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# Value stream mapping as a tool for systematic employee based improvement of the psychosocial work environment in hospitals

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## Abstract

Problems in communication and coordination in hospitals often hamper operations and constitute important stress factor for the staff. A specific methodology (P-lean) based on value stream mapping (VSM) has been developed and tested in practice. Key processes with a potential for psychosocial strain are selected and analysed in employee groups. VSM is followed up by collection of data and development of solutions. Results from the practical test show that VSM and process data provide new insights to the employees which help to improve the psychosocial work environment. However, working across departmental borders proved to be particular difficult.

**Keywords:** Healthcare, Lean, Public Sector

### Introduction

Hospitals are under severe economic pressure and the staff experience constant pressure to deliver more. Hospitals use lean to meet the growing performance demands. However, the productivity results of lean are mixed (D'Andreamatteo et al. 2015; Prætorius et al. 2015; Hasle et al. 2016), the consequences from an employee's perspective is debatable (Hasle et al. 2012) and only few studies are available from hospitals (See an example in Ulhassan et al. 2014).

Employee participation is emphasized in lean (Womack 1996). As the work pressure on staff originates largely from productivity demands (Westgaard & Winkel 2011), the question remains unanswered as to whether lean can be used not only to improve productivity but also to ease pressure on the staff. It is an answer to this question that is pursued in this paper.

Our starting point is Value Stream Mapping (VSM) which is a participatory tool for improvement of the processes (Rother & Shook 2009), and it has proved useful in the contexts of hospitals (Henrique et al. 2015). Insights into the process can potentially also be used to identify and improvement the work environment (Jarebrant et al. 2016). We developed a VSM based methodology for improvement of the psychosocial work environment and tested methodology in a qualitative case study in a large university hospital in Denmark.

## Methodology

The design of the intervention is based on the literature on lean and VSM (Rother & Shook 2009; Jarebrant et al. 2016) and participation (Van Eerd et al. 2010) as well as the particular hospital context. The intervention is named P-lean for improvement of the psychosocial work environment facilitated with lean.

The testing of the intervention methodology included five wards (table 1) in the university hospital covering different specialties.

*Table 1. Participating departments*

| | Specialty | No of empl. | Professions | Structure |
|---|---|---|---|---|
| Z | Department of Clinical Physiology (Urology examinations) | 84 | • Doctors<br>• Lab technicians<br>• Physicists<br>• Nurses<br>• Nurse assistants | • Management: A lab technician and a doctor.<br>• The department consists of a few sections and the section in question is directly controlled by the management of the department |
| B | Department of Nephrology | 153 | • Doctors<br>• Nurses<br>• Nurse assistants | • Management: A doctor and a nurse.<br>• The department consists of two sections. Each section is managed by one doctor and a nurse. |
| O | Department of Medicine | 277 | • Doctors<br>• Nurses<br>• Nurse assistants<br>• Physio- and occupational therapists<br>• Secretaries | • Management:<br>• a doctor and a nurse.<br>• The department consists of five sections. Each section is managed by one doctor and a nurse. |
| G | Department of gynaecology and obstetrics (gynaecological examination) | 335 | • Doctors<br>• Midwives<br>• Nurses<br>• Nurse assistants | • Management:<br>• A doctor a nurse and a midwife.<br>• The department consists of 11 sections and the section in question has a doctor and midwife as local management |
| E | Department of Paediatrics | 237 | • Doctors<br>• Nurses<br>• Nurse assistants<br>• Secretaries | • Management: A doctor and a nurse<br>• The department consists of two sections. Each section is managed by a doctor and a nurse. |

The methodology was introduced to the departments by internal lean and work environment consultants who also supported the application.

The evaluation of the results was based on a qualitative research design analysed by realistic evaluation (Pawson & Tilley 1997). Data included shadowing of activities in the wards, written information, and interviews with key stakeholders. Quantitative indicators collected by the wards included used when possible.

The data material from each ward was analysed by extracting elements which supported and hampered the process, the outcome of the process and compared these elements with the programme theory.

**Findings**

The results of the pilot testing were generally promising. The VSM proved useful to provide new insights in the processes. This insight was subsequently used to developed focused and implementable improvements. Table 2 shows an oversight over the results in the five departments.

*Table 2. Results in the five participating departments*

| | **The processes selected for VSM** | **Project activities** | **Improvements** |
|---|---|---|---|
| **Z** | The good reception of patients | • Three VSM workshops<br>• Descriptions of morning situations<br>• Observations<br>• Registrations<br>• Patient questionnaires | • A redesign of the reception process (including a new position as team coordinator)<br>• Disturbance of other colleagues during morning planning stopped<br>• Cooperation and climate improved considerable between receptionist and coordinators<br>• All patients examined even those who are not prepared properly on arrival – no patients are rejected and sent back for a new appointment.<br>• Time for four extra examinations daily identified in VSM |
| **B** | Information in shifts and delegation of job tasks in accordance to qualifications | • One whole day WSM workshop<br>• Consultant observed morning procedures | • Clear morning procedure for reading patients information<br>• Delegation through qualifications made transparent |
| **O** | Disruptions in medicine dispensing room | • Registration of interruptions in three dispensing rooms | • The importance of informal communication recognized and moved outside the dispensing room<br>• Film produced by the employees, showing disturbances in the dispensing room |
| **G** | A good balanced workday. The nuchal scan was selected as the process which most often disturbed the balance of the work day | • Three VSM workshops<br>• situations<br>• Interview with patients<br>• Registrations of time used for the particular scanning methodology | • Small solutions regarding towels, PC's, parking, letters to patients, information signs<br>• Action plan for different scenarios for reorganizing the whole scan procedure, including the demand for resources and competences |
| **E** | Well-structured workday beginning with well-structured meetings | • Three VSM workshop situations<br>• Consultant observed and evaluated morning meetings | • Well-structured and well prepared morning meetings<br>• Reorganizing teams<br>• Time outs to coordinate<br>• Small changes such as moving the coffee table, local medical supply depots etc. |

*Urology examinations*

We provide below an example from one of the five wards: Department of Clinical Physiology with a focus on Urology examinations.

