

# 10DS Data Scientist Technical Exercise – accident and emergency performance

## Context

The government is committed to improving accident and emergency performance. The headline performance measure for A&E is the **proportion of A&E attendances that are admitted, transferred or discharged from A&E within 4-hours of arrival**. As an interim target, NHSE is targeting a national average of 76% 4-hour performance in March 2024. All A&E attendances are included in this measure.

Other performance metrics include waits from a **decision-to-admit (DTA) made in A&E to actual admission into hospital** – data is provided for both four-hour and twelve-hour waits from the decision-to-admit. Since many people who attend A&E aren't admitted to hospital, most attendances aren't included in this measure. It is intended to capture problems downstream from A&E – e.g. insufficient ward capacity meaning that patients who are ready to be admitted are not flowing through quickly to the appropriate parts of the hospital.

There is significant variation in regional performance. NHS England is divided into 42 Integrated Care Boards (ICBs), each of which oversees several NHS trusts which are, in turn, made up of one or more hospitals. To improve performance in the worst performing ICBs, NHS England implemented a tiering system for the Integrated Care Boards (ICBs). The seven worst performing ICBs in A&E are included in "tier three" and, since April 2023, have been offered extensive support through a range of on-the-ground interventions and planning capacity.

## Task

Tier three support started in April 2023 for the following ICBs:

1. NHS Cheshire And Merseyside Integrated Care Board
2. NHS Cornwall And The Isles Of Scilly Integrated Care Board
3. NHS Devon Integrated Care Board
4. NHS Greater Manchester Integrated Care Board
5. NHS Kent And Medway Integrated Care Board
6. NHS Norfolk And Waveney Integrated Care Board
7. NHS North East London Integrated Care Board

The Secretary of State for Health has asked you to analyse NHS data to determine what impact (if any) the tiering system has had on the performance of the ICBs receiving tier three support. You will need to:

1. Produce a short presentation of at most five slides to communicate your findings.
2. Email a zip file of your code and presentation with the subject line '[Your Name] - Data Scientist technical exercise' to [dgoll@no10.gov.uk](mailto:dgoll@no10.gov.uk) at the time specified in the cover email. Please convert any presentational materials to pdf format to ensure they can be opened.
3. Deliver a short presentation on your findings. You should aim for a presentation that lasts for five minutes, and there will be a hard stop at seven minutes. The target audience for your presentation is the Secretary of State for Health, who is well-informed about the health system but doesn't have an analytical background.

### **Points you may wish to consider**

Below are examples of some of the questions you may wish to consider. You do not need to consider them all – they are intended only as prompts to help you think through your analysis.

- Has being in Tier 3 impacted performance?
- If so, where has it had the most impact?
- How does the impact at trust-level differ from the impact at ICB-level?
- Has the tiering system targeted the right ICBs? How would you approach tiering if were to repeat this exercise next year?
- How you would develop your analysis further given more time?

### **Relevant data**

The main page for A&E performance data can be found here: [Statistics » A&E Attendances and Emergency Admissions \(england.nhs.uk\)](https://statistics.nhs.uk/a-and-e-attendances-and-emergency-admissions).

For your convenience, we have included in this email a zip file containing the monthly data on ICB level performance as CSVs, back to April 2022. This includes data on attendances, admissions, four-hour performance and waits from decision-to-admit. You can download the equivalent excel files (which include additional notes on the data) in the “Monthly Data” section of the page above.

A&E data is often reported separately for Type 1 (major A&E), Type 2 (specialty) and Type 3 (minor injury units). For the purposes of this exercise, **you should focus on either** total performance (including all types, which is the relevant measure for national targets) or Type 1 (which account for most attendances and have the worst performance problems).

You are also welcome to integrate any additional data. Other data sources that might be useful:

- [Mapping from NHS trust to ICB](#)
- [Characteristics of ICBs \(with data linked in the Appendices at the bottom of the page\)](#)

### **Expectation**

You are required to demonstrate:

- ✎ a general understanding of how to manipulate data
- ✎ awareness of analytical techniques and best practices
- ✎ ability to communicate insight with data visualisation
- ✎ intellectual curiosity and story-telling ability

We do not expect an exhaustive analysis of all data. Rather, we would like to gain insight into your technical abilities and how you approach an exploratory problem from a data science / analytical perspective.

You can highlight additional or different approaches you would consider if you had more time.