Clinical Pathways

A literature and case study on clinical pathways and standardisation, skill-mix change and information technology

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Foreword / Acknowledgements

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Summary

Introduction

The pressure on the health care industry is ever rising. While trying to maintain and improve the safety, effectiveness, patient centeredness, and timeliness the costs of health care must be kept from rising. Amongst others standardisation, skill-mix change, and information technology are all presented as the solution to health care's problems.

Clinical pathways, considered a form of standardisation, will evidently bring skill-mix change, and information technology support seems promising. There is however little known about the relationship between these concepts.

This study tried to, describe recent insights concerning clinical pathways and the concepts of standardisation, skill-mix change and information technology in the literature, study how clinical pathways change practice by performing a case study, and investigate how information technology can help implement and use clinical pathways.

Literature study

Although generally accepted definitions of clinical pathways do not exist, there is general understanding that clinical pathways will not suffice on their own in changing health care by for instance bringing evidence into practice. Several authors identify therefore additional design principles, which can be summarised by Berg's (2005) four additional design principles: (1) a thorough restructuring and delegation of tasks, (2) the application of integrated planning, (3) the use of indicators about the functioning of the care programs, and (4) implementing process-supporting information technology.

These principles link clinical pathways with standardisation, skill-mix change and information technology. Concluding it seems evident that (introducing) clinical pathways comes with skill-mix change in the health care workforce while standardising health care delivery. Information technology can play an important role in facilitating these processes and vice versa.

Case study

Clinical pathways were studied in practice in the NHS setting in England at an independent sector treatment centre and two NHS Foundation Trusts by site visits and interviews.

The nursing staff's role was empowered by the clinical pathways and it gave them more control over the journey of the patient. Fear for "cookbook" medicine seems unfounded; in effect evidence-based practice can maximise the effect of clinical judgement and does not eliminate the need for professional judgement.

To what extent clinical pathways are really evidence-based is a point of discussion, for instance clinical pathways are rarely tested empirically. Another point of interest is the fact that clinical pathways are often developed by professionals extracted from the primary process, which may lead to medically effective, but unpractical standards.

The relationship between information technology and clinical pathways including additional changes that come with implementing and using pathways (e.g. standardisation, skill-mix) works both ways. For information technology to work it requires a standardisation of work processes and clinical pathways require information technology in order to standardise health care as information technology requires standardised use.

Introduction

This study investigates the relationship between clinical pathways and the concepts of standardisation, skill-mix and information technology. The introductory chapter starts by investigating background information regarding standardisation, skill-mix change and information technology before linking clinical pathways to these three concepts. Secondly the study plan for this research is given, by defining the problems, aims and research questions underlying this study.

Background

Before jumping to clinical pathways this background section starts by investigating the concepts of standardisation, skill-mix and information technology in health care. As it will turn out clinical pathways are often seen as a way for integrating evidence based medicine into daily practice whist also changing skill-mix and standardising health care. Information technology may be a helpful tool in making clinical pathways achieving this goal.

"Standardisation is key in integrating information technology in health care work." (Berg 2005)

After the concepts of standardisation, skill-mix change and information technology in health care are explored and the linkages between these three concepts, clinical pathways discussed against these concepts.

Standardisation

The demand on the health care system is ever rising. While trying to maintain and improve the safety, effectiveness, patient centeredness, and timeliness the costs of health care must be kept from rising (Berg 2005). Thus health care practices must face the challenge of improving their quality on multiple dimensions simultaneously (ibid). The Committee on Quality of Health Care in America (2001) speaks of a quality chasm between what the overall quality delivered by the health care system should be and what it actually is, given the resources spent and the qualification of its professionals. Berg (2005) on the other hand speaks of bridging this quality chasm by integrating professional and organisational approaches to quality. This requires new ways to think about how to deliver health care services. To face these challenges a careful and 'flexible' standardisation of care into care programs is central according to Berg (2005).

Health care has according to Berg (2005) evolved into an archetypical from of delivering health in a step-by-step form. This has resulted in fragmented, not patient centred, unsafe and inefficient care processes. Berg suggests standardisation through care programs to address these problems. Care programs are described as multidisciplinary protocols that encompass tasks,

decisions criteria, and work procedures for the care professionals involved in the care of for a specific patient group. For care programs to work Berg (ibid) cites "care programs are not just written guidelines, they should be concretely anchored in the organization".

The guru of competitive strategy Michael Porter has comparable criticism in his book *Redefining Healthcare* (2006). Porter notes that in the USA recent quality and pay-for performance initiatives address process compliance rather than the quality of results achieved. Principal tools used are practice guidelines and standards of care that every provider is expected to meet. However, the whole process-oriented approach is misguided according to Porter. He continues: "Standardized process guidelines belie the complexity of individual patient circumstances, and freeze care delivery processes rather that foster innovation." What is needed according to Porter is "competition on results, not standardized care, not just evidence-based medicine". What Porter calls "value based competition" is in his view the only antidote to the inefficiency and quality problems that plague the healthcare industry.

Berg and Porter agree on current issues in healthcare and that just standardisation (e.g. statically using guidelines) is not enough to tackle these issues. Where Porter focuses more on the competition on results, Berg focuses more standardisation using care programs, but also includes measuring care program performance.

In order to 'flexibly' standardise health care using care programs, four additional design principles are necessary according to Berg (2005), (1) a thorough restructuring and delegation of tasks, (2) the application of integrated planning, (3) the use of indicators about the functioning of the care programs, and (4) implementing process-supporting information technology.

These principles link the concept of standardisation in health care with several different concepts. The first principle 'a thorough restructuring and delegation of task' is closely related tot the concept of skill-mix change. 'The application of integrated planning' is more concerned with healthcare logistics and 'the use of indicators about the functioning of care programs' is very closely related to Porter's "competition on results" (Porter 2006). The fourth principle 'implementing process-supporting information technology' is crucial for realizing the new way of doing health care according to Berg (2005), and the other three principles are highly dependent on information technology.

Below the concepts of skill-mix change and information technology will be introduced before introducing clinical pathways.

Skill-mix change

Berg (2005) argues that critically reconsidering current work routines will bring components of the care program to the forefront that can be done more efficiently, in a more patient-centred manner, and often more effectively by other care professionals. An example given by Berg (ibid) is that often (specialized) nurses can do (part of the) intake, so that the physician is freed from tasks that do not require his/her specialized expertise. Ensuring a complete work-up before the consultation with a medical specialist, for example, can save many unnecessary outpatient visits.

Given shortages in qualified personnel, such a redistribution of tasks is essential to managing the increasing demand for care.

This view by Berg (2005) can be seen as a way of skill-mix change in healthcare. The concept skill-mix can be seen as a way to analyse job redesign and its impact in healthcare (Sibbald 2004). It is variously used to refer to the mix of skills or competencies possessed by an individual; ratio of senior to junior grade staff within a single disciple; or mix of different types of staff within a multidisciplinary team. Buchan & Dal Poz (2002) found various definitions for skill-mix, but conclude that in general it refers to the mix of posts, grades or occupations within an organisation, within or between disciplinary groups, or the combination of skills within an individual professional. A similar definition to that of Sibbald.

According to Sibbald (2004) skill-mix change in the healthcare workforce is presented as one of the solutions for the problems health care is facing. Also Buchan (1999) sees an increasing need for healthcare organisations to identify the most appropriate mix of staff as many countries initiate health sector reform-led cost containment and quality improvement measures. After all healthcare is labour intensive, and with the cost of labour accounting for a high proportion of total operating costs (often 75% or more), managers and health professionals are striving to identify the most effective mix of staff achievable within available resources (ibid).

Skill-mix change may be brought about in different forms and in different contexts for instance within a given service skill-mix change may take the form of task enhancement, substitution, delegation or innovation. While between services skill-mix may be brought about by changing the interface by transfer, relocation or liaison (Sibbald 2004). Without going deeper into the different types of change at this point, the purpose of all these changes is to enhance the effectiveness and/or efficiency of healthcare.

The question here is whether skill-mix really does enhance the effectiveness and/or efficiency of healthcare. Without answering this question yet, it seems reasonable to assume that standardisation can play an important role in the success of skill-mix change. Berg (2005) describes the relationship between standardisation and skill-mix a bidirectional. On the one hand restructuring and delegating task makes standardisation feasible, on the other hand standardisation can ensure both the quality of the work delivered by the different care professionals involved, and the coordination of their work tasks. Both require standardisation (ibid). In the research area concerned with skill-mix Buchan (1999) concludes that managers of healthcare organisations would greatly benefit form the development of standardised technologies and guidelines for skill mix studies.

Information technology

Three decades ago few imagined the impact that information systems and sciences would have on medical care today. In many respects, computerized medical information systems are an emerging technology whose true potential is yet to be fully realized. As with other emerging technologies, it is critical to evaluate information technology's contributions to improved health, its most appropriate uses, and its risks over time (Fitzmaurice 2002). Following is a short depiction of current evaluations of IT in healthcare.

Besides standardisation and skill-mix Information Technology (IT) is also often referred to as a way to increase healthcare quality and to reduce costs. Moreover, empirical evidence demonstrating the benefits of clinical IT and its potential to transform care delivery, offering greater quality, safety, and efficiency is growing (Garrido 2004). Berg (2005) even denotes IT as being crucial for realising the new way of doing health care (see above).

Hartswood (2003) also observes that Electronic Medical Records (EMR) systems are widely seen by healthcare policy makers as a key step in the achievement of more efficient and integrated healthcare services. However Hartswood's study reveals important discrepancies in the presumptions of the role of EMR systems in achieving healthcare service integration and reality. Hillestad (2005) estimates annual savings of an effective EMR implementation in the USA at billions and billions of dollars while increasing heath and other social benefits, however, Hillestad finds it unlikely to be realised without related changes to the healthcare system. Criticism against these big numbers comes from Himmelstein (2005). Behind impressive predictions of savings, Himmelstein sees a disturbing array of unproven assumptions, wishful thinking, and special effects.

It is clear there is lot of interest in information technology in healthcare. Most of the attention to IT in healthcare being positive and promising, there are also critical notes made by several authors concerning IT in healthcare. A short history of how information technology developed itself in healthcare is given by Ball (1999) and is summarised below.

Starting far behind other industries, healthcare has undergone a forced-draft migration to automated systems since the beginning of the 90s. Today, leading facilities in healthcare nearly equal those in other service industries in the use of information systems, and the average level of information automation is climbing steadily. The reason for this is simple, as healthcare organisations were looking for ways to cut costs; information technology was ready at hand. Its obvious targets were high labour costs of routine and often redundant clerical operations.

Much of the promise of IT went unrealised as the healthcare industry invested in computer systems that did little more then layer automated costs on top of manual costs. Generally, the healthcare industry repeated the same mistakes other industries had made earlier – not defining stable objectives for projects and not investing in management as well as hardware and software, automating manual processes rather than redesigning them and above all treating IT as a "support" capability and therefore as peripheral to the organisation's mission and strategy.

To be fair, the early failure of IT to accomplish it widely advertised goals in healthcare was partly the result of the limitations of the technology of the time: slow, rigid, unstandardised, requiring legions of support and almost incomprehensible.

The situation changed slowly and painfully but decisively. Healthcare executives are learning from the experience of other industries and from their own mistakes. Budgets and accountability are tighter, and the technology itself is better faster, more forgiving, mores standardised, and hence more flexible and much more powerful. Above all, the perceived role of information technology in healthcare has changed. Rather than being applied in piecemeal fashion to whatever routine manual processes offer themselves, IT is being used in powerful new ways:

- § To break down bureaucratic, departmentally focused organisational structures
- § To create radically different flatter, process-centred organisations
- § To foster efficient and effective integration of the continuum of care

To succeed in its use of IT the healthcare industry must according to Ball (1999) overcome several obstacles, including developing standards, securing security, confidentiality, access, and complexity.

Just as skill-mix change information technology can not transform change healthcare by itself and is dependent on amongst others standardisation in healthcare. For instance Berg (2005) talks about *process-supporting* information technology and emphasises the importance of information technology for redesigning and deleting tasks, integral planning and data-gathering, and feedback. Whether information technology is dependent on standardisation or the other way around is questionable, but reality is somewhere in between, with the relationship being bidirectional, being both are dependent on each other. Some of the authors above do refer to additional measures to be taken for information technology to fulfil its promises.

Although skill-mix change and information technology both receive lots of attention and both share much of the same objectives like improving healthcare quality and reducing costs, both concepts are rarely connected to each other (De Mul 2007). However, the relationship seems evident through the concept of standardisation.

Clinical pathways

Berg (2005) talks about using care paths to standardise healthcare in order to face healthcare's demanding challenges. The care paths mentioned by Berg are much alike clinical pathways. A working-definition for clinical pathways (also known as critical pathways, integrated care pathways, and care maps) is described by De Bleser (2006):

> "A clinical pathway is a method for the patient-care management of a well-defined group of patients during a well-defined period of time. A clinical pathway explicitly states the goals and key elements of care based on EBM guidelines, best practice and patient expectations by facilitating the communication, coordinating roles and sequencing the activities of the multidisciplinary care team, patients and their relatives; by documenting, monitoring and evaluating variances; and by providing the necessary resources and outcomes. The aim of a clinical pathway is to improve the quality of care, reduce risks, increase patient satisfaction and increase the efficiency in the use of resources."

