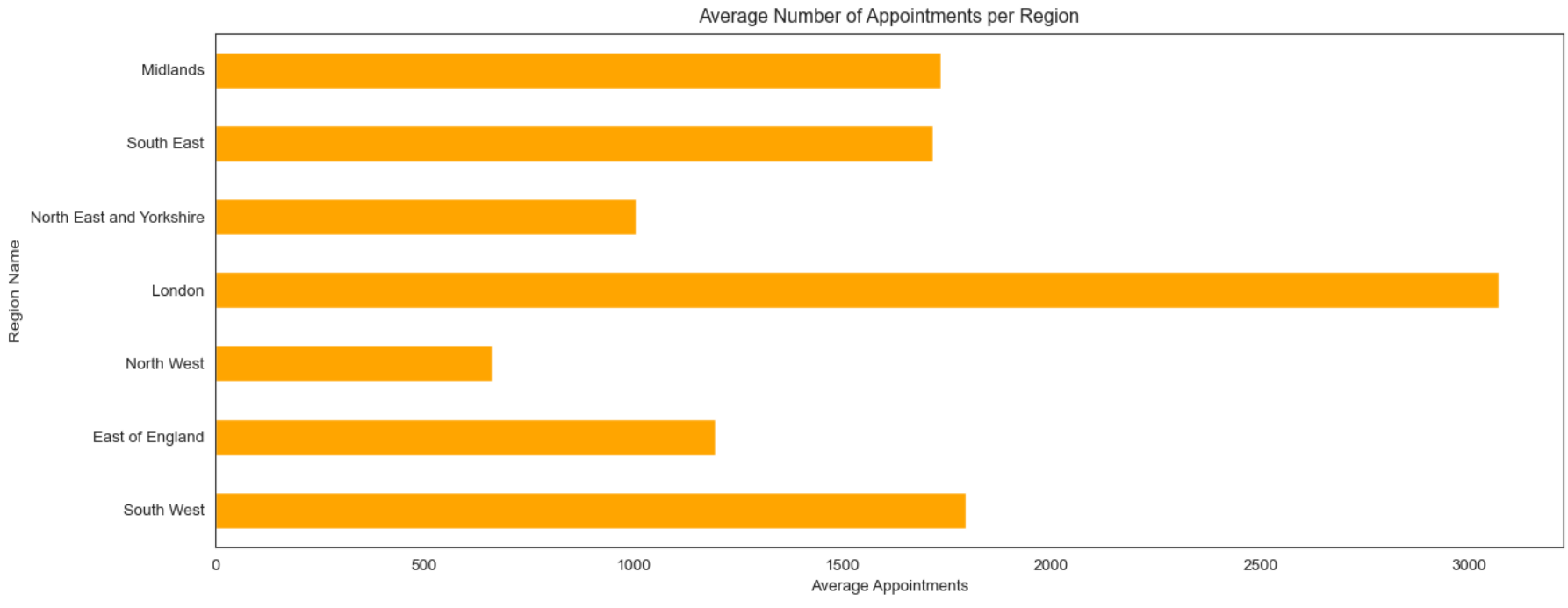
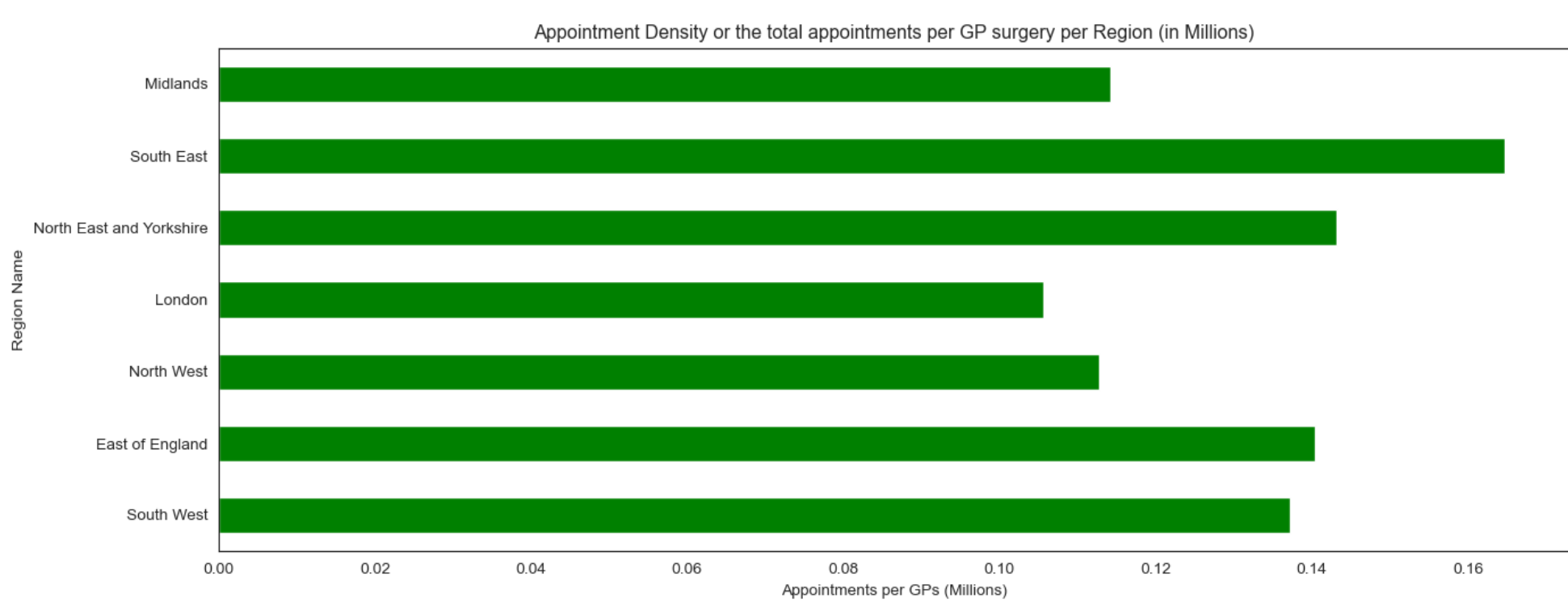
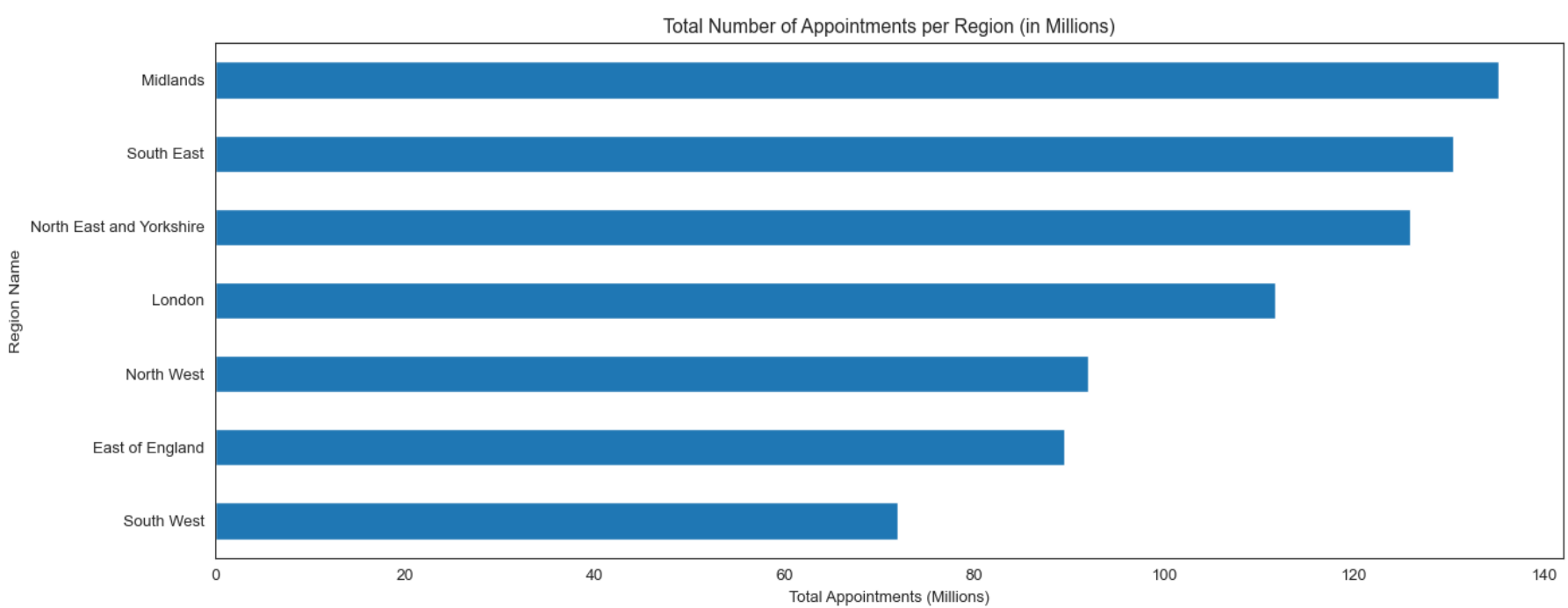
Staffing Levels by Region

Staff-to-Patient Ratios by Region



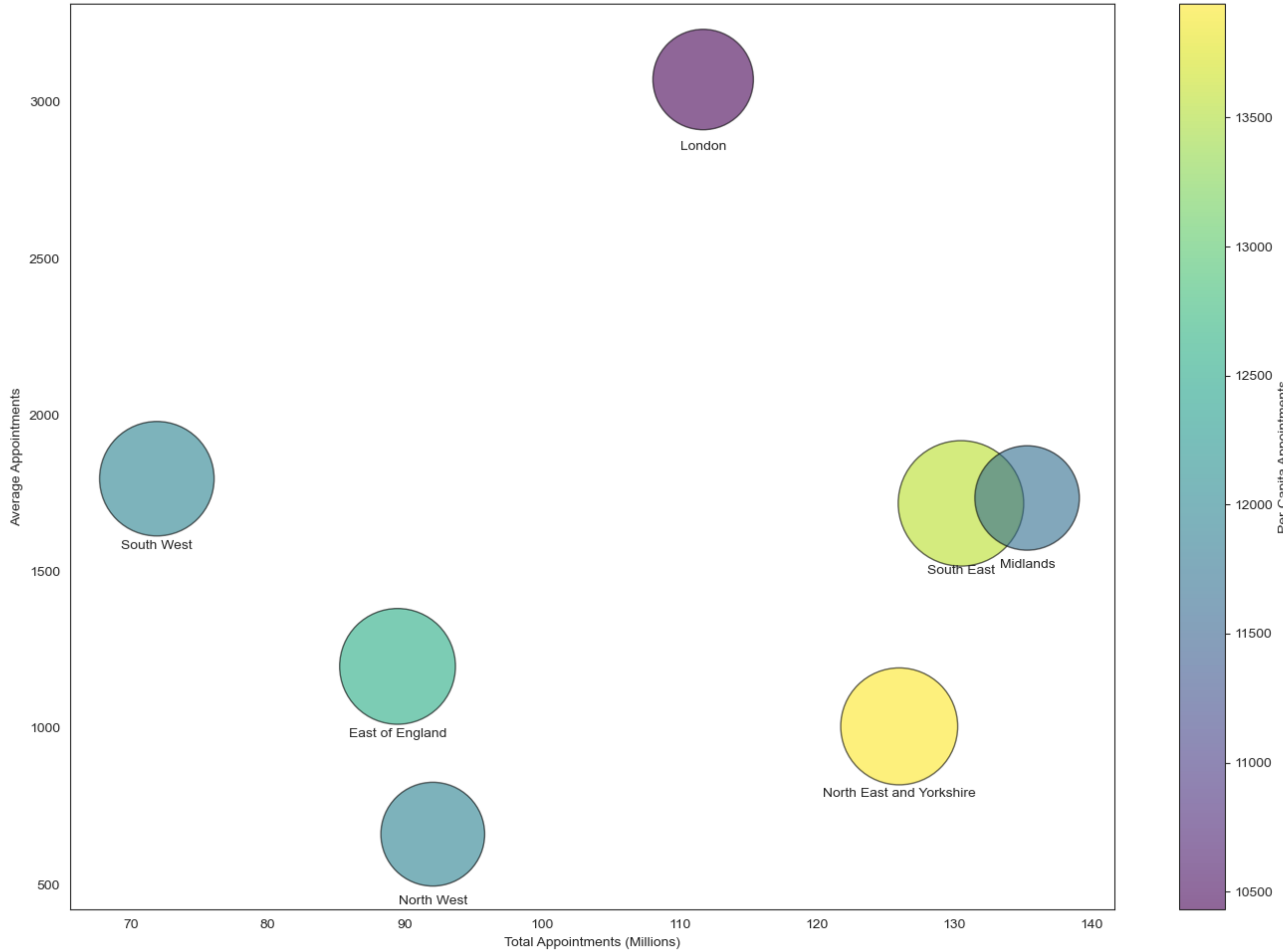


Total appointments, average appointments, total appointments per GP surgery and per capita appointments per Region

