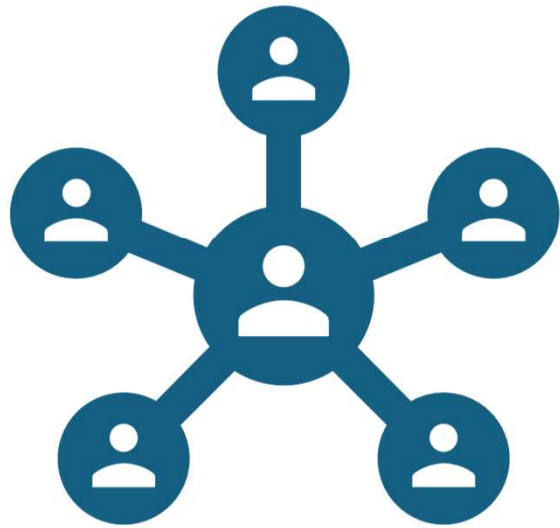


NHS Appointment Utilisation and Attendance Patterns: A Python Diagnostic Analysis

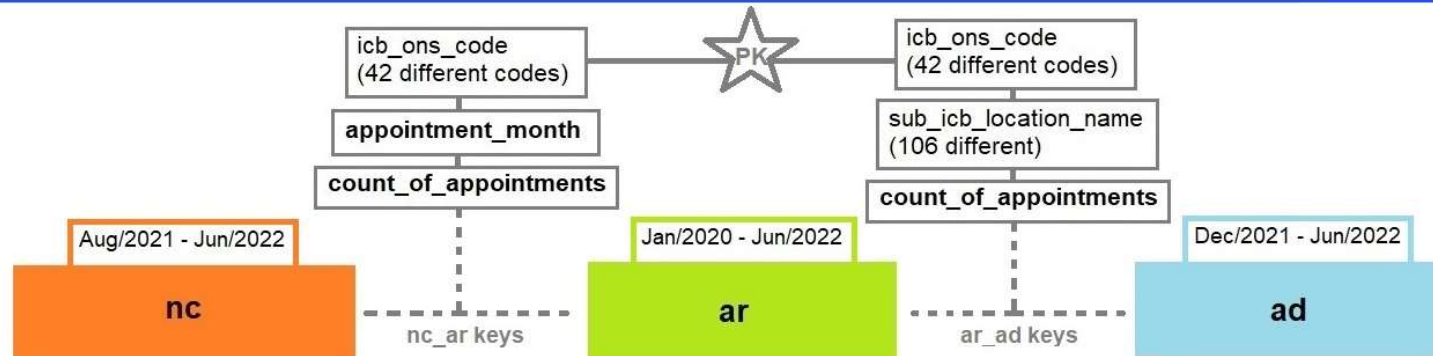




Main Research Questions

- **Has there been adequate staff and capacity in the networks?**
- **What was the actual utilisation of resources?**

NHS Missed Appointments and Capacity Analysis - Dataset Mindmap



appointment_date

national_category

- General Consultation Routine
- General Consultation Acute
- Structured Medication Review
- Service provided by organisation external to the practice
- Patient contact during Care Home Round
- Care Home Needs Assessment & Personalised Care and Support Planning
- Non-contractual chargeable work
- Group Consultation and Group Education

- Planned Clinics
- Clinical Triage
- Home Visit
- Care Home Visit
- Walk-in
- Planned Clinical Procedure
- Unplanned Clinical Activity
- Social Prescribing Service
- Inconsistent Mapping
- Unmapped

time_between_book_and_appointment

- Same
- 1 Day
- 2 to 7 Days
- 8 to 14 Days
- 15 to 21 Days
- 22 to 28 Days

appointment_mode

- Face-to-Face
- Telephone
- Home Visit
- Unknown
- Video/Online

appointment_status

- Attended
- Unknown
- DNA

hcp_type

- Other Practice staff
- GP
- Unknown

appointment_date

actual_duration


- 1-5 Minutes
- 6-10 Minutes
- 11-15 Minutes
- 16-20 Minutes
- 21-30 Minutes
- 31-60 Minutes
- Unknown / Data Quality
- Grand Total

sub_icb_location_code

sub icb location ons code

region_ons_code

- E4000003 - London
- E4000005 - Sussex
- E4000006 - Dorset
- E4000007 - Cambridgeshire & Peterborough
- E40000010 - Lancashire & South Cambria
- E40000011 - Nottingham & Nottinghamshire
- E40000012 - North East & North Cumbria



Basic Exploration and Descriptive Statistics

- **Actual Duration:**

23.98% 'Unknown / Data Quality'

