

Karolinska Sjukhuset (A)



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This case was written by Dr Joe Tabet, Programme Manager – Healthcare Management Programme, and James Teboul, Professor at INSEAD. It is intended to be used as a basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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Introduction

In August 1994, Dr Jan Lindsten took up a new appointment in Copenhagen as head of the biggest University Hospital in Denmark, where he was to restructure and reorganise eight large hospitals tied-up in a regional plan. Dr Lindsten had been chosen because of his success in an ambitious project that improved efficiency at one of Sweden's largest university hospitals, Karolinska Sjukhuset. His concept was based on three major themes: focusing the service on the patient, rationalising the utilisation of resources and improving employees' satisfaction. Anticipating the Swedish health reform, he strongly believed that the three conditions combined would result in better service at a lower cost.

Dr Lindsten was a Swedish medical doctor most of whose medical career had been devoted to research in human genetics which had earned him international repute. He was the elected Secretary of the Nobel Committee. He also had a long-standing interest in the management of healthcare delivery. In 1990 he became head of Stockholm's Northwest medical area. His responsibilities there covered primary care medicine and two general hospitals: Karolinska Sjukhuset and Löwenströmska. In 1992, these three parts were separated and Dr Lindsten chose to become chief executive of Karolinska. From the beginning, he had a clear idea about the changes that the Swedish government would implement in the healthcare sector, and took up the challenge of turning Karolinska's heavy, bureaucratic structure into a more dynamic, competitive organisation. At Karolinska he was seen as a true leader, a man with a vision who succeeded in raising healthcare services to the level of other competitive organisations.

Dr Lindsten believed that modern management concepts that had contributed to the success of firms in other industries could be applied to hospitals and healthcare services. One of the methods he introduced at Karolinska was Time Based Management, which helped achieving efficiency through redesigned processes. Other changes were: implementing a quality management scheme, organisational restructuring, and changing the institutional culture.

The reforms introduced by Dr Lindsten gave Karolinska a competitive edge in a fast changing industry; its ability to deliver excellent medical care was improved by reducing waiting time, optimising the patient flow inside the system and making the care process more appropriate for the patient's needs. Higher productivity and better utilisation of scarce resources contributed to cutting overall costs by 20 to 25% between 1991 and 1994. In many ways, Karolinska had become the European reference for bringing manufacturing concepts into the hospital.

None of the concepts introduced at Karolinska was innovative in itself. As Dr Lindsten commented:

"We have not invented anything. American hospitals are much more advanced in applying modern management tools. Efficient operations management has for long been implemented in the U.S. and we still can hardly compare our achievements with American best practices."

Sweden's Changing Healthcare Environment

The Swedish healthcare system was a vast economic sector; it employed 10% of the country's workforce and consumed 8.7 % of its GDP. Like in most industrialised countries, healthcare expenditures had been increasing for the last 10 years, at a rate above inflation and economic growth to become the first sector for public spending. This was the result of several factors, such as advances in medical technology and the desire to provide all citizens with ever better access to higher quality care. The ageing of the population also contributed to the mounting costs of care. Hospitals accounted for 55 % of the overall cost of healthcare, more than in any other European country (Exhibit 1).

Although 99% of Swedish hospitals were in the public sector, pressure on them to boost their competitive position by improving their quality/cost ratio was increasing. Quality assurance or quality control schemes were being implemented to evaluate the performance against costs. As elsewhere in Europe, the Swedish healthcare system, for long heavily regulated, was expected to rely increasingly on competition to contain costs and allocate resources.

High fixed costs for healthcare were often blamed on overcapacity in the acute care hospital sector, despite the long waiting lists of most hospitals, and reducing capacity by reducing the number of beds had become a major preoccupation. It was believed that hospital productivity could increase significantly if patient stays were shorter and if better organised community care and home care replaced expensive acute hospital care. Hospital managers felt considerable frustration; they feared that cutting costs would result in lower-quality care for patients, less time for research and education, and loss of personnel motivation. In addition, many hospitals had already been through several cost-cutting exercises and felt they could not go any further.

In June 1991, healthcare delivery underwent major changes in the medical region of Stockholm. The reformed system, known as the Stockholm Model (Exhibit 2), introduced new distribution patterns with purchasers and producers of healthcare services. Patients were, for the first time, given the right to choose their doctor and the hospital where they wished to be treated. Each hospital became an independent institution responsible for its own results. Quality assurance schemes were introduced at all levels within the healthcare sector, promoting increased accessibility to medical services and continuity of care. In order to reduce capacity, only six of the nine hospitals in the region of Stockholm, would retain their status as acute care general hospitals; the other three would either change their focus to long term care or become nursing homes.

Karolinska Hospital

Karolinska Sjukhuset (KS), established in 1940, was a large public university hospital for clinical care, medical research and teaching in the medical region of Stockholm, which had a population of 1.5 million. KS had 1,100 beds and over 5,000 staff (4,100 full time equivalent). KS reported 45,000 admissions and 25,000 surgical operations for 1993, while 440,000 outpatients received ambulatory care; this represented an annual turnover of two billion Swedish Kronor¹. In addition to patient care, most departments carried out clinical

1 SEK2 billion = \$270m (at the average 1994 exchange rate). This did not include state funding for research.

research and offered special training for specialising doctors and nurses. KS's research led the way in fields such as anaesthesiology, cancer treatment, endocrinology and thoracic surgery; it had also been the world's leading centre for pace-maker technology since the 1960s. According to its mission statement, the hospital's objectives were to:

- Provide healthcare, teaching and research of high international standard;
- Give excellent nursing care and service;
- Develop and spread knowledge of new methods for diagnosis, treatment and prevention of diseases;
- Provide good working conditions and advancement opportunities for all employees.

KS used the most advanced medical techniques and the best technologies, both in terms of medical equipment and for its paramedical and support services such as secretarial work and patient transportation. A comfortable work environment was of crucial importance in Sweden, which had laws and regulations on comfort at work. Good working conditions were believed to make employees more productive by increasing their motivation and reducing sick leave. At Karolinska, the degree of comfort went beyond legal requirements (Exhibit 3). Commenting on a newly acquired electric machine which lifts the patient from his bed on to the operating table, an anaesthesiologist said:

"This sophisticated lifting machine might appear extravagant but it prevents our nurses from hurting their back and getting off work; we don't see it as a luxury but as a necessity."

Changes at Karolinska

Until 1992, KS had been a research-oriented institution, as reflected by its annual reports, communication brochures and mission statement. Because of this, personnel turnover was high and the continuity of care suffered, since most people in training stayed for no longer than six months. Doctors, who were full-time employees, had responsibility for medical and nursing services². Although nursing research was well developed, nurses demanded more power and administrative responsibilities. Everything at the hospital was designed to offer the best working conditions to the medical body. If KS wanted to become a regional hospital at the patients' service, it needed more focus on clinical care.

Important changes started at Karolinska hospital when Jan Lindsten was appointed regional director. The changes ranged from modifying the organisational structure to changing the processes of providing treatment. In 1992, providing good care became the first objective listed in the mission statement, before research and education. Internal communication put more emphasis on the service to deliver, and patient treatment became a priority. The main changes that helped achieve these objectives were:

- Clustering the organisational structure;

2 There is not even a Swedish word for *nursing* which is called *caring*.

- Focusing the activities on the patient;
- Improving the information technology system;
- Implementing a quality improvement scheme;
- Introducing cost-cutting as an objective.

Redesigning Karolinska's Structure

Traditionally, KS had been divided into 50 separate departments, each one headed by a practising physician who was responsible for both clinical and administrative work. Each department covered a medical speciality such as cardiology, gynaecology or gastroenterology. Each head of department reported directly to the CEO. There was no co-ordination: each department fought to protect its own interests. In 1992, the 50 departments were reorganised into 11 divisions³ as shown in Exhibit 4. Clustering followed a certain logic: generally grouping together similar types of speciality – such as orthopaedics and plastic surgery – or departments sharing research interests – such as neurology and neurosurgery. Whenever possible, however, continuity of patient care was taken into consideration. For instance, rehabilitation medicine went into the surgery division, and not the medicine division. Clustering also took into consideration personal interactions which sometimes were an obstacle to rational clustering. Only half of the division heads were doctors, two were nurses; half of them were women. In the new structure, department heads had to work closely with their division heads, who reported to the CEO.

Focusing on the Patient

There was no objective evidence that patients treated at KS were not treated well. Good medical practise was a priority for all staff, not only the medical body. Nevertheless, patients were given little information about treatment, and many complained that they were not treated as individuals. Few patients saw the same doctor during their hospital stay; even fewer knew the names of their doctors. Patients also expressed frustration at the poor co-ordination among clinical departments. No-one was held accountable for poor quality service since nobody was in full charge of the whole care process. Most of the problems were blamed on the system. KS introduced several changes aimed at empowering patients, getting them involved in the care process, and better addressing their needs. Exhibit 5 shows a brochure distributed to patients at Karolinska hospital.

Continuity of Care

As continuity and quality of care required a close relationship between patients and doctors, each patient, on admission, was assigned a physician – known as P.A.L.⁴ – who would follow him throughout his stay. The P.A.L., who was the intermediary between the patient and other doctors, co-ordinated healthcare delivery and made sure the patient received appropriate treatment. Patients could ask to change P.A.L. Soon after its implementation at Karolinska, the P.A.L. concept became a legal requirement in the whole country.

3 Two new divisions, Geriatrics and the Child Centre, were added in 1993 and 1994 respectively.

4 PatientAnsvarig Läkare (Doctor in charge...).

Nursing also became the responsibility of a single person, although this was not a legal obligation. An assigned nurse – P.A.S.⁵ – was in charge of all nursing care for each patient. Previously, individual nurses had been responsible for a specific task such as distributing medicines, taking blood pressure or changing wound dressing for a group of patients in one ward. As one head nurse said, "Nursing is not only giving pills but establishing a relationship with the patient and his relatives". Giving more responsibility to nurses resulted in more personalised care, fewer mistakes, and a better technical quality of care.

Radio Karolinska

In 1987, KS started broadcasting a two-hour daily programme through a local radio station in an effort to increase its presence in the Stockholm community. Radio Karolinska offered information about health; in the beginning, its broadcasts included information about research activities as a means to facilitate fund-raising; in 1992, the area it broadcast to expanded to cover the whole Stockholm region; the broadcasts became a meeting ground for dialogue between local people and doctors. The station offered various information programmes at the public's request, including a live questions-and-answers programme (Exhibit 6).

Handling Complaints

In 1989 KS appointed a full time ombudsman to deal with complaints from patients and hospital staff. She was a former head nurse who had been involved in several quality improvement projects. Her office, in the main lobby, was open at normal office hours. Most of the complaints were about interaction between patients and staff. The ombudsman investigated each case as soon as it was reported and looked for a solution or compromise. All complaints were filed and stored in a computerised database. Einar Areklett, head of Healthcare Development explained:

"This enables us to detect problems at an early stage or as soon as they occur. When more complaints than average are detected, the problem is submitted to the concerned department for analysis and action".

Patients could also consult an independent patients' advisory committee outside the hospital. The committee helped patients and their relatives with medical care-related problems, thoroughly investigating complaints and making hospitals accountable for serious mistakes.