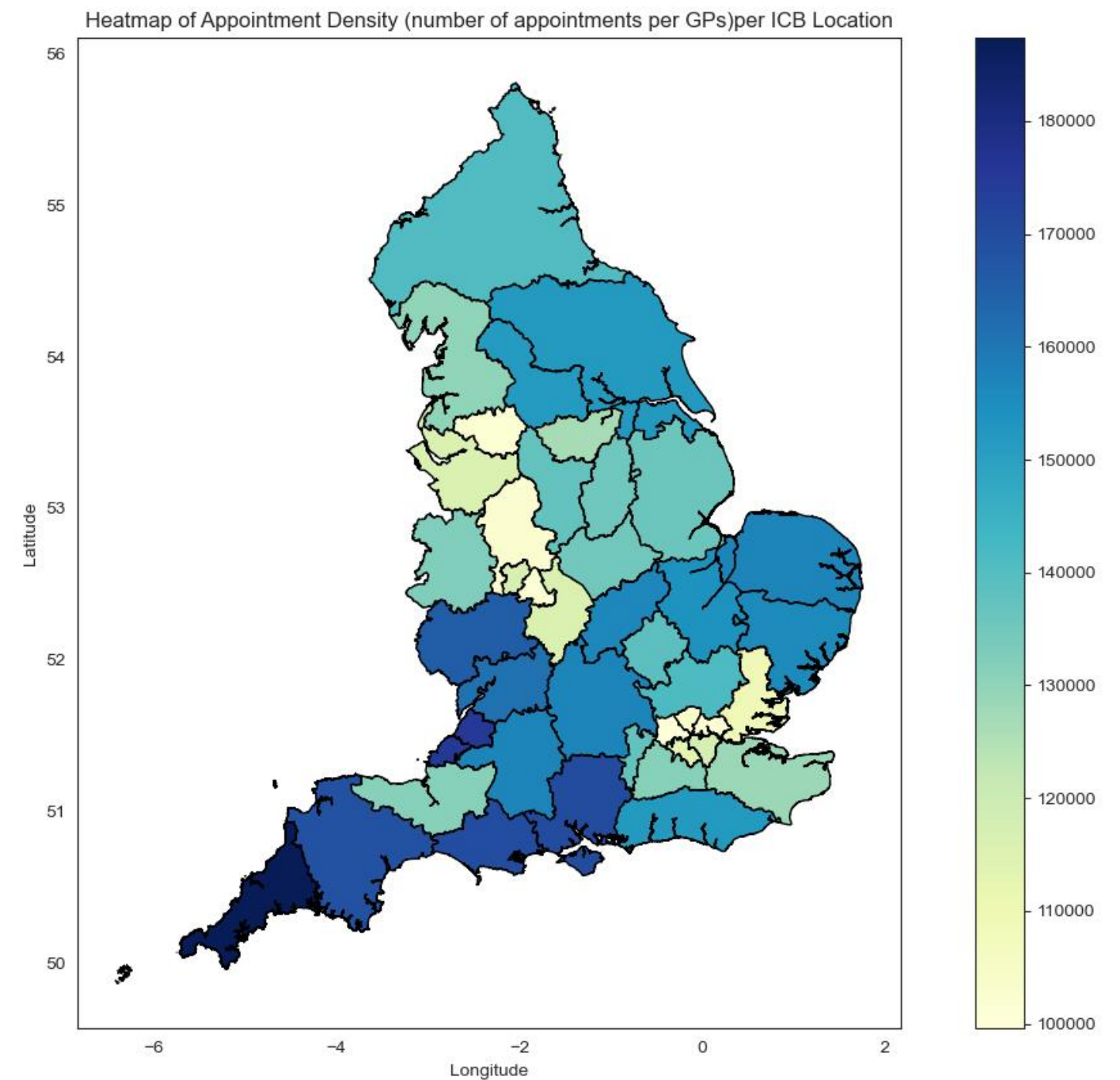
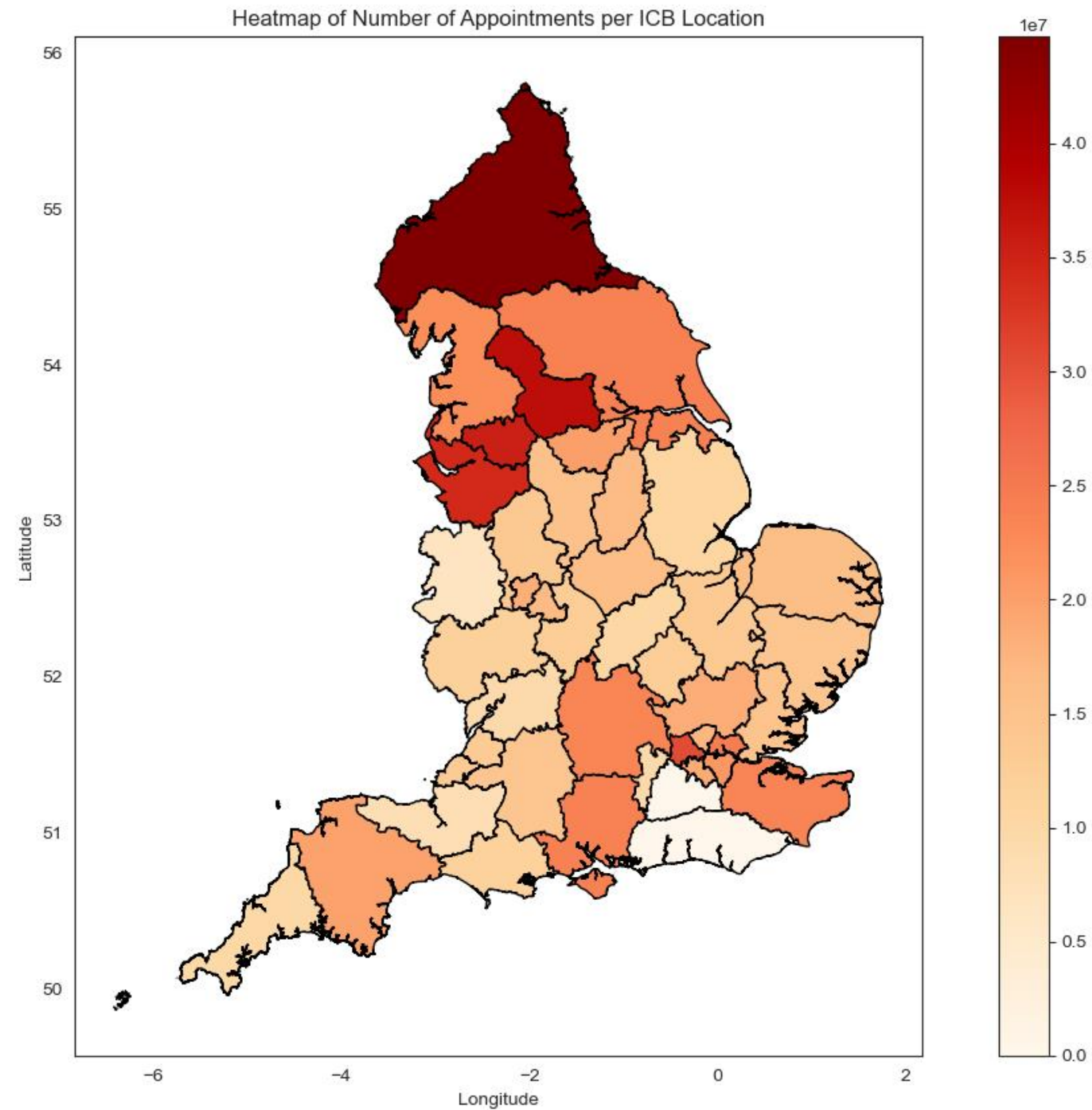


Note: Patient data used was from 08/2022. GP patient numbers grew by 2.5% during the 30 month reporting period.

Healthcare Appointments Analysis by Region



Total appointments and appointments per GP in the ICBs



Number of Appointments per ICB Location: [1](#)

- High Number: Northern regions (e.g., North East and North Cumbria, Greater Manchester) have a high number of appointments.
- Low Number: Southern and Central regions have a relatively lower number of appointments.