most common Appointment Length

(i) Unknown, (ii) 6-10mins, (iii) 1-5mins

- **National Categories:**

Appointment Counts: 1 – 16590

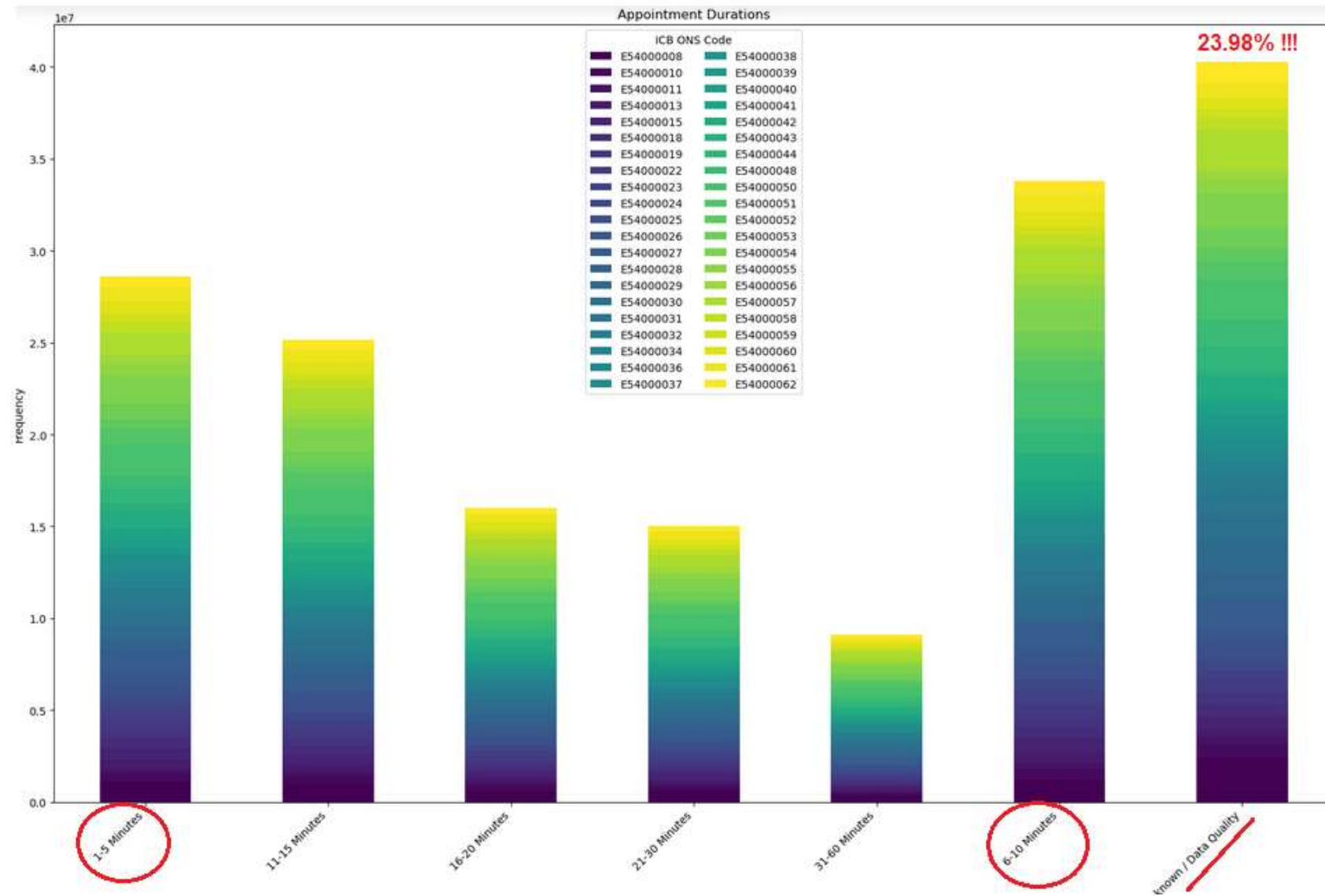
GP and General Consultation dominant

- **Appointments Regional:**

Largest date range Jan/2020 to Jun 2022

Appointments mostly occur within 1 – 7 days of booking

Investigating most common Appointment Length: (i) Unknown, (ii) 6-10mins, (iii) 1-5mins



Quality and Opportunities

- **Unknown data quality**
- **Data collection issues**
- **Absence of standardised time units creates ambiguity**
- **Address inconsistencies in data mapping**



