

Title: Modelling of Accident & Emergency Pathways

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Subject areas: Data Science; Statistical Modelling; Healthcare.

Project Description:

Public Health Scotland is Scotland's lead national agency for improving and protecting health and wellbeing of all of Scotland's people. One of Public Health Scotland's goals is the use of intelligence and data to support the system and improve the experience we will have with the system.

Unscheduled care is a key part of our health and social care system. We have had a range of tools over the years that help predict the demand for A&E services. Public Health Scotland has developed a model that currently covers primarily the acute hospital part of the system. We want to expand this with a more detailed A&E model. This model would then be used to help understand the flow of patients being admitted to the hospital system.

This project is about supporting one of our teams with their development of an A&E model. The project will use the A&E open data with additional open data sources. The goal of the project is to help inform the ways of modelling A&E attendances. The aim would be to model the seasonal trend of attendances to A&E and their subsequent waiting time factoring in daily and hourly variation using in historical activity data. You can propose options for how to model the data, put together initial models and/or evaluate their effectiveness, including any suggestions for us going forward. This could include machine learning, queuing theory, operational research, or Bayesian models.

You will be supporting the Whole system modelling team within Public Health Scotland which brings together data to understand the current system. As a result, you can also find out more about our work and our wider organisation. There will be an opportunity to explore our wider work and methods including the tools we use. All our modelling work is done in R at present, including using it for simulation work (R Simmer), regression models, and visualization. But we are open to using other tools such as Simul8 or Python and any new solutions that might expand our knowledge as well as your own.

References:

Public Health Scotland

[A Scotland where everybody thrives: Public Health Scotland's strategic plan 2022 to 2025 - Our organisation - Public Health Scotland](#)

Datasets

<https://www.opendata.nhs.scot/dataset/weekly-accident-and-emergency-activity-and-waiting-times/resource/a5f7ca94-c810-41b5-a7c9-25c18d43e5a4>

[Monthly A&E Activity and Waiting Times - When - Scottish Health and Social Care Open Data \(nhs.scot\)](#)