NHS CAPACITY AND RESOURCE UTILISATION: DATA TRENDS

Analysis Report

For the Attention of the Analysis Team & Project Lead

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Introduction

The Business Problem

The NHS has recognised that missed GP appointments are costly; it is therefore necessary to understand the cause. Eliminating/reducing these would be financially/socially beneficial.

The project is at an early stage. Currently, the NHS is keen to understand:
- Whether there has been adequate staff/capacity;
- The actual utilisation of resources.

Report Purpose

This report addresses the two questions, exploring and visualising provided data in relation to appointments (January 2020 to June 2022). The analysis will explore trends concerning appointments/missed appointments to understand staff capacity and resource utilisation.

Recommendations on further areas of exploration will be provided.

Analytical Approach

Action	Process	Rationale	Relevant Observations
GitHub repository set up.	Structure created, including readme file.	Allows team members to collaborate throughout project.	
Data imported into DataFrames and sense-checked.	All datasets imported and checked using head(), shape, dtypes, describe(), info().	Import, check and understand data.	
Null values checked.	df.isnull.sum()	Prevent from impacting analysis.	No null values found.
Total locations/categories counted.	Using count_values().	Understand data.	106 locations.
Dates formatted and date range checked.	Data sense-checked, formats changed using datetime module.	Ensure consistent/correct formats.	Dates Aug 2021 – Jun 2022 (one dataset starts in Dec 2021)
count_of_appointments changed to int64 in national_categories dataset.	Using astype().	Ensure correct format for analysis.	
Locations with most/least appointments identified.	Data sub-set, sorted and visualised.	Understand difference/compare with other open source data to understand capacity.	Comparison actual GP numbers.
Categories/settings visualised, plus total appointments by month.	Bar plots/line plots	Understand appointments/trends.	GP visits make up majority.
Unattended appointments analysed/visualised.	Data subset and visualised.	Understand characteristics of non-attended appointments.	Highest/lowest locations for non-attendance identified. Location demographics researched.
Tweets analysed.	Import tweets.csv, sense-check, sort top tweets.	Understand top health-related tweets.	NHS not directly mentioned in top tweets (indication of trending topics for consideration). Several NHS recruitment ads in dataset.

| Explore resource utilisation.	Monthly/daily utilisation charted (lineplots, compared with known NHS national capacity).	Understand actual utilisation.	Findings compared with top/bottom appointment count locations.