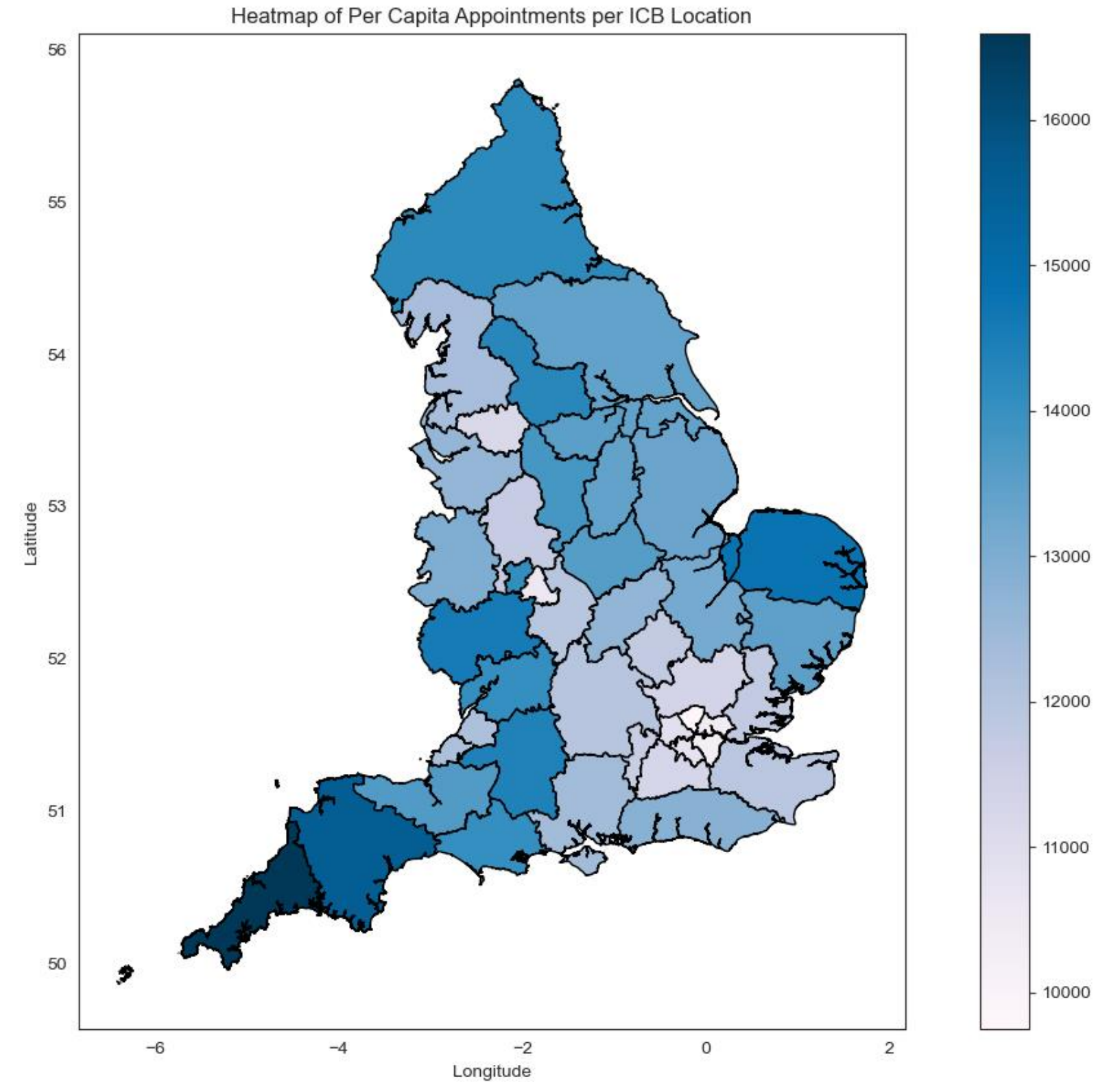
Appointment Density per ICB Location:

- High Density: South West regions (e.g., Cornwall) show higher appointment densities.
- Low Density: Central and Northern regions show lower appointment densities.

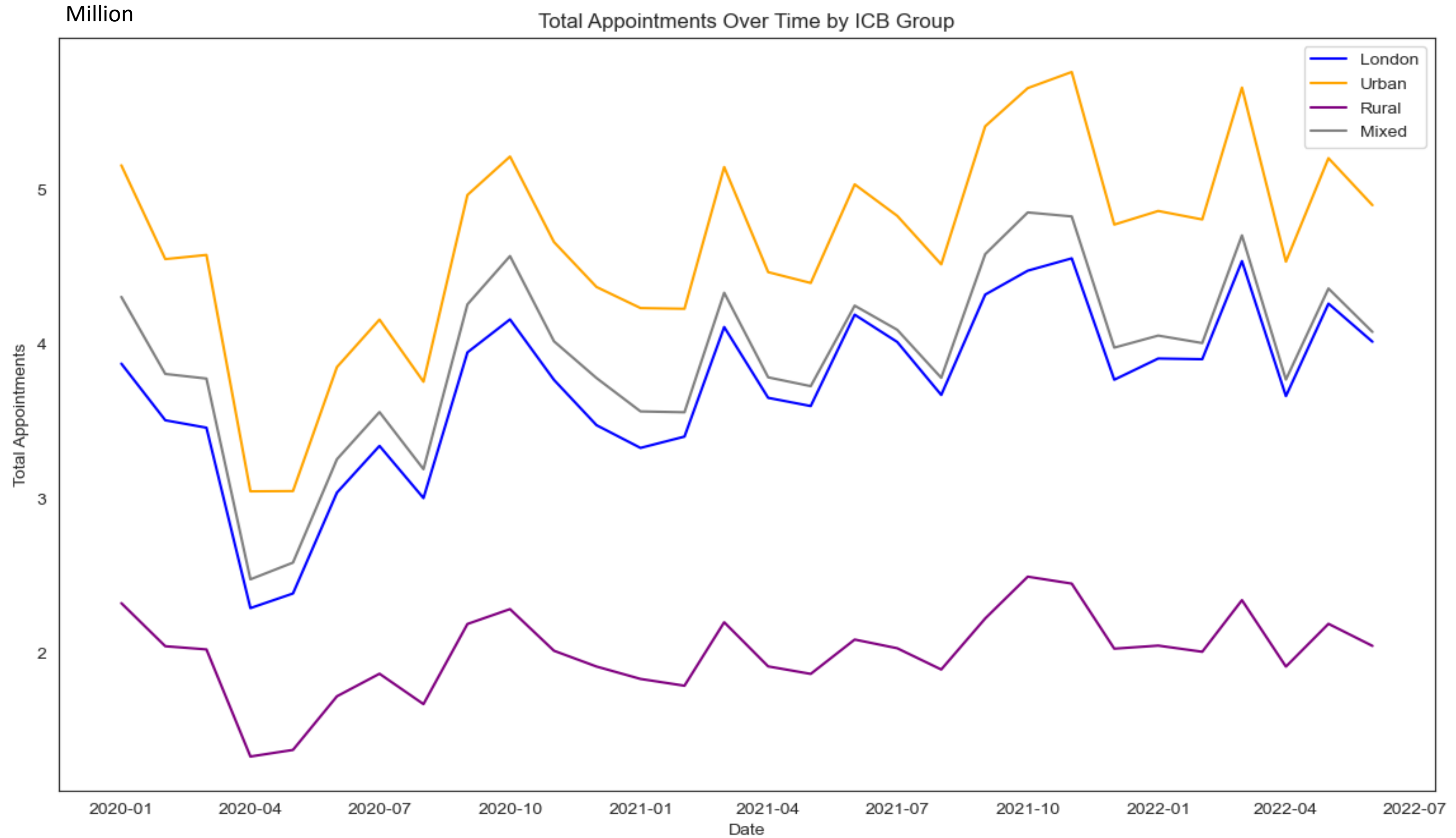
Per capita appointments in the ICBs

Per Capita Appointments per ICB Location:

- High Per Capita: Regions in the South West and some East of England areas have higher per capita appointments.
- Low Per Capita: London regions show lower per capita appointments.



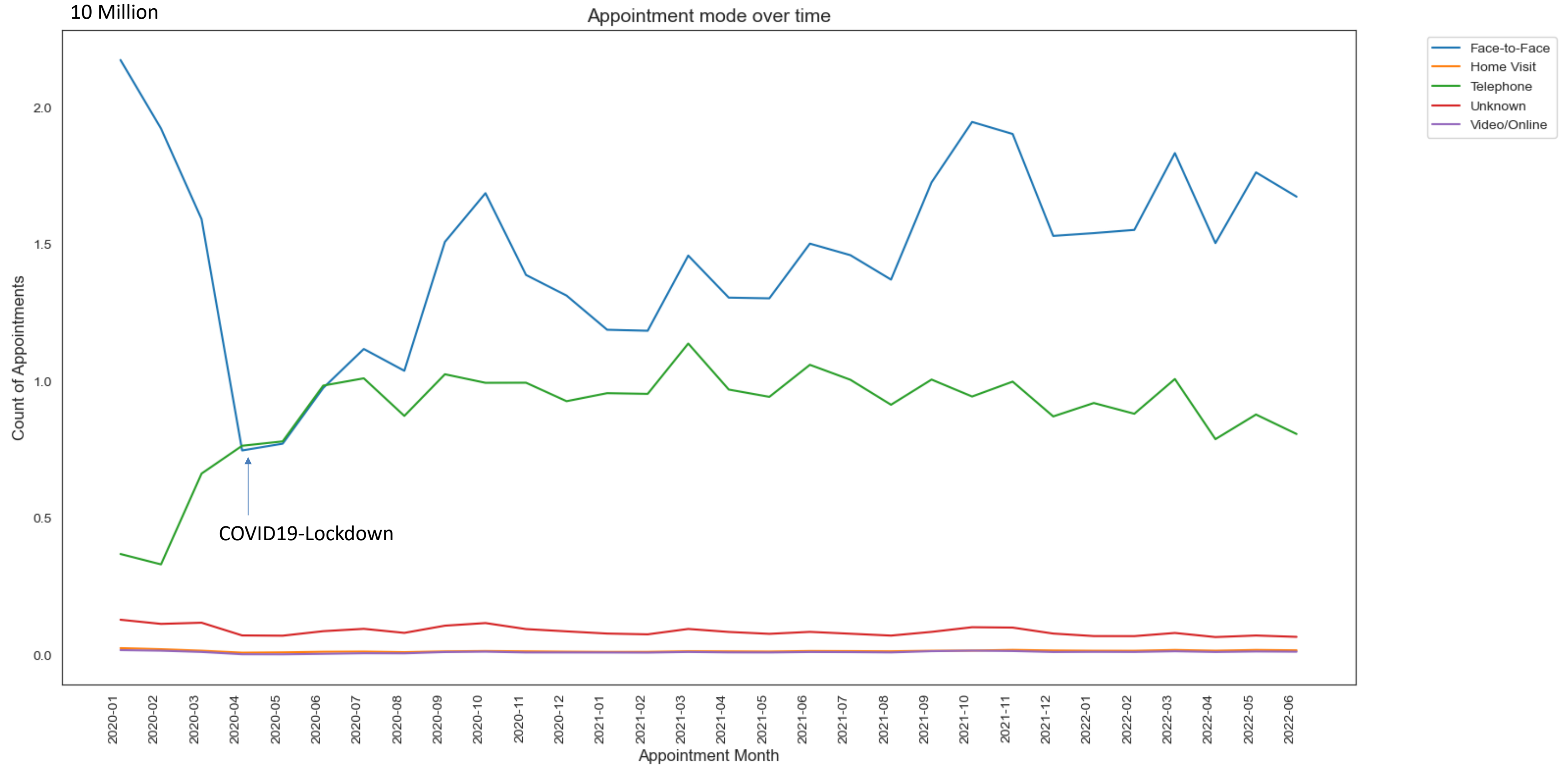
Appointment trends by ICB type



What was the actual utilisation of resources?

