Development and use of an indicator system for an addiction treatment center

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Abstract
The objective of this project was to develop and implement an indicator system, which delivered concise, specific and relevant information for the managers of the treatment departments. The project was carried out in The Jellinek Center, a treatment service for addiction in Amsterdam, The Netherlands. During a period of ten years the indicator system called Profile Package was developed and implemented in all departments. The results of the project are: a system and an infrastructure for producing a Profile Package for each team every quarter. The departments use five critical indicators and each department has added about 40 indicators to meet their needs. On the basis of the indicators the performance of the team can be monitored. An annual reviewing cycle and goal-finding procedure is established, which stimulates a results-orientation. The trend of the five critical indicators over a number of years shows that the results of the departments, working with the system, are positive.

Emerald

Introduction

There is a growing emphasis on results and performance of health-care organizations. One early pioneer in this field was Ernst Codman, who in 1920 established the term "The End Result Clinic" (Joint Commission, 1996). He proposed that the results of a clinic should be monitored and analyzed in order to improve the work of the professionals and the processes of the organization as a whole.

It took many years before the ideas of Codman (1996) were taken seriously. Since 1990 studies on performance indicators and improvement strategies of hospitals mostly related to conceptual and technical topics (Shaw, 1997; Aveyard, 1997). Some describe pilot projects of hospitals (Turpin et al., 1996; Garnik et al., 1994) or give examples of improving ambulatory care (Norman, 1995). The well-known Maryland Indicator Project (1992) is the only project in which the idea of Codman (1996) is systematically followed through on a broader scale. The publications on the Maryland Indicator Project are limited and mostly related to technical and organizational problems (Kazandijan et al., 1996). Also the experiences with the nation-wide indicator systems of the Joint Commission (JCHA, 1996), IMSL and ORYX, are not yet widely published. Besides those large projects we found a few experiments with indicator systems carried out by small organizations (Sorensen et al., 1987). These projects focused on simple indicator systems for treatment departments (Colson, 1994; van Es, 1995). One of these indicator projects was called the Profile Packet (Nabitz, 1996) of The Jellinek Center in Amsterdam, The Netherlands.

Objective

When The Jellinek Center started with the indicator project, the following goal was formulated – to develop and implement an indicator system, which could deliver concise but relevant information to support results-oriented management of the departments. The top management of The Jellinek also requested that reporting should be frequent, the statistics easy to understand and based on existing information systems.

Setting

The Jellinek Center is a treatment service specializing in people with addiction problems. Every year 5,000 patients are treated by a staff of 500 professionals. There are 15 services, ranging from prevention and counseling departments through to out-patient and detoxification programs and therapeutic communities. The annual budget of The Jellinek is about 25 million Euro (The Jellinek Center, 1998). The top management of The Jellinek Center has, like many health-care organizations, delegated much responsibility and authority to its clinical departments. That means that the managers of these departments are both result- and resource-responsible. Responsibility and authority can only be effective if relevant and objective information is available. Therefore an indicator system was needed.
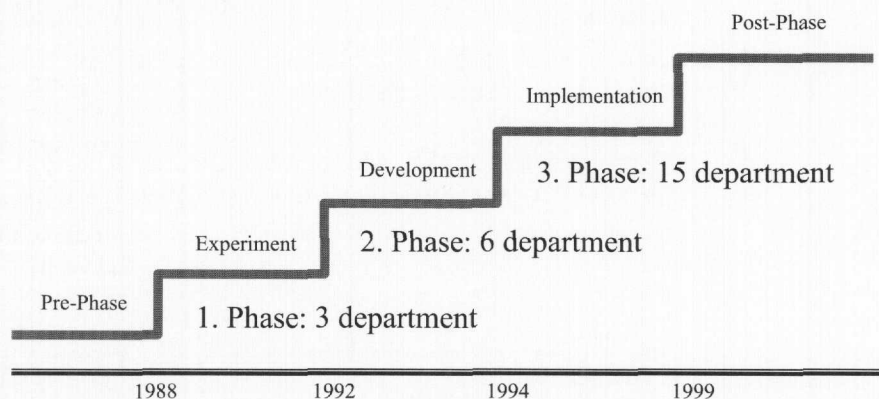
Approach and results

Phases and project organization
The project was carried out in three phases (see Figure 1). In the first phase we started several experiments to test the prototype and our approach. We limited ourselves to three

Figure 1
Project phases

departments. In the second phase we developed an electronic data-processing system and used it for the data processing for six departments and in the third phase we introduced the tested indicator system in all the departments of The Jellinek Center.

