KQuIP

Name /title of project and organisation

Development of Haemodialysis Trigger Tool and Patient Safety index to monitor harm events during haemodialysis treatments

Derby Teaching Hospitals NHS Foundation Trust, Derby, UK

Short summary of the area we needed to address

We identified that patients were experiencing a number of unintended consequences of haemodialysis treatments that affected the patient's experience of haemodialysis. Some of these unintended consequences include intra-dialytic hypotension, vascular access problems, blood loss from the circuit and machine problems (McIntyre, 2009; Bray et al, 2014; Rylance, 2014). We wanted to monitor the incidence of these events and use this to focus quality improvement achievements at the unit.

Bray BD, Boyd J, Daly C et al (2014) How safe is renal replacement therapy? A national study of mortality and adverse events contributing to the death of renal replacement therapy recipients. Nephrol Dial Transplant 29(3): 681–7. doi: 10.1093/ndt/gft197

McIntyre CW (2009) Effects of haemodialysis on cardiac function. Kidney Int 76(4): 371–5. doi:10.1038/ki.2009.207

Rylance PB (2014) Improving patient safety and avoiding incidents in renal units. Journal of Renal Nursing 6(1): 24–9

What did you want to achieve with your QI initiative?

We identified the trigger tool methodology, developed by the Institute of Healthcare Improvement (IHI) (Griffin and Resar, 2009), as a good approach to monitor harm events. However, the original trigger tool was designed to monitor harm events during adult in-patient hospital stays and so was not relevant to haemodialysis. We therefore decided to develop a haemodialysis specific haemodialysis trigger tool (HTT) to allow relevant monitoring.

We planned to use the HTT to monitor harm events monthly and develop quality improvement initiatives to reduce the incidence of identified harm events during haemodialysis. The monthly results could also be used to identify the impact of interventions. The tool was developed and piloted as described in Fielding et al (2016).

Following the pilot, 10 senior staff nurses were trained to use the HTT and asked to each randomly audit 5 haemodialysis treatments a month, providing an audit of 40-50 treatments a month. The results were collated monthly to provide:

- The monthly harm rate (%)—number of harm events divided by the number of treatments
- The monthly trigger rate (%)—number of triggers divided by the number of treatments (this is always higher than the harm rate, as not all triggers are associated with harm)

- The most frequent harm events each month.

The monthly results were fed back to the MDT, discussed and interventions identified. Following implementation, it became evident that results varied month to month. Therefore the results were also collated in a 12 month rolling period, which provided more consistency in results.

Following 3 years of using the HTT audit, we identified a definite trend in the type of harm events patients' experienced regularly and those events that were useful and not useful to identify. Using 3 years of data from the HTT audit, we identified 6 well defined harm events that occur regularly during haemodialysis treatments. This created a haemodialysis patient safety index (HD PSI) relevant to these patients.

The HD PSI allows data to be collected from every haemodialysis treatment and provides clear definitions of frequent harm events that happen during haemodialysis treatments. Following a pilot of this index, which collected data on every haemodialysis treatment over 1 week, this tool is being incorporated into our IT system. This will allow every haemodialysis treatment to be monitored for these harm events.

Griffin FA, Resar RK (2009) IHI Global Trigger Tool for Measuring Adverse Events. 2nd edn. Institute for Healthcare Improvement, Cambridge: MA

Fielding C.A., Rhodes C., Chesterton L., Fluck R.J., Lambe G., Inacay G. and Taal M. (2016) 'Development of a trigger tool to detect harm during haemodialysis' *Journal of Kidney Care* 1(2) 72-77

Who was involved in this QI work and what did you do?

Catherine (Katie) Fielding, Professional Development Advisor – Haemodialysis – HTT Lead and involved in development of HD PSI

Kelly White – Senior Staff Nurse Haemodialysis and Renal Research Nurse – HD PSI Lead

Maarten Taal, Nephrologist – involved in development of HTT and HD PSI

Carol Rhodes – Haemodialysis Senior Sister and Home Haemodialysis Lead– involved in development of HTT and HD PSI

Richard Fluck, Nephrologist– involved in development of HTT and HD PSI

Lindsay Chesterton, Nephrologist – involved in development of HTT

Georgina Lambe, Senior Staff Nurse Haemodialysis – involved in HTT development

Geoffrey Inacay, Senior Staff Nurse Haemodialysis – involved in HTT development

RDU Senior Staff Nurses – completion of monthly HTT data collection

Haemodialysis nursing staff – completion of HD PSI data collection

Gill Ogden – Divisional Nursing Director, Medicine and Cancer – provided authorisation for project

Key staff groups were involved in the development of the tool to ensure engagement in the

project. Leads were identified to encourage completion of the data collection and ensure collation and dissemination of the results. An excel spreadsheet was developed for input of the results, which generates the monthly data and run charts to monitor the impact of changes in practice and deterioration of frequency of harm events.

