

NEWS

New AI tool offers insights to improve safety for mothers and babies in maternity care

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Artificial intelligence Health and medicine

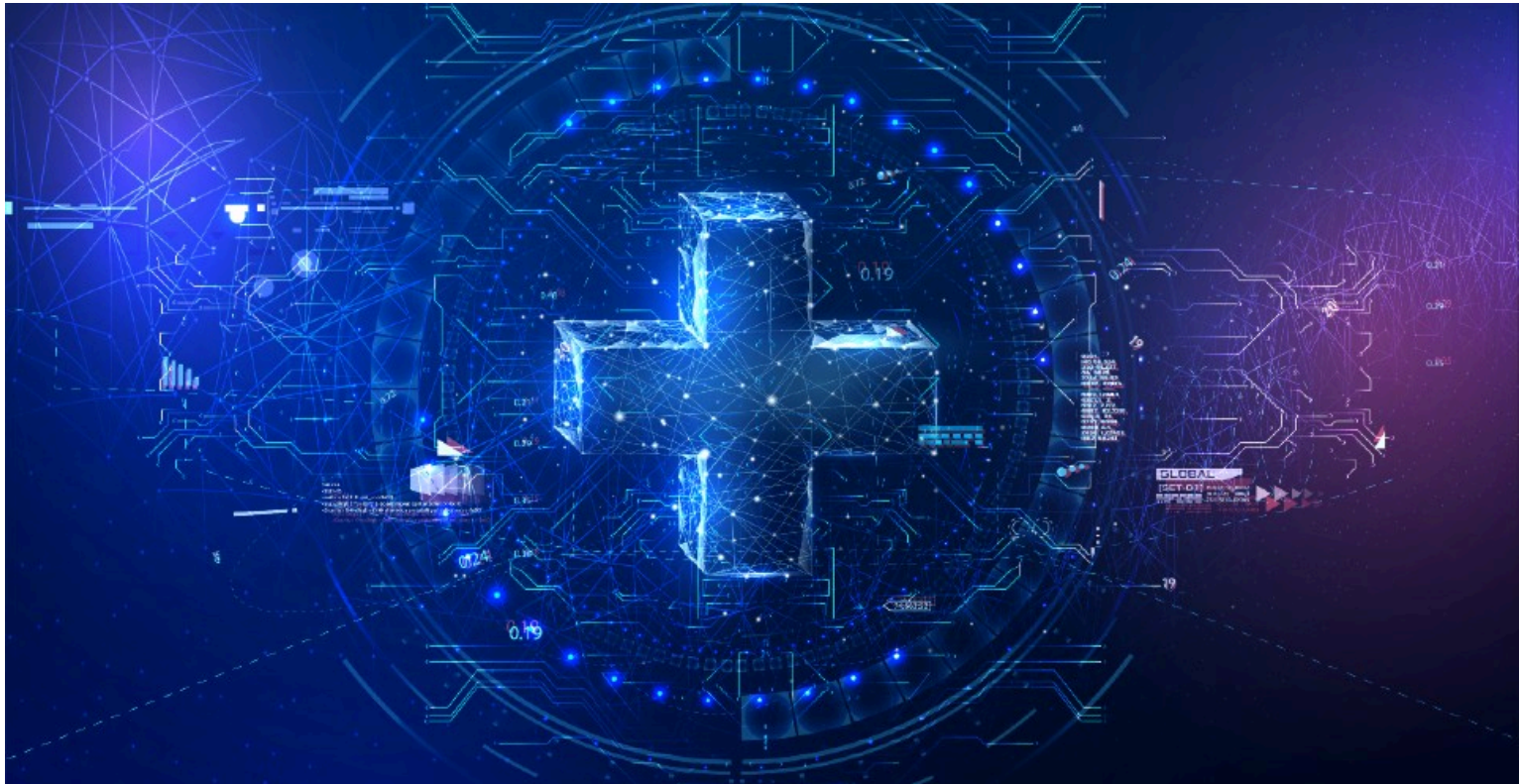


Image: Getty.

Loughborough University researchers have developed an artificial intelligence (AI) tool that identifies the key human factors influencing maternity care outcomes, supporting ongoing efforts to improve safety for mothers and babies.

