Tackling AKI: Lessons from our Quality Improvement methods

Purpose of this guide

The Tackling AKI project was designed with quality improvement (QI) methodology at its core. The structure ensured there were both learning opportunities and challenges for all the sites involved. QI was aligned to a stepped wedge study design and employed a 'peer assist' and 'peer review' process. This document is to relay the lessons learnt whilst we delivered our project, in particular the QI methods that we found were successful, and those that were less so.

Contents

Background

Over a seven-year period, a number of interventions were introduced at the Royal Derby Hospital to address care gaps in patients with AKI. These comprised of an electronic AKI detection and alerting system [1], a tailor-made education package [2] and an AKI care bundle [3]. Early data suggest that this combined approach has improved delivery of basic care and reduced hospital mortality rates [3, 4]. More recently, similar findings at other UK hospitals have been reported [5, 6]. These approaches are also aligned with the national AKI programme, Think Kidneys (www.thinkkidneys.nhs.uk). Conversely, a randomised controlled trial of an e-alert for AKI that was introduced into a US hospital in isolation without any improvement framework showed no impact on either the physicians' behaviour or patient outcomes [7]. The Tackling AKI study was conceived to definitively test the effectiveness of the approach to AKI of a multi-faceted intervention supported by quality improvement methodology.

The overall aims of Tackling AKI were to:

- test the effectiveness of a complex intervention to improve basic standards of care for patients with AKI, and to measure the effects on patient outcomes;

- describe the processes, barriers and enablers that allow successful adoption of the intervention across a range of secondary and tertiary care hospitals in the United Kingdom.

Strategy

We aimed to address the following needs:

- Lack of education and awareness of AKI
- Difficulties in detecting AKI
- Variation in the basic care of patients with AKI

We hypothesised that our intervention (education, electronic AKI detection, AKI care bundle) would address the needs as summarised in our original driver diagram (figure 1):

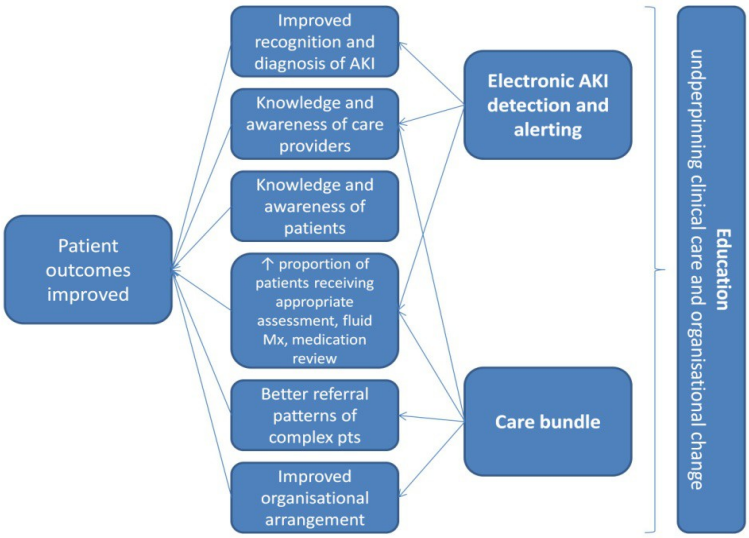

Figure 1: driver diagram to identify potential mechanisms by which the TAKI interventions would be efficacious

Intervention plan

We planned the intervention across 5 centres (Leeds General Infirmary, St James's University Hospital, Bradford Teaching Hospitals NHS Foundation Trust, Frimley Health NHS Foundation Trust and Ashford and St. Peters NHS Foundation Trust, the latter two supported by Surrey Pathology Services), employing a stepped-wedge cluster randomised trial (SWCRT) design [8]. The SWCRT design was based on several considerations. Firstly,

the intervention requires hospital-wide implementation, and randomisation within a single centre would almost certainly result in contamination of control groups. In addition, the nature of the intervention is aimed at reducing care gaps, as opposed to testing a new therapy. A SWCRT, with the intervention applied at a cluster level, overcomes ethical concerns around withholding treatment that could be considered in line with minimum care standards because the entire population recruited will receive the treatment by the end of the study. This approach also allows for differentiation between the effect of the intervention and potential independent time-related factors, something not possible with simple time-series (before-after) comparisons.

