

## Chapter 14

# An Evaluation of Laboratory Information Systems in Medical Laboratories in Jamaica

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### ABSTRACT

*This chapter seeks to find out information on the functionalities of the laboratory information systems available in medical laboratories in Jamaica and their ease of use and the overall performance and satisfaction of medical technologists using them. A cross-sectional descriptive survey involving the use of a 48-item questionnaire was conducted among medical laboratories with a LIS. There were a total of 14 completed questionnaires out of 15, giving a response rate of 93.3%. The findings reveal that the majority of the laboratories have a LIS that provides multi-level security, allows password protection at different levels, maintains a patient database, and generates records. The majority of the medical technologists agree or strongly agree that it is easy to use the LIS and experience improved overall performance on the job. The medical technologists clearly understand the existing features and functionality of the LIS. Additional functional features of the LIS should be customized, and adequate funding is needed, especially for hospital-based laboratories.*

### INTRODUCTION

Laboratory medicine is the foundation on which the structure of scientific medicine is erected and is an integral component of the clinical diagnosis and management process. The clinical laboratory is increasingly integrated with patient care, assist-

ing diagnosis, monitoring therapies and predicting clinical outcomes. Laboratories also provide essential public health information and disease surveillance (Dacombe et al., 2006). Due to this wide-ranging role, laboratories are an important part of many disease control programmes. Therefore, laboratory-based disciplines such as clinical

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chemistry, haematology, histology, immunology and microbiology contribute significantly in effectively controlling infectious and non-infectious diseases.

Laboratory medicine has undergone marked changes during the 20<sup>th</sup> century and is likely to develop even more rapidly in the 21<sup>st</sup> century (Guidi & Lippi, 2006). Ongoing technological developments have considerably improved the productivity and efficiency of clinical laboratories, and there have been significant improvements in the provision and quality of diagnostic tests. Significant developments such as automation, commercially produced reagents and more powerful computers provide clinicians with an ever-increasing list of rapid and cost-effective tests. Furthermore, more efficient patient result verification has greatly improved laboratory test throughput while decreasing turn-around-times, enabling critical results to reach clinicians rapidly for better clinical outcomes. Advances in laboratory medicine have occurred in conjunction with analytical developments that measure many different analytes with specificity for pathological conditions and ever-increasing sensitivity. Such tests revolutionized clinical diagnosis in ways that were unimaginable even a decade ago (Herzlinger, 2006).

Information systems in pathology provide opportunities for clinical laboratory scientists and pathologists to impact both clinical care and research agendas adding value to the health care system, both at local and international levels. Pathology information systems can provide major databases for research in health services and new informatics-based approaches to database research. Databases are created through the archiving and organization of laboratory data through the laboratory information system (LIS), hospital information systems (HIS) or peripheral programs (Connelly, 1997). Databases of quantitative laboratory data can be used for data mining, rule discovery, retrospective analysis and other clinical research applications. Maintaining the integrity of databases is an im-

portant function of the laboratory diagnostician or information technology scientist (Friedman, 1990). Database support encompasses acquisition, coding, data classification, design, display, reporting standards, management, and query methods (Connelly, 1997; Friedman, 1990).

The last two decades have brought major advances in processing power and software engineering, many of which have had a direct impact in clinical laboratories. Laboratory information systems have revolutionized the storage and retrieval of information. They are used for assessing and improving quality in clinical laboratories, and patient management using decision support (Bates et al., 1999). The purchase and installation of a modern LIS module in clinical laboratories have significantly increased laboratory productivity in terms of quality and cost reductions, and improved turn-around-time as test results are produced faster (Pelegri et al., 1996).

There are approximately 83 medical and non-medical laboratories in Jamaica. As part of the Government of Jamaica's objective to prepare laboratories for accreditation, 25 non-medical laboratories between 2003 and 2006 received over 700 man-hours of consultancy from the Swedish Board for Accreditation and Conformity Assessment (SWEDAC) to assist them with their preparation for accreditation using ISO 17025:1999. In March 2007, the accreditation body in Jamaica, called the Jamaica National Agency for Accreditation (JANAAC), was legally incorporated and officially launched on June 9, 2009. JANAAC operates in conformity with ISO 17011:2004 entitled Conformity assessment - General requirements for accreditation bodies accrediting conformity assessment bodies. JANAAC is currently accepting applications from medical and non-medical laboratories that are prepared for accreditation. To date 6 non-medicals and one (1) medical laboratory received accreditation for various tests from JANAAC. This study sought to: (i) find out information on the functionalities and technical features of the laboratory informa-

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