The Learning Curve for Laboratory Information Management System (LIMS) implementation: A case study at the NHLS-Stellenbosch Biobank (NSB)

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Introduction

The NSB started as an H3Africa-funded project, with the aim of setting up biobanking infrastructure in South Africa, and Africa. It formed part of a larger network of institutions across Africa, the US and UK, with the aim of streamlining and harmonizing bioinformatics and biobanking infrastructure across the African Continent in order to support genomic research. Locally, biobanking in South Africa has gained momentum in the past three years catalyzed by genomic reseachers who have placed increasing emphasis on data, and therefore sample quality, which is becoming a major area of focus in the modern research biobank. A LIMS is the heartbeat of any biobank, for without it, biobank is essentially a room full of freezers. We partnered with Bika Lab Systems, in association with SANBI to build a LIMS solution from the ground up. The inital phase focused on standards for LIMS implementation with emphasis on six divisions: sample management, data collection, data query, security and administration management, data integration, and data analysis

African Biobank LIMS

Sample Management

Receiving, Shipping, physical storage location, depth of storage

Data Collection

Inherent metadata (age, gender, etc.), generated data (-omics, etc.)

Data Query

Accessing said data, separate inherent from generated data

Security & User Admin

Different levels of access, data sharing

Data Integration

LIMS receiving data from other platforms. Can this be adapted?

Data Analysis

Who is the end-user? How does your data need to be presented?

Principles of Data Integration

De-identification

Protect the identity of patients/donors

Query Interface

Web-based server-client setup? Or Standalone installation

Data Collection Standards

Standardised questionnaires and nomenclature for all samples in the biobank

Data Query and Analysis

A key service of biobank informatics. Use stored samples/information to develop a proposal

Security and Administration Management

Authentication of users to create different levels of access

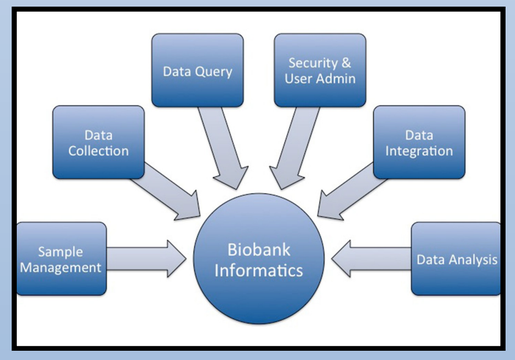

Fig.1 Implementing an African Biobank LIMS

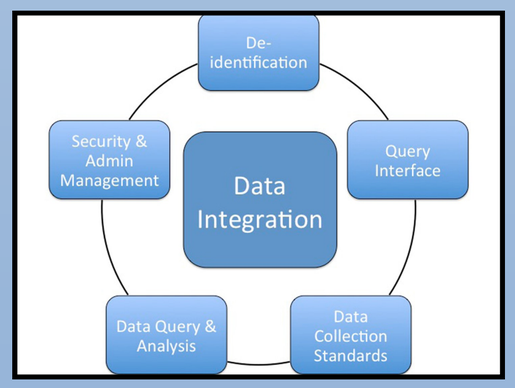

Fig.2 Principles of Data Integration

Bika LIMS Features

Workflow	Finance & Management
Roles	Web Content and Document Management
User Interfaces	Security
Automation	
Total Quality Control	

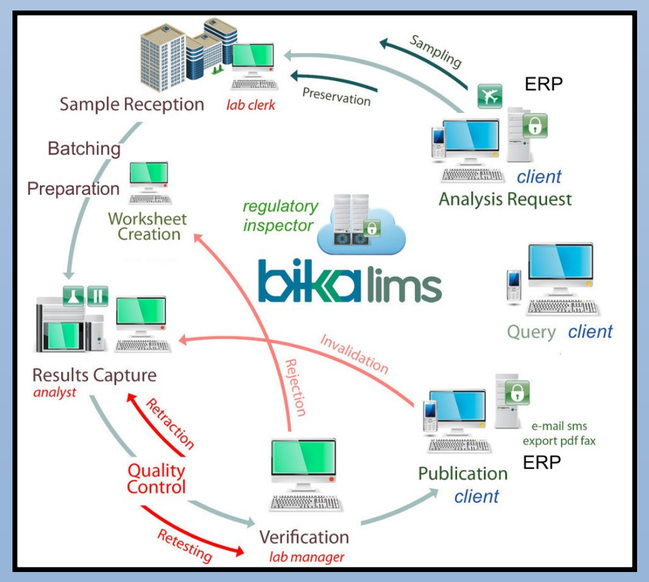

Fig.3 Bika LIMS Features and Workflow