QiC Diabetes
Quality in Care Programme 2019

SANOFI

T1A/02

Entry

Please tick relevant box that applies to your entry

Category	Children, young people and emerging adults (up to 25 years old)	Adults
Type 1 Specialist Service		
Prevention and Early Diagnosis: all other forms of Diabetes		
Patient Care Pathway, Secondary or Community		**X**
Diabetes Education Programmes: Healthcare Professionals (HCPs)		
Diabetes Education Programmes: People with Diabetes		
Mind and Body Healthy Together – Emotional Support Programmes for People with Diabetes		

Title of entry:
(10 words MAXIMUM)
Implementation of a national guideline with local changes: does an abbreviated Adult Diabetic Ketoacidosis (DKA) protocol improve local uptake and overall clinical care?

Submission statement (2500 maximum word count starts from here)

❖ Main outcomes

Summary (5 points)
Provide background & brief overview of the initiative

Despite advances in diabetes care, management of Diabetic Ketoacidosis (DKA) remains a significant clinical problem in hospitals. Morbidity, mortality and length of hospital stay is affected unless this life-threatening condition is diagnosed & treated quickly.
Joint British Diabetes Society (JBDS) guidelines on DKA was perceived to be too lengthy and complicated by junior doctors & nursing staff in our Trust resulting in poor adherence. In August 2015, we abbreviated this document from 10 to 2 pages. Audit in 2015-16 showed significant improvements in adherence, management outcomes, user

satisfaction & Length of Stay. This revised protocol became standard in our Trust since 2016.
Re-audit in 2018 to assess continuing quality improvement suggests that this protocol is effective and widely utilised. DKA is being diagnosed earlier (by 12 minutes) and normal saline used earlier (by 14 minutes). There is still a delay in starting insulin by 13 minutes which is being addressed.
Compared to national figures, we are doing very well on a number of fronts including achieving greater percentage of correct diagnosis (94% vs 71%), use of insulin (100% vs 91%) and normal saline (100% vs 96%), biochemical monitoring (100% vs 96%), continuing use of LA insulin (62% vs 58%), 10% Dextrose use (98% vs 82%) and referral to expert diabetes team (71% vs 14%). Admission to diagnosis time, use of insulin and normal saline was 65, 85 and 61 minutes respectively (compared to 77, 72 and 75 minutes respectively in 2015). Time to resolution and discharge was 21 hours and 5.6 days respectively (compared to 16 hours and 3.3 days respectively in 2015).
Our simple & inexpensive idea of redesigning a complicated and lengthy national DKA protocol into a user-friendly one was innovative. It created an almost instant solution to a long-standing problem. It has since been endorsed by 4 national societies, downloaded over 1000-times and is being used by many other Trusts in the country now.

Innovation (20 points)

It is essential that applicants explain how their initiative is different and innovative compared with others e.g. novel approaches, creative solutions to longstanding problems, bridging gaps in care etc.

The novel, yet simple, inexpensive idea of redesigning a complicated and lengthy national DKA protocol (which junior doctors were not utilizing resulting in unsafe DKA management) into a user-friendly one was innovative in that it created an almost instant solution to a previous long-standing problem.
The brevity of the 2-page document incorporating the well-known JBDS protocol was the key to this innovative approach working at a practical level such that it would be universally acceptable & utilized by junior doctors.

Other reasons why our new condensed DKA pathway design is innovative is because of the following reasons:

1) Improved **patient safety** from reduced DKA management errors in the hospital – reduced chances of a "never event" happening.

2) Significantly **easy to follow DKA management structure** – junior doctors and nursing staff very happy with the new protocol.

3) Improvement in **junior doctor education/upskilling, reflective learning and confidence** in managing DKA.

4) **Effective DKA management** in hospital - will in turn reduce morbidity, mortality and length of hospital stay.

5) **Early THINK GLUCOSE specialist referrals** leading to reduced length of stay – improved hospital capacity, better throughput and **cost savings**.

6) Much better **patient experience**.

7) **National adoption and recognition** with numerous downloads and uptake in many NHS Trusts.

The overall safety in correct clinical management of DKA in the trust has improved significantly since the new DKA protocol was introduced including reduction in length of stay and much improved user uptake and satisfaction. We have been able to identify human errors and rectify gaps in DKA management through the design of this new abbreviated DKA protocol – this has led to a positive experience for junior doctors who are now confident to use this protocol consistently.

Our revised DKA protocol (still largely based on the original national JBDS guidance) is currently being considered for more widespread national usage and implementation given the excellent transformation and results locally in our Trust.

