Improvement methods for healthcare pathway redesign: rapid literature review

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Context

The Access Quality Improvement Programme (Access QI) will support the implementation of the Waiting Times Improvement Plan by ensuring improvement science is routinely available to support delivery of reduced waiting times, and will have a particular role in supporting improvements in patient pathways using quality improvement methodology.

A rapid literature review was requested to help inform a pathway redesign quality improvement methodology for Scotland by providing a summary of what existing systematised methods have been applied to healthcare pathway redesign and any evidence around the impact of applying them.

Literature search

A systematic search of the literature was not possible due to the time constraints of the request. Instead, a quick search was conducted on 21 January 2019 of the following databases: Embase, HMIC, Medline, and Web of Science. Results were limited to English language publications from the last five years. To supplement the database search, key organisation websites were browsed and citation tracking used. A full list of resources searched and terms used are available on request. As this search yielded few relevant sources, the following literature summary is based largely on sources identified through ad hoc iterative online searching.

Literature summary

Sheffield Flow Coaching Academy approach

The Sheffield Flow Coaching Academy builds on two previous Health Foundation supported programmes: Flow Cost Quality and the Sheffield Microsystem Coaching Academy. A social franchise model is key to the Flow Coaching Academy programme to replicate the Academies nationally as a standard way to approach condition-based pathway improvement. The Academy provides a 12-month action learning training programme to give frontline staff the skills to coach improvement with local pathway teams in a 'Big Room' setting. Coaches come as pairs: one clinical from within the pathway and one external to provide balance and perspective. The course covers team coaching skills, a Flow Roadmap to guide improvement, data skills and the psychology of improvement and behaviour change concepts. Pathways are defined at condition level and developing ways in which the patient voice can be represented – and ultimately where care can be co-produced – is actively encouraged.

RAND Europe is undertaking an independent evaluation of the Flow Coaching Academy programme from which results are not yet published ([RAND](#)). A 2018 Health Foundation source notes that there are four active local Flow Coaching Academies and the aim is to set up three more in 2019[1].

HealthPathways

HealthPathways grew out of the New Zealand Health Ministry's drive to cut waiting times and is considered to be one of the district of Canterbury's most innovative and most effective changes[2]. HealthPathways is a set of local agreements on best practice, based on international evidence but built around available resources. The pathways are initially developed by bringing hospital practitioners and GPs together in the same room, then in the later stages bringing in nurses, allied health professionals and funders. There is relatively little formal patient input – it is described as a patient-centred design because the central question it asks when redesigning service pathways is 'How will this improve life for patients?' The pathways are routinely reviewed at one year, and then once every two years, but can also be changed when demand forces a tightening of the referral criteria or if powerful new evidence emerges.

In terms of impact, Canterbury moved from a position where its main hospital in Christchurch regularly entered 'gridlock' – with patients in its emergency department facing long waits – to one where that rarely happens[2]. HealthPathways has helped to ensure that only those patients who need an outpatient appointment get one, resulting in better use of hospital resources. Based on waiting time saved for a selection of its most effective condition-based pathways, the Canterbury health system claims to have saved patients more than a million days of waiting for treatment in just four clinical areas. Impact on the absolute quality of care often has to be inferred from other indirect measures. According to those involved in the design of the pathways, the process of creating the pathways is as essential as the outcome: that is, the communication between hospital specialists and GPs sitting down together discussing what the problems are, and the trust that is gradually built from these exchanges, is crucial to HealthPathways' success[2].

Canterbury's other initiatives implemented alongside HealthPathways are adaptations of lessons learned from elsewhere and as such their approach has many similarities with other examples of improvement in healthcare literature[2]. This includes sustained investment in providing staff with the skills needed to innovate, and supporting them when they do. Central to this is an ongoing commitment to enable change to take place 'from within' and pointing staff towards techniques that help them analyse and solve clinical and organisational problems. This is reflected in continuing investment in the '8' programmes, including Xceler8, Particip8 and Collabor8, for staff, including staff who work in the community but are not directly employed by the board. In Xceler8, staff undergo a week-long exposure to lean, six sigma and other system-wide thinking techniques.

HealthPathways' results in Canterbury have been sufficiently impressive for others in New Zealand and Australia to attempt to replicate it. An evaluation of its implementation in five 'Medicare Locals' in Australia found evidence of impact on improving collaboration between acute and primary care sector clinicians and clinicians' experience of patient care. However, there was no evidence, in the early stage of implementation when the evaluation was

conducted, of impact on system performance indicators such as waiting times for hospital services[3]. It noted that measuring the impact of HealthPathways in isolation of associated activities and initiatives is challenging and it is widely accepted that significant system level impacts of HealthPathways will not be seen in the short term.