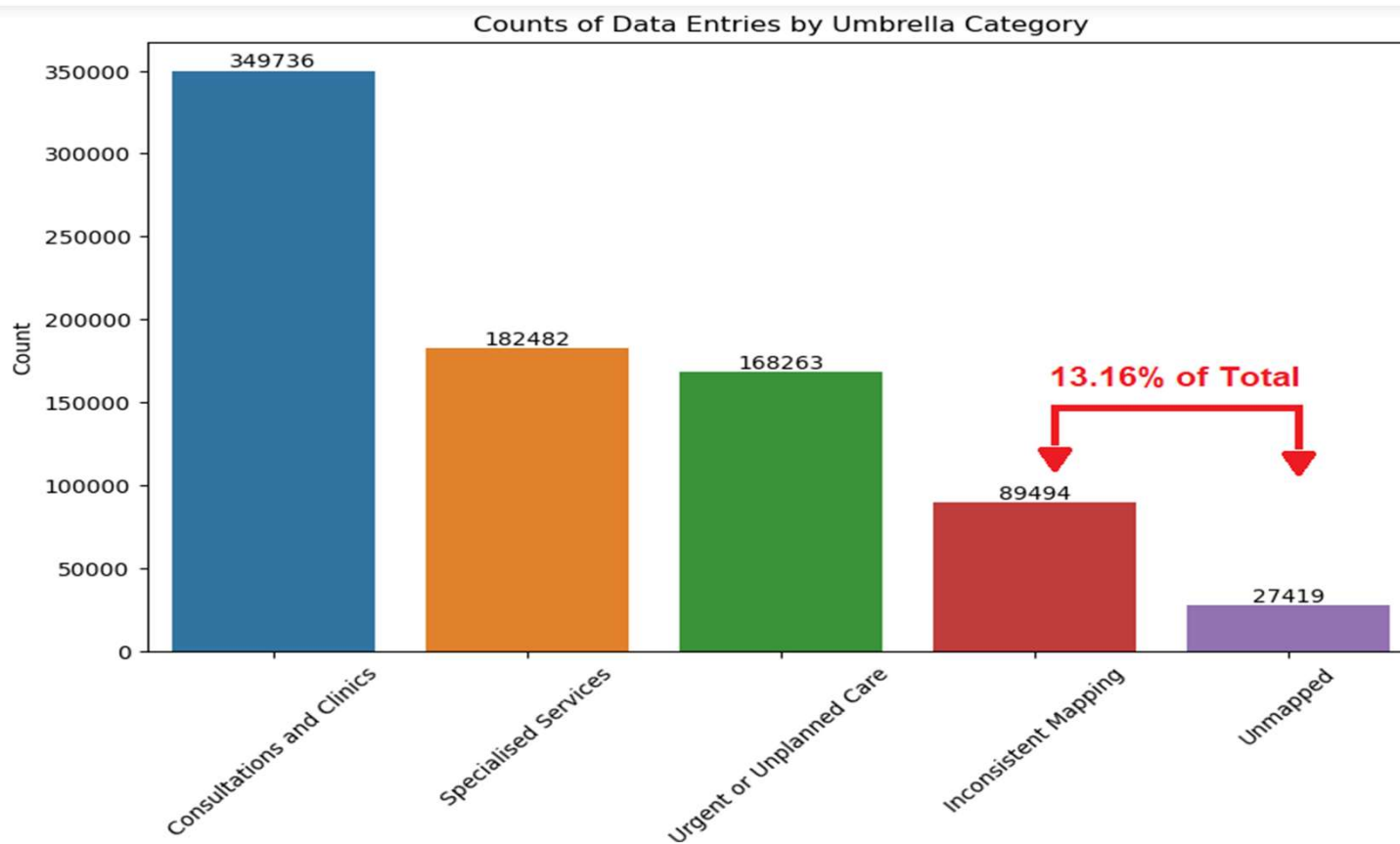
EDA continued

- **106 sub locations**
- **42 ICB locations**
- **7 regions**

- **5 service settings**
- **3 context types**
- **18 national categories**

- **3 appointment stati**
- **5 appointment modes**
