

Improving patient flow in pre-operative assessment

Cameron Stark, Anne Gent, Linda Kirkland
NHS Highland, United Kingdom

Abstract

Annual patient attendances at a pre-operative assessment department increased by 24.8% from 5659 in 2009, to 7062 in 2012. The unit was staffed by administrative staff, nurses, and health care assistants (HCA). Medical review was accessed via on call medical staff, or notes were sent to anaesthetists for further review.

With rising demand, patient waits increased. The average lead time for a patient (time from entering the department to leaving) was 79 minutes. 9.3% of patients attended within two weeks of their scheduled surgery date. 10% of patients were asked to return on a later day, as there was not sufficient capacity to undertake their assessment. There were nine routes of referral in to the department.

Patients moved between different clinic rooms and the waiting area several times. Work patterns were uneven, as many attendances were from out-patient clinics which meant peak attendance times were linked to clinic times. There were substantial differences in the approaches of different nurses, making the HCA role difficult. Patients reported dissatisfaction with waits.

Using a Lean quality improvement process with rapid PDSA cycles, the service changed to one in which patients were placed in a room, and remained there for the duration of their assessment. Standard work was developed for HCWs and nurses. Rooms were standardised using 5S processes, and set up improved to reduce time spent looking for supplies. A co-ordinator role was introduced using existing staff to monitor flow and to organise the required medical assessments and ECGs. Timing of booked appointments were altered to take account of clinic times. Routes in to the department were reduced from nine to one.

Ten months after the work began, the average lead time had reduced to 59 minutes. The proportion of people attending within two weeks of their surgery decreased from 9.3% to 5.3%. Referrals for an anaesthetic opinion decreased from 30% to 20%, and in the month reviewed no one had to return to be seen as a result of limited capacity.

Problem

This improvement project sought to decrease waiting times for patients at a pre-operative assessment service at Raigmore Hospital in Inverness, and to increase the proportion of patients who were seen on the same day as the decision to operate was made. The hospital is a district general hospital serving a large geographical area, and patients often travel long distances to attend out-patient appointments.

Patient attendances at the pre-operative assessment service had increased from 5659 in 2009 to 7062 in 2012, a 24.8% increase. Waiting times in the service had also increased, and not all people who attended could be seen on the day of attendance. 10% of people who attended from an out-patient clinic had to be offered return appointments on other days, resulting in them having to undertake a separate journey.

The waiting room was often busy. Staff worked in individual clinic rooms. Patients moved between the rooms and often had waits in between. Staff reported feeling very busy and were worried about their capacity to deal with expected further increases in numbers.

Case notes were not always available on all patients. Obtaining case notes was a particular challenge in the 10% of patients who

attended for pre-operative assessment within two weeks of the date of their planned surgery. Patients were sent for ECGs outside the department, and this could result in delays. Patients were asked to describe the service, and while many were positive, others used terms such as "busy", "abrupt" and "rushed".

Background

The NHS Institute for Improvement and Innovation [1] notes that pre-operative assessment helps to ensure that patients understand their procedure and are well informed; in good health before their procedure, and have the best chance of good post-operative recovery. They note that good pre-operative assessment procedures can help to reduce cancellations of procedures, and increase the likelihood of admission on the day of the procedure and of early discharge.

The Royal College of Anaesthetists[2] describes pre-operative assessment services as "fundamental to high quality". They advise that all patients undertaking elective surgery should attend a pre-operative assessment clinic, and this assessment should happen as early as possible in the patient's pathway so that obstacles can be overcome and discharge arrangements can be made.

The clinic should be led by nurses or other extended role

professionals. There should be protocols for the assessment, and agreed support from anaesthetists; information should be shared, and there should be use of guidelines, including guidelines for the management of people with specific conditions (such as diabetes).

Previous work has found that the assessment process is important in pre-operative assessment [3] and that waiting times are a common cause for dissatisfaction.[4]

Baseline measurement

In July 2012 - May 2013, the average attendance per day was 28, with a range from 12 - 48. Total attendances had increased substantially, from an average of 472 a month in 2009, to 589 in 2012.

