Seven ways to improve quality and safety in hospitals

An evidence based guide

DUQuE

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Executive summary

This guidebook aims to provide an up-dated framework to assess quality and safety improvement in hospitals. It is based on state-of-the art research and synthesises the results of the DUQuE Project and other large-scale empirical studies, systematic reviews, and expert knowledge. The key findings of this synthesis are reflected in "Seven ways to improve quality and safety in your hospital".

They consist of the following:

1. Align organisational processes with external pressure
2. Put quality high on the agenda
3. Implement supportive organisation-wide systems for quality improvement
4. Assure responsibilities and team expertise at departmental level
5. Organize care pathways based on evidence of quality and patient safety interventions
6. Implement pathway-oriented information systems
7. Conduct regular assessment and provide feedback

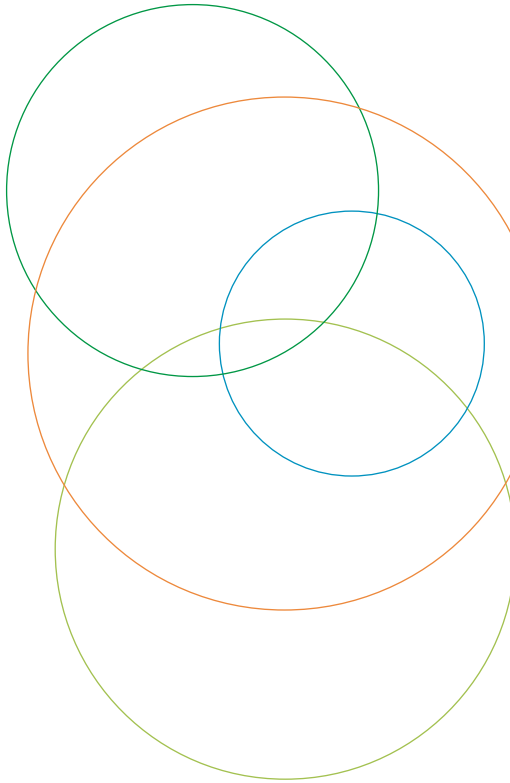
Hospital managers, quality managers, and professionals can use this tool to reflect on their organisation's strategy for quality improvement, to identify specific actions aimed at improving their strategy and applying it throughout the organisational units. Purchasing agencies can use this tool to ask care providers critical questions about their ways to improve quality and safety.

Seven ways to improve quality and safety in your hospital
Multiple strategies and tools to improve quality and safety work have been demonstrated to be effective in improving quality and safety at the micro system level. The purpose of this document is supporting management aligning the use of such strategies and tools. Emphasis is placed on cross-cutting issues such as oversight and leadership, building support systems for quality improvement and providing the necessary resources for high quality care to be provided.

The seven ways to improve quality and safety cover the following:

1. Align organisational processes with external pressure
2. Put quality high on the agenda
3. Implement supportive organisation-wide systems for quality improvement
4. Assure responsibilities and team expertise at departmental level
5. Organise care pathways based on evidence of quality and safety interventions
6. Implement pathway-oriented information systems
7. Conduct regular assessment and provide feedback

For each of the seven strategies, we provide an overview on the underlying evidence base, highlight key issues for further development and suggest prompts that can be used by quality managers and their teams to guide local question asking and reflection. Multiple assessment tools are referred to that can be used to support reflection processes with quantitative measurement.



Purpose of this document

Research on quality improvement methods has resulted in a wide range of assessment tools, statistical techniques and improvement applications in the last decade. There is substantial evidence for a large number of clinical and non-clinical interventions to improve the quality of care. This is in mismatch to the persistent variations in quality and safety that are consistently documented in the literature and in the media.

For those in charge of planning and implementing quality management, the wealth of information on quality and safety interventions creates a problem.

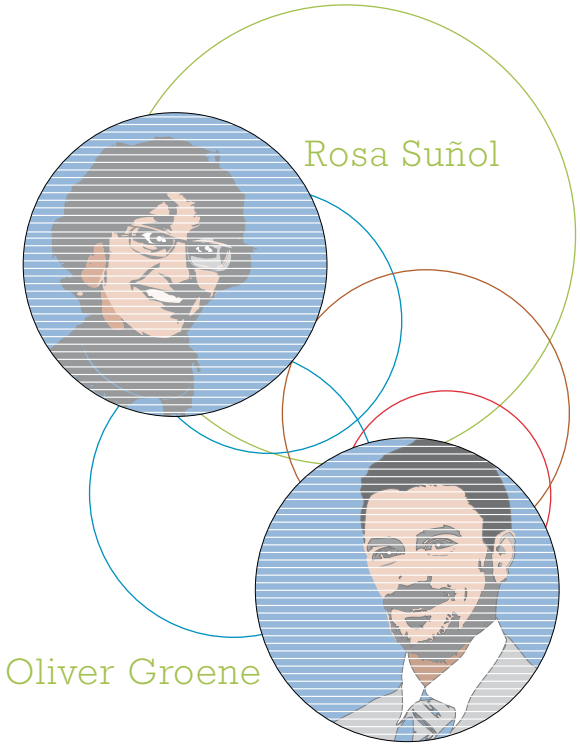
This document aims to provide an up-dated framework to assess quality and safety improvement in hospitals. It is based on state-of-the art research and synthesises the results of the DUQuE Project and other large-scale empirical studies, systematic reviews and expert knowledge.

It does not cover every quality strategy but rather takes a birds-eye view to support managers in reflecting on their organisation-wide approaches to ensure quality and safety. Interactive links are included to specific assessment tools from the literature or generated by the DUQuE Collaboration.

> The number of quality improvement tools is overwhelming.
> The question is: where to start?
> And: how do I translate hundreds of approaches into a coherent strategy?

This document is not meant to be prescriptive. Hospitals differ structurally, in terms of the services they are providing (and the patients that are receiving them), their professional workforce and the maturity of their quality and safety management systems. It remains the responsibility of professionals and managers to set local priorities for their engagement with quality and safety. However, some of the lessons synthesized here are likely to be relevant for any hospital, whether a community hospital or large university clinic, whether providing internationally recognized services or operating in a resource-constrained environment.

The framework provided here complements well-established clinical quality improvement interventions. What it aims to add is a deeper understanding of an organisation-wide approach to ensuring quality and safety.



1. Align organisational processes with external pressure

External pressure may take different forms, such as external assessment programmes (regulatory inspection, accreditation or certification) or pressure enforced by hospital league tables, public inquiries or media scandals.

There is mounting evidence to suggest that undergoing accreditation improves the organisation of work processes, promotes changes and professional development. The effectiveness of accreditation and clinical certification programs has been researched in close to 100 scientific studies. Very few evaluations have been published on the application or impact of ISO certification or regulatory supervision.

Nevertheless, despite these effects, the impact of health care accreditation and certification on health care outcomes remains unclear. It may thus be a particular advantage for hospitals that are aiming to clarify and organize work processes, but should not be regarded as a single tool to improve health care outcomes.

Accreditation of health care services • » view matrix «

Other forms of external pressure include collaborative audits, comparative performance data, professional regulation, governmental inspections, and the public media. Media coverage of high profile events raises concern about the safety and competence of specific institutions or individuals; it often goes on to ask whether similar failures could occur in other settings. Hospitals frequently fail to learn from such cases, falling into defensive routines aimed at minimising legal risk instead of taking the opportunity to review and reflect on their own culture, performance and systems.

> “External assessment supports assurance of payers, patients and the public at large. It helps to raise the bar. It also stimulates internal quality improvement and helps to align work processes.“

PROMPTS FOR REFLECTION:

- Before embarking on a new external assessment programme, first take stock of what processes are already in use at hospital and department or specialty level. Do not confine the mapping to patient safety; include staff safety, buildings, maintenance, utility supply, hotel services and environment.

- Processes could include self-assessment (using validated tools), peer review (between departments or external), benchmarking (e.g. with clinical registries, reference laboratories), ISO certification, accreditation (of facilities, training) as well as mandatory inspection for licensing or registration (e.g. radiation, pharmaceuticals, environment, fire safety).

- Information should be gathered regarding: Who provides these assessments, what do they include, what standards or criteria are used, how often are they done, to whom are results reported and what do they cost?

Starting external assessment

Hospital-wide self-assessment would be an early step in any accreditation programme, using the standards and tools of the selected accreditation organisation. Many of these organisations make their standards freely available on their website but usually without detailed criteria and scoring rules. Governmental and intergovernmental (eg Council of Europe, European Commission, WHO) websites tend to be more generous with sharing intellectual property of standards and assessment tools. Self-assessment tools for specific functions or departments are available from various sources and in various levels of sophistication.

Peer review schemes are operated by many professional specialist associations, both national and European. Clinical registries in general are well-developed in Scandinavia but many specialist groups, such as cardiac surgery, extend across Europe. Many registries and peer review schemes are willing to include colleagues in other countries. One specific form of benchmarking in clinical laboratories is ''external quality assurance''; this has been shown to reduce variability in test results by continually feeding back on performance of individual laboratories.

Uptake of external assessment

The availability and uptake of external assessments vary between countries and within countries (at national, regional and municipal level). Based on the results of the DUQuE questionnaire, the most frequent voluntary external assessment in that sample was ISO 9001 certification; 113 of 178 respondents (63%) had some type of certification at some time, compared with voluntary accreditation (59%) and teaching accreditation (53%). Mandatory programmes are confined within governmental boundaries but voluntary programmes, such as those offered by professional bodies, are usually available across borders. Details on the effect of external assessment programmes that were found in DUQuE are summarized in: Shaw C, Groene O, Botje D, Sunol R, Kutryba B, Klazinga NS, Bruneau C, Hammer A, Wang A, Arah O, Wagner C. The effect of certification and accreditation on quality management in 4 clinical services in 73 European hospitals. International Journal for Quality in Health Care; march 9, 2014.

The table below gives examples of some tools and programmes which are available in Europe

Self assessment tools - Hospital-wide	European Foundation for Quality Management
Self-assessment tools - Specialty	Making pregnancy safer Health promoting hospitals
Standards for services	See regulatory and technical agencies such as Haute Autorité de Santé, Healthcare Improvement Scotland, National Institute for Health and Care Excellence
Standards for patient safety	Australian National Safety and Quality Health Service Standards South African Core National Standards
ISO certification	Quality management system ISO 9004 Medical laboratories ISO 15189
Accreditation - international	Joint Commission International Accreditation Canada International DNV International Accreditation

2. Put quality high on the agenda

A common factor responsible for catastrophic failures in health care is the lack of leadership involvement. This is a decisive component that affects patient care even where patient care in clinical units is pursued by competent and dedicated professionals (see "Key quality and safety issues").

Simply put, research suggests that hospitals in which leaders are involved in quality, reach better quality of care outcomes.

Causal mechanisms for this are not fully understood but cover elements such as leading by example, non-blaming culture, adequate sourcing of key clinical areas, proactive monitoring of quality and safety indicators, and early interventions when problems arise.
Leaders should realistically assess the performance of the organisations they represent, be aware of the quality metrics available in the organisation and engaged with the clinical teams who are aware of the difficulties of quality improvement.