- **3 HCP types**

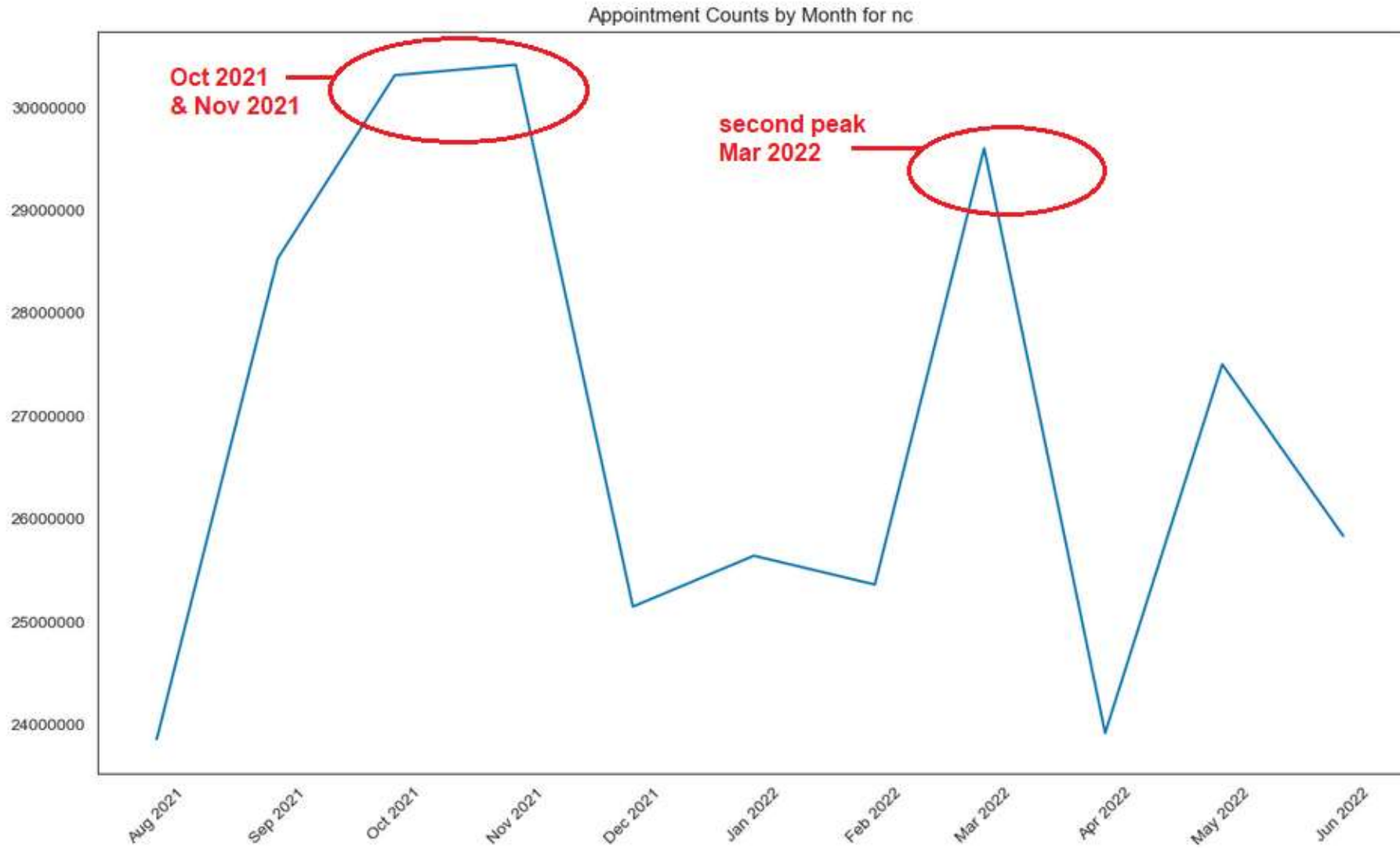
National Categories



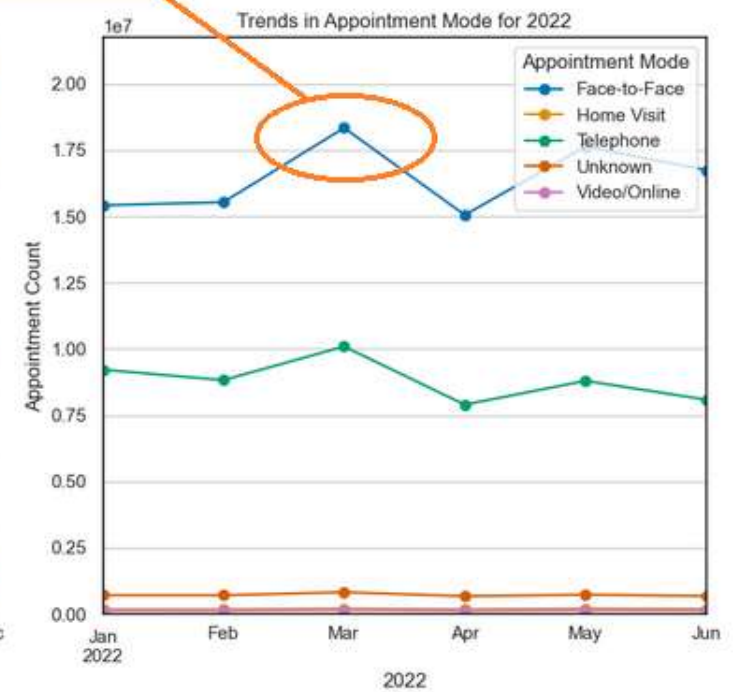
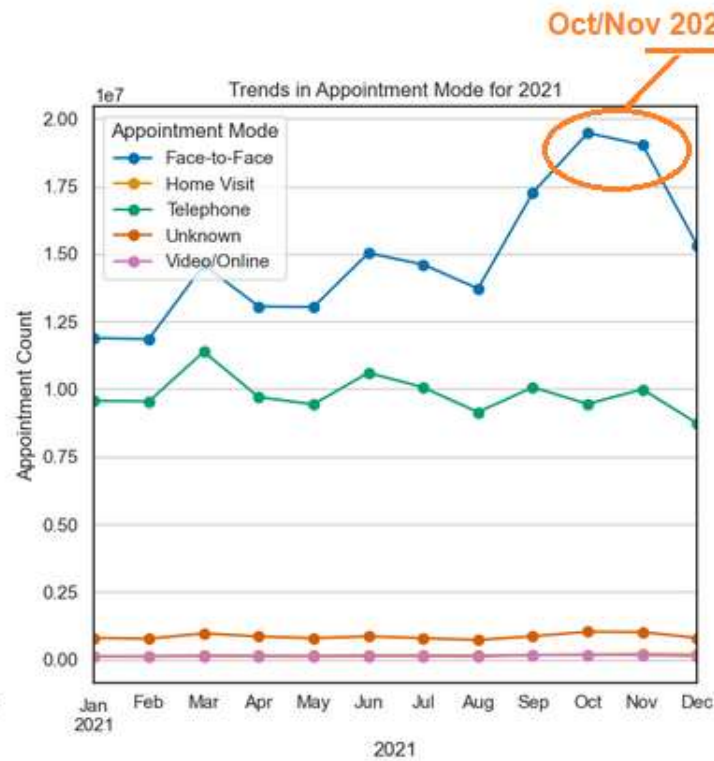
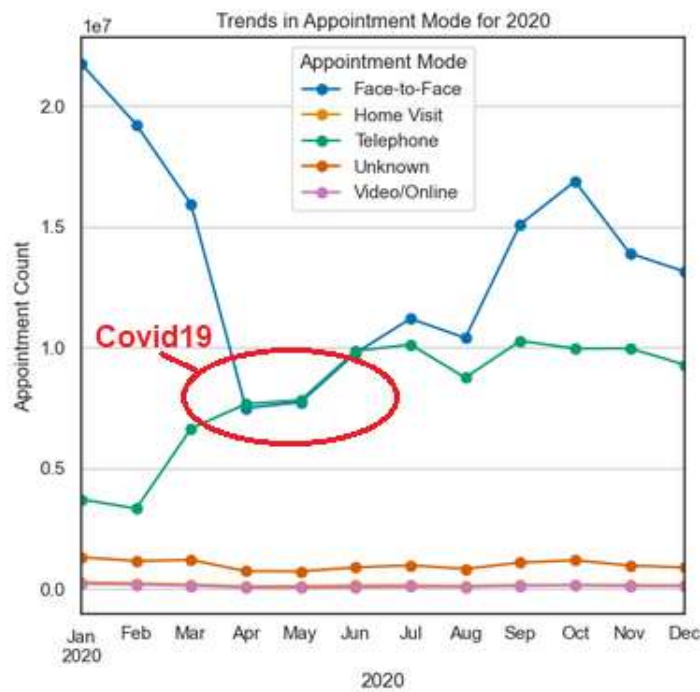
Visualisations and Monthly/Seasonal trends