A small team was in charge of the project and remained consistent over time. The members had worked in The Jellinek Center in a number of areas such as system management, research, administrative management and patient care. The team had the full support of both the top management and the management of the departments. The commitment of both top and departmental management in addition to clear project management and solid planning proved to be very important aspects for the success of the project. During some phases a data manager, an external consultant and a software firm supported the team.

Experimental phase

Information infrastructure and process model

In 1989 The Jellinek Center conducted a study to specify the mission and clarify the functions, processes and infrastructure of the treatment center. One of the results of this study was a conceptual process model with a distinction in primary processes, support processes and steering processes. Another result was the architecture for the information systems and the databases (Verkooyen, 1993).

This process model in combination with the detailed architecture for the information systems and the databases became the back-bone of the indicator system. The architecture for the information system gave stability throughout the different organizational changes and was used as a blueprint to set up a computer network, to start new patient registration systems, personnel and financial systems.

Specifying indicators for three departments

In order to specify indicators we held interviews with the departmental managers to gain an insight into their informational needs. We limited the interviews to three departments, which were well organized and had a substantial turnover of patients. The managers explained that they wanted productivity figures, statistics on the target groups and results and figures on personnel and costs. In other words, they wanted to see integrated information that included indicators over input, process, output and resources, which were specific to their own department. Above all, they wanted limited, relevant, reliable and readable information with a standardized layout and delivered at predefined intervals. They were very clear that all the information had to be retrieved from the databases already available and that introducing a new information system would not be acceptable.

We analyzed their needs in the light of the existing information systems of The Jellinek Center. Our analysis showed that the information systems and the databases were structured and set up to answer the needs of the departmental management but only a few of the data were available via the databases. Therefore we started an improvement project for the data administration and data-entry, which lasted several years. Although we knew that data in this phase of the project would be incomplete and not reliable, we defined an ideal set of 43 indicators (see Table I). We knew that we only had reliable data for 20 indicators available, but through the data improvement project we expected that the availability and reliability of the data would increase appropriately.

Table I
Definition of 43 indicators

Category	Indicator	Number
Admission	Total admission	1
	Short admission	2
	Long admission	3
Referral	Internal referral	4
	External referral	5
	No referral	6
Target group	Regional percentage	7
	Percentage women	8
	Percentage non-Dutch	9
Substance abuse	Alcohol	10
	Drugs	11
	Medicine	12
	Gambling	13
	Combination	14
Treatment results	Total discharge	15
	Regular discharge	16
	Number of drop-out	17
	Disciplinary discharge	18
	Percentage not regular discharge	19
Short admission	Number of discharge	20
	Time in program	21
Long admission	Number of discharge	22
	Time in program	23
Referral	Internal referral	24
	External referral	25
	No referral	26
Productivity	Bed occupied	27
	Percentage occupation	28
	Absentees – days	29
	Percentage absentees	30
Services	Counseling	31
	Advice	32
Personnel	Number of staff	33
	Contract days	34
	Staff turnover	35
	Sick-leaves	36
	Sick-leave days	37
	Percentage sick-leaves	38
Costs	Medicine	39
	Household material	40
	Other material expenses	41
	Personnel	42
	Total costs	43

Prototype

On the basis of the needs of the departmental management and their specified indicators we prepared a prototype for a report for one department. That prototype was a data sheet with 43 indicators on the vertical axis. Through the interview that we had carried out with the departmental managers we knew that they wanted to receive well-structured information on a quarterly basis. Therefore we grouped the indicators into admission, referral, target group, process, output and resources and introduced a standard timeframe of three months. We discussed the layout with the departmental managers, adjusted the prototype and called it a Profile Package (Donker, 1984). The prototype was a two-dimensional sheet with indicators on the vertical axis and on the horizontal axis five calendar quarters and cumulative annual results.