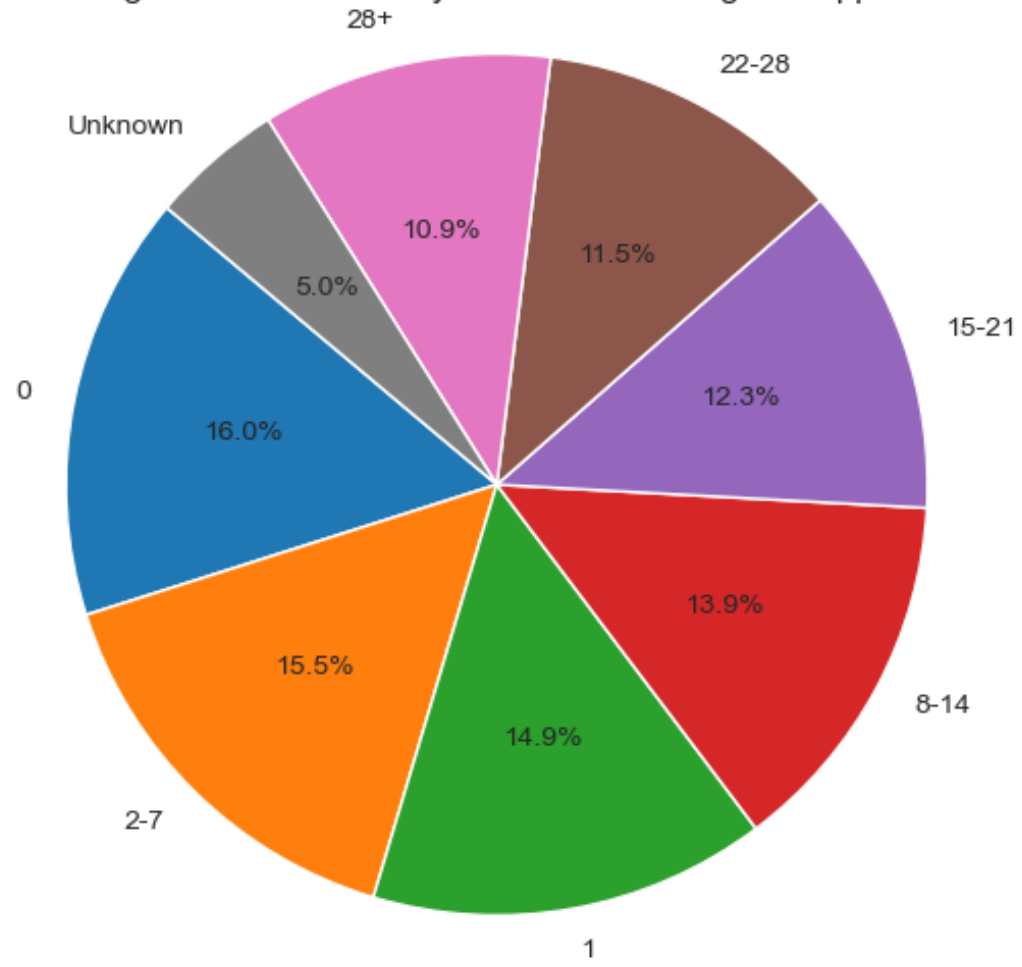


Appointment types over time

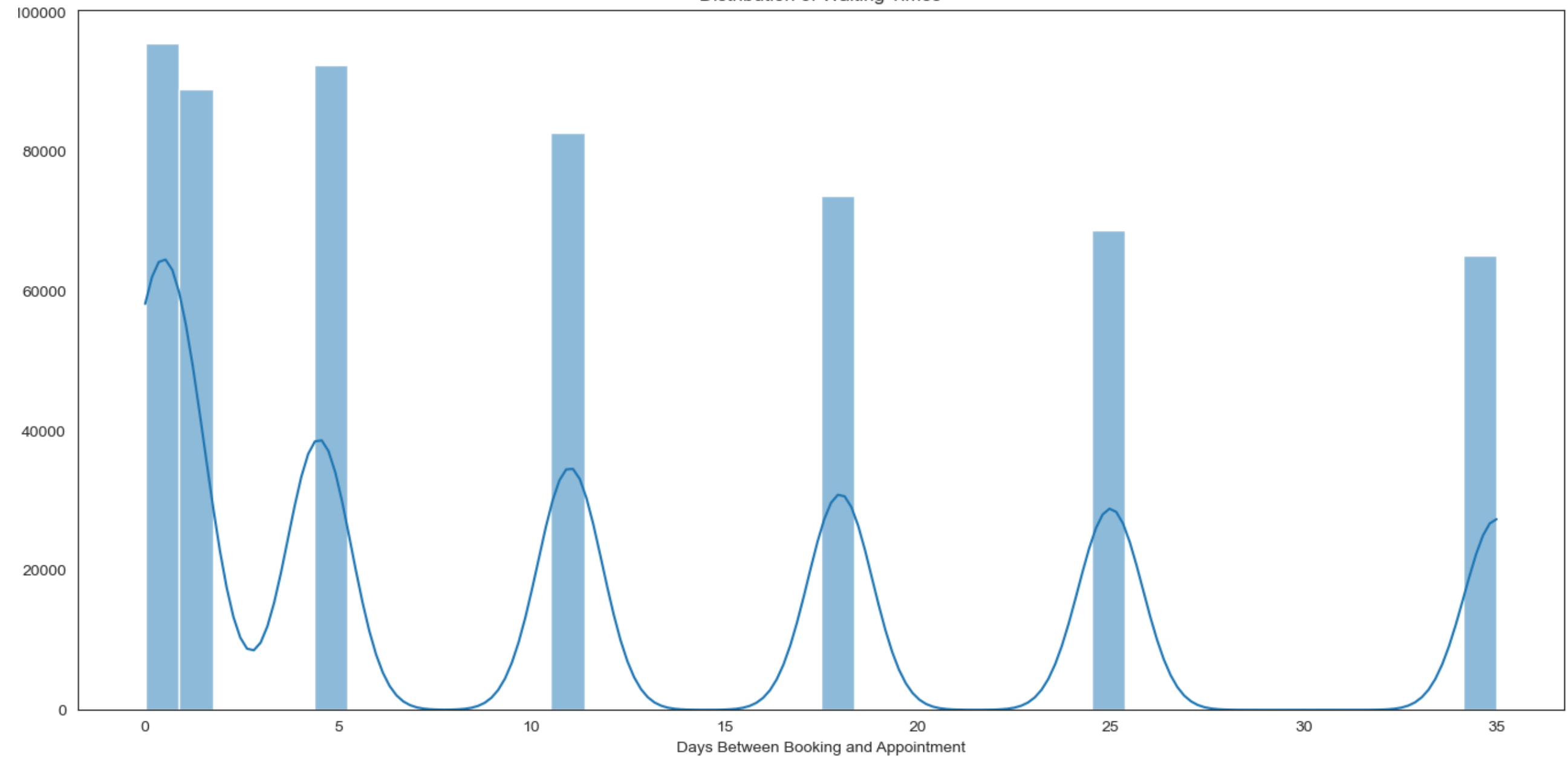


Waiting times

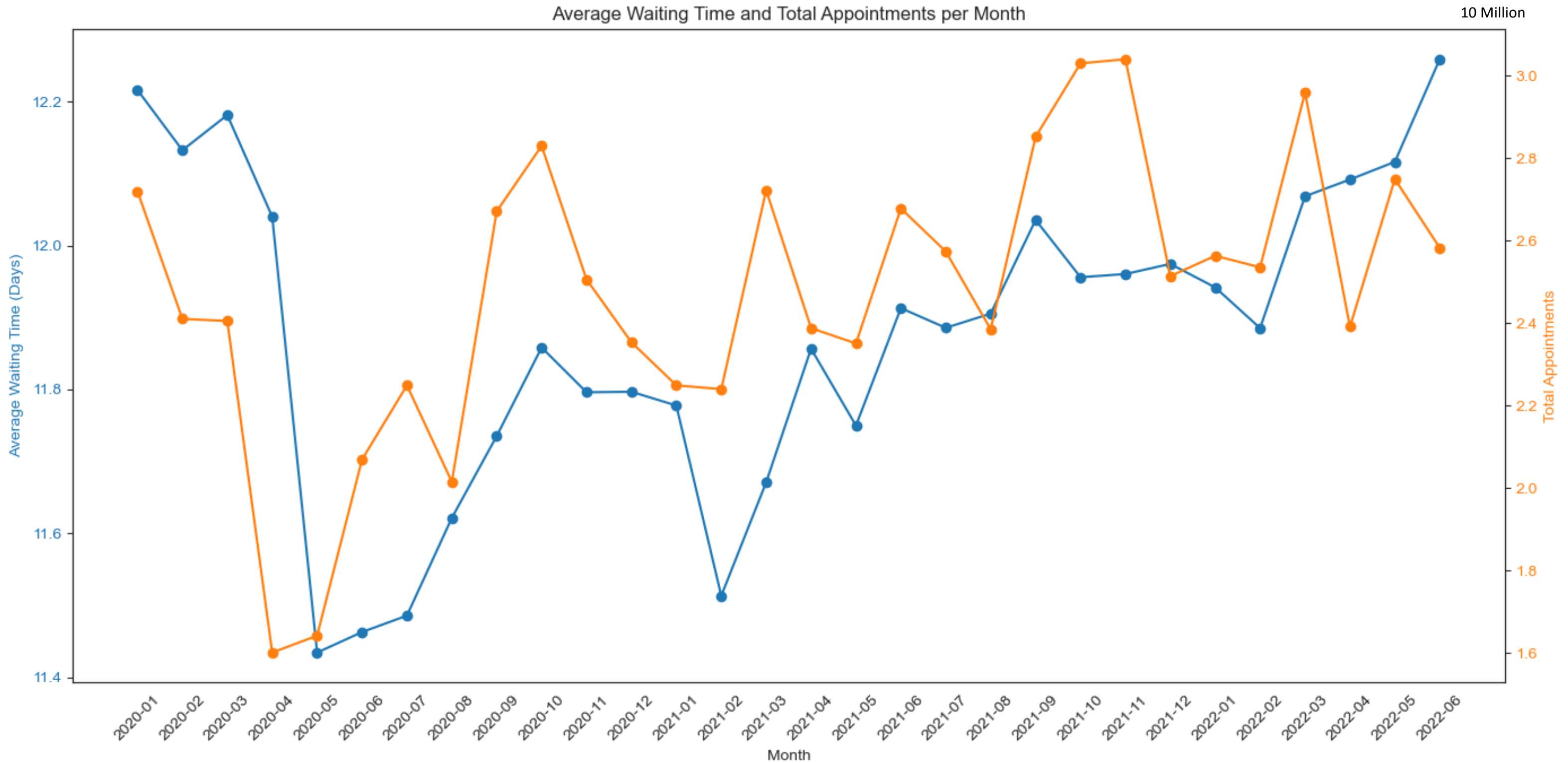
Percentage Distribution of Days Between Booking and Appointment