Lineplot showing Appointments per Month from Aug/2021 to Jun 2022



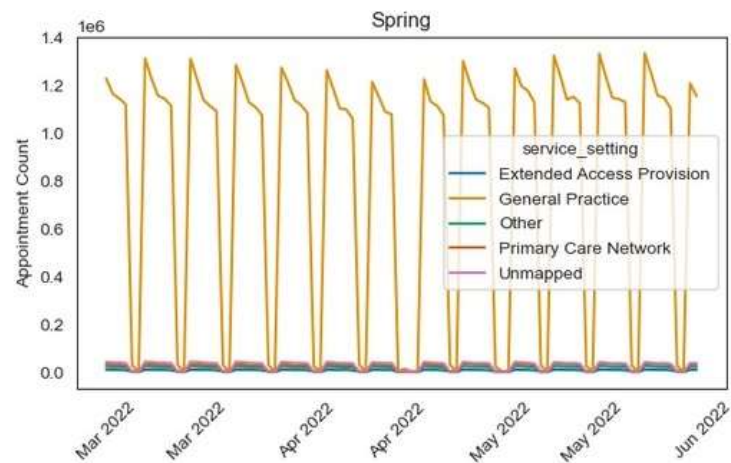
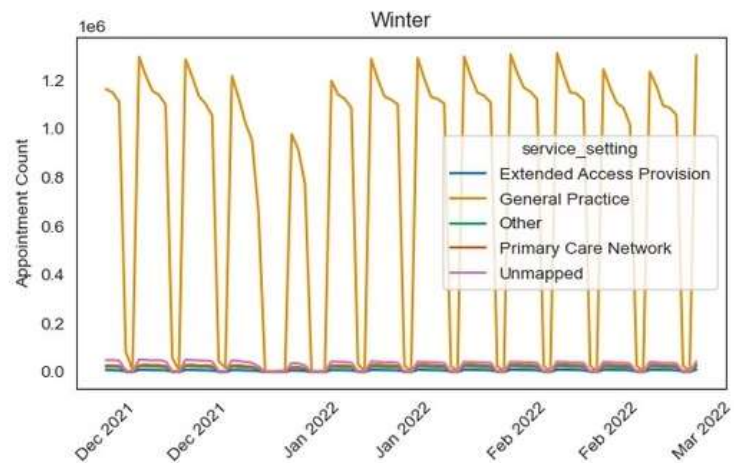
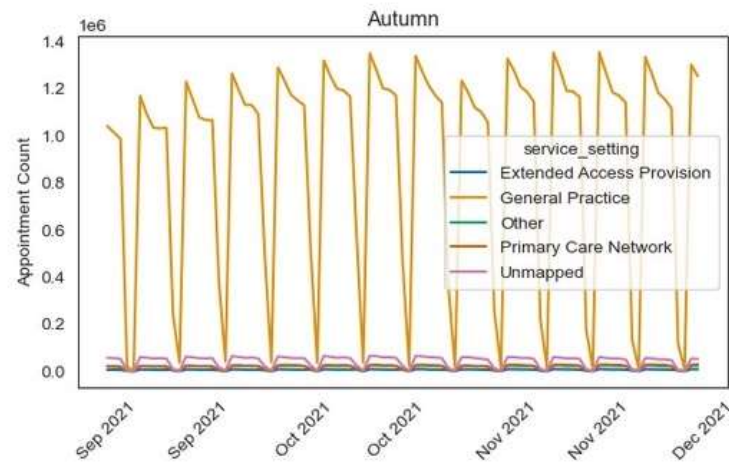
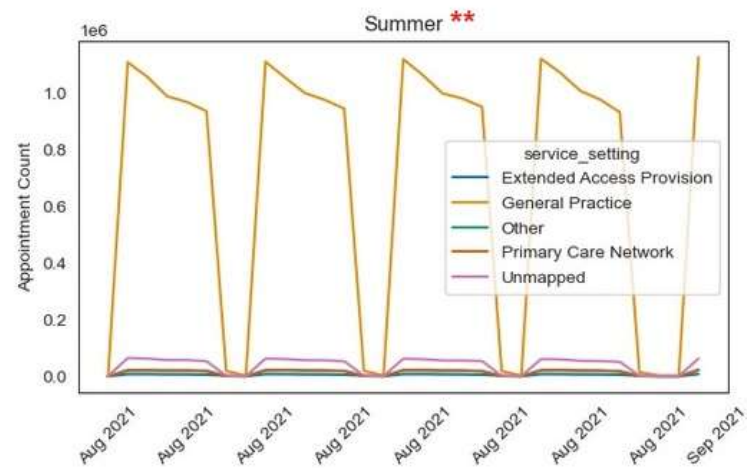
Appointment Mode Trends: 2020, 2021, 2022



Seasonal Patterns

Seasonal Plots for Nr. of Appointments per Service Setting by Season

**** Note:** a Total of 52523401 appointments is not included for Summer period, due to not being recorded in nc DataFrame.
This carries repercussions for comparability with other seasons - substitute data needed for further insight.



