

Knowledge management as a Tool in Health Care Systems Optimization - The Case of Närsjukvården Österlen AB

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– Essay –

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Abstract

Background: Närsjukvården Österlen AB (=NÖAB) won a five-year contract, late in 2000, to operate the local health care services in Simrishamn on behalf of the Region Skåne. The economical forecast for 2002 was a loss of 18 million SEK. A turnaround was urgent.

Aim: Primarily to evaluate Knowledge Management (=KM) techniques as a tool in the process of turning a health care organization around. Secondly, to describe the means by which NÖAB became a more efficient health care organization. In order to evaluate the use of KM in the turnaround process it is necessary to answer three fundamental research questions. Did a turnaround take place? Did the individual projects contribute to increased efficiency? And finally can the approach used in the projects be characterized as KM.

Method: The study was an ongoing case study using action research combined with evaluation. The Evaluation uses public data (both quantitative and qualitative) and evaluations done by third parties. That allows for a profound validation of the conclusions. Three central processes were singled out for the evaluation. 1) The makeover of the acute patients' way into the system, 2) the disease management program (=DPM) for patients suffering from COPD and 3) the introduction of an error-management system.

Results: The operating results were raised from minus 15 million SEK in 2002 to plus 10 million SEK in 2005. Manhours were reduced with 20.6%. The average cost for a consultations were reduced with 24.6%. The introduction of the COPD DPM resulted in a saving of approximately 1 million SEK a year. A total of 312 adverse event reports were filled during the first 10 month - an average of 31 a month. The introduction of KM turned the organization into a patient centered, lean health care organization. Changed the decisions making, and resulted in a significant shift towards an acceptance culture.

Conclusion: From the nature of the described projects, the description of the landmarks used and the discussion on how the projects fit into a Knowledge Management way of thinking it is concluded that a Knowledge Management approach was applied. The success of the turnaround described in the case makes a strong argument for the use of Knowledge Management when faced with the need to optimize health care systems.

Key words

knowledge management, optimizing health care systems, efficiency, turnaround, lean management.

Knowledge Management as a tool in Health Care Systems optimization

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The case of Närsjukvården Österlen AB

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Introduction

The turnaround of Simrishamn's hospital

Volvo Cars, Volvo Trucks and Ericsson are the three largest private employers in Swedish business life. However, the fourth largest private employer in Sweden, Praktikertjänst AB, is less known even to the Swedes themselves. Praktikertjänst AB is a corporation owned by 2,500 medical and dental professionals, with almost 16,000 employees in Sweden. Its core business is health and dental care, and one of several subsidiaries in the corporation is Närsjukvården Österlen AB (=NÖAB)(1). In 2000, on behalf of the regional health care authorities, NÖAB won a five year contract after a bid, to operate the local health care service in Simrishamn under private enterprise. (2). Contracted out were two health centers and a small local tertiary hospital with 75 beds (25 surgical, 35 medical and 15 stroke and rehabilitation beds) and almost 450 employees.

At the time, when the private company NÖAB won the contract, the local authorities had been running the hospital for more than 130 years. Simrishamn is geographically situated in the southeastern part of Sweden. The area has an infrastructure that to some extent isolates it from the Copenhagen-Malmö hub, creating the basis for the old, well-established, local, public culture that penetrated the organization "deep into the walls"(1). In other words the starting point for NÖAB can best be described as an organization with a strong public orientated organizational DNA(3).

The first two years showed large negative operating results for NÖAB. The forecast in October 2002 was an estimated catastrophic loss of 18 million SEK, valued in relation to a turnover of 240 million SEK. With this knowledge a substantial turnaround was an urgent and unavoidable necessity.

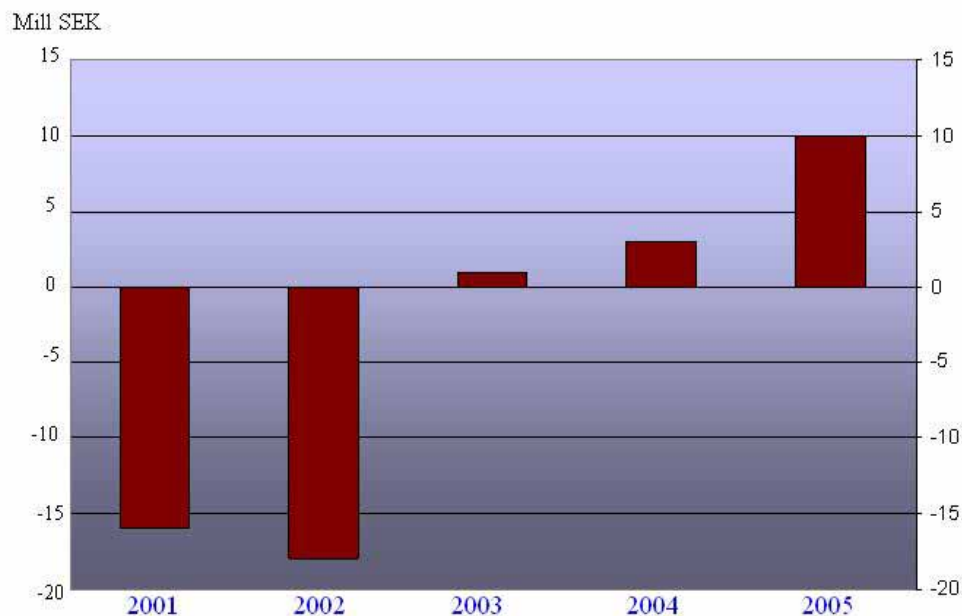


Figure 1 Operating result for Närsjukvården Österlen AB

That it took nearly two years to take action might be explained by the fact that NÖAB in the fiscal year 2001 had a temporary income. It was a one time 'restructuring fee' of 15 million SEK that is excluded in Figure 1 p 5. This fee most likely masked how urgent it was to take firm economic actions until late 2001(1).

The positive trend seen after 2002 strongly suggests that the turnaround was a success, since the operating results were increased with 25 million SEK. It rose from minus 15 million SEK in 2002 to plus 10 million SEK in 2005. In round figures it is equal to 10% of the annual turnover.

A clearly stated strategy of reaching financial balance by the end of 2003 was communicated strongly throughout the entire organization when it was realized during 2002 that a radical turnaround was vital for the company.

Processes were started with the aim to make the company more efficient without jeopardizing the quality of the delivered health care. Processes based on two fundamental assumptions: The economical disaster was so imminent that action was required without any delay. The work therefore had to be initiated without long and tiresome planning and evaluation phases. Secondly, the strategy called for was a systematic approach. At the same time it had to be a business optimization strategy. It could not be limited to either specific technologies or specific sources of information. In other words, the conditions for a Knowledge Management (=KM) approach existed.

The health care system crisis

The situation that existed for NÖAB is not unique in a Swedish perspective. Jesper Olsson in his thesis(4) states that:

'The Swedish health care system is struggling with financial limitations, an increasing demand for health care and the growing possibility to care for and cure more people than ever before. At the same time studies suggest that between 20-50% of health care expenditure is due to costs from poor quality and that about 30-40% of patients do not receive care based on current scientific evidence and best practice. Health care organizations undertake various improvement initiatives to cope with these problematic situations but only 20-40% of the improvement efforts aimed at changing practice are successful. From this follows that economical investment as well as time, and human resources are wasted and organizational willingness to embrace further necessary change initiatives diminish'.

It seems that this crisis is not only a Swedish phenomenon but a worldwide problem as well. A problem brought into daylight by the report 'To err is human: building a safer health system' from The Institute of Medicine(5) and later emphasized by both the EU(6) and the OECD(7). As a consequence the OECD, the WHO and others call for the strengthening of implementation research in health systems(8-10). Even though some researchers at the ivi league universities argue that few western societies have yet reached the limit for health care expenditure(11).

In a scenario like the one described above, knowledge should be extracted from all relevant cases dealing with improvement. With that intention in mind, it seems relevant to analyze why the turnaround of NÖAB became a success. Hopefully others can learn from such an analysis and be inspired.

Perspective

The use of Knowledge Management

One of the key challenges - from a public health perspective - facing the health care system today is the call for urgent and considerable improvement in overall efficiency and quality. The success of implementing KM in other industries and services prompt the question: Can KM improve health care? Arguably the answer is yes, simply based on the fact that a KM approach was used to carry through the processes making the turnaround of NÖAB possible.

What is KM then? In this paper KM is defined - as proposed by Bergeron(12) - from a practical business perspective as:

‘A deliberate, systematic business optimization strategy that selects, distills, stores, organizes, packages, and communicates information essential to the business of a company in a manner that improves employee performance and corporate competitiveness’.

WHO’s definition(13) is ‘Knowledge management is a set of principles, tools and practices that enable people to create knowledge, and to share, translate and apply what they know to create value and improve effectiveness’. In essence it is the same definition as that of Bergeron.

From the definitions, it should be clear that KM is fundamentally about a systematic approach, a business optimization strategy. It is neither limited to particular technologies nor particular sources of information.

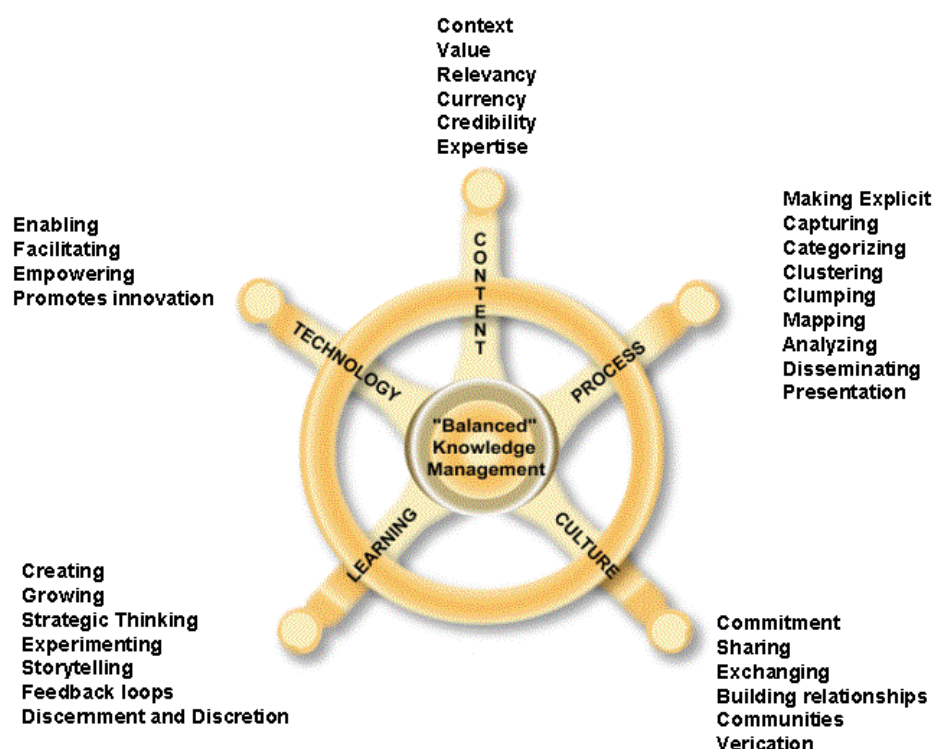


Figure 2. The Knowledge Management Framework

No consensus on a definition of KM exists(14). Various definitions have been proposed(15-17) and KM has to be viewed as an ambiguous concept. It is formed from all the major

managements and IT trends of the past 20 years(15). Because of its origin the concept of KM becomes a hybrid. KM is perhaps best described as the “sum of all the parts”(18). To literally use the proverb coined by Barnard(19) ‘*One Picture is Worth Ten Thousand Words*’, two different illustrations (see Figure 2 p 7 and Figure 3 below) might help clarifying the term. KM is a hybrid, many-headed and constantly changing concept involving the human-, social- and corporate capital. When working and using the term, users should be aware that different participants might have diverting understanding of what the term implies. However, fundamentally KM emphasizes the need for open and thorough communication.

What is the problem KM should help solve? The health care sector, especially hospitals, are incredibly fragmented places in which, at least four worlds exists: the trustees, the physicians, the managers, and the nurses. According to Mintzberg(20) these four worlds mostly talk past each other and attempt to solve problems in isolation from one another. Each world concerns itself with its own problems, with no mechanism for solving systemic problems – those problems that are spread across multiple worlds(21).