> "One thing that we have learned is that the board and senior management have got to be concerned with quality.
> Quality needs to be on the agenda at the top level."

... go to interview

Effectiveness of local leadership • » view matrix «

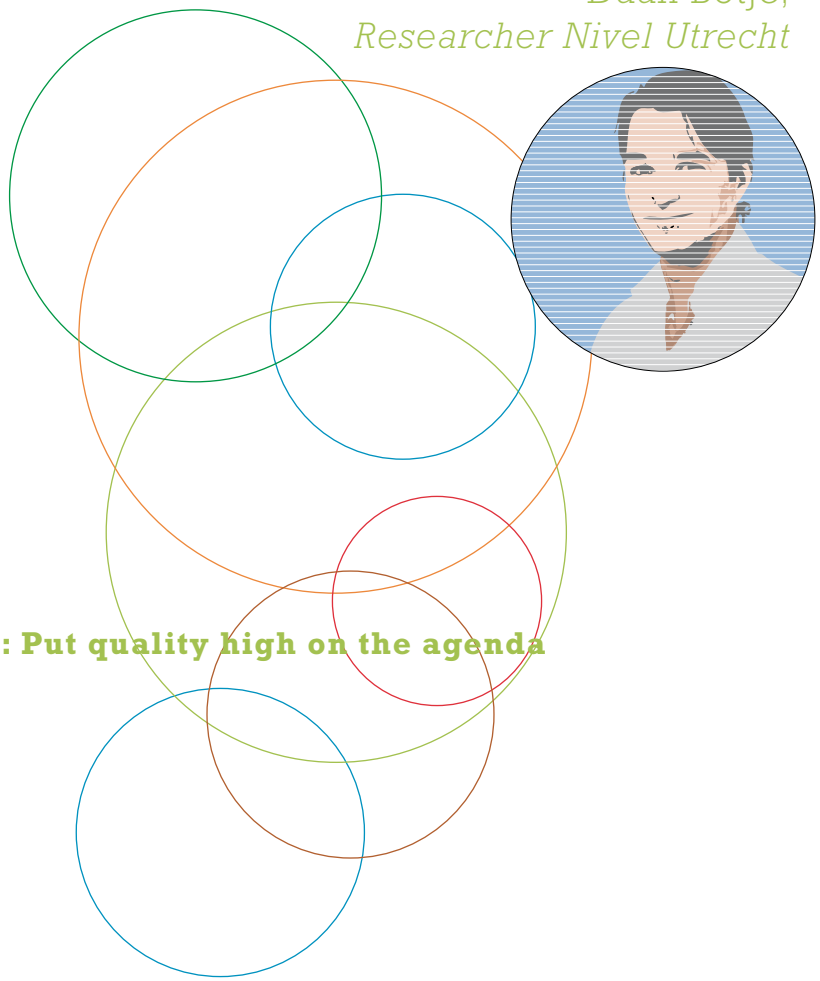
PROMPTS FOR REFLECTION:

- **Hospital board:** Board members should be familiar with the hospital performance on key quality and safety indicators. These should form the basis for discussion in periodic meetings. Involving members of the public at the board level helps to prevent an overly technical debate or discussion.

- **Executive management (Chief Executive Officer, Chief Medical Officer, Chief Nursing Officer and Chief Information Officer):** Critical engagement with quality in all its dimensions (including effectiveness, patient-centredness and safety) is the key responsibility of executive management. Consider whether the metrics available in your organisation are sufficient to control and monitor improvements in all organisational units. Liaise with clinical leaders to identify quality improvement actions and provide support for their implementation. Is there sufficient time at executive management level to discuss quality and patient safety issues?

Interview

Daan Botje,
Researcher Nivel Utrecht



Way 2: Put quality high on the agenda

"One thing that we have learned is that the board and senior management must be involved with quality. Quality needs to be on the agenda at the highest level."

Quality on the Agenda Leads to Better Care

''Hospitals that put quality on the agenda are generally better organised. Management focus on quality systems and have more insight into how well the wards are doing.

Management Boards are legally responsible for the quality of the care. It is therefore important that they set aside time and participate in improving quality of care. There are always critical observers: from inspections to patient organizations and the media.

Still not on Every Agenda

As logical as it seems to put quality on the agenda, this is not always the case: DUQuE research results indicate that more than a quarter of the hospital directors pay little or no attention to quality. A concerning statistic.

To have a good understanding of the quality of care, interaction between the departments and management is required. Directors must actively pursue the information from the departments. The specialists, on the other hand, must also feed the information, that maybe important to other departments and the board of directors, to management.

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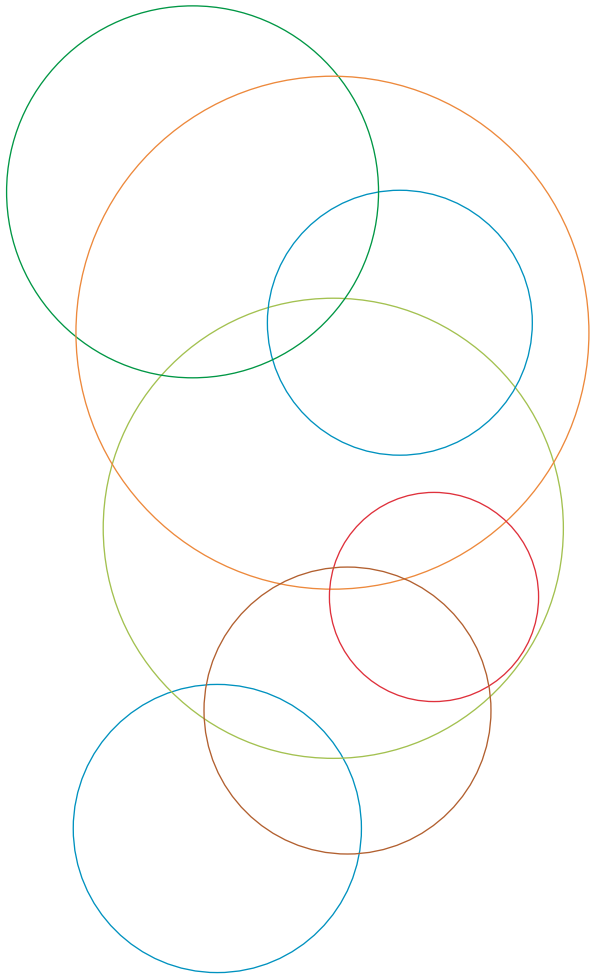
Quality Manager

A Quality Manager can play a role in this interaction. A linchpin of the organization, the Quality Manger must work closely with both management and specialists. In hospitals with an active Quality Manager, the management boards can be more involved. The quality systems could also be better developed.''



3. Implement supportive organisation-wide systems for quality improvement

One key finding of the DUQuE Collaboration is that multiple quality systems operate within any hospitals. These quality systems need to be well aligned to maximize impact and minimize unnecessary bureaucracy or documentation that takes time away from patient care.

Departmental level quality activities are strongly related with quality of care outcomes. Hospital quality management systems should be designed to support departments in delivering high quality care.

Firstly, hospital-wide quality management systems are necessary to establish priorities, structures (i.e. infection committee), procedures (i.e. for the dissemination of knowledge and the update of practice guidelines), data collection and quality monitoring systems. These systems are an important prerequisite for quality improvement in organisational units, however, should be designed to be supportive of clinical improvement processes and patient-centered care rather than becoming an end in itself.

Secondly, implementation of organisation-wide policies needs to be monitored throughout the organisation. Mission statements and a "tick-box mentality" is not enough. This can be assessed by evidence in documents, reports, files, records of compliance with policy, procedures and activities, and direct observation.

Thirdly, hospital wide quality management needs to translate into clinical quality improvement actions. Otherwise, it is at risk of being considered a bureaucratic exercise. A wide range of strategies exist at clinical level that should be assessed in relation to organisation procedures, e.g. evidence in minutes/ reports for sustainable prevention and measurement of infections, falls, pressure ulcers, medication, safe surgery. Current implementation and spread of these strategies needs to be monitored periodically. These three ways of conceptualizing organisation wide quality management should be linked with quality

> "Organisation-wide processes and accountability systems are important, but quality improvement adds most value near clinical processes. Thus, organisation-wide systems need to support departments in delivering quality."

... go to interview

improvement approaches at departmental level (see section IV). Furthermore, it is not apparent that current quality management systems do appropriately reflect outcomes that are important to patients and their families.

PROMPTS FOR REFLECTION:

- **Supportive policies:** Critically reflect on the organisation's mission statements and policies: how many of these are actually implemented, useful, and in support of clinical quality improvement activities?

- **Effective initiatives:** For those initiatives to be found effective, consider whether they are evenly implemented throughout the organization

- **Quality at department level:** Do you have effective quality management systems in all departments? To support them is a key function of your hospital quality management system? Who is responsible for supporting and monitoring quality in each department?

- **Quality domains:** Reflect whether quality systems are supportive of achieving patient-centred care, or whether they exclusively support clinical effectiveness and patient safety.

The assessment of integral quality management (QM) in a hospital asks for detailed measurement and monitoring from different perspectives and at various levels of care delivery. Within the DUQuE project we developed and validated 3 tools at hospital level, which complementarily addressed different aspects of the quality management system:

- **Quality Management Systems Index (QMSI)** an overall measure for the extent of implementation of quality management systems, also includes subscales on quality policy documents, quality monitoring by the board, training of professionals, formal protocols for infection control, formal protocols for medication and patient handling, analysing performance of care processes, analysing performance of professionals, analysing feedback & patient experiences and evaluating results.

- **Quality Management Compliance Index (QMCI)** developed from the perspective of how the hospital management oversees hospital quality program initiatives

- **Clinical Quality Implementation Index (CQII)** measuring the spread of quality efforts and continuous improvement in clinical areas.