Compared with the description of care programs by Berg (2005), clinical pathways can thus be seen as a way to standardise the delivery of health care. The above working-definition shows similarities with the first three of the four principles underlying standardisation (redesigning and delegation of tasks, integral planning and data-gathering, and feedback). Also the benefits of care programs as mentioned by Berg (ibid) are similar to the benefits given by the definition of

clinical pathways. Although not explicitly mentioned in the definition it is evident that process supporting IT (the fourth principle) can also be very valuable to clinical pathways. As Berg (ibid) mentioned "redesigning and delegating tasks, integral planning and data-gathering, and feedback ultimately depend on information technology".

The relationship between clinical pathways and skill-mix change seems also evident when looking at the above definition, which mentions 'facilitating the communication, coordinating roles and sequencing the activities of the multidisciplinary care team'.

Study plan

This section briefly describes the setting of this study before presenting the problems, aims and research questions underlying this study.

Study setting

Although several problems can be identified from the background section above, three problems are presented here with the corresponding aims and research questions to which this study is trying to find an answer to.

The study will start by giving a literature on clinical pathways and clinical pathways in relationship with the concepts of standardisation, skill-mix change and information technology in order to answer the research questions.

Besides the literature overview also a case study will be performed. The case study will be carried out in at NHS Trust and at an Independent Sector Treatment Centre carrying treating NHS patients. The case study will focus on clinical pathways, clinical pathways and information technology, and clinical pathways and the role of nurses/nursing.

In the following chapter it will be explained why the case study was carried out in the NHS setting. Summarising this is because the healthcare in the NHS is very much nurse-led and clinical pathways are heavily used and even mandatory for independent sector providers. This makes the NHS setting an interesting case study.

Problems

1. There is little evidence known about the relationship between clinical pathways and the concepts of standardisation, skill-mix and information technology in healthcare.
2. There is little evidence known about how clinical pathways actually change practice.
3. There is little evidence known about how information technology can support implementing and using clinical pathways.

Aims

1. Review resent literature on clinical pathways and the relationship of clinical pathways to the concepts of standardisation, skill mix and information technology in healthcare.

2. Perform a case study in the NHS setting in England on clinical pathways and in particular the role of nurses/nursing in using clinical pathways.

3. Explore how information technology can support implementing and using clinical pathways.

Research questions

In order to reach the aims presented above three research questions were formulated. These will also focus on the NHS setting in England and in particular the role of nurses/nursing in using clinical pathways.

1. What are the recent insights in the literature regarding clinical pathways and how do they relate to the concepts of standardisation, skill-mix and information technology in health care?

2. How do clinical pathways change practice in the case study?

3. Using the results from the literature study and the case study: how can information technology support implementing and using clinical pathways?

Design

The aims were addressed using different method and materials; the first aim was covered with a literature study on clinical pathways and the concepts of standardisation, skill-mix change and information technology. The second aim was covered by conducting a case NHS setting in England, and the third aim was covered by using both results from the literature study and the case study.

What is next?

Chapter two is concerned with the literature study and chapter three with the case study. Both chapters start by presenting the methods and materials used followed by presenting the results. The concluding fourth chapter presents the discussion and the conclusions to the three research questions

2.   Literature study

Introduction

This chapter presents the methods and materials and the results from the literature study performed to answer the first research question underlying this study: "What are the recent insights in the literature regarding clinical pathways and how do they relate to the concepts of standardisation, skill-mix and information technology in healthcare?" Also the third research question will be partly answered using results from the literature study: "How can information technology support implementing and using clinical pathways?"

First the methods and materials for the literature study are presented followed by the results of the study. The conclusions and discussion points will be combined for all three research questions and presented in the fourth chapter.

Methods and Materials

The first research question of this study is concerned with the recent literature on clinical pathways and the concepts of standardisation, skill-mix and information technology in health care. This research question was answered by performing a literature study, relevant literature was predominantly selected using the citation index PubMed (MEDLINE), and also Google's search engine was used to select relevant material and other non specific resources.

Search strategy PubMed

Of the terms clinical pathways, standardisation, skill-mix and information technology, clinical pathways (known as 'critical pathways' in the PubMed's MeSH vocabulary) is the only term that is contained in PubMed's MeSH (Medical Subject Headings) database defined as "Schedules of medical and nursing procedures, including diagnostic tests, medications, and consultations designed to effect an efficient, coordinated program of treatment". The other terms were entered as free text search terms or acronyms.

Different queries combining the different terms were used to select articles. The search queries were limited to articles published in the year 2000 or later and only articles classified as being a 'review' by PubMed were considered. Due tot the exploratory nature of this study no specific inclusion or exclusion criteria were used.

Results

First the recent insights regarding clinical pathways will be presented followed by the concepts of standardisation, skill-mix and information technology in healthcare in relationship with clinical pathways.

Clinical pathways

The first question being answered is "What is a clinical pathway?" Secondly different characteristics of clinical pathways will be explored, such as the basis of pathways, issues concerned with implementing pathways, and the impact of clinical pathways in practice.

What is a clinical pathway?

To start off first the question that will be answered is "What is a clinical pathway?" Or should we be asking what is a critical pathway, or an integrated care pathway, or perhaps a care map? In a recent literature review De Bleser et al. (2006) tried to answer this question. After systematically searching Medline over the years 2000-2003 for definition of clinical pathways the authors tried to classify these definitions according to three inherent features of pathways: (1) nouns, (2) characteristics, and (3) aims and outcomes.

The figure below shows the different nouns used for pathways along two dimensions. The horizontal axis represents the content of the pathway (descriptive versus prescriptive). The vertical axis represents the extent to with the pathway is viewed as a tool for changing clinical practice and improving the quality of health.

The authors reached consensus on classifying the characteristics of the definitions over 16 subcategories. 'Homogeneous patient group', 'multidisciplinary team', 'time scale', and 'inventory of actions' were the most common subcategories. On the aims and outcomes the authors reached consensus on 12 subcategories, with 'efficiency of care', 'evaluation', 'quality of care' being the subcategories under which the most definitions could be categorised.

The differences between definitions can partly be explained by the different origins. In the USA the global concept of clinical pathways originated as a framework for balancing cost and quality as a response to the escalating costs of health care. While in the United Kingdom clinical pathways are viewed as a way of achieving a continuum of care across care settings (De Bleser 2006).
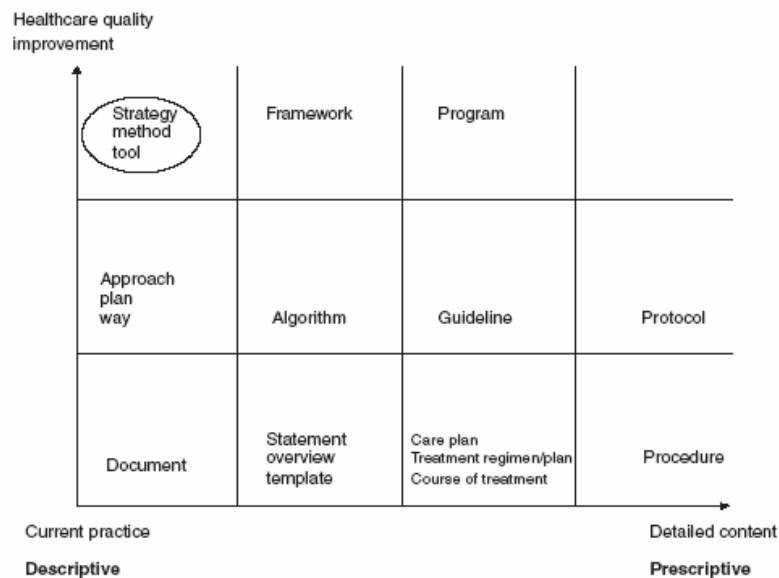
Fig.1: *Substantives of clinical pathways organized along a coordinate system (De Bleser 2006).*

Clinical pathways find their origin in Critical Path & Process Mapping methodologies used in industry, particularly in the field of engineering from as early as the 1950s. In the 1980's, clinicians in the USA began to develop the pathway tool within Managed Care; they were re-defining the delivery of care and attempting to identify measurable outcomes. They were focusing on the patient rather than the system, but needed to demonstrate efficient processes in order to fulfil the requirements of the insurance industry (National Library for Health 2007). The global concept of clinical pathways thus originated in the USA as a framework for balancing costs and quality as a response to the escalating costs of health care. In the United Kingdom however, clinical pathways are primarily seen as a way of achieving a continuum of care across care settings. These different origins of clinical pathways are partly responsible for the differences in definitions of clinical pathways (De Bleser 2006).

With the review the De Bleser et al. expected to "produce a new definition of clinical pathways, making other definitions obsolete". This expectation went unanswered, as no general agreement was achieved on "what a clinical pathway actually does and what is does not". However they give the following *working-definition* of a clinical pathway as a starting point for further research.

> "A clinical pathway is a method for the patient-care management of a well-defined group of patients during a well-defined period of time. A clinical pathway explicitly states the goals and key elements of care based on EBM guidelines, best practice and patient expectations by facilitating the communication, coordinating roles and sequencing the activities of the multidisciplinary care team, patients and their relatives; by documenting, monitoring and evaluating variances; and by providing the necessary resources and outcomes. The aim of a clinical pathway is to improve the quality of care, reduce risks, increase patient satisfaction and increase the efficiency in the use of resources."

An evidence based basis

The content of the clinical pathways should according to De Bleser (2006) thus be based on *evidence-based medicine guidelines*, best practice, and patient expectations. Evidence-based medicine is widely considered as a valuable method for improving patient care (Grol 2000, 2003, Mateo 2003). It is also often used to develop clinical practice guidelines (Heffner 1998, Woolf 2000); therefore the above definition speaks of evidence-based medicine guidelines. Evidence-based medicine not only comprises the best research evidence available but should also compromise clinical expertise and patient values (Sacket 2000). However, the above definition distinguishes between evidence-based medicine guidelines, best practice, and patient expectations. This section discusses the relationship between evidence-based medicine, clinical practice guidelines and clinical pathways. The next section addresses the other two bases for clinical pathways, best practice and patient expectations.

The number of new valuable or evidence-based insights, techniques and procedures published each year is ever growing. With the help of information technology and systems evidence can be brought to us in seconds (Sacket 2000). However, we learn that these innovations often do not find their way to normal daily routines (Grol 2000, 2003). Patients do therefore not always receive the best, most effective, rational, efficient and patient-centred care.

There is however no lack of ideas and approaches on how to improve care and implement optimal care (Grol 2000). Different parties often have different methods and strategies to implement quality improvements. Clinical researchers and epidemiologists propose systematic reviews to summarise the evidence and the development and dissemination of evidence-based guidelines as they see the lack of convincing scientific information on efficacy and efficient of specific clinical actions and decisions as the problem in achieving optimal care (ibid).

Also Heffner (1998) and Woolf (2000) see evidence-based medicine as a way to improve clinical practice guidelines. Heffner (1998) sees a great responsibility for guideline developers in analyzing and grading available evidence. In this way clinicians should be provided with the least biased and most valid clinical recommendations, "allowing them to apply selectively published guidelines and to practice evidence-based medicine". Woolf (2000) notes that growing disfavour over opinion based methods for developing guidelines has led to the adoption of evidence-based medicine for developing guidelines.

Although nobody will object evidence-based patient care there are also some problems (Grol 2000). Grol notes that introducing evidence-based guidelines often does not change practice; the impact is limited in most cases. Moreover the impact of guidelines on patient outcomes is often absent or not studied at all (ibid).

So according to Grol (2003) to change behaviour comprehensive approaches at different levels (doctor, team practice, hospital, and the wider environment) are necessary. Plans for change should not only be based on characteristics of the evidence or guideline itself but also on barriers and facilitators to change (ibid).

In recent publications clinical pathways are often seen as a way to implement evidence-based medicine and thus change behaviour. Mateo (2001) stresses the importance of using evidence-

based practise in providing care; in the end the goal of using evidence in practice is to improve health care for patients. Moving towards evidence-based practice has numerous benefits for patient care and clinical pathways, amongst others, have been referred to as a structured care approach and a way to implement best practices (ibid). Leglemann (2006) sees clinical pathways as a way to implement clinical practice guidelines into daily practice. In his eyes clinical pathways start where clinical practice guideline end. Zander (2002) states that clinical pathways connect the world of practice with the world of knowledge. According to Vlayen (2005) a clinical pathway is a way to implement a clinical practice guideline into daily practice. He states: "Clinical pathways contain concrete interventions rather than recommendations; clinical pathways are implemented rather then published."

Implementation "gap"

The above paragraph showed that there is a "gap" between evidence-based medicine and daily practice as innovations often do not find their way to daily practice. Evidence-based medicine is often presented in the form of clinical practice guidelines; however the impact of these guidelines on clinical practice is not self-evident. Clinical pathways may be the solution in 'translating' evidence-based practice guidelines to clinical practice and overcoming this implementation gap. This paragraph focuses on the problems underlying this implementation gap.

Blaser (2006) speaks of a "guideline Implementation gap", a gap between information contained in published clinical practise guidelines and the adoption of decision support systems in clinical practice. Grol (2003) also describes the difficulties that usually arise when introducing evidence into routine daily practice. For change to succeed in daily practice change should be adopted and supported by different levels in the organisation and measures and actions should preferably be taken at a team level Grol (ibid).