Visualisation and Insights

Total Appointments by Month Trend
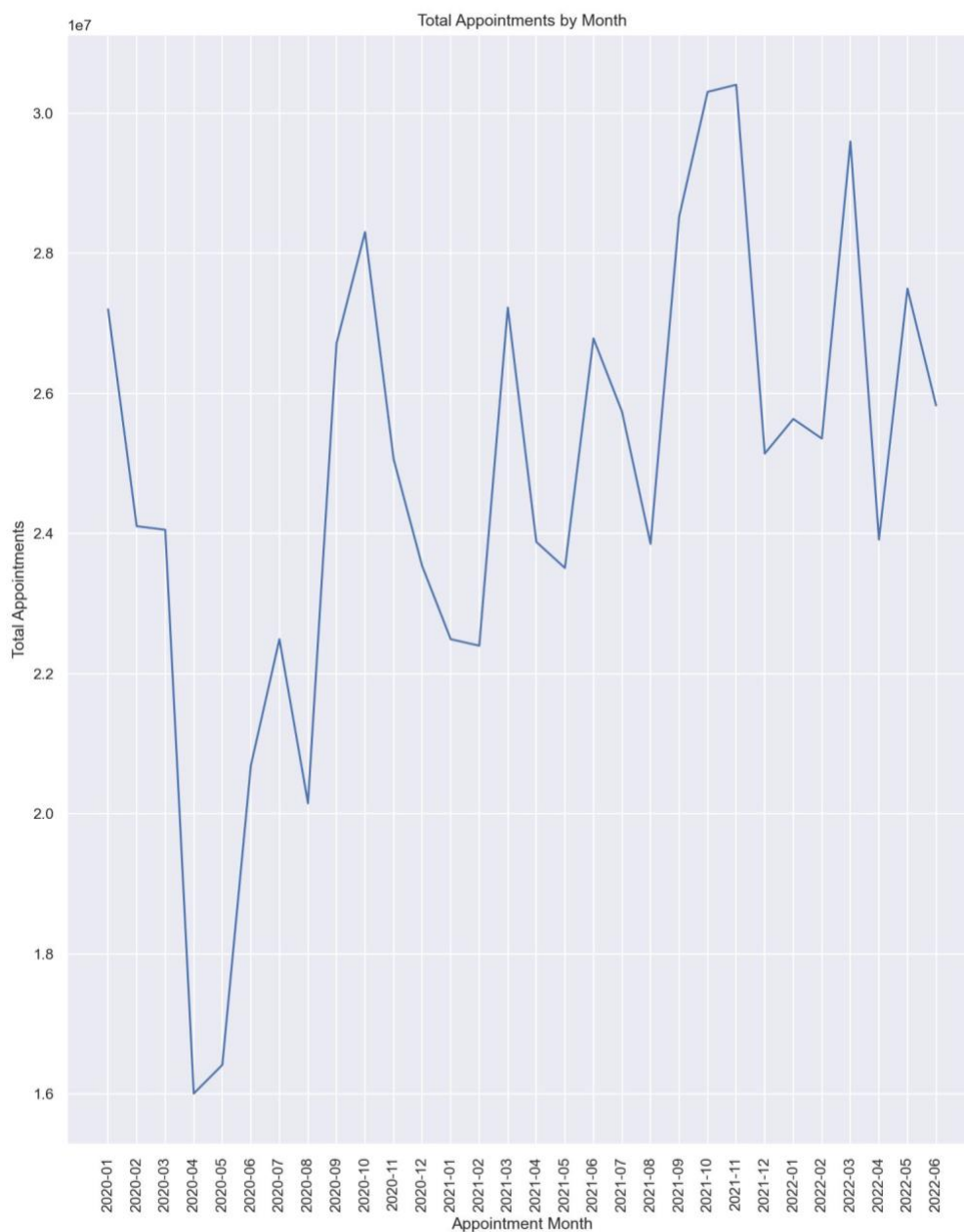
- The chart was chosen to assess national appointment levels over time and indicates a general upward trend.

- COVID clearly had an impact, with levels lowest in April 2020 when the NHS were limiting appointments. The steady increase could be a post-COVID catch-up/return to normality
- This suggests levels will potentially continue to increase going forward, but may level off.
- Stronger peaks noticeable in autumn (e.g. August to December 2021), likely due to seasonal illnesses.

