"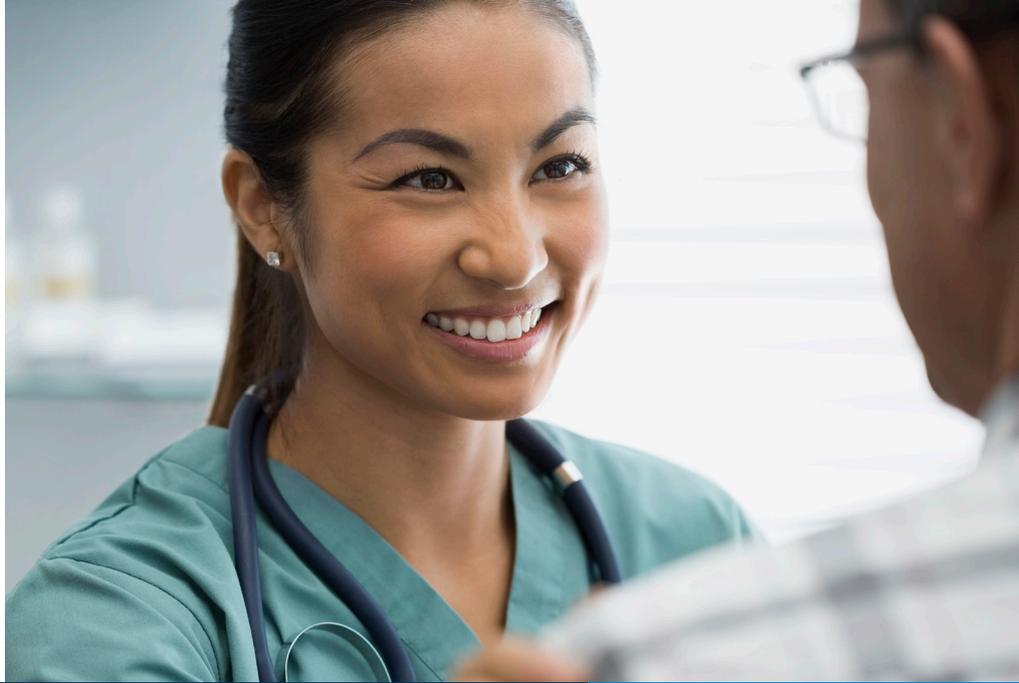With excellent support from the SAS team and solutions, we have made great strides in developing a model of the use of NHS services across care providers."

John Wilshaw
Head of Data Service for Commissioners

NHS England explores the potential for analytics to improve patient care

Eye-opening insights into healthcare needs across the population

Challenge

As the NHS balances rising demand for healthcare provision with available budget, how can it better exploit the data it holds about care episodes to provide targeted, cost-effective care to those who need it most?

Spotlight on patient care

To cope with the rising demands for healthcare provision sparked by an ageing population, the NHS constantly trials new ways to provide high-quality, cost-effective care.

John Wilshaw, Head of Data Service for Commissioners at NHS England, explains: "The NHS is under pressure to deliver world-class patient care cost-effectively. We wanted to take a closer look at how our services were being used, so that we could identify areas for improvement. Specifically, we wanted to find ways to raise the quality of care provided to patient cohorts who rely most on our services, and to identify opportunities to treat them more cost-effectively."

The answers lay hidden in the colossal quantities of data about care episodes held by NHS England. How could the organisation extract valuable insights from the mountains of raw data?

Administering a healthy dose of analytics

NHS England created the National Commissioning Data Repository (NCDR), which forms a single anonymised view of each episode of care by combining datasets from multiple sources – including Accident & Emergency departments, hospital admissions data, outpatient records, and community nurses' records. NHS England procured SAS to support analysis of this large dataset. SAS Data Management Standard supports the ETL processes that help NHS England transfer data from healthcare providers' systems into the repository and standardise the formatting.

Next, NHS England, the Leeds health and social care system and SAS began a revolutionary Proof of Concept, using powerful analytics solutions from SAS to develop a deeper understanding of healthcare needs, harnessing a focused subset of data from the NCDR. The NHS England team uses SAS solutions to distil this data to create a consolidated view of how each patient cohort uses healthcare services over a year, and how they transition through the system. For the analysis, NHS England relies on SAS Enterprise Miner, SAS Office Analytics and SAS Visual Analytics. SAS Grid Manager works in the background, managing computing resources so that users receive rapid results to their queries.

"SAS helps us transform huge quantities of raw data about care episodes into rich insights into patient cohort care," continues John Wilshaw. "With excellent support from the SAS team and solutions, we have made great strides in developing a deeper understanding of the healthcare needs of cohorts."

Solution

SAS® Data Management

SAS® Enterprise Miner™

SAS® Grid Manager

SAS® Office Analytics

SAS® Visual Analytics

Benefits

- Unlocks insight into actual care pathway, offering potential to improve care

- Reveals key drivers behind planned and unplanned utilisation of healthcare services

- Identifies opportunities to reduce cost

Performing powerful segmentation

Next, the Leeds health and social care system conducted a segmentation exercise, grouping the patients by factors such as the number of unplanned visits to NHS facilities, usage of hospital beds, and the number of acute treatments received.

John Wilshaw remarks: "We identified seven distinct groups, each with its own service-usage pattern. One of the groups particularly sparked our interest: individuals showing significantly higher service utilisation on every measure than the other population segments. These people rely heavily on our support and cost us the most to treat, so naturally we wanted to find out more."

To develop a deeper understanding of this highest-utilisation segment, NHS England built a decision tree that reveals common attributes between patients in this cohort. Specifically, the team aimed to pinpoint trends in diagnoses of the cohorts – for example, there might be certain combinations of ailments that cause people to require care more often. By identifying the shared factors, the team might be able to identify areas for improvement in how these ailments are treated, ultimately helping to provide better care and reduce the cost to the taxpayer.

Additionally, the Leeds health and social care system started to explore how, when and why these cohorts of patients transition between high-utilisation, low-utilisation and no-utilisation segments. In doing so, the team will be able to better understand the causes of high service utilisation, and take targeted action to reduce or prevent it.

A positive prognosis

The Proof of Concept demonstrates the immense potential of SAS analytics to improve patient care. Encouraged by the results, NHS England began offering the patient-segmentation analysis as a free service to the 44 Sustainability and Transformation Partnerships across England, where local councils and the NHS come together to develop proposals to improve health and care. By providing targeted care, NHS England and the Sustainability and Transformation Partnerships aim to both improve patient outcomes and reduce costs.

Thomas Mason, Chief Analyst at Leeds NHS & Social Care Commissions, concludes: "The decision-tree analysis approach has yielded some very interesting insights into the types of conditions, and more importantly the combination of conditions, that are associated with high resource use.

"In terms of commissioning, the information provides evidence-based guidance as to which clinical areas warrant further investigation to ensure patients' needs are being appropriately met. Without this analysis, it is unlikely that commissioners would be aware of these patterns, and the opportunities to improve patient outcomes would be missed."

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