We used this format to develop spreadsheets and began to report to three departments on a quarterly basis (Nabitz et al., 1984). We discussed each report with the managers thoroughly. During the whole project of ten years we followed a consistent protocol in that each quarter a Profile Package was delivered and discussed with the departmental management. The discussions with the departmental managers were very informative and helpful for the managers and the project team. Next to the quarterly discussions we introduced an annual review of the indicators. This meant that the indicators remained stable for one year but could be redefined for the following year. That gave us stability and flexibility. There was also a report to the top management of The Jellinek in an aggregated format. The agreement was made that during the experimental phase no sanctions or rewards from the top management would be given, because the data were not yet reliable and because the project was still in the pilot phase. When other Dutch addiction treatment services heard about our experiences of the first phase they became very interested. Therefore we organized a conference and presented the indicator set and the prototype of the Profile Package (Nabitz et al., 1993a).

Lessons learned

We learned that a stable technical infrastructure is necessary from the very beginning. During the whole project the infrastructure was the back-bone of the indicator system. Next we managed to keep the project small and did not get lost in technical, administrative and organizational problems. Therefore we had time to establish a dialogue with the teams. The use of a prototype of the Profile Package helped us to shape the expectations of management and made it clear what the reports would look like.

Development phase

Profile Packages for six departments

After our work with the prototype of the Profile Package with three departments we extended the project to include a further three departments. We realized that the spreadsheet format, which we used, was not the right tool for reporting 43 indicators in five different timeframes for the six departments, because we would have had to handle 1,290 data points each quarter, which could only be done safely by a database management system.

The documentation, registration and data entry had improved during the experimental phase, but only through constant attention and improvements. In this phase of the project we introduced a feedback and control mechanism to focus on the timeliness, reliability and validity of the data. New forms for the documentation and registration (Nabitz *et al.*, 1993b) were introduced and protocols for delivery and auditing made. Control figures were used in order to check all the steps of the data processing from documentation to report.

Development of PROFIS

Through our work with the six departments the complexity of the data management became evident. In order to solve the technical problems a software "house" was built to handle the interfaces, manage the data and calculate the indicators for the departments. The interfaces were up to that point manual interfaces, which meant that the data were delivered on paper or on floppy disk. This was not suitable and so the interfaces had to be automated.

Three functions had to be distinguished in the system. First the raw data had to be checked and stored in a source database. Second the data had to be recalculated according to specific rules in order to convert to indicator values. For example, the drop-out percentage was calculated from the number of drop-outs and the number of discharges on a monthly basis. Third, the indicators with the data values of each timeframe and each department had to be stored in a database to be able to produce a report quickly. The system, which was developed, was named PROFIS (see Figure 2).

Defining statistics

While developing the PROFIS system we experimented with certain weights and risk adjustments from the statistics. Our guiding principle was that the value of an indicator should be evident and not difficult to explain to the departmental managers. We eventually decided to use simple statistics such as counts, e.g. number of patients admitted in a

period, percentage sick-leave days, money spent, and number of days in treatment. We also added the precise definitions of all indicators on the back of the Profile Package, for example, "Short admission" – the number of patients admitted in the reporting period to the short treatment program of the department, "Sick-leave days" – the number of days of all sick staff members in the reporting period as defined by the Personnel Department.

Communication with the department management

While working on these technical issues we continued producing the Profile Package each quarter. We discussed each delivered Profile Package with the departmental managers, and collected their suggestions. During the talks with the management it became clear that the managers wanted to introduce performance goals for each indicator and wanted to calculate prognoses for each indicator. We considered those suggestions and during the annual review meeting developed a prototype for goals and prognoses.

During the development phase, the project became so complex that it exceeded the resources available to The Jellinek Center. The data management took more time than expected, the data processing appeared more complex and the departmental managers became more demanding, mainly because they saw the importance and relevance of the information they were receiving on a regular basis. At the same time there were other departments waiting to receive a Profile Package. We applied for a grant from a national program designed to stimulate medical information systems and received financial support for three years.

Lessons learned

We never delivered data to the departmental managers but we communicated their results in an active and creative way. That took time and patience but was the only way to understand the needs of the managers and motivate staff to use indicators. We could handle all the data of several departments by building a database management system, which interfaced with other database systems, handled the integrity of the data and produced speedy output.

Implementation phase

Changed environment

A major change of the organizational structure of the addiction treatment services in Amsterdam took place in 1994. New departments were added to The Jellinek Center and the departments were grouped

into divisions. Therefore the position and function of the Profile Package in the new organization had to be redefined. In a policy document (Nabitz, 1993), the responsibility and authority of the departmental managers concerning the results of the Profile Package were specified and aligned with the new structure.