Lichtmann (2001) gives an example of the difficulties that arise when trying to implement a clinical practice guideline beyond its original setting. The study showed that even with a standardised implementation protocol consistent results across institutions were not obtained. Lichtmann (ibid) concludes that the results demonstrate that local factors should be taken into account when implementing guidelines into practice.

Another "gap" exists between evidence-based medicine and patient expectations. This gap may be one of the reasons of the existence of the above implementation gap. Bensing (2000) studied this gap and concluded that both paradigms have little in common. Evidence-based medicine for instance considers medicine merely as a cognitive-rational enterprise. In this approach the uniqueness of the patient, their individual needs and preferences, and their emotional status are easily neglected in the decision making process. In the ideological base of patient-centred medicine these factors are all taken into account, however, the evidence-base is often less developed. Thus the challenge for the future is to integrate both paradigms according to Bensing (ibid). Meaning evidence-based medicine should become more patient-centred and vice-versa patient-centred medicine should become more evidence-based.

The impact of clinical pathways

The paragraph above showed that there is an implementation gap between evidence-based medicine and best practice and between evidence-based medicine and patient expectations (patient centeredness), and that clinical pathways are seen as a bridge between these paradigms. However there is still little evidence that clinical pathways lead to improved pathway related outcomes. If the goal of the pathway is implementing evidence-based medicine into practice, it should be possible to determine the impact of the pathway retrospectively. This should be equally true for every other pathway related goal. A final step would then be to identify pathway characteristics that lead a positive change in pathway related outcomes.

Two recent studies focused on this subject, the first study by Vanhaecht et al. (2006) aimed to determine whether clinical pathway audit tools can identify the characteristics of well-organized care processes. The authors searched for audit tools using four different search strategies and after applying inclusion and exclusion criteria they reached consensus on selecting seven audit tools. They content analyzed these seven audit tools which resulted in 17 different characteristics.

Results show that of the seven tools five find their origin in England, Scotland or Wales, most tools are the result of local (student) initiatives. One tool was validated, one tool focused on implementing pathways, none of the tools relate the resulting score to patient outcomes and two tools are no longer in user.

They authors find the lack of research on the auditing of pathways astonishing, especially considering the vast amounts of literature on the effects of clinical pathways. They also conclude that: "the variability of the tools analysed confirm a lack of consensus on the definition of pathways."

According to the authors pathways function within in a black-box: "it remains unknown how each pathway characteristic contributes to pathway-related outcomes. A clinical pathway audit tool should therefore, focus on such 'key characteristics', ones that can affect patient outcomes."

A second review by Vlayen (2005) tried to identify a critical appraisal tool for clinical practice guidelines that could serve as a basis for the development of an appraisal tool for clinical pathways. Vlayen (ibid) states that it is unknown whether "a clear relationship exists between the methodological and content quality of clinical pathways on the one hand and clinical quality, defined by the judicious and explicit use of the evidence from clinical trials, on the other." None of the audit tools found by Vlayen for clinical practice guidelines scores the evidence-base of the clinical content of guidelines.

From the above paragraphs it also became clear that there is strong need for a cut-clear definition of what a clinical pathway is and that there is an implementation gap between evidence-based medicine and daily practice to be overcome. Besides this there is thus also a strong need for the systematic analysis of the effects of clinical pathways and future research should particularly focus on characteristics that have impact on pathway related outcomes. An area little evidence is known about to date.

Standardisation

In the introductory chapter the 'flexible' standardisation of health care into care programs as proposed by Berg (2005) was already mentioned. Also the resemblance between the proposed care programs and clinical pathways was made. Berg describes care programs as multidisciplinary protocols that encompass tasks, decisions criteria, and work procedures for the care professionals involved in the care for a specific patient group. For care programs to work Berg (ibid) cites "care programs are not just written guidelines, they should be concretely anchored in the organization".

The four additional and necessary design principles in order to 'flexibly' standardise health care using care programs according to Berg (ibid) were, (1) a thorough restructuring and delegation of tasks, (2) the application of integrated planning, (3) the use of indicators about the functioning of the care programs, and (4) implementing process-supporting information technology.

As mentioned in the introductory chapter these principles can be linked with several different concepts. The first principle 'a thorough restructuring and delegation of task' is closely related to the concept of skill-mix change. 'The application of integrated planning' is more concerned with healthcare logistics and 'the use of indicators about the functioning of care programs' is very closely related to Porter's "competition on results" (Porter 2006). The fourth principle 'implementing process-supporting information technology' is crucial for realizing the new way of doing health care according to Berg (2005), and the other three principles are highly dependent on information technology.

The comments mentioned above in the clinical pathway section by Grol (2003), Blaser (2006), and Lichtmann (2001) that evidence does not necessarily changes daily practice underline the vision by Berg (2005). Berg thus pleads for an integrated approach to the different dimensions of quality and standardising health care delivery using care programs.

Berg's care programs can thus be seen as a way to standardise health care. Several other authors link clinical pathways to the concept of standardisation. However, most do not specifically define standardisation or standards of care. On the other hand Ilott (2006) did try to define protocol-based care by performing a concept analysis.

According to Ilott (ibid) protocol-based care is an umbrella term that encompasses a range of clinical care processes, including algorithms, care pathways, clinical guidelines, procedures, and patient group directives. These processes are associated with the standardisation and evidence-based practice movements, movements that redefine relationships between all health care practitioners and patients.

After a five-step concept analysis (existing dictionary and policy definitions, content analysis, systematic search, opinion leader interviews, and analysing and clarifying the concept) the defining attribute of protocol-based care was standardisation of the processes of clinical care in documents, such as protocols, pathways or guidelines (ibid). Common features of these documents are that they set the parameters by stating when care should be initiated, given, adjusted or referred back to others. Ilott (ibid) makes a distinction between two different contexts for the applications of the concept of protocol-based care, generic and specialist contexts. In generic contexts protocols, pathways or guidelines are used as a tool by the multidisciplinary team or individual professions to standardise and co-ordinate care processes. In specialist

contexts, authority and accountability is delegated for specific clinical processes. This often occurs with expended roles and new services, where these documents are designed to support role and task performance.

Of the different forms of protocol-based care protocols, care pathways and guidelines are described as tools for getting research evidence into generic as well as specialist contexts. In both contexts staff follow rules codified in these documents which aim to standardise health care delivery and outcomes. These documents do this in subtly different ways, varying the specificity and scope in which they have an effect upon the processes of clinical care. Staff retain responsibility for using them appropriately and for obtaining informed patient consent (Ilott 2006).

The definition of protocol-based care by Ilott adds to Berg's design principles for standardising health care using care programs, and care programs fit the description of protocol-based care. Both require a restructuring of tasks, integrated planning and the use of indicators and both intent to reduce variations in health care and promote the utilisation of research in practice.

Several other authors bring the concepts of standardisation and protocol-base care together. Thomson (2000) proposes that clinical guidelines can provide a vital link between theory and practice. Care protocols, clinical pathways and algorithmic guidelines can according to Thomson help infuse research into practice and thereby promote quality and standardisation of care. Underlying is a need to demonstrate effectiveness in healthcare representing a shift in culture from basing decisions on opinions, and past practice towards more utilisation of science, research, and evidence. Kent (2006) identified three success factors for maintaining momentum after Integrated Care Pathway (ICP) implementation after the first in-depth study of ICPs undertaken in Scotland. The first being variance analysis and reporting to ensure continuous development of ICPs , the second being key ICP development 'drivers' and 'champions', and the third ICPs as a tool to support standardisation of practice was identified as a success factor. Rationale for this is that variations in clinical practice result in poor-quality health care and that standardisation can lead to improved outcomes, a statement that was proven right in the cases studied by Kent (ibid).

Muething (2005) links reliability with standardisation as a basic step in developing a reliable health care system. Muething also refers to a clinical pathways study that adds to the evidence indicating an association between standardisation of care and improved outcomes. He finds it important to compare patient outcomes over time using different evidence-based tools; an important step to be taken is clarifying the definitions of protocol-based care tools.

Cole (1999) describes several Structured Care Methodologies (SCMs) which can be categorised as protocol-based care tools. SCM tools are developed in the current health care environment, in which processes are streamlined to reduce costs and best practice patterns are established while providing an interdisciplinary dimension to quality. Cole (ibid) identifies four major functional components of SCMs: 1) time line, 2) collaboration, 3) patient outcomes, and 4) quality enhancement of care. Before the institution of SCMs patient care depended on individualised approaches often leading to fragmentation of care, with SCMs services are provided in a more holistic manner and when used appropriately, these tools can have a major impact on the standardisation of care and the achievement of desired outcomes. However Cole (ibid) states that one tool may not be sufficient for developing standardised practice, tools should therefore be used in conjunction.

Vissers (2005 p. 101) approaches pathways in a logistics approach which adds to on the four principles by Berg (2005), the application of integrated planning. Vissers describes care pathways as multifaceted tools, which compare a number of different elements that have the primary purpose of supporting clinical processes. However, they can also be used for secondary purposes including monitoring the activity undertaken and commissioning services. Vissers also sees care pathways as tools that can be used to deliver integrated care across traditional health care and agency boundaries.

Comparing the different approaches to describing health care processes Vissers (ibid) says that quality management/ business process redesign often focuses on the improvement of a process in terms of its performance on the time dimension, while care pathways try to visualise the medical decision-making process and often use a more detailed description. Logistics approaches use a process description with a clear linkage with the resources used for the process. Berg's (2005) plea for integrated planning is connected with the transformation from unit logistics and chain logistics to integrated network logistics described by Vissers (2005). Berg notes that "through care programs, optimizing the planning of scarce resources becomes possible", and by this the standardisation through care paths is linked with health care logistics.

Skill-mix change

In the introduction the link between skill-mix change and standardisation was already made. One of the design principles for flexibly standardising health care as proposed by Berg (2005) is based on a thorough restructuring and delegation of tasks. And this is exactly what skill-mix change is all about as the concept can be seen as a way to analyse job redesign and its impact in health care according to Sibbald (2004). Buchan & Dal Poz (2002) concluded that in general skill-mix change can be defined as the mix of posts, grades or occupations within an organisation, within or between disciplinary groups, or the combination of skills within an individual professional (ibid).

Sibbald (2004) gives an overview of the different forms in which skill-mix change can present itself. Sibbald distinguishes different organisational processes underpinning Skill-mix change, within a given service skill-mix change may be brought about through (Sibbald 2004):

§ *enhancement* – increasing the depth of a job by extending the role or skills of a particular group of workers,

§ *substitution* – expanding the breadth of a job, in particular by working across professional divides or exchanging one type of worker for another,

§ *delegation* – moving a task up or down a traditional unidisciplinary ladder,

§ *innovation* – creating new jobs by introducing a new type of worker.

Changes in skill-mix may also be brought about by changing the interface between services, including (Sibbald 2004):

§ *transfer* – moving the provision of a service from one health care sector to another, e.g. substituting community for hospital care,

§ *relocation* – shifting the venue from which a service is provided from one health care sector to another, without changing the people who deliver the service, e.g. running a hospital clinic in a general practice setting,

§ *liaison* – using specialists in one health care sector to educate and support staff working in another sector, e.g. hospital 'outreach' facilitators in general practice.

Besides well known benefits associated with care programs such as the delivery of care becomes more evidence based, and colleagues, patients, and payers know better what care to expect, Berg (2005) also describes the reduction of coordination work as a benefit of care programs. Using care programs thoroughly reduces coordination work, since everybody knows what to expect in next – and previous – steps. On one side this makes care more effective and efficient, and on the other side also safer and more patient centred (ibid).

The question posed in the introduction was whether skill-mix really does enhance the effectiveness and/or efficiency of healthcare. Sibbald (2004) tried to answer this question by performing a systematic search for existing reviews of research into skill-mix change. Sibbald concluded that skill-mix is an attribute of the health care system as a whole and that optimum skill-mix is dependent on context and may vary from service to service and organisation to organisation. Policy makers and managers need first to analyse carefully the nature of the problem they wish to resolve and consider whether a skill-mix change is the best solution.

Although Sibbald (2004) concluded that the effectiveness and/or efficiency of skill-mix in health care is strongly situational, he recognises that skill-mix change in the health care workforce is presented as one of the solutions for the problems health care is facing. Also Buchan (1999) sees an increasing need for healthcare organisations to identify the most appropriate mix of staff as many countries initiate health sector reform-led cost containment and quality improvement measures.

Several authors presented above in the section about standardisation also, albeit briefly or indirectly, mention elements that relate to skill-mix change. That is most authors define clinical pathways as a multidisciplinary plan that allows for standardisation of health care or refer to increased multidisciplinary collaboration (Berg 2005, Cole 1999, Ilott 2006, Kent 2006, Thomson 2000).

Ilott (2006) makes a more specific link with skill-mix. He distinguishes between generic and specialist appliance of protocol-based care and the second appliance being concerned with delegated authority and accountability for specific clinical processes. An example of specialist use of protocol-based care and an antecedent for the use of protocol-based care in the UK was the reduction in hours worked by junior doctors that necessitated service redesign and changes in the workforce, particularly the expansion of nursing roles. Protocol-based care was a way of enabling these major organisational changes within a framework of clinical governance and risk management (ibid)

De Mul (2007) poses the clearest assumption by stating that skill-mix and information technology (IT) both share an important precondition: standardisation of work processes. Because information systems can be used to organise and structure not only all types of data but also can sequence and structure activities, IT has the potential to significantly support task delegation and

reallocation in skill-mix change projects. And at the same time, redistribution of tasks is often necessary for information systems to optimise their potential impact (ibid).

