

# Organisational interventions to reduce length of stay in hospital: a rapid evidence assessment

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## Scientific summary

### Interventions to reduce length of stay in hospital

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# Scientific summary

## Background

The NHS is under pressure to meet growing demand while ensuring continuous improvement in quality, and NHS organisations are expected to make large efficiency savings over the next decade. Efforts to reduce length of stay in hospital are considered an important measure to enhance efficiency. The existing evidence on effective interventions to reduce length of stay in hospital is wide-ranging and complex, however, with interventions ranging from planned shorter stays, such as day surgery, to those seeking to facilitate discharge of patients who have to stay in hospital longer. Factors driving length of stay are complex and include those acting at the health system, organisational and patient levels, and the interface between these.

There is a need to better understand the diverse literature on reducing the length of hospital stay. This study seeks to contribute to this effort by presenting a rapid evidence assessment (REA) of organisational interventions aiming to reduce length of stay, with a particular focus on patient management processes in hospital or hospital-initiated services delivered in the community.

## Objectives

Principally drawing on a REA, we sought to:

- describe the nature of initiatives and interventions that have been used to reduce length of stay in acute care hospitals
- identify modifiable factors known to influence length of stay
- assess the impact of interventions to reduce length of stay on patient outcomes, service outcomes and costs.

## Methods

We conducted a REA of the available literature. The review was informed by a conceptual framework, and in consultation with the advisors to the project we focused the review on organisational interventions, with a particular emphasis on patient management processes in hospital or hospital-initiated services delivered in the community to help identify the modifiable factors that have an impact upon length of stay.

Search terms were identified using the National Library of Medicine's Medical Subject Headings keyword nomenclature developed for MEDLINE. We searched MEDLINE (Ovid), EMBASE, the Health Management Information Consortium and System for Information on Grey Literature in Europe for the period January 1995 to January 2013.

We considered organisational interventions set in or initiated from acute hospitals, and excluded studies that examined a specific clinical intervention only (e.g. a surgical technique or new pharmacological treatment) or assessed enhanced recovery, fast-track or clinical care pathway initiatives related to elective surgery. We further excluded studies related to length of stay in obstetrics, psychiatric day hospitals, accident and emergency departments and intensive care units where this was the only aspect of hospital stay considered. We applied a cut-off of 10 years; systematic reviews published before 2003 were excluded from the review, as were primary studies reporting on data collected before 2003. We limited the

evidence to studies conducted in high-income countries and published in the English, French, German, Dutch and Spanish languages.

The primary outcome of interest was length of stay. Eligible studies had to report a quantified estimate of the impact of the intervention under study on length of stay. Secondary outcome measures were clinical outcomes and patient experience; carer and staff outcomes; utilisation; and costs.

Records identified by searches were assessed for inclusion by scanning titles and abstracts against inclusion and exclusion criteria to identify potentially relevant studies. This was led by two researchers who independently screened the same sample according to the initial set of selection criteria, with differences resolved through discussion. Data from studies identified as eligible for review were extracted into a data template, according to study design and objective(s), intervention(s) under study, methodological approach, reported outcomes and identified limitations. A minimum quality threshold was set based on clarity of reporting of research question(s), methods and results. A narrative synthesis approach was used and studies were analysed and reported according to the stage of the patient journey on which they sought to have an impact.

We supplemented the review with a series of exploratory key informant interviews with a small set of NHS managers and clinical leads in four acute NHS trust sites in England. This component of the research was designed to help place the findings of the evidence review in the NHS context, and so inform how our findings might best be used to meet the needs of the NHS.

## Findings

A total of 53 studies met our inclusion criteria, comprising 19 systematic reviews and 34 primary studies. Primary studies included eight randomised controlled trials (RCTs), four non-RCTs, three controlled before-and-after studies, 17 before-and-after comparisons, one cross-sectional study and one retrospective cohort study. Primary studies were set mostly in the USA ( $n = 12$ ), Australia ( $n = 8$ ) and the UK ( $n = 7$ ), with the remainder set in the Netherlands, Belgium, Italy, Spain, Sweden and Switzerland.

Of the studies identified, 29 assessed interventions targeted at the stay in hospital (11 systematic reviews, 18 primary studies); 15 evaluated interventions aimed at discharge (five systematic reviews, 10 primary studies); and nine examined clinical care pathways (three systematic reviews, six primary studies).

There was evidence of the potential for a range of interventions involving multidisciplinary teams or care models to reduce length of stay. These included some forms of organised stroke care delivered in dedicated units when assessed against alternative service provision, and multidisciplinary rehabilitation that included exercise for older patients with acute exacerbations of a medical condition. There was also, albeit somewhat weaker, evidence pointing to a beneficial impact on length of stay of multidisciplinary, hospital-initiated nurse-led case management for older people and, possibly, heart failure patients. Selected multidisciplinary interventions involving some form of geriatric assessment may also be promising in their potential to reduce length of stay; however, relevant evidence was based on small or uncontrolled studies only and needs to be interpreted with caution. Similarly, there may be potential for selected nurse-led interventions to reduce length of stay, although the impact of interventions is difficult to interpret in the absence of a controlled study design. In several instances, observed improvements were attributed to changes in best practice adherence.

There was evidence of the potential of selected staffing models to reduce length of stay, such as adding a specialist nurse, using midwifery teams, changing the frequency of consultant ward rounds or adding a pharmacist to the clinical team. The evidence remained inconclusive for the provision of additional physiotherapy out of hours and palliative care consultation services. In all cases, the authors cautioned

about the robustness of the available evidence and highlighted the need to interpret findings against the background of other outcomes, such as clinical outcomes, potentially benefited by the intervention.