Observations were conducted of the lead time - the time from entering to leaving the department. Three staff conducted observations on three separate days. Patients were approached when they arrived in the unit, and asked if they could be followed during their visit. All patients who were asked, agreed. The range of times for the visit was 20 to 195 minutes, with an average of 79 minutes (mode 104 minutes). There were nine routes of referral in to the Department.

Observations were also made of cycle times, the times for each individual part of the process, and of the wait times between cycles. This was done by observing individual staff members. Other measures were obtained by examining notes and department records. 10% of people who attended from an out-patient clinic without a pre-determined appointment were asked to return on a later date as there was no capacity to see them. The case notes of 30.6% of patients were referred to an anaesthetist for a further opinion.

Annual, monthly and weekly attendances for pre-operative assessment were identified by NHS Highland's service planning department, using information from the patient administration system. Attendances by clinic were also calculated. 9.3% of patients attended within two weeks of their planned surgery date.

Design

We undertook an improvement event, using a Rapid Process Improvement Workshop (RPIW) [5, 6] using lean methods.[7,8] Steps included meetings to agree the scope of the work, to identify the team who would undertake the process improvement work, and to gather information on processes. Monitoring of patient journeys and staff activities was undertaken by several staff members, using standard forms. Processes were mapped, and travel within the department identified using standard work sheets. Percentage load charts were used to describe the patterns of work. Information was combined to produce a value stream map. [9,10]

Idea forms were distributed to staff to obtain suggestions on improvements. A waste wheel, showing types of waste, was placed in the department, and staff could add any identified waste to the

wheel. A large sheet of paper was placed in the clinic, and patients were invited to add words or phrases that reflected their experience in the unit.

During the RPIW, staff decided to change the process of moving patients between rooms to a design where patients were roomed and then remained in that room while staff came to them, with the exception of ECGs which were conducted in a neighbouring department.

As staff would need to work in different rooms, the standard content of a room was identified, and all treatment rooms standardised to this ideal with the intention of reducing walking for staff to obtain supplies. A standard work sheet was created, showing the actions expected.

As the burden of work between health care assistants and nurses was markedly uneven, a rapid review identified which tasks could be undertaken by people in either role, and which tasks required a trained nurse. This was incorporated in to the standard work sheet and a skills matrix, and allowed work to be moved to other staff where appropriate if a bottleneck was developing in the process. An andon (a visual signal) was introduced to allow staff to see which room was in use, and a visual control board was developed to track patients while they were in the department. A new role of shift co-ordinator was developed, and this person was empowered to keep track of the flow through the department and to direct staff to the relevant tasks. This role could be undertaken by any staff member with an understanding of the processes. Plans were developed to reduce the number of referral routes in to the department.

Strategy

Cycles of change were trialled during the improvement event. As the event was conducted in a room adjacent to the pre-operative assessment clinic, it was straightforward to trial changes immediately. Standard work sheets were produced and shared with staff, and revised after feedback. The co-ordinator role was trialled by the third day of the workshop. It proved to be difficult to keep track of patients, and a whiteboard was introduced to allow each patient in the department to be recorded and tracked.

Administrative staff played an important role in both answering the telephone, greeting patients, and obtaining case notes. They were restricted by the physical location of the reception desk, and by the need to stay close to the telephone. The layout of the area was changed during the week, and a cordless headset introduced to allow the administrator to move from their desk. In the weeks following the RPIW, physical changes were made to the reception area to make this role easier and bring notes in to closer proximity to the administrative staff.

The new layout of the rooms was trialled in one room, and amended in three cycles as the required equipment and forms were identified. Standard work sheets were produced on the processes, and photographs were taken so that staff could easily see the required lay out of the rooms and equipment.

BMJ Quality Improvement Reports

During the work it became clear that ward referrals could cause difficulties as the pre-operative assessment clinic could not physically accommodate a bed or a hoist. Consequently, standard work for ward staff was developed, tested, and distributed to clarify what assessment could happen on the ward.