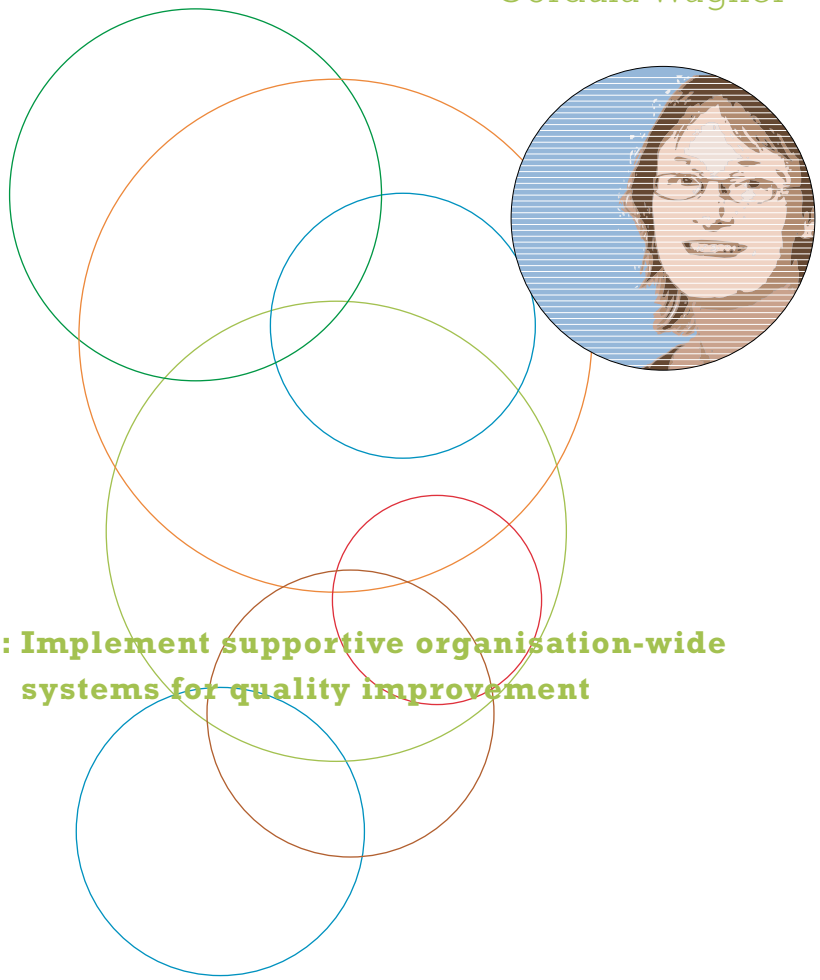
DEVELOPMENT AND VALIDATION OF INDICES

C. Wagner, O. Groene, C. A. Thompson, N. S. Klazinga, M. Dersarkissian, O. A. Arah, R. Suñol, and on behalf of the DUQuE Project Consortium Development and validation of an index to assess hospital quality management systems. Int J Qual Health Care (2014) 26 (suppl 1): 16-26 doi:10.1093/intqhc/mzu021

C. Wagner, O. Groene, M. Dersarkissian, C.A. Thompson, N.S. Klazinga, O.A. Arah, R. Suñol, and on behalf of the DUQuE Project Consortium The use of on-site visits to assess compliance and implementation of quality management at hospital level. Int J Qual Health Care (2014) 26 (suppl 1): 27-35 doi:10.1093/intqhc/mzu026

Interview

Cordula Wagner



Way 3: Implement supportive organisation-wide systems for quality improvement

"Our quality systems are designed to improve clinical processes and measure clinical outcomes. They currently fail to capture what is important for patients and their families."

Added Value of Health

''The DUQuE research has shown that organization-wide quality systems are positively related to quality activities at departmental level, and that department level activities are positively related to patient related clinical process and outcome indicators. But there are other factors besides these clinical indicators that are important for patients and their families. The benefit of health care is not always (or maybe not only) in clinical results.

Involvement

More and more patients want to be involved in their care processes and be informed of treatment choices and possible side effects. Within the existing quality systems, organizations have organized the involvement of patients or their representatives in quality committees, in discussing patient surveys and developing guidelines. Unfortunately, no positive link could be found between the development of the quality system, the involvement of patients in these quality activities and patient experiences.

Shared Decision Making

The question is: How can we capture what is important for patients and their families? Future research should possibly focus more on shared decision making between care providers and patients, and the support of department level quality activities in this process.''

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4. Assure responsibilities and team expertise at departmental level

High quality care cannot be provided without well-trained and motivated professionals. A key strategy to improve the quality of care is thus the recruitment, retention and development of professionals with the right competences.

High performing hospitals often attract particularly motivated individuals which cements their reputation. On the other side, hospitals without a track record in terms of quality and safety, research output and reputation may have difficulties recruiting the best professionals.

Continuing medical education • » view matrix «
Patient safety culture • » view matrix «
Effectiveness of local leadership • » view matrix «

> "Key factors to delivering high quality care are recruiting professionals with the right competences and establishing clear responsibilities for care processes."

... go to interview

Tools to assess the level of Engagement in quality management at department level

- Specialized expertise and responsibility (SER) covering how clinical responsibilities are assigned for each of the four conditions
- Evidence-based organization of pathways (EBOP) measuring if department organisation processe for admission, acute care, rehabilitation (if appropriate) and discharge reflect evidence based care
- Patient safety strategies (PSS) based on patient safety recommendations of international agencies
- Clinical review (CR) evaluating if audit and systematic monitoring are embedded in departmental quality management mechanisms

PROMPTS FOR REFLECTION:

- **Recruitment:** Put in the center of selection process clinical knowledge and skills and teamwork capacities more than only scientific credentials. Consider asking for clinical outcomes and audit reviews of the candidate in previous work places.

- **Continuing medical education:** Include quality and safety results of each unit as an important bases to select topics for continuous education.

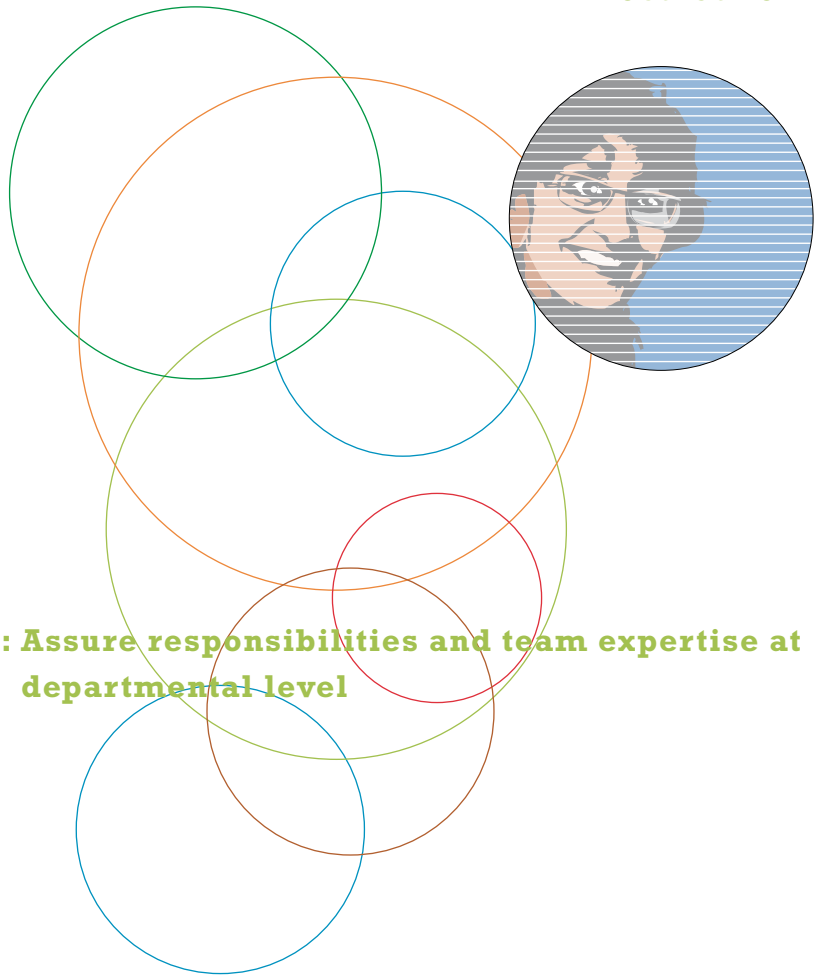
- **Educational outreach:** Use teaching status to consolidate the importance of excellent clinical and interpersonal results. Built a no-blame culture and teach the advantages of self-monitoring each professional and team results

- **Organizing care with clear responsibilities;** Do not accept "everybody does everything here". Establish clear responsibilities and leadership for each key clinical condition and ask for systematic team meetings to review their care.

- **Teamwork:** The quality of care depends on the care chain and teamwork among professionals, this requires specific attitudes and competenties.

Interview

Rosa Sunol



Way 4: Assure responsibilities and team expertise at departmental level

"Key factors to delivering high quality care include recruiting professionals with the right competencies and establishing clear responsibilities for care processes."

''We explored both professionalism (including professional attitudes and behaviour) and patient's safety culture in a sample of 4872 professionals in the 294 departments studied. In the first case, we used a newly developed questionnaire in this project and for the second case we used a highly accepted measure in most of the studies.

Direct Observation

We explored how responsibilities are allocated, by having an independent professional visit each of the participating departments (294) for direct observation and to review documents; including the existence of specific responsibilities for patient care, responsibilities of the clinical leader and to ensure that the evidence-based clinical guidelines had been formally adopted and disseminated to the clinical staff.

Professionalism is an important concept to measure and the newly developed scale enables us to measure professionalism. The dimensions covered by this measurement include improving quality of care, maintaining professional competence, fulfilling professional responsibilities and inter-professional collaboration. This measure can allow other researchers to further study areas that have limited research instruments available.

Clarifying Responsibilities

Also, hospitals with more developed quality management systems are positively associated with high levels of perceived teamwork and safety climate

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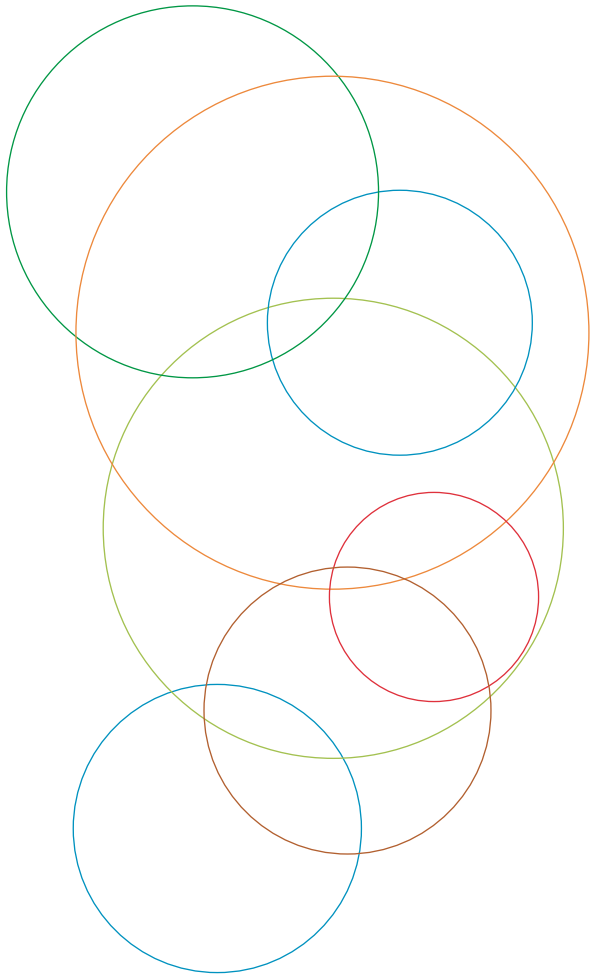
among their professionals. Specialized expertise and responsibility seems to have strong relationship with some clinical indicators, mainly in acute myocardial infarction and stroke management. This suggests that clarifying responsibilities inside clinical teams and departments is an important quality measure that can easily be implemented in European Hospitals.
All these findings support the idea that promoting continuous medical education, enhancing clinical attitudes and behaviours, developing a consistent patient safety culture and supporting local leadership effectiveness and responsibilities are important areas to cover when developing quality systems for hospitals.''



5. Organise care pathways based on evidence of quality and safety interventions

The majority of hospital departments still follow a traditional organizing principle according the medical specialization. To better respond to current patient´s needs, an organisation based on care pathways should be pursued in which all clinical activities are centred on the patient´s overall journey.