Information Technology

A central information technology (IT) system was used at first for administrative applications, and then extended to the clinical divisions as a support of clinical care. All divisions had to use the same information system and contribute to its development. Administrative applications included booking appointments, billing patient with reference to a coding system, human resources management and staffing, and statistical analysis of the hospital's activity. Clinical departments used IT to keep patient records and access test results. The system also had information on the activity of each ward, such as average length of stay and bed occupancy rate. Exhibit 7 shows sample ward activity reports. The new budgeting system, implemented with the Stockholm Model, forced doctors to use IT; they had to enter medical

5 PatientAnsvarig Sjuksköterska (Nurse in charge...).

data – such as operation type and diagnosis code – for accounting and record-keeping purposes. Although doctors were not directly paid for each patient they treated, the nature of their medical activities determined the budget allocated to their department. The new budgeting system is summarised in Exhibit 8. All computer users were connected to electronic mail.

Quality Management

Karolinska's staff was aware that quality was an important issue. With the support of Dr Lindsten, the medical advisory committee gave quality issues a high priority. The approach they chose for quality management was Continuous Quality Improvement (CQI), rather than quality control. Policy and objectives statements, executive meetings and other important messages all underlined the commitment to improving quality.

Multi-disciplinary quality circles were set up in order to define a clear policy; a quality council (CQI council) was responsible for piloting the CQI project.

A quality statement was distributed to all employees:

- The patient's need for care of high quality shall always have the highest priority;
- Continuous Quality Improvement does not only concern central management but should be spread at all levels in the organisation;
- Every employee has individual responsibility for quality and efficiency;
- Hospital resources shall support quality improvement projects that prove their efficiency according to scientific knowledge and empirical experimentation.

Improving quality was not meant to be a separate project. The CQI council acknowledged the staff's long-time effort to improve the quality of patient care. In fact, most of the operating units had gained valuable experience from trying different approaches in nursing and serving patients. The CQI council didn't want to create a new 'religion' but to build on existing values, systems and culture.

The increase in competition due to patients being given the right to choose a hospital emphasised the importance of non-medical services. Surveys showed that while patients expected high quality medical care, most of their comments to friends and family related to nursing, service and security. Patients – or their representatives – were therefore involved in evaluating care at all levels; they were also involved in planning and defining new protocols.

The implementation of CQI was both from the top down, and from the bottom up. Each division appointed a full-time CQI coordinator – generally the head nurse or ward sister. "The essence of the bottom-up approach was empowerment and decentralisation, while management by objective (MBO) characterised the top-down approach", said Einar Areklett.

The CQI council was in charge of co-ordination, support and education. While CQI methods were initially taught to nurses, it was soon realised that a multi-disciplinary group, including other categories of personnel, would be more creative in using CQI tools. All employees were free to join a CQI group. Working teams wrote protocols describing standards for each procedure. These protocols were revised and updated periodically.

Although different consulting firms offered ready-made CQI methodology, KS decided to develop tailor-made tools instead. One method, described in Exhibit 9, combined cyclical improvement (DySSSy⁶) and management by objectives (MBO). Process analysis was used to assess patient flows throughout the system. Medical technology was assessed separately, using the world leader's method for technology assessment.

The CQI council did not want a parallel quality improvement organisation to emerge. Einar Areklett explained:

"Responsibility and accountability for quality must be held within the organisation's line of command. Even if resource people at different levels in the organisation do most of the work, quality issues must always be linked with routine planning and follow-up. We are debating whether the quality council should be replaced by the hospital's overall executive council. For now we have found a compromise by holding some joint meetings."

An external audit of the CQI project, carried out in 1993, showed that the combined approach, top down and bottom-up, had left out the middle part: the department heads. It also showed that nurses were more committed to CQI than doctors. Despite these shortcomings, the CQI project succeeded in putting the whole organisation in motion; by 1994 some 375 projects were in progress at the ward level. A catalogue of projects, shown in Exhibit 10, was published annually to encourage internal benchmarking and to highlight best achievements.

Cost Cutting

Offering a better service at KS was always linked to cutting costs. Reducing hospital expenses became an objective in its own right. Since 1989, all staff were asked to make efforts to help the hospital reduce its yearly increasing deficit. The process was slow to start; as one head nurse commented:

"At first, few ideas emerged. KS staff had long behaved like bureaucrats; they were not used to taking the initiative. Lack of interest was another reason; people delivering healthcare are more committed to improving care than to cutting costs."

Besides minor initiatives aimed at reducing unnecessary expenses at the individual level, shortening hospital stay was the most significant measure taken in most departments. Patients were discharged as soon as they had enough autonomy. As each department had little control over processes involving other departments, short hospital stay resulted from a shift from ward care to ambulatory care rather than shorter treatment time. For instance, patients who had undergone breast cancer surgery were discharged six days after the operation, with their drainage tube still in place, instead of remaining at the hospital until their tube was removed – usually on day 10. They came back every day for nursing care. In order to allay anxiety, each patient received detailed information about the steps to follow. Had they any questions, a nursing assistant could be reached by phone, day or night.

6 Dynamic Standards Setting System.

Although early discharge resulted in higher patient turnover, increased productivity and less cost per patient, the Stockholm Model required costs to be cut still further. Doctors and nurses feared that this would result in unacceptably poor care. KS management was convinced that additional savings could only come through redesigning processes. At Dr Lindsten's suggestion, external consultants were retained. They shared his belief that industrial concepts could apply to a hospital once operational procedures were fully understood.

The Process Redesign Project

A feasibility study was initiated in February 1992. It aimed at testing the consultants' method, in order to make a difference between thoughts or beliefs and real facts. The initial task was to collect precise data and information about the healthcare delivery process at the hospital. After spending several months observing, mapping and measuring, the consultants found a major problem of co-ordination among hospital services which resulted in inefficiency, redundant effort, waste of time, patient dissatisfaction and low personnel motivation. The consultants decided to apply their process re-engineering method known as Time Based Management.

Time Based Management

The consultants described Time Based Management as follows:

"TBM is a philosophy that relies on analysing a business from the consumer's perspective. In the case of a hospital, the patient is at the centre of the process; everything starts with him and all the processes should be made as efficient as possible to address his needs. Then, the hospital becomes a series of processes and flows that follow the patient and meet his requirements.

"Time is used to measure performance in all processes. As a measurement unit, time is easy to understand, make comparisons and translate into costs. It has proved to be one of the best ways of describing flows and identifying inefficiencies and bottlenecks. Mapping and measuring is the cornerstone of TBM. Each process within the flow is analysed in order to identify how time is being utilised. This enables to identify the exact value-adding time – i.e. time spent on carrying out key tasks – and the non value-adding time – i.e. time wasted between value-adding steps. Then it is all about reducing the non value-adding time. (Exhibit 11).

"Performance is also measured by comparing the processes with those of world-class performers – external benchmarking – or with other practices within the same institution – internal benchmarking. Benchmarking is an important reference point for an organisation and introduces a salutary element of competition."

The Communication Plan

Consultants insisted that the project relied on close collaboration among everybody in the hospital; it was therefore important to get key people, such as medical doctors, involved from

the start. The feasibility study's early goal was to find convincing arguments to sell the project to the medical body. Jan Lindsten presented the project to the division chiefs to try to convince them to undertake a major process change with the consultants' help. Most division heads were suspicious, explained Pr Per Gillström, head of the surgery division:

"There was a real threat that the medical body turned down the whole project, but things were presented to us very smoothly and the discussion was always open. They showed us facts and evidence that ended up convincing me to host the pilot project."

Once Pr Gillström had agreed to run the pilot, Jan Lindsten presented the project to the two departments where the project would start: general surgery and gynaecology. Pr Gillström:

"If we had to do it again, I would definitely announce the project myself. People would have felt much more confident and less threatened by the change that might result. I would also have asked each person to discuss it with his subordinates."

The project re-organised processes around the patient. For each category of ailments, such as inguinal hernia or gall bladder disease, the process was reviewed with all staff involved, including anaesthesiologists and nurses. Most surgeons recognised the need for improving the system, but resisted the idea of collaborating with other categories of personnel or other divisions. One surgeon said:

"Consultants cannot understand medical practice. It will take us much more time to explain what we do than it would to fix the problem on our own. Each patient is a unique case. Management concepts and manufacturing techniques do not apply when each case has to be analysed and handled separately."

Consultants were careful to avoid conflicts of interest with doctors and not to infringe on their responsibilities. They made it clear that doctors would decide all changes that affected medical practice. The consulting project manager commented:

"Doctors are strong people, with a strong character. They are driven by scientific reasoning. We did not understand from the beginning the level of detail required to make them understand what we were telling them. It took us some time to start speaking their language and to present things appropriately."

All Karolinska's staff were also informed from the beginning. Round table discussions were carried out with personnel representatives to get them involved in the implementation. Labour unions feared that cutting costs would result in cutting jobs. Rumours about layoffs created a stressful uncertainty among employees, particularly those with low qualifications such as nurse-aides and cleaning maids. Unions tried to resist the project by negotiating directly with the government but the health authorities held firm; they insisted that union members help managers achieve efficiency. Presentations supported by precise data – which prevented people from arguing around fuzzy assumptions – proved convincing. The communication campaign made it clear that layoffs were not a goal in themselves and would be justified. In some cases efficiency required positions to be cut; in others, new jobs would be created. The hospital offered a training programme for personnel conversion to give the maximum

opportunity to those willing to acquire new expertise. This appeared to reassure the unions, who endorsed the project.

"We were aware that communication was very important and still more information was needed," said the consulting firm's vice-president. "We learned to keep on informing and informing again and get people to inform their divisions."

Although the communication campaign got many people involved in the process review project, by no means did they all agree to the changes proposed by the consultants. But nothing was imposed; the only changes adopted were those agreed by staff in charge.

Pilot Project and Implementation

In May 1992, a pilot project was initiated in two divisions: general surgery and gynaecology. The first phase of mapping and measuring processes was achieved through some 120 personal interviews, data collection from over 1,000 medical records, and activity analysis. A steering committee of hospital staff and consultants was in charge of finding alternatives for improvement. Implementation in other divisions took place between February and September 1993, as shown in Exhibit 12.

Patient Flow

The TBM concept focused on the patient, as the final customer. Everything was rethought from the patient's perspective. Business development put more emphasis on making patients' needs the guideline in choosing new types of treatment and setting research priorities. Achieving optimal patient service with existing resources was also a clear objective. In the first place, service to patients had to be redefined. What service to deliver, where and how, were the questions to answer before re-designing a process.

As patient care involved several disciplines, requiring patients to move from one department to another, the traditional hospital structure – organised by speciality – was no longer seen as suitable. The redesigned hospital would ultimately be a series of processes organised in a sequence that followed the patients' needs, as shown in Exhibit 13. While in the past the aim had been to optimise each function separately, interdependence and co-ordination became more important. The flow of patients within the system had to be optimised to improve overall efficiency.