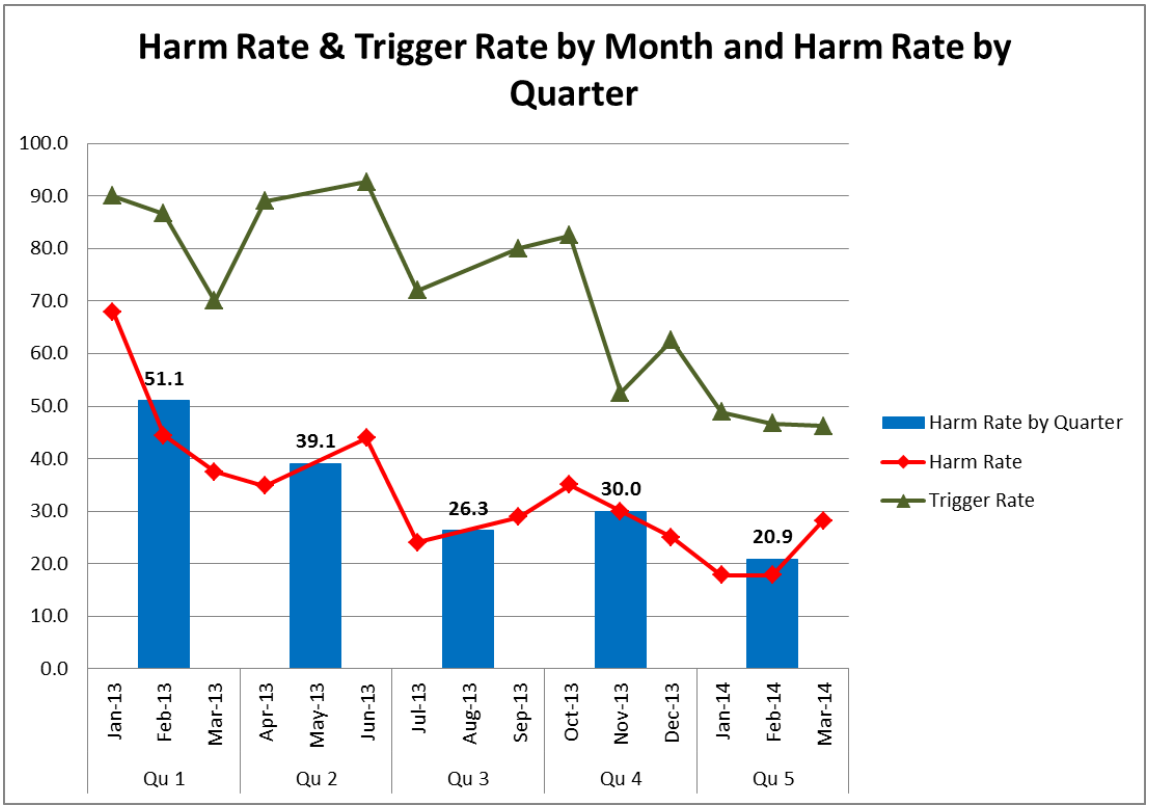
Results were fed back in MDT meetings, via email and directly to haemodialysis unit staff in teaching, meetings and posters in the staff room, so they could visibly see the impact of the interventions. Any key change in a result was highlighted via the MDT. The impact of the results, practical application and improvement in harm events motivated staff and generated interest in the results.

When launching the HTT and HD PSI, training was provided to those collecting the data. However, wider information was provided verbally during meetings and teaching to increase awareness across the haemodialysis team.