Distribution of Waiting Times



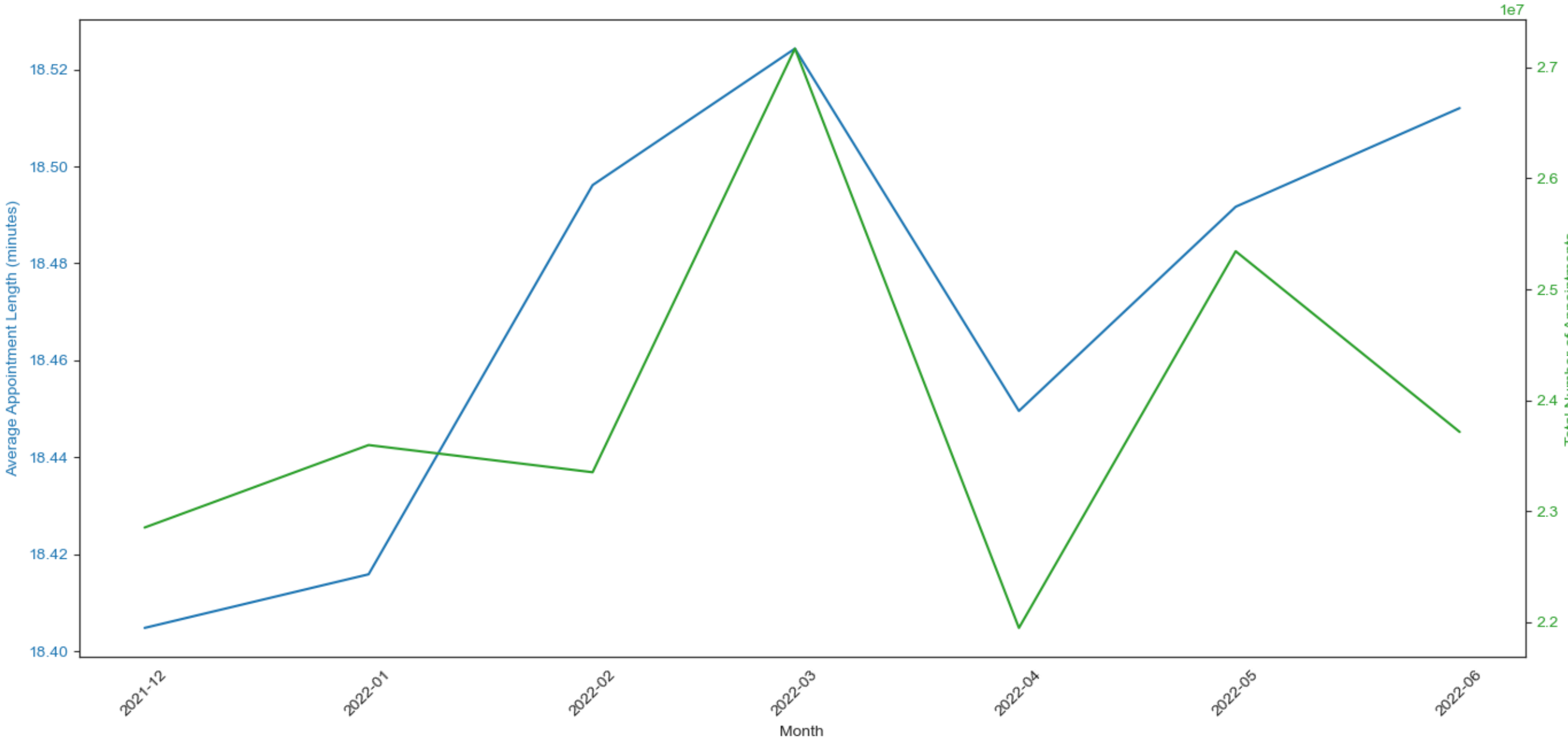
Average waiting time trends



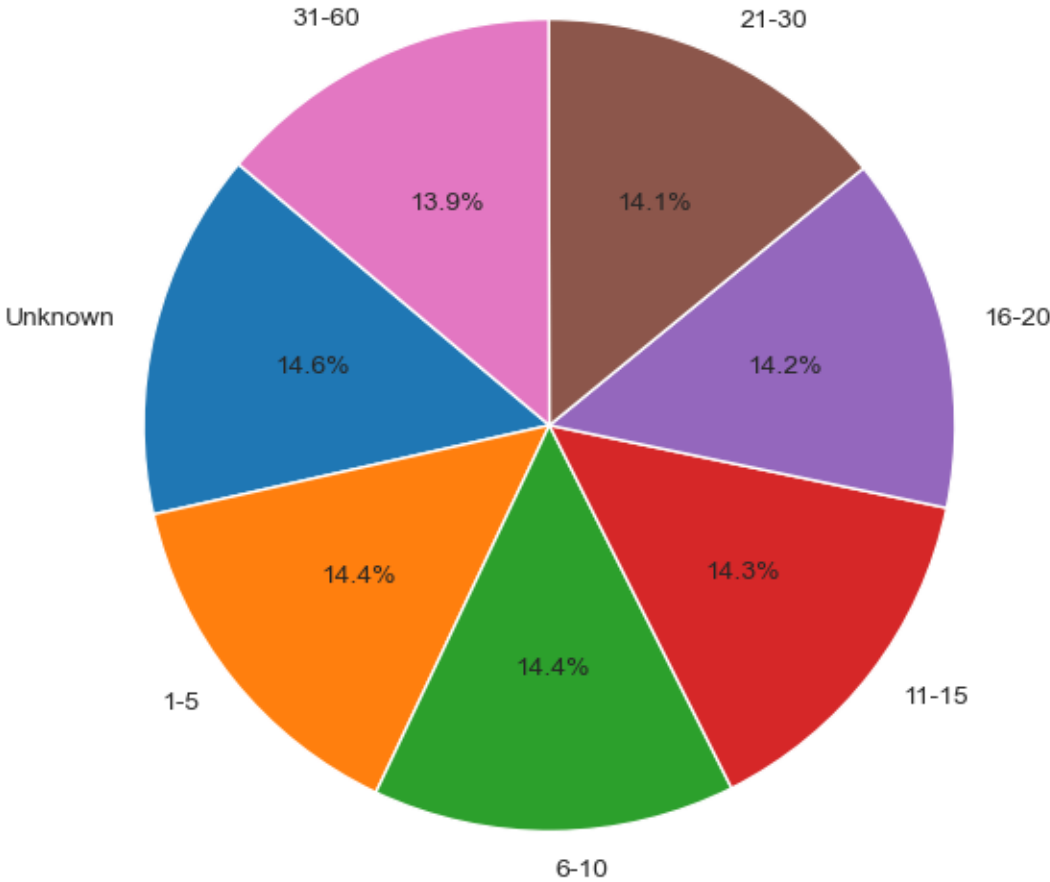
Appointment length

(between 01/12/21- 30/06/22)

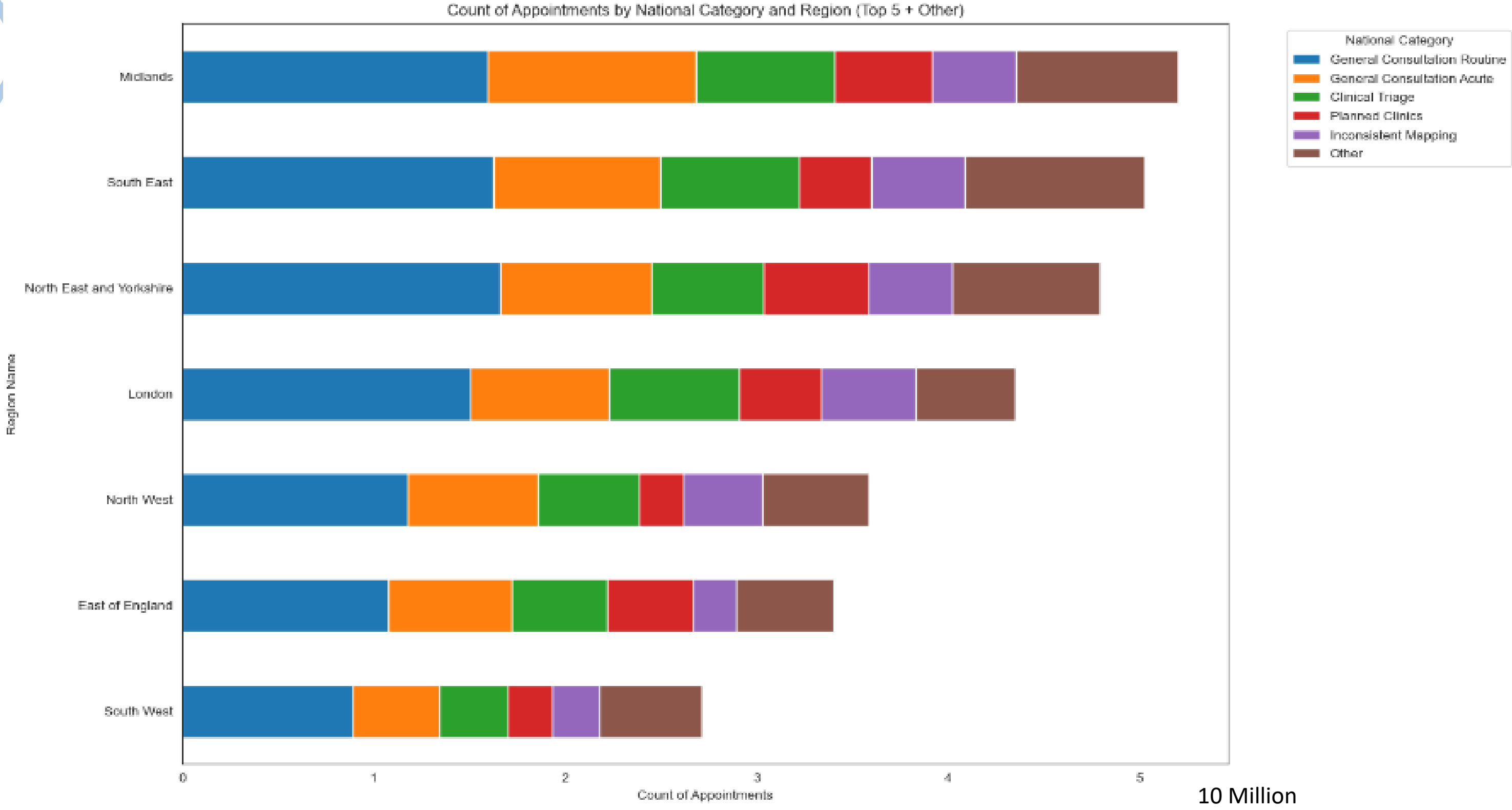
Average Appointment Length and Total Number of Appointments Over Time



