Improve the management of inpatients on insulin

Over the last two years at HDFT we recognised an increase in the number, type and severity of reported insulin related incidents and errors in both acute and community settings.

Insulin prescribing and administration safety was identified in 2014/15 as a safety concern by Diabetes UK, the Association of Clinical Diabetologists and endorsed by National Clinical Directors. All Trusts were written to, and insulin use and safety continues to be a focus of the National Diabetes Inpatient Audit (NADIA).

The safe use of insulin is also affected by the range and complexity of new insulin types and devices, which whilst a major step forward, have also been highlighted by UK and European Medicines Regulatory Authorities (MHRA and EMEA) as a potential risk of medication error.

What have we done?

We instigated a "safe use of insulin group" (SING), comprising diabetes nurse specialists (adult and paediatric), consultants, community matron and pharmacists to develop a programme of work to improve the safe use of insulin at HDFT. This group has monitored insulin incidents and errors reported on Datix (incident reporting system) across HDFT and classified numbers, types, locations of error and levels of harm. This has allowed a targeted work programme focused on:

- Improving the reporting and investigation of incidents including feedback to clinical teams;
- Analysis of five years of reported insulin error data to target interventions;
- Utilising and improving ePMA (electronic prescribing and medicines administration system) to help minimise prescribing errors;
- Developing a dashboard identifying all inpatients prescribed insulin to allow early intervention by the diabetes team and pharmacy staff;
- Developing a self-administration programme for patients using insulin;
- Developing a training needs analysis and implementing an essential skills training programme on the safe use of insulin for all relevant doctors, nurses, care support workers, pharmacists and pharmacy technicians;
- Utilising the Unipoc dashboard (highlighting patients with abnormal blood glucose levels) to proactively monitor blood glucose levels and target interventions as appropriate;
- Continuing to participate in NADIA and report its findings.

The quality improvement programme specifically aimed to:

- Continue a high level of reporting of insulin errors and incidents in acute and community settings;
- Investigate all errors, classify with a level of harm and provide feedback and learning to clinical teams;
- Reduce to zero the number of serious incidents requiring investigation (SIRIs) involving insulin;
- Reduce the number and proportion of moderate and severe harm insulin errors below the 2015/16 level;
- Increase the proportion of no / low harm reported insulin errors above the 2015/16 level;
- Embed the dashboard of patients prescribed insulin into clinical practice and use to target early interventions;

- Implement the essential skills training packages on safe use of insulin across all acute (adult and paediatric) and community settings;
- Embed the dashboard of patients with abnormal blood glucose levels (Unipoc) into clinical practice and use to pro-actively identify patients needing review;
- Reduce the number of patients (%) on insulin experiencing at least one insulin error below 34.4% as found in NADIA 2015.

What are the results?

We used 2015/16 data as our baseline position and agreed the metrics described below.

An important component of the safety programme during 2016/17 was to maintain or improve on the level of reporting but affect the proportion of harm levels i.e. increase the ratio of no / low harm reports. This would demonstrate a good reporting culture. In 2016/17 we have seen a similar number of reported errors at 40 demonstrating a good reporting culture. Insulin errors accounted for 10% of the total medicine related errors. We have seen a rise in the number of errors reported in the acute setting to 35 and a significant fall in the community setting errors, reduced from 13 to five.

The most important component of these reports is the associated levels of harm. In 2015/16 we saw 34 errors (83%) classified as no / low harm and seven errors (17%) classified as moderate / severe harm, including two severe harms with one progressing onto a full SIRI investigation. In 2016/17 we saw a significant change in this ratio with 37 errors (92%) classified as no / low harm and three errors (8%) classified as moderate. There were no severe insulin related errors during 2016/17. This demonstrates a really significant improvement in the safe use of insulin at HDFT.

