Case Study: Northern Care Alliance – Abandoned Referrals Classification

Overview:

The Northern Care Alliance NHS Trust partnered with Keystream to tackle a significant data challenge involving approximately 1.1 million abandoned outpatient referrals. These referrals had not recorded any interaction for over 180 days, were not attached to any outpatient waiting list, and had no scheduled appointments. The goal was to implement a robust, scalable solution to identify and classify these records in a way that supports safe and data-informed referral disposal.

Project Objective

The project aimed to create a repeatable, technology-led process to:

- Identify all abandoned referrals using an agreed business definition

- Classify each referral into defined risk categories, assigning a score to guide appropriate follow-up or disposal

- Enable reusability across NHS Trusts, regardless of differing systems or data models

- Maintain a vendor-agnostic approach using open-source tools and frameworks

Approach

The engagement was shaped by a combination of strong architectural principles and open technologies:

Architectural Design: A vendor-agnostic and reusable solution was developed using open-source tools including Python, Pandas, Dask, MongoDB and FastAPI. This architecture ensures adaptability across NHS Trusts with differing IT environments and referral workflows.

System Architecture: A logical and physical architecture was created, centred around a Referrals Classification API. This REST API enables integration with business intelligence tools such as Power BI and supports automation via third-party scripts or bots.

Risk-Based Classification: Each abandoned referral was grouped into defined risk categories, with an associated score to guide next steps. This allowed prioritisation of actions based on clinical and operational risk.

Data and Systems Discovery: Discovery phases focused on understanding referral data structures, system architecture, and transformation logic. Activities included mapping data flows, documenting system topologies, and linking technical elements to business processes.

Technical Requirements Capture: A full set of technical requirements was gathered and prioritised using the MoSCoW method, forming the foundation for future improvements and reuse across NHS organisations.

The Result

Keystream delivered a scalable, flexible classification tool that is now in place to help the Northern Care Alliance manage and address the challenge of abandoned referrals. The tool ensures data-driven, risk-based decisions can be made safely and efficiently, while also providing a blueprint that can be tailored by other NHS Trusts. This technology-driven approach supports patient safety, improves system efficiency, and contributes to a broader digital transformation agenda in healthcare.

Keystream