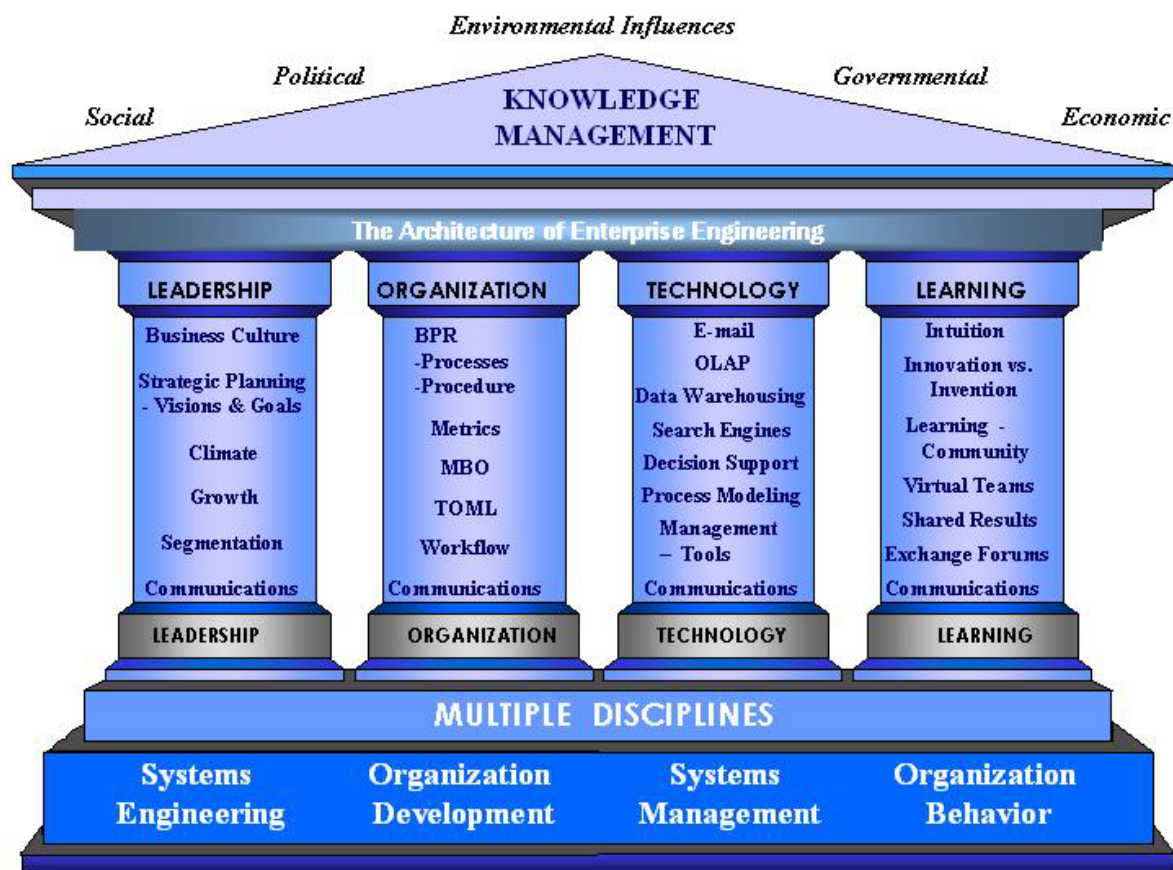


Figure 3 The Knowledge Management portal (source The Institute for Knowledge and Innovation – The George Washington University, 2002)

A more holistic approach to organization, as seen in many Japanese companies, is founded on a fundamental insight. A company is not a machine but a living organism – a complex adaptive system. Much like an individual, it can have a collective sense of identity and fundamental purpose. Nonaka(22) argues that it is the equivalent of self-knowledge – a shared understanding of what the organization stands for, where it is heading, what kind of

world it wants to live in, and, most important, how to make that world a reality. Hence organizations must be managed by knowledge. Rather than describing them on one hand as mechanistic systems and on the other hand as professional bureaucracies, they are best viewed as a combination - professional complex adaptive systems(23). Clearly new thoughts on management are required. Such new thoughts could very well be KM, a trend underlined by the fact that both the WHO(24) and the NHS(13) have recently issued strategy papers on KM.

Why has KM not caught on to health care? KM has caught on to many industries but far less to health care as judged from an analysis by IDC(15). Only a few accounts of successful adaptation of KM in health care exist. This is understandable since it takes a lot of courage to be the first to apply a new management approach to the conservative health care sector. However examination of the few accounts that do exist tells story of successes(25-27). It is not clear why, but it seems as a general rule that knowledge and experience from management and organizational theory are only transformed with enormous inertia into health care.

As Koeck(28) phrases it: *“Up to this point a student of management and organization theory could only be stunned by how little the efforts to improve quality have learnt from current thinking in management theory and from the experience of other industries”*. However it seems that the general pressure on health care makes it more evident than ever, that it is a mistake to neglect the learning from other industries(29). The health care organizations are now so complex that it is impossible for any single individual to control and guide the operations, and no single profession can claim to be able to guarantee high quality care(28). The view held by most doctors, that health care is fundamentally different and has therefore little to learn from other disciplines(28), is no longer valid. The paradox in the doctors’ view - unfortunately also deep rooted – can be illustrated by an example.

In a municipal hospital in Scandinavia an optimization project was being prepared. In a strategy meeting the Chief Medical Officer (=CMO) was requested by the chartered accountant to give the cost of an appendectomy. The CMO’s reply was that it could not be done because each operation and each patient were different. The same officer who himself used descriptive statistics as a mean to define normal in his dissertation for a Doctorate in Medicine. In essence, it was the same question as in the dissertation the accountant put forward; all he wanted was the mean cost and a range.

Seminal landmarks in the creation of new processes

Confronted with the need for rapid and firm action when you have a largely uncharted road ahead you need to have some landmarks to stay on track to reach your goal. The main landmark used in the turnaround was to practice leadership based on a culture that exhibits both openness, safety and at the same time accountability. These principles will be discussed in details later in the section on Ethics (p 22).

Five additional landmarks were used to navigate by. First, the awareness of how decisions are made and the implication it can have on the processes in the organization. The second landmark used was the philosophy of consumerism - putting the patient first. The third landmark was to build a culture of acceptance. The fourth landmark was a firm belief in the lean management principles and the fifth was the understanding of the necessity to introduce procedures to determine when things went wrong. These landmarks will now be discussed in more details.

Decision-making

Decision-making at first glance seems straightforward. First define the problem, then diagnose its causes, next design possible solutions, finally decide which is best and implement it. But this “thinking first” model, as pointed out by Mintzberg & Westley(30) should be supplemented with two very different models – a “seeing first” and a “doing first”. When leaders use all three models, they can improve the quality of their decisions. Healthy organizations, like healthy people, have the capacity for all three(30).

The “think first” or rational model follows a clearly defined process: **Define → Diagnose → Design → Decide.**

This model represents the scientific approach. It represents the core logic in medicine and thus the way medical professionals ideally make decisions. Everyone involved in the health care sector, has during various discussions, heard arguments such as “it’s in the literature”. Implying it is “based on published facts”, even though follow-up sometimes fails to reveal the precise source. So the question is how is the decision-making really, when there are no or few facts to build the decisions on? Clearly other models must be involved.

Insight –“seeing first”- suggests that decisions, or at least actions, may be driven as much by what is seen as by what is thought(30). Archimedes in his bathtub *saw* (i.e. realized) the law of buoyancy and Alexander Flemming *saw* the mold, that had killed the bacteria, in his research samples and from that discovery gave us penicillin. Four steps are identified in the process of creative discoveries: **Preparation → Incubation → Illumination → Verification.**

After realizing a problem we work on it, consciously and unconsciously, and suddenly we see the solution. We can verify it either by logic or by actually doing it.

But what happens when one can not see it and can not imagine it? Just do it(30). The process for “doing first”, is in essence experimentation – trying something so that you can learn. It has three steps: **Enactment → Selection → Retention.**

It means trying various things under various circumstances. Finding out which one works, making sense of that and repeating the successful behavior and discarding the rest. Another term for it is “learning by doing”.

“Thinking first”	“Seeing first”	“Doing first”
Features the qualities of	Features the qualities of	Features the qualities of
Science	Art	Craft
Planning, programming	Visioning, imagining	Venturing, learning
The verbal	The visual	The visceral
Facts	Ideas	Experiences

Table 1 Characteristics of the three approaches to decision-making

The three major approaches to decision making “thinking first”, “seeing first” and “doing first” correlates with the conventional views on science, art and craft. The first is mainly verbal, the second is visual, and the third is visceral (see Table 1 above). Those who favor thinking are people who cherish facts, those who favor seeing cherish ideas and those who favor doing cherish experiences. Having realized the three decision-making approaches, the strengths and weaknesses of each approach can be mapped (Table 2 p 11).

“Thinking first” Works best when:	“Seeing first” Works best when:	“Doing first” Works best when:
The issue is clear The data is reliable The context is structured Thoughts can be pinned down Discipline can be applied	Many elements have to be combined into creative solutions Commitment to those solutions is the key Communication across boundaries is essential	The situation is novel and confusing Complicated specifications would get in the way A few simple relationship rules can help people move forward
As in: An established production process	As in: New product development	As when: Organizations face a disruptive technology.

Table 2 Situations where the “thing first”, “seeing first” and “doing first” works best

By combining the three approaches the organization can learn and create new knowledge. In order to learn, a group might tackle a new issue first, by craft, which is tied to doing; then, in order to imagine, by art, which is tied to seeing; finally, in order to program, by science, which is tied to thinking. In ongoing situations, art provides the overview, or vision; science specifies the structure, or plan; and craft produces the action, energy(30).

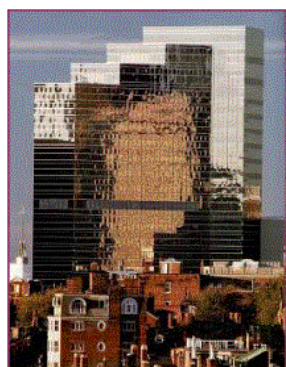
Having established the landmarks for decision making, it is time to turn to the organizations customers.

Consumerism

Consumers want the best treatment and care available anywhere in the world whenever they need it. They do not want to wait unless they are forced to do so.



They want to stay healthy



**The best treatment available
anywhere in the world**

When they need it

Delivered in their neighborhood

At a price they can afford

Efficiency

Figure 4 Consumerism constantly punching for more efficiency.

Long waiting lists were the case in Skåne as is the case in many other health care systems today. The consumers want disclosure of waiting lists so that they can choose where to get treatment. They want all treatment to be available in their vicinity. This pressure seems to have resulted in changes even in socialized health care systems. These changes are significant. Speed and convenience were the main deficiencies of the NHS in the eyes of the UK consumers(31). In more than half the of the UK trusts' annual reports information on waiting lists and on other quality issues are now included(32). This tendency to disclose waiting lists and quality indicators are also seen in the Scandinavian health care systems. One could argue that consumerism will lower health care costs as it does in virtually every other area of the free market(33). Even though the public has become used to the bureaucratic trappings of the health care sector, they demand a more personal and responsive system(23).

Compared to other industries, health care has been slow to identify who the customer really is. It seems that in the very complex health care systems internal customers have often driven the processes. They are the physicians, hospitals, insurers, governments, and payers. It is critically important that value be defined by the primary customer: the patient(34).

Consumers' – called patients from now on - needs and desires can in a way each be viewed as external forces. Forces that continuously apply pressure on the health care system to deliver their services more and more efficiently (see Figure 4 p 12). Certainly consumerism represents a significant landmark in the process of reengineering health care organizations.

The Jack Welch approach

Having established the landmarks for decisions and customers, a landmark for the culture change is next. Armed with experience from other turnaround projects an approach building on what could be termed the 'Jack Welch approach' was chosen. Since more than 80% of the company's cost was staff related it seemed too risky to assume that the turnaround could be executed without change in staffing. Assuming Welch's notion that 20% of the employees is very successful, 70% are average performers and 10% of employees will never succeed, and the latter should be shown the door as expeditiously as possible(35). The aim is to build the processes on the two first groups of employees and spending very little time on persons belonging to the last. It is intuitively known and confirmed by research that underperforming staff pulls down an organization's performance(36). It is also true for poorly performing doctors and other health care staff since they are a risk not only to the patients but also to the whole organization(37). There is plenty evidence that performance problems exist in health care in general and that the cases recognized are only the tip of the iceberg.

Axelrod and co-authors(36) divide the workforce of an organization into three categories: A, B and C-performers. In principle it is the same categorization as Jack Welch's 20-70-10 grouping. By surveying senior managers at 112 companies, their research showed that high-performing companies are 33% more likely to make deliberate action on C-performers than average-performing companies. They list the main reasons as: C-performers block talented employee's advancement, C-performers constantly call their superiors' judgment into question, encouraging a C-player mentality in others. C-performers are repelling valuable people and they hire other C-performers. Eighty percent of respondents in Axelrod's survey said working for a low performer prevented them from learning, kept them from making

greater contributions to the organization, and made them want to leave the company(36). Clearly the C-performers are barriers to efficiency by being knowledge demolishers. Consequently the organization should use its energy to develop the A- and B- performers and should take care not to over invest in C-performers (see Figure 5 below). In the words of Jack Welch: “My main job was to develop talent. I was the gardener providing water and other nourishment to our top 750 people” but he adds “Of course, I had to pull out some weeds, too”.