Percentage Distribution of Actual Appointment Duration

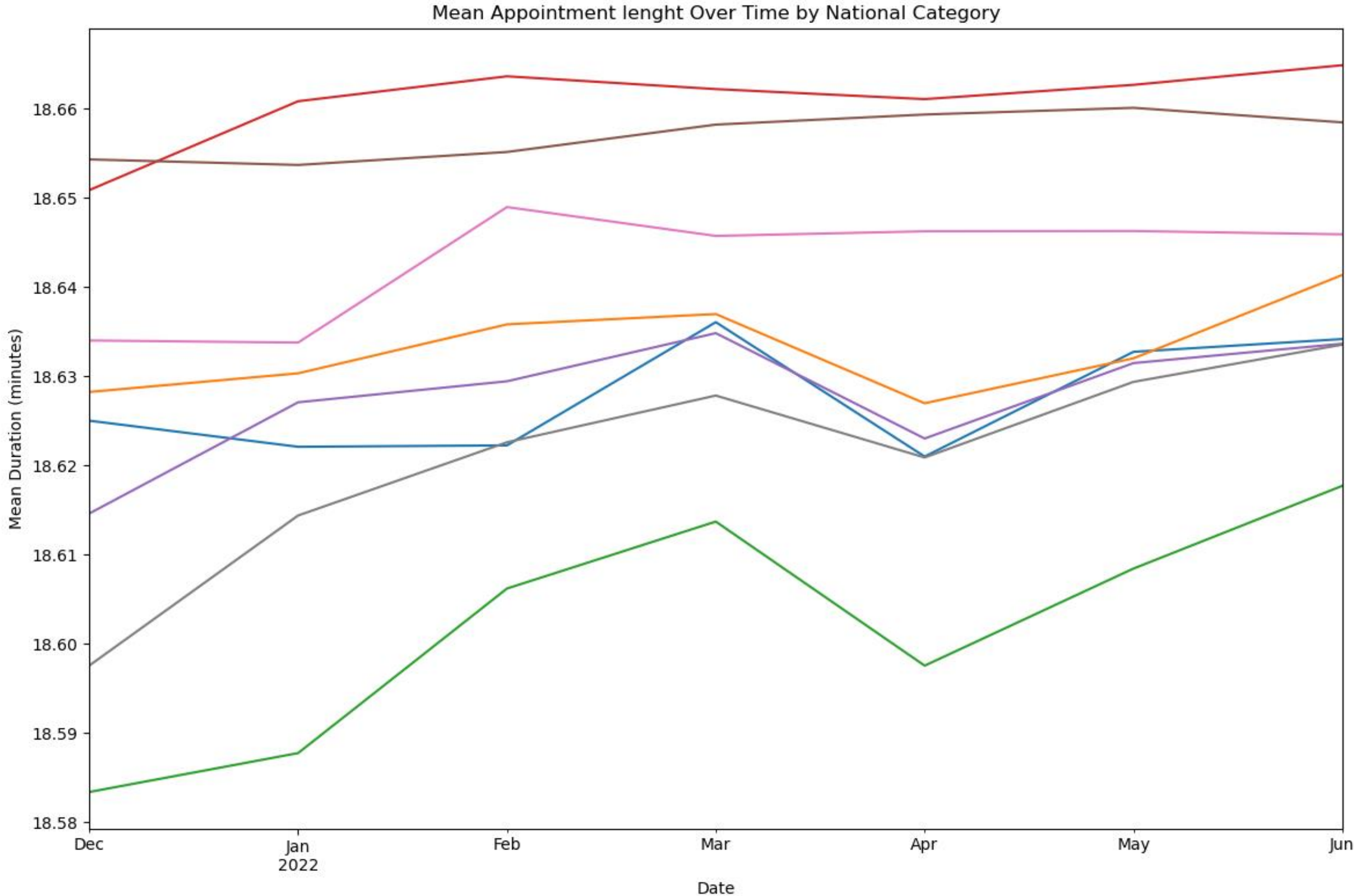


National Categories



Appointment length by categories

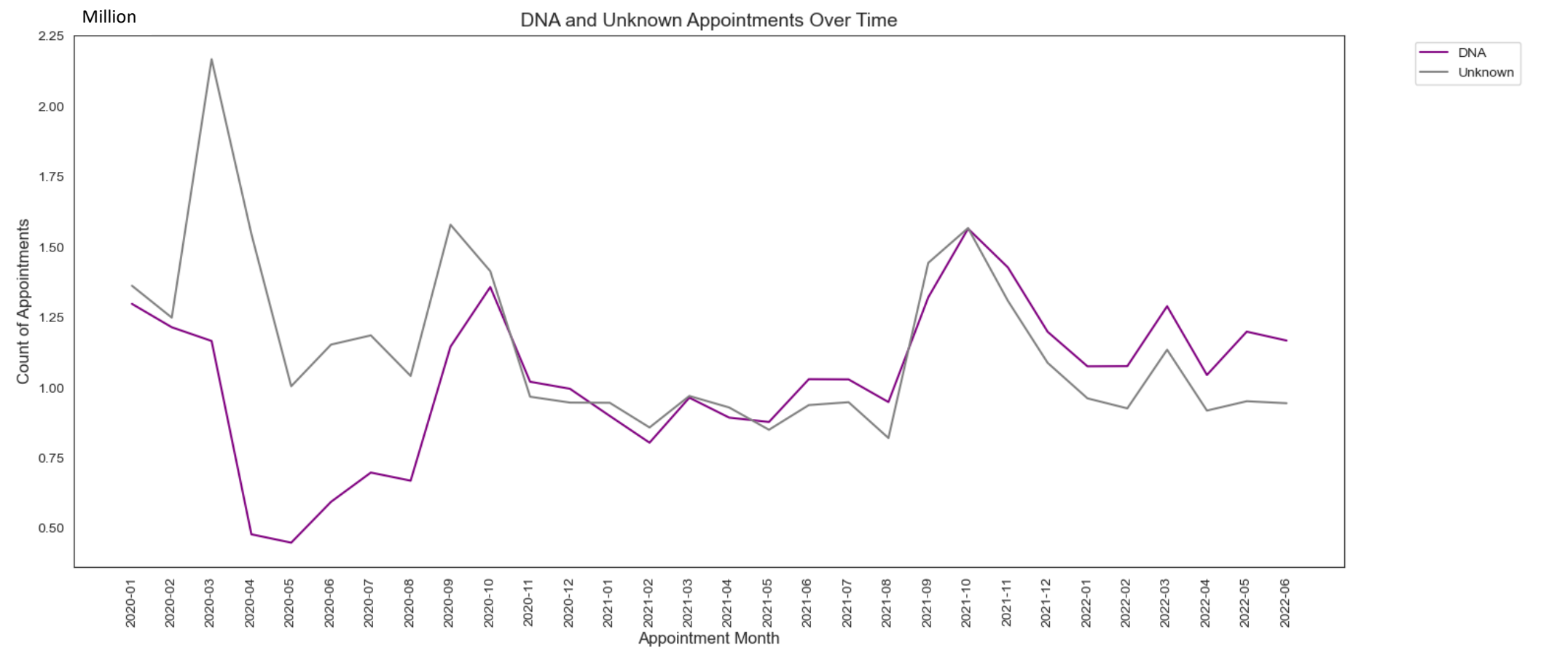
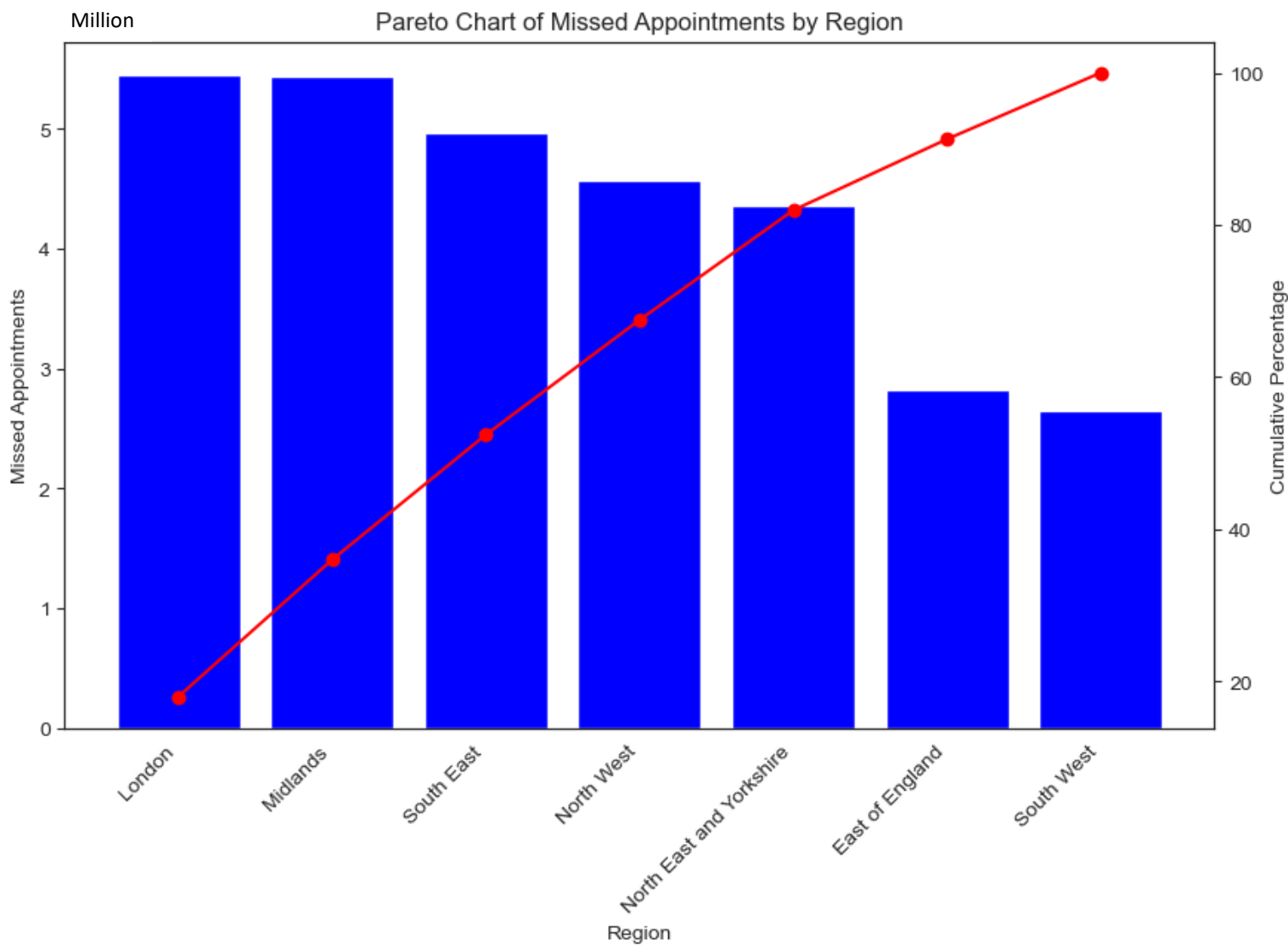
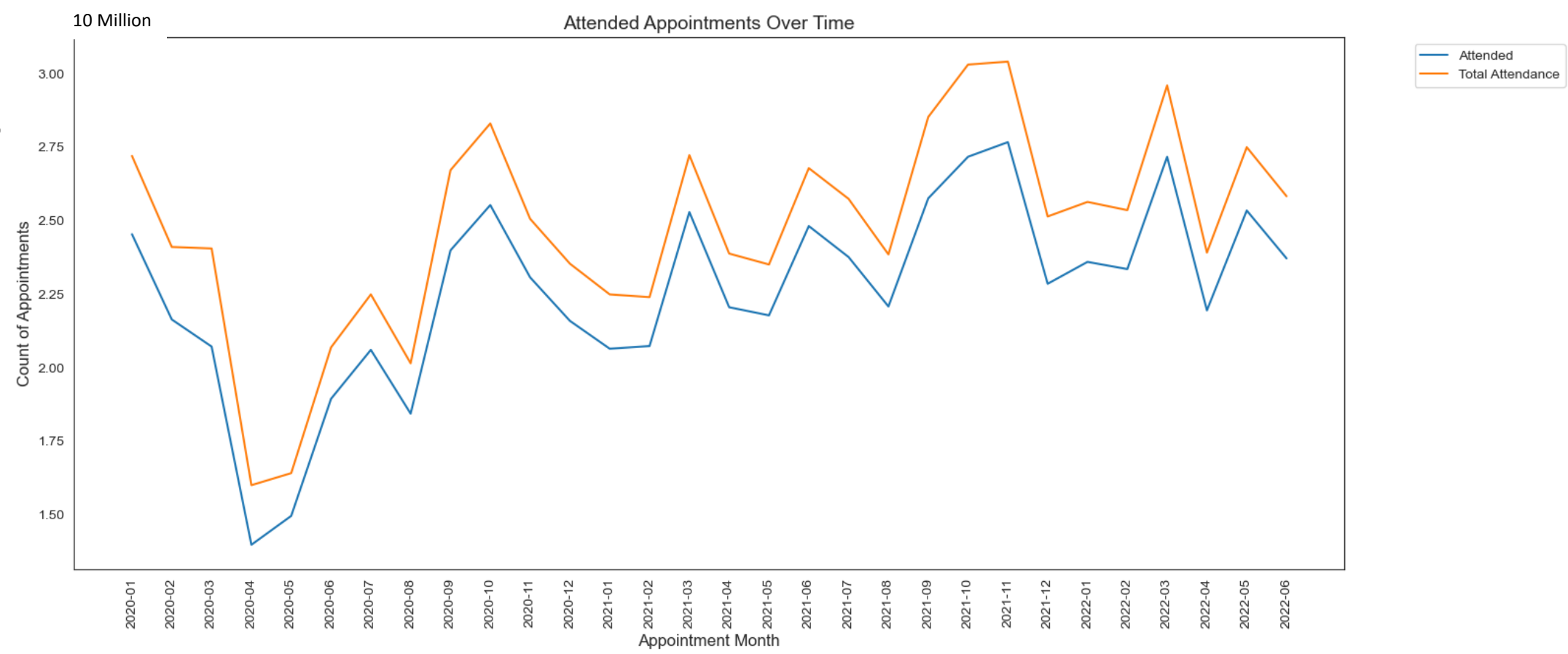
(between 01/12/21- 30/06/22)



