

DEKODE: A Scalable Surveillance and Quality Improvement Model Transforming DKA Care Across the NHS

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Background: Diabetic ketoacidosis (DKA) is a life-threatening metabolic emergency and a leading cause of unplanned hospitalisation in people with diabetes. In the UK, over 32,000 DKA admissions occur annually, costing the NHS over £90 million. Despite national guidelines from the Joint British Diabetes Societies-Inpatient Care (JBDS-IP), significant variation in DKA care and outcomes persists across NHS hospitals. National audits, such as the National Diabetes Inpatient Safety Audit (NDISA), report adverse outcomes but do not capture the process-level deviations driving this variation. There is a need for a scalable, cost-efficient model to identify care gaps, promote local data ownership, and support continuous quality improvement.

Objectives: To implement and evaluate DEKODE (Digital Evaluation of Ketosis and Other Diabetes-related Emergencies), a federated, cloud-based surveillance and quality improvement model designed to: Enable standardised, multi-centre data collection and real-time monitoring of adherence to JBDS-IP guidelines; Provide structured, quarterly feedback to support targeted local interventions; Identify unrecognised systemic and post-resolution care gaps.

Methods: DEKODE was launched in January 2020 at University Hospitals Birmingham and has expanded to 43 NHS hospitals. Participating hospitals obtained local clinical governance approval and collected pseudonymised DKA data using JBDS-IP definitions. Data were entered into a secure, central cloud platform, capturing metrics such as DKA duration, hospital length of stay, time to specialist review, adherence to insulin and fluid therapy protocols, monitoring frequency, and complication rates. Data collection was conducted by healthcare professionals—resident doctors, nurses, and medical students—under supervision, embedding quality improvement into clinical education. Quarterly feedback benchmarked hospital performance against national medians and anonymised peers (identified by alphabet codes), guiding local interventions.

Results: By Q4 2024, over 7,500 DKA episodes had been captured across 43 hospitals. Marked inter-site variation was observed in fluid resuscitation, insulin infusion adjustments, and biochemical monitoring. In early adopter hospitals, fluid prescription adherence improved from 60% to 85%, and hourly glucose monitoring from 34% to 60%. Hypoglycaemia rates in Hospital F declined from 30% to 11%. Systemic post-resolution gaps—such as inconsistent specialist review and unclear discharge criteria—were linked to prolonged hospitalisation. Feedback led to the adoption of standardised discharge protocols and improved cross-team coordination.

Conclusion: DEKODE demonstrates the feasibility and impact of a scalable, trainee-led surveillance and quality improvement model embedded in routine NHS practice. It exposes care gaps not captured in national audits and supports targeted interventions. DEKODE has now expanded to other diabetic emergencies, including hyperosmolar hyperglycaemic state and severe hypoglycaemia and we are working on integration of electronic health records and machine learning.

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Background

- DKA: life-threatening diabetic emergency
- >32,000 UK admissions/year → ~£90M NHS cost
- Large variation in care persists despite JBDS-IP guidelines
- National audits capture outcomes but miss process-level gaps
- Need: scalable, cost-efficient model for real-time detection of care gaps and continuous improvement

Aim

To implement and evaluate DEKODE — a federated, cloud-based surveillance & QI model enabling:
• Standardised, multi-centre data collection
• Real-time monitoring of JBDS-IP adherence
• Structured feedback to drive local interventions
• Identification of systemic and post-resolution care gaps

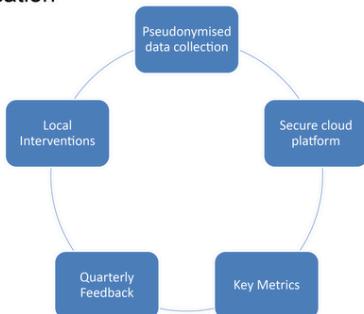
Methods

Workflow:

1. Local approval: Governance clearance at each site
2. Pseudonymised data: Collected using JBDS-IP definitions
3. Secure cloud platform: Centralised storage & analysis
4. Key metrics: DKA duration, LOS, time to specialist review, insulin & fluid protocol adherence, monitoring frequency, complication rates
5. Quarterly feedback: Benchmarked vs national medians & anonymised peers (A-Z codes)
6. Local action: Data-informed interventions

Special features:

- Data collection by doctors, nurses, medical students
- Trainee-led QI embedded in clinical education

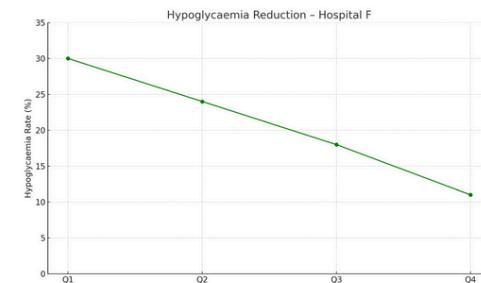
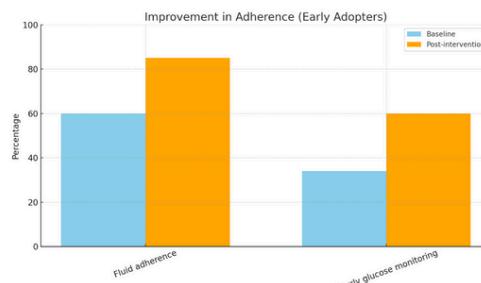


Results

By Q4 2024:

- 7,500+ DKA episodes, 43 NHS hospitals
- Improvements in early adopters:
 - Fluid prescription adherence: 60% → 85%
 - Hourly glucose monitoring: 34% → 60%
 - Hypoglycaemia rate (Hospital F): 30% → 11%
- Identified care gaps:
 - Inconsistent post-resolution specialist review
 - Unclear discharge criteria → prolonged LOS
- Impact:
 - Standardised discharge protocols adopted
 - Improved cross-team coordination

Metric	Baseline	Post-intervention
Fluid prescription adherence	60%	85%
Hourly glucose monitoring	34%	60%
Hypoglycaemia rate (Hospital F)	30%	11%



Reference

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Inequities & Patient Safety Impact

- Detects variation invisible to national audits
- Supports resource-limited hospitals in identifying gaps
- Improves safety via earlier recognition & monitoring compliance

Innovation

- Federated, cloud-based NHS-wide QI model
- Trainee-led, education-embedded
- Automated quarterly benchmarking
- Scalable beyond DKA → HHS & severe hypoglycaemia
- Future plans: EHR integration + machine learning

Conclusion

- Feasible, scalable surveillance & QI model embedded in NHS practice
- Exposes hidden care gaps and drives targeted improvement
- Potential blueprint for other acute medical emergencies

New automated Feedback Dashboard for DEKODE Model