A SWCRT involves delivery of the intervention in sequential steps to one or more units of randomisation per time-period and delivered to all the units of randomisation by the end of the study (see figure 2). This design is particularly suited to quality improvement or pragmatic trials because lessons learnt, know-how and resources can be shared between those centres that have implemented with those centres that will follow. A baseline (control) period prior to any of the centres introducing the intervention was followed by five randomisation steps (one hospital per step). The time-period immediately after a site introduced the intervention, when it is expected not to have reached full effect on outcomes, is considered a transition period and was excluded from analyses. There was a total of eight time-periods, each of three months in length (24 months in total).

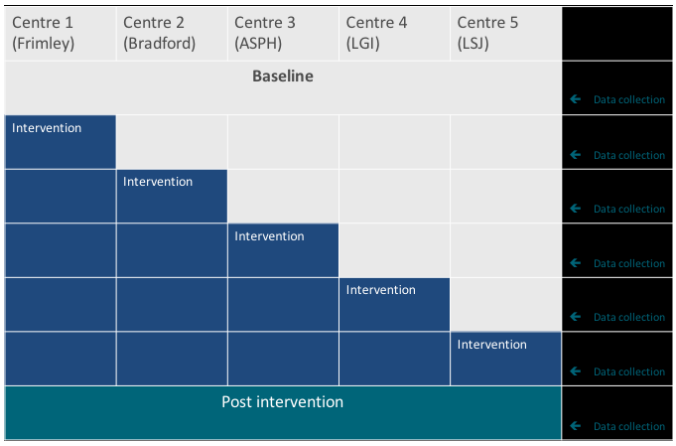

Figure 2: Stepped wedge study design

Each site was scheduled to have its own sequential implementation period, the order of which was determined randomly at the outset of the project. For the Trusts about to begin, plans were shared at the peer assist meeting with the core project team and colleagues from other Trusts who had already implemented. This meeting provided an opportunity to discuss the plans with colleagues who could call on their experiences to share likely challenges and suggest possible ways to overcome these.

Peer review meetings provided an opportunity for Trusts to discuss with the project team what actually had happened in the implementation period, what learning had been gained and challenges faced. This was an opportunity to pull out key learning for the organisation

which was due to implement next. The changes that were implemented were tested using plan do study act (PDSA) cycles to ensure they would work in practice and the clinical teams were fully engaged in the process. It was intended that implementation teams would employ measurement for improvement throughout their implementation periods so they could track progress with their interventions.

What Happened?

Peer review and peer assist meetings

The peer review and assist meetings were a success, providing an open and honest forum for discussion and challenge that was well received by the teams. Key benefits were:

- Sharing of key learning
- Generation of ideas
- Reduced duplication
- Sharing resources that could be adapted for use at other sites
- Building a sense of 'team' across the different project sites

There were however some challenges that we faced. Following peer review, the aim was to change plans where needed but this was sometimes not possible due to time constraints and organisational differences. There were also significant geographical barriers to the meetings taking place; WebEx was used in parallel with face to face meetings as a way of overcoming this. Ensuring the voice of staff from the front line was included in the meeting was sometimes difficult as they could not always be released from clinical duties.

Interestingly we learnt that although hospitals differed, they often faced similar problems around time and impetus.

"It was nice to talk to people who'd done it before, to speak and to learn from their problems and their …but I think their problems ended up being our problems as well which was not the actually putting the package together but getting the time and the impetus to try to move it forward."

Peer review/assist meetings also provided opportunity for learning around content and layout of the care bundle particularly how simple/lengthy they should or shouldn't be. One person mentioned that they had learnt from seeing a previous lengthy bundle that they wanted theirs to be simple.

"there was definitely something about a care bundle which they had had to adapt because it had too much in it, so I remember being cognisant of that and not wanting too complex a care bundle, such that we had to undo it all and so on, so I was keen therefore to involve trainees at the very beginning on that, so that was interesting."

Measurement for improvement

As part of the quality improvement methodology around care bundle implementation, we planned to use 'measurement for improvement' to promote usage. Although there was a clear structure for uploading outcome and clinical audit data, in practice this has been

difficult to achieve. The major barrier has been the amount of time required to collect and report meaningful data and which precluded ward staff doing this. Potential IT solutions have not been realised within the life of the project. This is important learning – measurement for improvement has to be adequately resourced, and is more likely to be successful at a local/small scale as opposed to hospital wide spread (unless a proven IT solution can help). Quotes to give examples of the difficulties*:*

'Data collection very difficult as extremely time consuming'; 'Not enough resources to complete data collection for accurate run charting'; 'Junior doctor recruited to check alerts on VitalPAC and to complete spreadsheet – only managed to complete for a week and did not start patients on the care bundle!'