Advantages of an organisation based on care pathways are better standardization of care processes, better collaboration among clinicians, reduced variability and improve clinical outcomes.

A care pathway is more than a guideline. It reflects best evidence and bed-side actions, but more importantly is reflected in the overall organisation of work, including definition of professional roles, physical ward organisation and strategies to ensure patient safety. Patient safety strategies have to be in place where the clinical service is provided. This is not an add on, it is an integral component of organizing the care. The implementation of care pathways is often challenging as old patterns of care needs to be overcome and new collaborations, often across specialties and professionals groups, need to be established. Care pathways are associated with reduced costs, but they don´t come for free and leadership support, financial resources for reorganisation and staff training are required.

> “There is a lot that we can still learn from evidence-based medicine.
> It is not just about professionals following guidelines; it is about organizing care according to best evidence.”

... go to interview

Guidelines dissemination and implementation • » view matrix «

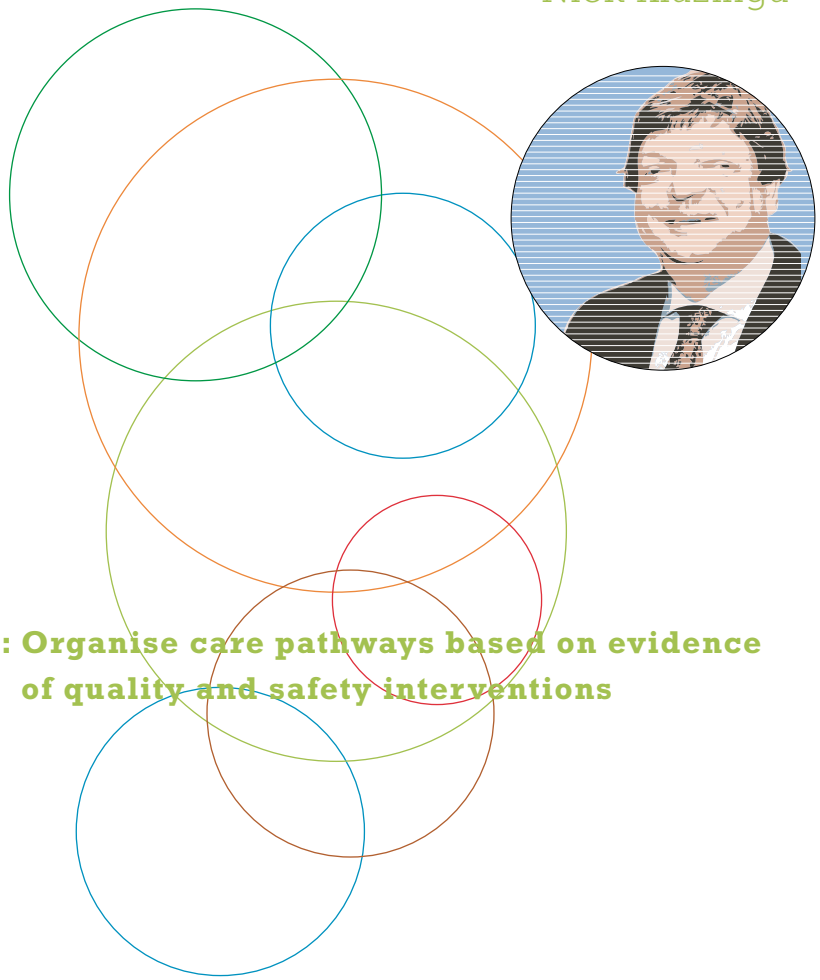
Interventions to improve handovers • » view matrix «

PROMPTS FOR REFLECTION:

- **Baseline assessment:** Consider the main patient groups at your hospital (in terms of high volume or high impact): to what extent is care for these groups based on evidence-based care pathways?
- **Organizing care path:** Does ward and pathway organization allow to apply evidence based care? Do you have the resources and processes needed to apply the evidence?
- **Monitoring:** How is the implementation of the care pathway monitored?
- **Patient safety:** Are evidence-based patient safety procedures an integral component of the care pathway?
- **New evidence:** Is there a process and responsible person to assess whether care processes are in line with best evidence?

Interview

Niek Klazinga



Way 5: Organise care pathways based on evidence of quality and safety interventions

"There is still a lot we can learn from evidence-based medicine. It is not just about professionals following guidelines; it is about organizing care according to best evidence."

"Scientific evidence not only provides a foundation for medicine, it should also be one of the corner stones of management. Especially the way we organise health care delivery in an effective, safe, timely and patient-centred way, can benefit from the huge amount of evidence that is available. Where physicians and nurses have become more skilled over the past decades in applying the principles of evidence-based medicine, managers in health care often seem less able to practice evidence-based management.
In that respect, assuring patient safety should be considered an integral part of assuring medical effectiveness. Managing safety is not a separate activity, it is an integral part of the organization and management of health care services and it should optimise benefits as well as minimize risks.

Multitude of Surveys

Quality management strategies in general and patient safety strategies in particular have been studied on different levels in the DUQuE project; the external environment of the hospital, strategies at hospital level, strategies at pathway and department level for four disease groups and at the level of the actual delivery of patient care. A multitude of surveys have been used for professionals (10.000) and CEO's (200) including many professionals with management tasks at a hospital and departmental level. In addition, a series of 74 site visits and about 9000 chart reviews were performed to assess whether care was meeting safety standards and was compliant with evidence-based protocols.

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Good Management

The bad news it that, on each of the four clinical conditions (stroke, acute myocardial infarction, hip fractures and deliveries), we identified a large number of shortcomings on compliance with evidence based protocols and safety standards. The good news is that we obtained important insight into how, more effective and safer care is related to the how quality management systems and quality improvement activities have been implemented. The extent to which quality management principles are applied on pathways of care (at a departmental level) has an especially strong correlation to the quality of care that is delivered in the hospitals studied. Hence, the DUQuE study provides new evidence on how the quality of medicine can be improved through good management.''

6. Implement pathway-oriented information systems

Hospital information systems (covering computerized clinical decision support systems in hospitals, electronic health records, computer-assisted diagnosis, reminders for preventive care or disease management or drug dosing and prescribing) have an enormous potential to improve quality and safety of health care.

The effectiveness of computerized clinical decision support systems has been evaluated by a wealth of (more than 300) studies, including randomized controlled trials. There is, therefore, a strong evidence-base for its effectiveness.

Computerised clinical decision support systems • » view matrix «

Six Sigma and Lean • » view matrix «

Current implementation of health care information technology varies greatly between hospitals, even within national boundaries. Likewise, the implementation of hospital information technology can be resource intensive. A fully integrated electronic health record may not be necessary. In fact, the strongest evidence for quality and safety improvement points at specific medication order. For hospital information systems to be fit for the future, careful integration with clinical pathways within and outside the hospital is paramount.

> "No other organisation could afford to continue using paper and pencil instead of maintaining sophisticated information systems to plan, deliver and control service provision. Forced functions are highly effective in modifying behavior."

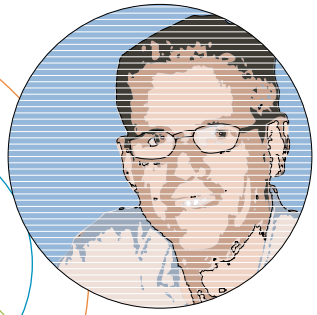
... go to interview

PROMPTS FOR REFLECTION:

- **HIT implementation:** Assess the extent to which information systems are implemented throughout the organisation.
- **Professionals' buy-in:** How effectively are existing systems used by the professional workforce? How effectively can information be shared across organisational units (and with subsequent care providers after discharge)?
- **Quality improvement:** HITs produce a wealth of information. To what extent is this information used to inform local quality improvement?

Interview

Philippe Michel



Way 6: Implement pathway-oriented information systems

"No other organization could afford to continue using paper and pencil, instead of maintaining sophisticated information systems to plan, deliver and control service provision. Forced functions are highly effective in modifying behaviour."

Full Range of Questions

''We assessed quality managers in all participating hospitals with a full range of questions addressing existing information systems. Questions included (i) whether hospitals had implemented electronic inpatient medical records, (ii) whether test and imaging results were electronically available in in-patient units or consulting rooms, (iii) whether in-patient Computer Provider Order Entry Systems were available for medications and (iv) whether decision support systems such as reminders and alerts had been implemented. In addition, we asked many closely related questions on the use of an information system, at all levels of the organization. For example; at a frontline worker level ''whether information concerning important events and problems is passed on properly when teams change?'' or at CEO and CMO level ''Do you have a quality 'dashboard' or 'scoreboard' that is reviewed regularly?''

Many Preventable Adverse Events

We know from past experience (insufficiently published as these were negative results!) that numerous quality improvement initiatives failed to reach sustainable outcomes because of the lack of an information system, making it impossible to offer systematic and periodic feedback.
Enormous effort has been put into delivering efficient care (the 'business case of quality') using methods such as lean management. How many have failed because of a lack of a proper information system?

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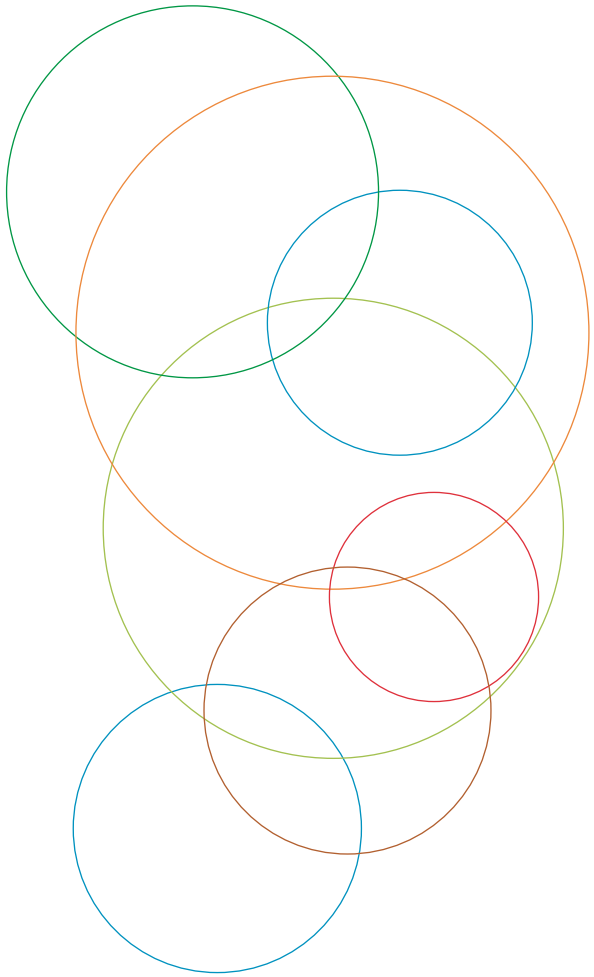
Currently huge efforts in quality and safety are devoted to improving the patient care pathway. How many clinical care pathway implementations, at both ward and hospital level, have failed because of the lack of information systems? How often is discontinuity of care in the healthcare system (between primary, secondary and tertiary care organizations) related to disruption in information transfer?

How many preventable adverse events are directly related to an inadequate information system? We don't really know. I suspect 'a lot'.



