



Joint British Diabetes Societies for In-Patient Care (JBDS-IP)

**The Rowan Hillson Inpatient Safety Award 2018
Best Inpatient Diabetes Educational Programme for Health Care Professionals**

How to enter:

1. Email your completed entry to: Christine Jones, JBDS Administrator at christine.jones@nnuh.nhs.uk

All entries must be emailed by: 28.02.2019

2. Please submit any supplementary materials to support your initiative, as these will be considered as part of the judging process.
3. **Please note this competition is only for projects undertaken in the last 3 years i.e. since 1.1.2016.**

Your contact details:

Name: Dr. Michael Lloyd

email: Michael.lloyd@sthk.nhs.uk

Post: Clinical Education Lead Pharmacist

Trust name and address where work was undertaken: St Helens and Knowsley Teaching Hospitals NHS Trust

Additional contributors: Dr. Niall Furlong, Ms. Abigail Wilkinson, Mr. Mark Rowson, Mrs. Jan Cardwell, Mrs. Sue Michaels, Mr Nicholas Bennett

Title of entry (10 words maximum)

- Improving insulin prescribing and knowledge of the management of diabetes emergencies.

Brief summary of entry

Provide a short summary of your initiative in **no more than 200 words (The box will expand)**

Insulin prescribing errors are prevalent in hospital settings whilst the incidence of inpatient hypoglycaemia and diabetic ketoacidosis (DKA) also remains high, with low confidence and competence in managing these conditions reported by healthcare staff.

A multi-professional group of healthcare professionals, in collaboration with NaDIA, reviewed current practices in an acute teaching hospital to address insulin prescribing error rates, and the knowledge and confidence of healthcare staff in managing hypoglycaemia and DKA. With the input of key service users, interventions were designed and implemented including:

- Individualised and shared insulin prescribing error feedback delivered monthly;
- Safe Insulin TipS (SIPS), delivered weekly to nursing and medical staff and;
- A multi-professional simulation based training (SBT) programme for the management of hypoglycaemia and DKA.

The interventions were evaluated with the impact of feedback on insulin prescribing explored using mixed methodologies. Pre and post-intervention multiple choice questions were used to explore the impact of SBT on knowledge of participants in recognising and managing hypoglycaemia and DKA. Questionnaires were used with five-point likert scales used to evaluate the views of staff of the SIPS and SBT, and perceived impact of SBT on their confidence in managing hypoglycaemia and DKA.

Background/Situation analysis/Innovation (300 words maximum)

Briefly provide the background and rationale for the initiative. From this the judges should be able to understand why there was a need for the initiative to be undertaken. Explain what makes your initiative innovative or pioneering.

Insulin is a common and high risk medication with insulin prescribing and administration errors prevalent in hospital settings.

Insufficient training in insulin is often cited as a contributing factor with many healthcare professionals unfamiliar with the range of insulin formulations, devices, regimens, dosage adjustments or timings of insulin administration.

Errors in insulin use can lead to episodes of diabetic ketoacidosis (DKA) and severe hypoglycaemia. DKA and hypoglycaemia are diabetic emergencies requiring prompt recognition and appropriate management. However, despite this, healthcare staff have reported low confidence and knowledge in managing these diabetic emergencies.

As an organization, benchmarking data from NaDIA and local audits outlined the need for improvement in insulin prescribing and management of DKA and hypoglycaemia, with further interventions needed to improve outcomes.

A multi-professional group of educationalists, diabetologists, diabetes specialist nurses and pharmacists collaborated with NaDIA throughout 2018 to target these outcomes.

For behavioural change, it is proposed that individuals must have the physical and psychological capability, social and physical opportunity, and automatic or reflective motivation to complete the behaviour.

Regular feedback, academic detailing and simulation based training (SBT) have been shown to have significant impacts on knowledge and behaviour elsewhere.

Considering this, potential interventions were proposed based on key literature including;

- Frequent pharmacist-led insulin prescribing feedback
- Twelve safe insulin tips (SIPS) delivered weekly to nurses and doctors
- Multi-professional simulation based training

These interventions were proposed to encourage a community of practice for learning with SBT allowing deliberate practice in a safe environment. The SIPS were designed to allow bite-sized education in a busy working environment, with feedback raising awareness of prescribing performance and encouraging reflective practice for improvement.

Focus groups were set up with key stakeholders (Foundation and core medical grade trainee doctors, nurses and patients) to discuss, develop and refine these interventions.