This view adds to that of Berg (2005) who describes the relationship between standardisation and skill-mix as bidirectional. On the one hand restructuring and delegating task makes standardisation feasible, on the other hand standardisation can ensure both the quality of the work delivered by the different care professionals involved, and the coordination of their work tasks. These processes ultimately depend on process-supporting information technology, whereby information technology is similarly dependent on care programs to succeed (ibid).

From the above it seems evident that (introducing) clinical pathways comes with skill-mix change in the health care workforce. Standardisation is also highly intertwined with both concepts and plays an important role in the success of both skill-mix change and clinical pathways.

Information technology

From the previous section it already became clear that information technology (IT) is strongly related to standardisation and also skill-mix change (Berg 2005, De Mul 2007). However, there is little literature combining the concepts of IT and skill-mix (De Mul 2007), and the same can be said for the IT and clinical pathways. Nevertheless the combination seems promising and is acknowledged by Berg (ibid) and also De Mul (ibid) who pose standardisation as a binding concept between skill-mix and IT, and where clinical pathways can be sees as a form of standardisation.

Considering the promise and sustained interest in IT in health care as depicted in the introduction it is remarkable that the number of conceptual or review publications on clinical pathways and IT is low. There are numerous studies published presenting the results of clinical pathways in a specific setting where information technology was used to support the clinical pathway (implementation), however these studies are in general focused on the (implementation of the) clinical pathway instead of the information technology component. And on a conceptual level these studies can are less useful unless reviewed in order to identify a relationship between the two concepts.

Blaser (2007), who identified the implementation gap mentioned in the clinical pathway section, does conceptualise the relationship between clinical pathways and IT. He sees using computer-based decision support (e.g. reminder systems) on the basis of clinical pathways as a way to improve clinician performance by delivering patient-specific advice at the time of consultation. The integration of IT applications into the clinical workflow is core precondition. An application development process supporting close cooperation between software engineers and clinical users helps a seamless integration of patient specific pathway information into routine documentation. Blaser (ibid) warns that data entry should be awarded with enough benefit for the users, for instance by reusing entered data to accelerate routine tasks (e.g. automatically generating orders and reports).

Lenz (2007) adds to this view by Blaser (who co-authored the article). Clinical pathways are described as effective instruments to decrease undesired practice variability and improve clinician performance. To reach increased pathway compliance IT-applications should be

embedded into clinical routine work. Precondition for successfully implementing such applications are according to Lenz (ibid) both a responsive IT infrastructure and a participatory and iterative design process aimed at achieving user acceptance and usability. Experiences from implementations at a German university medical centre show that pathway conformance actually could be improved by the use of IT.

Information technology can thus seen as a way that can contribute to improving and standardising health care processes. The way in which Blaser (2007) sees the role of IT is a way that directly supports the primary care processes; an indirect way of using IT is when aggregated data is being used to improve these processes. An example of an indirect way of supporting clinical pathways with IT is when aggregated information is used to evaluate the pathways performance, or when used for indicators about the functioning of care programs as pointed out by Berg (2005). Using information technology this way is related to auditing clinical pathways (Vlayen 2005).

Berg's care programs are not only highly dependent on the four additional design principles (redesigning and delegation of tasks, integral planning and data-gathering, feedback, and process supporting information technology), as mentioned earlier but also vice versa (Berg 2005). The four principles can only function properly when integrated with care programs, for instance Berg (ibid) describes that to have a useful electronic patient record, professionals need to use it in a similar way, or to work with order-entry they will have to heed the agreements assumed by the application. Thus, Berg (ibid) states "care programs bring the standardisation that information technology requires, and in turn, information technology can further improve the corporation, data management, and planning possibilities brought by the care program."

In earlier work Berg (2001) also stressed that the introduction of information technology should be accompanied with standardisation of data, decision criteria, and processes. Berg (ibid) also stressed that making information available should not be the only goal of information systems, these systems should direct and support health care processes. An area that deserves more attention according to Berg (ibid) is aggregating and reusing the information collected in the primary processes in order to improve existing processes. Thus "standardisation is key in this development of fully integrating information technology into health care work".

By stating that both skill-mix change and IT have standardisation of work processes as a precondition De Mul (2007) adds to Berg's view. De Mul claims that the fact that IT requires standardised use can be optimally utilised in situations where standardised work is required. It can then become a deliberate choice to use IT instead of paper records and forms in skill-mix change. An example given by De Mul is that the coordinating and accumulating role of IT can only be fulfilled if professionals align themselves with the standards of the system. Therefore "standardisation plays an important role in IT-supported skill-mix change" (ibid).

3. Case study

Introduction

This chapter presents the methods and materials and the results from the case study performed in the NHS setting in England to answer the second research question underlying this study: "How do clinical pathways change practice in the case study?" Also the third research question will be partly answered using results from the case study: "How can information technology support implementing and using clinical pathways?"

First the methods and materials for case study are presented followed by the results of the study. The conclusions and discussion points will be combined for all three research questions and presented in the fourth chapter.

Methods and Materials

The second research question is about performing a case study. After considering material from Creswell (2003) and Yin (2003), it was decided to perform a case study in order to study clinical pathways in practice. Some of the considerations in choosing to perform a case study are presented below.

The most important issue in choosing a research method according to Creswell (2003) is matching the type of research with a specific research approach. "If a concept needs to be understood because little research has been done on it, then it merits a qualitative approach. Qualitative research is exploratory and is useful when the researcher does not know the important variables to examine. This type of approach may be needed because the topic is new, the topic has never been addressed with a certain sample or group of people, or existing theories do not apply with the particular sample or group under study."

The subject of clinical pathways is a research area that has not yet settled in completely. Universal definitions are still to be defined (De Bleser 2006). There is also little evidence known about cause and effect relationships in implementing clinical pathways and pathway-related outcomes (Vanhaecht 2006). These characteristics of clinical pathways make it more suitable for qualitative research than it does for quantitative research. Often used and employed strategies of inquiry in qualitative research are amongst others case studies (Creswell 2003).

Yin (2003) describes case studies, as one way of doing research in the social sciences. Each strategy has specific advantages and disadvantages depending on three conditions: (a) the type of research question, (b) the control an investigator has over actual behavioural events, and (c) the focus on contemporary as opposed to historical phenomena. The goal is to avoid gross misfits. According to Yin (ibid) case studies are the preferred strategy when "how" or "why" questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context.

Considering the above the best research strategy for this study was besides performing a literature study performing a case study.

Case study background

Yin (2003) gives a technical definition of a case study as being an empirical inquiry that:

§ Investigates a contemporary phenomenon within its real-life context, especially when

§ the boundaries between phenomenon and context are not clearly evident.

§ Copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result,

§ relies on multiple sources of evidence, with data needing to converge in a triangulation fashion, and as another result,

§ benefits from the prior development of theoretical propositions to guide data collection and analysis.

A common misconception is that case studies are only valuable at the exploratory phase of investigations; Yin (2003) however, questions this. According to Yin case studies can be used for all purposes, exploratory, descriptive, or explanatory. It is also often questioned how it is possible to generalise from a single case. Yin counters this question by asking "how can you generalise from a single experiment?"

Scientific facts are rarely based on single experiments; the same is true for case studies. Case studies, just as experiments are generalizable to theoretical propositions and not to populations or universes. A case study does therefore not represent a "sample" and doing a case study the goal will be to expand and generalise theories and not to enumerate frequencies (ibid).

Case setting

The case setting will be the NHS setting in England, this because clinical pathways are heavily used and are even mandatory for independent sector providers to deliver NHS care. Also the role of nurses/nursing in England comprises more than for instance in The Netherlands. The NHS works with a nurse-led philosophy amongst others due to waiting lists and a shortage of doctors. The results section start by giving some background information on the NHS setting. Summarising the following activities were carried out for the case study:

Site-visits:

§ Blakelands NHS Treatment Centre, Milton Keynes (Independent Sector)

    ú Interviews with registered nurse (RN), endoscopy nurse, head of treatment centre, head of Operating Theatre, and Clinical Application Specialist.

    ú Walkthrough of (clinical pathway) information system

§ North Hampshire NHS Foundation Trust, Basingstoke

    ú Interviews with Orthopaedic nurse, Cardiology nurse, Junior sister (Adult medicine)

ú   Documents (paper version pathways)

Telephone interview:

§   Milton Keynes General Hospital, NHS Trust

ú   Interview with ambulatory care manager

Results

Before the results of the case studies are presented first some background information will be given on the NHS setting and why the NHS makes an interesting case for studying clinical pathways in practice.

The NHS

The National Health Service (NHS) is the publicly funded health care system of England. The NHS provides the majority of health care in England, from general practitioners to hospitals, long-term health care, dentistry and ophthalmology

. It was founded in 1948 and has become an integral part of British society and culture. NHS services are largely "free at the point of delivery", paid for by taxes; the NHS's budget for 2007-08 is £104 billion. The government department responsible for the NHS is the Department of Health, headed by the Secretary of State for Health.

Changing times

The Department of Health (DH) realised in 2000 that although it's many achievements the NHS had failed to keep pace with the changes in the society. Problems identified were:

§   Too often patients have to wait too long.

§   There are unacceptable variations in standards across the country.

§   What patients receive depends too much on where they live and the NHS has yet to fulfil the aspiration to provide a truly national service.

§   Constraints on funding mean that staff often work under great pressure and lack the time and resources they need to offer the best possible service

To tackle these problems the government decided to make an historic commitment to increase the funding of the NHS over the next years. More money is, however, only the starting point. The challenge is to use the resources available to achieve real benefits for patients and to ensure that the NHS is modernised to meet modern public expectations. All this was reported in a plan for the future of the NHS: The NHS Plan, A plan for investment, A plan for reform (Department of Health 2000).

The NHS Plan

Following a depiction of what the NHS Plan is about. The purpose and vision of the NHS Plan is to give the people of Britain a health service fit for the 21st century: a health service designed around the patient. The NHS has delivered major improvements in health but it falls short of the standards patients expect and staff want to provide. Public consultation for the Plan showed that the public wanted to see:

§   More and better paid staff using new ways of working.

§   Reduced waiting times and high quality care centred on patients.

§   Improvements in local hospitals and surgeries.

It was concluded that in part the NHS is failing to deliver because over the years it has been underfunded. In particular there have been too few doctors and nurses and other key staff to carry out all the treatments required. But there have been other underlying problems as well. The Department of Health (DH) concluded that the NHS is a 1940s system operating in a 21st century world. It has:

§   A lack of national standards.

§   Old-fashioned demarcations between staff and barriers between services.

§   A lack of clear incentives and levers to improve performance.

§   Over-centralisation and disempowered patients.

The planned investments have to be accompanied by reform. The NHS has to be redesigned around the needs of the patient. Local hospitals cannot be run from Whitehall (i.e. governmental administration). There will be a new relationship between the DH and the NHS to enshrine the trust that patients have in frontline staff. The principles of subsidiarity will apply. A new system of earned autonomy will devolve power from the centre to the local health service as modernisation takes hold (Department of Health 2000 p.10-11).

The NHS Improvement Plan

In 2004 The NHS Improvement Plan was published by the Department of Health (DH). This plan detailed the priorities for the NHS until 2008 and provided support for the government's continuing commitment to the 10-year process of reform first set out in The NHS Plan, in July 2000 (Department of Health 2004, p.8).

Summarising the NHS Improvement Plan concluded that only four years into the 10-year NHS Plan the new delivery system and providers are expanding capacity and choice. Goals for the next four years as stated in the Improvement Plan are mostly considered with offering a better-service to the patients. Waiting times will have to be reduced; patients will be able to choose amongst different providers and will be given more access to a wider range of services. The NHS aims to provide people will high-quality personal care; the NHS aims to become patient-led.

In order to reduce waiting lists and increase choice and access for patients the capacity of the NHS will have to continue to grow. For hospital care, NHS Foundation Trusts[1] will, by 2008, be treating many more patients. NHS patients will also be able to choose from a growing range of independent providers, with their diagnosis and treatment paid for by the NHS. To support capacity and choice by 2008, independent sector providers will provide up to 15% of elective surgical procedures on behalf of the NHS. The Health care Commission will inspect all providers, whether in the NHS or in the independent sector, to ensure high-quality care for patients wherever it is delivered.

Independent sector providers

One of the major initiatives of the NHS Plan is thus to create additional capacity within the NHS to reduce waiting times and introduce choice for patients. Treatment Centres (TCs) have been developed as a way of creating additional capacity. Run by either the NHS or the Independent Sector, TCs undertake elective and diagnostic work only in specialties such as ophthalmology and orthopaedics.

In 2005 the Department of Health (DH) set up the Independent Sector Treatment Centre (ISTC) Programme. The programme is intended to be an efficient and cost-effective use of Independent Sector capacity and capability to reduce waiting times and offer more choice to NHS patients (Department of Health 2005). The services offered by Independent Sector providers as part of the ISTC Programme must be delivered in accordance with NHS principles, i.e. with treatment free at the point of delivery and available according to clinical need, not ability to pay (Department of Health, 2005).

