

From Data-Rich to Insight-Driven Care: Embedding AI-Enabled Physiological Risk Analytics into Paediatric Intensive Care

Hesham Mohamed, Olufemi Olajide, Darren Gates
Alder Hey Children's NHS Foundation Trust

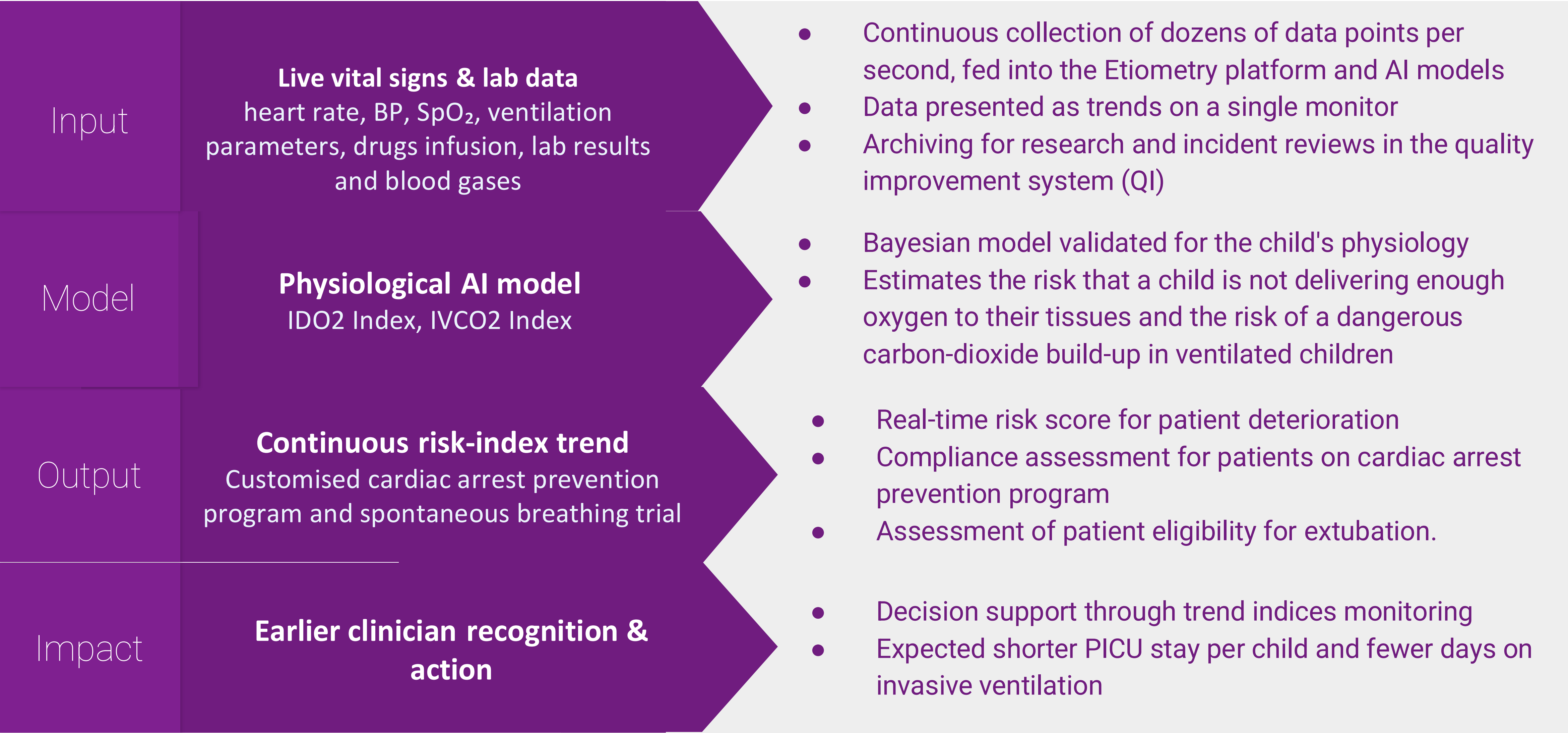


The clinical problem and who it affects:

- The paediatric intensive care unit (PICU) cares for the sickest children in the hospital
- These children can deteriorate quickly and silently. Early tissue oxygen starvation or a dangerous build-up of carbon dioxide can precede a cardiac arrest or lasting organ injury
- Bedside teams already watch a wall of fragmented monitors, but raw numbers are noisy and the warning window is short
- Every avoidable complication also means lifelong comorbidity for the child and longer stays in one of the NHS's scarcest, most expensive bed types

