DRUG MANAGEMENT IN AN EMERGENCY DEPARTMENT (PROSPECTIVE AND RETROSPECTIVE STUDIES)

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Abstract: Our research relates to the drug usage process in the Observation Unit, integral part of the Emergency Department of the University Hospital of Nancy. We carried out an analysis of the impact of this process compared to the patient taking care process using the FMECA (Failure Mode Effects and Criticality Analysis) methodology. This method resulting from industrial organizations is confronted with a retrospective study concerning the same field. We propose to enrich the results of the FMECA with the enterprise model of three decision levels: strategic, tactical and operational.

Keywords: medical systems, complex system, processes, performance evaluation, failure detection

1. INTRODUCTION

In France and in industrialized countries, the health sector is going through a period of great change. The hospital is a complex structure, which generates risks. Emergency departments (ED) are a good example of this complexity due to the number and diversity of patients took care. An ED must adapt itself to a changing and complex environment whilst ensuring the quality, the safety and the efficiency of patient taking care. For several years, in France, a wish for change has appeared. This can be explained by an awareness of the multiple dysfunctions of the ED at a national level, by health professionals as well as by the patients themselves (Health Ministry Report, 2003). Such a change can only be carried out by utilizing a modern hospital management system. Our research, which relates to drug management in the Observation Unit (OU), is placed in a context of change, along with other projects currently in progress within the University Hospital of Nancy.

2. METHODOLOGY

2.1 Complexity of a system

Hospital organization is complex as compared to other businesses because it is composed by independent units. Each one of them has a distinct culture, profession and functions therefore associating several kinds of services: care, pharmacy, administration, medical-technical, operating bloc, logistics... This implies multiple decision makers, a random process, numerous information and flows. The hospital function correctly if there is

communication and collaboration between these units in order to treat the patients as well as possible (De Rosnay, 1979).

2.2 Levels of decisions in business modeling

Risk is defined as the level of uncertainty (temporal, material, relational...) from which an individual, facing a danger, is ready to commit himself to an analysis of the situation or a particular action.
The complexity of the health sector involves risks of different nature and temporality: short-term risks (for patients and care personnel), medium term risks (financial) and long-term risks (legal).
This risk concept leads to classify the decisions in three different levels: operational (resource utilization by the projects), tactical (resources management, new projects) and strategic (relation to the environment, i.e. regulations).
Our evaluation relates to the three levels of decision. Hospitals, as businesses, include engineering decisions (design or analysis) and piloting decisions (associated to the action). Compared to industrial organizations, a health system actor can be placed at the strategic level and at the operational level at the same time (i.e. head of the ED). This model can be used in installation (from strategy to operations) or in process improvement (from operations to strategy) (Rakotondranaivo, *et al.,* 2005).
The added value of this classification is to structure the solutions according to temporality (from short-term to long-term) and to take into account the status of the actors in the structure.

3. RESEARCH PROCESS

3.1 Subject of research

The global patient taking care process includes several stages: the arrival of the patient, the patient intake, the medical and therapeutic taking care and the patient departure from the department. The drug circuit in health establishments is composed of a series of successive phases, carried out by distinct health professionals. The prescription is a medical act, the dispensation is a pharmaceutical act and the administration of the drug to the patient is a nurse act. The drug inventory management and the post drug administration surveillance process are part of the drug circuit (Decree, 1999).
Each stage of this circuit can produce errors that will impact on the patient's health. Upgrading and securing all steps are necessary to guarantee the efficiency and the safety of the health system whilst respecting regulations.
Our research relates to the impact of the drug circuit on the patient taking care process in an ED. Our study is limited to the Observation Unit (8-bed OU), one of the three functional units of the ED of the University Hospital of Nancy. The prime function of the OU is a short time monitoring zone. The patient stay should not exceed in theory 24 hours before a transfer to another service or a return home (Brillman, *et al.,* 1995). The monitoring and the medication prescription are particularly complex due to the patient turnover (average of 5 arrivals/departures per day) and to the diversity of the treated diseases. The research subject shows several levels of concern: patient, ED professionals and hospital Pharmacy. The object of our study is placed at the interface of these different actors.

3.2 Positioning of research compared to actual situation

The objective of this work is to propose and adapt methods and tools resulting from engineering sciences in order to better understand the process, to measure and to improve the performance of drug management within the OU.
Publications on drug utilization process and on the ED dysfunctions are numerous. They are two main actual subjects in France:
- Drug use process: accreditation since 1996 (National Agency for Accreditation and Evaluation in Health (ANAES), 2004; decree of 31 March 1999)
- Mediatization of the ED dysfunctions (Health Ministry Report, 2003).

Our research is positioned in the convergence point of these themes: drug usage process and ED dysfunctions. It is essential to associate the two topics because the patient is in the center of the process, which includes the therapeutic taking care amongst other things. This research does not fit in the continuation of existing work; it comes to enrich the existing work. The FMECA methodology is used more and more in the hospital environment but few articles mention its limits. This research work reveals some limits of the methodology and we propose to structure the results of the FMECA (dysfunctions and solutions) by modeling in three levels of decision: strategic, tactical and operational (Rakotondranaivo, *et al.*, 2005).

3.3 Research hypothesis

The FMECA associated with retrospective studies give a complete vision of the drug circuit in an OU of the ED.

3.4 Methodology construction

We broke up the main global patient taking care process into secondary processes according to the value chain (figure 1). A main process meets the patient requirements and the secondary processes come in support to the main process (Porter, 1998).