Objectives (200 words maximum)

State clearly the objectives of the initiative(s).

- The objectives of these interventions were:
- To explore the impact of simulation based training on staff knowledge and confidence to manage hypoglycaemia and diabetic ketoacidosis.
- To explore the impact of pharmacist-led feedback on insulin prescribing behaviour.
- To determine the impact of feedback on insulin prescribing error rates.

Project plan/methods (400 words maximum)

Please outline the method(s) you used to achieve your objectives. The judges will also be looking for a clear rationale for your method(s).

Twelve SIPS were developed covering specific topics such as management of hypoglycemia, insulin prescribing, dose adjustment and common errors. These were e-mailed out weekly to nursing and medical staff on seven hospital wards to read with additional verbal facilitation of each tip weekly by ward pharmacists to allow questions and consolidation of knowledge. Each tip typically took five minutes to deliver. Pharmacists were trained in the delivery of each of the SIPS.

A programme of pharmacist-led feedback was designed to deliver both verbal and written feedback monthly on two medical wards on insulin prescribing. This was delivered to individual doctors with further feedback for any significant errors and as a wider session across the directorate for shared learning.

Ward pharmacists were trained in data collection for insulin prescribing and delivery of feedback on insulin prescribing. Insulin prescribing errors were based on a modified NaDIA classification. Feedback was designed to be constructive to reinforce good practice, encourage reflection on the risk of any error, potential error causation and agreed actions to improve performance.

Insulin prescribing was audited continuously in two intervention and two control wards. Baseline data was collected in the first four weeks. The feedback intervention was then

implemented on the intervention wards for 12-weeks with control wards continuing with existing practice. Insulin prescribing was re-audited over a four-week period to compare change in insulin prescribing error rates between the two groups.

A half-day multi-professional, high-fidelity live actor simulation was designed for severe hypoglycemia and DKA with staff from two wards invited to participate initially before further staff were able to attend.

Effectiveness of the simulation on understanding of the management of hypoglycaemia and DKA was measured using ten pre- and post-test multiple choice questions with a five-point confidence scale used to determine any change in their perceived confidence in managing these conditions.

Questionnaires were distributed to evaluate the views of nurses and doctors towards receiving the SIPS. Further semi-structured interviews were conducted with a subsample of doctors for an in-depth analysis of the feasibility and impact of the SIPS and feedback on their insulin prescribing.

Quantitative data was analyzed using SPSS with relevant descriptive statistics, chi-squared, paired t-tests and Wilcoxon sign rank tests used. Qualitative data was analyzed thematically using a framework approach with themes mapped to the COM-B (Capability, Opportunity, Motivation-Behaviour) model to explore the impact of feedback on prescribing behaviour.

Evaluation and results (400 words maximum)

Use this section to report the results and demonstrate how you measured the success of your initiative/project

Prescribing data was collected on 374 insulin prescriptions for twenty-two doctors. Error frequencies were different at baseline ($\chi=5.4$, $p=0.02$) between control (80 errors / 80 prescriptions) and intervention groups (69 errors / 115 prescriptions). Post-intervention, there was a significant reduction ($\chi=20.2$, $p<0.05$) in error frequency (17 errors / 105 prescriptions) in the intervention group with no difference ($\chi=0.54$, $p=0.816$) in the control group (78 errors / 74 prescriptions), an overall improvement in change in insulin prescription error rates of 49.2% between groups.

Twelve doctors were interviewed regarding feedback. The intervention was described as educational, raised awareness of prescribing capability, individual learning needs and insulin error causation. The opportunity to receive feedback was valued and considered feasible whilst creating a social opportunity to learn and develop working relationships with pharmacists. Feedback encouraged reflection on practice and development of conscious plans to improve insulin prescribing practice. Other reported motivating factors included competitiveness amongst peers, a personal pride, and desire to improve and develop.

Doctors agreed that feedback was improving their practice and described changes in their prescribing behaviour including greater information and feedback seeking and mindful prescribing.

Forty-five participants (25 nurses, 3 healthcare assistants, 17 foundation year 2 doctors) attended the SBT.

- Pre-test, mean knowledge scores were 4.8 ± 2.0 .
- Post-test, mean scores were 7.8 ± 1.5

A significant improvement in mean score of 3.0 (CI 2.4 to 3.6) $t(44) = -10.1133$, $p < 0.0001$.