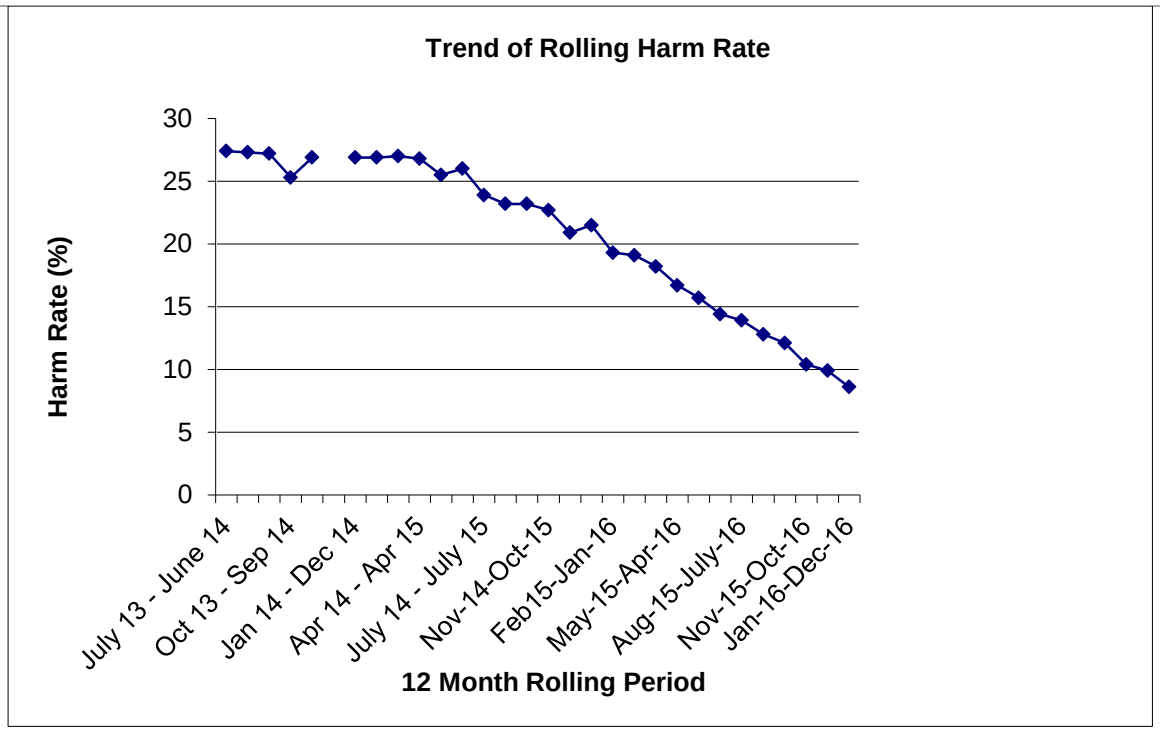
Both development of HTT and HD PSI had a low impact on resources. No timescales / deadlines were required during development, but regular meetings were planned to ensure momentum, with the designated leads expected to drive the project forward.

What was the outcome of your QI work?

The HTT is now an established part of practice on the haemodialysis unit. Results continue to be collected monthly and reviewed. Initially, results showed a significant decline in harm events (χ^2 =39.4; P=0.001 for trend):



This has been sustained with present results show a decline in harm events identified during haemodialysis within the 12 month rolling data:



This is attributed to:

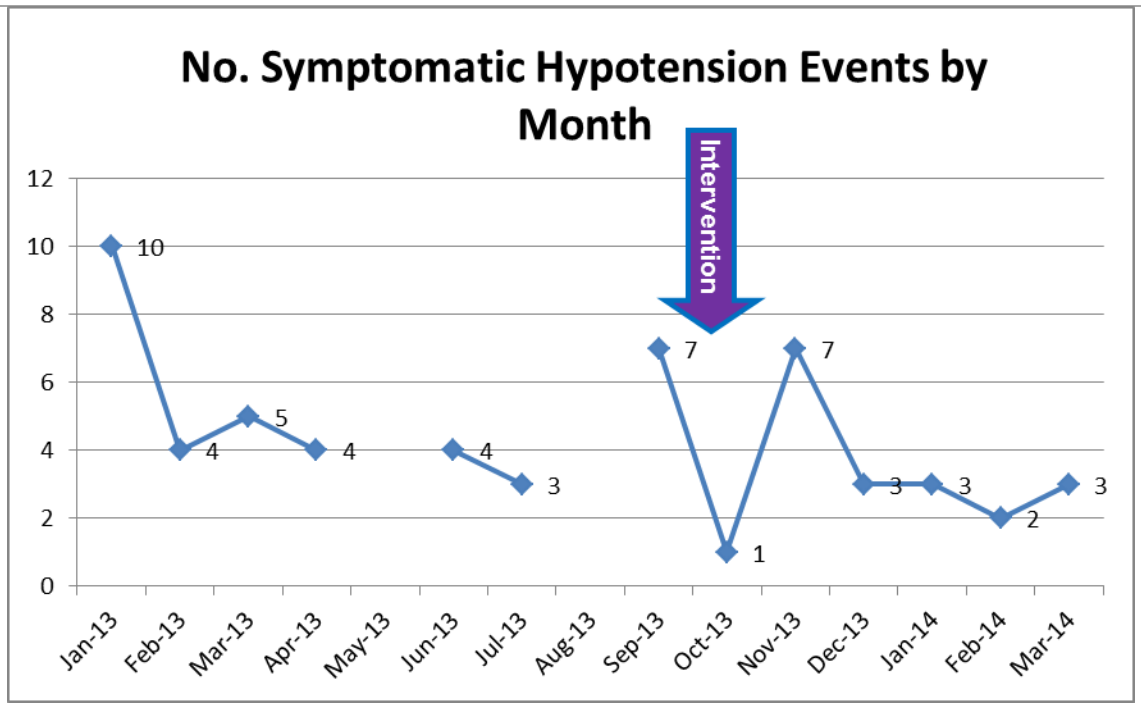
- An improved safety culture within the haemodialysis nursing staff, where focus is on minimising harm events rather than accepting them as the 'norm'
- Interventions to address trends in individual harms
- Increased familiarity with the senior staff nurses with the HTT leading to more consistent results

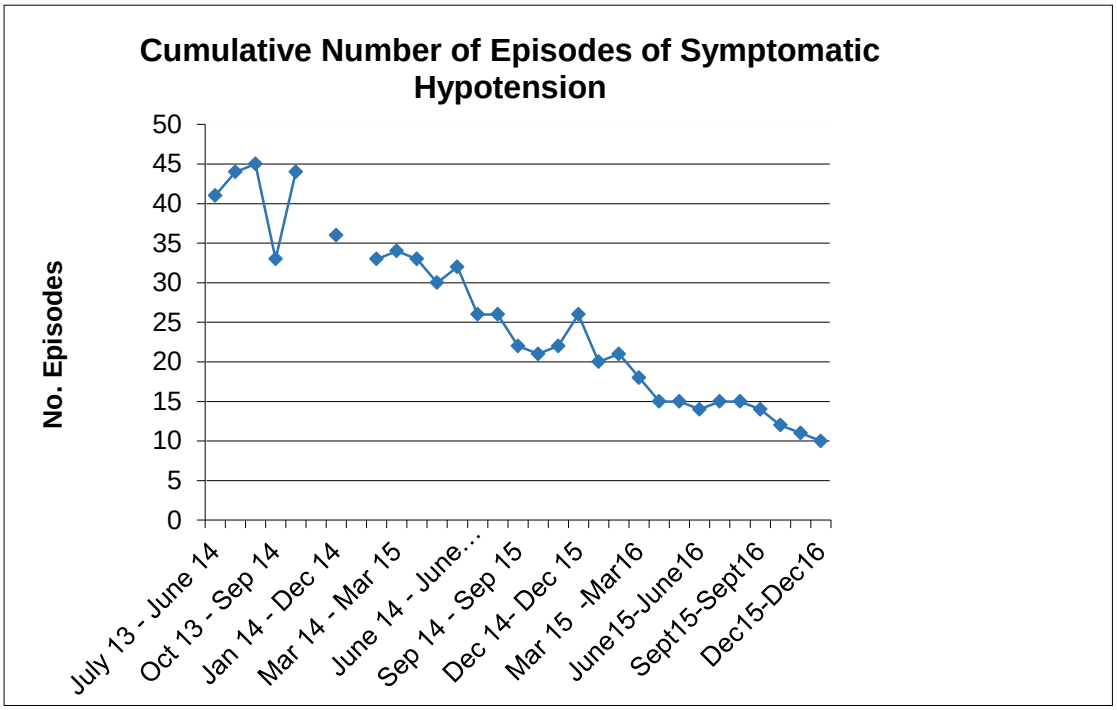
Individual projects that have been developed to improve individual harm events include:

1) Reducing symptomatic hypotension
   Teaching sessions were provided to the haemodialysis nursing staff to identify why this was occurring and generate solutions. This fostered a problem solving approach as well providing them with ownership of the solutions. Solutions generated included:
   - Increase in target weight assessment
   - Improvement in pre-dialysis assessment of fluid removal
   - Increased use of isolated UF and sequential dialysis to manage large fluid loss
   - Increase in sensitivity in monitoring for the signs of hypotension, including use of BP and blood volume measurements.