## Most Common Appointment Setting
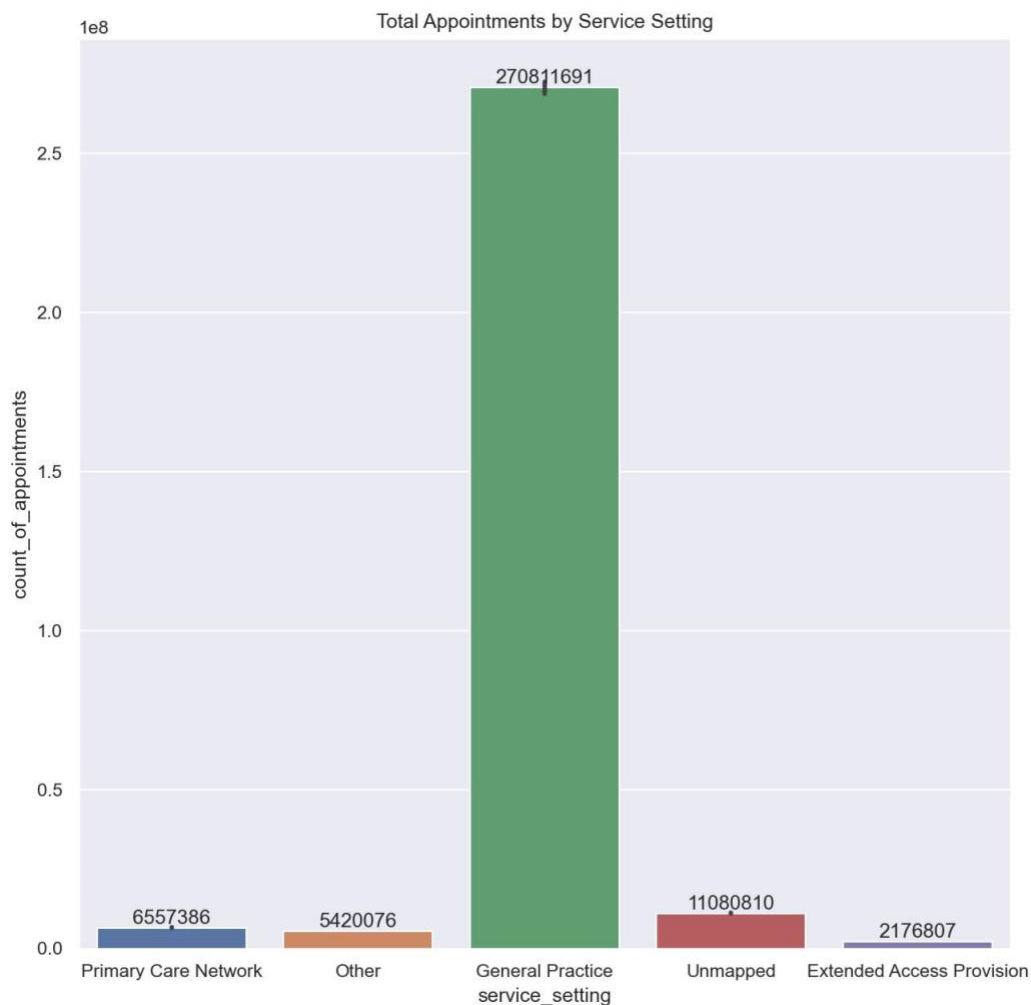
- A bar chart best demonstrates category division (General Practice was the most common service setting). This is the setting of interest in terms of resources. Data quality issues (i.e. 'Other' and 'Unmapped') across the dataset limited full interpretation.