Standard Paths

Patient flow analysis confirmed most doctors' intuition that patient flows through the hospital were complex, diverse and unpredictable. Thorough analysis identified three groups; one of standard diagnoses and two of more complex diagnoses:

- The *standard group* for which over 60% of patients went through a standard path which could be optimised;
- The *customised group*, for which the entire diagnostic path was rarely predictable but where it was possible to design a tailor-made path relatively early in the process;

- The *resource demanding* group for which the patient flow was impossible to predict; here patient follow-up depended on intensive interaction among departments and changes could occur at any stage.

A consultant explained:

"Most of the hospital's processes had been designed around the most complex cases, which have the highest degree of uncertainty. With the new segmentation most patients now go through a least-resource-demanding process while those requiring additional resources can be identified and put on a customised, tailor-made scheme. Introducing an interactive information system has made it possible to closely follow the customised group and build a decision tree that would help improve the customised processes."

Process Change

Each division identified standard diagnoses. For each diagnosis the standard process was analysed by a mixed team of consultants and hospital staff. The initial steps were to map and measure the entire process as a reference base-line situation. This involved both so-called macro-mapping – which identified the steps where the patient received care or service – and micro-mapping – which took each step separately and measured the time spent on actually providing care to the patient. Examples of macro and micro-mapping are shown in Exhibit 11. Each team made suggestions for improvement. Before the changes were implemented, a simulation of the new process was compared with the base-line situation and suggestions for further improvement were made until a final consensus was reached on an optimal process.

Elective Surgery

Routine surgical procedures were analysed for each of the most frequent diagnoses such as enlarged prostate gland and inguinal hernia. For instance, record review of patients referred for an enlarged prostate gland showed that an average 255 days elapsed from the day the patient was referred to the hospital, until the day he was discharged. Only 2% of that time was spent treating the patient. The rest was wasted due to poor co-ordination among the departments involved. None of these departments was able to find a time-saving solution that would not affect its priorities adversely. A new position was therefore created: that of a nurse co-ordinator, with responsibility for planning the entire chain of care in the most efficient way. Nurse co-ordinators would also look after optimising the standard process flow and continuously improving the process. Several changes were implemented along the main sequence. Each individual change would have resulted in a limited improvement, but introducing them all simultaneously led to a radical improvement. The amount of time wasted was cut by 75%, as shown in Exhibit 14.

One change was the standardisation of clinical investigations⁷, which made it easier to forecast which tests were likely to be needed. The nurse co-ordinator scheduled the tests in an optimal sequence. A centralised on-line booking system was introduced; it eliminated the

⁷ Standards for clinical investigations were defined by doctors according to documented best practices.

need to negotiate appointments with each department and made it easier to change appointments.

Out-patient visits, for example, involved delays that patients found frustrating. Not only did it take a long time to get an appointment; patients also spent a long time in the waiting-room on the day of appointment. Out-patient visits were improved through an improved scheduling process as well as by referring patients to the most appropriate doctor, according to the diagnosis mentioned on the referral letter.

Assessment carried out prior to surgery also suffered from inefficiency. Examinations were not scheduled in advance and anaesthesiologists only saw their patients on the eve of the operation. If additional investigations were needed, the operation had to be postponed. On the other hand, each anaesthesiologist was in charge of seeing patients on admission and giving anaesthesia in the operating theatres. Anaesthesiologists had to find a compromise between following the pace in the operating theatre and seeing new patients as soon as possible. Complaints came from both sides as surgeons also complained from having to wait for the anaesthesiologists while they were consulting in the wards. The solution was to create an anaesthesiology outpatient clinic. Each day, one of the anaesthesiologists would be on duty to see all patients in need of pre-operative assessment; on that day, he would not go to the operating theatre. The idea was nothing new. Many US and European hospitals had for long dissociated consultations from anaesthesia. But implementing that change at KS required anaesthesiologists to agree on a standard approach to pre-operative assessment. Record keeping had to be improved in order to make the information easy to read and understand by all. Setting up the out-patient clinic required support and funding from KS management.

Hospital stay also had many inefficient aspects. Poor co-ordination was the main cause. In one ward, 17.5% of planned operations were cancelled. Only 17% of the cancellations were related to medical contra-indications and 3% to patients failing to show up. The main reasons were the lack of time for pre-operative assessment (29%), and overbooked operation schedule (20%). In 6% of the cases, no surgeon was available. No standard procedures were available which resulted in a big discrepancy. For instance, the share of patients who had their clinical investigations completed on admission varied from 10% to 80%. When wards performances were compared, each team worked on improving their results. As a consequence 100% of elective cases had their clinical investigations completed on admission.

The Central Operating Theatre

A major functional bottleneck was detected: the central operating theatre where most surgical departments operated⁸. Compressing pre-operative lead time was of limited use if the patient still had to wait before surgery. But the theatres were running at full capacity and personnel often worked overtime. Variation in demand, emergency cases and inefficient planning made for a complex situation. Accelerating the process by reducing surgery time was not a solution since it would increase risks. In fact, theatres were inefficiently used for many reasons. Late starting time, long changeover time between operations, cancellations and early completion of operations combined to waste valuable professional time. Another reason was the lack of anaesthesiologists whose time was used at an average rate of 80%. As a result, surgeons and operating nurses spent a small proportion of their time performing surgery (Exhibit 15).

⁸ Some departments ran their own independent operating theatres.

Benchmarking showed a lot of room for improvement. For instance, the changeover time between two operations was 59 minutes compared with 12 minutes at leading international hospitals with a comparable mix of surgical operations.

The central operating theatre employed a highly qualified staff of anaesthesiologists, anaesthesiology nurses, operating nurses and porters – who carried patients from and back to the wards. It had 15 operating rooms (ORs) and a 10-bed recovery room where patients spent a few hours after surgery. Operating nurses sterilised surgical instruments and prepared operation kits, according to their time-availability. No one had full responsibility for the theatres and shared management resulted in conflicting priorities and much arguing among the four professional groups.

The operating theatre became an independent department headed by one person responsible for the whole process, assisted by a three-member directorate representing the other professional groups. There was a debate over whether the head of the operating theatre should be a surgeon or an anaesthesiologist, which was settled with the decision that it should be whichever doctor was most committed to management. Pr Björn Cedermark, a surgeon, was appointed; he was assisted by an anaesthesiologist, an operating nurse and an anaesthesiology nurse. The new department offered its services to the various surgery departments.

The major change in the operating theatre regarded operating room allocation. A room used to be allocated for a whole day to a surgeon or to a speciality, such as plastic surgery or urology. The new segmentation divided the rooms in four groups according to turnover (Exhibit 16):

	Surgery time	Time between cases
• Fast	< 1 hour	15-30 min
• Intermediate	> 1 hour, < 2 hours	30 min
• Slow	> 2 hours	60 min
• Emergency cases	N/A	N/A

Personnel was allocated so as to optimise OR occupation as shown in Exhibit 17. A balanced personnel mix would allow overlapping and reduce time between operations. Each OR had an 'anteroom' where patients could be prepared and anaesthetised while the previous operation was completed and the room prepared (Exhibits 18 and 19). A special operating room and staff were reserved for emergency cases. A 'time bank system' made a pool of staff available for additional emergencies or extra workload. Staff could fulfil their working hours with maximum flexibility; they worked only when required and were credited hours accordingly.

Operations could be booked from the wards, but the operating theatre directorate finalised scheduling for the next day, every day at 4:00 p.m. Request forms included the estimated operation time. A software programme automatically computed the changeover time and gave the schedule for the day. On the day of surgery, the head nurse followed the operations' progress from her desk through a centralised information system. In case of delay or early completion she modified the schedule appropriately and informed teams who were affected.

The system was also used to improve the utilisation of professional time. Doctors and nurses could be told how long they had to wait before they could start to operate. This gave them the possibility of using their free time. For instance, surgeons could do part of their administrative work in the operations department; for that purpose, secretarial services were made available with cubicles and tape recorders where they could dictate operations reports. Not only did this prevent surgeons from leaving the department; it also guaranteed that when patients left the OR, their reports had been typed. In the same line of thinking, operating nurses could use their free time to sterilise surgical instruments and prepare operation kits.

The productivity of the operations department went up by 30%. Keeping the same structure, it was possible to perform 15,700 operations annually, instead of 12,000. Karolinska's routine workload needed only 12 ORs; the remaining three were kept available at marginal cost.

Results and Achievements

Major achievements were evaluated in different ways at several levels in the hospital. Each department carried out surveys among patients, adapting a questionnaire provided by central management to its own needs. The satisfaction of personnel was also surveyed, but since a central survey could have been misinterpreted by the staff, this was left to the discretion of each department. The satisfaction of purchasers and GPs was evaluated through personal interviews and discussed during contract negotiations. A standard questionnaire was being prepared for that purpose.

Three overall targets had been set and communicated at the outset of the process redesign project. Results were measured against each of these criteria:

- Keeping the focus on the patient;
- Increasing service to new buyers of medical care (patients, GPs, local councils);
- Increasing productivity and cost efficiency within the hospital;
- Increasing personnel satisfaction, and making Karolinska an attractive employer.

By spring 1994, patient surveys reflected a marked improvement in the perceived overall quality of care. Patients felt that care was more personalised since they interacted with fewer hospital staff. The average waiting time was reduced both for outpatient visits and for specific procedures. Clinical investigations were better coordinated. Personnel motivation resulted in a higher degree of team work, more focus on patient-related tasks and active participation in changing the hospital work environment. Productivity increased and the average cost of treatment per patient fell by 15% to 20%. These results are summarised in Exhibit 20.

Future Prospects

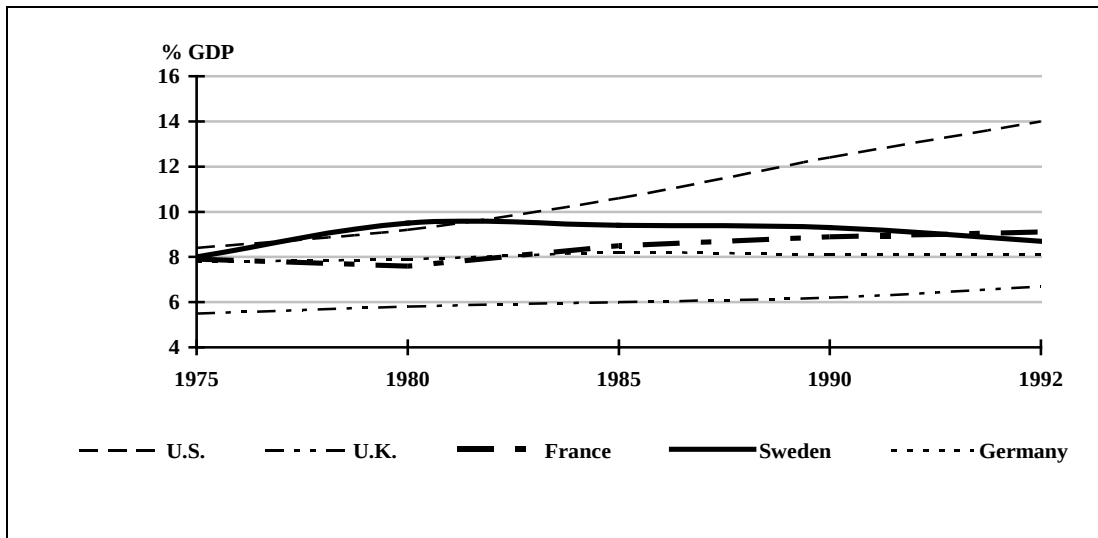
Many at Karolinska felt that, after having achieved remarkable improvement, they were losing momentum. Several problems remained unresolved; queues started to build up again. Divisions were still working independently. Cross fertilisation did not work as had been expected and some divisions were suspiciously observing the others' spectacular changes. The

process design did not solve the problem of patients who did not fit in the standard path; the optimisation of customised paths was never tackled seriously.