Participant confidence scores significantly increased following the SBT for recognition of signs of hypoglycaemia (mean change 0.69 ± 0.73 , $p < 0.05$), management of hypoglycaemia (mean change 0.69 ± 0.85 , $p < 0.05$), recognising symptoms of DKA (mean change 0.96 ± 0.85 , $p < 0.05$) and management of DKA (mean change 0.71 ± 0.87 , $p < 0.05$) for all staff groups.

All participants agreed/strongly agreed that:

The SBT was a valuable learning experience (mean 4.6 ± 0.5);

They would recommend the course to colleagues (mean 4.6 ± 0.7);

Will apply their learning in practice (mean 4.6 ± 0.5);

The SBT will improve the care of their patients (mean 4.6 ± 0.5).

Over 150 staff members received the SIPS. Fifty-one staff members (25 doctors, 26 nurses) completed the survey and agreed that the SIPS were useful (mean 4.6 ± 0.6), informed their practice (mean 4.6 ± 0.6), raised awareness of insulin errors (mean 4.6 ± 0.6), should continue (mean 4.5 ± 0.7) and be developed for other medications (mean 4.7 ± 0.6). Staff disagreed that the SIPS should be distributed by other media, agreeing that the face-to-face delivery by the pharmacists was valuable (mean 4.8 ± 0.4).

Impact (300 words maximum)

Describe the impact of the initiative(s) for inpatients with diabetes and how this was measured.

Insulin is a high risk medication with high prescribing error rates in hospital settings. These errors can compromise patient care and safety with delayed discharges and adverse effects such as hypoglycaemia and DKA. By reducing prescribing errors, these risks are reduced and patient safety enhanced. Implementation of a simple feedback intervention has shown great promise in reducing insulin prescribing errors (49.2% change reported) with clear potential for optimising patient safety with a reduction in the average number of errors per insulin prescription from 0.64 to 0.08 in the intervention group.

Healthcare staff have reported low confidence and knowledge in managing hypoglycaemia and DKA. Where signs and symptoms are not recognised early, treatment is delayed or incorrect, or monitoring inadequately performed, the risks of complications can be increased.

Whilst this quality improvement work has not addressed potential error rates, evaluations of

the SBT and SIPS programmes have reported enhanced staff understanding of insulin error and confidence in the recognition and management of hypoglycaemia and DKA.

Enhancing knowledge is a first step in changing behaviour and it is anticipated that this will enhance the management of hypoglycaemia to limit episodes of severe hypoglycaemia for example or inpatient DKA and optimise patient care throughout their hospital inpatient stay.

Adaptability, Cost and Sustainability (300 words maximum)

How easily could your initiative(s) be adapted to other hospital Trusts? Please state whether any other Trust(s) has adapted your initiative(s) and/or any steps you have taken to promote wider dissemination of your initiative(s).

Please demonstrate the sustainability of your initiative(s). Include the cost incurred and the source of funding i.e. acute trust or CCG or any other means. Describe the process by which the funding has been sought and the challenges experienced.

Early pilot work was supported with a grant from Health Education England. Ongoing work is delivered as part of routine practice by diabetes specialist nurses and pharmacists in the acute Trust with delivery of education and training key components of their job roles.

These interventions have been designed with consideration of sustainability and scalability and it is our belief that these interventions are transferrable to other organisations.

The insulin prescribing feedback programme is routine practice on the endocrine wards with a similar programme being introduced in other high-risk areas such as acute admissions.

The SIPS are to be used Trust-wide as part of a wider medicines optimisation programme and have catalysed similar ongoing projects for other high-risk medications.

The weekly SIPS take five minutes to deliver, with prescribing feedback taking approximately 5-10 minutes per session.

The SBT event is now a catalogued monthly training programme with candidate registration via the electronic service records portal. The diabetes specialist nurses and a pharmacist now facilitate the SBT as part of their employed roles. The course has been advertised internally with over 80 candidates attending the course to date.

Results from our early work have been shared with other NHS Trusts at a national NaDIA meeting. Additionally, early results have been accepted for presentation at relevant national and international conferences throughout 2019 to share best practice with a wider audience. Manuscripts are currently in preparation for submission to peer reviewed journals.

The cost of an insulin error or poor management of hypoglycaemia or a DKA can be huge with significant impacts on patient care, costs of treatment and litigation. Where the interventions reduce insulin prescribing error rates and improve care of hypoglycaemia and DKA, there will be potentially substantial cost savings and most importantly, improvements to patient care and safety.

