Surrey Heartlands

Director Builds Model to Predict 70-80% of Emergency Readmissions

David Howell is a Joint Director for Strategic Insight and Analytics at Surrey Heartlands Health and Care Partnership, which is responsible for meeting the population's health needs, managing the NHS budget and arranging for the provision of health services in the Surrey Heartlands area.

Building insights for better health

There's an abundance of data that impacts people's health. But around 80% of it lives outside the NHS—data from services like community and mental health, police and fire, social care, as well as household data like income and employment status.

Enter David Howell. David manages two analytics teams across two organisations: Surrey Heartlands' Integrated Care Board and Surrey County Council. Together, they use the insights from these combined data sources to help improve patient outcomes.

David saw major potential in applying more advanced analytics in healthcare. And he viewed the Level 7 programme as his opportunity to "lead by example" in acquiring those advanced skills.

> There's clearly a lack of implementation of machine learning within healthcare. I think people don't necessarily see how these insights and analytics teams could be used to really start to help patients and citizens more proactively. And I was really keen to lead by example and actually take people on that journey."

David Howell
Joint Director for Strategic Insight and Analytics

Learner Profile

Organisation: Surrey Heartlands Health and Care Partnership
Job function: Insight & Analytics
Job title: Joint Director for Strategic Insight and Analytics
Industry: Healthcare
Company Size: ~200 employees
Programme: Level 7 AI & Data Science
Programme Duration: 15 months

Finding a use case for machine learning

Apart from just upskilling, David wanted to build a compelling use case for machine learning that would drive NHS funding for similar projects in the future. He saw emergency readmissions, an issue that has worsened since Covid-19, as one such use case.

Emergency readmissions happen when a patient enters a hospital to receive an operation and then returns for urgent treatment within 30 days of being discharged as a result of that first admission.

Besides needlessly drawing from already limited NHS resources, readmissions have broader social consequences, such as the safety of at-risk patients who are without support at home following major surgery.

Being able to accurately predict emergency readmissions has the potential to save lives and expand the capacity of healthcare services across the NHS.

Results

Reliably predicted 70-80% of emergency readmissions
by building a machine learning model with supervised learning

Predicting emergency readmissions

The Surrey healthcare system sees about 10,000 emergency readmissions each year. Of these, 15% are generally accepted to be non-preventable cases.

Working to address the 85% of preventable readmissions, David applied his learnings on the Level 7 programme to build a machine learning model that reliably predicts and flags 70-80% of readmissions. The team are now working on honing the model and experimenting with other models to improve prediction accuracy.

Looking ahead to implementation

David says there's still governance work needed before the model could be implemented in hospitals. But he hopes it will one day be deployed to augment clinicians at the point of discharge, flagging at-risk patients and informing interventions to prevent readmission.

> The programme's been brilliant. It's been really good. It's really well rounded. There are a lot of support mechanisms in place. And I've definitely got a lot out of it."

David Howell
Joint Director for Strategic Insight and Analytics