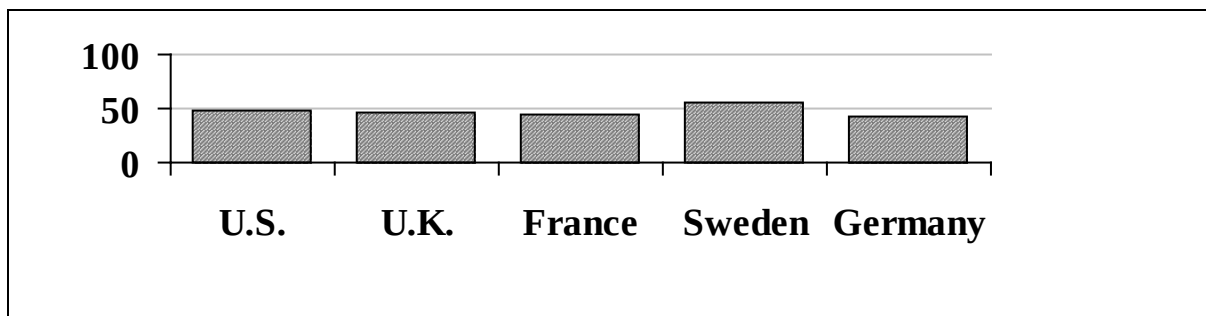
"Keeping the pace with continuous improvement will be the challenge for the future", said Pr Gillström. "People talk about the process change in the past as if it was finished, while now we have got a wonderful information system that enables us to identify bottlenecks, highlight the causes of inefficiency and determine the ideal mix of resources and personnel".

While doctors waited for a new CEO to be appointed, they wondered whether he or she would carry out the same strategy with the same enthusiasm. They also feared that the health authorities would use budget constraints to bring about ever greater efficiency and cost reductions. Most believed that beyond a certain limit, any additional budget cuts would result in decreasing both efficiency and performance.

Exhibit 1
Total Healthcare Expenditure as % of GDP



Hospital's Share of Total Healthcare Expenditure



Structure of the Hospital Sector

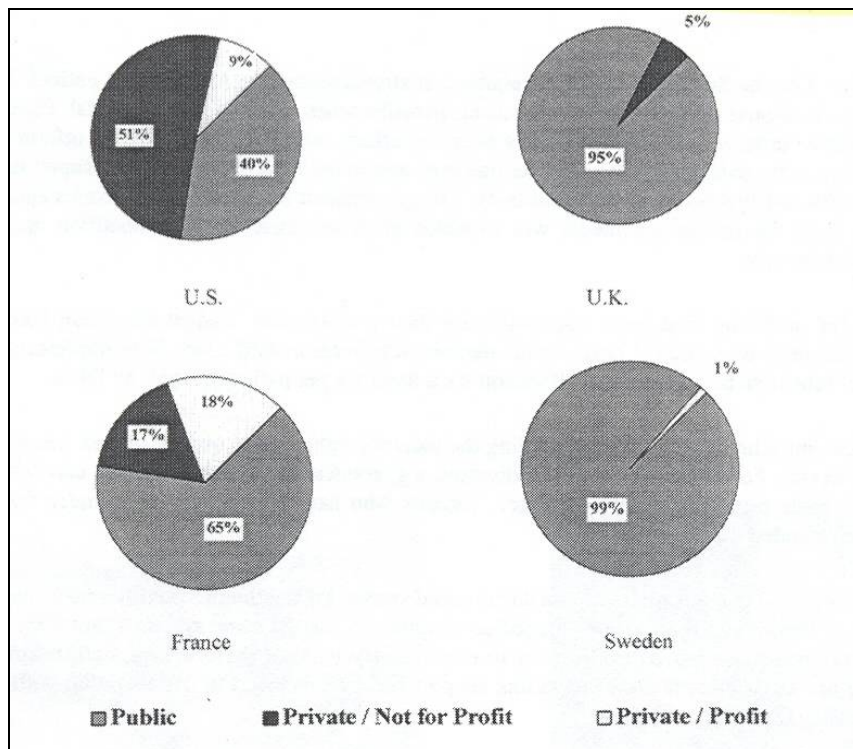


Exhibit 2

The Stockholm Model

In June 1991 the Stockholm county Council decided to implement the Stockholm Model:

- A new political management organization with
- A new distribution model with purchasers and producers
- And a new method of steering and distributing economic resources

The Stockholm Model is the logical consequence of a development that has been in progress for a number of years and that has aimed at strengthening the status of the patient.

Previously the County Council had already taken decisions about increased freedom of choice for patients, that is to say the right to choose a medical care centre, family doctor and the specialist clinic to which they wished to be referred.

Now the Stockholm Model creates prerequisites for improved care and better cooperation within the care-chain.



Better quality care

When patients utilize their freedom of choice, medical care centres and clinics will have to compete with good quality medical care and nursing, increased accessibility, short queues and good post-hospital treatment. Work with quality assurance is introduced on all levels within the care sector.

Care continuity

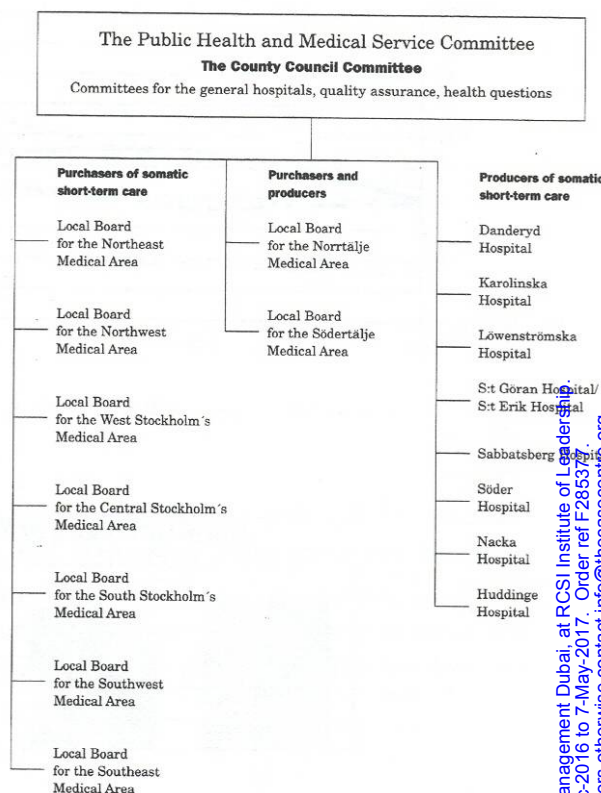
Each patient is provided with a family doctor who has overall responsibility for the patients' health. Co-operation Agreements between clinics and primary care give cooperation for the sake of the patients' health a concrete form.

Increased accessibility

Primary care is reorganized and provided with more doctors. The target is one doctor per 2,000 inhabitants.

Improved public health

Public Health Contracts stimulate primary care to concentrate on preventive measures.



Most of the changes introduced by the Stockholm model were aimed at strengthening the status of the patient. The patient was given the freedom to choose a family doctor, a medical specialist when required and a hospital. Patients - and doctors - needed objective criteria in order to choose a hospital; efforts were therefore made to inform the public. Hospital activity reports were published in the medical literature and in the local press under the supervision of the National Board of Health and Welfare, a government body. The government introduced no measures against bad performance. Pressure from the public and media was expected to drive constructive competition among hospitals and result in better treatment.

Hospitals were given financial autonomy and made responsible for their performance. Budget allocation was no longer arbitrary but rather calculated on a DRG⁹ basis for the number of patients treated. Once fully implemented, the Stockholm Model would substitute hospital budget allocation for a fixed fee per patient treated, by DRG.

The Stockholm model had also introduced new values regarding the patient's rights; good quality of care became a right - instead of a tradable service. For certain categories of diseases, a guarantee for receiving medical care within three months had become a basic requirement. By legislation, patients who had to wait over 30 minutes for an appointment could ask to be refunded immediately.

The Stockholm Model also suggested that hospitals adopt a documented system for continuous quality improvement (CQI). The National Board of Health and Welfare encouraged all hospitals to use the same system - ISO 9004¹⁰ - to make it easier to compare results and outcomes. In order to continuously monitor performance, both hospitals and community care had to use an Automatic Data Processing support (ADP) developed in collaboration with the County Council Data Processing Centre.

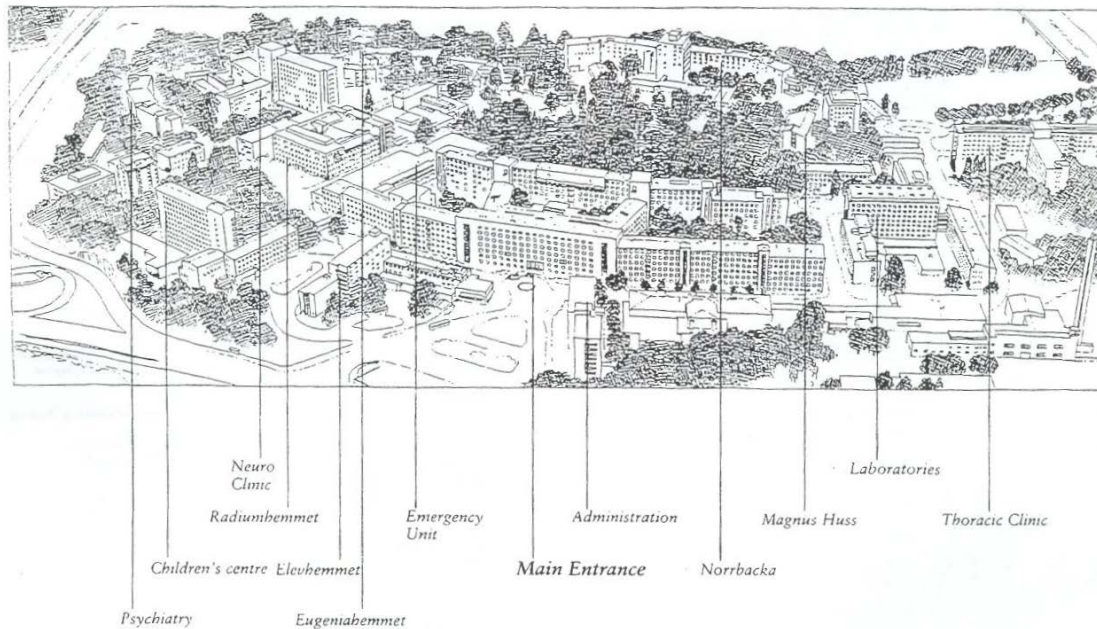
Source: Stockholm's Läns Landsting.