Locations with Highest and Lowest Appointment Numbers and Resources
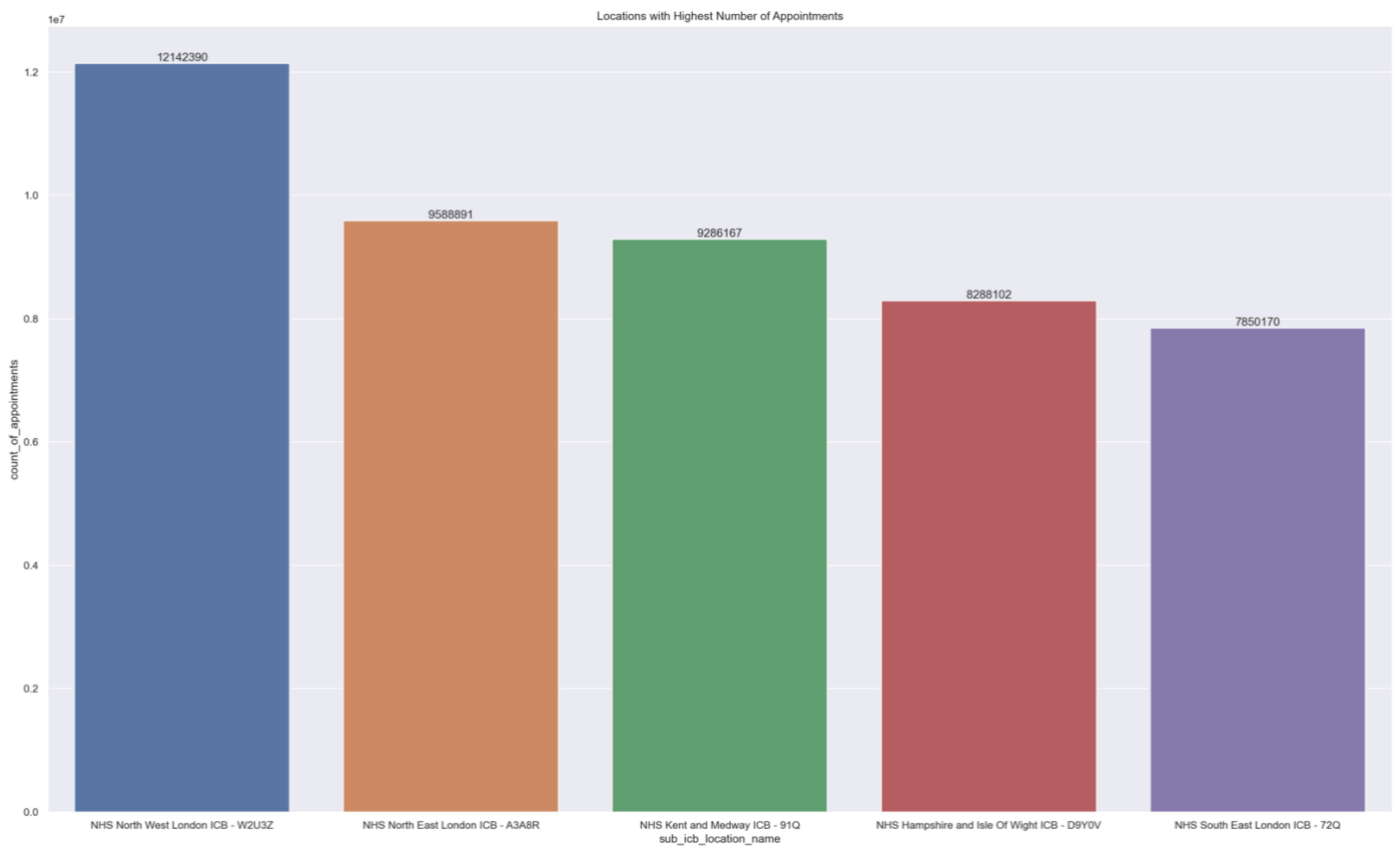
- The top five/bottom five locations were compared. North West London (W2U3Z) came top, with two other London locations in the top five (all South East).
- The bottom five (see below chart) are, in contrast, mostly in the North West, with Lancashire and South Cumbria (02G) having fewest.
- Further data obtained from the NHS[1] shows that W2U3Z has 1,638 GPs, handling on average 598 appointments per month per GP. However, 02G has 62 GPs, yet handles on average 11,571 per GP! Whilst other staff are excluded, this implies that the location with fewest appointments may have insufficient staff to meet demand.
- Data does not address patients waiting for appointments.

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[1] PCN+Practice+NWRS+DQ+Data+13+February+2023.csv (source: digital.nhs.uk)