7. Conduct regular assessment and provide feedback

Audit and feedback are key quality improvement strategies, which can be applied individually or as part of multifaceted interventions. The assumption is that professionals will improve their performance when feedback demonstrates deficiencies in process or outcomes of care.

Audit and feedback has been well researched in more than 100 studies based on experimental or quasi-experimental design.

Audit and feedback mechanisms differ with regard to:
- Format of feedback
- Source of feedback
- Frequency of feedback
- Instructions for improvement
- Baseline performance
- Targeted behaviour
- Measures that make a difference to patients

Hospitals engage in audit and feedback for a number of reasons. Many countries monitor the quality of care at national level, prospectively collect information and provide feedback on variations in provider performance. 'Closing the audit cycle' is a frequently used expression to denote deficiencies in making sense out of and using audit data to drive improvement processes.

> "Audit and systematic monitoring need to be embedded in departmental quality management mechanisms, with all professionals participating and receiving feedback on performance."

... go to interview

Audit and feedback • » view matrix «
Hospital incident reporting • » view matrix «
Safety checklists • » view matrix «
Educational outreach visits • » view matrix «

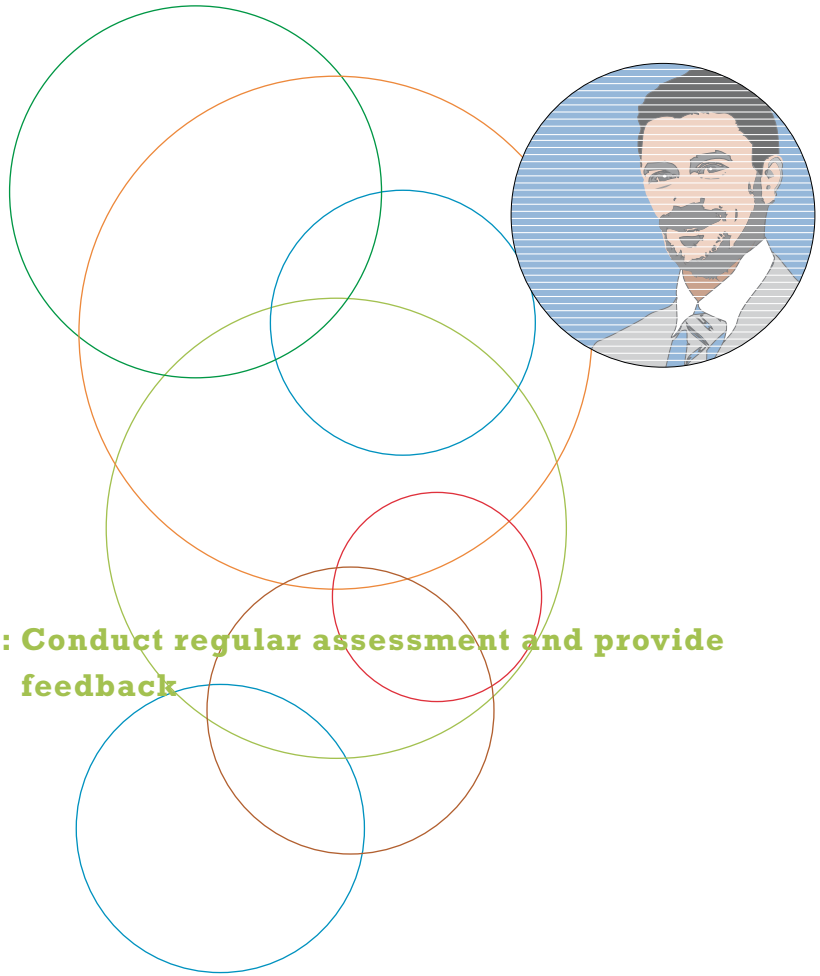
PROMPTS FOR REFLECTION:

- **Closing the audit loop:** Who is responsible in the organisation to monitor performance between audit cycles and liaise with clinical units regarding quality improvement actions based on audit findings? Who links the results of the audits with the overarching QMS of the hospital in a way that professionals in one unit can learn from experiences in other units
- **Linking audit and feedback to improvement:** Is audit and feedback embedded in an appropriate strategy to reflect on the results and initiate improvements?
- **Covering all quality domains:** Does audit and feedback cover what is important to measure or is it based on easily measurable data items?

Performance information • » view matrix «

Interview

Oliver Groene



Way 7: Conduct regular assessment and provide feedback

"Auditing and systematic monitoring need to be embedded in departmental quality management mechanisms, with all professionals participating and receiving feedback on performance."

"There is a vast amount of literature that suggests that systematic monitoring is the key, or if you wish, the starting point for any improvement of quality and safety. If you do not know how well you are doing, you might in fact not be doing well at all, and you certainly do not know whether care is improving.

Information on Performance

Monitoring itself is not enough. Information on performance needs to be reported back timely and concisely at an appropriate level, be it the hospital, the team or the individual. How the feedback is provided is vital. When the baseline performance is low, it is most effective when given by a supervisor or a colleague and it should include clear targets and an action plan.

Auditing and feedback is an integral component of any quality management system. We have collected data on these systems in almost 200 hospitals and surveyed more than 10,000 professionals. We asked about the type of data being collected (e.g. data on volume, compliance with clinical guidelines, complications, incidents, patient surveys etc.), how the data is being used and whether the performance of individual doctors and nurses is monitored.

Three Main Findings

Broadly speaking, there were three main findings. First, if we look at the data we see that the hospitals' approach to monitoring and feedback is still

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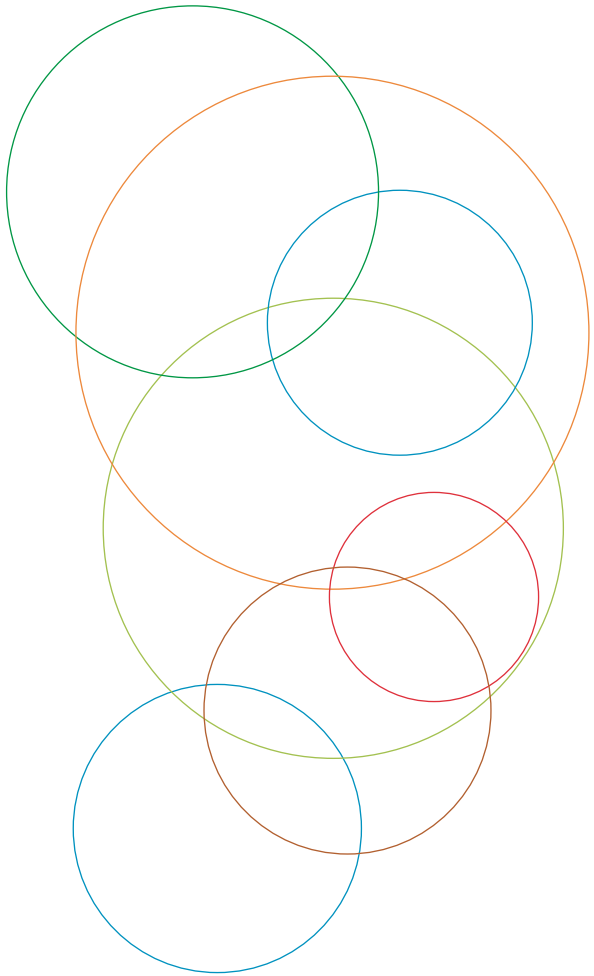
very heterogeneous, despite the wealth of evidence that suggests its importance! That means, for many hospitals there is still considerable room for improvement. Secondly, our psychometric analysis confirmed that monitoring and feedback is an integral domain of quality management. This suggests that it should not be separated from other quality activities. Thirdly, our study is the largest so far that looked at the impact of quality management on health care outcomes and we detected a very strong effect on quality activities that are closely aligned with the clinical management.



Close and Timely

The main implication of this is that auditing and feedback should not be a standalone system in hospitals, it should be directly related to all key clinical areas. It is important to emphasize that in the past quality management systems have become too top-heavy, that implies too many policies on quality and too little actual improvement! Our results suggest that the key focus of quality management, auditing and feedback should be as close and timely to actual patient care as possible. If done correctly, quality outcomes will improve.''

Key quality and safety issues

Our knowledge has increased substantially in the last 30 years on measuring quality, implementing clinical practice guidelines, assessing patient views and investigating adverse events. While quality and safety overall improved, variations within and between hospitals remain.

These variations pertain both the adherence to process of care measures (such as providing beta blockers at discharge after Acute Myocardial Infarction) as well as outcomes of care (such as complications or mortality after surgery). Moreover, hospital performance varies across quality domains, i.e. they may perform well in terms of clinical effectiveness of care but perform poorly in terms of patient safety or patient-centeredness.

Solving quality problems requires actions that often go beyond the responsibility of the unit where the problem is observed. Examples are:

- Reducing hospital infections
- Failure to rescue after high-risk surgery
- Meeting the needs of chronically ill patients
- Ensure integration of services across sectors
- Improving performance on non-clinical outcomes (e.g. patient-reported outcome measures)

Due to the complexity of modern health care, the natural variance in patients' expectations and the different resource environments in which hospitals operate, it is infeasible and undesirable to eliminate all variability in clinical care.

However, differences in care between hospitals that are comparable in patient case-mix and that operate in the same technical environment raise questions regarding the underlying reasons for the differences observed. Even more surprising are the stark differences in the quality of care provided within different organisational units of a single hospital.

> "Clinical effectiveness, patient-centred care and safety are attributes of quality in any hospital. Achievement of these attributes often differs widely across organisational units."

Excellent outcomes at the level of the micro-system may reflect effects of volumes of care, re-organisation of services or referral patterns. More often, however, they reflect a clear dedication to the principles of quality improvement. It is these principles that need to be strengthened in order to reduce unwarranted variations and to improve quality and safety throughout the organisation.

In implementing quality improvement actions, attention needs to be given to the role of context. Contextual factors, such as staffing ratios, supportive cultures, types of reporting back on performances, have a major influence on the effectiveness of quality improvement. Hospitals need to be aware of these contextual factors in designing, implementing and improving their quality management systems.

Sources of evidence used in this guide:

This guide synthesizes multiple sources of evidence. These sources were collected by members of the Deepening our understanding of quality improvement in Europe (DUQuE) Consortium, a research project financed by the EU 7th Research Framework Programme.
The main goal of the project was to study the effectiveness of quality management systems in European hospitals and to investigate factors associated with: a) their implementation (such as organisational culture, social capital, professional involvement, teamwork and safety climate, external pressure), and b) quality of care outcomes. DUQuE collected data using a cross-sectional, observational study design. Data were collected at hospital, departmental, professional and patient levels. Hospitals in the Czech Republic, France, Germany, Poland, Portugal, Spain, Turkey and the United Kingdom participated.

Overall, 188 hospitals participated in the data collection, including surveys of 9,857 professionals and 6,536 patients, 9,082 chart reviews, 74 external visits, and routine data from 182 hospitals. These make this the largest collaborative project ever to investigate the effect of quality management systems in European hospitals.