By the beginning of 2007 there are more than 30 treatment centres run by NHS Acute Trusts and Foundation Trusts and more than 20 run by the Independent Sector. These Independent Sector Treatment Centres (ISTCs) have been given over £3 billion worth of contracts over five years to treat NHS patients in Phase 1 of the ISTC programme and a further £1 billion is being spent on a second wave (The Chartered Society for Physiotherapy 2007).

The use of ISTCs is not without controversy, the House of Commons Health Select Committee was critical of ISTCs in its inquiry report of July 2006. The committee acknowledges there are major benefits from separating elective and emergency care in treatment centres. They are however not convinced that ISTCs provide better value for money than other options such as more NHS Treatment Centres or greater use of existing NHS facilities out–of–hours (House of Commons 2006).

Clinical standards

The Health care Commission will inspect all providers, whether in the NHS or in the Independent Sector, to ensure high-quality care for patients wherever it is delivered. Also every ISTC has to sign a contract that sets out all the clinical and non-clinical services (e.g. maintenance of the

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[1] NHS Foundation Trusts are a new type of NHS organisation, established as independent, not for profit public benefit corporations with accountability to their local communities rather than Central Government control.

facilities) which the provider must supply as described in the ISTC manual that is part of the ISTC programme.

A key principle reflected in the contract is that the standard of care delivered by the independent sector provider must be at least equivalent to that provided by the NHS. However, it is not the intention of the ISTC programme that providers should be required to adopt the same working, clinical or management practices used in the NHS. This principle is reflected in the contract in the following ways:

§ The provider must provide the clinical services in accordance with agreed clinical standards.

§ The contract sets out agreed patient *care pathways* in relation to each surgical procedure.

§ The provider can only begin to provide the clinical services once the facilities satisfy certain Health care Commission standards and it has received all other necessary registrations and permissions from the Health care Commission

§ All staff employed by the Provider must be registered with an appropriate professional body.

In contrast to NHS Treatment Centres ISTCs are bound by the contract to use pathways for all their treatments. The contracts are made up to for instance provide capacity for several thousands of ophthalmology pathways per year for a period of five years. Although ISTCs are obliged to use defined patient pathways for all their treatments, the conditions for these pathways are not specified in the ISTC Manual or in any other document published by the Department of Health.

Nursing within the NHS

The nursing profession within the NHS has been developing continuously since Florence Nightingale began in 1851, but nursing has faced many challenges to achieve self – actualisation. Traditionally nurses have had considerable autonomy in shaping their own practice but the medical profession have claimed the greater autonomy in shaping the organisation of hospitals and health care. Nurses are bound by standards set by the Nursing and Midwifery Council (NMC) (2002), which defines the overarching principles of being able to practice as a nurse as to:

§ Manage oneself, one's practice, and that of others, in accordance with the NMC code of professional conduct: standards for conduct, performance and ethics, recognising one's own abilities and limitations.

Autonomous developments within the nursing profession have evolved alongside political imperatives to develop existing roles in nursing. Nurse practitioners first developed in primary care in the 1980's and they were enabled to diagnose, refer, prescribe and provide care for patients with undifferentiated health problems (Stilwell 1985). The roles then extended into secondary care from the 1990's when Nurse Practitioners started to take over some of the tasks previously performed by doctors. Thus the professional regulation of the nursing profession has

developed alongside political and practical developments and has enabled many nurses to take on new roles and activities. The Wanless Report, the first ever evidence-based assessment of the long-term resource requirements for the NHS (Wanless 2002) also reinforced this change in that its expectations were that nurse practitioners would take on around 20 percent of the work currently done by doctors.

In 2004 for the first time ten key roles for nurses were embedded in the NHS Plan, this development represents the breakdown in paternalistic medical hierarchy and a reduction in the authority of the previously all powerful medical profession. The 10 key roles for nurses as identified in the NHS Plan (Department of Health 2000, p.83):

- § to order diagnostic investigations such as pathology tests and X-rays
- § to make and receive referrals direct, say, to a therapist or a pain consultant
- § to admit and discharge patients for specified conditions and within agreed protocols
- § to manage patient caseloads, say for diabetes or rheumatology
- § to run clinics, say, for ophthalmology or dermatology
- § to prescribe medicines and treatments
- § to carry out a wide range of resuscitation procedures including defibrillation
- § to perform minor surgery and outpatient procedures
- § to triage patients using the latest IT to the most appropriate health professional
- § to take a lead in the way local health services are organised and in the way that they are run.

Outside the NHS

Compared to the Dutch situation the most striking difference is that there is no obligation from the government to use clinical pathways as in the Independent Sector Treatment Centres in the NHS. Moreover clinical pathways are rarely mentioned by the government. However there are several (inter)national initiatives that promote the use and implementation of clinical pathways.

The NHS National Library's 'Protocols & Care Pathways Specialist Library' aims to provide information relating to the development and implementation of care pathways and protocols, by providing an extensive database of examples. The primary audience are health professionals who are developing, implementing and evaluating care pathways and clinical protocols. The pathways in the library have an abstract, are available in full-text, and searchable by keyword (http://www.library.nhs.uk/pathways).

A comparable initiative is the Belgian - Dutch NKP (Network for Clinical Pathways). Organised by the Belgian University of Leuven, and the Dutch CVZ (Collage for Health care Insurances) and CBO (Institute for Quality in Health care). In January 2007 64 Belgian en 32 Dutch health care organisations (mainly hospitals) were enlisted as members. The NKP aims to share knowledge concerned with clinical pathways amongst its members, for instance by providing pathway methodologies, data gathering and processing instruments, workgroups, and education by the

Teach-The-Teacher concept. The primary audience are project leaders and/or coordinator from within the organisations (https://www.nkp.be).

The main difference with the library from the NHS is that the library provides a database with pathways samples. The NKP is also a member of the European Pathway Association, a comparable initiative but on the European level. The EPA describes itself as an international network of clinical /care pathway user groups, academic institutions, supporting organisations and individuals who want to support the development, implementation and evaluation of clinical / care pathways (http://www.e-p-a.org).

Social services in Dutch health care

Anticipating the results and analysis of the case studies the results of a Dutch study done by the WRR (Scientific Advisory board for Government policy) on social services in Dutch health care will be presented.

The WRR has studied social services in five different sectors, amongst others social services in the health care sector (2004). They authors identified several problems concerned with social services in the health care sector, categorised under provisional problems, problems concerned with the demand for care, and with directing the health care sector. Besides identifying these problems they also bring forward possible resolutions for these problems.

One of the main problems in the Dutch health care sector, according to the WRR, is the undermining of the professional autonomy of health care professionals. The professionals are often subordinate to secondary processes. As part of their problem resolutions the WRR speaks of the 'health care professional of the future', a new professional that differs from their colleagues from the past.

Differences include the more horizontal relationship to the patient, the consequences of professional operating on social services and the large financial consequences for the public and the government. In the light of this study the most interesting difference is the extent to which the medical profession is steered by science and technology and as a consequence the need for teamwork.

Inevitably a plea for more professional responsibility will have to lead to the acceptance of social and organisational commitments for the health care professional of the future the WRR study continues (ibid). The authors argue that more autonomy and responsibility can only go hand in hand with a truly different task conception. Meaning that the professional needs to have:

§   The willingness to approach the patient as a full-fledged citizen with rights and duties.

§   The willingness to lift the profession to the highest standards (meaning evidence based) and to practice its profession in a transparent way.

§   The willingness to participate as a team member and organisational partner.

§   The willingness to think with the government about the future of the sector.

The WRR thus concludes that the health care professional increasingly needs to become a team player; however they also plead for more professional autonomy. In relation with policy problems the WRR concludes that approaches that start to reason with the characteristics of the care

giving process all come down to the following problem definition: The specific character of the primary process is not enough taken into account (especially the relational character of health care) and the crucial role the health care professional plays (professional autonomy); the application of the specialist is sub ordinary to bureaucratic mechanisms secondary to health care policy goals (accessibility, measurable quality, macro efficiency) which are often used for supply regulation. The motivation of the health care professionals and with that their essential contribution health care, is being undermined.

From the above it became clear that a tension exists in health care. This tension is about the logic and culture of the bureaucracy and the 'market' on the one side and professionalism on the other side, and is difficult to regulate. Or in other words a tension between the (mainly technical) efficiency and the professional standards and values. The WRR suggests that the tension leaver should primarily be sought in deregulation and in breaking down bureaucracy in the caregivers market and in a new task conception of the role of the health care professional which was already described above.

Relevance for this study

From the above it becomes clear that the NHS setting makes an interesting case for studying clinical pathways in practice and how they change practice. The independent sector treatment centres (ISTCs) make an especially interesting case as they are obliged to using clinical pathways for all their surgical procedures. The link with standardisation and skill-mix change is also apparent. The ISTCs are for instance by contract obliged to provide services with agreed clinical standards and the nursing profession is undergoing changes and taking on new roles and activities making the NHS more and more nurse-led. Clinical pathways may be an instrument to support these changes and it seems also commonsense that information technology can play in important role in these transformation processes.

On the other hand the results of the WRR study on social services in Dutch health care show another picture. They plea for less bureaucracy and more room for professional autonomy as the role of the health care professional is often sub ordinate to bureaucratic mechanisms. But they also argue that this will have to come with a truly different task conception.

Case studies

The results of the case studies are now presented alongside relevant literature, primarily following the care paths as described by Berg (2005) to standardise health care and the results of the Dutch study on social services in health care (WRR 2004). With the model by Berg, the study by the WRR and the results of the case studies we can determine what factors contribute to the success of clinical pathways.

To recapitulate in figure 2 Berg's care paths are shown together with the four additional design principles: professionals' quality system, restructuring and delegation of tasks, integrated planning, and process-supporting information technology as described in the results to the literature study (see chapter 2).

First the three case sites will be introduced by giving some quick background information on the sites. Following the results of the case studies will be presented alongside the relationship between learning and controlling, a relationship that seems to be positively present in the model by Berg, especially in the top half containing the 'professional quality system' and 'restructuring and delegation of tasks' design principles. Principles also closely related to the concepts of, standardisation, skill-mix change as introduced in the first two chapters.
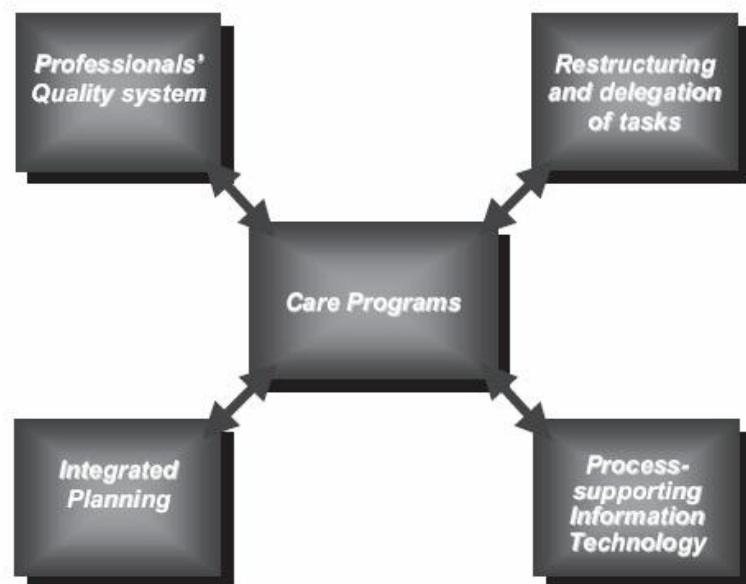

Figure 2: Care paths and four additional design principles (Berg 2005)

On the other hand the results of the WRR study on Dutch health care show a more negative relationship between learning and controlling, meaning that both concepts may lead to a conflict where health care professionals might find themselves affected in their autonomy. The results of the case studies studied in this study will investigate the relationship between the controlling effect of clinical pathways (i.e. signing off step of care given, keeping track of progress, variance tracking) and the learning effect of clinical pathways (i.e. pathways as a reminder system, empowering users).

The difference between the NHS and the Dutch health care system will also be used to guide the analysis of the case study results. As the results will show there seems to be a different effect of the relationship between controlling and learning when comparing the Dutch health care system and the results of this study done in the English NHS health care system.

Case sites

Capio Health care[1] is one of the leading providers of independent hospital services in England, with a network of 22 private hospitals, 10 NHS treatment centres, neurological centres and dedicated eye units. They provide a wide and comprehensive range of specialised and efficient clinical specialties from orthopaedics and general surgery, to cardiac surgery and oncology.

In April 2004, Capio were appointed to carry out 9,000 operations in partnership with the NHS. In May 2004, Capio signed the largest public sector care contract ever awarded to a private health care provider in the UK. Under this contract 95,000 NHS patients will be treated by Capio over 5 years.

Capio Health care only helps ASA classification 1, 2 and 3 patients (i.e. normal healthy patients to patients with moderate systemic disease with functional limitations) and offers 55 different treatments all supported by clinical pathways. A purpose build day case unit in Milton Keynes was visited. The centre has been designed to provide outpatient facilities for the assessment and treatment of patients and has two operating theatres for day case surgical procedures (http://www.capio.co.uk/).