Locations with Lowest Number of Appointments
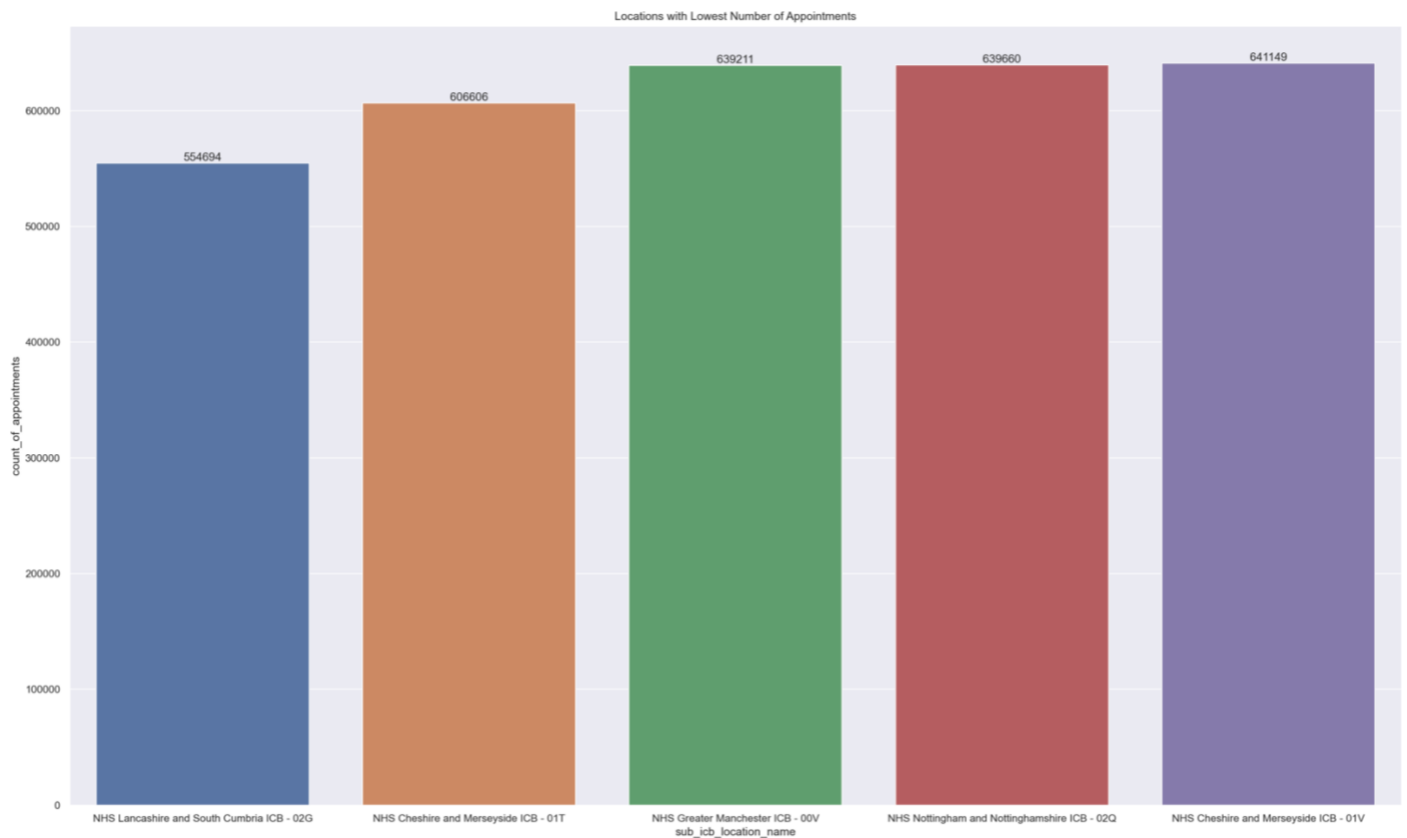
Actual Utilisation of Resources

The below chart demonstrates that the NHS handled fewer than its 1.2 million appointment daily capacity (shown by the red dotted line). On average, this means each ICB location should handle 11,320 per day (not taking account of the size/population for each ICB (which would vary)). Anecdotally, the busiest location handled on average over 31,000 appointments per day.

Analysis therefore suggests that staff may be wrongly located according to demand.