We formulated and tested hypotheses regarding the implementation of quality management systems, their associations with other factors known to affect quality, and their effect on quality of care in four care pathways that reflect the diversity of hospital operations (e.g. pathways for patients with acute myocardial infarction, hip fracture, stroke and for deliveries).

In addition, the Consortium conducted a series of systematic reviews on the key strategies to improve quality and safety in hospitals. We extracted information on their effectiveness and on contextual factors affecting their implementation. Results of these reviews are referred to throughout the subsequent chapters.

Finally, the Consortium brings together a large group of health care quality researchers, stakeholders representing national/regional quality agencies, and clinicians and managers in charge of implementing quality systems and ensuring quality of care. Their expert knowledge, too, was used in the formulation of recommendations.

> "The 'Seven Ways to Improve Quality' presented here are based on the key findings of the project."

Questionnaires and data collection forms of the DUQuE project are available in seven languages for other researchers. Please note that the questionnaires include more items than those included in our indices and analysis. Some of these measures have been validated and published in the **International Journal for Quality in Health Care**, others are still in process of validation. If you want further information or use the measures for scientific projects please submit a protocol outline (including objective, methods, expected use and whether funding is available) to the DUQuE coordinators Rosa Suñol (rsunol@fadq.org) or Oliver Groene (oliver.groene@lshtm.ac.uk). The questionnaires can be assessed on the following webpage: www.duque.eu.

Key concepts

- **Quality:** Care that is clinically effective, personal and safe *(Darzi 2008)*.

- **Clinical effectiveness** - This includes care provided in line with evidence-based standards of care and results of care *(Institute of Medicine 2001)*.

- **Patient centred care** - Health care that establishes a partnership among practitioners, patients, and their families (when appropriate) to ensure that decisions respect patients' wants, needs, and the preferences and that patients have the education and support they need to make decisions and participate in their own care (Hurtado 2001)

- **Patient safety** - The prevention of harm caused by errors of commission and omission *(Institute of Medicine 1999)*

- **Quality improvement** - Improving effectiveness, safety and patient-oriented care processes (better quality) in order to reach better outcomes for patients.

- **Quality management system** - A set of interacting activities, methods and procedures used to direct, control and improve the quality of care.

- **Quality strategies** - Organisational application of tools and interventions to improve patient care

- **Quality management** - A systematic process of identifying, assessing and taking action to maintain and improve the quality of care processes.

- **External pressure** - The demands to ensure quality exerted through statutory regulation, external evaluation through certification or accreditation or public expectations *(Wagner 2001)*.

- **Hospital governance** - A shared process of top-level organisational leadership, policy making and decision making *(Alexander 2006)*

- **Organisational culture** - or corporate culture, comprises the attitudes, experiences, beliefs and values of an organisation (which can be influenced by management) *(Mannion 2008)*

- **Professional involvement** - A set of attitudes and behaviours of professional staff (doctors, nurses, allied health professions) that is distinct but related to organisational culture and has implications for teamwork individual motivations, teamwork and professional-patient interactions.

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SEVENTH FRAMEWORK PROGRAMME

DUQuE

Concept and realisation:
Leene Communicatie
Design:
Ontwerpstudio D&AS

DUQuE consortium

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Annex

Appraisal matrix 1: Accreditation of health care services

Appraisal matrix 2: Effectiveness of local leadership

Appraisal matrix 3: Continuing medical education

Appraisal matrix 4: Patient safety culture

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Appraisal matrix 6: Guidelines dissemination and implementation

Appraisal matrix 7: Interventions to improve handovers

Appraisal matrix 8: Patient-centred care interventions

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Appraisal matrix 10: Performance information

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Appraisal matrix 13: Safety checklists

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Appraisal matrix 1: Accreditation of health care services

Strategy	Description	Effectiveness	Context - actions
Accreditation of health care services	Accreditation is (usually) a voluntary program in which trained external peer reviewers evaluate a healthcare organisation's compliance with pre-established performance standards. It is assumed that accreditation programmes improve healthcare organisation's behaviour, patient outcomes, and thus the quality of health care.	The effectiveness of accreditation programs has been researched by around 95 studies, with different focus areas. There is **consistent evidence** that **general and subspecialty accreditation** programs for: - acute myocardial infarction - trauma - ambulatory surgical care - infection control - pain management **improve the process of care** provided by healthcare services by **improving the structure and organisation** of healthcare facilities. Several studies also showed **improvements in clinical outcomes** of a wide spectrum of clinical conditions; though this evidence is not consistent across all studies. Accreditation is consistently related to **promoting change and professional development**.	Profession's attitudes to accreditation is likely to have an impact on its successful implementation, although there is no real evidence for this. It has been shown that profession's attitudes to accreditation is determined by: • their belief in its positive impact on quality, organisational performance and collegial decision-making; • perceived bureaucracy, time and costs involved; and • perceived difficulty in meeting standards and collecting data.

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Appraisal matrix 2: Effectiveness of local leadership

Strategy	Description	Effectiveness	Context - actions
Local opinion leaders	Local opinion leaders are health professionals nominated by their colleagues as 'educationally influential'. They can be used as a quality improvement strategy by e.g. **transmitting norms, modelling appropriate behaviour, or diffusing the use** of new technologies among colleagues, based on their credibility and status as members of the local community. The interventions studied in the scientific literature generally aimed at **appropriate management of a specific patient problem**. Local opinion leaders sent out educational materials at several points in time, hosted a community meeting with a recognised expert in the field, maintained or enhanced their regular formal and informal contacts with colleagues, were involved in didactic programmes, community outreach activities or community task forces. It is **assumed** that local opinion leaders can positively influence health care professional practice and health care outcomes.	The effectiveness of local opinion leaders on health care professional practice and health care outcomes has only been researched by 8 studies using randomised controlled trials. The **limited available evidence base** shows: Clear improvement in health care professional practice: • Reduction of incorrect urinary catheter practices after attending a lecture and tutorial led by a local opinion leader; • More patients received aspirin and physical therapy; • An increase in vaginal births. No improvement in health care outcomes.	Use of local opinion leaders appears to be more effective when it is combined with other complementary interventions, such as: - reminders - audit and feedback - outreach visits - marketing strategies - local consensus processes - patient-mediated interventions

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Appraisal matrix 3: Continuing medical education

Strategy	Description	Effectiveness	Context - actions
Continuing medical education (CME).	Physician continuing medical education is aimed to help professionals stay abreast of advances in patient care, accept new more-beneficial care, and discontinue use of existing lower-benefit diagnostic and therapeutic interventions. This should improve physician clinical practice and improve patient health outcomes. There are various CME tool and techniques available, including: - didactic programs - interactive education - audit and feedback - academic detailing/outreach - opinion leaders - reminders - clinical practice guidelines.	The effectiveness of physician continuing medical education has been well studied. The **evidence-base is therefore relatively strong**. **Techniques to change physician clinical practice behavior:** • Interactive programs among practitioners and educators have moderate-to-high beneficial effects, with highest effects for: audit and feedback on optimal versus actual care provided, diagnosis specific care reminders for best care, academic detailing, and other outreach programs on best practices, clinical practice guidelines, and to a lesser extent, opinion leaders. • Didactic techniques and providing printed materials alone have no-to-low effect **Education techniques that improve patient outcomes:** • Several studies showed that audit and feedback, academic detailing, and physician reminders are each moderately or highly effective in proving patient health outcomes. **The effectiveness of electronic CME:** Various studies have shown that multicomponent electronic CME interventions can be effective in changing health professionals' practice patterns, and improve their knowledge, However, when the program is only based on flat text they are	Key features for success are; - valued members transmitting the information - targeting group interests and motivations - using collaborative teamwork - tailoring interventions to audience needs - enlisting peer and senior management support. - awareness of local health-care organisation needs - evidence of suboptimal use of effective care - sound estimates of costs of changing behavior Multifaceted policies are needed for multifaceted CME policy development and implementation. Organisation, delivery, and financing changes will be needed in all countries to support such changes within each country's unique health and medical-care system.

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Appraisal matrix 3: Continuing medical education

Strategy	Description	Effectiveness	Context - actions
		of limited effectiveness. **The cost-effectiveness of programs aimed at changing practitioner behaviour** One cost-effectiveness study of education outreach/counterdetailing for two interventions, concluded • CME for angiotensin-converting enzyme inhibitors for heart failure was highly cost-effective at $2,062 per life-year saved, and • reducing selective serotonin reuptake inhibitor use in favor of tricyclic antidepressants found cost per patient of outreach ($82) was greater than the savings from changing physician behavior ($75)	A potential barriers for physicians to apply clinical advances is: - rapid changes are stressful to both physicians and prospective patients, perhaps due to a lack of experience with new modalities There must be awareness that no single approach to professional education works best under all circumstances. Educators most use approaches that focus on teams and organisations within unique social, political, and economic environments.

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Appraisal matrix 4: Patient safety culture

Strategy	Description	Effectiveness	Context - actions
Promoting a patient safety organisational culture.	It is increasingly recognised that structural change in health care organisations alone will not results in sufficient gains in health care performance. Promoting a positive patient safety culture across the units of the hospital to ensure consistent values, attitudes, and appropriate behaviour in regard to patient safety is considered to be an important strategy to support the improvement of health care system performance. Many different strategies can be used, such as e.g.: - Educational sessions (e.g. workshop and weekly booster sessions) to develop personal action plans, addressing employees spirit at work, employees wellness, job satisfaction, organisational commitment - introducing an (e.g. administrative) intervention for changing organisational culture on specific safety behaviour, such as on hand washing frequency, and rates on selected nosocomial infections. - Team training: a set of structured methods for optimizing	A limited amount of studies have evaluated the effectiveness of promoting patient safety organisation culture to improve health care performance. The studies are very heterogeneous, often cross sectional in design and suffer from confounding, which limits their external validity. The available **(weak) evidence** shows: **Handwashing intervention** • Although studies are inconsistent in their proven effectiveness in terms of increased compliance, a study did show a reduction in **nosocomial infections** (vancomycin-resistant enterococci, RR=0.19; n=1). **Educational sessions to boost workers' spirit**, can result in **improvements in work related outcomes** (Spirit at work; Job satisfaction; Organisational commitment and culture; Team work; Morale/climate), but not personal outcomes oriented at life (n=1 study). **Team training:** • Several studies (n=16) showed that team training or tools to support team communication can results in improvement in staff perceptions of safety culture, care processes (e.g. decreased delays), **better patient safety outcomes** (e.g. less adverse events).	The participation of nurses in leadership walk rounds was shown to increase its effectiveness. Targeting practice change through patient safety culture/climate is generally considered to be a key strategy to enhance patient safety. **Administrative support** increases hand-washing suppliance (OR 5.5.7; CI: 5.25-6.31).

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Appraisal matrix 4: Patient safety culture

Strategy	Description	Effectiveness	Context - actions
	teamwork processes, such as communication, cooperation, collaboration, and leadership. Its focus is on attaining the knowledge, skills or attitudes that underlie effective teamwork. - Walk rounds: Executives or senior leaders visit frontline patient care areas with the goal of observing and discussing current or potential threats to patient safety, as well as supporting front-line staff in addressing such threats. - Techniques that combine several intervention strategies, e.g. Comprehensive Unit-Based Safety Program (CUSP). However, it is assumed that health care organisations or units of work have identifiable cultures, that culture is related to performance, that interventions will provide a worthwhile return on investment.	**Executive walk rounds:** • Have shown (n=8) to results in **improvements in staff perceptions or safety culture.** Comprehensive Unit-Based Safety Program: • Has shown (n=6) to result in improved processes of care, and staff perceptions of teamwork. Overall, all studies agree there is **a very weak evidence-base** there is a **link between organisational culture and health care performance**.	