Whole System Flow methods

The Health Foundation published an evidence scan in 2013 on methods used to improve patient flow across organisations and care pathways[4]. It found evidence that methods to improve patient flow can enhance throughput and reduce waiting time. However, many different methods have been used, few studies provide enough detail about the exact approaches used or step-by-step guides to allow replication, and few studies have explicitly compared whether one methodology is more effective than others. Moreover, little has been published about the impacts of methods to analyse or improve flow on outcomes. Overall, the evidence suggested that quality improvement approaches, such as lean and six sigma that address variation, may help tackle patient flow issues across pathways of care. However, the true impact of these approaches is difficult to judge.

Two key learning points on the use of quality improvement methodologies emerged from the evidence scan[4]. Firstly, a number of methodologies can be used to analyse and improve flow, but localised adaptation is key – research has shown that it is possible to transfer techniques such as lean, queuing theory and capacity analysis to a healthcare context, but it is essential to recognise contextual factors and adapt the methods appropriately. Secondly, it is essential to undertake detailed diagnostic work, and real-time demand and capacity management may be key. Undertaking an appropriate needs assessment and analysis of potential bottlenecks, then trying short tests of new approaches has been found to work well, but there is no evidence to suggest that one method of analysing flow is any more effective than another. Instead, it appears useful for organisations to select easy to use approaches that fit with data availability and involve multiple stakeholders in exploring the findings and planning next steps: *"In other words, it is not the exact method used that appears important, but rather the process of examining flow and bottlenecks and engaging the wider team in generating solutions."* Using resources that display data visually, such as statistical process control charts, fishbone cause and effect diagrams or pathway diagrams may help to get wider groups of staff engaged[4].

In a more recent report the Health Foundation set out a multilevel organising framework for improving whole system flow, supported by case studies of innovative and effective practice[5]. It includes a structured approach for improving flow at the care journey level that draws upon learning from the Health Foundation's Flow Cost Quality programme that aimed to improve patient flow along emergency care pathways in two NHS foundation trusts in Sheffield and South Warwickshire. The trusts were encouraged to use the structured lean A3 improvement process, which helped the teams to understand the root cause of problems and develop tests of change, and proved to be a powerful method for changing the beliefs and behaviours of

those involved. Overall, the programme demonstrated that a combination of lean approaches, strong system leadership and broad stakeholder engagement can be employed successfully to reshape health and social care services[5].

In its consideration of implementation, the latter report describes a case study on how partner organisations in Darlington worked together to redesign dementia services to achieve improved flow across organisational boundaries as one of the few instances of this type of whole system redesign in the UK[5]. One of that collaborative's aims was to determine whether a consistent approach to improvement would work across organisational boundaries. The approach it used was based on the Virginia Mason Production System (VPMS) of applying lean methodology. Its reported improvements included a reduced lead time for patients to be seen by liaison psychiatry[5]. That initiative grew out of the work led by the former strategic health authority on the North East Transformation System (NETS). An independent evaluation of the impact of the NETS, including impact on reduced waiting times, illustrated the challenges of conducting research in complex systems and concluded that it would be inappropriate to list a set of firm recommendations which, if adopted, would allow the NETS to be replicated and to succeed elsewhere[6]. One of its key implications, however, was to avoid becoming fixated on the method – in this case the quality improvement methods derived from VPMS – as an end in itself rather than a means to an end, as what accounted for the NETS's appeal and central difference from other change approaches was its focus on culture change and ensuring that was sufficiently embedded caused the greatest challenge for some study sites[6]. Staff engagement is a key feature of the VPMS approach, embedded through sustained effort to create a culture of learning in which tools can be applied successfully to drive continuous improvement[7].

There is a resource on [Flow](#) to reduce unnecessary waits in NHS Improvement's online library of Quality, Service Improvement and Redesign (QSIR) tools that suggests a step-by-step approach on the basis of lean principles.

Approaches integrating lean with other methods

A recent article explores overlap and synergies between lean and Integrated Care Pathways (ICPs) and provides a conceptual framework for how these two approaches could be combined to help care pathway designers and implementers consider the benefits of applying both approaches to improvement[8]. The framework's starting point is understanding value from the pathway users' (patient and/or carer/relative) perspective, followed by mapping the care pathway, patient flow analysis, pulling resources to the patient (requiring demand information), empowering teams and individuals (including users) to undertake improvement and finally sustain incremental change to continually work towards perfection. Embedding Plan- Do-Study-Act cycles within existing work patterns, it is suggested, may help to ensure ICPs and processes are reviewed within the dynamic context that they exist. This framework still needs to be tested empirically so there is as yet no information on impact[8].