	2015/16	2016/17 [1, 2]
Total number of reported insulin errors in acute and community settings	41	40
Acute hospital reported insulin errors	28	35
Community services reported insulin errors	13	5
% Insulin errors as a proportion of all reported medicine incidents and errors	9%	10%
% errors investigated	100%	100%
Number and % of reported no / low insulin harms	34 (83%)	37 (92%)
Number and % of reported moderate insulin harms	5 (12%)	3 (8%)
Number and % of reported severe insulin harms	2 (5%)	0
Number of insulin related SIRIs	1	0
Number of Datix reported insulin incidents triggered by use of the dashboard to allow early intervention	6	18

Table 6: Comparison of insulin reported errors at HDFT (2015/16 and 2016/17)

Note[1]: ePMA Dashboard reviewed 100% Mon – Fri now fully embedded into practice. Pharmacist review at weekends where possible.
Note[2]: Identified as best practice by CQC.

We developed an insulin dashboard utilising ePMA during late 2015/16. This report identifies all patients prescribed insulin on a daily basis, allowing early intervention from the diabetes specialist nurses and/or pharmacists. Early intervention has prevented any insulin related issue to go on to cause harm to a patient. We believe this has added significantly to our safe use of insulin programme, led to an increase in early reporting and contributed to the change in harm ratio increasing the proportion of no / low harm errors.

National Adult Diabetes Inpatient Audit (NADIA)

HDFT contributes annually to the National Adult Diabetes Inpatient Audit. This is a snapshot audit on one day and took place in September 2016. We have compared our results with the 2015 audit and the data described below substantiates the improvements we have made with the safe use of insulin. We have seen improvements across the medicines related domains and are either better or similar to the England average.

The data does however demonstrate that we have further improvements to make.

	HDFT 2015	HDFT 2016	England average 2016	England quartile*	
				2015	2016
Medication error (all diabetes related medication errors - includes oral hypoglycaemic agents)	53%	33.3%	37.8%	4	2
Prescription error (insulin not prescribed, wrong name / dose, wrong time etc.)	40.6%	16.7%	21.1%	4	2
Medication management error (dose not adjusted, inappropriate omission etc.)	34.4%	25%	24.1%	4	3
Insulin error (insulin prescription or management error)	34.4%	25%	22.7%	4	3

Table 7: Comparison of errors identified from NADIA 2015 and 2016

* The quartile column represents how each value compares to the England distribution for the audit year; Quartile 1 means that the result is in the lowest 25%, whereas quartile 4 means the result is in the highest 25%. Quartile 1 is the best performance in relation to errors.

Use of the Unipoc system for monitoring of abnormal blood glucose levels

The Unipoc system and dashboard allows the diabetes team to monitor abnormal patient blood glucose levels to allow early intervention and to adjust treatment as required. The system was implemented during late 2015/16. In combination with the insulin prescription dashboard this proactive monitoring of blood glucose has contributed to the improvements in the safe use of insulin at HDFT. The criteria for review has been refined so the dashboard has become more specific in allowing the diabetes specialist nurses to review patients who require specialist input and treatment modification.

<u>Essential skills training programme</u>

During the late summer of 2016/17 we introduced a safe use of insulin essential skills training programme for all staff handling insulin. The programme has commenced and progress is being made. This will form part of the Trust monitoring process for 2017/18.

Staff groups	Training required	Compliance
Acute Trust nurses	Medicines Management Training	73%
Community nurses	Community Nurses Medicines Management Training	52%
Pharmacists and pharmacy technicians	Bespoke Training session	100%

Table 9: Medicines Management training compliance 2016/17

We are also training healthcare support workers, doctors in training and consultants with bespoke training sessions.

Summary

During 2016/17 we have made significant improvements in the safe use of insulin and have met our quality improvement goals. We have:

- Maintained a high level of reporting of insulin errors and incidents in acute and community settings;
- Investigated 100% errors and classified each with a level of harm;
- Reduced to zero the number of SIRIs involving insulin;
- Reduced the number and proportion of moderate and severe harm insulin errors below the 2015/16 level;
- Increased the proportion of no / low harm insulin errors above the 2015/16 level;
- Embedded the dashboard of patients prescribed insulin into clinical practice and used to target early interventions;
- Embedded the dashboard of patients with abnormal blood glucose levels (Unipoc) into clinical practice and used to pro-actively identify patients needing review;
- Reduced the proportion of patients on insulin experiencing at least one insulin error below 34.4% as found in NADIA 2015;
- Implemented the essential skills training packages on safe use of insulin across all acute (adult and paediatric) and community settings.