Milton Keynes General Hospital is a 500-bed hospital with a three-star (out of three) rating from the Health care Commission in 2005 providing a wide range of general hospital services, including day surgery in a custom-built treatment centre. The trust has been invited by the Secretary of State for Health to apply for NHS Foundation Trust, giving the trust accountability to their local communities rather than central government control (http://www.mkgeneral.nhs.uk/).

North Hampshire NHS Trust is 400 bed hospital and a major provider of acute services, providing a full range of acute services with tertiary services. The hospital has been awarded the NHS Foundation Trust status in 2007 (http://www.northhampshire.nhs.uk/).

Independent sector versus public sector

Private sector

Treatment Centres, run by either the NHS or the Independent Sector, have been developed as a way of creating additional capacity for NHS patients. The Capio Health care Blakelands NHS treatment centre is an independent sector treatment centre (ISTC) treating NHS patients. The Blakelands treatment centre falls under the ISTC Programme of the Department of Health. The programme is intended to be an efficient and cost-effective use of Independent Sector capacity and capability to reduce waiting times and offer more choice to NHS patients.

The private sector have to adhere to tighter guidelines that the NHS and have to report on a greater number of KPIs (key performance indicators) that the NHS counterparts. The ISTCs rely on nurse led care to ensure the throughput of patients, much for the same reasons as the NHS but have additional pressures to deal with. For instance ISTCs do not have the same level of staff to call upon as their NHS counterparts. Nurses have become an integral success of the Day

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[1] In September 2007 Capio Health care was acquired by Ramsey Health Care, an Australian private hospital operator, however Capio Health care will be used throughout this study to refer to the case site.

Case Units (DCUs) and have become more responsible for the management of day case patients.

ISTCs (e.g. Capio health care) are contracted by the NHS to perform a set number of procedures for NHS patients, but are able to use extra capacity for their own private paying patients Capio Health care has a contract under which they will treat 95.000 NHS patients over 5 years. All contracted treatments are so called day cases. Day cases are those were patients are admitted, receive treatment (not just surgery) and are discharged on the same day or within 23 hours. As all ISTCs Capio Health Care is by this contract obliged to use pathways for all their treatments. The Blakelands NHS treatment centre was purpose build by Capio Health Care for the NHS contract. All pathways used at the Blakelands treatment centre are supported by a clinical IT system.

Because the Blakelands NHS treatment centre was purpose build for the NHS contract there is no 'before situation', a situation in which they treated patients without clinical pathways. Thus all patients have been treated following clinical pathways supported by the clinical IT system. The treatment centre is also fairly small, with 12 specialists and 16 available treatments.

Public sector

The North Hampshire NHS Trust and the Milton Keynes General Hospital are considerably larger than the Blakelands NHS treatment centre with 400 to 500 beds, both providing a full range of services to patients in all ASA classifications. A considerable difference compared with the Private Blakelands treatment centre, only providing 16 treatments, to ASA classification 1, 2 and 3 patients.

The ISTCs thus treat a different category of patients compared to the NHS, with the ISTCs concentrating on the 'normal' run of the mill, high volume, low cost procedures, soaking up the patients the NHS cannot accommodate, leaving the NHS with the more complex, high cost procedures. The ISTCs have strict acceptability criteria to screen out patients who are not suitable and these are then referred back to the NHS.

Both public sector hospitals started using clinical pathways in several departments, but still most departments have not and thus most treatments at both hospitals are carried out without the support of clinical pathways. For this reason there is a 'before situation' in which treatments were carried out without the support of a clinical pathway, this gives the interviewees the possibility to compare the work situation with and without the support of clinical pathways.

The learning vs. controlling paradox

The model by Berg (2005), the results of the WRR study and the results of the case studies will be used to determine what factors contribute to the success of clinical pathways.

As the results presented below will show there seems to be a positive relationship between the controlling effect of clinical pathways (e.g. signing off step of care given, keeping track of progress, variance tracking) and the learning effect of clinical pathways (e.g. pathways as a reminder system, empowering users). This relationship can also be found in the model of Berg, especially in the top half of the model containing the 'professional quality system' principle (i.e.

the use of indicators about the functioning of the care programs) and the 'restructuring and delegation of tasks' principle. This preliminary conclusion, however, contradicts with the results of the Dutch study done by the WRR (Scientific Advisory board for Government policy) on social services in Dutch health care.

They WRR pleas for less bureaucracy and more room for professional autonomy as the role of the health care professional is often sub ordinate to bureaucratic mechanisms. But they also argue that this will have to come with a truly different task conception. The WRR presented several problem resolutions in which the health care professional increasingly needs to become a team player; however they also plead for more professional autonomy, but this seems to be somewhat of a contradiction.

The results of the WRR study thus suggest there is a negative relationship between controlling and learning. Due to bureaucratic mechanisms health care professionals are often taken away from taking care of their patients. Therefore they plea for more autonomy and responsibility and thus suggest there is a negative relationship between controlling and learning as both do not go hand in hand. But on the other hand they argue that more autonomy and responsibility can only go hand in hand with a truly different task conception. Meaning that amongst other conditions the health care professional needs to become a team member, and be willing to lift the profession to the highest level.

These opposing views on the relationship between controlling and learning may be traced back to the health care system and/or culture. For instance the ISTC setting in the NHS seems to be a perfect example of a setting in which the relationship turns out to be positive. This may be because of the relative low number of treatments, the often purpose build buildings with collectively trained staff, the better availability of computers, and the obligation to report lots of figures to the department of health.

Outside the independent sector the controlling versus learning paradox also seems to work out positive, although the effect maybe de less apparent. This is in contrast to the Dutch situation as might be concluded from the WRR report as they suggest a negative relationship. A reason for this difference might be found in the different role of nursing between both countries. The nursing staff in the NHS has more responsibilities and autonomy than in the Dutch health care system and the nursing staff is in general the most intensive clinical pathway user.

Teamwork

Teamwork is an apparent part of the problem resolutions proposed by the WRR (2004). The integrated planning part of the model by Berg also emphasises teamwork. But working together is more than just consulting with your colleagues; it is about the predetermined division of tasks, where professionals from different disciplines work towards a single goal. Or in other words the willingness to practice the profession in a transparent way and to participate as a team member as described in the WRR study.

Berg (2005) comes to a similar problem definition as the WRR; the fact that the primary health care process is often not the ultimate goal. Berg notes that the step-by-step approach in care delivery comes with large autonomy of the individual professionals, departments, or organisations 'processing' each step. Most operational departments have their own agenda and

lines of accountability with the organisation's top management (ibid). This may lead to wasted time investments in the care giving process during which unnecessary coordination work has to be performed and additional costs are incurred. Integrated planning is thus needed and care programs (i.e. clinical pathways) may facilitate this move towards multidisciplinary teamwork.

Working with care programs is highly skilful work; it implies judging, at every step, whether the next planned step is indeed appropriate for this individual case. However Berg (ibid) warns by continuing that a *care program is no assembly line.* Standardisation should not be pursued for its own sake. Flexible standardisation is about enhancing competencies of professionals. Supported by physician-developed protocols nurses can now for instance be responsible for therapeutic activities that traditionally would have been seen as restricted to physicians.

All pathways used at the three sites are comprehensive multidisciplinary documents containing all steps to be taken in a care process for a specific treatment. In general all pathways contain sections for the different phases of the treatment including anamnesis, pre-admission assessment, admission, pre-, peri- and post-operative care up to discharge and follow-up. The document travels with the patient during the patient's admission. Different user groups use and record in the pathways (including specialists, nurses, physiotherapist, occupational therapists, and patients).

An example of teamwork in practice was found in the acute stroke care pathway of the North Hampshire NHS Trust which includes a swallow assessment test which allows nurses to individually assess the patient's risk factor. Before using the pathway each patient was consulted by a speech and language therapist, now by restructuring and delegation of tasks only if the assessment included in the pathway suggests so. This skill-mix change came with the introduction of the pathway however a junior sister in adult medicine adds "this was a coincidence, the whole hospital works with this swallow assessment now, and the therapists provided training on how to use it" [junior sister in adult medicine, North Hampshire NHS Trust, June 15 2007].

The Capio Health Care Blakelands Treatment Centre which was purpose build for NHS bid facilitates teamwork in the form of integrated planning by its specific architecture. The building is build around the journey (i.e. path) of the patient rather than department oriented. Both the North Hampshire NHS Trust and the Milton Keynes General Hospital are still build around departments which makes integrated planning more difficult, also the smaller size of the Capio Health care Blakelands Treatment Centre and the relative low number of pathways provided makes integrated planning and thus teamwork easier.

This multidisciplinary character of the pathways is a form of integrated planning which makes it for instance possible to optimise the planning of scarce resources. By critically redesigning the individual steps to be taken in a care giving process, the resources required for that care program become clear.

According to Berg (2005) integrated planning is patient friendly, effective and the reduction of ad hoc coordination tasks is inevitably a relief for all professionals involved. This adds to the different task conception proposed by the WRR resolutions in which they plea for teamwork and the willingness to lift the profession to the highest level and to practice the profession in a transparent way.

Effects of learning vs. controlling

The results of the cases show there seems to be a positive relationship between controlling and learning. By having to record all steps of care given pathways users might feel that they are being 'watched over their shoulder', that their doing is being controlled. However the pathway users interviewed focus on the positive things this controlling mechanism plays; they feel empowered by the clinical pathways as they are able to individually perform more tasks than they would have without the clinical pathways. In other words clinical pathways work as a learning system for the users.

This is contrary to the findings of the WRR in the Dutch health care system; the WRR argues that the controlling aspect has a negative effect on the learning aspect as the motivation of health care professionals is undermined. This might be especially true for the nursing staff in the Dutch health care system as their autonomy and responsibilities fall behind compared to NHS colleagues, who have their role empowered by law. Special situations in which the controlling aspect stimulates the learning aspect of clinical pathways were found at the case sites.

The pathways used at the sites are all broken into chunks that represent small steps in the entire process (for instance "prepare clean theatre bed", "bath / shower", "discuss discharge plans"). For each phase the different steps are grouped by the different user groups. Anyone making an entry into the pathway must register in a 'user identification sheet'. The users are instructed to sign in the appropriate space provided by each step to confirm that the prescribed care has been delivered or the step has been carried out and are instructed to only document problems and/or variances. Variances can either be recorded on a separate communication / variance sheet which accompanies the pathway or space provided on each page.

This signing off of steps is a form of controlling the health care professionals. At the Capio Health Care Blakelands Treatment Centre the different steps in the pathways have to be 'saved' or 'signed'; depending on your role you are either authorised to save or sign steps, and in the end all steps have to be signed off. This makes it possible for nurses to only save certain steps in the care giving process, which may need the clinical expertise of a physician.

The pathways are predominantly written in positive language (e.g. "base line observations recorded and within normal limits", "passing urine in good volume") making signing of the steps easy as most patients will suffice. So it is either signing of a task done, record a score, measurement or filling out an assessment. Only if the patient does not suffice the condition a variance must be recorded. If necessary there is also room for recording comments and/or free text.

In orthopaedic care at North Hampshire hospital when an orthopaedic nurse was asked whether the use of pathways allowed the nurses to do different things this was denied "you are not doing more it is just the same things" and "it doesn't change the way care is given" [orthopaedic nurse, North Hampshire NHS Trust, June 15 2007]. However when asked about the situation before the pathway apparent benefits of clinical pathways are mentioned "it minimises the risk of people forgetting and when filled in properly it does work, everything is there from different people" and "it actually allows you to record the care that has been given" [orthopaedic nurse, North Hampshire NHS Trust, June 15 2007]. In the before situation it was "leaving it up the will of memory", the pathway "prompts you to do things the day things are meant to be done" [orthopaedic nurse, North Hampshire NHS Trust, June 15 2007].

In the cardiology department at North Hampshire hospital pathways are not yet used, it is however thought to have a positive impact by the department's modern matron "it might give more confidence and empower nurses in looking after patients" [modern matron cardiology department, North Hampshire NHS Trust, June 15 2007].

The interviewees above indicate that the controlling effect of using clinical pathways does not work against them, they feel as they are being helped by the pathways in not forgetting to deliver steps of care and in empowering them to perform more tasks they could have done without clinical pathways. Below several examples are given of situations where this controlling aspect of clinical pathways also works stimulating and empowering.

The Milton Keynes General Hospital ambulatory care department uses amongst others pathways for many of their breast care treatments. According to the ambulatory care manager this is believed to have a positive impact on the role of nurses in the care giving process "you know in advance what the journey of the patient is going to be which puts you in control", and "improving the patient journey empowers the nurse, they are more in charge of the patients journey", "the patient gets a much better journey, and that's what we are here for" [ambulatory care manager, Milton Keynes General Hospital, June 14 2007]. The manager does not feel that the use of clinical pathways leads to so called 'cookbook medicine' as "there are still a lot of clinical decision being made by the nurses" [ambulatory care manager, Milton Keynes General Hospital, June 14 2007].

As pointed out earlier the nursing staff in the NHS and even more in the independent sector and day case units has a prominent role in the care giving process; the use of clinical pathways facilitates this role. The nurse-led philosophy in the NHS is supported by the ambulatory care manager of the Milton Keynes General Hospital: "I do encourage the nurse-led philosophy here in England. The government is looking for nurse-led care as there is a lack of specialists" [ambulatory care manager, Milton Keynes General Hospital, June 14 2007]. Clinical pathways can support this philosophy, for instance "if the patient succeeds the pathway, the patient can be discharged by the nurse (nurse-led discharge); this allows for a better and faster discharge reducing the length of stay" [ambulatory care manager, Milton Keynes General Hospital, June 14 2007]. This is a good example larger autonomy of the nursing staff in NHS compared to the Dutch health care system.