Planning, methods and results

Project planning (5 points)

Describe the identified need for the initiative. Organisation, stakeholders, planned timeframes and milestones. Evidence of clear, specific goals and outcome measures including reasoning behind these. How did you involve service users?

Diabetic ketoacidosis (DKA) is the commonest acute metabolic emergency and accounts for 46% of hospital admissions in people with type 1 diabetes in UK. Incorrectly managed DKA can potentially lead to fatal complications and emerging data indicate that this is mostly linked to the quality of hospital care.

The key idea was to make it into an easy and concise document for junior doctors to consistently follow and thus, improve overall clinical care and safety for those admitted with DKA in Sandwell and West Birmingham Trust (SWBHT). This new guideline was split into 4 sections starting from the initial admission 0-60 min, 60min-6 hours, 6-12 hours

and beyond 12 hours with detailed step wise action plans in each of the sections (see power point attachment 1).

Objectives in the 2 phases of the project were:

In 2015-2016:
1) To evaluate the management of DKA before and after introduction of the new abbreviated DKA protocol in our Trust (new protocol introduced Aug 2015).
2) To identify clinical errors and improve safety and standards of DKA management.

In 2018-2019:
1) **To assess continuing quality improvement in DKA management (following embedding of this revised and condensed protocol).**
2) **To compare our hospital results in 2018 with national audit (2014) and 2015-16 results.**

Methods (10 points)

Putting plans into action. What did you do? Describe how the initiative was implemented, and outline the procedures and tools you used to measure outcomes

SWB NHS Trust is a large NHS teaching hospital with a bed base of 850 patients and has 38,000 admissions each year. 1 in 3 admitted patients have diabetes and nearly 20 - 30% of these are insulin treated.

Current national Joint British Diabetes Society (JBDS) DKA guidance is a long 10-page document which is seldom followed in real life by junior doctors for a variety of reasons including lack of time and the sheer length of the document. In Aug 2015, following lengthy consultation with key stakeholders (in-patient nurses, matrons, junior doctors, clinical effectiveness, risk, IT) and an initial pilot, we decided to abbreviate this document into 2 pages (essentially following the same principles of the national JBDS guidance).

We undertook a retrospective review of DKA admissions (May 2015 – Aug 2016) in our Trust using the new abbreviated DKA guideline (introduced Aug 2015). Data was collected using an audit tool modelled on JBDS DKA guidance covering all aspects including DKA diagnostic criteria, investigations, management, resolution, timeline and discharge planning during DKA admission. Overall journey of patient (from Accident & Emergency to discharge) was mapped before and after the implementation of new DKA protocol.

In 2015-16 an audit evaluating DKA management before and after this shortened protocol was initiated and this showed significant improvement in adherence and management.

This revised and condensed protocol is now well embedded in our hospital system since 2016. We carried out another evaluation of this protocol usage to assess continuing quality improvement and assess any areas of deficit. Consecutive DKA-associated admissions in calendar year 2018 were reviewed including usage of diagnostic criteria, time to diagnosis, insulin/fluid management, monitoring, length of stay, resolution of DKA & appropriate specialist referral. Comparison was made with national audit (2014) and from 2015 post introduction of the new protocol.

All the biochemical tests were carried out using standard operating procedures in the biochemical laboratory at SWBHT. This project was logged with trust clinical effectiveness department and coded data on DKA admissions was provided to us by the trust IT department. Data were recorded on Microsoft excel spreadsheet and analysis of data was carried out by using Minitab statistics software.

Safety considerations (5 points)

Risk assessment, clinical governance, ethics and any other safety considerations and how these were successfully addressed

The main risk from continuation of the 10-page JBDS original protocol was the inability to consistently follow the protocol during a busy take when junior doctors are already overwhelmed. This resulted in numerous errors in management and was a serious clinical risk and governance issue. Interviewing doctors at the front end we felt the need to come up with something similar to the national document but simple and concise so that it would be easier to follow and adhere to in a busy medical take. The ultimate focus was on safe, correct and timely management of all DKA patients.

A small multi-disciplinary group was formed comprising junior doctors, nursing staff,

diabetologists and pharmacist to thrash out the forward plan and this resulted in the formation of the 2-page condensed DKA pathway which was initially piloted very successfully resulting ultimately in full scale Trust wide launch. We are continuing to audit locally as well as educate junior doctors and new staff on this new protocol through induction sessions, ward teaching and mandatory training.

Effectiveness (15 points)

Demonstrate project effectiveness to illustrate efficiency improvement(s), how the initiative brought about change to support improved outcomes and what was the impact for people with diabetes?