9 DRG (Diagnosis Related Groups) is a classification of patients by groups of diseases, taking into account the risk factors and the median treatment. In 1994, the Stockholm Model referred to 700 DRG codes for adults and 794 for children.

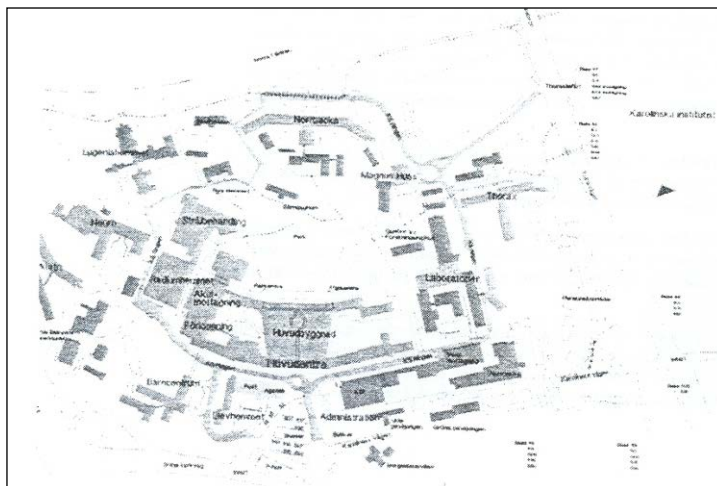
10 ISO 9004 is the norm set by the International Organisation for Standardisation regarding quality in services.

Exhibit 3

Architectural Map of Karolinska Hospital



KAROLINSKA SJUKHUSET



Source: Karolinska Sjukhuset.

Built in 1932 by the architect Carl Westman, Karolinska was conceived to maximise contact with the surrounding environment. Limits between departments were not strictly defined in order to give the whole building enough flexibility to allow future extension.

Patient's comfort was a priority; Buildings are thin in order to give all rooms access to natural daylight. None of the patient's rooms is oriented to the north.

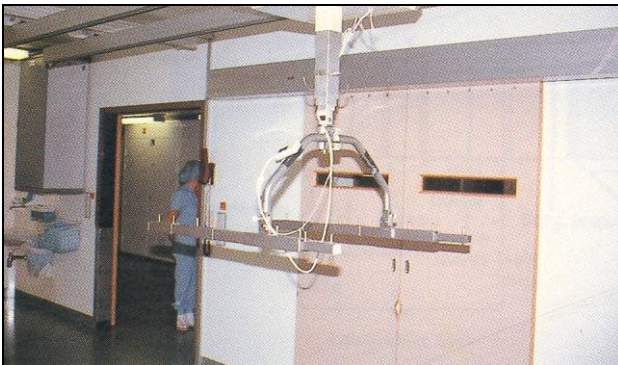
Exhibit 3 (Continued)



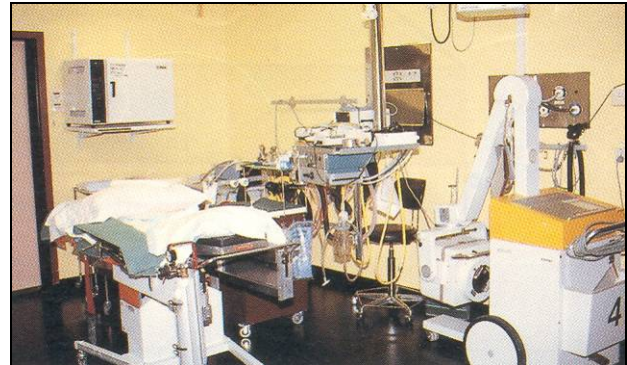
The main entrance: visitors are given maps of the hospital



The central operating theatre: operating tables on wheels



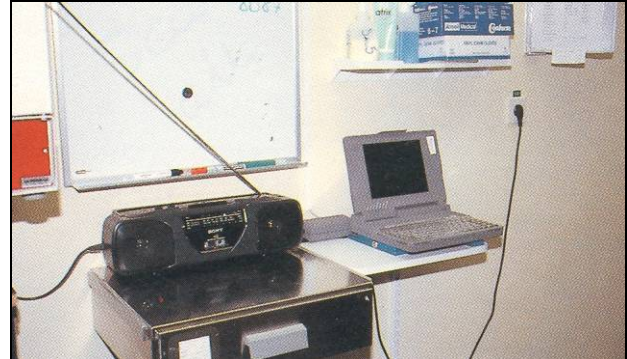
The electric machine used to lift patients from their bed onto the operating table



The emergency operating room: all the necessary equipment is at the patient's side, even the X-ray machine



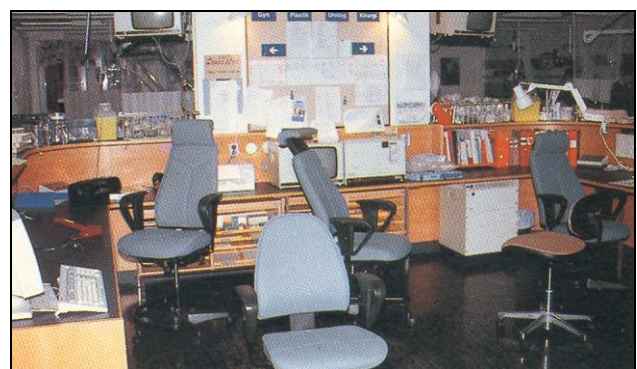
A standard operating room has not only the best technical equipment



.... but also a computer terminal and ... music



The paediatric operating room decorated with familiar cartoons



The recovery room: a central observation desk, with monitors and computer terminals, offers a direct view on all patients

Exhibit 4
Karolinska Hospital – Organisation Chart

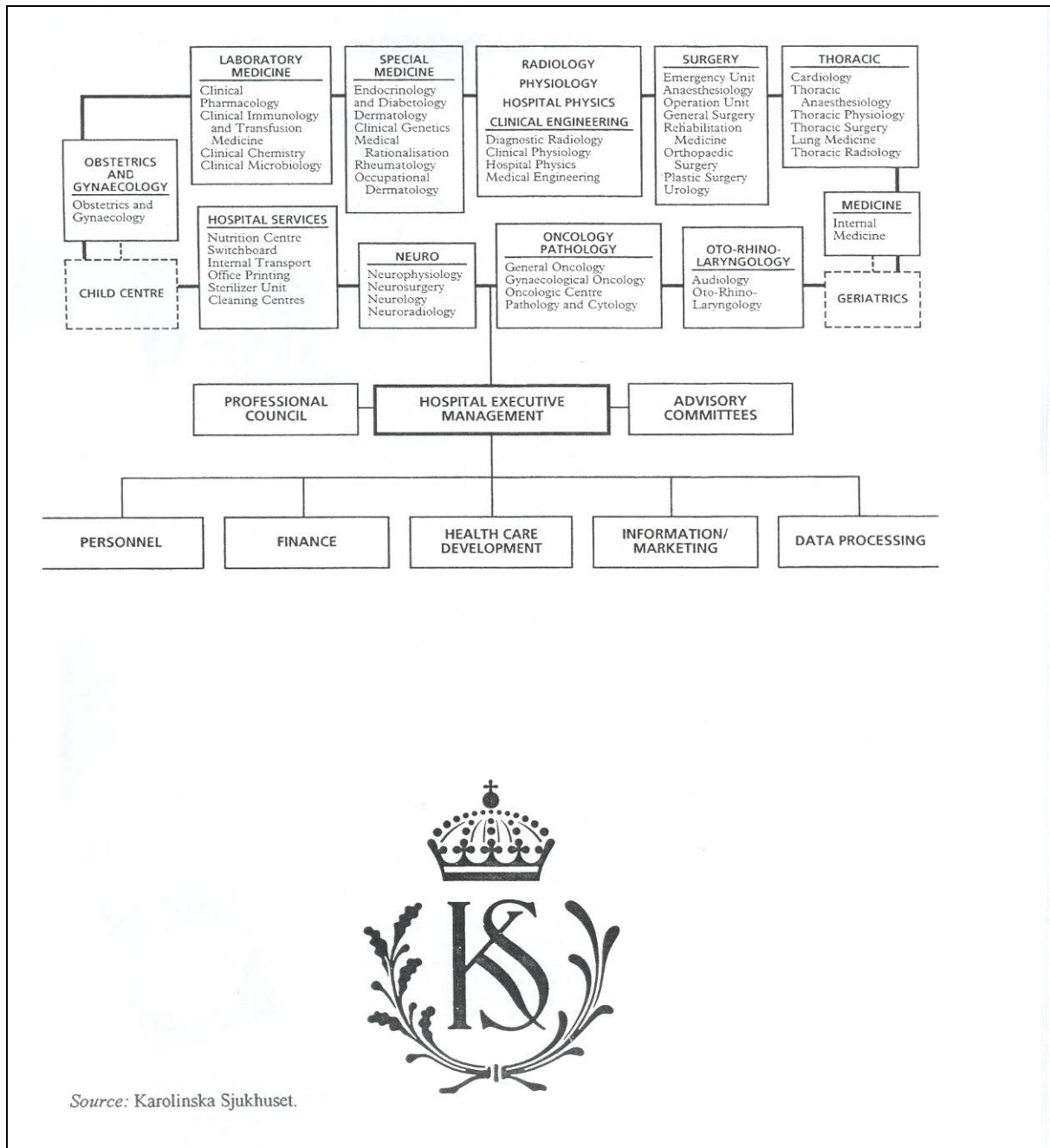


Exhibit 5

Brochure Distributed by the Stockholm Health Authorities at Karolinska Hospital

QUALITY IS A RIGHT

As a patient, you are entitled to high quality treatment and care carried out by knowledgeable and authorised staff. Even the way in which you are treated should have a high quality rating.

For example, if you have made an appointment in advance you should not need to sit in the waiting room for a long time. If you have to wait longer than half an hour after the time of your appointment, you are entitled to have your patient's fee returned to you. This does not apply, however, in the case of an emergency visit to a medical care centre or hospital casualty department.

In an emergency it is sometimes better to contact your GP (general practitioner = husläkare) or medical centre instead of going direct to a hospital casualty department. Further information about this can be found in the brochure "Rätt Väg till Vård" which is available from hospitals and medical care centres.

High quality treatment should meet the patient at all times, for example, from when he/she is admitted to a casualty department, transferred to a hospital ward, until he/she is being rehabilitated and for later check-ups. High quality treatment means that a transfer from one kind of medical care to another takes place as smoothly as possible.

Source: Karolinska Sjukhuset.

FOCUSING ON THE PATIENT



YOUR RIGHTS AS A PATIENT

MEDICAL CARE GUARANTEE

A guarantee of medical care means that no patient has to wait longer than three months for certain kinds of operation. If the waiting time at the hospital of your choice is expected to be more than three months, the hospital is then responsible for seeing that you are operated on at another hospital within three months. In such cases the patient's travelling expenses are paid by the County Council.

At present (1993) a medical care guarantee is given, following consultation with specialists, for coronary diseases and operations for hip/knee joints, cataract, gallstone, inguinal hernia, benign enlargement of the prostate gland, uterine prolapse and incontinence in women. It is also valid for the testing of hearing aids.