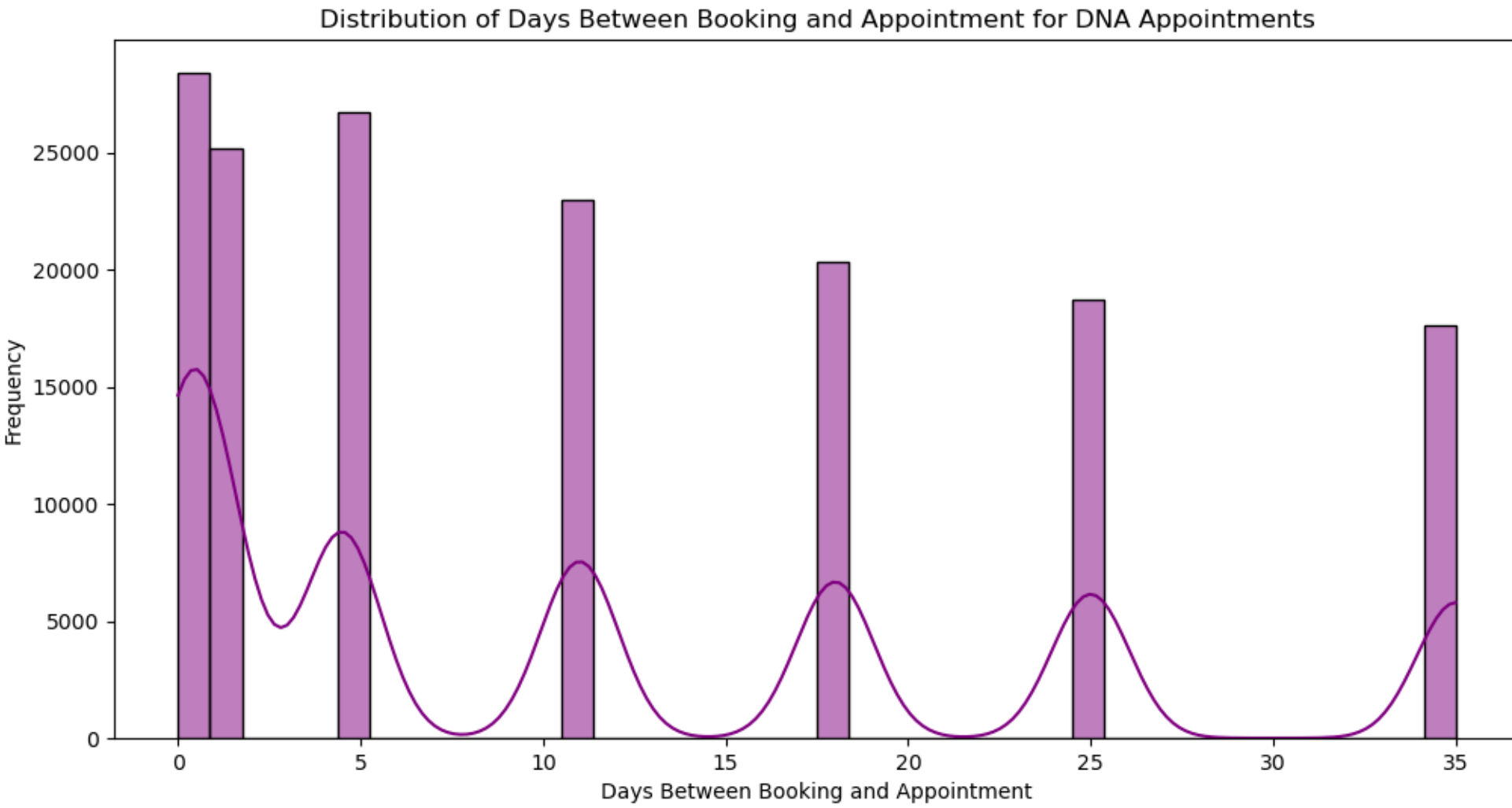
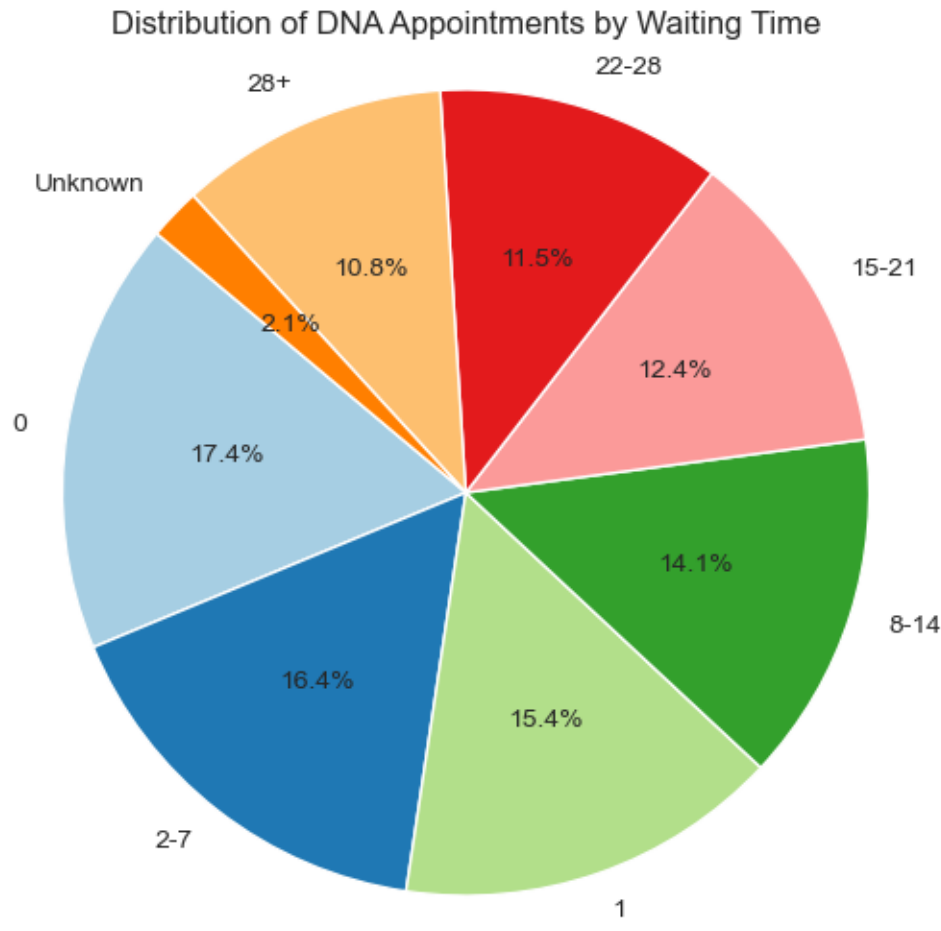
Percentages for 31-60 minute long appointments:
Inconsistent Mapping: 11.46%
General Consultation Routine: 11.18%
General Consultation Acute: 10.93%
Planned Clinics: 9.25%
Clinical Triage: 9.18%

Missed appointment (DNA) trends

- Missed appointments costs the NHS £216million pounds per year about £ 30 per appointment (2019)
- Considering that around 5% of all appointments are missed on average around 1 Million appointments per month (at least £360 M during the reporting period)



Missed Appointments (DNA) and waiting times



X (Twitter) Analysis

Top trending hashtags:

healthcare
health
job

Top locations:

Chicago
USA
Canada

Few UK locations

Top mentioned words:

Health
Healthcare
Medical
Patient

Only 3 NHS Mentions

Sentiment:

Neutral to positive sentiment

Recommendations

1. Appointment length management
2. Seasonal capacity management – Increase the overall maximum capacity to 1.4-1.5 M
3. Improved Data Mapping and Reporting
4. Regional Staffing Adjustments
5. Resilience Building for future outbreaks
6. Telehealth and Online Appointments
7. Strain on Services – review maximum capacity
8. Waiting time reduction



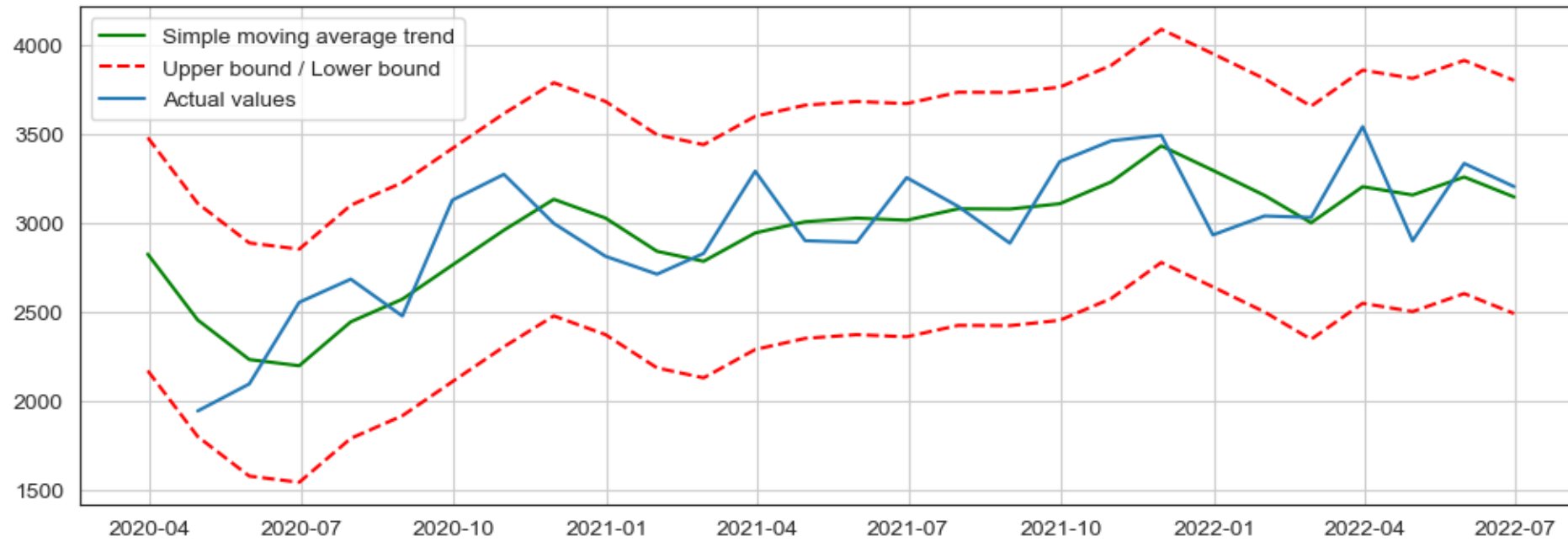
Further analysis

1. Further analysis to reasons for service Overutilization
2. Impact of Seasonal and External Factors, such as weather
3. Integration of Patient and Staffing Metrics
4. Longitudinal and predictive Analysis of recent data
5. Local Performance Analysis
6. Reasons for missed appointments
7. Predictive analysis