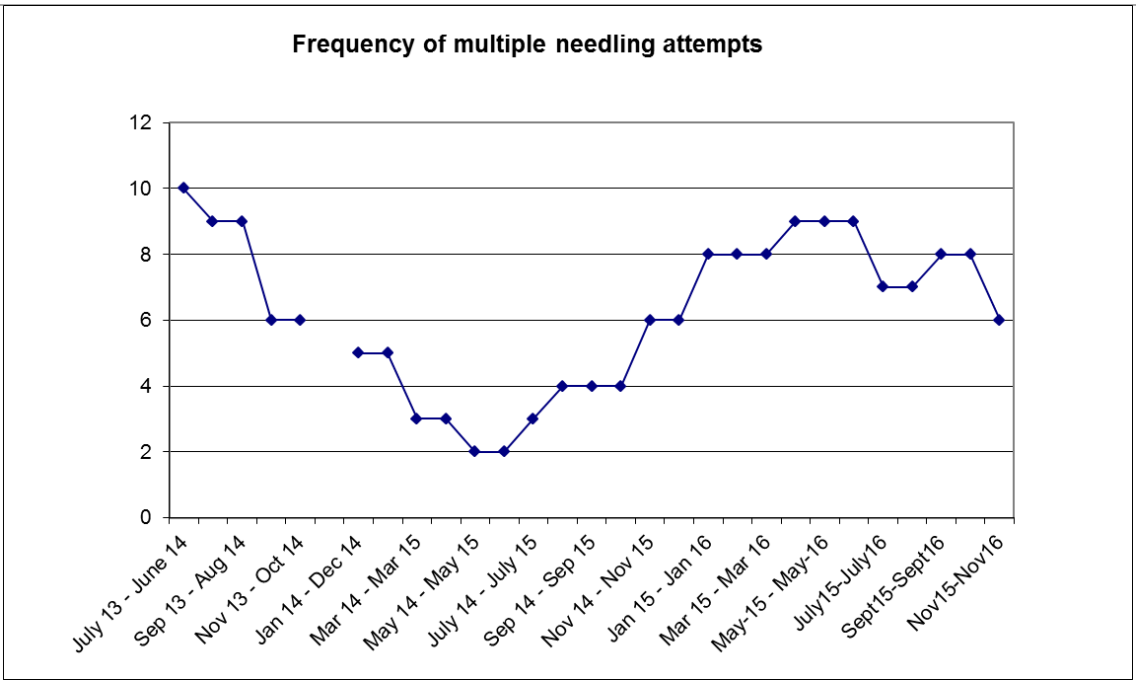
   The wider MDT also responded to the frequency of this harm event. MDT unit reviews incorporate the review of the frequency symptomatic hypotension for individual patients, with input from nephrologists and dieticians to focus on management and also focus on reducing inter-dialytic fluid gains.

   The impact of the changes to practice are shown in the graphs below:

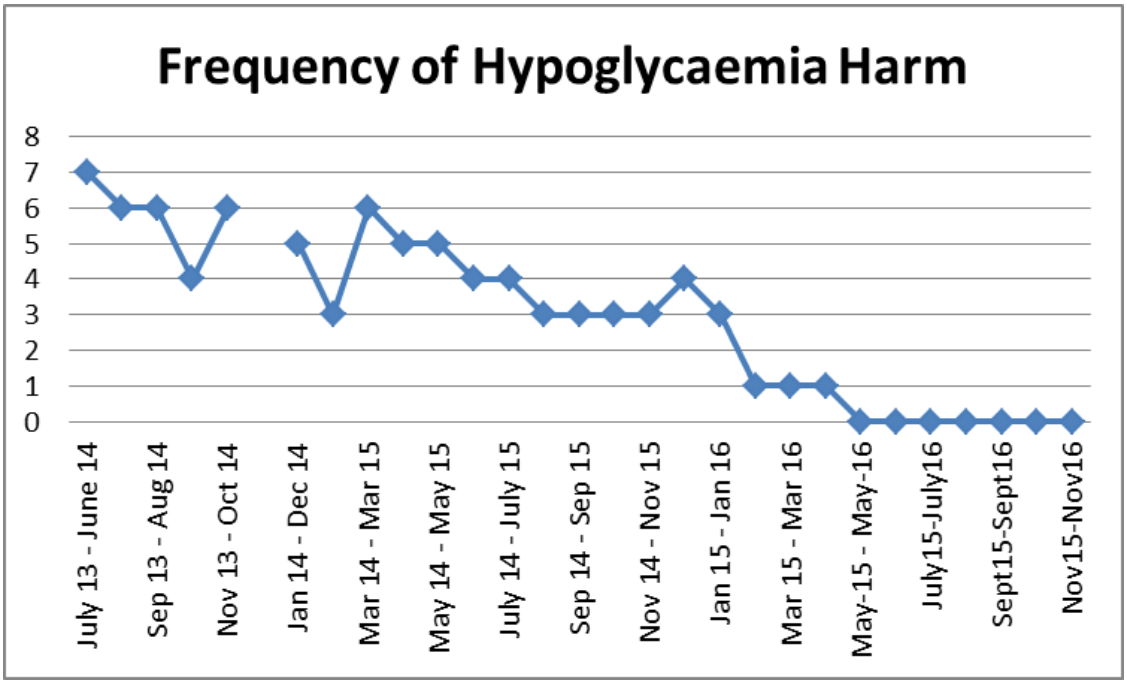




2) Reducing number of multiple needling attempts on arteriovenous fistulae
'Multiple needle attempts' has recently been identified as a regular harm event that is increasing, as shown in the graph. Extra categorisation was added to the tool to identify if the issue was with new or old AVF and with buttonhole or rope ladder technique. This information shows this occurs frequently with new AVF and established buttonhole sites. During teaching with the haemodialysis nursing staff, it was identified that there is poor communication within the nursing team on how to cannulate specific AVF. Adjustments have been made to documentation to promote better communication between haemodialysis sessions. We are waiting to see if this has an impact on the number of multiple cannulation attempts or whether this requires further intervention.



3) Improved management of blood sugar control in patients with diabetes
Diabetes has always been an area of clinical practice that our unit has focussed on developing, working closely with our diabetes team. However, despite this we still noted our diabetes control was less than ideal with 'Hypoglycaemia' triggering as a frequent harm (see graph below).
Our diabetes link nurses have refocused escalation of abnormal blood sugars to the diabetes team for review, highlighting hypoglycaemia and prompting a review of their diabetes management regime. To facilitate this, our diabetes link nurses have implemented and now promote a patient held record of blood sugar measurements, to allow review of these measures over time as well as encouraging patient engagement in the results. At present this had led to a sustained reduction in hypoglycaemia, as shown in the graph below.



What impact have changes as a result of your work had on patient care?

The results on patient care are demonstrated above. To summarise, interventions are aimed at reducing these harm events and their effectiveness can be monitored. Reducing these harm events will avoid discomfort to the patient and prevent harmful events occurring.

What did you learn?

Whilst implementation of the HTT into clinical practice has added to the already busy workload of haemodialysis nurses, the benefits have justified the time required. Once implemented, the results motivated nursing staff as to the usefulness of the HTT, encouraged further completion of the HTT and facilitated their involvement in local QI projects. A key to success of this project was the visibility of the results to key stakeholders. This ensured results were acted on, but also made the HTT meaningful to the whole MDT. If staff can see the benefits of data collection for a project, they are more likely to be motivated and engaged in this.

Discussion of developments to reduce harm events allowed contribution from all levels of the nursing team and wider MDT. This gave all staff levels' ownership over the data collected and improvement projects, again facilitating engagement and interest in the HTT. Sharing the challenges and developments constructively, with a focus on how to improve things rather than criticise, made this a more meaningful to staff.

Describe the whole process in three words

Improving haemodialysis safety

Author's name and contact details and any links for more information about your QI project

Katie Fielding – katie.fielding@nhs.net

Fielding C.A., Rhodes C., Chesterton L., Fluck R.J., Lambe G., Inacay G. and Taal M. (2016) 'Development of a trigger tool to detect harm during haemodialysis' *Journal of Kidney Care* 1(2) 72-77