A recently published book considers how to bring together the two improvement paradigms of lean and agile, dubbed 'leagility', to provide an approach that is useful for the (re)design of patient pathways[9]. It explores how 'decoupling points' have been used within supply chain design and proposes how this concept can be used in healthcare. It reviews the limited literature on leagility in healthcare and proposes a conceptual framework where lean, agile and leagile may be used to help deliver seamless healthcare services and improve the design of patient care pathways. Further information from this book or any examples it may include could not be obtained within the time available to produce this summary.

An earlier publication describes integration of lean methodology with queuing theory in a three-step model (LEAN-HC) comprising physician directed queuing, value stream mapping, and applying lean methods to continually improve (de-bottleneck) the care process stream[10]. The article outlines its application in three hospital emergency department sites, particularly with regard to patient wait time. A citation search (for subsequently published studies citing this study) failed to identify any more recent examples of the application of this approach.

Another published integrated methodology for process improvement describes combining data collection and representation methods for process mapping (each method having some limitations when used alone)[11]. This entailed combining multidisciplinary meetings and walking the patient journey for data collection with a combined RACI (Responsible, Accountable, Consulted, and Informed) matrix and Swim Lane Diagram (RACI-SLA) for data representation. A multidisciplinary cancer centre case study in the USA was used to illustrate the effectiveness of the proposed methodology, which showed process time savings per patient for different treatment scenarios. A citation search failed to identify any more recent examples of the application of this approach.

Microsystems approaches

A recent journal article reports on learning from a Dartmouth Clinical Microsystems (CMS) quality improvement approach to integrated care across the Sheffield Falls Care Pathway[12]. This initiative was previously described in the grey literature[13]. The Dartmouth CMS approach involves training coaches in CMS methodology and improvement science who then facilitate local frontline microsystem teams (including patients and carers) to progress through defined stages of improvement. Among its reported achievements is progress towards achieving change in relation to key aspects of the falls pathway that were identified to be problematic: streamlining the referral process, for example, led to improvements in the number of patients being referred appropriately and the timeliness of referral, and a reduction in waiting times for the 'level 3' falls outpatient clinic service. The use of CMS methodology was also seen to empower staff and clinical managers in taking on improvement work, thereby providing a foundation upon which further service transformation could be based.

An earlier Institute for Innovation and Improvement evaluation within an NHS England context concurred with many of the claims made of the CMS approach in relation to the

flattening of hierarchies and motivating a range of staff groups to become involved in service improvement[14]. It found that CMS implementers appeared to adopt and embody principles of practice that were conducive to ongoing change and improvement – implying an underlying shift in culture, making future innovation more achievable. It thus provided support for the claims made regarding the 'integrating' potential of CMS compared with problem-based approaches to improvement. The study found a relative absence of outcomes data and a lack of measurable impact on key areas, consequently emphasising the importance of strong data collection in achieving 'high performing' status. Its recommendations for future microsystem programmes included the need to address patient involvement as well as process/outcome monitoring (but, bearing in mind that this study was published in 2009, this may not accurately reflect the current situation).

Theory of constraints

The QSIR has a resource on Theory of Constraints (TOC), an approach to identifying the most important limiting factor (or constraint) that prevents any system or process from meeting its goal, and then systematically improving that constraint until it is no longer the limiting factor. It suggests tools and techniques to use at each step of the 5-step TOC method. A study published in 2005 that assessed the impact of applying TOC in an NHS Trust found some evidence of impact on reducing patient waiting lists; and also highlighted the need to take context and the wider system into account to maximise the benefits of using TOC[15].

Conclusion

The reviewed systematised quality improvement approaches that have been applied to healthcare pathway redesign suggest a number of effective principles. Local engagement is commonly identified as a key feature of success, together with sustained commitment to embedding a learning culture to enable change and continuous improvement to take place from within the system. Successful approaches to redesigning care pathways, resulting in improved outcomes, including waiting times, have adopted various quality improvement methodologies, commonly including lean methodologies, but localised adaptation is key. It appears that a systems-wide perspective and enabling the wider team, including service users, to become collectively involved in ongoing service improvement is more vital to success than the use of particular quality improvement methods or tools.

As this review is based largely on sources identified through ad hoc iterative online searching, other relevant sources of information about systematised approaches using quality improvement methods to support healthcare pathway redesign may have been missed.

References

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