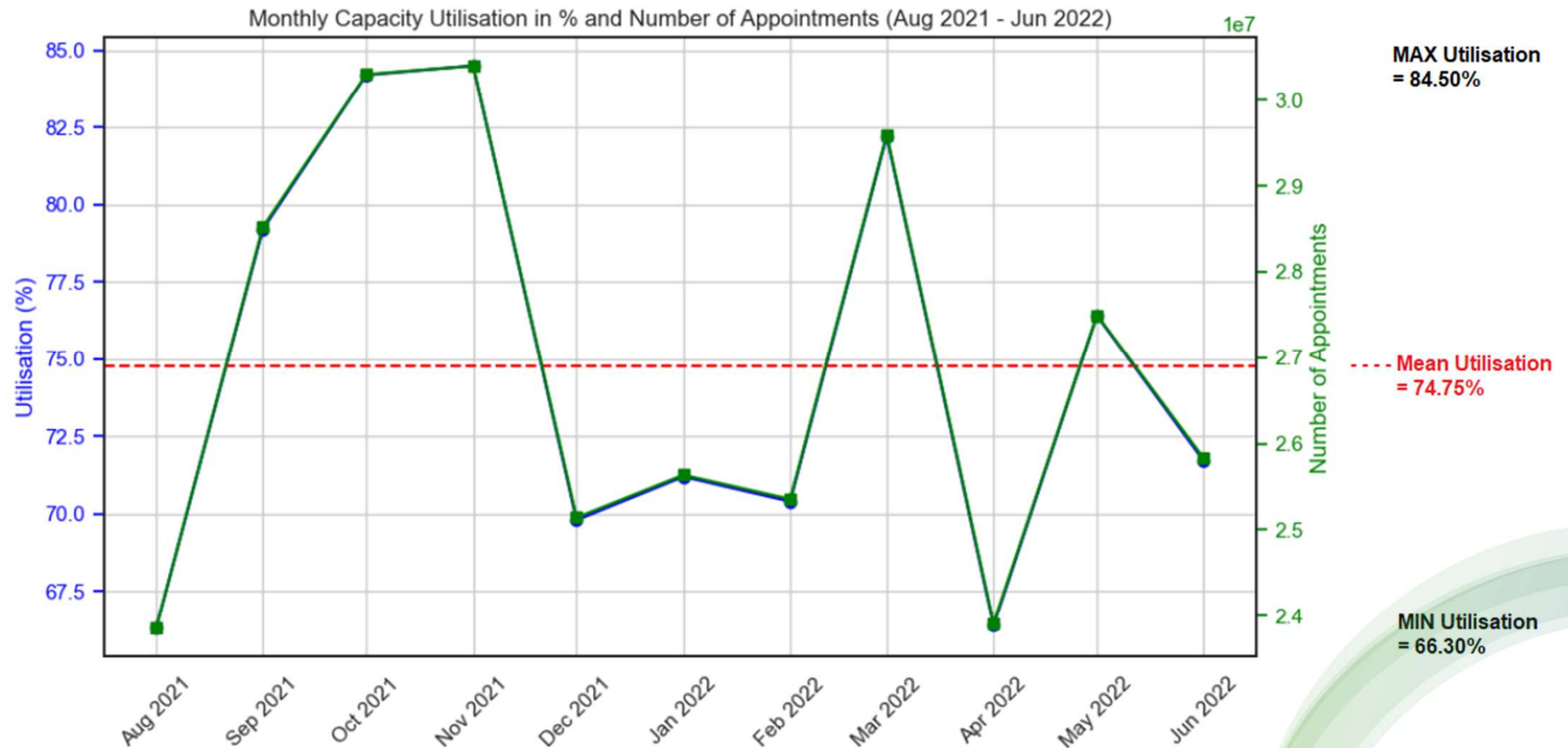
Twitter Analysis

- **No designated #NHS**
- **Irrelevant tweets**
- **#USA not applicable**
- **Refinement needed**



NHS Monthly Appointment Utilisation as % and Nr. of Appointments against 1,200,000 Max. Capacity

