


University Hospitals of Leicester improves patient outcomes

University Hospitals of Leicester 
NHS Trust

Using analytics from IBM, the hospital optimizes insight into pediatric admissions

Smart is...

Applying advanced analytics to validate and enrich methods, helping doctors decide which patients need urgent care and which they can safely send home.

University Hospitals of Leicester (UHL) wanted to enhance the assessment of children in emergency departments to improve patient outcomes and safely discharge those who do not need hospital stays. By working with IBM® Global Business Services® and implementing IBM SPSS® software, UHL validated and enriched a system that scores patients on risk factors, helping doctors decide which patients need urgent care and which they can safely send home. UHL now drives better care by allowing physicians to focus on urgent cases, reduces unnecessary hospital admissions, and predicts the duration of hospital stays to improve resource planning.

University Hospitals of Leicester (UHL) is one of the largest teaching trusts in the National Health Service (NHS), the UK agency that provides state-funded medical care. UHL incorporates Leicester General Hospital, Glenfield Hospital and the Leicester Royal Infirmary Hospital. It employs over 12,000 people and serves around one million local people.

Delivering top-notch medical care

UHL provides high-quality medical care to thousands of children who arrive in its emergency department each year. Staff must quickly identify and prioritize the most urgent cases to improve patient outcomes.

UHL is also under pressure to keep costs low, a concern for all state-funded bodies. However, staff in fast-paced emergency care environments often lack time for detailed resource planning.

Dr. Damian Roland, consultant in pediatric emergency medicine at UHL, explains, “The key is not just to identify urgent cases but also to improve resource use by reducing unnecessary hospital admissions while ensuring that we do not send home patients who are likely to be readmitted shortly afterward.”

To score adults attending an emergency department, the NHS has systems such as Modified Early Warning Score (MEWS), which produces a severity score based on measures such as heart rate.

“Adult-focused systems are not suitable for assessing illness in children, because physiology changes as we age. For example, what constitutes a healthy resting heart rate is different between a one-year-old and a five-year-old, let alone an adult,” adds Dr. Roland. “Also, children tend to suffer from different types of ailments than adults, so a high temperature in a child is likely to have a different inference to the same symptom in an adult. Equally, MEWS focuses on spotting early signs of serious illness, whereas we wanted a system that could also work out which patients could be safely discharged.”



Business benefits

- Demonstrates the potential of up to a 10 percent reduction in hospital stay costs for patients with the lowest POPS scores
 - Improves planning by predicting medical resource consumption
 - Drives better care by allowing physicians to focus on urgent cases
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“Our doctors now use POPS to assess incoming patients, determine the severity of each case and prioritize treatment. Ultimately, this helps us provide better care and improve patient outcomes.”

— Dr. Damian Roland, consultant in pediatric emergency medicine, University Hospitals of Leicester

Pioneering a revolution in pediatric care

Using published guidance about child physiology plus experience from its own doctors, UHL devised an assessment called the Pediatric Observation Priority Score (POPS), a checklist of physiological and behavioral risk identifiers that uses assigned values to produce an integer score indicating illness severity. The evaluation helps clinicians of all experience levels assess the acuity of incoming patients’ illnesses and decide whether to admit or discharge them.

UHL wanted to assess POPS’s efficacy in evaluating illness severity and predicting clinical resource consumption, such as durations of hospital stays, but it faced challenges in collecting and analyzing significant volumes of data to validate the system. UHL needed to correlate POPS scores with patient data to establish that the scores correctly indicated factors.

To tackle the challenge of integrating two data sets, UHL engaged IBM Global Business Services. Dr. Roland says, “The IBM team understood our needs and shared our vision of how big data and analytics can drive better clinical decision making.”

IBM integrated POPS with patient data, using IBM SPSS Statistics software to analyze correlations between POPS scores and clinical outcomes. The number of data points used to validate POPS increased from 1,000 to 20,000. IBM SPSS Analytic Catalyst software identified key drivers from the data points using sophisticated algorithms and regression-based techniques.

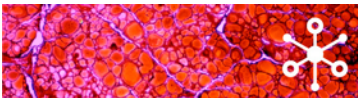
Smarter Healthcare

Improving patient care through analytics



Instrumented

POPS data from more than 20,000 patients, along with their patient treatment records, is pulled into the analytics applications for review.



Interconnected

The solution integrates data from two systems to allow statistical analysis of the combined data.



Intelligent

Applying statistical modeling and trending tools to the combined POPS and patient data improved confidence in the value of the POPS score as a treatment-planning tool.

Solution components

Software

- IBM® SPSS® Statistics
- IBM SPSS Analytic Catalyst

Services

- IBM Global Business Services® — Strategy & Analytics
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“Working with IBM, we have developed a system that could revolutionize pediatric care.”

— Dr. Damian Roland, consultant in pediatric emergency medicine, University Hospitals of Leicester

“The IBM team’s enthusiasm has played a key role in the success of this project.”

— Dr. Damian Roland, consultant in pediatric emergency medicine, University Hospitals of Leicester

Improving patient outcomes

UHL determined that POPS can reliably determine illness acuity, hospital stay length and readmission rates. Dr. Roland says: “Our doctors now use POPS to assess incoming patients, determine the severity of each case and prioritize treatment accordingly. Ultimately, this helps us provide better care and improve patient outcomes.

“We also learned that POPS can accurately identify low-risk cases, so we can safely discharge those patients and avoid unnecessary hospital admissions. This helps us keep overheads low and make the best possible use of our limited resources. Around six million children use emergency care services in UK hospitals each year, so the potential to improve public health and unlock cost savings is huge.”

UHL plans to use POPS to examine its performance compared with the illness acuity of incoming patients so that it can identify and establish best practices for treatment. UHL can also use the system to predict resource use, which would enable staff to request resources in the event of a sudden influx of patients whom the system deems likely to require long hospital stays.

Revolutionizing healthcare

POPS offers huge potential to revolutionize emergency pediatric care.

Dr. Roland explains: “In the long term, we plan to fully integrate POPS with a broader range of IT systems using handheld technology to accelerate data access and eliminate the need for paper records. Medical staff would have a single interface to access data held in multiple systems, and the POPS score could be updated automatically depending on test results.

“POPS is potentially of interest to other NHS Trusts, and we are working to develop a national standard for assessing emergency pediatric patients. With the huge data volumes we would gain from a larger rollout, we could fine-tune POPS even further to boost its accuracy.

“Ultimately, though this is certainly beyond the current scope, correlating sets of daily POPS scores with clinical data opens a whole world of analytics and data-mining possibilities. For example, analyzing large data sets might show previously unknown links between physiological factors and diseases, giving clinicians new diagnostic capabilities.”

For more information

To learn more about how IBM can help you transform your business, please contact your IBM marketing representative or IBM Business Partner or visit us at: ibm.com/gbs.



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