As well as differences by day of the week, there were differences in times of attendance, and the clinic could be very busy at particular times of the day. Further work was undertaken to analyse the conversion rate of individual clinics (the proportion of patients on average referred to pre-operative assessment). Knowledge of this, together with information on average timing of attendance, allowed improved matching of staff capacity to demand.

Results

Baseline measures were collected by a combination of analyses of electronic data, extraction from notes, and observations. A system was later developed to record routinely attendance times and length of time in the department. Data were measured as part of the workshop, and there were follow ups at 30, 60, and 90 days after the workshop. Final data were collected in June 2014, 10 months after the workshop.

At baseline, the average lead time (time taken for service users to enter the department until they left) was 79 minutes. The average lead time was 46 minutes in a trial period on the last day of the RPIW, 58 minutes at 30 days, and 60 minutes at 60 days. Ten months after the RPIW, the lead time measured over a full month was an average of 59 minutes. The median time was 60 minutes (range 5 to 175 minutes, interquartile range 30 to 75 minutes, mode 60 minutes). Most of the longest waits were in people who required an echocardiogram, or who were also seeing a doctor. There was one referral route in to the Department.

In the baseline observations, 10% of people who attended without pre-arranged appointments left before being seen because of waiting times in the department. In the month of data at ten months after the RPIW, no patient was recorded as leaving unseen after arriving at the department. At baseline, 9.3% of patients were attending within two weeks of an elective surgery date. Follow-up data were not routinely available, but was recorded over a six day period. Seven of 131 attendances (5.3%) were in people within two weeks of an elective surgery date.

At 30 days, 60 days, and 90 days there was no reduction in the anaesthetic referral rate. The clinic team undertook further work with a consultant anaesthetist eight months after the workshop and produced guidelines on referral. This was combined with discussion sessions with the consultant. When measured over a six day period ten months after the event, 27 of 131 people (20.3%) were referred for an anaesthetic opinion.

Lessons and limitations

Some information needed for the work could be gathered from electronic systems, but other information needed to be gathered

through manual recording. Following patients through their journey was time consuming, but proved very useful. It meant that the quality improvement staff working on the process had a good understanding of the work, and it also meant that staff knew that the information was based on direct observation.

Capturing ideas from staff on the unit, and supporting staff from the clinic and its neighbouring services to develop and trial the changes produced ownership. Staff had identified most of the issues previously, but had not felt empowered to make changes. Involving staff with information skills, along with estates and medical records staff, meant that changes could be made very quickly. This helped to maintain a momentum, and to show positive signs of improvements during the improvement event.

Having regular reporting dates to monitor progress was very useful, as it set time periods for further activity and helped to produce continued action, which can be difficult when staff return to their day to day duties. Producing information on changes was challenging, as the clinic systems did not lend themselves to recording of lead times. Time had to be identified to undertake these recordings in order to monitor progress.

There were some one off costs in the changes, such as minor building work to re-structure the reception area. Two rooms previously used by the clinic were no longer required when the changes were implemented, and these have been released for use by other services, resulting in potential savings elsewhere in the hospital. During the follow-up period, staffing increased by 0.7 Whole Time Equivalents (a Health Care Assistant, making a 7% increase in staffing). This was partly offset by a decrease of £15,000 in Bank and Agency nursing costs.

Some changes introduced in the workshop week were later altered as staff developed the process further. The use of andons was unnecessary as the co-ordinator was able to keep track of room use. The visual display board also proved to be unnecessary, and was replaced by cards that showed the test to be undertaken on each person.

Other changes were developed by the staff in the ten months after the workshop. Writing up notes in the patient rooms delayed the next patient using the room, so staff altered a room to provide workstations at which case notes could be completed, which produced a form of external set up. This room also contains a terminal with links to test results, which allows some of the preparation for the next patient (or any patients booked by wards for the following day) to be done in advance without using a treatment room.