This brochure has been translated from Swedish into English, Finnish and Spanish and is also on a cassette for use by people with impaired vision.

Further copies may be obtained from
HSN, koncernstaben, kontorservice,
Tel: 08-737 25 00.

Source: Karolinska Sjukhuset

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Exhibit 6



KAROLINSKA SJUKHUSET

Radio Karolinska

'ar dag på Radio Q, 104,7



Source: Karolinska Sjukhuset.

Examples of Broadcast Programmes

Allergy - the expanding disease. In Some 2 million Swedes suffer from allergy and asthma, and the number is growing. More and more people are concerned.

Dr Olle Zetterström, lung medical clinic at KS

Skin Cancer - easy to get but easy to avoid
Skin cancer is the fastest-spreading type of cancer. You can avoid it simply by protecting yourself.

Chief Head Dr Ulrik Ringborg, the clinic of general oncology at KS.

We sleep too little!

There are too many "Thieves of Sleep" in our society. Our biological clock has little chance against TV-sport programmes from other time zones.

Head Dr Charlotte Sachs, neurology clinic at KS.

Sun, summer and headless jumps

Clas Hultling, former anaesthetic doctor, dived into ground water and became paralysed. From his wheel chair he is now running a project for victims of spinal injury.

Dr Clas Hultling, Solbergaprojektet for the spinally-injured.

Ring directly and ask!

RK broadcasts a live programme. All are welcome; Give us a ring, ask questions and share your point of view.

Listen to the radio regularly so you do not miss our next programme.

Exhibit 7
Example of Activity Report – The Case of Inguinal Hernia

	Day Surgery	Ward 1	Ward 2	Ward 3
Age (average)	50	67	68	64
<i>Days (median values)</i>				
Referral to Outpatient visit	31	112	84	58
Outpatient visit to Admission	18	83	54	80
In-hospital Stay	0	3.5	2	1
<i>Clinical Investigations</i>				
Electro-Cardiogramme	16 %	80 %	73 %	60 %
Chest X-Ray	0 %	30 %	45 %	40 %
Pre-anaesthesiology visit	0 %	90 %	91 %	100 %
Share of Patients with completed investigations	100 %	10 %	36 %	80 %
Share of Cancelled Operations	0 %	14.8 %	17.5 %	3 %
Number of Doctors Treating the Patient	1	3	3	4
Share of Referring Doctors Getting Feedback from Karolinska Hospital	69 %	70 %	27 %	100 %

Source: Karolinska Sjukhuset.

Exhibit 8 Major Changes in the Budgeting System

Until 1991, the County Council distributed the funds collected from public taxation between community medicine and public hospitals. Each hospital got a budget proportional to the perceived importance of its activity.

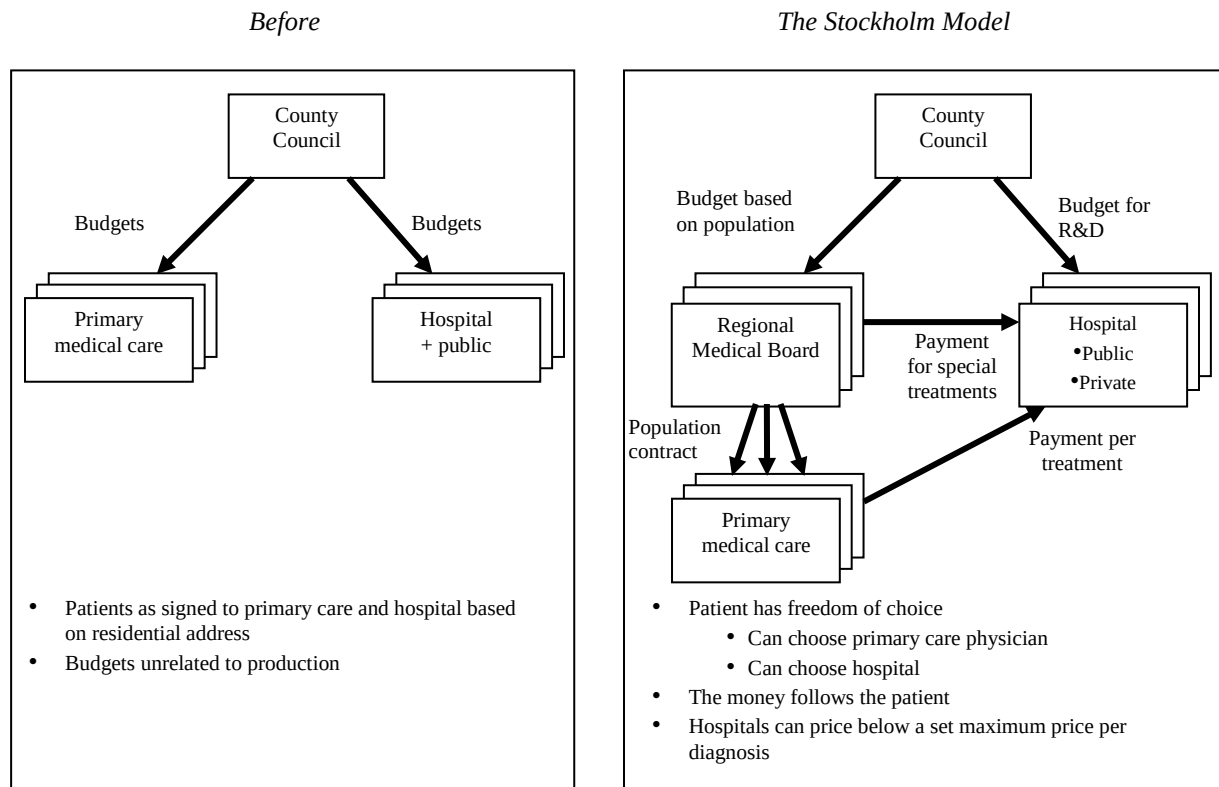
The new system required each division to submit a budget estimate reflecting its case-mix (cost of treatment estimated on a DRG basis). The hospital added-up the estimates and made a total budget request. Since there were not enough public funds to cover all the requests, hospitals received only part of their budget and were always in the red.

In the future, the Stockholm Model will establish a direct payment of a fixed fee (calculated on a DRG basis), for each patient treated.

The patient's direct contribution will not change; 80SEK per day.

THE STOCKHOLM MODEL WAS INTRODUCED IN 1992

A radical change to the health care system



Source: The Boston Consulting Group – Stockholm.

Exhibit 9

DySSSy

DySSSy (Dynamic Standard Setting System) is a quality improvement method based on the traditional three steps for quality management: measure, plan, act. It was described by Kitson in "A framework for Quality" in 1989 as a series of steps to follow:

- 1- A group identifies a number of problems or fields of interest for quality improvement.
- 2- One of the problems is chosen by the group and defined as precisely as possible.
- 3- Objectives are clearly formulated.
- 4- The group defines criteria to determine the resources needed, the actions to be taken, and the results to expect.
- 5- Standards are defined reflecting the objectives as well as the indicators of quality.
- 6- The group sets an "achieve date" and a date for reviewing the standards.
- 7- Standards are filed in a central index system by content, action, field, etc. and measurement of quality starts.
- 8- If the standards defined previously are met the group chooses another problem and the process starts again.

Source: Karolinska Sjukhuset.

Exhibit 10

Excerpts from Karolinska's Q. I. Project Catalogue

Telephone service

Improvement of the paging system in order to reach a larger number of people and make it more user-friendly with direct access from any telephone terminal.

E.N.T.

- 1) Training given by nurses to doctors, nutritionists, dentists, psychologists, patients' relatives and priests (10 sessions), in order to improve knowledge and understanding of E.N.T.-disabled patients and get patient's relatives more involved in the care process.
- 2) Development of a network in order to help E.N.T.-disabled patients to exchange thoughts and feelings.

Oncology

Information brochure to inform patients about radiotherapy and give them a better understanding of this treatment.

Nutrition

A documentation system that helps nurses selecting menus for their patients. The document includes a list of food and beverages with the corresponding contents and energy-equivalents.

Ob-Gyn

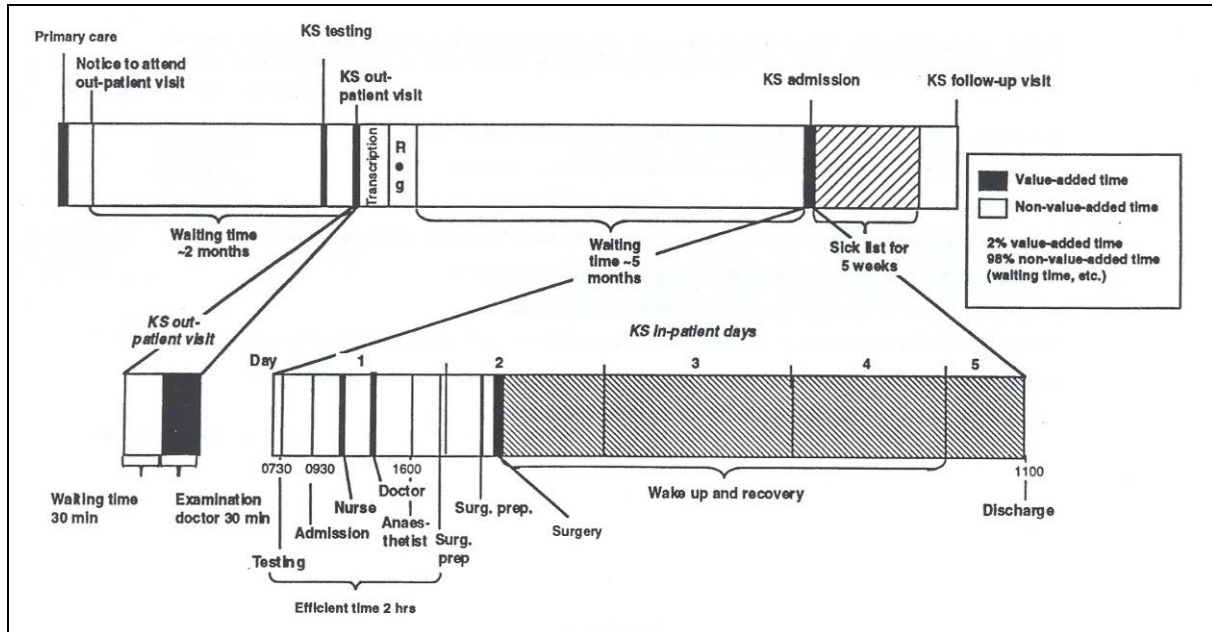
Information about the obstetrics department made available to future parents, who could ask for a guided visit of the department with a midwife or a nurse.

Reception

Definition of standard procedures for the reception of emergency cases. Routine protocols for interviewing the patient, providing care, as well as target objectives for results. The patient should be taken care of as soon as possible and informed about the expected waiting time.