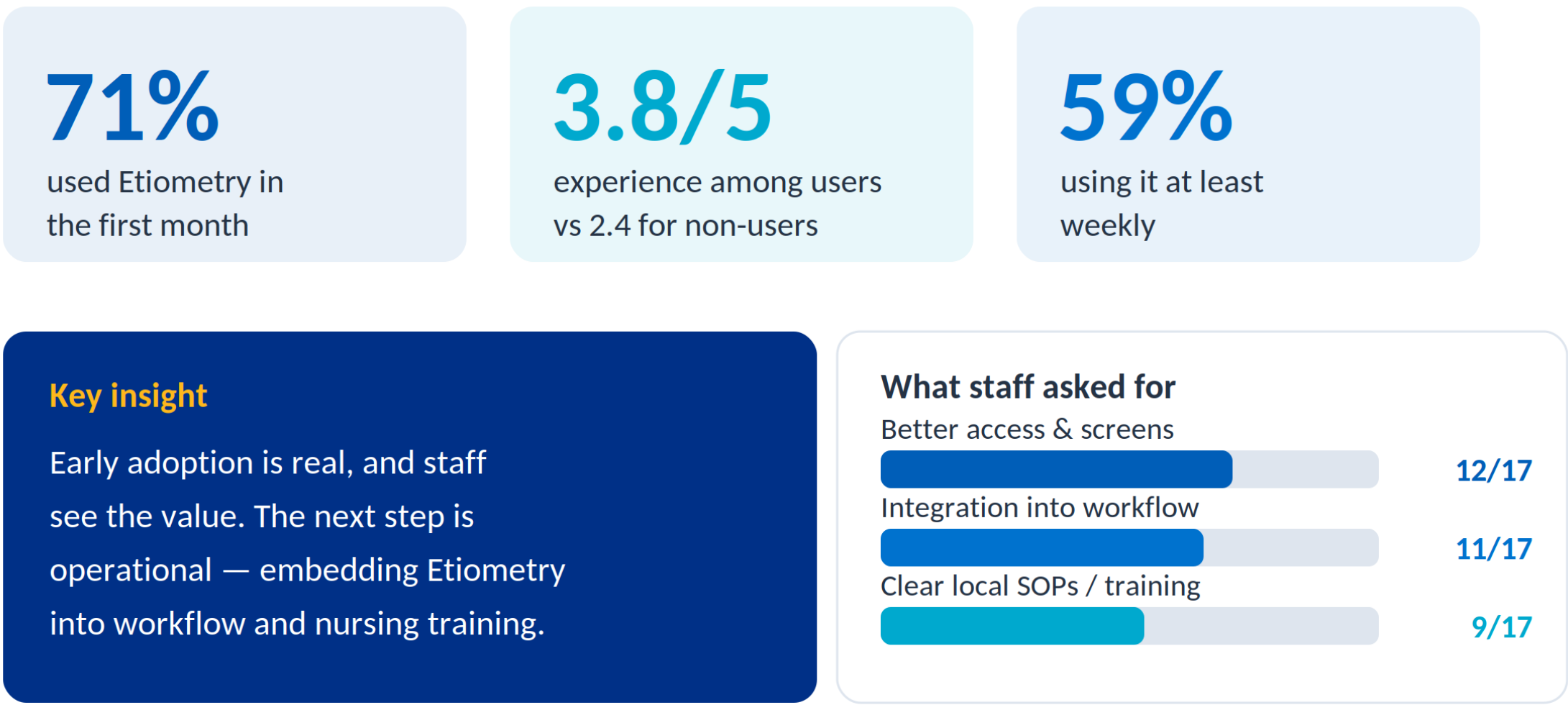


The AI solution (Etiometry®): turning data into meaningful insights



Early evaluation through an initial engagement staff survey

Changing the way data is visualised and used in the critical care environment



Inadequate delivery of oxygen (IDO2) index



Inadequate ventilation of carbon dioxide (IVCO2) index

Projected impact



Next steps for the project:

- **Embed in practice:** complete nursing and wider-staff training, improve bedside access (permanent displays, BadgerNet integration), and establish routine review of the IDO2 and IVCO2 indices in huddles, ward rounds and handovers
- **Evaluate impact:** prospectively assess effect on patient outcomes (length of stay, ventilation days, deterioration/cardiac arrest) and health-economic value
- **Leverage the QI platform:** for critical-incident review, teaching, and to enable big-data analytics and research
- **Scale the platform:** horizontally into the HDU beds, and vertically by adding further AI models and analytics
- **Govern responsibly:** monitor model and system behaviour for drift, with ongoing safety and equity oversight
- **Sustain and share:** build the business case beyond the fellowship and publish and disseminate the work

Etiometry ® is CE-marked and FDA-cleared medical device with local DCB0129/0160 clinical safety case in progress, DPIA was completed and IG signed-off with agreement that no patient data leaves the trust servers. The project was supported by project supervisory team, Alder hey innovation, information technology team and clinical team in PICU.