

Improving quality and supporting management through visualising information in a Business Intelligence solution.

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Aims

The aim of the project was to develop a management information system for Diakonhjemmet Hospital that could use information already contained in the diverse computer systems that have been implemented in recent years. The MIS had to be able to provide up-to-date, that is daily, information that could be used not just for reporting but to be used for day to day management without any extra input from already overworked clinical employees.

The main hypothesis was that existing information should be enough to create business intelligence (BI) and from this improvements in quality and efficiency.

Introduction

It is well known that the enormous investment in information technology in healthcare has not produced the return on investment that many major projects had projected. There are many different reasons for this and at least one recurring theme is how the systems are integrated at the organisational level and whether all the information put into the systems is actually used to achieve the organisation's strategic and operative goals. These two aspects of systems come under the domain of Business Intelligence (BI). Diakonhjemmet Hospital has developed an innovative BI solution using commercial software combining data from its patient management, electronic patient record (EPR), patient incident reporting, financial and personnel management systems.

Method

A method based on Systems Thinking and User Centred Design was employed called Evolutionary Prototyping in Context (EPiC). This is the opposite of a traditional design specification based approach where the final specification is produced at the start of the project and the aim is to produce a system that meets the specification. With the EPiC approach the aim is to develop a system that meets the growing needs of the users as they experience the potential of the system as it evolves. The method is in the domain of Operational Research (OR).

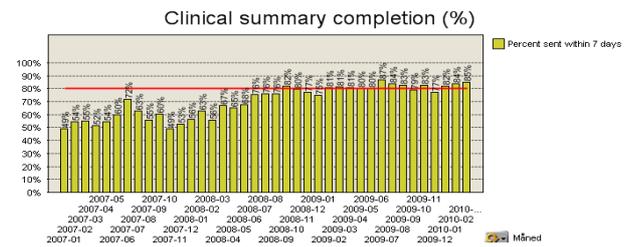
The development starts with a problem identified by the potential user community. From there a prototype is produced with data from the underlying IT systems allowing the users to investigate the problem using real time data. Information on patients and cases, finances and personnel is available immediately and different hypotheses as to the causes of the problem can be investigated. As the users' knowledge of the problem increases new hypotheses can be tested with new prototypes.

When the root causes are identified the final prototype is made available and can be used to follow until the necessary level of improvement is achieved. The whole MIS is therefore developed from the users own experience and is therefore not received as a typical top-down imposed solution.

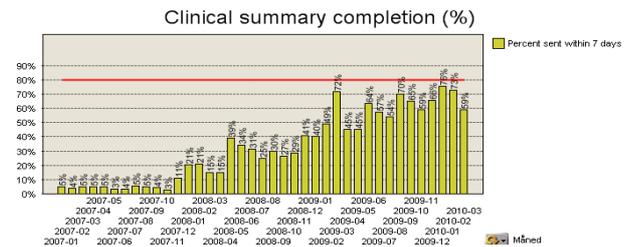
Discussion and conclusions

Hospitals in all parts of the world face similar problems and have similar requirements to increase both efficiency and safety. Common for many hospitals is also the rate of investment in new technology to try to achieve these aims and common also the failure to realise the potential from this investiture. By using a bottom-up user focused development methodology Diakonhjemmet Hospital has built a Management Information System matched to the needs of not just top management but management at all levels. The system provides management information focused on root causes to problems identified by users with no extra effort than their regular daily data entry in existing systems. The results show that through the use of continual prototyping in context the users develop real business intelligence to support better decision making and targets for both productivity, efficiency and quality are met or improved.

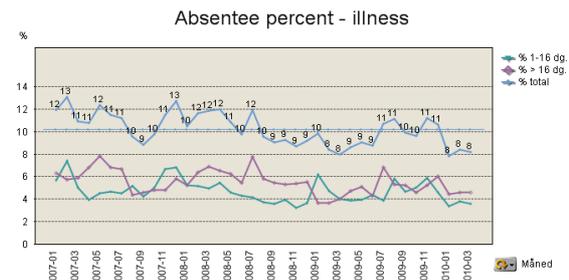
Results



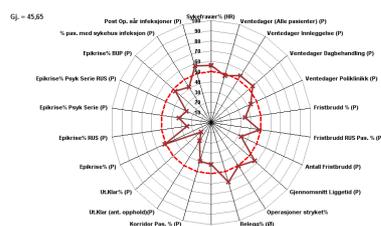
The national minimum target for sending clinical summaries from the hospital is 80% within 7 days. In 2007 the hospital achieved only 50%. There are many processes involved in producing the summary and the EPiC process identified several root causes and one by one they were eliminated until 80% was achieved and maintained. (figures are for all clinical departments)



The same quality parameter here shown for the District Psychiatric Centre (DPS) showing how they improved through the same period.



Many managers have used the absenteeism module to target specific problems rather than applying generic solutions to all employees. The graph shows the results from the three main somatic clinical departments across all professions. The increase at the end of 2009 was due to swine flu.



The overall result from all the measurements are represented in a radar diagram or spider web. The target levels are shown as the red dotted ring, the achieved result per parameter as the continuous line. Targets that are achieved are outside the dotted target line and targets not achieved are inside. This gives top managers a quick visual overview of the total performance and quality of the whole hospital.



The running chart shows how the total LIS Score has developed for the quality parameters. The LIS Score represents the hospital's ability to meet its targets independent of the actual target values.

The red line is the target and the results show that by the end of 2009 targets are being consistently met or exceeded. Targets for 2010 are set higher than 2009 and are already being exceeded.