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Appraisal matrix 5: Computerised clinical decision support systems

Strategy	Description	Effectiveness	Context - actions
Computerised clinical decision support systems	Computerised clinical decision support systems are available for different functions. Commonly used systems provide computer-assisted: - diagnosis - reminders for preventive care or disease management - drug dosing and prescribing. They are assumed to improve practitioner performance	The effectiveness of computerized clinical decision support systems has been evaluated by wealth of studies (more than 300), often randomized controlled trials). There is therefore a **strong evidence-base for its effectiveness**. The studies have shown the computerized clinical decision support systems results in: **Improved morbidity outcomes** • RR 0.88 (95% CI 0.80-0.96) Studies are inconsistent in their results on the effectiveness of CDSS on patient outcomes. So far they seem to have limited consistent capacity to detect clinically important differences, particularly on mortality. **Increased adverse drug event identification and rates** • Identification: By 2.36% points (from 0.04 to 2.4%) • Rates: decreased absolute adverse drug event rates by 5.4% points (from 7.6 to 2.2%) • Improvements in drug dosing ranged from 12 to 21% Large improvements have been confirmed by several studies. **Improved application of preventive care services** • OR 1.42 (95% CI 1.27-1.58) Large improvements have been confirmed by several studies. **More appropriate treatment and therapy ordered by providers** • OR 1.57 (95% CI 1.35-1.82) Large improvements have been confirmed by several studies. Improved ordering or completing clinical studies • OR 1.72 (95%CI 1.47-2.00) Improved efficiency and process of care • Decreased rates of health services utilization, ranging from 8.5 to 24% points.	Integration of Computerised clinical decision support systems with Electronic Medical Records and use in an academic setting has been associated with CCDSS failure. However the evidence base for this finding was very weak. Various studies (about 70) studied the **critical features** of CDSS for improving clinical practice. These include: - Automatically providing decision support as part of clinician workflow - Providing decision support at the time and location of decision making - Providing a recommendation rather than just an assessment - Using a computer to generate the decision support

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Appraisal matrix 5: Computerised clinical decision support systems

Strategy	Description	Effectiveness	Context - actions
		Large reductions have been confirmed by several studies. • Reduced time to delivery (11% decrease in time) Large improvements have been confirmed by several studies. Reduced hospitalisation expenses and costs. • For example from USD 35,283 to USD 26,315). Major cost savings were confirmed by several studies. Overall increased provider satisfaction among most users of CDSSs. Large improvements have been confirmed by several studies. CDSSs using diagnostic systems, reminder systems, disease management systems or drug dosing or prescribing systems, have all been widely associated with improved practitioner performance.	

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Appraisal matrix 6: Guidelines dissemination and implementation

Strategy	Description	Effectiveness	Context - actions
Guideline dissemination and implementation	Clinical guidelines have the potential to improve patient care by promoting evidence-based interventions. There is however uncertainty about the likely effectiveness of different guideline dissemination and implementation strategies and resources required to deliver them. Commonly investigated interventions to disseminate and implement clinical guidelines are: - Reminders ((computer-generated) paper-based) - Dissemination of educational materials - Educational meetings - Audit and feedback - Patient-directed interventions.	The effectiveness of guideline dissemination and implementation strategies has been well researched in more than 200 studies including over 300 comparisons; though the quality of these studies is generally poor. The majority of studies reporting dichotomous process data (86.6%) observed **modest to moderate improvements in care**, suggesting that dissemination and implementation of guidelines can promote compliance with recommended practices. *Evidence from single intervention studies:* • Educational materials Median improvement in care (n=4): +8.1% (range 3.6-17%) • Audit and feedback Median improvement in care (n=6): +7.0% (range 1.3-16.0%) • Reminders Median improvement in care (n=14): +14.1% (range -1.0-34.0%) Multiple intervention studies: • Educational materials (48%) / educational meetings (41%) / reminders (31%) / audit and feedback (24%) Median improvement in care (n=18): +17.3% (range -5.6-16.4%). The effectiveness of multiple interventions is not higher than single interventions, and does not appear to increase with the number of interventions. It has also been shown that that clinical practice guidelines are more effective when they are presented in easy-to-access/easy-to-use portable formats and implemented using patient specific reminders. Very few studies investigated the costs of different strategies. In general, short (e.g. lunch) educational meetings and dissemination of educational materials appear to be most feasible considering limited available resources.	Clinical practice guidelines are more effective if adapted to local needs. The availability of resources and practical considerations are important elements that should be offset against the expected effectiveness, to determine the choice for intervention.

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- Grimshaw JM, Thomas RE, MacLennan G, Fraser C, Ramsay CR, Vale L et al. Effectiveness and efficiency of guideline dissemination and implementation strategies. Health Technol Assess 2004; 8(6):iii-72.

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Appraisal matrix 7: Interventions to improve handovers

Strategy	Description	Effectiveness	Context - actions
	There are several critical transition points in patient care during and after a hospital stay, which are called handoffs. These occur: - in the transfer of care from one provider to another for a shift or service change (intra hospital transfer) - when a patient is admitted or discharged Incomplete or poor handoffs can result in adverse events and near misses in patients. There are several interventions available that aim to optimise hospital handoffs. Examples of interventions to improve intrahospital transfers are, introduction of: - a liaison nurse role in a ICU/ PICU - handoff protocol using the analogy of Formula 1 pit-stop and expertise from aviation - voice-mail-based semi structured sign-out for ED admissions to internal medicine - a pharmacist-initiated handoff during patient transfer from oncology and haematology unit to critical care	Around 50 studies evaluated the effectiveness of interventions aiming to improve intrahospital transfers, which often suffer from a weak methodology. Studies showed that: Technological solutions result in: • a reduction in preventable adverse events (from 1.7 to 1.2%) • improved satisfaction with handoff quality • improved provider identification (50% reduction in missed patients during rounds) Nursing studies showed that supplementing verbal with a written medium leads to: • improved retention of information. White papers or consensus statements have characterised effective verbal exchange, as focussing on: • ill patients and actions required • with time for questions and minimal interruptions Content should be kept up to date on a daily basis. • Although it has not been demonstrated that handover education can improve patient outcomes, it does improve attitudes, knowledge and skills of professionals to the workplace. The effectiveness of discharge interventions has been widely studied (n>200) by very hetero-	Development and validation of self and peer assessment of hospitalist handoff quality is important and can be incorporated in certification programs. Professional medical organisations can also serve as powerful mediators of change, e.g. by raising the visibility of handoffs, and by mobilizing research funding. Professional associations can support discharge planning by developing guidelines for the transfer of critically ill patients. It is possible that discharge interventions: • only have a measurable effect on the long term (e.g. after 3 months); • are only working in specific subgroups of patients • are only effective in higher intensities Features that may hamper or complicate the effectiveness of handoff interventions are: • The required multitasking of clinicians at the ED

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Appraisal matrix 7: Interventions to improve handovers

Strategy	Description	Effectiveness	Context - actions
	- Technology solutions: e.g. creating an electronic template that downloads information form electronic medical records. - Supplementing verbal information with written information - Educational interventions related to information management, recognition of errors, team working, and communication using e.g. role-play, using observation, evaluation and feedback. Interventions aimed at reducing problems in adult patients discharged from hospital: - Pre-admission assessment - Comprehensive discharge planning protocols - Comprehensive geriatric assessment - Discharge support arrangements - Educational interventions	geneous studies. Most studies reached no firm conclusions that the discharge interventions were effective. There was reasonable evidence that: • Comprehensive discharge planning in combination with postdischarge across the hospital-home interface (e.g. for older people with chronic heart failure) reduce readmission rates and may improve health outcomes (e.g. survival and quality of life) without increasing costs • Communication and effective planning are one of the most important factors in enhancing the discharge process and reducing adverse events. • Services combining needs assessment, discharge planning and a method for facilitating the implementation of these plans were more effective than services that do not include the latter action. There was limited evidence that: • Educational interventions have an effect on aspects of the patients' emotional status after discharge, on knowledge and medication adherence. • Patients treated in 'hospital-at-home' interventions more frequently remain at home • decrease in readmissions for patients receiving discharge planning (difference -11%, 95% CI -17% to -4%) at 4 weeks follow-up • a greater proportion of patients allocated to discharge planning were discharged home	• The unpredictability of workload (e.g. in a recovery room), making staff availability difficult to plan • Difficulty in cross-departmental information sharing • Lack of knowledge in the critical care domain impedes effective communication • Functional diversity of care teams In addition, studies have shown that: • Hospitals that are largely based on multidisciplinary teamwork ('magnet' hospitals) have a 4.6% lower mortality rate after adjusting for predicted mortality. For instance introduction of a multidisciplinary infection control team can result in major reductions of nosocomial MRSA or pneumonia rates.

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Appraisal matrix 7: Interventions to improve handovers

Strategy	Description	Effectiveness	Context - actions
		compared with those receiving no formal discharge planning (difference 6% 95% CI 0.4% to 12%), this difference increased at 9 months follow up (difference 8.3%95%CI 1.6% to 15%) • improvement from 4 to12 on the Barthel score and a change in the Euroqol score at 26 weeks • improved patient satisfaction for those allocated to discharge planning (n=2) • Cost reductions: 1 study found a difference for hospital costs for total charges including read-mission costs at 2 weeks follow-up (difference-$ 170,247, 95%CI -$253,000 to -$87,000) and at 2 to 6 weeks follow-up (difference -$137,508, 95%CI -$210,000 to -$67,000). Another study observed lower costs for laboratory services for patients receiving discharge planning (mean difference per patient -£295, 95% CI -£564 to -£26).	

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Appraisal matrix 8: Patient-centred care interventions

Strategy	Description	Effectiveness	Context - actions
Patient-centred care interventions	There is a broad range of quality interventions available to improve patient-centred care. The most frequently studied interventions are: - Training the clinical consultant on patient-centred care; - Providing patient-centred training materials for patients; - Providing condition-or behaviour specific materials for providers and patients; - Tackling low levels of health literacy in disadvantaged groups; - Provision of decision aids to improve clinical decision making; - Self-help groups and peer support to improve self-care and self management; - Patient involvement in prevention (e.g. infection control) to improve patient safety. The assumption is that patient-centred care will result in improved: - Consultation processes - Patients' and providers' experiences with care - Patients' knowledge - Use of health services - health status and wellbeing	The effectiveness of patient focussed quality interventions have been researched in about 146 studies based on randomised controlled trails and controlled clinical trials. The most evident results come from a recent Cochrane Systematic Literature Review which studied the effectiveness of the first three listed (training; information material) interventions, showing: **Clear positive effect on the consultation process:** • Increased detection of psychological distress; • Increased proportion of visits in which all health concerns were elicited • Improved patient perception on disease-specific information provided **Mixed effects on the consultation process, regarding:** • The patient-centred communication behaviour of providers; • Empathy skills of providers; • Provider use of various data gathering skills; • Co-decision making (incl. child involvement). **Indication of positive effect on patient satisfaction, regarding:** • The art of care given; • Technical quality of care; • Total satisfaction rating. No improvement in patients' health care behaviours or use.	Little is known on the impact of contextual actions on the effectiveness of patient-centred interventions. Available evidence indicates that the effectiveness of patient-centred interventions is hampered by: - Resource pressures - Lack of awareness, skills and knowledge

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Appraisal matrix 8: Patient-centred care interventions

Strategy	Description	Effectiveness	Context - actions
		Clear improvement in health status, regarding: • Reduction in emotional distress for patients suffering from this; **Mixed or no effect on health status:** • Mixed effect on physiological measures of health; • No effect on general health status measures.	