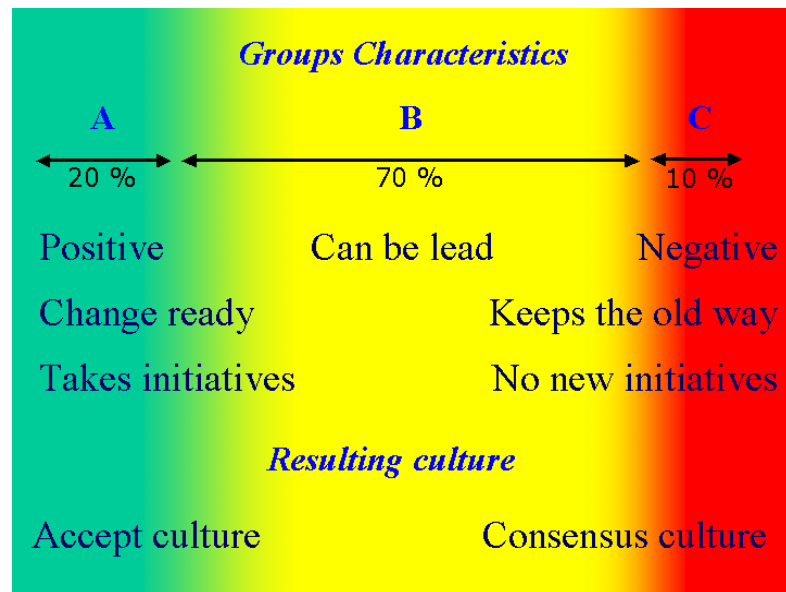


Figure 5 Cultural implications of grouping employee the ‘Jack Welch stile’

Here he touches on a central issue in health care, namely, that managers are responsible for performance, but on the other hand they have only limited powers of enforcement compared with the medical profession’s power to regulate itself and to construct errors as non-errors(38). This situation is further aggravated by the lack of a shared language between managers and doctors making it very difficult to arrive at a consensus about how to monitor and evaluate medical practice(39).

Building a lean health care business

Having landmarks on decision making, consumerism and the culture change needed it is time to set landmarks for production. NÖAB simply needed to use less resource to produce more. In other words implement “lean thinking”. This way of thinking is most commonly associated with Japanese manufacturing management, particularly the Toyota Production System, to create organizations that can simultaneously focus on quality, safety and cost management throughout the enterprise(40).

In their book, *Competing on the Edge*, Brown and Eisenhardt(41) contend that in rapidly changing industries “*competing on the edge is about strategy-making centered at the business unit, not at corporate headquarters.*” Essentially, lean thinking means that processes must be designed centered on each product or product group to ensure optimal results. To provide an operating approach that best matches the focus on businesses rather than infrastructure(41). The institute for Health Care Improvement believes that lean principles can be – indeed, already are being – successfully applied to the delivery of health

care(34). Hospitals are, in fact, large process centers with multiple lines of business and hence we need to build the organization with this fact in mind. The old methods of cost reduction will simply not work when you have to improve quality and safety while at the same time having to decrease costs.

The essence of lean thinking is to eliminate waste through understanding the value the patients want. The essential steps, to deliver that value is to create an efficient, waste-free continuous flow built on a pull, not a batch-and-queue approach, and a continual pursuit of a perfect system. Two fundamental principles of the Toyota system are that all value is the result of a process and that the right process will produce the right results.

These principles are dependent on the skill and commitment of people in the organization or in other words the A and B team.

Lean thinking builds on six essential practices:

1. Eliminate waste
2. Create continuous flow,
3. Build quality at the source
4. Standardize processes,
5. Use visual controls
6. Engage and respect everyone's contribution

Implementing lean thinking requires major change throughout the entire organization. Because the organization's culture has to be changed it can be traumatic and difficult(34). Here organization's culture is understood as the set of values and beliefs that causes people to behave in certain ways. When they behave in that way and get the results they expect, it reinforces those values and beliefs. This self-reinforcing cycle creates a culture. The difference between the traditional health care culture and a lean culture is listed in Table 3 below. Note that the characteristics of the lean culture also facilitate the practicing of the Accept Culture rather than the traditional culture.

Traditional Culture	Lean Culture
Function silos	Interdisciplinary teams
Managers direct	Managers teach/enable
Benchmark to justify not improving: "just as good"	Seek the ultimate performance, the absence of waste
Blame people	Root cause analysis
Rewards: individual	Supplier is ally
Suppliers is enemy	Share information
Guard information	Share information
Volume lowers cost	Removing waste lowers cost
Internal focus	Customer focus
Expert driven	Process driven

Table 3 Traditional Culture vs. Lean Culture

Error management

From a management perspective health care delivery involves complex systems and preventable injuries occur more frequently than in other complex industries(42). The

predominant experience of the last two decades has been an increasing numbers of documented quality failings and an inability to mobilize effective actions(43). Hence a landmark is needed to detect when things go wrong.

Many studies have proven that a surprisingly high proportion of patients experience “medical errors”(44-47). Various studies indicate rates of medical errors between 3,9 % and 16,8 % of all admissions, resulting in prolonged hospital stay or produced disability that vary at the time of discharge. The same studies report that 51% - 69% of the errors had been preventable(45;48). Other studies indicate serious adverse drug events in about 7% of admissions(45). The precise prevalence and magnitude of medical error are unknown, but are probably much higher(45;49) and a serious universal problem(50).

In an attempt to reduce the errors several classification systems (= protocols) have been proposed but they are still at a relatively early stage, both conceptually and practically(51). Seemingly, so far no consensus had been reached(52) and it was not likely that a general platform would be agreed upon (not international and even less on a country level) in the near future. In the absence of developed “medical-error”-models it might be fruitful to look at models from other industries. The aviation industry has been engaged in systematic error analysis for the last 25 years. Hence a substantial knowledge base exists(52). Helmreich(53) argues that the health care providers and the aviation industry “*both operate in complex environments where teams interact with technology. In both domains, risk varies from low to high with threats coming from a variety of sources in the environment. Safety is paramount for both professions*”. In aviation, human error is implicated in 70% - 80% of all accidents(54;55) and intuitively comparable to the rate one would expect to find in health care. In aviation the rate of accidents due to technical failures is declining, just as in medicine, because the technical development is rapidly improving mechanical safety.

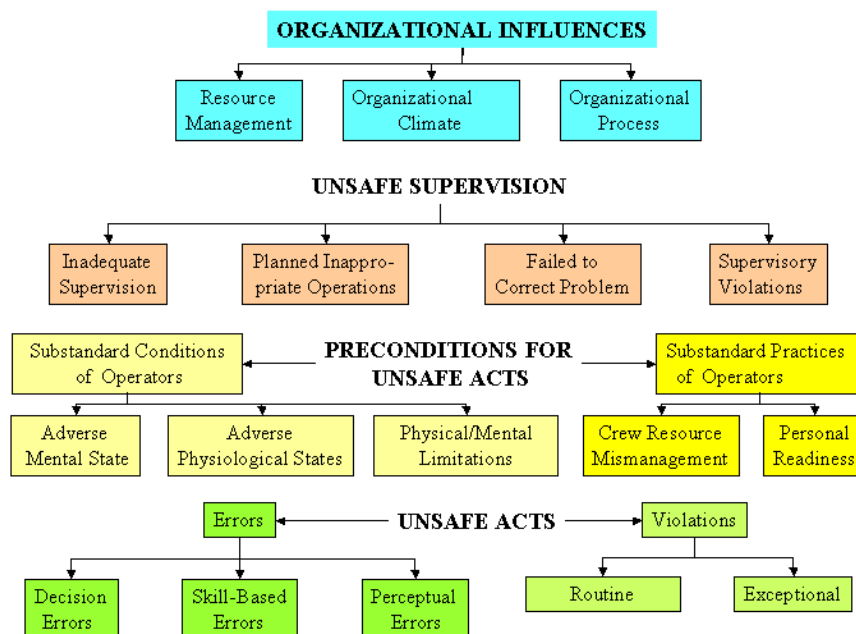
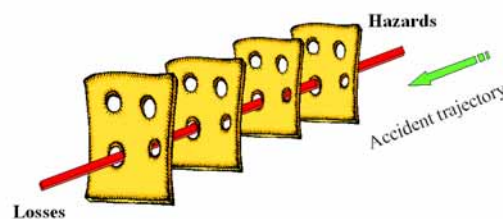


Figure 6 The human factor analysis and classification system

The human factor analysis and classification system (=HFACS) (see Figure 6 above) has been developed to meet the need for doing comprehensive analysis of human error, a taxonomy that takes into account the multiple causes of human failure. It is a system originally developed for the U.S Navy and Marine Corps as an accident investigation and data analysis tool. Now widely used by both military organizations and civil authorities (FAA, CAA and NASA). The model builds on Reason's(56) 'Swiss cheese' model (see Figure 7 below) and dualism with both a 'person approach' and a 'system approach'.

The Swiss cheese model of system accidents



After: James Reason, BMJ 2000; 320: 768-70

Figure 7 The Swiss cheese model of errors.

Aim of the research

The turnaround of NÖAB called for a change in management. A KM approach based on the previously mentioned landmarks was adopted. The implementation of a new management approach in any health care setting should be evaluated seriously. Many new management practices have been implemented purely on the assumption that it would improve performance. Unfortunately, often without any evaluation on the effect on performance(57). An obvious explanation could be that agreed yardsticks do not exist. Predictably it will take a good many years before they are worked out simply because the running of knowledge-based organization requires new values and new goals(58). However it would be beneficial for both practicing managers and management research if we learned from the experience others might have in all their variety(57). Unfortunately even if the practices are successful they often remain local and are not easily diffused to the rest of the organization(59).

Therefore the aim of the research presented in this publication is twofold.

Primarily to evaluate KM techniques as a tool in the process of turning a health care organization around

Secondarily to describe, in a structured way, the means by which NÖAB became a more efficient health care organization.

Hypothesis and study questions

As stated previously the aim of this work is primarily to evaluate KM techniques as a tool in a turn around process and secondly to describe, in a structured way, the means by which NÖAB became a more efficient health care organization. Thus the hypothesis is: KM can be used as a management tool to make health care systems more economically efficient.

In order to evaluate the use of KM in the turnaround process it is necessary to answer three fundamental research questions. Did a turnaround take place? Did the individual projects contribute to increased efficiency? Finally, can the approach used in the projects be characterized as KM?

Did a turnaround take place?

Before it is possible to conclude anything about the use of KM as a tool in a turnaround project one has to prove that a genuine turnaround actually took place. To prove it two criteria must be fulfilled, namely that the health care providers operating results improved significantly and that the health care provider fulfilled its obligations towards society. The last criterion is to verify that the turnaround was not simply a masked reduction in services.

In general terms a positive conclusion is argued to imply an increase in effectiveness. If the operating result increases while the income is fixed then the operating cost must have decreased. If at the same time the production is unchanged then the ratio production/cost have increased. It means a more efficient production since productive efficiency is defined simply as the most output for the least input. If, on the other hand, the conclusion turns out to be negative, the hypothesis will already collapse at this stage.

Did the individual projects contribute to increased efficiency?

In a major turnaround like the one NÖAB went through many activities weave into one another. It can be difficult to clearly separate the various processes from each other. However three distinctive processes can be singled out.

Project ‘Närakut’ was the makeover of the handling of patients in need of emergency health services. Because handling of acute patients was centralized in one location the project was named after that location - the ‘Närakut’.

Project ‘COPD-team’ was a more effective way of servicing patients with chronic disease. A shift from fixed scheduled consultations to consultations on demand – from push to pull technology – exemplified by the disease management program (DMP) for chronic obstructive pulmonary disease (COPD)(60).

Project ‘Error Reporting’ was a focus on error management. A computerized error reporting system was the backbone in systematic error analysis aimed at reducing quality failings(61).

Only if the analyses reached the conclusions that the projects contributed positively to the turnaround will it be meaningful to proceed to the final question.

Can the approach used in the projects be characterized as KM?

If positive answers can be given to all three questions then together they form a strong indication that using KM as a tool has been beneficial. Then a generalized interpretation will support the hypothesis that KM can be used as a management tool to make health care systems more economically efficient.

Method

Study methodology

Øvretveit(62) makes the distinction between pure or fundamental **research** (the aim of which is only scientific knowledge) and **evaluation** (the aim of which is to help people to make better informed practical decisions).

The very nature of KM is to make information available to increase the organization's performance, which naturally leads to the concept of evaluation. This is not to say that KM research should/could not be done, but it demands resources and top qualifications only available in academic institutions whose focus is on KM.

Evaluation

Øvretveit(62) also introduces the very useful concept of looking at an evaluation of health care from within one of four "evaluation perspectives": **Experimental** evaluations aim to discover whether an intervention has an effect, and the causes of any effects. **Economic** evaluations aim to discover how many resources are consumed by using an intervention, and usually also to quantify the consequences of an intervention. **Developmental** evaluations use systematic methods and theories within an evaluation framework to enable service providers to develop and improve their treatments, services, policies or organizational interventions. **Managerial** evaluations are made for managers and supervisory boards to monitor or improve the performance of services or policies, or to check that agreed changes or projects were implemented as intended.

An evaluation perspective both "sees" and "focuses" on certain aspects of an evaluation. Looking at a particular issue from a known perspective allows focusing. The awareness of the perspective involves assumptions about what is valid knowledge (epistemology).

The awareness of perspective also involves assumptions about how this knowledge is created (methodology). Again the nature of KM is multidisciplinary hence methodology will sooner or later become an issue when discussing validity of the evaluation. An issue fuelled by crossing borders between different professions and disciplines, as all often have totally different views on acceptable methodology. It is hard to imagine any domain composed of more diverse views of methodology than seen between the different professions involved in the health care (ex. the doctors stressing quantitative- versus the nurses stressing qualitative-methods).