A specific example of the positive relationship between controlling and learning when using clinical pathways is when clinical pathways are being used as a teaching tool. For instance the clinical IT system tool used within Capio Health Care may also be used as a teaching tool, say for instance letting trainees only 'save' information and have users with higher authorisation 'sign' of the steps. They staff had not looked at the system in this way however they found this to be a plausible idea, a registered nurse added "it could be helpful for new staff and from a teaching point of view this would be easier" [registered nurse Capio Health Care Blakelands NHS Treatment Centre, June 14 2007]. Although with the current software it would take many actions (i.e. mouse actions) but that is an issue that can be resolved in a newer version of the software.

Reporting

The recording of and reporting on variances has become an integral part of pathways. In order to assess patient care and the effectiveness of pathway variances must be considered. Outcomes are identified as part of pathway development and whether patients meet these outcomes are recorded at the end of any phase or completion of the total pathway. Where patients do not meet an expected outcome the variance and the reason for the variance are identified and also recorded.

Clinical pathways are also put into operational use when managing individual patients and the ability to aggregate the data gathered whilst using the pathway so that it can used for audit and reporting purposes. The outcomes and data can then be used for continuing quality improvements. Information can not only be used when planning individualised care, but it is also important to recognise the importance of audit when planning for future patients. Without looking back at outcomes, variances, and where patients have not followed the pathway it is impossible to monitor the success of current pathways. Audit is vital when looking at the cycle for improvement. Thus this controlling aspect (i.e. reporting) of clinical pathways also shows a positive relationship with the learning aspect (i.e. quality improvements).

Nurses are realising that they are no longer the only users of data; whilst they may use the outcomes of audit for monitoring care it actually becomes important at a higher operational level. This is not different in the Private sector where data is used not only to report on individual variances, but the information is used by organisations to report on their numerous KPIs (Key Performance Indicators). The NHS does not have the same level of reporting to achieve for its Day Case Units, however with the ever increasing number of Trusts reaching Foundation Trust status, and therefore being more responsible for their own futures, this state may change

Capio Health care uses the pathway system to audit their different treatment centres. Periodically for each treatment centre ten randomly chosen pathways are scored against criteria in seven categories, including 'medical record keeping' and 'care pathways and variance tracking'. The criteria are where possible based on standards (e.g. NHS or NMC (Nursery and Midwifery Council) standards). Each treatment centre gets scored against these criteria and the results are available to all treatment centres. In case of a low score on one or more of the seven categories compared to the other treatment centres this encourages the centre to inform the other centres on how they can improve their practices.

At all three sites it is possible and in fact obliged to record variances if they occur. At the NHS sites this is done in provided free-text space at Capio Health care it is possible to record variances using the software system, which makes reporting on variances much easier. At Capio Health care variances can be recorded in 26 categories (additional free text input is possible) and quarterly variance reports are made up automatically. The number of variances recorded at the Milton Keynes treatment centre for the first quarter of 2007 was only about 20. The provided free text option is mainly useful for teaching nurses how to write things down as they tend to "write on and on" according to the head of the treatment centre. The variance information is also used for clinical governance and for the Health care Commission, as the Department of Health demands a lot of figures. According to the head of the treatment centre "the government is very nervous about treating NHS patients in treatment centres run by private contractors, and therefore they

demand a lot of figures" [head of Capio Health Care Blakelands NHS Treatment Centre, June 14 2007].

But all that is golden does not glitter. When reporting becomes mandatory and measures will follow these reports when the results are not satisfying pathway users may feel obstructed to recording variances. Recording variances may be seen as deviating from the norm and thus unsatisfying. This situation should be avoided as much as possible as this can be a serious negative affect of the controlling versus learning paradox.

Information technology support

Within the ISTC of Capio Health care the use of information technology (IT) is more naturally than within the NHS. Reasons tot this are the small scale of the centre, the relative low number of users who were collectively trained, and the relative low number of different treatments. Moreover the use of IT is enforced by the head of the treatment centre. And besides these reasons IT is actually obligatory when considering the information demand by the Department of Health. Without IT this demand for information would be impossible to fulfil.

The use of IT within the NHS is in general less obvious. There is in general a lack of enough work stations, there are many more employees that need to be trained, and the diversity in treatments is also much larger than within the private sector. Where within the Capio treatment centre the benefits of clinical pathways are directly visible due to the use of IT (e.g. reminders), within the NHS the pathway users put a lot of effort into the pathways but the benefits are less apparent. The results of the cases underline this.

All pathways at the Capio treatment centre were developed for the NHS bid and had to be developed in a limited time frame. The clinical application specialist explains that "the pathways were developed using available evidence and clinical leads and specialists of Capio Health care and basically whoever we could get hold of" [clinical application specialist, Capio Health Care Blakelands NHS Treatment Centre, June 14 2007].

The Capio treatment centre was purpose build for the NHS bid and has worked with the software system supporting all their pathways from the beginning. According to a registered nurse this was beneficial in employing the pathways "we all started at the same time and were trained together; the unit [Blakelands treatment centre] is very motivated" [registered nurse, Capio Health Care Blakelands NHS Treatment Centre, June 14 2007]. Experiences are predominantly positive "when you are used to the system care can actually be quicker", and "it is easier, you can not forget things, it works as a checklist, as you are very busy and likely to forget things" [registered nurse, Capio Health Care Blakelands NHS Treatment Centre, June 14 2007]. The software system also "makes bottlenecks become very visible, if a nurse is not keeping up this becomes directly visible in the pathway, and because of the small group [of staff] you know who this is, and this keeps you motivated" [registered nurse, Capio Health Care Blakelands NHS Treatment Centre, June 14 2007].

Within the NHS cases IT support is thought "to be quicker in theory" and beneficial as "you never loose information, now things go missing in the trust" [modern matron cardiology department, North Hampshire NHS Trust, June 15 2007].

An additional benefit of IT supported pathways is the fact that they can be easily adapted and actualised. At Capio health care the pathways can be designed and adapted by the clinical application specialist. Changes can be done in several hours "if for instance from the evidence it becomes clear that it is better that the patient is 12 instead of 6 hours sober before surgery, this can be included in the pathway, and directly all Capio treatments are done this way", according to the clinical application specialist [clinical application specialist, Capio Health Care Blakelands NHS Treatment Centre, June 14 2007].

In general clinical pathways are seen as having a positive impact by the ambulatory care manager of the Milton Keynes General hospital: "I think pathways are a much better option than sheets of paper, it is all in the same document, all information in one place and you can also refer back to earlier stages" [ambulatory care manager, Milton Keynes General Hospital, June 14 2007].

However the additional workload that comes with IT supported pathways can take up a lot of the user's time. This is supported by the registered nurse who indicates that "it can take too much time, for instance with the pre-assessment, you often record when the patient is gone, this can pile up the work" and "it is sometimes difficult to concentrate on the patient" [registered nurse, Capio Health Care Blakelands NHS Treatment Centre, June 14 2007]. Especially in endoscopy where the patient turnover is approximately 8 minutes there is limited time acknowledges an endoscopy nurse "[it] gives you no time to leave the patient and you need more time to fill out the peri-operative [activity] bundle. You are talking about a wrong skill-mix, I am supposed to be a consultant, recovery nurse and fill out the pathway" [endoscopy nurse, Capio Health Care Blakelands NHS Treatment Centre, June 14 2007]

And besides that filling out electronic pathways takes more time than paper pathways there are also additional tasks that need to be carried out at the Capio treatment centre. At the end of the patient's treatment all paper documents (e.g. referral letters, signed statement by the patient) are scanned into the computer and added as a digital document to the pathway, making the treatment centre paper-free. This is not the case for all Capio Health care treatment centres, the use of IT supported pathways in the Milton Keynes treatment centre is enforced by the head of the treatment centre. Although Capio Health care aims to only use IT supported pathways this is not enforced by all treatments centres. It is therefore possible that a surgeon has to use the IT supported pathways at the Milton Keynes treatment centre and uses the paper version at other Capio Health care treatment centres.

Although it is indeed thought to be more time consuming this does not weigh up to the advantages "it will cost more time, but it will be a tidier message". Infrastructure problems are thought to be the main barrier "it will take more time to access a computer and there is limited time and limited work stations; palm computers, for instance, could be helpful" [ambulatory care manager, Milton Keynes General Hospital, June 14 2007].

4.   Discussion and conclusion

This final chapter discusses the results from the literature study and the case study performed to answer the research questions posed in the introductory chapter. Secondly the conclusions to the three research question will be presented.

Discussion

This study was carried out as the final part of the Master's study Health care Management at the Erasmus University of Rotterdam. The literature study aimed to find answers to the first research question asking about recent insights regarding clinical pathways and how they relate to the concepts of standardisation, skill-mix and information technology in health care. The literature study was of an explorative nature and can therefore not be considered as being complete on the topics of interest. The explorative nature is in line with the overall qualitative design of the study.

As mentioned in the beginning the subject of clinical pathways is a research area that has not yet settled in completely. Universal definitions are still to be defined (De Bleser 2006) and there is also little evidence known about cause and effect relationships in implementing clinical pathways and pathway-related outcomes (Vanhaecht 2006). These characteristics of clinical pathways made it more suitable for qualitative research than it does for quantitative research.

For the literature study only the citation index PubMed (MEDLINE) was searched. Although the literature search can not be seen as a systematic review the PubMed index was searched semi-systematically for (predominantly review) articles published after the year 2000 using appropriate MeSH (Medical Subject Headings) were possible. The fact that only 'critical pathways' is contained in the MeSH database made the search process more difficult. Standardisation, skill-mix and information technology were therefore entered as free text fields, for information technology synonyms were also used (e.g. computer supported, information systems).

Often used and employed strategies of inquiry in qualitative research are amongst others case studies, hence the second research question asked about how clinical pathways changes practice in the case studies. The case studies were carried out in the NHS setting which can be considered as a good case setting for studying clinical pathways in practice. Not only due to the high application of clinical pathways in the NHS, but also due to the fact that independent sector providers are obliged by the government to use clinical pathways for all their treatments.

The relative high use of clinical pathways in the NHS and the nurse-led philosophy of the NHS contribute to making the NHS an interesting case. Reasons like unacceptable waiting lists and a lack of doctors in the NHS led to the expansion of nursing roles and services. Changes like nurse-led discharge and the concept of the named nurse (i.e. a nurse responsible for the coordination of care and liaising with other staff in the multi-disciplinary team for a single patient) empower nursing staff and give them more control over the journey of the patient. The link with clinical pathways, standardisation and skill-mix change is than easily made as clinical pathways

are seen as a supporting tool for changing the role of nursing staff in the NHS while also standardising health care practices.

Although the results of case studies can not be used to draw conclusions, the results can be used to identify indications of how clinical pathways change practice and under what circumstances they will be more or less successful. The results of the literature study will also help identifying in what circumstances clinical pathways will sort the most effect. The results of both the literature and the case study will now be discussed alongside several insights by different authors: the extent to how evidence-based clinical pathways are, the abstraction of pathway developers from the primary care giving process, and the fear for "cookbook" medicine.

Evidence-based practice?

The pathways used at the case sites, although multidisciplinary, are to the greater part focused on nursing care. Both concepts are associated with evidence-based practice and/or the use of best practices. From the literature study it became clear that clinical pathways are often seen as a way to implement evidence-based medicine and/or practice. Youngblut (2001) on the other hand argues that evidence-based practice provides many opportunities for nursing care to be more individualised, more effective, streamlined and dynamic, and to maximise effects of clinical judgement. A form of skill-mix change which can also be facilitated by implementing clinical pathways as pointed out in the literature study.

Youngblut (ibid) notes that nurses tend to remember the best and the worst cases, for example patients who had outstanding outcomes despite lots of adversity. However these extreme cases do not represent the majority of the patients nurses see. Thus, Youngblut argues "practice based on experience, anecdotal accounts, and case histories may fit the extreme cases but not the more usual patient situations, and may not provide a complete picture of the phenomenon." In effect Youngblut pleads for evidence-based practice in nursing.

Youngblut (ibid) stresses however that in order for nursing to adopt evidence-based practice, changes in the education of students are necessary as well as more practice relevant research, and a closer working relationship between clinicians and researchers. Youngblut is for instance critical about the level of "evidence" contained in clinical pathways although they are often cited as evidence-based practices. However, Youngblut critiques that "in many cases, clinical pathways are designed by local "experts" and based on their own clinical experiences rather than on research evidence", and "clinical pathways rarely are tested empirically to see if they result in the desired outcomes". Comparable criticism comes from El Baz (2007) who tried to answer the question whether the outcomes of clinical pathways are evidence-based by performing a systematic review. El Baz (ibid) concluded that "readers should be cautious when interpreting the results of clinical pathway evaluation studies because of the confounding factors and sources of contamination affecting the evidence-based validity of the outcomes."