Profile Packages for 15 departments

During the organizational changes the delivery of a Profile Package was possible because of the information system PROFIS, which was flexible enough to redefine the units and parameters to adapt the system to the new organizational structure. PROFIS also made it possible to increase the service from six to 15 departments and to produce three divisional Profile Packages. The data processing was efficient and fast. With the original spreadsheet application we needed several weeks to refresh the data and to deliver output, but with PROFIS the total production for the departments and the divisions took two days. Auditing the data from the information systems remained a time-consuming task, but after many talks with the system administrators the data were delivered within ten working days after the end of the reporting period, which was very often a very tight timescale. Eventually it was possible to deliver a Profile Packet for each department in the third week after the reporting period.

Deviation profile and Goalfinder

During the implementation all departmental managers of The Jellinek Center became familiar with the reporting format and began

to trust the information delivered to them. They started to feel comfortable with two years' data in their hands. The managers openly discussed the results in their teams and began to set goals. They started to discuss targets for their productivity, for their client groups and for their financial results. Once the targets were formulated, we were able to calculate the deviation from the target for each indicator and thus reflect positive or negative deviation in a figure, which we called the deviation profile. With a glance at the deviation profile one could see how close a department was to its targets (see Figure 3). In the beginning it was important that the top management did not impose targets but that the departmental managers first discussed them with their teams. Later the departmental managers used the information of their Profile Package for their quarterly report. In this way an effective bottom-up reporting system was established.

Soon after the targets were introduced and the deviation profile reported there was the need to align the targets of the different teams. We developed a method, which we called the Goalfinder. Once a year we asked all managers for a meeting in which they could compare and align their departmental target. A computer-driven overhead projection was used, which made it possible to align the targets of the individual departments to the goals of the division and The Jellinek Center as a whole. In the Goalfinder meetings all managers, top, division and departmental, were represented. The meetings became, next to the budget

Figure 2
Data interfaces and PROFIS
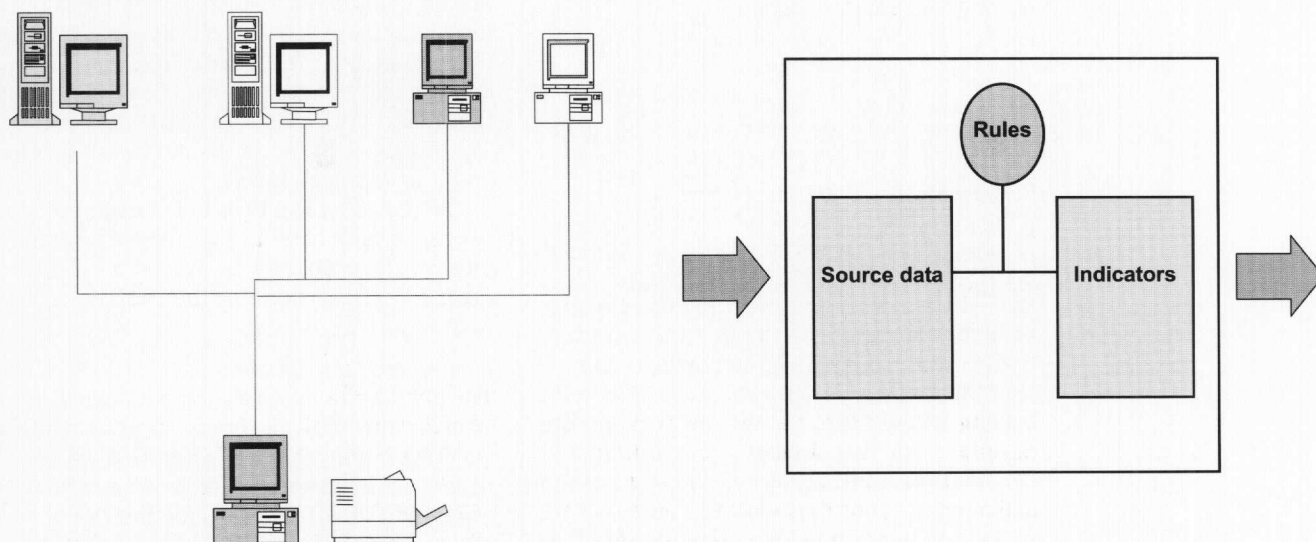
Figure 3
Deviation profile