Furthermore Øvretveit(62) operates with six types of evaluation designs for health interventions:

Descriptive, evaluator observes and selects features of the intervention, which he or she describes. The description can be retrospective or concurrent. **Audit**, evaluator compares what the service does with what it should do. The audit assumes a better outcome is achieved provided the health care organization follows a certain procedure (ex. a guideline). **"Before –After"**, this is what many recognize as a real evaluation design, since one is making an assessment of the situation before the intervention and compare the results with the results of an assessment done after the intervention. **Comparative-experimental**, this type compares two interventions using the before-after comparison. **Randomized controlled experimental**, this is the classical design in medical science. Basically the same designs as comparative-experimental but individuals to the two groups are assigned randomly and usually one group receives no intervention – the so-called control group. **Interventions to health organizations**, in a way it could be argued that this is a special case

of “Before –After” where the service or health care personnel are assessed before and after an intervention.

Action research

When an organization has embarked on a KM initiative that involves a sizeable part of the organization it is difficult to imagine that it can suddenly be brought to a halt in a period just for evaluation. There are several reasons for this.

Firstly, when the employees have caught on to the idea some themselves becomes advocates for the new approach. They have experienced benefits from this new approach and it is unlikely that they will let go of these benefits. Secondly, when a process involving “soft values” like culture and ethics begins to catch on among the employees inertia builds up. It takes just about the same managerial efforts to stop it again, as it did to start it. Thirdly, outside the organization the level of knowledge continues to accelerate. It just makes the catching up harder after each stop. Thus, an approach for evaluation and researching into an organization embarking on a KM-journey should allow for generating knowledge about a system while, at the same time, attempting to change it. One approach could be to use an action research technique(63;64). A four step framework consistent of planning, acting, observing, and reflecting(63).

One of the forces in action research, is that interventions may be made by the researcher which offer the organization a new way to think about an old problem(63). Offering both insight into the organization and advice on how to change it is the strength of this approach since it contributes both to problem solving and to theory building. Hart & Bond(63) states: *“The main attraction of action research for... researchers seems to be that it offers the possibility of working with people in a way which is non-hierarchical and non-exploitative, that it may be used to make changes, and that it closes the theory-practice gap”*. Virtually it is the same gap that Pfeffer coined ‘the knowing-doing gap’(65) a term now widely used in the KM literature.

Action research may encompass both quantitative and qualitative approaches. Combining techniques in an informed manner offers the action researcher the opportunity to compensate for limitations of one technique with the contributions from another. It makes it possible to take bearings on the problem under investigation in different ways and from a number of perspectives using the ideas of triangulation. Thus not synonymous with qualitative research, action research typically draws on qualitative methods such as interviews and observation(66). Action research is a style of research rather than a specific method(66). It is an eclectic approach to research and draws on a variety of data collection methods. The focus on the process as well as on the outcomes of the change helps to explain the frequent use of qualitative methods by action researchers(66).

One has to think of the problem one wants to study as less of a generalized theoretical problem needed to be analyzed and more as an intervention based on a need for changes. The intention with the study is one of action directed to a future state in which the ‘real’ comes closer to the ‘ideal’(63). This shift also means that the study must appreciate the specific features of the organization and the kind of constraints derived from it(67). Arguably it is from the gap between the ideal and the actual that policy-problems emerge(63). A point elaborated in the section on ethics on page 22, where it is argued that health care reform often fails because it attempts technical solutions to ethical problems(68).

In considering the contribution of action research to knowledge, it is important to note that generalizations made from action research studies differ from those made on the basis of more conventional forms of research. To some extent, reports of action research studies

rely on readers to underwrite the account of the research by drawing on their own knowledge of human situations. It is therefore important to describe the work in a rich contextual detail(66).

The strength of action research is its ability to influence practice positively, while simultaneously gathering data to share with the audience(66).

Four basic types of action research have been identified: experimental, organizational, professionalizing, and empowering(63). Though this typology is useful in understanding the wide range of action research, its multidimensional nature means that it is not particularly easy to classify individual studies. It may be more beneficial to use this typology as a framework for critiquing individual studies and, in particular for thinking about how concepts are operationalized, the features of particular settings, and the contribution of the people within those settings to solutions(66). Therefore, in the present study no attempt has been done to classify the type of action research.

From a above perspective the action research has many traits in common with KM such as a non-hierarchical approach, multi disciplinary angel, team-based, situation specific, and one could say a “non-scientific-religious” approach since it is pragmatic and advocates practical approaches as long as they are ethical.

It could be proposed that action research from a sociological point of view is what KM is from a medical management point of view, since action research and KM both are aiming at improvements and use of best practice – convergence of professional standpoints. This would imply that doing an action research project during an implementation of KM would be a simple task. In actuality it is one of the only practical approaches to research in the application of KM.

Study design

Based on the previous discussion on methodology above, it may be argued that the present study is an evaluation since the overall aim is to help leaders of health care organizations make better informed practical decisions. Since it was a study of a running organization, an action research design was adopted. Which kind of evaluation should then be used? To answer the first research question, ‘Did a turnaround take place?’ one has to adopt a primarily economical perspective, since, the aim is to quantify the consequences of the intervention in financial terms. Hence we are dealing with an economical evaluation. The type is a “Before –After” evaluation since an assessment of the situation is made before and after the intervention.

However, to verify that the turnaround was not simply a masked reduction in production and/or quality the perspective of the evaluation point at a managerial evaluation. The type is an “Audit” to ensure that agreed changes were implemented as intended.

To answer the second research question ‘did the individual projects that were carried out contribute to increased efficiency?’ a mixture of evaluations were chosen based on the characteristics of the individual projects.

The project ‘Nārakut’- is a developmental evaluation since the aim of the projects was to develop more efficient processes. The accounting and auditing system did not adapt to the newly developed processes before they were fully implemented, thus, the nature of the available data forces the type of evaluation to be retrospective descriptive.

The evaluation of the ‘COPD team’ has an economical perspective. It is an intervention to health organizations where the service is assessed before and after the implementation of the DMP.

The implementation of a computerized error reporting system was the backbone in systematic error analysis aimed at reducing quality failings. The perspective makes it a managerial evaluation and again the nature of the available data calls for a descriptive approach.

The third research question is: Can the approach used in the projects be characterized as KM? The approach to answer this final question is purely descriptive and argumentative.

Validation

In medical research the question is no longer whether qualitative methods are valuable but how rigorism can be ensured or enhanced(69). Judged from reviewing journals and grant submissions Barbour lists five methods (see Table 4 below) that hold the greatest popularity(69).

Method	Concerns addressed	Realistic potential
Purposive sampling	Bias	Enhancing sample coverage and providing a framework for analysis
Grounded theory	Original theorizing	Developing existing theory or, occasionally new theories
Multiple coding	Inter-rater reliability	Refining interpretation or coding frameworks
Triangulation	Confirmation or refutation of internal validity	Corroborating or, more often refining findings
Respondent validation	Confirmation or refutation of interpretations	Corroborating or, more often refining findings

Table 4 Method of validation in qualitative research (adapted after Barbour(69))

The first choice of validation method could be purposive sampling. It addresses bias and in very general terms aims to reflect the diversity within a given population. In a way it is equivalent to statistical generalisability or representativeness in quantitative research(69). The present study is very biased in that it examines one entire organizational intervention. One could argue that a sampling issue exists, namely which parameters to examine in the evaluation process. For practical reasons the choice of parameters to examine was done based on de facto availability, hence purposive sampling is not applicable.

The second option is grounded theory. It alleges that theories are derived from the dataset itself rather than from a researcher's prior theoretical viewpoint(69). The aim of the present study is not to find a new theory but simply to evaluate if the practical application of a KM approach to management could facilitate a turnaround. The choice of theory in this case is done entirely from prior theoretical reasoning. So grounded theory is not an option for validation of the present study either.

Multiple coding represents the third option. Multiple coding involve the cross checking of coding strategies and interpretation of data by independent researchers(69). It could be argued that this strategy has been used to some extent. Data has been collected from different sources and has been interpreted by different groups of persons. For example, the organization's certified public accountant, the boards of directors and the local health care authorities have interpreted the financial data. However, they all focus on different figures from the financial dataset. Hence, strictly speaking they have not been part of a multiple coding process because they have not addressed the problem of inter-rater reliability. One important point to emphasize is that all data used in the evaluation process

has been collected as part of day-to-day operations. This means that data has been evaluated and verified as required by the normal operation of the organization and not only for research purposes.

The last two options – triangulation and respondent validation – address the issue of internal validity and interpretation.

Triangulation is based on using more than one method of data collection to get different sets of data to answer the research question(69). As mentioned above data is collected from different sources and to some extent by different persons. The data collected is mainly the data used for the yearly evaluation of the Balanced Score Card (=BSC) in addition to the data used for bookkeeping. Since all the data is closely related to the performance of the researched organization they all directly or indirectly infer something about the turnaround. It is justifiable to argue that triangulation has been used to assure internal validation.

However, the dominant validation technique used in this study is respondent validation. Several individuals, groups or institutions have evaluated various aspects of the organization. Mainly it was politically driven evaluations fuelled by the paradox of having a ‘private for profit health care provider’ responsible for a cornerstone in public service. Among the respondents that have evaluated NÖAB are: The yearly evaluation by the public health care payers done using a BSC(70); the valuation of management of health care in the district by researcher at the University of Växjö(71); the Grufman Reje Report(72); the evaluation of Swedish Health care in the book ‘The sick Health Care’(73); the peer reviewed article dealing with the treatment of COPD patient(60); and the Chief of Human Relation’s MBA thesis(1).

Ethical issues concerning the research

As always in a complex world numerous relevant ethical issues can be raised. The discussion here will be limited to two central issues. The first issue is whether medical ethics is compatible with KM thinking. The second issue concerns the ethics involved when an insider is conducting research into his own organization.

It might be viewed as unconventional to start the discussion of ethics of a research process before the results have been described. However one could argue that it is unethical to introduce new “techniques” without having an ethical discussion first. It would raise even more complicated ethical discussions if one came to the conclusion that the new “technique” did produce a favorable result but the “technique” itself was unethical.

Further more a careful discussion of the medical ethics hopefully gives a deeper understanding of some very central concepts in KM. Namely the requirement of open, transparent and accountable cultures.

Is Knowledge Management compatible with medical ethics?

A recent focus area in medical ethics has been on medical errors. Ethical analyses have focused on the obligation to disclose and report errors when they occur. However disclosure, though important, does not provide a solid ethical basis for the development of a culture of safety in medicine(74). The Tavistock Group has proposed a shared ethical principle for everybody in health care in an attempt to oppose this shortcoming. A simple shared code of ethics to guide all who influence and deliver health care based on the assumption that cooperation throughout a health care system can produce better outcomes and much greater value. Such cooperation requires agreement across disciplinary, professional, and organizational lines about the fundamental ethical principles that should guide all decisions, in a truly integrated health care system(68). Realizing that much of health care is indeed

multidisciplinary yet ethical codes usually cover only one discipline. Also realizing that the interactions are so complex, that no single profession can credibly declare, that its own code of ethics is enough. This understanding makes it clear that some general frameworks are needed(75).

The Tavistock Group originally stated five major ethical principles that should govern health care systems(68), As a result of the discussion after publishing the initial five principles two more were added(76). There is some evidence that even on an international level these thoughts are catching on. A recent WHO report “Rapid Response to Future Challenges in Health”(77) concludes that there is a need for governments to report their experience and data so that other policy-makers can benefit from the gained knowledge. Furthermore that it should be done openly and by asking the right questions(77). High profile politicians have now begun to capture the Tavistock principles(78) as have leading health care providers(79).

These seven major principles state several points that are important for every health care organization. From a KM point of view some principles have direct implications on attitudes, which an organization’s KM should be based on. These principles have been tabulated in the following tables (Table 5 to Table 9). The intention behind tabulating the principles is that they may also serve as a checklist, to insure that a KM project complies with the major principles of ethics.

Rights - Health care is a human right	
Tavistock Ethical principle	KM implications
Health care is financed in part or in whole by governments, and society heavily subsidizes the processes of acquiring medical knowledge, education and skills. These are important reasons why the care resulting from the application of medical skills cannot belong exclusively to individual providers or organizations.	An obligation to <u>share knowledge</u> both internally and externally in the organization. The design of a KM system should in “Kant-terminology” recognize the <u>imperfect obligation</u> of any organization to offer health care.
Stewardship of the specialized knowledge of medicine and health care requires its refinement and extension through research and its distribution through teaching and collaboration with colleagues, regardless of their organizational affiliation.	<u>Multidisciplinary</u> , and hinting at <u>team</u> approaches. An obligation to report results positive as well as negative of all project and change processes initiated in an organization.
Individual clinical data concerning patients belong to them alone and require the highest degree of confidentiality.	<u>Security</u> issues should have high priorities especially in IT-solutions.
Comprehensiveness - The responsibilities of the health care delivery system include the prevention of illness and the alleviation of disability.	
Tavistock Ethical principle	KM implications
Biological, clinical, and social sciences have the potential to prevent illness as well as to cure it or alleviate suffering. The goal of research must therefore be to prevent illness and reduce disability so effectively that health care can increasingly shift its focus from curing or caring for disease to keeping people healthy.	The KM system should be able to support initiatives both preventive and follow up activities. Utilize that KM is a hybrid, many-headed concept.