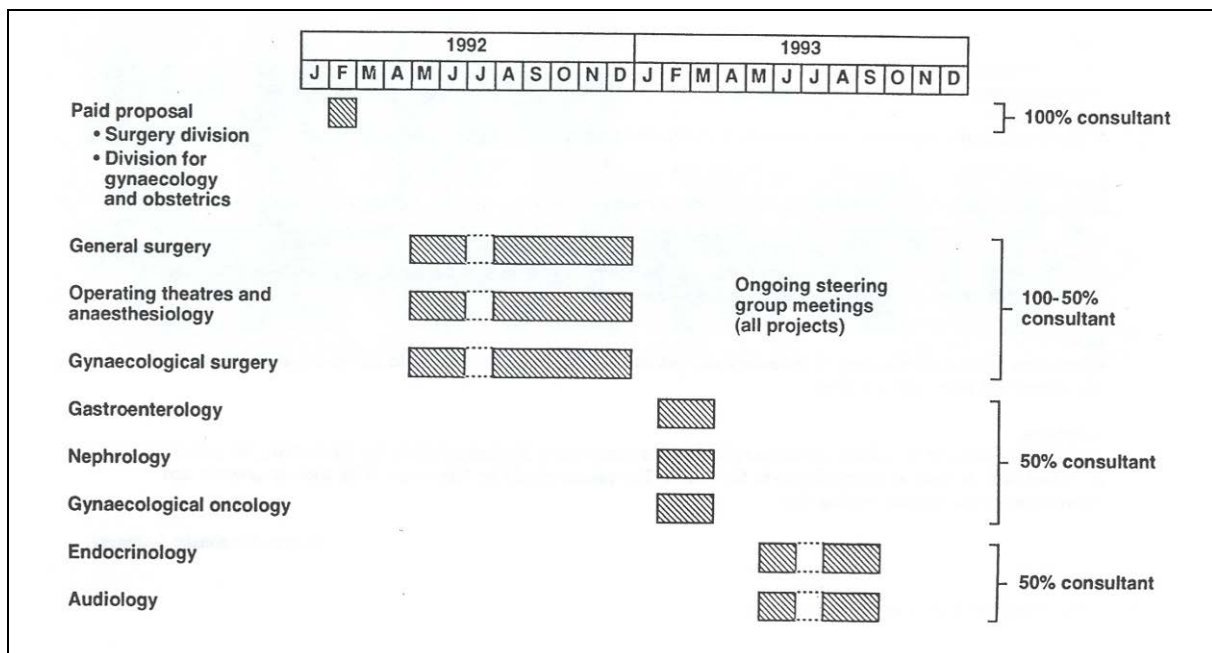
Source: Karolinska Sjukhuset.

Exhibit 11
*Macro and Micro Mapping of the Treatment
of a Patient Referred for an Enlarged Prostate Gland*



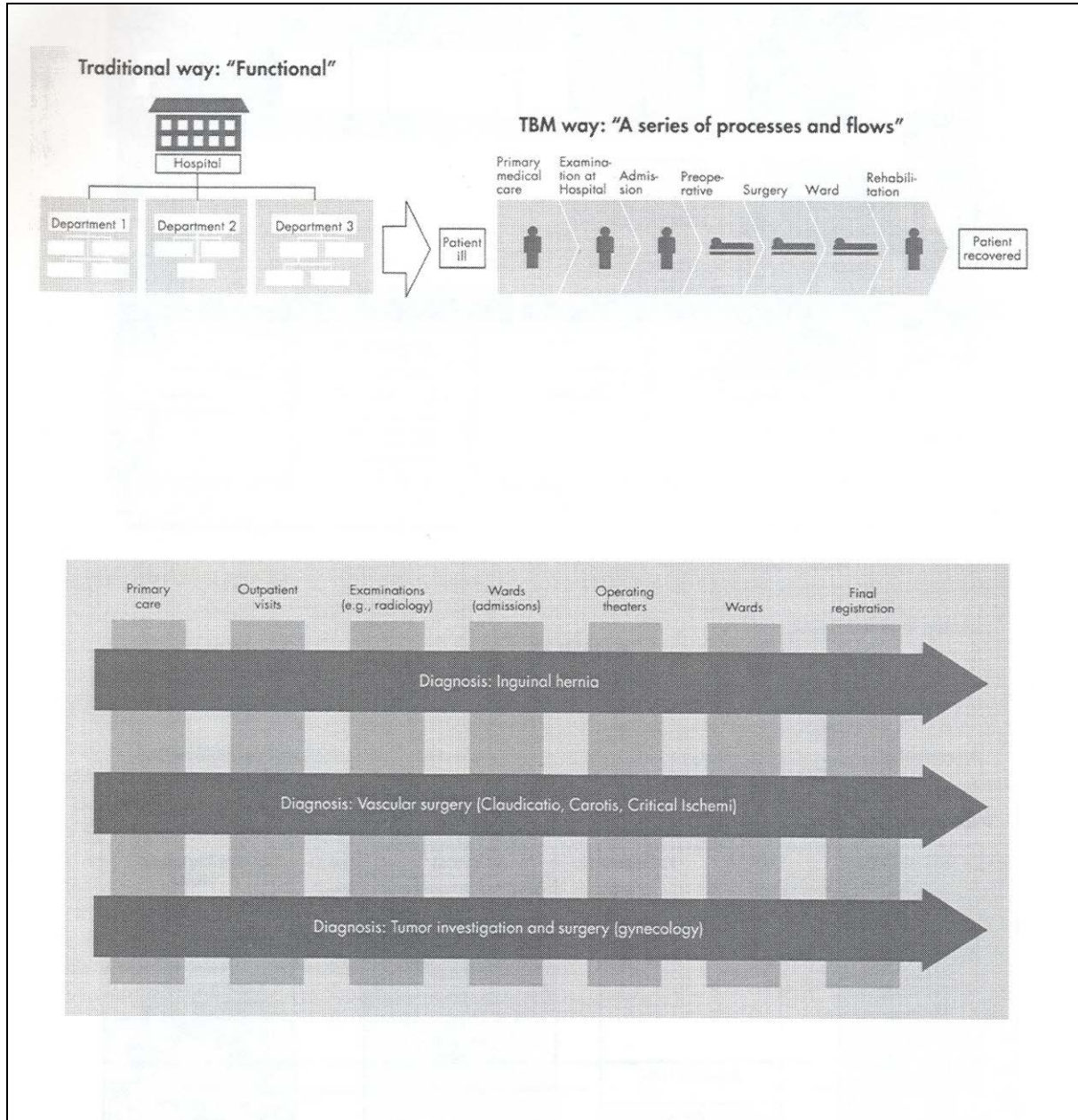
Source: The Boston Consulting Group - Stockholm.

Exhibit 12
Implementation Schedule



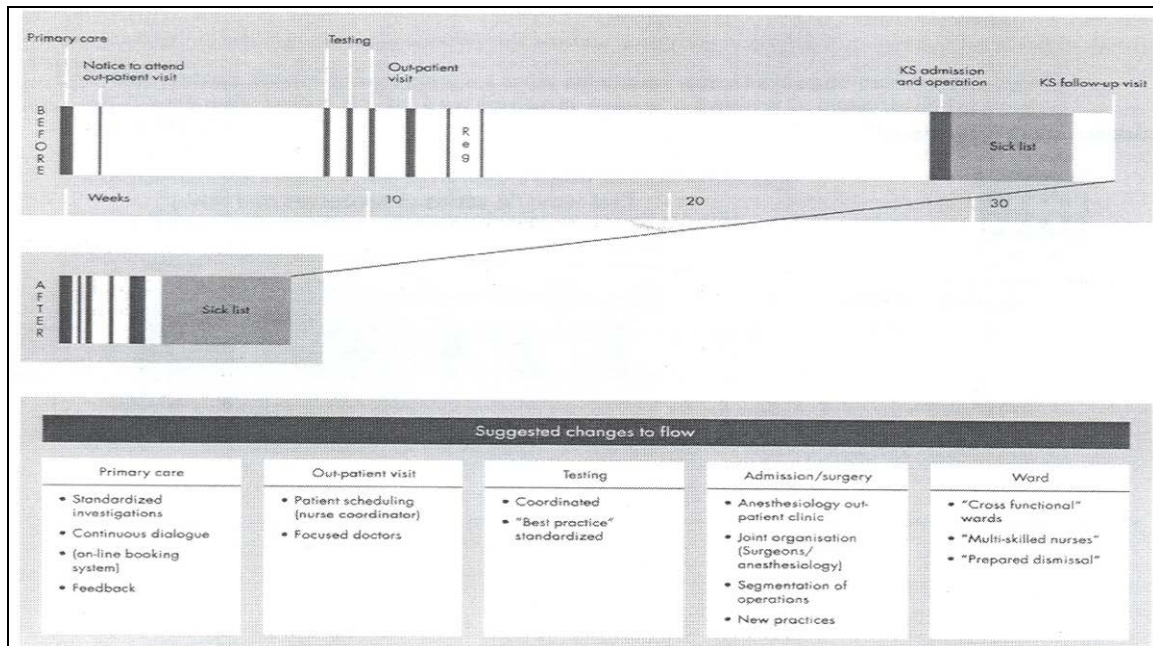
Source: The Boston Consulting Group – Stockholm.

Exhibit 13
Change from Functional Structure to Process Flow



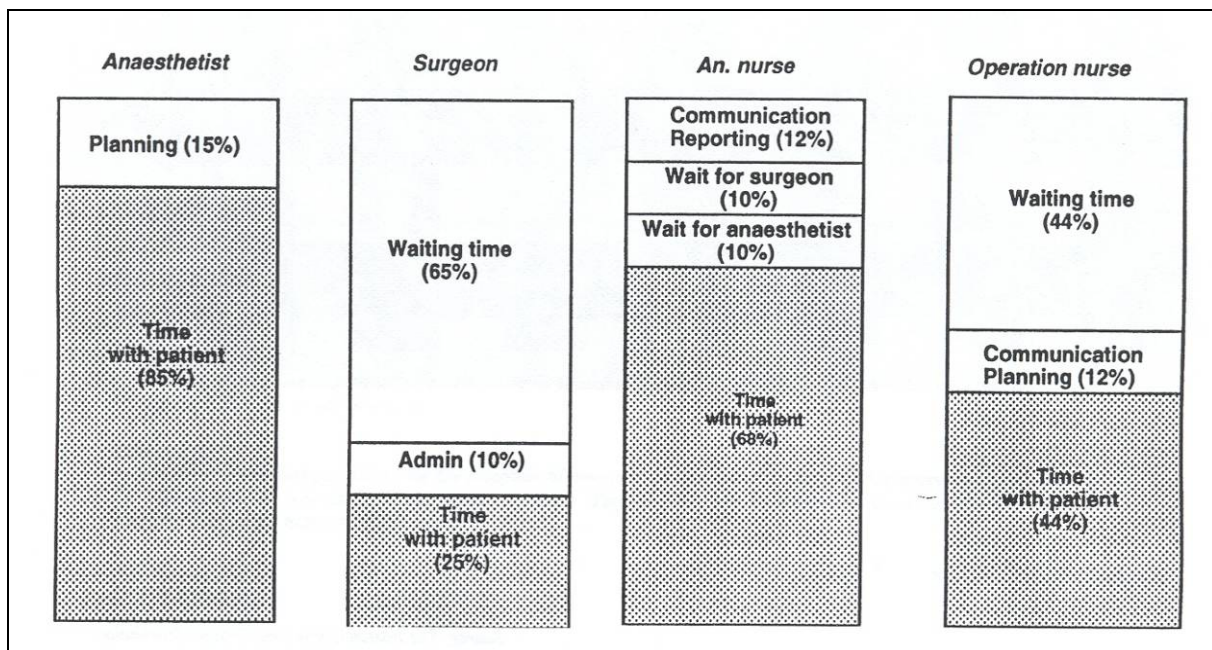
Source: The Boston Consulting Group - Stockholm.