Indicators	-100%	-50%	Goal	+50%	+100%
Admissions 1					
Short progr. 2					
Long progr. 3					
Internal referral 4					
External referral 5					
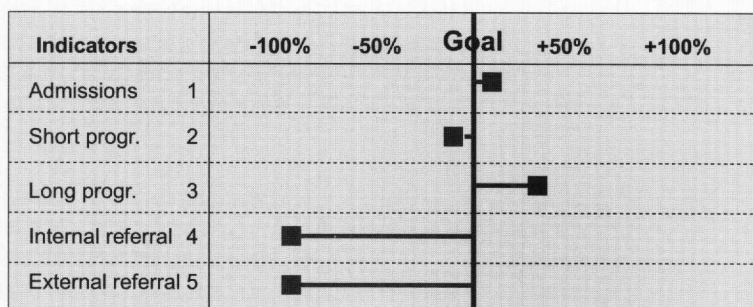
meetings, one of the most important annual meetings in The Jellinek Center.

Merging information systems and reviewing the approach
Fundamental changes to the information systems were introduced in The Jellinek Center in 1996. Four systems covering the primary care process of the clinics were replaced by one integral information system. Although the change-over took much longer than expected, we eventually could reduce the number of interfaces from eight to four, which was a big advantage for the production of the Profile Package.

After the successful migration to the new system and several years of experience with the indicator system we decided to undertake a fundamental review of our approach. First, we invited colleagues from other organizations to check our procedures and methods and asked for recommendations for improvements. These meetings were very constructive and brought forth many suggestions. One of these suggestions was to include data from non-automated databases, such as data from patient satisfaction surveys or data concerning the results of the clinical work. They also suggested that we further automate the data processing and move away from the paper output to an intranet site. Second, we developed a questionnaire and asked the 28 managers and staff members who received the Profile Package to evaluate it. The survey was anonymous in order to stimulate critical responses. Everybody responded and the answers gave us a good insight into the use and value of the Profile Package. The majority of the users were pleased with the indicator system and felt that the Profile Package was necessary for responsible and results-oriented management. The managers of the departments said that working with indicators was a good way to help them and their team to manage by facts and focus on targets. In the questionnaire we also asked the departmental managers to list the critical indicators. The following five indicators were selected: admission rate, productivity, drop-out, sick-leave of the personnel, and one financial parameter. These five indicators were to become the standard for all departments and a base for future benchmarking (see Table II).

Profile Package layout
The review of our approach resulted in an improved layout of the Profile Package. In Figure 4 the Profile Package of the Alcohol Clinic for Women department is shown. On the front page is the name of the manager of the department, the reporting period and the results for the five critical indicators. The results shown relate to the last quarter, the previous year's annual results, the current targets and the prognoses. On the front page there is also a short comment text. The second page of Figure 4 is the datasheet with five columns for the quarterly results and three columns with targets, prognoses and results of the previous year. The datasheet is different for the departments. Several departments have also added statistics on patient satisfaction and clinical effectiveness measurements. The back-side of the A3 contains all the definitions of the indicators that make interpretation of the data easy. The A4 sheet contains the deviation profile and a benchmark form.

The layout of the Profile Package has become standardized in the organization. Most of the reporting is aligned with the format and the layout of the Profile Package.

Example of improvements
The goal of the project was to deliver limited but relevant information to support results-oriented management. In Figure 5 we see these accumulated results for five critical indicators over five years for the Detox Alcohol department. We can see that the sick-leave of the staff was reduced by almost 70

per cent, the drop-out rate of the clients reduced by 40 per cent and the costs reduced by 30 per cent. At the same time the number of admissions increased by 10 per cent and occupied bed days increased slightly.

The improvements are evident, but for the teams the trends for the five critical indicators are more important. In Figure 6 we see on the x-axis the quarters over five years and on the y-axis the scale for the indicators. We can see that costs were reduced with some fluctuation.

The biggest fluctuation is shown in the sick-leave, where a peak in the first quarter of 1994 and 1995 can be seen. This type of trend information was very important for a team. They could relate their actions to their results. Whilst it exceeds the aim of this article to analyze the trend information in detail, it must be emphasised that quarterly feedback is necessary to provide an insight into the effects of management actions and is an important motivator for improvements in a team.