The latter shows that our original idea of embedding measurement for improvement into the clinical teams did not work.

Other successes and enablers:

! The 'team'. Team building has been crucial. We have been fortunate to have so many skilled and enthusiastic professionals involved in the project. Working with the right people, mutual support, communication and leadership are all important aspects to this; demonstrating and maintaining visible enthusiasm also. Sometimes personal relationships within centres have been extremely effective in getting things done. These are some of the key roles:

- Clinical Lead: consultant, not necessarily a nephrologist. Absolutely essential to provide enthusiastic leadership; engaging and influencing consultant colleagues (good links to medical consultants particularly important as the majority of AKI workload is within medicine); strategic direction for the group; engagement with senior management. Without this leadership, extremely difficult to be successful.
- Project Manager(s): Provided organisational impetus and maintained momentum – holds the whole team together (and bring additional skills e.g. QI, events organisation)
- Clinical biochemist: Link between laboratory AKI detection and clinical teams.
- Engagement with MDT: Doctors (senior and junior), nurses, pharmacy
- Outreach team, or dedicated CQUIN/AKI nurses: on the spot education, ward-level awareness raising, encouraging care bundle use, collected data on process measures

! Empowerment and engagement of the multidisciplinary team is extremely effective at promoting and achieving uptake of new initiatives. The MDT generally has a lower staff turnover rate as compared to junior doctors who rotate every four months. Ownership and desire to be seen as a successful or 'good' clinical area are also enablers. Involving the MDT may also help with ensuring that interventions are tailored to existing structures and are therefore more likely to have sustainable uptake.

- Follow these links to watch interviews with front line staff that illustrate these points:

https://youtu.be/ne8JGsVmTjQ
https://youtu.be/YheJHeAcxwc
https://youtu.be/Ffg21lyq9XM

! Ward walks have been very powerful in maintaining awareness and promoting care bundle usage. This does require resource, either by expanding existing roles (e.g. outreach teams) or a number of hospitals across the UK have created AKI nurse posts. This approach also fits with observations from the qualitative team to use feedback on performance as an enabler for change.

! Having an active and effective steering committee. For our project, the steering committee contains senior figures with clinical, methodological and QI expertise. There are also good inter-personal relationships between steering group members and between the PI. This has allowed periodic, independent review of the project throughout its lifespan, with robust but positive challenge to the PI and suggestion of ideas and new directions. From experience elsewhere, the effectiveness of this depends on the makeup of the steering committee so it has to be configured carefully and for the correct reasons (and not just to 'tick a box').

! Using established frameworks and aligning with complementary initiatives e.g. capturing trust priorities and using those to promote your project. Examples include the effect of the CQUIN and established, highly effective quality and safety teams that can deliver awareness/teaching at scale and pace. Additionally, some centres had evolved audit teams already in place. These centres were much more easily able to deliver the data collection elements of the project as compared to those centres that did not have this resource in place.

Challenges and barriers:

! For AKI specific projects, ensuring engagement and support from consultants within the division of medicine is essential. One of our sites found this significantly more challenging that the other sites, and they had some specific challenges that did not affect the other centres to such a degree. These were:
  - MAU reorganisation at the same time that implementation happened, with MAU being a key area for the intervention. This meant that staff were distracted and some were disillusioned with the reorganisation, which in turn meant it was harder to get engagement.
  - There was a change in project leader during the project.
  - The project leads were Intensive Care consultants and it was noticeable that in contrast to other centres there was lack of engagement and even a degree resistance from medical consultants ('*we do that already!')*.

- The net effect of this was that it appeared much harder to encourage junior doctors to adopt the intervention and over time the project manager noted a waning of enthusiasm and dissipation of the AKI team.
- These issues were identified during the project and mitigation strategies put in place. Particular successes were the MDT empowerment via the teaching days and good engagement from pharmacy and informatics.

! For the larger organisations, achieving hospital wide spread has been difficult. Size of hospital and local resources should be carefully examined to decide whether hospital wide spread is always achievable. If not, then a more focussed approach on key areas may be more effective and more rewarding for the QI teams. Alternatively, a hospital wide launch followed by specific focus on key areas may be another way of approaching this.

! Staff do change – this will almost certainly occur during any project. We coped with this well, but noted that the project lead, project managers and consultant leads at each site were constant (with the exception of ASPH where the consultant lead changed).