Learning (300 words maximum)

One of the main aims of the competition is to enable learning and sharing of initiatives for the benefit of inpatients with diabetes. Use this section to outline any learning(s) that can be taken from the initiative(s) and/or challenges faced along the way that could be transferred to other Trusts looking at introducing similar initiatives.

Key learning outcomes include:

- Focused feedback on insulin prescribing that is both individualised and shared has potential to improve the quality of insulin prescribing.
- Safe Insulin Tips are simple, convenient and feasible interventions to support insulin medication practice.
- SBT can enhance staff confidence and knowledge of managing diabetes scenarios experientially in a safe and supported learning environment.

Key challenges to date have been focused on developing materials, gaining approval from relevant committees and training of staff to both implement and receive the interventions. These challenges were managed by a committed multi-professional team with regular project meetings to monitor progress with responsibility and accountability for all team members.

Senior nursing and medical staff were engaged early in the process to raise awareness of the project, its purpose and intended outcomes. This was critical to support the desired learning culture and allow attendance of staff for receipt of the SIPS, prescribing feedback and SBT events.

All SIPS were designed by a multi-professional group. Individuals drafted allocated SIPS with rigorous peer review by all group members against best practice. All SIPS were then approved by relevant governance committees.

Distribution lists were provided by ward managers for nursing and medical staff with automated e-mails then sending out each individual safe insulin tip at weekly intervals. SIPS were delivered face-to-face to nursing staff as part of clinical handover and board rounds. Similarly, the SIPS and shared prescribing feedback were delivered to doctors as part of a routine clinical meeting.

Individual feedback was negotiated at a convenient time between the doctor and pharmacists to accommodate rotas and annual leave.

The SBT was designed with clinical staff and education leads for an optimal learning experience. Room and faculty availability to support the programme was negotiated with the head of clinical education.

Feedback from staff and patients (300 words maximum)

Please include a summary of any patient feedback and evaluations of the initiative(s). It will be helpful if you can provide (as supporting materials) the tools used to gather this information. If available please include summary of staff feedback to demonstrate their

perspective on the initiative(s)' impact on the care of inpatients with diabetes in relation to the prevention and management of hypoglycaemia.

Doctors described the value of feedback in supporting their learning by raising awareness of performance, providing the opportunity for reflection and negotiating solutions for improvement with the facilitating pharmacist.

"As a junior doctor you don't get feedback... If we don't get feedback how do we know where we need to improve?" (D3, CT1)

Doctors described the impact feedback was having on their practice with clear changes acknowledged in their prescribing behaviour:

"For me I think that this has been the only intervention that I have had so far working in the NHS [National Health Service] that I have thought to myself this has changed my prescribing behaviour and really made me think." (Doctor 9, CT2)

The SBT was well evaluated with participants enjoying the interactive nature of the training:

"Really enjoyed the session. Very interactive. Thank you!" (Nurse, band 5)

The multi-professional approach was valued with staff finding it particularly useful for the debrief session:

"It was great having the pharmacist and specialist nurses there to provide expert practical advice." (Doctor, FY2)

Nursing staff commented that the SIPS were useful in supporting their learning and were feasible, an important consideration for busy ward environments:

"Brilliant idea. This has been super helpful in recognising prescribing errors and helping my own practice". (Nurse A)

"Excellent idea. Perfectly bite size and supports our learning in practice. Should be developed for other drugs too." (Nurse B)

Doctors reported using the SIPS in practice to inform their prescribing:

"The tips are really good. There was one on a GKI [Glucose potassium Insulin infusion] recently and I've used that, and the surgery one too when a patient has gone for surgery. I've used them on-call too when I access them on my phone." (Doctor 4)

Supporting materials

The judges' core assessment of your initiative will be based on this entry form. However, we do recommend that you **support your entry** with relevant materials, as these will be made available to the judges and are often the deciding factor in short listing the finalists.

Supporting materials could include: IT based programmes, pamphlets, booklets, audits, events, reports, journal articles, evaluation documentation, websites etc.

Supporting materials along with your entry form should be submitted by email to christine.jones@nnuh.nhs.uk.

Closing date: 28.02.2019

The winners of the Rowan Hillson Insulin Safety Award 2018: "Best Inpatient Diabetes Educational Programme for Health Care Professionals" will be published on the Association of British Clinical Diabetologists (ABCD) and Diabetes UK website and will appear and be referred to in future journal articles. By submitting your entry, you will be consenting to your initiative being used for these purposes.