Table 5 Tavistock Ethical principle Rights & Comprehensiveness

Balance - The care of individuals is at the center of health care delivery but must be viewed and practiced within the overall context of continuing work to generate the greatest possible health gains for groups and populations.	
Tavistock Ethical principle	KM implications
The personal experience of illness is generally the principal concern of individual patients, and, therefore, the principal focus of health care delivery systems must be individual patients and their families or support groups.	The KM system should only be implemented if its use ultimately benefits the patients.
Those who provide medical care for individual patients are not, in that role, directly responsible for the care of populations. While the duty of individual health care workers is primarily to the individual patients whose care they assume, care givers must be aware that the interrelationships inherent in a system make it impossible to separate actions taken on behalf of individual patients from the overall performance of the system and its impact on the health of society	The KM systems for those who are providing care should aid in doing so and highlight issues where the interest of the individual might conflict with the overall performance of the organization.
Doctors and other clinicians should be advocates for their patients or the populations they serve but should refrain from manipulating the system to obtain benefits for them to the substantial disadvantage of others.	The KM system should facilitate the “mining” of data both pro et contra concerning any issue supported by the KM system.

Table 6 Tavistock Ethical principle – Balance

Safety - Do no harm	
Tavistock Ethical principle	KM implications
There is increasing recognition of just how much harm health care systems produce and how policies with benign intentions can create harm. The intention is that all should struggle to maximize benefits, minimize harm, and reduce error.	The KM system should be continuously evaluated to identify adverse influence.
Openness - Being open, honest, and trustworthy is vital in the health care.	
Openness is the most banal and the most profound principle. Nobody could argue against being open, honest, and trustworthy and yet every day in every health care system people fail on all three accounts.	Perhaps the most central prerequisite for the success of KM.

Table 7 Tavistock Ethical principle – Safety & Openness

Cooperation - Cooperation with each other and those served is imperative for those working within the health care delivery system.	
Tavistock Ethical principle	KM implications
Only with cooperation can health care delivery systems produce optimal outcome and value for individuals and society.	The KM system should facilitate cooperation –that is exactly the key in KM.
<p>Among the essential tasks in health care delivery systems that require collaboration are:</p> <p>Contributing to sustaining healthy, safe communities in which to live.</p> <p>Creating a safe, secure, clean and disciplined health care-working environment.</p> <p>Assuring that clinical management uses the best available evidence from research and minimizes unnecessary and inappropriate variation in practice.</p> <p>Managing the various components of a patient's illness or need</p> <p>Minimizing errors</p> <p>Remaining orientated towards prevention</p>	These points underline the need for KM systems to be multidisciplinary and team oriented.
Each professional group involved in health care delivery must recognize and acknowledge ethical precepts and principles and promote a culture of ethics within its own membership. All professionals involved in health care delivery must collaborate with each other for the benefit of their patients and the public health in a manner that respects the ethical principles of professionalism and health care.	A KM system build to aide one group of professionals in more specific tasks should be designed so that other groups of professionals can gain insight into the specialized task the system is intended for.
Maintaining ethical principles must not be confused with rigidity or defensiveness over roles and actions. On the contrary, knowing the boundaries and respecting the integrity of principles allows individual health care workers to move among groups and operate effectively, according to the requirements of various roles	The KM system should not be designed with the purpose to aid people in performing tasks that they are not trained for. It should clearly define who has “authorization” to perform what.
All those involved in the health care system must be committed to developing and applying the specific skills needed to work creatively in the presence of interpersonal and inter-group tensions. Patients and families bring their individual experience, capabilities, motivations, and expectations to the health care delivery system along with their illnesses, their needs, and their bodies.	The KM system should be designed to accommodate caregivers with tools to cope with the patient's personal need. For instance a system supporting dietary decisions should recognize the influence of religion on the patient's food priorities.

Table 8 Tavistock Ethical principle – Cooperation

Improvements - All individuals and groups involved in health care, whether providing access or services, have the continuing responsibility to help improve quality.	
Tavistock Ethical principle	KM implications
Health care organizations have an obligation to establish processes that identify new procedures or discoveries that have the potential to benefit the care of patients, and to minimize the time required to incorporate these improvements into their system.	The KM system should be an integrated inating new beneficially knowledge.
Individual clinicians have an obligation to support and participate in improvements that reduce costs and to suggest how the money and other resources saved could be reinvested to accomplish better care for patients	The KM system should whenever possible be integrated with available performance data to aid in decisions concerning efficiency issues.
Individual clinicians should not impede improvements in patient care because the financial implications of the improvements may affect them adversely	The KM system should aid the fair allocation of resources and should not only identify over performers but also under performers.
Individual clinicians have an obligation to change practices that may serve their interests but are costly to the system as a whole	The KM system should aid in illuminating the consequence of individual behavior on overall performance.
All who work in the health care delivery system have an obligation to share ideas about “best practices” and to learn continually from each other.	The core items in KM. Sharing and continuous learning as opposed to keeping knowledge to oneself.

Table 9 Tavistock Ethical principle – Improvements

Another of the most important recent advances in medical ethics has been the development of the ethics framework of accountability for reasonableness(74). The framework has its origin in the fact that employees in a health care organization very often find themselves in the role of manager – being required to set priorities – or affected by the decisions of others about priorities. Priority decisions that unfortunately now and then are in conflict with the good of the individual patient, whose care the employees feel personally responsible for. Priority setting was called “rationing” 20 years ago, “resource allocation” 10 years ago and will be called “sustainability” 10 years from now as our language about this problem becomes progressively sanitized(74).

Accountability as argued by Linda and Ezekiel Emanuel is based on mechanisms for taking responsibility; sharing information, exchanging perspectives, making adjustment, and enforcing standards when necessary(80). Further they argue that since no single model of accountability is appropriate to health care; a stratified model involving a professional model (physician - patient relationship), a political model (politician - citizens relationship) and an economic model (politician – health organization relationship) is most suitable(81). However, the central point is that no turning point will be reached unless directors,

regardless of which model they belong to, become accountable for the medical performance of their institutions (82) and show leadership by example(83).

Mervis & James argue that, seen from a patient point of view an additional concept becomes important – choice. By choice, is meant choice of health plan, of provider, and of care – as right of autonomy and self-determination(84). Choices build on personal value as well as medical knowledge.

Daniels & Sabin(85) argue that market accountability requires plans to inform purchasers and patients about performance and options. In theory it will legitimize limits to care by consumer choice i.e. recognizing the limits of consumer choice. Thus it requires that the rationales for limits to service be made public. Limits based on reasons or rules that “fair-minded” people can agree are relevant to pursuing appropriate patient care under necessary resource constraints. Ultimately authority for limiting care rests with democratic processes. For priority decisions to be accepted, i.e. legitimized and fair, in an organization Daniels & Sabin(85;86) set four conditions that must be met. These conditions can easily be expanded to cover all major decisions taken in health care organizations because all decisions in one or the other way ultimately will influence patient care.

The first condition is **publicity**. Decisions and their rationales must be made publicly accessible. In a KM concept the tool is communication.

The second condition is **relevance**. The rationales must rest on evidence, reasons and principles that fair-minded parties (managers, clinicians, patients and consumers in general) can agree are relevant to the decision. Again the tool is communication.

The third condition is **appeals**. There must be a mechanism for challenge and dispute resolution regarding decisions especially an opportunity for revising the decision in light of further evidence or arguments. Again the tool is communication, communication based on open and multi disciplinary discussion in an environment that provides trust and security.

The fourth condition is **enforcement**. There must be either voluntary or public regulation of the process to ensure that the first three conditions are met. The tool could be to adhere to the rules of the formal organization including the regularly meeting with the works committees. Assure that it is explicit where in the chain of the decision process a given proposal is located. Also make the time limits explicit and enforce that they are kept.

A fifth condition **transparency** probably should be added. Ghosn(87) described how he imposed transparency on the entire organization, to ensure that everyone knew what everyone else was doing, as a tool for trust building when he made the gigantic turnaround of Nissan in the late nineties. It could be argued that transparency is included in the condition publicity. On the other hand it does seem important to focus not only on making the decision and its arguments public but also to make all aspects of its implication public. The only way it can be done is by transparency, since it is completely impossible to foresee all areas a decision will influence. One can only expose what everyone is doing.

The five conditions are not in any way seen as constraints for the practice of KM. In contrast it is all elements of an open and creative knowledge creating process. For the benefit of the patient the ethic principle of accountability and choice should be actively incorporated and enforced in the culture of health care. These principles are viewed as KM enablers.

The headline of this passage was the question ‘is KM compatible with medical ethics?’ If a health care provider wants to maintain a high medical ethical standard, the organization needs to be built on a culture that exhibits both openness and safety and at the same time accountability. This is also fundamental for successful implementation of the KM project. From an ethical perspective it could be seen as an asset for a Health Care Organization to

start on a KM path. Therefore a very strong line of arguments exist to support that medical ethics is very compatible with KM. It means that the answer to the question must be a definitively - yes.

Is research done by an insider ethical?

Having concluded that medical ethics is compatible with KM it is now time to discuss the second ethical issue. Several authors have discussed a number of ethical questions that could be raised when an insider, who is a member of the organization, conducts research into the operations of the organization. Holian and Brooks(88) propose a checklist of 5 questions:

1) *The nature of the information or data of interest, who 'owns' this, and who can 'release' it for the research purposes requested.* In the present evaluation of the turnaround of NÖAB the evaluation rests entirely on information and data that are publicly available, thus the data are already released and accessible for the public.

2) *The nature of the relationship between the 'human subjects' who may potentially be involved in the research and the 'researcher'.* There is no evaluation of individuals and thus there are no 'human subjects'.

3) *The nature and extent of the level of informed consent and freedom to choose not to participate in events or behavior that may be part of 'normal' work, that could later be included in that selected to be included in the 'research' or research publications.* Potentially this is a relevant issue since taken to its extreme; the employers could only choose not to participate in the turnaround by leaving the organization. The entire organization is evaluated and some processes are described in more details than others. Therefore staff involved in these processes is potentially more exposed. The position taken is that the present evaluation and subsequent publication is within the acceptable ethical limits, again because all data is publicly available. No steps have been taken that were not founded in the day-to-day operation of the organization. Even when it comes to the conclusions they are also all publicly available, although in this publication someone may feel that conclusions are pushed to extremes.

4) *The nature and extent of anonymity and confidentiality for individuals and the organization, including between potential participants or 'human subjects' involved in 'normal' meetings or 'special' group discussions for research purposes.* In this project most meetings have been part of normal operations. The meetings that have been conducted about development projects have their origin, not in the research, but the fact that NÖAB should engage in health care development. A requirement laid out in the contract(2). Everyone who participated in the planning phase of such a project had operational management functions. They were all well aware of the clause in the contract. When a development project was established it was added to the list of developmental activities accounted for in the balanced scorecard and, as such, part of the public knowledge.

The overall conclusion is that the 'insider-issue' concerning individuals in this present evaluation falls well within acceptable ethical limits. In addition 'insider' research may also have the potential to encounter problems due to unexpected and potentially negative or even dangerous outcomes for organizations and individuals(88). The thorough evaluation that NÖAB has been through can be viewed as a result of the social paradox that exists when a private health care provider operates for profit in an otherwise completely public funded socialized health care system. It is evident that any report that could be used either as pro or contra in a society's discussion about a paradigm shift could harm the organization or its reputation. But as Holian and Brooks(88) conclude: *We have seen great*

research done this way and wish to encourage others to take on this challenge, particularly those who have access to hard earned ‘internal’ intelligence on how to address and solve practical problems in organizations, and who are passionate about sharing their experience for the benefit of others.

The overall conclusion drawn here is that medical ethics is compatible with KM thinking and furthermore that the insider research has been conducted within acceptable ethical limits.

Results

As already mentioned during the discussion of methods, all data has been collected from public available external sources. Data is presented in the order they contribute to answering the research questions.

Economical results – the turn around

The operating results for NÖAB for the years 2001 to 2005 is shown in Table 10 below (graphical represented in Figure 1 p 5).

Year	2001	2002	2003	2004	2005
Result Mill SEK	-15.6	-18.1	1.3	3.1	10.0

Table 10 Operating results for Närsjukvården Österlen AB.

The annual turnover amounts to an almost steady 240 million SEK during the whole period. The sources are the annual accounts for NÖAB. The figures in the annual accounts have been audited by a certified public accountant as required by Swedish law.

Production Key-figures for the medical department from 2002 (before the intervention) and from 2003 (after the intervention) is shown in Table 11 below. The key-figures are from sub analysis likewise from the annual accounts.

Key-figures	2002	2003	Change in %
Consultations at a doctor	18832	22266	18.23
Consultations at a nurse	12607	13254	5.13
DRG	1540	1716	11.43
Produced Bed days	8816	9438	7.06
DRG/Bed days	0.1745	0.1818	4.09
Man hours	194756	154730	-20.55
Staff cost pr Consultations at a doctor	2842	2033	-28.47
Total cost pr Consultations at a doctor	3982	3003	-24.59
Staff cost pr DRG	34759	26389	-24.08
Staff cost pr bed days	6071	4787	-21.15

Table 11 Production key-figures for the medical department

External evaluations – fulfillment of obligations

One of the cornerstones used to follow up on the services provided by NÖAB was the use of a balanced scorecard (BSC) in the annual evaluation of NÖAB done by the public health care payer(70).