The first VSM workshop revealed a particular morning problem. The list of new patients should be available on the fax machine at 7.45, but it seldom happened due to acute patients. The personnel removed the curtains from the reception window at 8.00 every morning and opened for contact with waiting patients. The assistant nurse experienced problems as all patients were not on list for the day. Some patients came on the wrong day, at the wrong time or were not properly hydrated. Frustration appeared as she called the ward coordinator, trying to get the patient an examination time and often got a gruff answer. The result was that the assistant nurses gave up calling and just hoped a solution to appear later. The staff shared an important experience through VSM as they shifted the problem understanding from blaming people to a focus on the organizational disturbances during the preparation of the daily plan. This new understanding was the point of departure for the development of a number of different solutions which were subsequently implemented. The results of the whole intervention are summarized below.

*Table 3. Indicators on the effect of the P-Lean intervention*

| **Situation before P-Lean intervention** | **Situation after P-Lean intervention** |
|---|---|
| 2-3 patients denied their scheduled examination on a weekly basis. | No denials, all patients are examined the scheduled day |
| 26 examinations each day | 30 examinations each day |
| Problem identification: Personality | Problem identification: Disturbance in a work process that needs concentration |
| Avoidance and lack of respect | Helpfulness and mutual recognition |
| The process consists of 11 steps involving 4 employees. | The process consists of 4 steps involving typically 2-3 employees. |
| Diuretics are used - inconvenience for patient | No diuretics are used |
| 2-3 disturbing phone calls from the reception during the morning scheduling work | No disturbing phone calls from the reception during the schedule work |

However, the department opted out of problems which derived from relations with other departments, in particular the emergency department which often was the cause of missing information about incoming patients. The management and the staff considered it too difficult to intervene in the work of other departments. The same constraint was experienced in the other involved departments.

Another important feature was the importance of the external support from the internal consultants. It appears to be difficult for the staff to look at their daily operations with new eyes. Although the VSM was the main tool for the eye opening effect, the consultants played an important role in securing the procedures were followed and the VSM was applied in a qualified manner.

**Discussion**

Hospitals are described as a typical example of a professional bureaucracy with reference to the conceptual frame developed by Glouberman and Mintzberg (2001). Hospitals are dominated by many groups of professionals with doctors and nurses as the two

dominating groups. Both groups can be characterized as professionals with high autonomy in the execution of their work tasks. As a tendency, this has led to development of an organization often characterized as a silo-organization where the professionals only have limited communication and coordination concerning the performance of tasks even though they share the task of treating patients.

It is therefore well in accordance with the problem of professional silos that communication and coordination proved to be the focus points for all the intervention wards. The staff in the different professional groups tend to lose the general view of the individual processes as well as the workflow. When constraints for their work appear, they are inclined to attribute the problems to persons and personalities rather than the organization of the work. It is therefore a key to understand and solve the problems to secure social relations in communication and coordination. The process which Gittell and colleagues call relation coordination (Gittell et al. 2008).

The involvement of employees through the intervention methodology P-lean seems to be a feasible way to work with the problems related to both the psychosocial factors at work and the inefficiencies related to constrained communication. The point is that VSM opens new insights in the processes and the flow connecting the processes, which facilitates a transfer of the problem from personal conflicts to organization of work. The involvement part secures two core elements. The first one is that only the employees have the necessary practical in depth knowledge of the process in order to carry out a VSM, which digs sufficiently deep to create new insights. The second one is that solutions can only be identified, accepted and implemented in practice if they are meaningful for the employees.

The results indicate that outside assistance is needed for successful achievements. While the ambitions of the design were to create a self-implementable methodology, the wards lacked sufficient competence and outsiders were needed to help create the momentum necessary for progress. Since larger hospitals in Denmark, and probably also in many other industrialized countries have access to internal consultants with an expertise in HR, work environment and/or lean, it should be possible to accommodate this requirement. Especially since the intervention takes place within a limited timeframe.

One of the constraints for the test of P-lean methodology presented in this paper is the lack of experience with cross-departmental issues such as the transfer of patients from one ward to another. All the departments chose to work with their internal problems first as explicitly showed by the Urology Examination case. The employees apparently do not believe that they have sufficient power within the hospital to open for changes even though they are able to describe the structural problems in the hospital.

**Relevance**

Lean is often considered a purely a tool for rationalisation, and it is often emphasised as ‘lean and mean’ (Anderson-Connolly et al. 2002). In contrary, our results indicate that lean, and in particular VSM, can serve as a valuable tool for improvement of the psychosocial work environment as well as efficiency of hospitals. The intervention methodology P-lean can therefore provide a possibility for improvement in particular of problems related to communication and coordination, and it secures the participation of the employees as a necessary resource for implementation.

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