Results (period 2015-2016): see power point 2

Out of 55 DKA admissions, 33 (60%) were reviewed and the remaining excluded due to unavailability of case notes and incorrect diagnosis (14 cases May – July 2015 and 19 cases Aug 2015-Aug 2016). Results were compared before and after introduction of the new chart in Aug 2015.

1) Before Aug 2015, 4 out of 14 patients (28%) with DKA admission had no basal insulin given along with DKA protocol and 25% did not have 10% Dextrose infusion started when blood glucose fell below 10 mmol (hypoglycaemia). Close to 50% doctors did not complete the old 10-page protocol completely.

2) After Aug 2015, there was a 23% improvement in basal insulin continuation rate and 29% improvements in switching to 10% Dextrose infusion when blood glucose dropped below 10 mmol – these improvements have resulted in earlier resolution of DKA and significantly reduced hypoglycaemia incidence when managing an acute event like DKA.

3) As a result of improved uptake of this new protocol along and with widespread communication and both medical/nursing staff education and upskilling, there was a significant increase in quicker & earlier referral to our in-house Think Glucose diabetes specialist team and therefore, better overall clinical care and safe management of DKA.

4) Mean admission to diagnosis time of DKA fell by 58min (135 to 77 min), admission to initiation of fixed rate intravenous insulin infusion time fell by 105 min (177 to 71 min), admission to initiation of IV normal saline time fell by 18 min (93 to 75 min) and time to resolution of DKA improved by 1hr 10min (16.9 to 15.8 hours).

5) DKA patients spent significantly less time in hospital as length of stay (LoS) improved by mean 4.3 days, suggestive of not only better but more effective clinical management - resulting in less risk of hospital acquired infections for inpatients, improved patient experience throughout admission and overall cost savings for the Trust.

6) User experience: Junior doctor survey: 20/26 (77%) felt the new protocol was helpful, 16/25(64%) found it easier to use and 17/25 (68%) found that it made DKA management much easier.

Results (period 2018-2019): see power point 3

A total of 49/72 patients coded as DKA were included (rest excluded due to wrong diagnosis or incomplete data) – 32(65%) were males with a mean age of 40 years. 26/49 (53%) – White European, 9/49 (18%) South Asian and 10/49 (20%) were Afro-Caribbean.

According to JBDS guidelines, 94% had the correct diagnosis of DKA made (nationally 71%), 100% were given fixed rate insulin infusion (FRII) and normal saline (nationally 91% and 96% respectively). Appropriate blood tests were done in 100% (nationally 69%).

20/49 (41%) needed ITU review and 5/49 (10%) needed ITU stay. 47/49 (96%) were appropriately treated in a monitored unit. Chest X-ray was needed in 36/49 (73%), ECG in 41/49 (84%) and urinalyses in 37/49 (76%) patients.

As per protocol, basal insulin was continued in 13/21(62%) patients (nationally 58%), 10% dextrose was started when BM <14 mmol in 48/49 (98%) patients (nationally 82%), DKA resolution confirmed correctly in 47/49 (96%) and 35/49 (71%) patients were referred to diabetes for review (nationally only 14%).

Admission to diagnosis time, use of insulin and normal saline was 65, 85 and 61 minutes respectively (compared to 77, 72 and 75 minutes respectively in 2015). Time to resolution and discharge was 21 hours and 5.6 days respectively (compared to 16 hours and 3.3 days respectively in 2015) – see power point 4

We seem to doing well on a number of fronts as shown from our comparative DKA audit figures. However, we need to ensure LA insulin is not discontinued and our figures of 62%, although still much better than nationally, needs to be improved further. We also need to strengthen our mechanisms of ensuring earlier insulin usage in the treatment protocol as this is still somewhat slower compared to 2015-16 data (by 13 minutes), although we have no national audit data to compare.

Timeliness (5 points)

Did you achieve your goals in desired/required time frame?

The condensed protocol took about 4 months to complete following multiple discussions and joint working with the Diabetes & Acute Medicine team of nurses, specialists, junior doctors & pharmacists. It took another 2 months to survey, pilot, advertise and implement the proper pathway in A&E, Acute Medical Unit followed by the rest of the hospital. The new and condensed DKA protocol was completed in August 2015 and in about a year (August 2016) was well established and embedded within the hospital management pathway.

User feedback (15 points)

Evidence of support from a range of interested stakeholders, eg healthcare professionals and/or service users. Please include statements. Describe how feedback was collected and bias was minimised. Provide examples of service user feedback and explain how this is used.