Among interventions aimed at discharge, early supported discharge showed the greatest effect on length of stay, although discharge planning and supported discharge may lead to a range of other benefits whereas early supported discharge may be associated with greater subsequent hospital utilisation. There was also some, albeit limited, evidence that interventions could be associated with savings for early supported discharge and discharge planning with postdischarge support. There was some suggestion that individual or discrete interventions such as discharge planning or postdischarge medication review on their own may convey little beneficial effect in relation to length of stay, whereas a combination of interventions or sets of interventions are more likely to be effective with regard to this outcome.

Evidence from evaluations of clinical care pathways suggests a positive impact on length of hospital stay and patient outcomes such as mortality. Additional benefits were evident in terms of improvements in processes or teamwork, reduced delays in discharge and better collaboration within the team.

Interventions considered in the review highlighted the need to interpret length of stay in hospital in the context of hospital (re)admissions, noting that although length of stay might not necessarily be reduced as a consequence of the intervention, the overall number of patient-days might be lower as a result of observed reductions in (re)admission rates. Furthermore, where an intervention has been found to increase length of stay, it is not to say that such an increase is necessarily inappropriate, as other outcomes may have improved. In the case of nursing-led inpatient units, for example, although length of stay increased, ability to live independently and functional status were improved.

We also found that several interventions that did not appear to have an impact on length of stay contributed to improvements in patient outcomes, such as reducing mortality and complications rates, and organisational outcomes, such as streamlining processes and increasing inter- and intrateam collaboration. Overall, the potential for any particular intervention to reduce length of stay will be highly context dependent, depending on the underlying problem and the current model and quality of service provision.

Finally, evidence reviewed was mixed with regard to the extent to which interventions seeking to reduce length of stay were associated with cost savings. Much of the evidence from primary studies was from countries outside the UK, making transferability difficult, and information on costs was typically inferred rather than measured directly and assessed from a health perspective only. Understanding the cost consequences of reductions in length of stay for the wider health system and for patients and families will be important.

## Conclusions

In this study we sought, by means of a review of the published literature, to describe the nature of strategies that have been implemented to reduce length of stay, identify modifiable factors known to influence length of stay, and assess the impact of these interventions on patient outcomes, service outcomes and costs. Evidence reviewed in this report points to selected types of interventions that have the potential to reduce length of hospital stay. These were:

- Multidisciplinary team care, for example some forms of organised stroke care. This may include care from specialist geriatricians and rehabilitation specialists.
- Improved discharge planning. This may lead to a range of benefits including more efficient and rapid processes in completing paperwork, better communication between primary and secondary care and increased satisfaction among patients.

- Early supported discharge programmes. These show potential for significant reductions in length of stay without an increase in subsequent readmissions. Postdischarge programmes without a focus on early discharge did not appear to reduce length of stay.
- Clinical care pathways. These include an explicit statement of goals and key elements of care, and the co-ordination of the care process by co-ordinating and sequencing the activities of the care team. This needs to include good communication among team members and with patients and families. The approach requires structured care plans detailing essential steps in the care of the patient.

We also found that nursing-led inpatient units were associated with some improved outcomes but, if anything, increased length of stay. However, there was also some evidence of potential adverse effects, suggesting the need for close monitoring if implemented as a strategy.

The diversity of evidence identified emphasises that the design and implementation of an intervention seeking to reduce (directly or indirectly) length of stay should be informed by local context and needs. This involves understanding how the intervention is seeking to change processes and behaviours that are anticipated, based on the available evidence, to achieve desired outcomes ('theory of change'). It will also involve assessing the organisational structures and processes that will need to be put in place to ensure that staff who are expected to deliver the intervention are appropriately prepared and supported.

### Recommendations for research

Reviewing the evidence presented in this report, we have identified a number of gaps in the evidence that would benefit from further research to usefully inform practice. We offer a small set of recommendations for further research, relating to the design, implementation and evaluation of organisational interventions seeking to reduce length of hospital stay.

- Greater attention should be given to the theoretical underpinning of the design, implementation and evaluation of interventions or programmes. Only a small number of studies reviewed in this report provided detail on the design of the intervention(s) under study, and the extent to which this was informed by a 'theory of change' also guiding implementation and evaluation. Explicit definition and reporting would help to advance the literature in the field and improve learning from one context to another.
- There is a need for further research using appropriate methodology to assess the effectiveness of different types of interventions in different settings. Our review highlighted methodological shortcomings that prevented us from being able to confidently interpret some of the results. Future research should focus not only on the impact of such interventions on length of stay as the indicator of success, but should set this in relation to other impacts such as patient outcomes, service utilisation and costs more broadly. Careful consideration should be given to study design including treatment allocation and choice of comparator.
- Different evaluation approaches may be useful, and closer relationships between researchers and NHS organisations would enable more formative evaluation. One approach to address design and reporting shortcomings of current research lies in the capacity of stakeholders to embed evaluation in the design of an intervention, or at the early stages of the implementation phase. Benefits of such research practice would include the possibility of adapting the intervention protocol to the needs and resources of the organisation at different points in time. Other approaches such as a realist review have the potential to address the questions of what works, where, why and for whom – questions which were repeatedly raised through our review. Such an approach would aim to identify the drivers of and barriers to change, disentangling the influence of the local and organisational contexts from the impact of the interventions themselves, and contributing to the production of practical guidelines for health-care managers.

- Full economic costing should be undertaken where possible. Studies reviewed in this report provided some tentative evidence to support the assumption that interventions aimed at reducing length of stay may be associated with cost savings. However, costs were generally poorly reported, and findings are not easily transferable across settings, in particular from studies carried out in different health systems. Further research is needed that considers the cost implications for different stakeholders in the system, and takes a societal perspective to capture costs that affect the wider local health economy.

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