Developed by AI and data scientist [Professor Georgina Cosma](#) and human factors and complex systems expert [Professor Patrick Waterson](#), the tool analyses maternity incident reports to highlight key human factors – such as communication, teamwork, and decision-making – that may have impacted care outcomes, providing insights into areas that could benefit from additional support.

When an adverse maternity incident occurs in England, detailed investigation reports are produced to identify opportunities for learning and enhancing safety.

These reports provide valuable insights into clinical aspects that impacted care, such as health conditions, procedures, and tests. However, identifying the human factors involved is often more challenging, as they tend to be complex and nuanced.

Currently, experts must carry out manual reviews to extract human factor insights from incident reports. This process is resource-intensive, time-consuming, and relies on individual interpretation and expertise, which can lead to varying conclusions.

The AI tool addresses these challenges by identifying and categorising human factors in reports quickly and consistently. Its standardised approach allows it to analyse multiple reports and identify recurring factors, helping pinpoint areas that would benefit most from additional support.

The AI model was trained and tested on data from 188 real maternity incident reports. It successfully identified human factors in each report and analysed them collectively, providing insights into where extra support could improve outcomes.

"AI has transformed our analysis of maternity safety reports. We've uncovered crucial insights far quicker than manual methods," said Professor Cosma.

"This has enabled us to gather a comprehensive understanding of where there are areas for improvement in maternity care, and these insights can help identify ways to enhance patient safety and improve outcomes for mothers and babies."

Insights from the reports

Teamwork and communication emerged as the most frequently identified human factors across all the analysed reports, underscoring the importance of effective collaboration and clear information exchange among healthcare professionals and patients in promoting safety and quality in maternity care.

The analysis also emphasised the importance of thorough patient evaluations – including assessments, investigations, and screenings – as well as the impact of individual patient characteristics, such as birth history and conditions like pre-eclampsia, on care outcomes.

The AI tool identified challenges related to medical technology use and staff performance, indicating that ongoing training and support could improve care outcomes. It also provided insights into how COVID-19 affected maternity services, underscoring the need for adaptability in practices.

The analysis also indicated that certain human factors might have a greater impact on mothers from ethnic minority groups. However, due to the limited number of reports that included ethnicity data, further research is required to reach definitive conclusions.

Next steps

The Loughborough researchers hope to secure funding to refine the AI model using a larger, more diverse dataset as expanded testing is essential to validate the tool's effectiveness and further understand the challenges faced by mothers from ethnic minority groups in maternity care.

"We are seeking to collaborate with hospitals, healthcare organisations, and investigation bodies to further refine and apply our AI tool to reports. These partnerships will help us extract vital intelligence to prevent adverse incidents and ensure the safety of all mothers and babies," said Professor Cosma.

"We also hope to adapt the tool for use with other types of reports, such as adverse police incident reports, where understanding the human factors involved can help prevent future incidents and improve response strategies."

The importance of the research for improving maternity care

Professor Waterson said: "Our work opens up new possibilities for understanding the complex interplay between social, technical, and organisational factors influencing maternal safety and population health outcomes.

"The need for such research was highlighted in the Ockenden Review, which examined maternity care and set to improve safety and care quality in maternity services.

"By taking a more comprehensive view of maternal healthcare delivery, we can develop targeted interventions to improve maternal outcomes for all mothers and babies."

The [Health Services Safety Investigations Body \(HSSIB\)](#) investigates patient safety concerns across England to improve NHS and independent healthcare at a national level.

When asked about the research, Dr Jonathan Back, a safety insights analyst at HSSIB, said it "could help analysts working in health and care to identify where there are inequalities, maximising learning by bringing together findings from multiple investigations".

Information on the AI tool and findings from the analysis of the 188 reports has been published in a new paper in the International Journal of Population Data Science. [The full paper is available on the journal's website.](#)

The AI tool was developed as part of a project called 'I-SIRch', which was jointly funded by the Health Foundation and the NHS AI Lab at the NHS Transformation Directorate and supported by the National Institute for Health and Care Research.



Professor Georgina Cosma and Professor Patrick Waterson.

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