Average Daily Appointments Vs. Daily Capacity
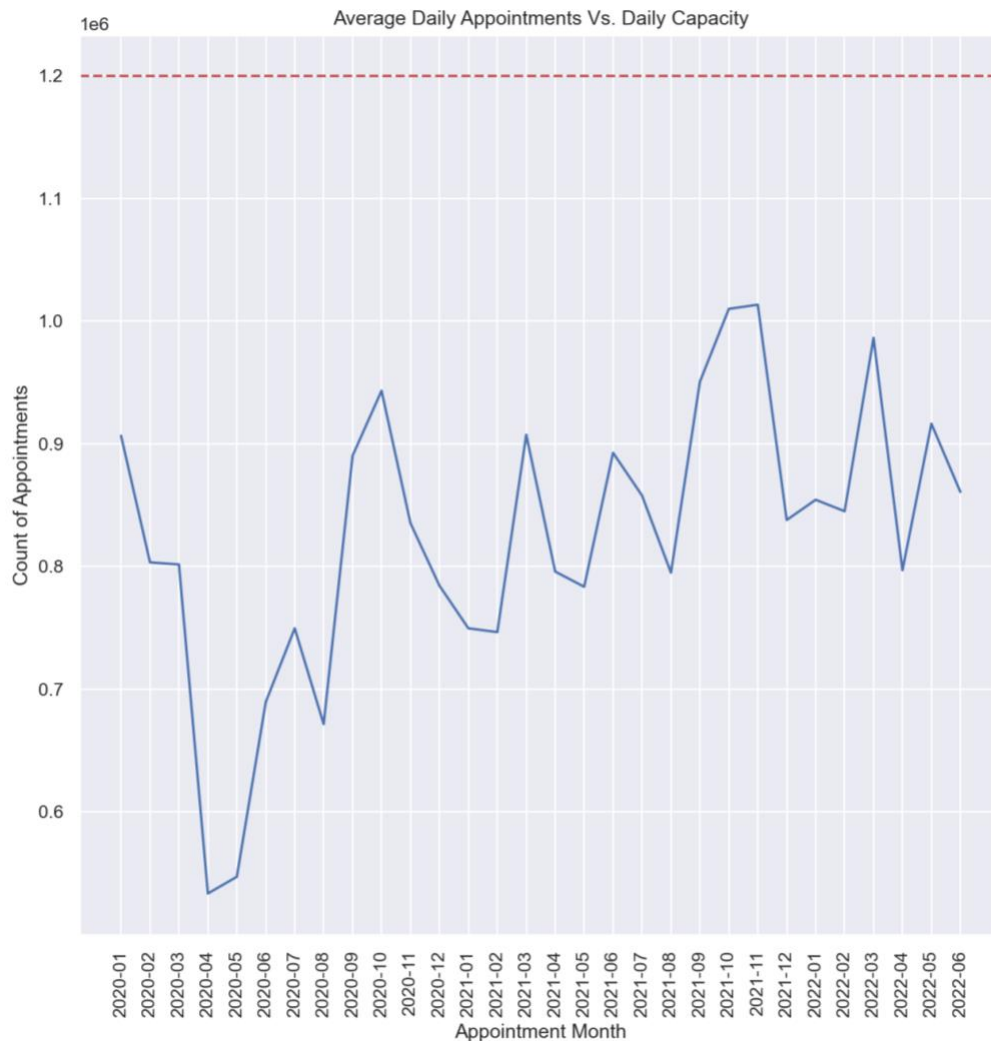
Unattended Appointments

Unattended appointments are most commonly:

- Face-to-face (as opposed to telephone etc.). Video/online sees fewest missed appointments, suggesting this method could be used more often to improve take-up;
- Arranged with 'Other Practice Staff' (see charts below). A look at wait times further shows that patients commonly wait up to two weeks (whereas GP appointments are commonly same day/within 7 days). Data is limited as regards further understanding of category composition.
- In the North West. Research suggests this region has high deprivation and poor general health[2] - there may be a correlation between this and non-attendance.