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Appraisal matrix 9: Six Sigma and Lean

Strategy	Description	Effectiveness	Context - actions
Six Sigma and Lean for continuous quality improvement	Although Lean and Six Sigma are two separate popular techniques (from the manufacturing industry) they can be used together to establish a **cycle of continuous quality improvement** in a health care organisation. The combined use could provide quality improvement teams and a health care organisation with processes focussed **on measuring and eliminating errors** (Six Sigma) and ensuring a **workflow** that is efficient and value-added (Lean). Both tools emphasize tracking data and using quantitative methods to document quality improvement and progress toward a **stated goal.** They are assumed to result in improved clinical outcomes, processes of care and financial performance of health care organisations.	The effectiveness of Six Sigma and Lean has only been evaluated by a very limited number of studies. Although the **evidence base is weak**, several studies have shown that application of **Six Sigma and/or Lean** can result in (we report results from individual studies): **Improved infection control** • 85% reduction in the rate of catheter-related bloodstream infection (Sigma) • 68% reduction in the methicillin-resistant Staphylococcus aureus infection rate in surgical patients and those in the ICU with a 4-year follow-up (Sigma) **Improved process of care** • 23-30% reduction in delay to start surgery (Sixma) Although the evidence is relatively weak, other studies also reported that combined use of Six Sigma and Lean results in improved process of care for example regarding OR throughput; ED throughput; patient wait times). **Increased antibiotic use** • An increase in the proportion of non-cardiac patients receiving antibiotics within 1 hour before operation, from 38 to 86 per cent with 8 months of follow-up (Sigma) **Reduced length of stay** • a reduced length of stay for surgical and injured patients of almost 3 days with a 10-month follow-up (combined use of Lean and Six Sigma)	Not reported in the included studies

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Appraisal matrix 9: Six Sigma and Lean

Strategy	Description	Effectiveness	Context - actions
		Improved clinical outcomes • Improved spincter preservation rates in patients with rectal cancer using a new surgical technique (Six Sixma) Although other studies also found improved clinical outcomes using Six Sixma, these studies suffered from a low quality. **Cost savings** • There is good analytical evidence that the use of Six Sigma can result in cost saving (estimation by one study of USD.1.32 million) **Reduced medication errors** • Several studies showed implementation of either Lean or Six Sigma program can result in reduced medication errors	

Selected references

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- Glasgow JM, Scott-Caziewell JR, Kaboli PJ. Guiding inpatient quality improvement: a systematic review of Lean and Six Sigma. Jt Comm J Qual Patient Saf 2010; 36(12):533-540.
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Appraisal matrix 10: Performance information

Strategy	Description	Effectiveness	Context - actions
Performance information.	By using performance indicators, and publicly releasing performance data about the quality of hospital care, it is expected that: - patient and consumers patients and consumers can better decide what health care they wish to select; - healthcare professionals and organisations can better decide what to provide, to improve or to purchase.	Very few studies have examined the effectiveness of publicly releasing performance information on patient and provider behavior, or quality of care. We can only provide limited evidence from single studies. **Publicly releasing performance information, can potentially result in:** • positive effect on **30 day mortality** for acute myocardial infarction, while no effect on 1 year mortality (n=1). Another study reported a 21% actual decrease of mortality after CABG surgery (41% risk-adjusted decrease). Other studies also confirmed that feedback on physician's clinical performance results in improved performance. **improved outcomes** • associated with publication of mortality data for 6 common medical conditions and 2 surgical operations (n=1) • small positive effect of the publishing of patient outcomes data on **patient volumes** for coronary bypass surgery and low-complication outliers for lumbar discectomy, but these effects did not persist longer than two months after each public release (n=1). Another study also showed more provision of services (e.g. infant car seat program, formal transfer arrangements, or breast feeding nurse education) and **improvement of outcomes** (e.g. patient satisfaction and cesarean delivery rates) • **no effect** of availability of CAHPS performance data on **switching** from health plan for new Medicaid beneficiaries (n=2). **Implementation strategies** • Several studies showed that using **feedback reports combined with other implementation strategies** such as education or using quality improvement plans resulted in an improved health care **process outcomes**.	Reported **barriers** to implementation of performance indicators or changing health care practices: - unawareness of health care professional - lack of credible data to evaluate effects - unsupportive management/physicians - lack of resources (e.g. quality improvement facilities) - little administrative - insufficient administrative support - lack of distribution of educational material - absence of local opinion leader.

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- Ketelaar-Nicole ABM, Faber MJ, Flottorp S, Rygh LH, Deane-Katherine HO, Eccles MP. Public release of performance data in changing the behaviour of healthcare consumers, professionals or organisations. Cochrane Database of Systematic Reviews 2011.
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Appraisal matrix 11: Audit and feedback

Strategy	Description	Effectiveness	Context - actions
Audit and feedback	Audit and feedback are a key quality improvement strategies, which can be applied individually or as part of multifaceted interventions. The **assumption** is that professionals will improve their performance when feedback demonstrates deficiencies in process or outcomes of care. Audit and feedback **mechanisms differ** with regard to: - Format of feedback - Source of feedback - Frequency of feedback - Instructions for improvement - Direction of change required - Baseline performance - Profession of recipient - Context - Targeted behaviour.	Audit and feedback has been **well researched** in hundreds of studies of with more than 100 studies based on experimental or quasi-experimental design. Various Cochrane reviews have evaluated the effectiveness of audit and feedback. A recent update of the **Cochrane review** (Ivers 2012, n=70) demonstrated small to moderate, but systematic effects of audit and feedback on effectiveness of improvements in professional practice. - Mean improvement in studies with dichotomous outcomes (n=49): 4.3% (IQR 0.5-16%) - Mean improvement in studies with continuous outcomes (n=21): 1.3% (IQR 1.3-28.9%) A **meta-analysis** of audit and feedback strategies (Hysong 2009, based on data from the 2006 Cochrane review, n=19) confirms this finding.	Effectiveness is greater or improvement more pronounced under the following conditions: - Low baseline performance - Source is a supervisor or colleague - Provided more than once - Includes both explicit targets and an action plan. The following **attenuated the effect** of audit and feedback: - Delivered verbally only - Graphical feedback without written supervisor feedback or action plan.

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Appraisal matrix 12: Hospital Incident reporting

Strategy	Description	Effectiveness	Context - actions
Incident reporting	Incident report (also known as root cause analysis) is an event analysis tool to retrospectively analyse the systematic causes and prevent recurrences of adverse events and pre-ventable errors leading to death, serious physical or psychological injury, risk of such injury. It is **assumed** that feedback from incident reporting leads to an improved **patient safety** in health care services delivery.	Limited research is available on the effectiveness of incident reporting. Around 40 studies have studied the effectiveness of root cause analyses specifically. Although no aggregated effects have been reported, the outcomes indicate that incident reporting results in: • Decreased **mortality** (from 5% to 1% 3 years after) and improved **1-year patient survival** (ranging from 70 to 93%); (n=2) • Decreased rate of **adverse drug events** (by 46% over 29 months; n=1) • Improved patient safety **communi-cation** among staff members • Improved **compliance with work process** (from 78 to 100%) • Improved **follow-up care.**	The effectiveness of feedback from incident reporting systems increases when the following aspects are incorporated/considered in the design: • Feedback at multiple levels of the organisation • Appropriateness of mode of delivery • Relevance of content to local work place and systems • Integration of feedback within the design of safety information systems • Control of feedback and sensitivity to information requirements of different users • Empowering staff to take responsibility for improving safety • Capability for rapid feedback cycles and immediate comprehension of risks • Direct feedback to reporters and key stakeholders • Feedback processes are established, continuous, clearly defined and commonly understood • Integration of safety feedback within working routines of front-line staff • Improvements made are visible • Personnel consider the source and content of feedback to be credible • Feedback preserves confidentiality and fosters trust between reporters and policy developers • Visible senior-level support for systems improvement and safety initiatives • Double-loop learning

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Appraisal matrix 13: Safety checklists

Strategy	Description	Effectiveness	Context - actions
Safety checklists	Safety checklists (also known as medical checklists) are a tool intended to improve care processes and patient safety outcomes. They are often part of multi-component quality improvement initiatives. Safety checklists can vary in their design, content, and method of implementation.	The number of studies that have evaluated the effectiveness of safety checklists on paper are few (n=9), with various designs and settings, and often suffer from a high risk in bias. The results should therefore be cautiously used. The safety checklist was applied to patients by medical care teams, which had to include a medical clinician or surgeon. Overall, they suggest **some improvements in patient safety** arising from use of paper safety checklists by medical care teams, particularly with regard to: **ICU** • Reduction of patient **length of stay** in some studies • Improvements in **compliance in some care processes** in some studies, but these were not consistent across all studies **Emergency department** • Increased **appropriate use of catheters** (not statistically significant) • Decreased **length of stay** **Surgery** • Reduction of **the rate of any complication, surgical-site infection, unplanned reoperation, and death** • Stable incidence **pneumonia** **Acute care** • Improvement of **antibiotic administration** within eight hours for patients with pneumonia	The effectiveness of checklists is likely to increase if: • The design and implementation method are based on an evidence-based approach • The checklist is pilot tested and validated (to ensure the list contains all relevant items and interpreted consistently across users) • Staff members are trained on proper use and compliance of checklists

Selected references

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Appraisal matrix 14: Educational outreach visits

Strategy	Description	Effectiveness	Context - actions
Educational outreach visits	Educational outreach visits is a quality **improvement intervention aimed at improving health professional practice and health outcomes**. Trained people visit clinicians where they practice and provide them with information to **change how they practice**. The information given may include **feedback about their performance**, or may be based on **overcoming obstacles to change**. This type of face-to-face visits is also known as university-based educational detailing, academic detailing, and educational visiting.	The effectiveness of educational outreach visits has been well researched. The studies show that educational outreach visits can be effective in improving health professional practice. The effects are, for the most part, **small to moderate**, but potentially important: • Median adjusted risk difference (RD) in **compliance with desired practice** was 5.6% (interquartile range 3-9%) • Small but consistent effects on **prescribing behaviour:** median 4.8% (IQ range 3-6.5%). The effect on other professional behaviour is more variable (median adjusted RD 6% (IQ range 3.6-16%).	The **qualifications of the visitor** delivering the educational outreach visits is likely to be important for the effectiveness. However, their potential influence has not been studied to date.

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