The BSC was initially introduced in the private sector but has also been introduced into the public sector as a management tool(89) and naturally also in health care(90). From the very beginning the use of a BSC was stated in the contract between the private health care provider and the public payer(2). The intention was to use it as a tool to follow up on the private health care provider in all major aspects that concerns society. The application of the BSC followed the original recommendations made by Kaplan and Norton(91) and modified as suggested by Santiago(90). To ensure that the BSC reflected the demands that society has on a health care organization it was divided into four perspectives. First a public health perspective with 5 indicators, second a development perspective with 5 indicators, third a customer perspective with 6 indicators and fourth an economy perspective with 5 indicators. A detailed description of all the measures represented in the BSC is outside the scope of this writing. The process and the measures have been documented and ‘internally’ evaluated in details by representatives from both the payer and the provider in the book by Viklund, Ståhl and Lassen Nielsen (70). Also externally evaluated in the research report by Lars-Göran Aidemark(71).

Because the health care provider was a private company operating in a world of socialized medicine several other external evaluations took place. One was an expert group from the Confederation of Swedish Enterprise who analyzed the Swedish health system with the intention to introduce a public debate on the optimal use of resources in health care. In their book ‘The sick Health Care’ they called attention to health care providers who excelled in providing good and effective care – among those was NÖAB (73).

At the middle of the five year contract the highest decision-making political organ of Region Skåne - the Regional Council – initiated evaluation of the performance of the private health care provider in their preparation for the decision of how the future management of Simrishamn’s hospital should be. It resulted in the Grufman Reje Report(72).

The overall conclusion, from all these reports, was that the private health care provider did fulfill its obligations as a full partner of the county’s health service. In some instances NÖAB was even better to implement the county’s visions for local care than its public counterparts(72).

The projects

Data on the ‘Närakut’-project

The patient flow before redesigning the flow of taking care of acute patient is shown in Figure 8 p 31. The flow after the implementation of the reengineering of the patient flow is shown in Figure 9 p 31. The project has also been evaluated by the yearly BSC report(70).

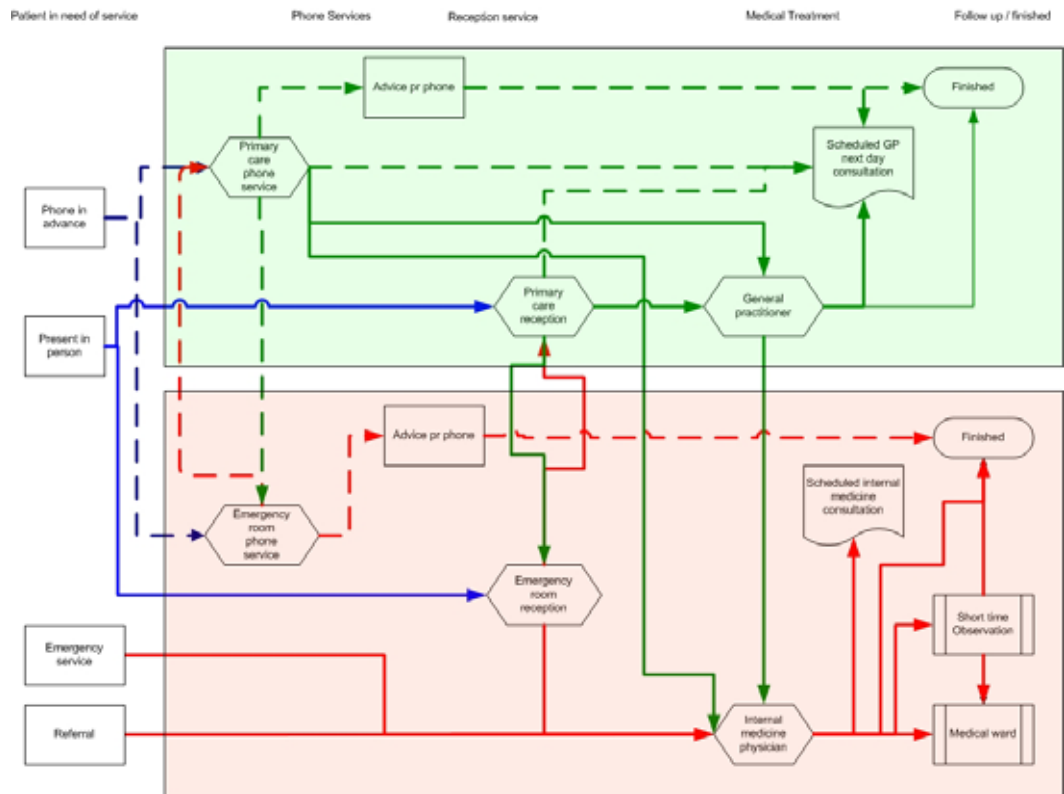


Figure 8 Patient flow before

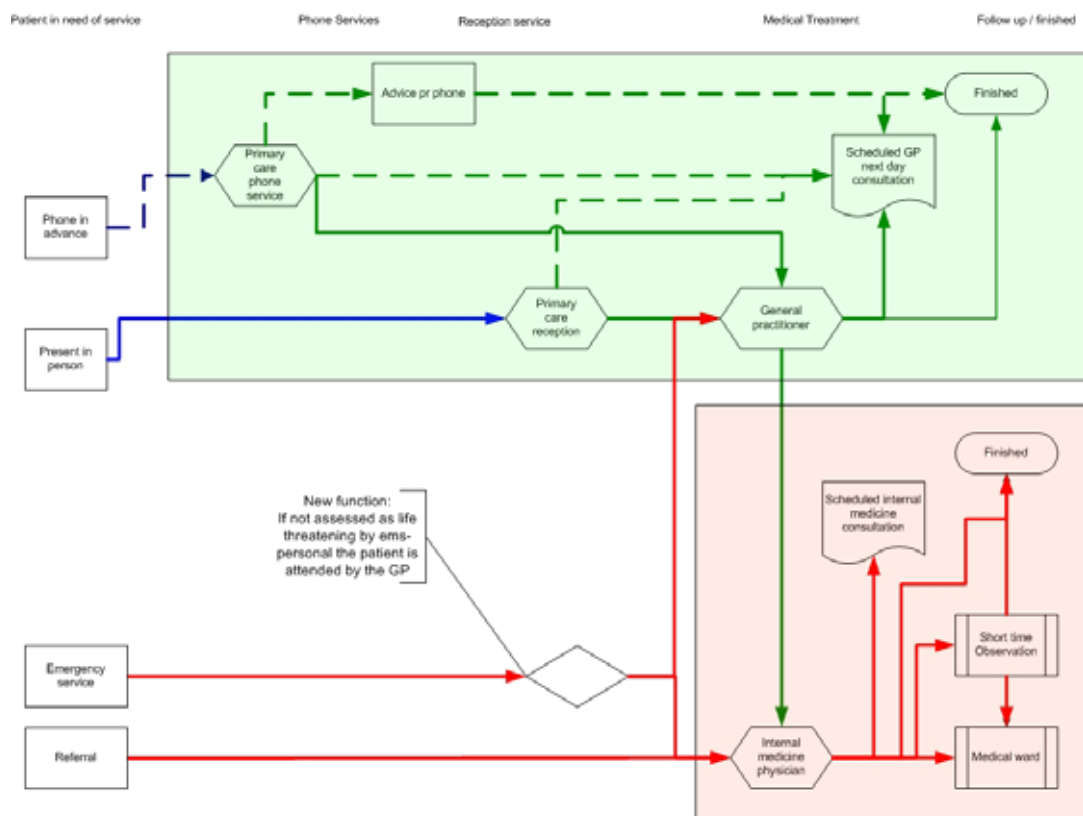


Figure 9 Patient flow after

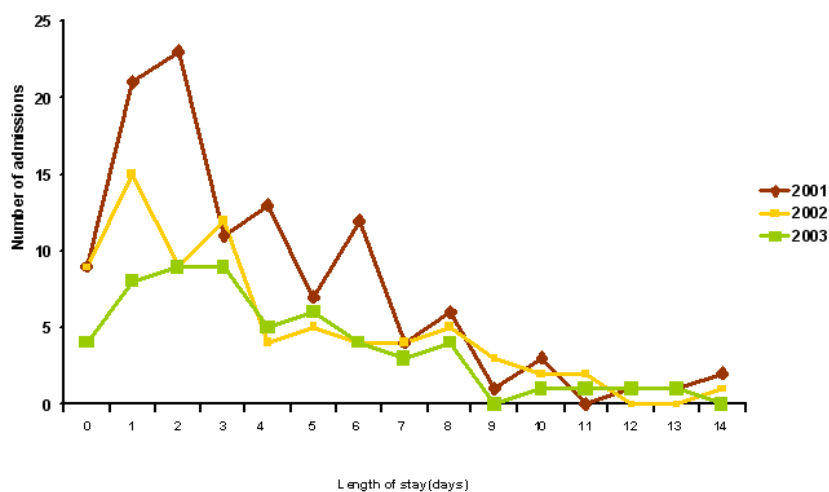
Data on the ‘COPD-team’-project

Before, the implementation of the DMP, COPD-patients suffering from exacerbations were taken care of by the emergency system. Patients were normally followed-up by the specialist doctors at fixed intervals. Intervals were often from ½ to 1 year. An “oxygen nurse” managed the very severe COPD-patients who were prescribed continuous oxygen therapy. There was no special COPD-unit for the patients to contact when he or she experienced the first symptoms of deteriorating respiration (often a respiratory tract infection with increased cough and amount of phlegm, purulence, obstruction of the airways or fever).

After the implementation, when the patients are recruited to the COPD team, the chest physician is assigned as the physician responsible for the COPD patient. The implemented ‘Simrishamn model’ is centered round a specialist COPD nurse. The primary aim is to give the patient immediate feedback. Whenever the patient experiences symptoms of deteriorating respiration he or she phones the specialist nurse for guidance. The nurse then has several options: 1) accept the patient for an immediate consultation at the hospital; this could include analysis of blood samples, spirometry, X-ray and if necessary hospitalization; 2) outpatient treatment with inhaled β_2 -agonists and anticholinergics; 3) start at home treatment with antibiotics and oral steroids immediately by initiating a phone-prescription by the consultant.

Besides acting as a telephone guard, the specialist nurse is responsible for scheduled outpatients daily. The nurse performs spirometry when appropriate and takes blood gas samples if necessary. The nurse also acts as a supporter in smoking cessation programs and life-style matters. A physician is always consulted when problems arise. The nurse also checks daily if any COPD patients have passed the emergency room during the night to ensure follow up.

An external evaluation was done with the corporation of the Swedish Institute for Health Economics (IHE). The result is published in a peer reviewed paper in Health Policy(60). This paper reports on the retrospective analysis of hospital-based health care costs associated with the management of chronic obstructive pulmonary disease (COPD).



Note: Admissions of less than 24 h happen, e.g. when patients are admitted for observation over the day, but not over the night

Figure 10 Number of hospital admissions for COPD by duration (days)

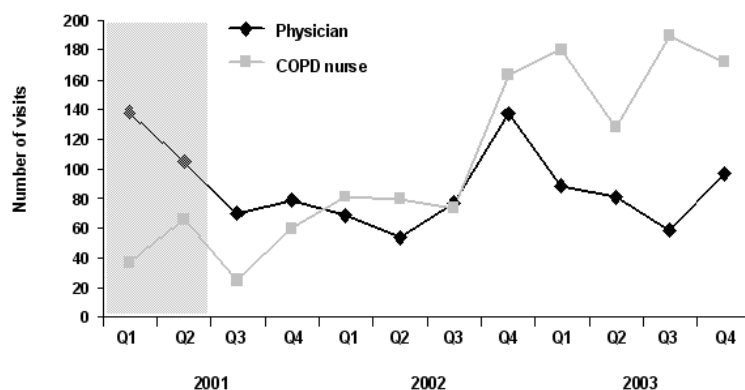


Figure 11 Number of outpatient visits each quarter in the 6 months prior to implementation of a COPD Disease Management Program (shaded area), and the post-intervention period up to December 2003

In the paper it is concluded that: *Following the implementation of a dedicated hospital-based, COPD DMP, direct medical costs, including outpatient and drug costs increased. However, this was accompanied by a marked decreased in the number of hospital admissions for acute COPD exacerbations. The decrease in hospital admissions for acute COPD exacerbations equated to a saving of up to approximately SEK 1.000.000 per year, which is enough to cover the increase in outpatient and drug costs. The results presented here strongly indicate that redirection of health care resources towards a dedicated COPD DMP can offer substantial overall direct cost savings.*

Data on the 'Error management' program

Before, the implementation focus was 100% on failures from individuals but after the implementation only 54% were classified as failures from individuals. The remaining 46% of the reported failures were classified as failures at system level(61). A total of 312 reports were filled during the first 10 month after the system was operational - an average of 31 a month.

The staff themselves decided how they would categorize the severity of an incidence when they made the initial recording of the incidence. Of the 312 reported incidences only 9% were classified as severe adverse effects, 54% were classified as moderate and 37% as mild or potential adverse effect.

Discussion

Evaluation of the turnaround

The first study question is: Did a turnaround take place? As previously discussed two criteria must be fulfilled. Namely that the health care providers operating result improved significantly and that the private health care provider fulfilled its obligations towards society. In other words could the turnaround be categorized as a small-scale reform of the health care in the catchment area served by the provider?

Turning the economical results into black digits.