! Winter pressures reduce available time and may have affected the ability of staff to attend training sessions. If possible we would recommend avoiding introducing new interventions in late December or January. The converse view to this is that the NHS is under fairly constant pressure – if we had waited for a 'quiet time' that may never have come! However if implementing new ideas at winter time, additional planning to account for the pressures on staff should be considered. For the nursing teams the change to 12 hour working patterns and therefore loss of the lunchtime overlap period also had an impact.

! Despite delivering many hours of AKI education in a variety of different formats, interim feedback at qualitative evaluation dress rehearsals has been that some staff still would have liked to have had more exposure to training. This follows the previous point regarding clinical pressures preventing access, and this is a factor that may differ across the MDT (e.g. junior doctor teaching sessions are now protected time, but this may not be provided for nursing staff).

Care bundles

The key learning from developing AKI care bundles across the centres was that all needed to be adapted after initial rollout in response to end-user feedback. This was notable even though each centre's AKI team (containing substantial AKI expertise) had spent considerable time debating the content of their care bundle and how best to adapt it prior to initial launch. However, usability and appearance of the bundles still needed subsequent refinement. As an illustration of this, Bradford Trust has a paper based care bundle and worked closely with the test ward to adapt and improve from feedback from the staff using it

in practice. The implementation team felt it was crucially important to be able to feedback compliance and uptake of the bundle to the team in order to understand some of the challenges faced and try to overcome these. Figure 3 shows the methods used within the Bradford team and figure 4 how the care bundle evolved in response to this.

"Having feedback from stakeholders before implementing is really useful, so putting something out there that you haven't had feedback from the actual people that are using it, is not going to be helpful when you're trying to scale-up. And having input from the full team is really important, so everyone, even if they're not actually using the intervention, but if they're involved in the process in any way, that they should be involved in, in the planning and design"

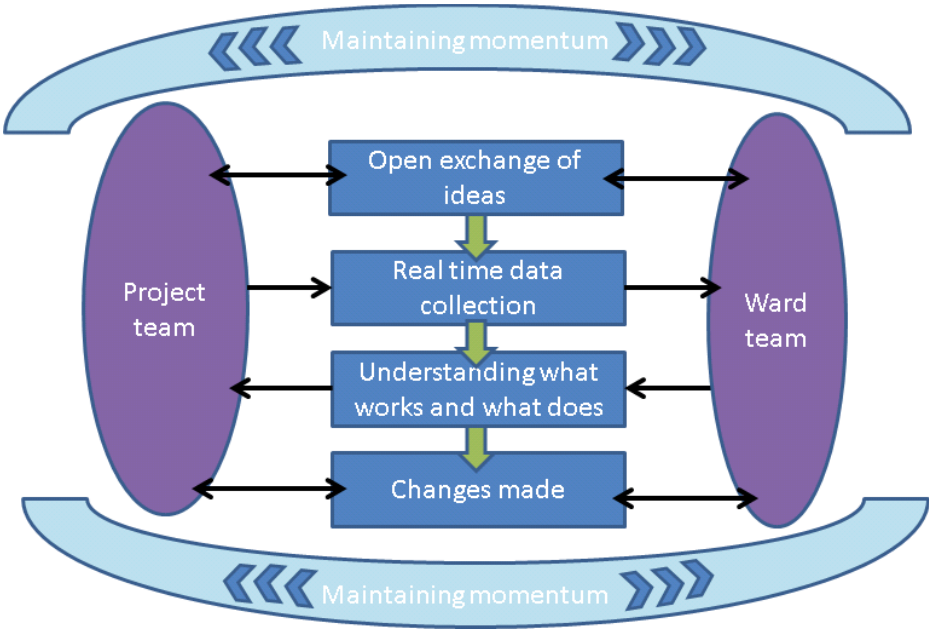

Figure 3.