Total Non-Attended Appointments by HCP Type

Total Non-Attended Appointments by HCP Type/Wait Time
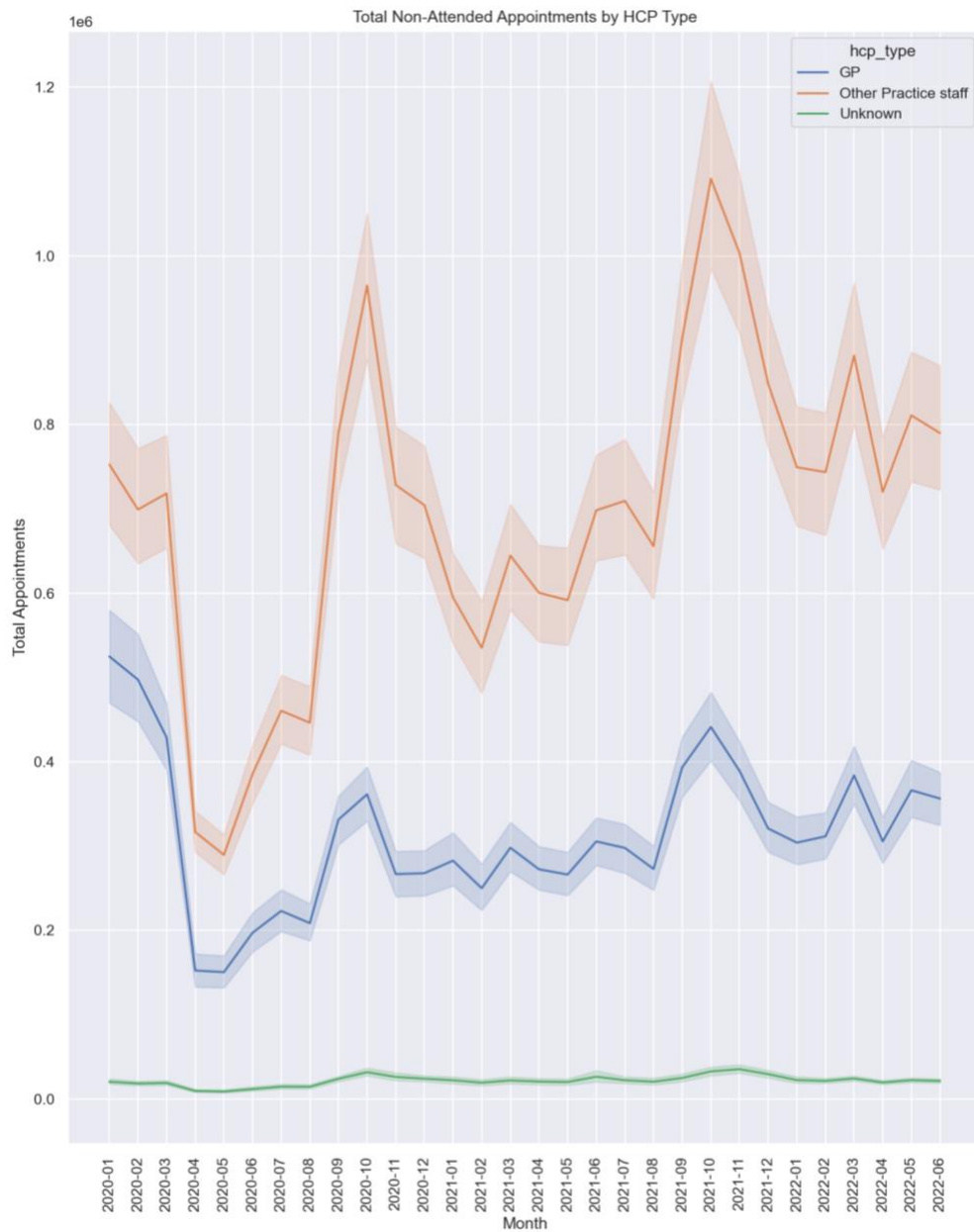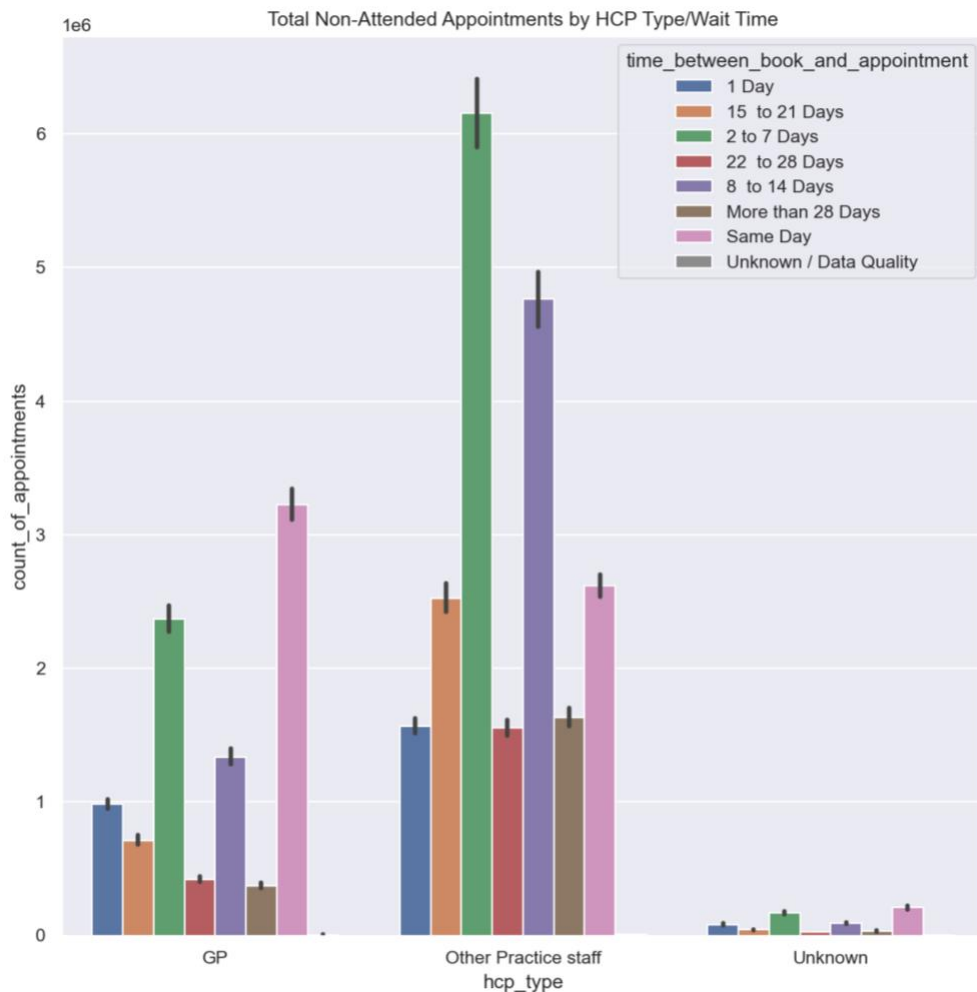
Patterns and Predictions

