Chapter 8
Integration of Automation and Clinical Decision Support Systems

Ronnel Nallas
Austin Health, Australia

Jane Moon
Austin Health, Australia

ABSTRACT

As the world of pathology and laboratory medicine has increasingly headed in the direction of automation, implementation of Clinical Decision Support Systems are becoming a vital part of the process. The advances in technology and costs of human resources are factors pushing for automation. This chapter addresses the advantages and issues encountered during the installation of the new automated system Roche Cobas 8000 and Middleware IT3000 for the Clinical Chemistry Laboratory of one of the major teaching hospitals in Australia. The input and cooperation of Laboratory staff, Clinicians, Roche Diagnostics and LEAN processes has resulted in a fine example of how automation and clinical decision support systems play a major role in Improving Health Management.

INTRODUCTION

Since the introduction of automation and information technology, developments in the health industry have shown staggering growth and advancements. Their application to healthcare has resulted in significant improvements in the industry. Technological innovations have substantially improved the productivity of clinical laboratories (Bossuyt, Verweire, & Blanckaert, 2007). Some of the improvements include productivity, staff safety, specimen handling, and allow the reallocation of personnel for growth and expansion of services (S. Melanson, Lindeman, & Jarolim, 2007).

The primary reasons for the push for automation and information technology have been a reduction of human error, as well as a continuing increase in workload, difficulties in recruitment of experienced technical staff and reduction of the operational budget (Lam & Jacob, 2012). To address these concerns,

DOI: 10.4018/978-1-4666-9432-3.ch008

two management methods from manufacturing industries have been adopted. Six Sigma, introduced by engineers in Motorola to reduce non conformity, and Lean management adopted by Toyota to remove non-value added activities and reduce human errors (Joosten, Bongers, & Janssen, 2009), have been taken up by the health sector (DelliFraine, Langabeer, & Nembhard, 2010).

This chapter discusses the empirical evidence of how the automation process was implemented at one of the major teaching hospitals in Australia, shedding some light on why and how the automation process was achieved and the changes experienced after three years of automation. The paradigm shift brought on by automation in pathology and the possible impact on pathology in the future is also discussed.

BACKGROUND

The major teaching hospital currently provides pathology services to the following health facilities:

- General public
- Hospital for Women
- Pediatrics
- Numerous GP and Specialist Practices

It also operates a successful private enterprise in the community and supports several other major public hospitals. The Pathology Department provides a range of services including Anatomical Pathology, Biochemistry, Hematology and Microbiology. It also provides specimen collection services (including blood collection).

The pathology specimen reception receives and processes 1500 to 1700 patients' specimen test requests on a daily basis and the Clinical Chemistry department performs approximately 16,000 tests.

The Pathology Core Laboratory has had a recent upgrade and restructure to accommodate the increased demands for pathology services and also to respond to the challenge of dwindling resources from the government to operate its health services.

Why Automate?

There are many reasons for automating a process, which can be narrowed down to:

- Economic reasons - Businesses or organizations need to be sustainable so operating costs are usually an area that is investigated.
- Reducing errors – Many factors cause errors and so eliminating or reducing these is highly regarded especially in the health industry.
- Improved quality.

Automation derives from the replacement of manual, potentially dangerous, error-prone steps with automated processes requiring minimal operator intervention (Melanson, Lindeman & Jarolim, 2007). This results in improved turnaround times and tracking of specimens, and prevention of errors in specimen aliquoting; the end result provides an efficient and quality service to health workers and patients.