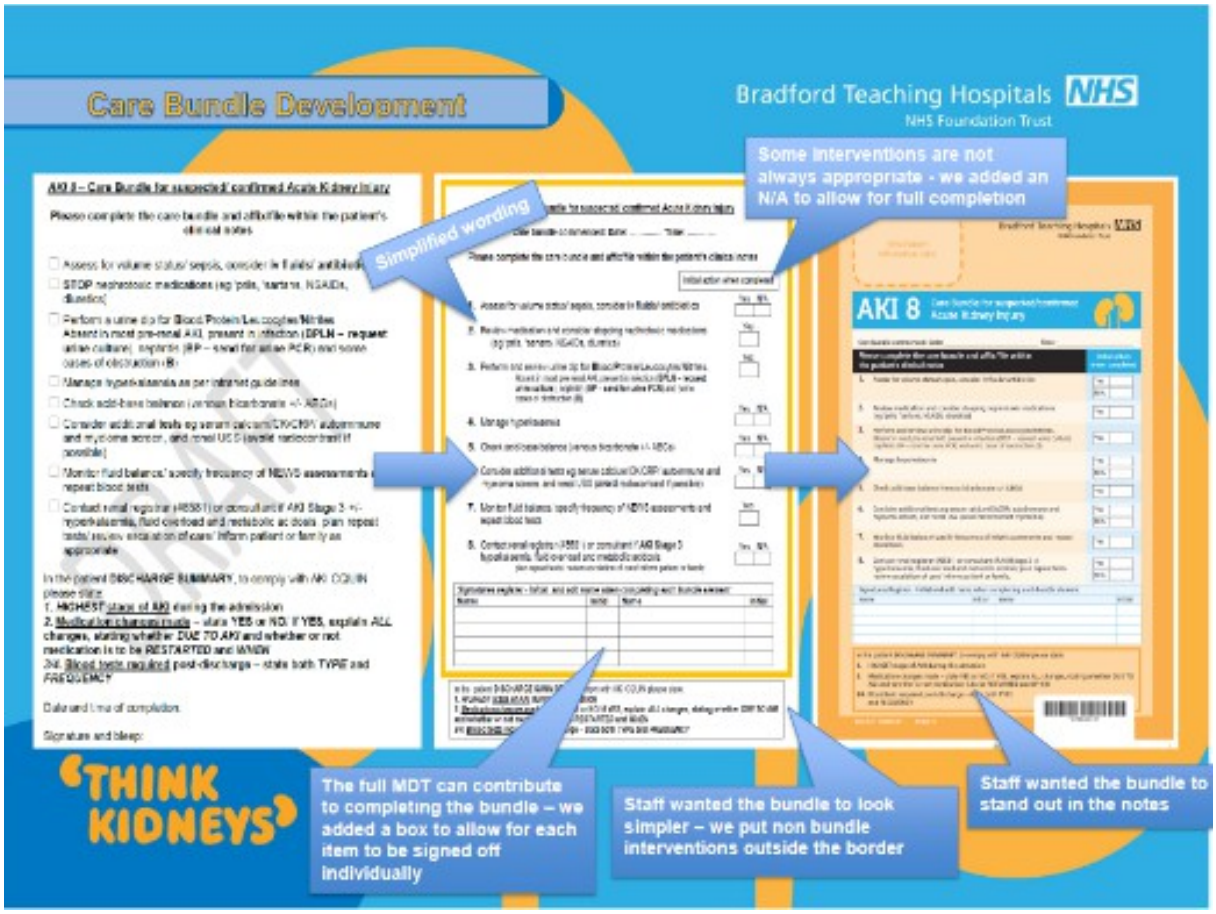

Figure 4.

References

1. Selby NM, Crowley L, Fluck RJ, et al. Use of electronic results reporting to diagnose and monitor AKI in hospitalized patients. Clin J Am Soc Nephrol. 2012;7(4):533-40.
2. Xu G, Baines R, Westacott R, et al. An educational approach to improve outcomes in acute kidney injury (AKI): report of a quality improvement project. BMJ Open. 2014;4(3).
3. Kolhe NV, Staples D, Reilly T, et al. Impact of Compliance with a Care Bundle on Acute Kidney Injury Outcomes: A Prospective Observational Study. PLoS One. 2015;10(7):e0132279.
4. Selby NM. Electronic alerts for acute kidney injury. Curr Opin Nephrol Hypertens. 2013;22(6):637-42.
5. Chandrasekar T, Sharma A, Tennent L, et al. A Whole System Approach to Improving Mortality associated with Acute Kidney Injury. QJM. 2017.
6. Ebah L, Hanumapura P, Waring D, et al. A Multifaceted Quality Improvement Programme to Improve Acute Kidney Injury Care and Outcomes in a Large Teaching Hospital. BMJ Qual Improv Rep. 2017;6(1).
7. Wilson FP, Shashaty M, Testani J, et al. Automated, electronic alerts for acute kidney injury: a single-blind, parallel-group, randomised controlled trial. Lancet. 2015.
8. Hemming K, Haines TP, Chilton PJ, et al. The stepped wedge cluster randomised trial: rationale, design, analysis, and reporting. BMJ. 2015;350:h391.