The trends shown for the department Detox Alcohol can also be shown for the clinics as a whole.

Lessons learned
When a team is familiar with the indicators and the reporting system, it is a logical step to define goals for each indicator. It is our experience that a procedure to set goals can be very challenging for a team despite having a trusted information system. However, it has to be carried out via a dialogue and the

Table II
Critical indicators

IMC Jellinek OM003	2nd qtr 1998	Results 1997	Goals 1998	Prognoses 1998
Critical indicators				
Admissions	19	96	120	85
Drop-out	8	11	18	19
Bed occupancy	1.478	5.973	5.850	5.932
Staff sick-leave (%)	12	8	10	12
Costs (F)	219.054	847.694	827.667	871.049

Figure 4
"Profile package"

goals have to be derived from the facts of the previous period. Furthermore, we learned that we had to focus on five critical indicators, which were consistent across all departments. Those indicators stimulated the teams to compare, benchmark and search for best practice. The most important lesson learned during the project was that the information feedback loop was transferable to other departments and organizations. The results over five years show that the performance of a department can improve when the managers are provided with reliable, timely and relevant data.

Conclusion

The introduction of an indicator system was a long process in a constantly changing environment. When we started we estimated that a period of three years would be sufficient, but it took us three times as long. The system, which we developed in The Jellinek is called Profile Package and is focused on the departmental level in order to support results-oriented management. The project can be seen as one of the examples of Codman's idea of an End Result Clinic. To our knowledge it is the first time that such an

Figure 5
Example of improvements
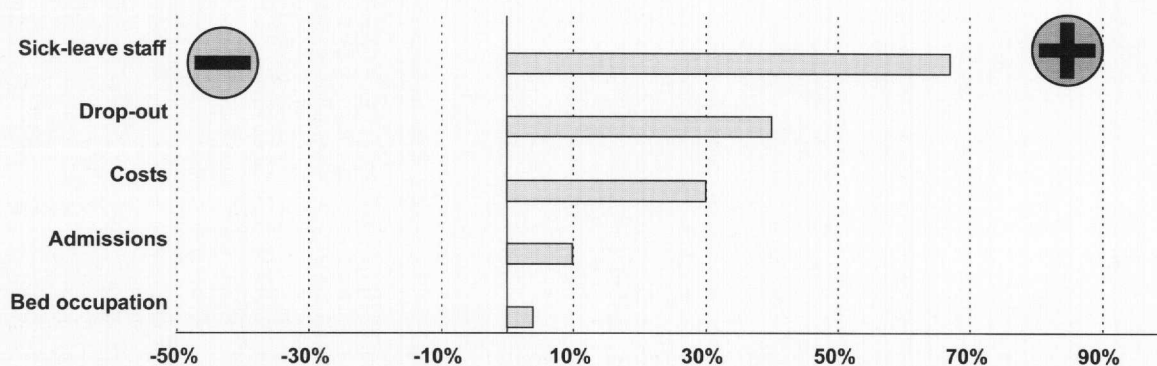
Figure 6
Trends
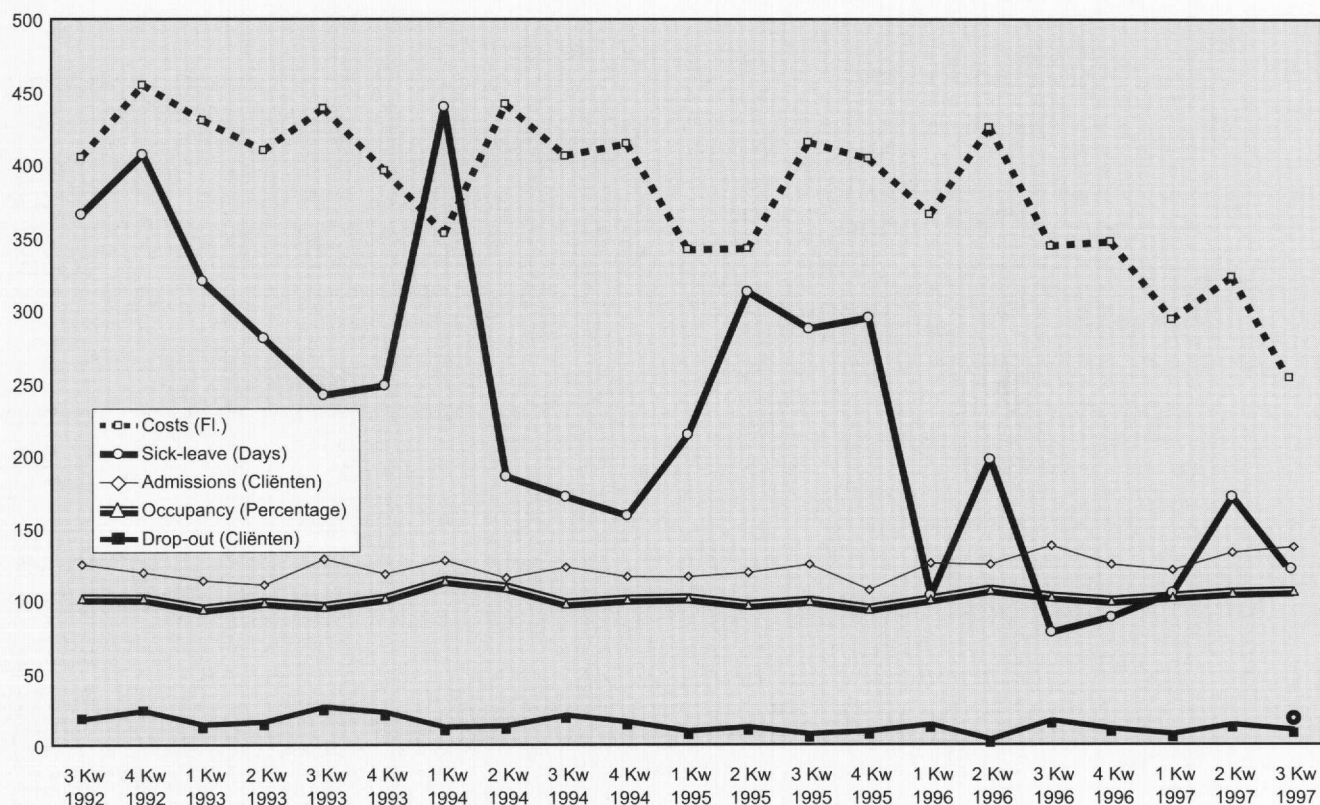
indicator system on a department level has been developed, implemented and used for several years.