Exhibit 14
Wasted Time is Cut by 75% after Process Change



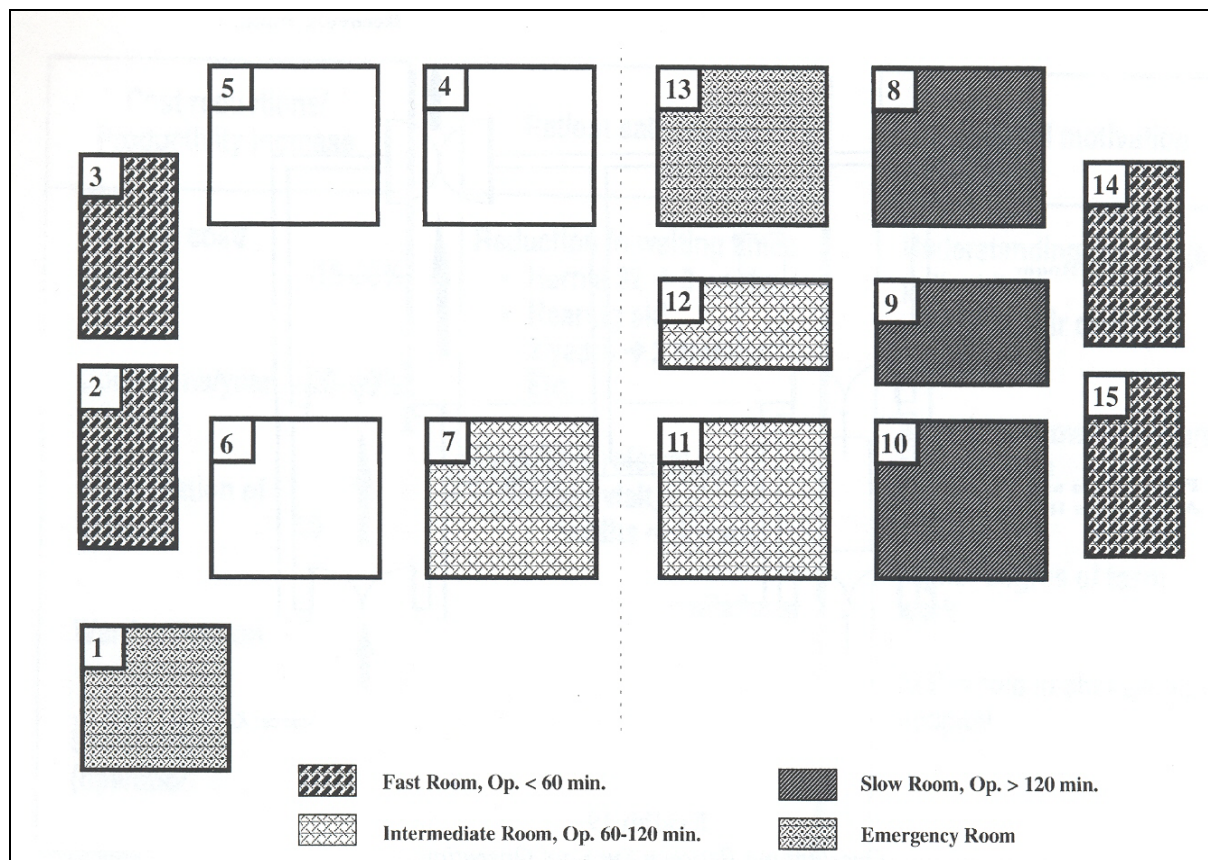
Source: The Boston Consulting Group – Stockholm.

Exhibit 15
Time Utilisation of Operating Room Personnel



Source: The Boston Consulting Group - Stockholm.

Exhibit 16
New Segmentation of the Operating Rooms



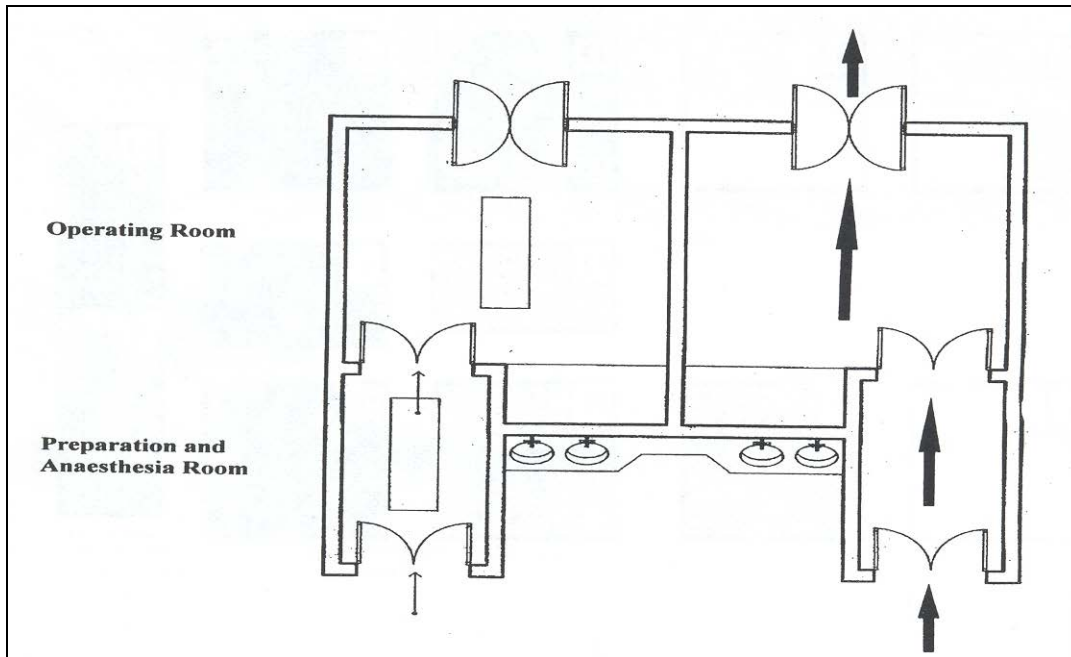
Source: Karolinska Sjukhuset.

Exhibit 17
Personnel Mix in the Operating Theatres
Before After OR Segmentation

	Each Room		Fast Room	Intermediate Room	Slow Room	Emergency Room
Personnal/OR			Op.<60 min.	Op.60-120 min.	Op.>120 min.	N.A.
Anaesthesiologists	0.3		0.5	0.5	1	1
Anesth. Nurses	1		2	1.5	1	1
Operat. Nurses	1		1.3	2	2	2
Porters	1		1	0	0	0

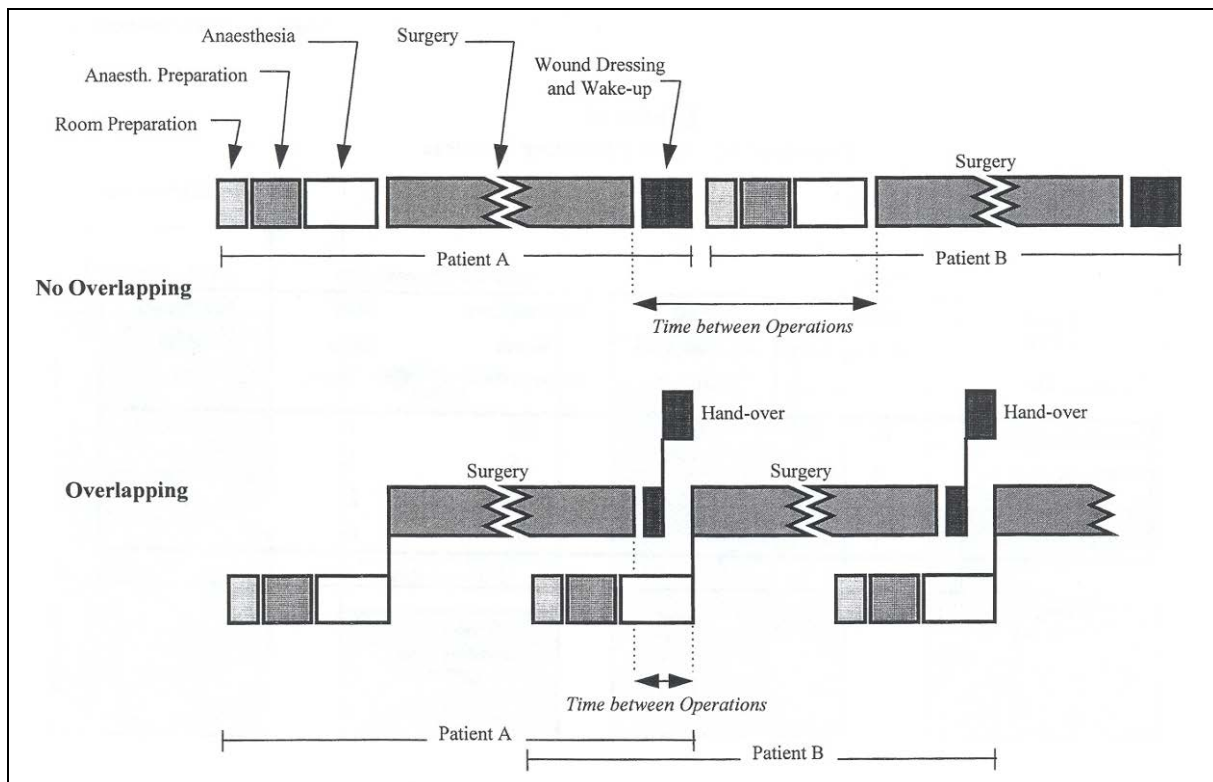
Source: The Boston Consulting Group – Stockholm.

Exhibit 18
The Anaesthesia and Preparation Room



Source: Karolinska Sjukhuset.

Exhibit 19
Overlapping Between Surgical Operations



Source: The Boston Consulting Group - Stockholm.

Exhibit 20
Overall Results

Cost reductions/ Productivity increase		Patient satisfaction		Personnel motivation
Average cost/ Episode -15-30 %		Reduction in waiting times • Hernia 32 -> 3 weeks • Heating aid 2 years -> 2 months • Etc.		Understanding the whole patient flow • And their own role within
Operations/year +20-30 %		Time from referral to outpatient visit • 3 months -> 1 week		More focus toward patient related tasks Higher degree of team work
Coordination of Tests 20->80 %		Reduction in waiting times • 12 % -> 3 %		Active role in changing the hospital
Ward utilization 80->95 %		Coordination of tests • 20 % -> 80 %		
Switching times 59 min (operations) ->30 min				

Source: Karolinska Sjukhuset.