Has there been adequate staff and capacity in the networks?

Analysis shows that some locations have high volumes of work/high staff count, while others have fewer staff/lower overall workload. However, the proportion of staff to workload does not always appear well-balanced (i.e. the location with the lowest number of appointments has 26 times fewer GPs than the highest, resulting in greater workload per staff member).

Further indications suggest there is a North/South divide, with poor communities in the North West less able to access services and more likely to miss appointments. Staff in this area handle more patients per head. Tackling attendance levels, while important, could put further pressure on those locations (where approx. 5% of appointments are missed each month at the top non-attendance ICB). Therefore, staffing levels must first be considered.

What was the actual utilisation of resources?

General Practice uses most resources in terms of patient appointments (91.5%) nationally.

Taken as a whole, utilisation falls below national capacity, but this generalisation ignores individual capacities of each of the 106 locations, which have different needs. Further analysis/data is required to understand individual utilisation within ICBs of differing sizes.

Trends suggest that appointment numbers are heading upwards and are predicted to increase further over the next year, but could reach a post-COVID plateau.

Recommendations

- Further data acquisition/analysis on:
    - locations according to size/population served, to better understand capacity;
    - the correlation between deprivation and appointment attendance, to develop possible solutions;
    - actual staff numbers/needs for each setting, to further explore utilisation.
    - 'other practice staff'-related appointments (specific trends by staff type and medical condition to better understand missed appointments).
- NHS to consider whether staff are in the right places, before making decisions on staff increases.
- Utilise top Twitter hashtags (i.e. "#healthcare") in recruitment campaigns to gain maximum exposure. Implement sentiment analysis to understand the public's views on the NHS. Utilise regex for more in-depth analysis of tweets.
- NHS to improve data quality/recording practices for better informed analysis.