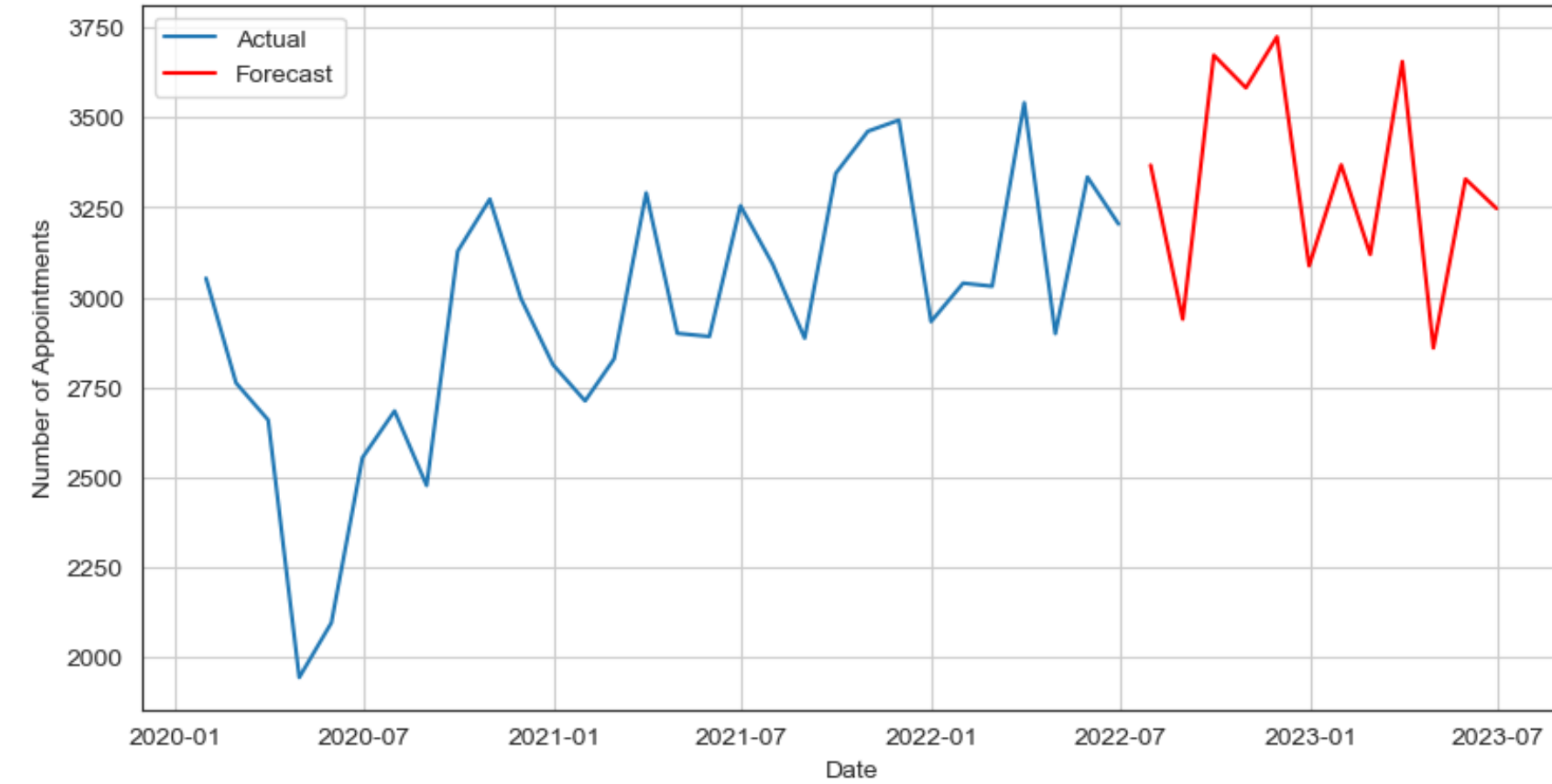


Looking at the future - Predictive modelling (London Example)

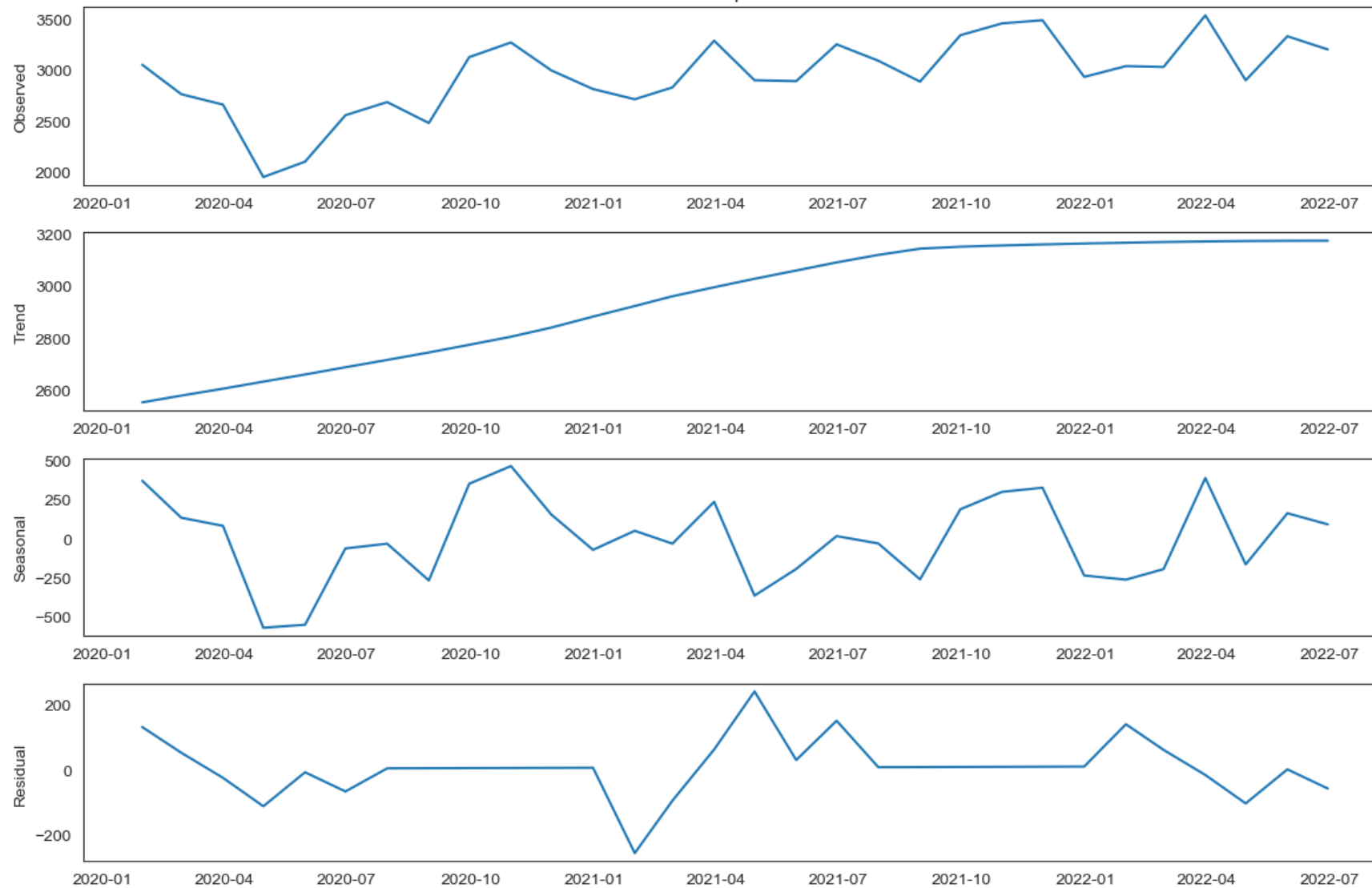
Moving average
window size = 3



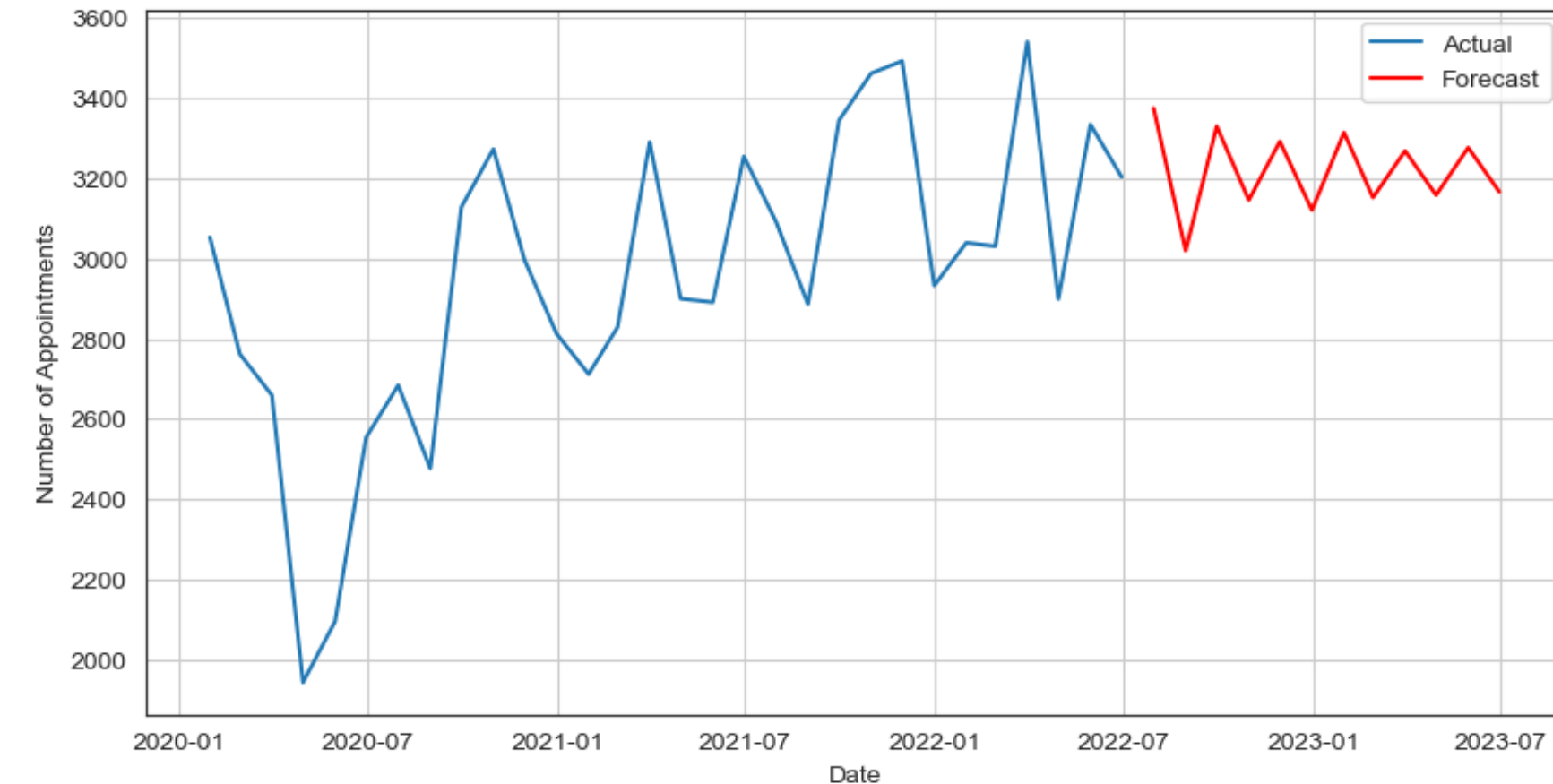
SARIMA Forecast - London



Seasonal Decomposition - London



ARIMA Forecast - London



Thank You