Conclusion

The aim of this improvement work was to improve the process by reducing waiting times for patients and increasing the proportion seen on the day on which a decision to operate was made. The work aimed to produce a more person-centred service by increasing responsiveness; to increase safety and effectiveness by increasing standard work and to increase efficiency.

This service had experienced a 24.8% increase in demand over three years with no corresponding increase in resource. It had seemed likely that substantial further investment would be required.

The work undertaken found that there were inefficiencies in the existing process, and staff had many ideas on how to improve the quality of the service. Supporting decision-making was an important issue [11] as was found in other pre-operative assessment services.

Harnessing the enthusiasm of the staff, and giving them the opportunity to re-design their work, produced substantial changes. The waiting times within the service decreased, and patients experienced shorter waits. The reduction in the average length of time spent in the department, from 79 minutes to 59 minutes was maintained ten months after the workshop. In a month of observation ten months after the event, no patient had to leave without being seen because of insufficient capacity.

Some of the changes from the workshop were discarded by staff in favour of simpler methods, and some additional changes were introduced. Staff continued to make changes, including the introduction of work stations, the use of standard work on referral for anaesthetic opinions with consultant feedback and teaching, and developed a method of monitoring short notice attendances. The innovation in the period after the improvement event, and the evidence that department staff had taken control of the delivery of their service and felt sufficiently confident to alter it and monitor the impact of changes, was striking.

References

1. NHS Institute for Innovation and Improvement. Quality and Safety Improvement Tools: Pre-operative assessment and planning. NHS Institute for Innovation and Improvement, 2008.
2. Jones K, Swart M, Key W. Anaesthesia services for pre-operative assessment and preparation 2014. In Guidelines on the provision of anaesthetic services 2014. The Royal College of Anaesthetists, 2014.
3. Fraczyk L, Godfrey H. Perceived levels of satisfaction with the preoperative assessment service experienced by patients undergoing general anaesthesia in a day surgery setting. *J Clin Nurs* 2010; 2849-59.
4. Edward GM, de Haes JC, Oort FJ, Lemaire LC, Hollmann MW, Preckel B. Setting priorities for improving the preoperative assessment clinic: the patients' and the professionals' perspective. *Br J Anaesth* 2008; 100(3):322-6.
5. Jackson TL. Kaizen workshops for Lean Healthcare. CRC Press, 2013.
6. Stark C. What's in an RPIW report out? 2013 <http://leanhealthservices.org/2013/5>
7. Dean ML. Lean healthcare deployment and sustainability. McGraw Hill, 2013.
8. Graban M. Lean Hospitals. Improving quality, patient safety, and employee engagement. Second edition. CRC Press, 2012.
9. Tapping D, Luyster T, Shuker T. Value stream

management. Productivity Press, 2002.

10. Jackson TL. Mapping clinical value streams. CRC Press, 2013.
11. Flamm M, Fritsch G, Hysek M, Klausner S, Entacher K, Panisch S, Soennichsen AC. Quality improvement in preoperative assessment by implementation of an electronic decision support tool. *J Am Med Inform Assoc* 2013; 20:e91-6.

Declaration of interests

Nothing to declare.

Acknowledgements

Lee Darrow, Virginia Mason Institute.

Mr Nick Abbott, Christine Bickers, Lucy Briggs, Angela Brown, Sophie Clark, Ann Dalgety, Alison Finlay, Chrisan Folan, Carl Hope, Dr Jacqui Howes, Donna Janssens, Colin McEwan, Elaine Mackenzie, Donald MacLeod, Edna Montgomery, Elizabeth Mathieson, Catriona Marshall, Janice Pickering, Dawn Russell, Norma Rutherford, Fiona Tolmie and Jane York, all of Raigmore Hospital, Inverness.

Gavin Hookway, Lynda Thomson, and Gill Cooksley, Kaizen Promotion Office, NHS Highland.

Rachel Hill and Gaye Jaffrey, Clinical Governance team, and Sharon Davies, Service Planning Department, NHS Highland.