The pathways used at the Capio treatment centre were developed in a limited time frame. The clinical application specialist explained that "the pathways were developed using available evidence and clinical leads and specialists of Capio Health care and basically whoever we could get hold of". The level evidence in the clinical pathways is therefore questionable; the same can

be said for the pathways used at the North Hampshire NHS Foundation Trust. However, the use of pathways leads to unambiguous treatment plans and thus standardises health care while reducing coordination work. This view is in line with the care programs and additional design principles described by Berg (2005) in order to standardise health care.

Once clinical pathways are installed this simplifies incorporating new insights, best practices from the available evidence into the pathways. The clinical IT system used at Capio Health care makes adapting the pathways even easier; new insights can directly be included in the pathway template, and from that moment all pathways users at Capio are confronted with these new insights.

Although maybe not entirely evidence-based the pathways at the sites do facilitate an unambiguous way of working. And besides this the sites showed a positive combination of the controlling and learning effect of clinical pathways. The pathway users feel that the use of pathways encourages them to work in pre-determined standards and see the pathway as a tool for making sure no steps are missed and the pathways empower them as they are able to perform tasks they could not have done without the pathways.

Abstraction from primary process

Another point for discussion is the fact that clinical pathways are often developed by health care professionals who are extracted from the actual care giving process. A point that shows resemblance with the criticism in the WRR report (2004); the health care professional is too often sub ordinate to secondary processes.

Bal and De Bont (Bal 2005) are critical about the fact that standardised care paths (or clinical/critical pathways) are often made a great distance from the actual care giving process, and that they are characterised by a distinction between the organisation of care en the actual content of the care delivered to the patients. The authors note that health care professionals are often involved in developing pathways; they are however taken away from the actual care giving process. A connection between the standard and primary process is therefore often missing because health care professionals contribute with a too much rationalised version of the primary process. Such a process leads to standards that are effective in a medical aspect, but can not be realised in practice according to Bal en De Bont.

Developing pathways should therefore not be the ultimate goal according to Bal en De Bont (ibid), but should contribute to resolving specific problems. The goal is not to accurately describe all tasks being done in a path of treatment as happens to often in the current processes of developing pathways. The redesigning of problematic aspects in the whole chain of delivering care should be the aim according to the authors.

This criticism seems however less relevant for the pathways used at the case sites. The pathways used at both the Capio treatment centre and the North Hampshire NHS Trust were mainly developed by health care professionals from within the organisations. As discussed above this will also partly be the reason why the pathways used at the sites are not especially based on best-practices. However the pathway users at both sites can and do deliver input for the content

of the pathways. This input is in fact used to adapt the pathways which are regularly updated and revised. For instance swallow assessment at the North Hampshire Trust was added to several pathways after consultation between the speech and language therapist and the department nursing staff. At Capio Health care it has to be taken in mind that changing a pathway affects all treatment centres and not only the one located in Milton Keynes.

Cookbook medicine

Yet another point of discussion is addressed by Timmermans and Mauck (2005), who note that although advocates welcome the stronger scientific foundation of evidence-based medicine, critics fear that standardised practice will lead to "cookbook medicine". Youngblut (2001), as an advocate, states that evidence-based practice does not eliminate the need for professional clinical judgement. Moreover, Youngblut (ibid) continues by stating that evidence-based practice has the potential to save both nursing time and health care dollars, as ineffective practices are replaced with practices that result in the desired patient outcomes. But Youngblut (ibid) cautions "it also places demands on clinicians, educators, and researchers to make changes in practice, education, and the focus of programs of research."

Timmermans (2005) summarises the points of critique on evidence-based medicine, which mostly come from within the medical professions, as that it "brings about stagnation and bland uniformity, derogatorily characterised as 'cookbook medicine'", and "instead of using clinical judgement, practitioners will be encouraged to follow protocols that treat all patients as essentially interchangeable" (Timmermans 2005).

Opposed to this view Youngblut (2001) states that "as always the nurse performs the assessment of the patient's condition and needs, and decides what observations, actions, or interventions are indicated." Thus indicating that evidence-based practice does not eliminate the need for professional judgement. Although Youngblut (ibid) acknowledges that nurses in a fast-paced unit may not be able to use evidence as a basis for every decision, "it is possible and necessary to use evidence in developing the clinical pathways and the policy and procedure manuals that guide nursing practice".

An example of the effects of standardisation with clinical pathways is described by Broers (2006), who studied the feasibility and efficacy of a nurse-led clinic opposed to a resident-led clinic for patients recovering from a recent myocardial infarction. Results showed that treatment in a nurse-led clinic, using standardised clinical pathways, was found to be feasible and effective with a significantly higher level of patient satisfaction.

At all case sites it was said that the use clinical pathways had a positive impact on the role of the nursing in the overall treatment. It was said that the nursing staff felt empowered as they had "more control over the journey of the patient." There was also no fear for "cookbook" medicine as "there are still a lot of clinical decisions being made by the nurses", and probably even more as the nursing role is expanded by the clinical pathways. What the cases basically showed was a positive relationship between the learning and controlling aspect of clinical pathways. While controlling the care by using pathways the users find themselves empowered. The NSH setting and even more the independent sector providers form a good case setting for this positive

relationship as the nursing staff are by law able to perform more tasks than for instance in Dutch health care. Thus clinical pathways seem to support and even stimulate this increased autonomy.

This view is supported by Youngblut (2001) who states that using research to guide practice means that nursing interventions and approaches can be highly individualized based on patient characteristics. The other opportunity that evidence-based practice affords is the ability to maximise the effect of nurses' clinical judgement on patient outcomes. Youngblut's (ibid) conclusion adds to this view stating that "despite concerns to the contrary, evidence-based practice actually increases the need for nurses to use well-developed, finely tuned, sound clinical judgement. And, it will increase awareness of the role that nurses' clinical judgement plays in patient outcomes."

The basic premise of Timmermans and Mauck (2005) is also supportive of evidence-based practice and concludes that "the debate over clinical practice guidelines and their mixed record at changing clinical practice results from a reliance on a traditional and narrow image of the medical professional as the sole decision maker in contemporary health care." They therefore plea for a broader conception of health care professionalism and that this might increase the success of clinical practice guidelines. This plea shows resemblance with the different task conception of the 'health care professional of the future' as described in the WRR report (2004).

With the foreseen broader conception of health care that reflects its collaborative nature by Timmermans and Mauck (ibid) they argue that change in health care is possible. A possible strategy uttered by the authors is "a multifaceted approach tailored to local stakeholders and their differing interests that solves the problem of transparency without undermining professional autonomy." A view that adds to the concept of clinical pathways, something they acknowledge by stating that "in the current health care climate, clinical practice guidelines used to capitalise upon interdependency and coordinate collaboration, as well as to install uniform best practices, increase the likelihood of a better standard of medical care." This view is also in line with the care programs and additional design principles, especially the restructuring and delegation of tasks, described by Berg (2005) in order to standardise health care.

Conclusion

The conclusions to the three research question posed in the introductory chapter are presented in the following sections.

Literature study

"What are the recent insights in the literature regarding clinical pathways and how do they relate to the concepts of standardisation, skill mix and information technology in health care?"

Although generally accepted definitions do not exist for clinical pathways, De Bleser (2006) gives a comprehensive working definition. Authors do have there differences but generally agree on the purposes and promises associated with clinical pathways being increased quality of care, increased patient safety, reduction of coordination work and care becomes more evidence-based. Clinical pathways can also be categorised under the umbrella term protocol-based care (Ilott 2006). Considering all protocol-based care tools clinical pathways are however seen as the best way for getting evidence into practice.

There is general understanding that pathways will not suffice on their own in bringing evidence into practice. Several authors identify additional design principles, which can be summarised by Berg's (2005) four additional design principles: (1) a thorough restructuring and delegation of tasks, (2) the application of integrated planning, (3) the use of indicators about the functioning of the care programs, and (4) implementing process-supporting information technology.

The link with the concepts standardisation, skill-mix change and information technology is made with the above design principles. Standardisation was found to be the defining attribute of protocol-based care and it is also suggested that the standardisation of work processes is an important precondition for skill-mix change and information technology. Clinical pathways can thus be seen as a tool for standardising health care delivery, although as mentioned above they can not suffice on their own and need additional supporting measures to be taken.

Just as clinical pathways skill-mix change is seen as a solution to the problems health care is facing. Skill-mix change seems inevitable when introducing clinical pathways as they are without exception associated with the multidisciplinary team leading, and thus leading to increased and/or different relationships between the different members of the multidisciplinary team.

Considering the combination of information technology and clinical pathways seems promising there is limited literature combining both concepts. However the relationship is made explicit by Berg (2005) stating "standardisation is key in fully integrating information technology into health care work" and De Mul (2007) adds "in situations where standardisation is required information technology may be a deliberate choice as it requires standardised use".

Concluding it seems evident that (introducing) clinical pathways comes with skill-mix change in the health care workforce while standardising health care delivery and information technology can play an important role in facilitating these processes and vice versa.

Case study

"How do clinical pathways change practice in the case study?"

At the NHS case sites it is claimed that clinical pathways do not necessarily change the care that is being given but does change the way it is being delivered. Introducing clinical pathways does not evidently mean that more things are being done than there were before the pathway implementation. However clinical pathways are claimed to make a tidier and more complete message.

Although clinical pathways do not necessarily change what is being done, the care provided becomes more evidence-based and protocolised using clinical pathways. The protocol-based pathways make sure that care is being delivered in a uniform and agreed upon way, and where possible based on available evidence. The level of evidence contained in the pathways was however a point of discussion as the pathways were developed at the local level and/or in a limited time frame. Moreover this is a general concern with clinical pathway development and research (Youngblut 2001, El Baz 2007).

The pathways give the user also more control over the patient's journey as it is known in advance how the journey of the patient is going to be. There are however still many clinical decisions being made by the pathway users. In effect evidence-based practice can maximise the effect of clinical judgement and does not eliminate the need for professional judgement (Youngblut 2001). This is also contrary to the critics of evidence-based practices fearing "cookbook medicine".

The impact of clinical pathways on the autonomy of pathway user remains a point of discussion, and seems dependent on the type of pathway user as Sibbald (2004) notes that "the introduction of care pathways was perceived as 'restrictions on autonomy' by doctors but as 'enhancing autonomy' by nurses". At the case sites the introduction of clinical pathway was also perceived as empowering by the nursing staff. The results of the case sites add to what Sibbald describes and can be seen a positive combination of the controlling and learning aspect of clinical pathways.

A single document also seems to encourage the users to fill out and document all different steps in the care giving process as it becomes immediately visible which steps are not signed as being carried out. This also acts as a reminder to the pathway user, which is especially helpful as you tend to forget things, which will make the care giving process more complete.

Elective or easy to plan treatments seem to be more appropriate for using clinical pathways as they are often well described and evidence is available, bearing in mind the shortcomings of the available evidence as mentioned above. The scale of the Capio Health care treatment centre seems also beneficial for using pathways as the multidisciplinary team is formed by the small number of employees who positively control each other. The relative easy treatments with mostly perfectly healthy patients make sure that a very a low number of patients do not fit the pathways; accordingly the number of recorded variances is generally low. Although one should be cautious of the adverse effects of reporting as recording variances may be seen as deviating from the norm and thus unsatisfying.

Implementing Clinical Pathways

"How can information technology support implementing and using clinical pathways?

Although clinical pathways are generally seen as a platform to implement guidelines within a specific setting, from the literature study it became clear that implementing clinical pathways will not necessarily change practice or put evidence into practice. Pathway implementations should therefore come with additional measures (see the four design principles by Berg above).

Standardisation, skill-mix change and process-supporting information technology are all important in effectively implementing clinical pathways. Information technology can either directly or indirectly support clinical pathways; however there is little evidence available on how information technology can support (implementing) clinical pathways either way.

One of the few publications on this subject states that information technology applications should be embedded into clinical routine work to reach increased pathway compliance. Preconditions for successfully implementing such applications are both a responsive information technology infrastructure and a participatory and iterative design process aimed at achieving user acceptance and usability (Blaser 2006). It is also argued that information technology in the form of computer-based decision support (e.g. reminder systems) can on the basis of clinical pathways improve clinician performance.

As became clear from the literature study "standardisation is key in fully integrating information technology into health care work" as information technology often requires standardised use (Berg 2005). Standardisation of health care can partly be established using clinical pathways and taking into account additional design principles. It is therefore evident that "in situations where standardisation is required information technology may be a deliberate choice as it requires standardised use" (De Mul 2007).

From the above it is clear that the relationship between clinical pathways, including additional changes that come with implementing and using pathways (e.g. standardisation, skill-mix) and information technology works both ways. Information technology requires standardisation and standardisation may be brought about through clinical pathways, indirectly information technology thus requires clinical pathways. Vice versa clinical pathways may require information technology in order to standardise health care as information technology requires standardised use.

Clinical pathways aim to improve the quality of care, increase patient safety, reduce coordination work, and making care more evidence-based. Additionally monitoring and evaluating variances is also seen as an important part of clinical pathways. Information technology can standardise variance tracking and simplify evaluating variances. The automatically generated variance reports at Capio Health care are a prime example of how information technology can support variance tracking for clinical pathways. The Capio Health care site also shows that using information technology supported clinical pathways help to ensure that the pathway is being followed and no steps are being forgotten. The completely paper-free patient record at the site is also a noticeable benefit of information technology supported pathways, although this does take extra time and effort. A clinical IT system, as used at Capio health care, greatly facilitates adapting the pathways after new insights.

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