**** Note: Max. Capacity is exaggerated on purpose to account for flexibility in non-attendance**



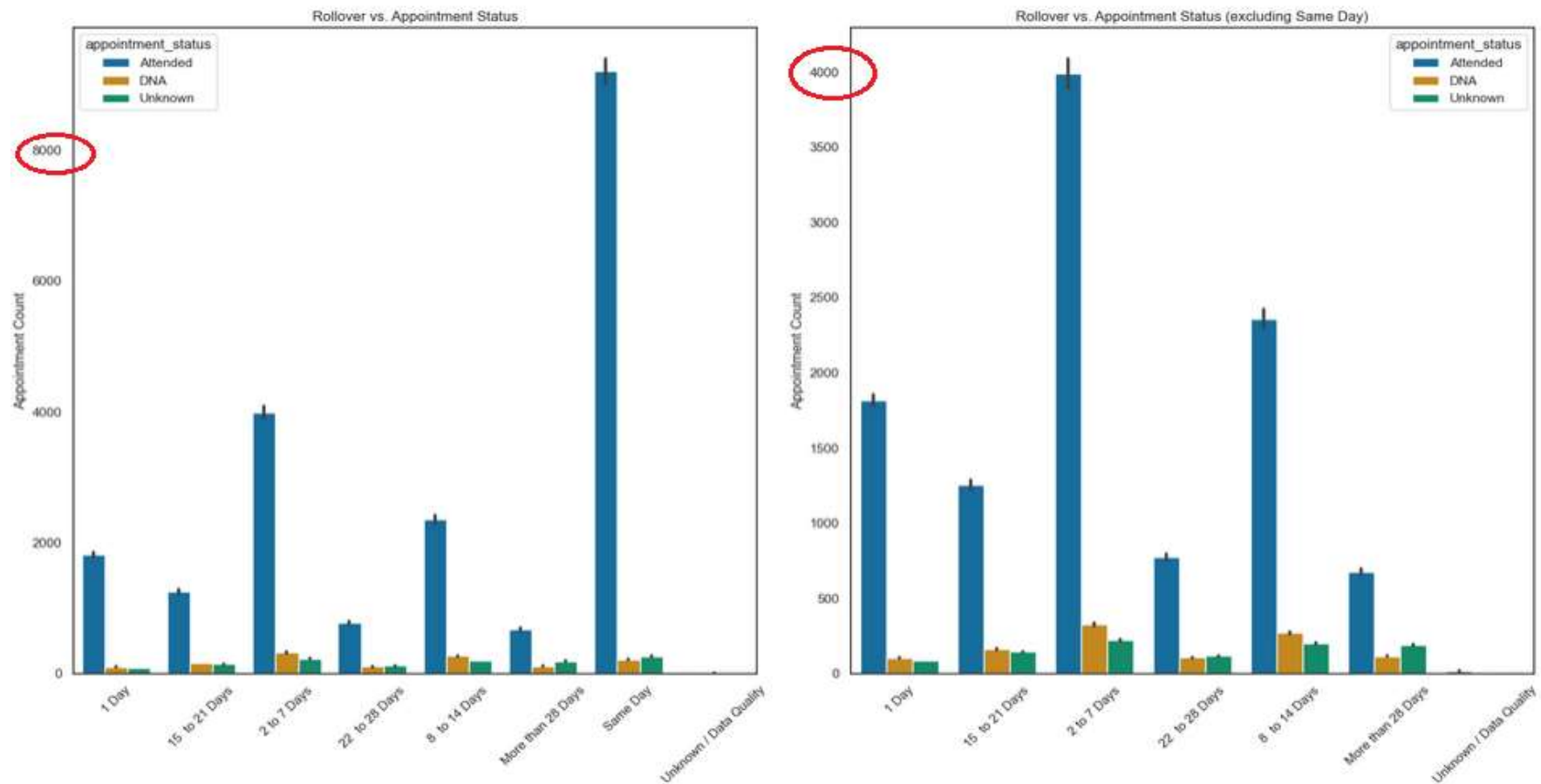
Time Trends and Correlations

- **HCP, Attendance Status, and Mode remain within parameter of general fluctuation throughout.**
- **GP is dominant category and Attendance is the norm.**

