

Chapter 12

Re-Engineering a Medical Devices Management Software System: The Web Approach

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ABSTRACT

The primary aim of a hospital Clinical Engineering Department (CED) is to ensure a safe and cost-effective operation of the medical devices. In order to achieve this goal, it needs to implement and establish a comprehensive biomedical technology management program, which is a complex and multidimensional task. This work presents a medical devices management software system to assist the CED in healthcare, and it appears, as a result, of an effort to re-engineer and rebuild such an old, successful management system. The findings of this re-engineering attempt are presented. The goal was the incorporation of the new trends in clinical engineering and medical devices management and the exploitation of the new capabilities provided by the modern software tools and platforms. The system is expected to respond to the changing healthcare environment demands, the increased efforts required, and the respective broader role that CEDs have to play.

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INTRODUCTION

The huge number of medical devices used today in almost every health care facility has respectively increased the effort required in order for these devices to function safely, effectively and productively. Clinical Engineering Departments (CEDs) are the units within the hospitals that carry out the preventive and corrective maintenance and all the other tasks that are required for the proper function of the device and ultimately the best provision of health care services (Bronzino, 1992).

The primary goal of a CED is to ensure safe and cost-effective operation of medical equipment, and in order to achieve that goal it needs to implement the so-called biomedical technology management program. Such a program embraces not only the technical aspects of maintaining medical equipment, but also the development of institutional policy, regarding equipment acquisition, use, and replacement.

A comprehensive biomedical technology management is a complex and multidimensional task (Glouhova, Kolitsi & Pallikarakis, 2000; Pallikarakis, Anselmann & Pernice, 1996). The diversity and complexity depend on the skills and background of the personnel involved; however, a general scheme should include the following elements:

1. Control and monitoring of equipment performance, including routine performance testing, initial inspection, preventive maintenance, calibration, and verification of performance, repair, and action on device recalls and hazards;
2. Monitor of total equipment maintenance costs, including in-house costs, as well as costs associated with manufacturer and third-party service contracts;
3. Involvement of all aspects of equipment acquisition and replacement decisions;
4. Development of training programs for all users of patient care equipment, as well as for biomedical equipment technicians;
5. A quality assurance and risk management program related to technology use.

During the last two decades, in order to satisfy the increased needs for medical equipment management, CEDs have been turning to computerization and the use of software tools, specifically designed for medical equipment management. These tools have been proven to offer many capabilities, such as following and assisting the everyday departments' routine, storing, processing, and analysis of data, as well as organizing the CEDs procedures and schedule.

This paper presents a medical devices management software system, called Web-Praxis, which is the result of an effort to re-engineer and rebuild an old successful management system. The paper also presents some of the findings of the re-engineering attempted. The purpose of this reconstruction was for a new system to incorporate the new trends in clinical engineering and medical devices management and to exploit the new capabilities provided by the modern software tools and platforms.

METHODOLOGY

Although this system is the 5th generation of a Medical Equipment Management System (MEMS) that was initially created in the early 90's, the new system's development followed the well-established phases of Requirement Analysis, Design, Implementation and Evaluation in order to be able to respond to the recent needs in the field (Panousis, Malataras, Patelodimou, Kolitsi, & Pallikarakis 1997).

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