The main reason for starting the tough journey in 2002 was the forecast of a catastrophic loss of 18 million SEK from the day-to-day operation (see 'The turnaround of Simrishamn's hospital' on p 5). By nature a private company must make a profit if it intends to exist over a longer period. Obviously the final end point of the turnaround must be for the company to show a profit.

As previously shown (see Table 10 p 29) the economical result turned from 'red' to 'green' digits in 2003. It could be argued that the figure represents an even greater achievement. From 2002 to 2003 neighboring comparable public managed hospitals had a 5.2% increase in operating costs. At the same time they experienced an annual reduction in production of 1.8%(72).

Based on the economical figures the conclusion must be that a turnaround actually took place. Since the conclusion is confirmed internally (by the board of directors) as well as externally (by the certified public accountant) it could be categorized as a respondent validation (see Table 4 p. 21). It could be argued that the conclusion has been confirmed three times over. The results were positive for the years 2003 to 2005. Or it could be argued that the changes made from 2002 to 2003 were of a permanent nature since the trend was constant even for 2004 and 2005. Either way the financial results are very strong arguments for the hypothesis that a lasting turnaround did take place from 2002 to 2003.

Fulfillment of obligations towards society

Annually the results of the scorecard were presented for the governing political forum (Distriktsnämnden i Ystad-Österlens sjukvårdsdistrikt). The overall conclusion from the political discussions throughout the 5 years was that the provider in the eyes of the public payer provided the service demanded(71). The politicians have seen the BSC as an asset as stated by the chairman of the governing political forum Gertud Ekman (social democrat)(70): *"Earlier it was easy both to be manipulated and left to ones own guess; but that time has now passed and instead it is facts that apply"*. The vice chairman Anki Gauffin (conservative)(70) states: *"The provider has fulfilled the task with an open and professional attitude. For me as a politician that means trust and accountability"*. The use of this particular scorecard as a political management tool has also been externally evaluated as positive(71;72).

Based on all the evaluations the answer is yes to the question 'did the health care organization continue to provide a service that conformed to the standards requested by society after the turnaround?' Again it is argued that the conclusion is highly validated both by triangulation – the processes around the BSC - and by respondent validation – the external evaluation of the results.

Having answered both questions 'whether a turnaround actually did take place?' and 'whether the health care provider continued to provide a service that conformed to the standards requested by society after the turnaround?' positively, the conclusion on the first research question must be that a true turnaround did take place.

Evaluation of the processes

The second research question is: Did the individual projects that were carried out contribute to the increased efficiency?

Before evaluating the three processes singled out it might be worthwhile to briefly recapitulate the backbones and the landmarks of the process thinking applied. The backbone

is the intention to build an organizational culture that exhibits both openness, safety and at the same time accountability (see 'Is Knowledge Management compatible with medical ethics?' p 22). The landmarks to navigate with include decision-making, patient focus, acceptance culture, lean thinking and error correcting (see 'Seminal landmarks in the creation of new processes' p 9). Of course all heavily grounded in KM. By recommending the reader to recapitulate now it is hoped two goals will be fulfilled. First, that it will make the understanding of the ideas behind the three processes more digestible. Second, that it will help to understand the processes in rich contextual details as discussed in the section 'Action research' (see p. 19).

The need for the radical turnaround of NÖAB was caused by the failure of the old established processes. Immediate development of new processes was demanded while the organization faced a very destructive loss. As can be interpreted from Table 2 p 11 it called for the use of all three ways of decision-making. The urgency of the matter favored a 'doing first' approach. The management had to work hard to get the professions to accept decisions based on the two "new models" of 'seeing first' and 'doing first'.

Being a private health care provider it seems evident to view consumerism as one of the major change drivers in health care meaning that the patients need to be in the center of all processes. A viewpoint further strengthened by the general consumerism already found in society. This line of thinking heavily influenced the action the management took. The argument being that relevant information, access to timely and expert knowledge, and shared decision making together with efficiency and clinical effectiveness are relevant criteria when choosing a direction for process improvement in health care(92;93). A common denominator is knowledge. Especially increased information load and fast exchange of information will drive for some kind of KM approach to handle the demands in turnaround projects. Thus the management selected a KM approach.

The consequences of adopting 'the Jack Welch' approach were several. First the management clearly signaled that they would not concentrate on staff belonging to group C, an approach that is the opposite of the experience one often has after spending years in public management. Certainly it was a threat to the existing 'public culture'.

It also has a very important cultural aspect since it facilitates the transformation from a consensus to an acceptance culture. The existing culture was the very time consuming consensus culture. It is the old well-established -"deep into the walls"- public culture where every body has to agree and only the lowest common denominator decision can be reached. However the acceptance culture was desired because it is less time consuming. It also allows decision making on the lowest possible management level. In the 'Jack Welch approach' is also embedded the right to fail and try again for those who try to change things. In other words it signals action(94) and thus also facilitates the acceptance of the seeing first and doing first decision makings.

Finally this approach meant, that the management also signaled what was said in the early 1980s as Jack Welch was dubbed "Neutron Jack" (in reference to the neutron bomb) for *wiping out* the employees while leaving the buildings intact(35). The management wanted the core image – being an accountably health care provider – untouched. Certainly the management was aware of the consequence and did not hide that employees that did not want to contribute positively had to leave.

Simrishamn Hospital had previously been public driven. Taking over the management meant facing an organization that was still running on an organizational model

at least 50 years old. An organization model – not different to public managed health care organizations in general - with focus on infrastructure rather than serving the needs of the patients, their customers. In line with the Pareto equilibrium the management needed to focus on the 20% of the patients that drove 80% of the cost. All unnecessary procedures had to be cut off. The six essential practices (see Table 3 p 14) that lean thinking builds on can be found - to a greater or lesser extend - in all the process of reengineering and development that were carried out in order to achieve the turnaround of NÖAB.

The management publicly stated that a “no-layoff policy” was central to the policy. That the expected decrease in staffing due to improved productivity meant that overtime, retirement or leave for other reasons would not be replaced. However, it was made equally clear to the staff as well as to the unions that if the productivity did not increase, a significant layoff was to be expected.

Note that the characteristics of the lean culture also facilitate the practicing of the Accept Culture rather than the Consensus Culture. The management team actually developed a change management program for NÖAB. A program that is thoroughly described in Vello Timoleon’s E-MBA dissertation paper from the University of Lund(1).

Evaluation of the ‘Närakut’ process

The project was the makeover of the emergency health services. Because handling of acute patients was being centralized in one location the project was named after that location - the ‘Närakut’.

From a management point of view there were several reasons for choosing this project as the first major step in the turnaround.

The contract between the provider and the payer called for finding new ways of delivering health care(2). Roughly 90% of admissions were acute patients and it was believed that a better examination of these patients could prevent some patients from being hospitalized already at the doorstep.

There was a strong ‘emergency culture’ in the emergency department. Procedure and staffing were organized for the worst imaginable scenario even though no surgery was available. NÖAB only had specialized elective surgery and no trauma was admitted at all. For example the average number of patients at night was less than 2. Nevertheless, the staff supported by primarily the nurses union demanded that 2 fully registered nurses were present. That not even one of them could give a helping hand at the ward, when there were no patients in the emergency room. It meant that the treatment of one patient had an average cost of 8 man-hours. A paradox was that one of the union’s arguments for not helping at the ward was that the nurses were not competent for that but fully capable of observing and treating severe cases in the emergency room. At day time an average of 5 employees attended on average 20 patients, which meant an average cost of 2 man-hours pr patient. It was well known throughout the organization that it was comfortable to work in the emergency department. Calculation of simple production key-figures like the number of patients treated pr shift pr employee show that a lot of slack time had to be present. It is known that employees are usually very protective of slack time(12) and the management was prepared for a tough fight. By taking the fight in an focus area the management showed that they were prepared to go through with the cultural change program from ‘Public Operation to Private Enterprise’(1). At times feelings ran high and it is outside the scope of this publication to go into this part of the cultural change work. One example gives a hint of how intense it can get. The central deputy from the nurse association publicly stated that the Chief Medical Officer was not of good standing with the national board of health even

though the opposite could be verified through several authoritative homepages. This example shows that the leaders of significant turnaround projects should anticipate attacks below the belt. The experience from the turnaround of NÖAB is that when the attacks start to come below the belt and are not evidence based any longer, then you know that you have hit the core DNA. That is precisely the DNA that needs to be exchanged.

The management received complaints from patients that were sent backwards and forwards between the primary health center and the emergency room. Again it was the emergency culture's position that they judged whether the patient could stay at the emergency room or be admitted to the primary health care. On the other hand the primary health care center thought that it was fair if the emergency department helped relieve the pressure by taking some patients, when the health care center was overloaded. When the problem was investigated another 'public' way of thinking emerged namely that many of the employees felt that they were employed on the emergency room and not by the entire company. Hence they felt no solidarity with the other departments. When the processes were looked over actually two double loops were discovered one in the telephone service and one between the receptions services (see Figure 8 p 31).

Actually one more way in for the patients was discovered. Some patients with a prior history from the department of internal medicine were often instructed by the emergency ward staff to go directly to the out patient ambulatory (not shown in Figure 8).

Experience from other leaders in health care also suggested to start improvement projects in the emergency department simply because it is where the process of being hospitalized starts for most patients(95). Weighing the facts the decision was to start the turnaround at the emergency. A 'doing first' decision model was adopted which gave the management the opportunity to demonstrate that they intended to follow new ways. The staff was shown the process diagram of how the management saw the processes (see Figure 8 p 31) and a diagram showing how the management wanted it in principle (see Figure 9 p 31). The redesign of the flow would make it simpler for the patient to get treatment at the right level. By that the management inferred that the patient should be the focus. The management indicated that they were committed in that a Jack Welch like approach was chosen. A central function, the handling of acute patient should be preserved, but the procedures around would be changed completely. Groups of employees that saw the benefits in the changes were selected to carry it out. Of course these were the A's. The C's were simply neglected and it was made clear that a reduction in staff was unavoidable and that two options existed. Placement in another function within the organization or they would have to leave the organization. Finally it was a good opportunity to show the organization the thinking behind lean-management. Eliminating waste in this case was to eliminate the over staffing that existed. Creating continuous flow was by eliminating existing double loops and functions that were double e.g. two phone services and two receptions existed. Quality was built in because new procedures were documented and with the exit of the C's the remaining competency was elevated considerably. Visual controls were introduced in the form of available day-to-day production data. So was the monthly status of the economy on both departmental and company level. Finally on the intranet the rose of the week was awarded to an individual or to a group that had contributed positively to the process.

The result of the redesign - the formation of the 'Närakut' - is seen as a success and is believed to have contributed significantly to the turnaround. One serious mistake was made in the redesign process. The accounting was not laid out in the same way in the medical department as in the primary health center. A detailed comparison could neither take place

before nor after. Several reasons can be given but the main one was that NÖAB was forced by the contract(2) to use the regions financial system which did not allow a 'profit center' thinking. Secondly, that the chief financial officer left for another job and his substitute never quite understood that the financial department ought to be a service to the business units. The key-figures for the medical department from 2002 to 2003 can be seen from Table 11 p 29. The figures clear-cut show that an increase in production took place despite the staff reduction. Since the emergency belonged administratively to the medical department the main effect of the reengineering would be expected to be visible on the figures from the medical department. Because the health care center managed in broad outline to handle the increased load within the same budget the result for the medical department is believed to stem primarily from the reengineering of the emergency and the COPD project. The process thinking spread throughout the organization and even though some other changes were made along the way, it is still assumed that a major effect on the turnaround stems from the two projects 'Närakut' and the COPD-team.

The external evaluations also value the 'Närakut' project as a success. The annual BSC concluded the process as excellent and the Reje report(72) concludes that NÖAB had developed the 'Närakut' concept further than it was laid out in the regions policy document 'Skånsk Livskraft - vård och hälsa'(96) and naturally the board of directors were content with the development of the turnaround.

Evaluation of the 'COPD-team'

Another project was a more effective way of servicing patients with chronic obstructive pulmonary disease (= COPD). Hence the project was named the "COPD-team". Again the reasons for choosing this project were many.

The contract between the provider and the payer called for finding new ways of delivering health care(2). Under the Customer/patient perspective in the BSC one key performance indicator under medical results was that the numbers of hospital admissions for COPD patients should decrease with 10% compared with index year 2001(70).

In accordance with the customer perspective the management believed that the patients wanted service when they needed it. It means a shift from fixed scheduled consultations to consultations on demand – from push to pull technology. Several projects were embarked with the same template – for diabetes-, ischemic heart disease-, coronary insufficiency- and rheumatic patients. In this paper all these projects are exemplified by the disease management program (= DMP) for COPD. The COPD project was initiated with the objectives to increasing the precision of diagnosis and treating exacerbations promptly, before the patient's health deteriorated to a state where he or she would need hospitalization(60). The decision process was mainly a seeing-first approach. Again the management showed to the organization that action and new ways of running things were highly desired.

The staff belonged largely to the A's and B' so no cultural crash was expected with this project.

It also represented lean management thinking in that the team saw only patients in need of consultation. Furthermore the team actively worked for the reduction of admitting patients to the medical ward and reduced the use of the emergency room.