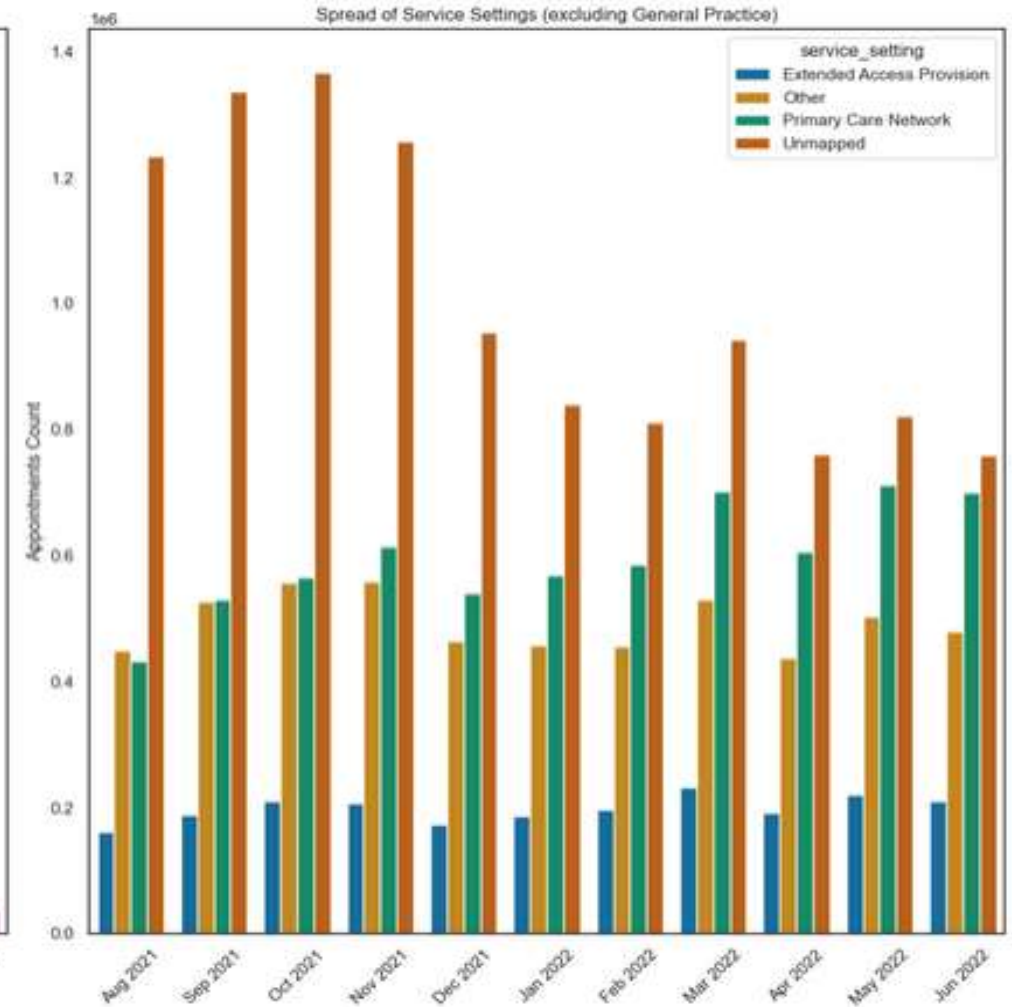
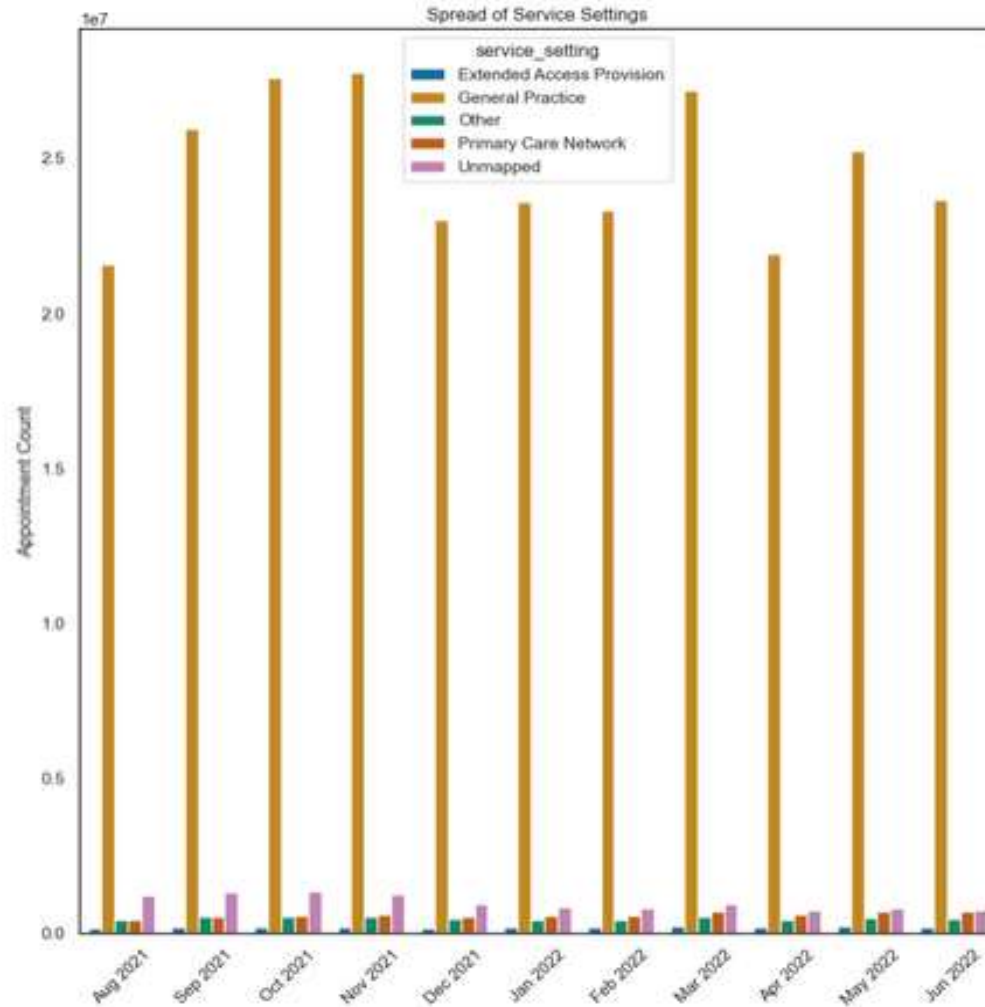


Time between Booking and Appointment vs Status

Question i: Time betw. Booking and Appointment vs Appointment Status



Spread of Service Settings



Recommendations and Conclusion



Utilise Timestamps



Leverage Location Information



Explore Appointment Characteristics



Address Data Quality Issues



Investigate Variability in Appointment Counts



Machine Learning