Since the service users were mostly front-end junior doctors, we surveyed them before and after introduction of the new chart.

Initial Junior doctor DKA survey (n= 34): March 2016
(before introduction of new DKA protocol)

50% junior doctors unaware of Trust DKA protocol
15% cannot confidently & correctly diagnose DKA
24% do not which fluid and how much to give during initial treatment
25% do not know when to change to 10% DEXTROSE during DKA treatment
20% unaware of POTASSIUM replacement policy or rate of correction
15% unaware of need to continue LA basal insulin
20% unaware of DKA resolution and when to stop FRIII
30% cannot manage DKA during weekend
55% junior doctors feel they need more training/education to manage DKA

Junior doctor new DKA protocol survey (n=31) May 2016:

20/26 (77%) who had seen chart felt it was helpful
16/25 (64%) found it easier to use
17/25 (68%) found it made DKA management easier
17/31 (55%) wanted more teaching, 4/31 said maybe

Comments:
"New protocol makes it easier to manage DKA, more concise"
"Much easier than old one"
"The page for monitoring is good, better than the old one"
"Good as it takes you through step by step and gives good advice with potassium and fluids"

Comments from this survey has been taken on board and changes made accordingly.

A new binary Yes/No DKA management survey was conducted in April 2019 (31 responders):

1) **Are you aware of Trust DKA protocol? Yes 94%**
2) **Can you confidently diagnose DKA? Yes 97%**
3) **Do you know what fluid and how much to give on initial assessment? Yes 74%**
4) **Do you know when to change to 10% DEXTROSE during DKA treatment? Yes 81%**
5) **Are you aware of POTASSIUM replacement policy? Yes 97%**
6) **Are you aware of need to continue Long Acting basal insulin? Yes 97%**
7) **Are you aware of DKA resolution criteria and when to stop Fixed Rate Insulin Infusion (FRII)? Yes 65%**
8) **Can you confidently manage DKA during weekend? Yes 65%**
9) **Do you feel you need more training/education to manage DKA? Yes 55%**

10) Do you find the 2 page DKA chart easy and helpful to use? Yes 90%
11) Do you think the 2 page DKA chart has made DKA management easier? Yes 94%

This feedback points to the fact that general awareness and management of DKA has improved significantly over the years following the use of the new abbreviated DKA protocol. However, we also need to focus more on areas like fluid/insulin management and improving confidence to treat DKA over the weekend. Since most of these are education issues, we plan to include this in our induction sessions moving forward.

Cost efficiency and economic viability (10 points)

Evidence of, and maximising quality health outcomes and minimising NHS costs, getting better value from the NHS budget

Due to the relative simple intervention and a dedicated team, the cost and input required was minimal, with significant outcomes achieved in a relatively short span of time. All the key interventions including care processes and new implementations in place are essentially cost neutral and should be sustainable. They are aimed at smarter working designed to improve knowledge & skill base of junior doctors through innovative use of a simple abbreviated DKA protocol. Once the safety system of this usable, DKA chart is in place and up & running, return on investment for NHS Trusts should be significant - through avoidable harm prevention, early and safe discharge, reduction in length of stay and better overall management of the commonest diabetic emergency.

Sustainability and evidence for sharing practice and dissemination (10)

1) *Detail of potential or secured commitment to the initiative including length of plan, resources, stakeholders, funding sources.*
(2) For demonstrable sustainability describe integration, compatibility, barriers encountered, evaluation and milestones.
(3)For achieved spread of initiative to wider geographical areas or other healthcare setting include details of strategy, communication of outcomes, key messages, objectives and evaluation undertaken
(Word count ends)

Through multidisciplinary consultation in our Trust, we developed a condensed DKA guidance in 2016 following non-compliance with the lengthy national guidance. Since then and the initial pilot, this abbreviated guideline has become standard practice in our hospital. We have also communicated this service innovation nationwide which has been endorsed by 4 national societies – DUK, JBDS, ABCD, DIPN. It has been downloaded >

1000 times till date and many other Trusts in the country having been using it with individual requests to do so. Simple targeted strategies have been used in our in-patient safety programmes, which should be easily sustainable as the processes and protocols are not complex and are easy to set-up and follow. Our DKA protocol is based on JBDS guidance and can be replicated in other NHS Trusts to deliver safe and error-free diabetes care.

Permission for materials to be used in activities to promote QiC Diabetes

☐ Please tick this box if you **do not** wish your information and materials to be used to promote the awards

Section 12: Return of supplementary materials

☐ **Please tick** this box if you wish your supplementary materials to be returned to you.