Several studies have showed that increased uses of chronic disease management programs in COPD have reduced admissions and hospital bed days(97;98). Some studies even claim that it is indicative of failing primary care delivery if an increased rate of admissions for ambulatory care sensitive conditions exists(99;100). It is assumed that programs reducing

admission rate and hospital bed days are likely to be cost-effective from a societal perspective(101).

The effect of the program was evaluated by two external sources. By the payer via the BSC were the key-indicator numbers of admitted patient with COPD should decrease(70). There has been a steadily decrease in the numbers of admittance over the years as seen in Figure 10 p 32.

Effects of the lean thinking can be observed in that only the resources needed should be used on a given service. In this case, a shift from the patient always has a consultation with the doctor to always see the nurse first and the doctor only when needed (Figure 11 p 33). An increased number of patients have been serviced with unchanged resource.

The overall conclusion is that the COPD-team contributed positively to the turnaround and that the combined effect of this project and the 'Närakut' project can be read from the key-performance figures for the medical department as previously commented (see Table 11 p 29). A gained experience from this project was that when external stakeholders (in this case IHE and AstraZeneca) showed interest in the project it accelerated the internal process by reinforcing the impression that the organization was on the right track.

Evaluation of the 'Error management' program

Another project was the implementation of systematic error management. Most of all it was the report 'To Err is Human' (5) and the media publicity at the start of the 'save the 100K lives campaign'(102) that called the attention of the managements.

The management's intentions should be seen along the previously mentioned landmarks. Preventing errors is first of all aimed at the patients (consumer perspective) but it is also a measure that identifies where the organization fails which is lean management thinking. Hence it was the management's intention to identify areas that needed to be redesigned or changed, to ensure that failure in new procedures were caught and ultimately to find unsafe performing staff. It was also an opportunity for the management to see if the organization actually worked as they thought - to look at the ongoing activity itself(103-105). But also the only way to get insight in the rich variety of informal practice that was not mentioned in any manual but crucial to getting the work done (106).

Based on the paper by Douglas A. Wiegmann and Scott A. Shapell(54) the model was tailored the needs for NÖAB. The process started with the translation of the HFACS. Representatives from all departments that had previously shown initiatives and interest in quality work formed a team – an A-team. Their discussions during the translation of the classification system had additional positive outcomes. It laid down the cornerstone for an open safety and a non-punitive culture. As a consequence the reporting system should now cover all errors that occurred in the entire organization. These were not only the medical- and administrative failures but also the mechanical failures and even cases where the organization's ethics went wrong. Finally the reporting of improvement suggestions from the staff should be handled the same way to clearly signal that the error reporting system should be viewed as a tool for organization improvement and not a "sneaking-system". Arguably this development can be seen as the ultimate implementation of the Tavistock principles.

Based on Helmreich suggestions(53) a five step approach was adapted to establishing an error management routine in NÖAB. As in the treatment of disease, action begins with:

1. History and examination. The history includes detailed knowledge of the organization, its norms, and its staff.

2. Diagnosis includes data from confidential incident reporting systems and surveys, systematic observations of team performance, and details of adverse events and near misses.
3. Dealing with latent factors that have been detected, changing the organizational and professional cultures, providing clear performance standards, and adopting a non-punitive approach to error (but not to violations of safety procedures).
4. Providing formal training in teamwork, the nature of error, and in limitations of human performance.
5. Providing feedback and reinforcement on both interpersonal and technical performance. Making error management is an ongoing organizational commitment through recurrent training and data collection.

The translated classification and the processes were then adapted to a web-based incidence reporting system - 'Munkeby'. A process that unfortunately meant restrictions when it was realized that the system was not as flexible as promised during the buying phase. Further limitations were introduced because of lack of IT knowledge by the region. Even though the team bended and remodeled their ideas to fit the constrained IT-world, the result became a "Trabi model" and not the intended "Rolls Royce model".

The general impression of the process is that it positively aided in sustaining the results achieved from the turnaround. The most valuable aspect was that it constantly pointed out where the organization didn't work. Before the implementation focus was 100% on failures from individuals, but after the implementation only 54% were classified as failures from individuals. The remaining 46% of the reported failures were classified as system level failures(61). This shift toward system failures alerted the middle managers to start focusing more on system design and functionality.

It can also be argued that it was a success since the staff reported errors on a wide scale. The staff themselves decided the classifications when they reported the incidence. No rules of severity classification were defined. The staff classified 9% as severe adverse effects, 54% were classified as moderate and 37% as mild or potential adverse effect. Reporting from adverse events studies from Harvard, Australia and Utah/Colorado(47;48;107) reports ranges for severe adverse effect between 13,7% and 2,6%. Since the figures for severe adverse events from Simrishamn falls within the same limits as the reported figures it is interpreted as a success. It shows that Simrishamn was no worse than could be expected. From other sources ('Lex-Maria' reporting, complaints to the patients ombudsman and the statistics from the patient insurance organization) it could be verified that it was not underreported.

Simrishamn has much higher figures reported as moderate and much lower as mild compared with the published figures for moderate 13,7% - 31,6% and for mild 46,6% - 56,8%. Judged from the reviewing of the cases it is a matter of commitment. The staff saw all incidences as important; hence the tendency to classify any incidence as at least moderate.

A total of 312 reports were filled during the first 10 months after the system was operational - an average of 31 a month. It is considered a success compared with the rate of 177 filled reports a month using an online web-based reporting system at the Osaka University Hospital (1076 beds) (108).

Overall conclusions on the evaluation

It is now time to recapitulate the answers to the research questions.

Did a turnaround take place? Based on the hard economical figures the conclusion is solid that a real turnaround took place. A conclusion confirmed internally as well as externally. The conclusion is further assured by the fact that it was examined whether a deterioration of services occurred as a consequence of the turnaround, which it did not. To quote the Anki Gauffin(70) again: *“The provider has fulfilled the task with an open and professional attitude. For me as a politician that means trust and accountability”*.

The second question was did the individual projects contribute to the turnaround? Project ‘Närakut’ was an optimization project of the handling of patients in need of emergency health services. It certainly released resources and made the care for the acute patient less complex. The conclusion on the evaluation was that the action did contribute positively to the turnaround.

Project ‘COPD-team’ was a more effective way of servicing patients with COPD. It represents the introduction of new technology -pull technology- that was evaluated externally to save NÖAB up to a million SEK. Again the conclusion was positive. Also the implementation of an error reporting system contributed positively.

The overall conclusion must be that the sum of all the activities contributed to the positive economical development of NÖAB. There were many more projects that contributed. To name a few, a new center for women’s health formed by merging of several sections was started. There was the outsourcing to the pharmacy of maintaining inventory of drugs at a minimum and the introduction of ‘standard medicine list’. Also a project to centralize blood sampling was carried out using the same script as the one used for the ‘Närakut’-project.

Can the processes in the turnaround be categorized as applied KM?

The ‘Närakut’ project used elements from all four pillars in the KM portal (Figure 3 p 5). From the ‘Leadership pillar’ it was a question about strategic planning. Visions and goals stemming from the need of turning the result for NÖAB into black figures and from the contract that demanded the development of health care locally. It was the question of business culture that was addressed by the Change Management initiative(1). In the ‘organizational pillar’ it was the development of new processes and procedures by changing the workflow. In the ‘Technology pillar’ it was a question of using process modeling and to substantiate the overuse of resources by pulling and combining data from the various databases (=Data warehousing). Finally it was a learning experience for the organization in innovation. The organization learned that projects based on ‘do first’ and virtual teams (the A + B employees that implemented the vision and the goals) can be implemented rather quickly.

The ‘COPD-team’ project used elements from all spoke in the KM Framework (Figure 2 p 7). From the ‘Content spoke’ the notion of value, relevancy, credibility and expertise were used when offering patients the optimal treatment at the right time. In the ‘Process spoke’ the procedure was made explicit and analyzing. The presentation track was actively pursued to increase the knowledge about the program. From the ‘Culture spoke’ it was commitment and building relationship. The ‘Learning spoke’ represented by the feedback loops, story telling and creating and finally ‘Technology spoke’ was facilitating and empowering. It was a shift from push to pull.

In the ‘error management’ project Helmreich’s “six steps”-plan resembles a KM approach judged from the features of the plan.

First of all it is analytical, the problem should be acknowledged by examination – knowledge and data driven (step 1 + 2). The plan realizes that it is multidisciplinary and that it would continue to be so. Scientific studies in human factors engineering, organizational psychology, operations research, and other disciplines show that in complex systems, safety depends not on exhortation, but rather on proper design of equipment, jobs, support systems, and organizations(50;109)

Secondly it builds on an open culture and realizes that a cultural change toward openness is mandatory (step 3). If we can take any lesson from the stunning progress in safety in aviation and other risk industries it is that fear, reprisal, and punishment produce not safety, but rather defensiveness secrecy, and enormous human anguish(50). Thus Error management shall promote a greater climate of openness and move away from finger pointing and routine assignment of blame(51;52). It is important to realize that the necessary changes are as much cultural as technical(109).

Some report that error management reaffirms the provider's reputation for putting the patient first. The patients were much more accepting of inevitability of human error than the health care personnel was and furthermore the patients were impressed that something was done to reduce errors(110).

Thirdly the plan implies a learning organization (step 4). The clinicians are trained to identify the problems bedside (i.e. the unsafe actions). However they are unfamiliar with identifying contributing factors (i.e preconditions for unsafe acts, unsafe supervision and organizational influence). A systematic error management program pays dividend when the exploring of the contributing factors generates a greater awareness of these issues and is translated into preventive measures(51).

Fourthly it builds on open two-way communication otherwise reinforcement cannot take place (step 5). The problem is not fundamentally due to lack of knowledge, we already know a lot more then we put into practice(65;109). But we have to implement this knowledge through an ongoing learning process. Organizational learning without reinforcement -"single loop" learning- fuels and sustains "vulnerable system syndrome" while "double loop" learning is a necessity to start breaking free from the burden of "vulnerable system syndrome"(111).

Finally plan is an ongoing continuous process with an explicit strategy (step 6).

To declare that it is simple to add an error management program in an organization used to KM thinking is maybe to push the arguments too far. But it is hard to deny that there are striking similarities between error management and KM.

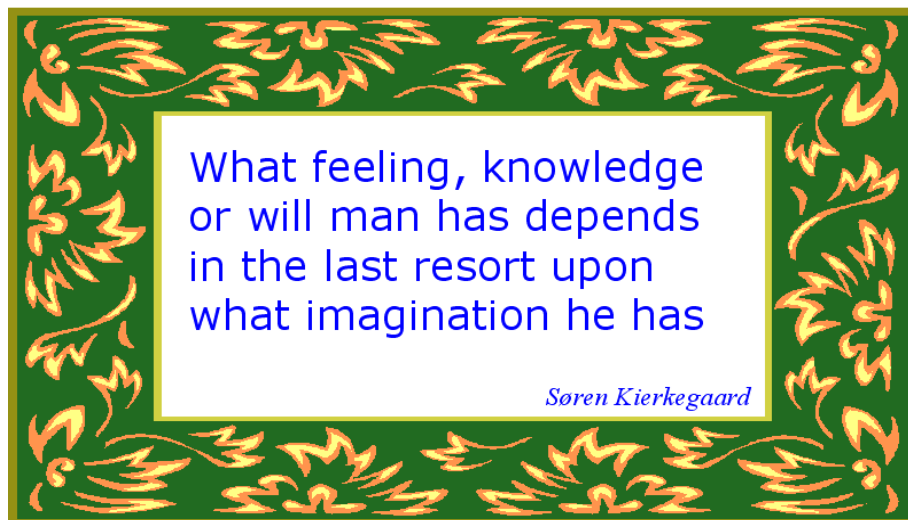
Building a healthcare organization on the Tavistock Group ethical principle is to build an organization on fundamental principles also needed in a knowledge intense organization. It is the opinion that it is a further driver for the need to implement KM in health care. A detailed list of the principles and their consequence as seen from a KM perspective is shown in Table 5 to Table 9 (p 23 - 26).

Final conclusion and epilog

So far it has been concluded that a real turnaround took place. The overall conclusion from the evaluation of the projects described was that the sum of all the activities contributed positively to the turnaround.

From the nature of the described projects, the description of the landmarks used and the discussion on how the projects fit into a Knowledge Management way of thinking it is made probable that a Knowledge Management approach was applied. The success of the turnaround described in the case makes a strong argument for the use of Knowledge Management when faced with the need to optimize health care systems.

Hopefully it has been a success to lift the case – NÖAB's travel from red to green figures – into a broader perspective. Hopefully others can gain knowledge from it. It would be positive if this account of a tough but successful journey has fuelled others to consider embarking on a Knowledge Management project. To openly explore and share their experience so that we all can help each other to find new safe and effective ways of delivering health care.



Abriviations

AB	AB is the Swedish abbreviation for a limited company - 'aktiebolag'
BSC	Balanced score card
CAA	Civil Aviation Authority (UK)
CMO	Chief Medical Officer
COPD	Chronic obstructive pulmonary disease
DMP	Disease management program
DNA	Genetic material
FAA	Federal aviation authority (USA)
HFACS	The human factor analysis and classification system
IDC	International Data Consulting
IHE	Institutet för hälso- och sjukvårdsekonomi
KM	Knowledge Management
NASA	National Aeronautics and Space Administration
NHS	The National Health Service (UK)
NÖAB	Närsjukvården Österlen AB
SEK	Swedish kronor

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