The Profile Package covers five critical indicators – admission, productivity, drop-out, sick-leave, and costs – and about 40 department-specific indicators. It was delivered one month after the end of the quarter to the manager of each department, meaning that it was not too frequent, but frequent enough to support evidence-based management. On the basis of the quarterly Profile Package the departmental manager could produce a summary, which was then consolidated into an overview report for the directorate and the organization as a whole. In addition each departmental manager discussed the results with the team so that actions could be taken when needed. This reporting cycle of analysis, discussion and communication is well established and is related to an annual review of the Goal Finder system.

The Profile Package is part of the infrastructure of The Jellinek Center. We can see that the feedback of information helps teams to improve their efficiency and effectiveness. Our findings include observations from teams combined with patient satisfaction results with results from the Profile Package. Clarity, transparency of the performance and feedback of results have positively impacted on the quality of care for patients, the prime reason for undertaking such an exercise. Further data and evidence relating to the performance of The Jellinek Centre will be available in follow-up articles.

Several health-care organizations in The Netherlands have learned from our experiences and have started to introduce a Profile Package into their organizations. Their experiences show that our approach is transferable to other health-care services.

According to our experience there were three critical success factors for the indicator project. First, the combination of bottom-up and top-down approaches was very important. We listened carefully to the needs of the departmental managers and we had a strong commitment from the top management within the organization. Second, using advanced information technology (databases and interfaces), in order to process the data for the specific indicators quickly and regularly, contributed to the success. Third, the continuity of the project team and a stable infrastructure were imperative for long-term sustainability, continual development and improvement.

The next step for the indicator system in The Jellinek is the integration of clinical effectiveness indicators for the departments. We want to combine these new indicators with a conceptual change of the Profile Package in the direction of the Balanced Score-Card or the approach of the European Foundation for Quality Management Excellence Model. Another important topic for the coming years is the alignment of other reporting systems with the Profile Package and the dissemination of the information via the intranet of The Jellinek Center.

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