THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

UGANDA Supranational® Reference Laboratory

Timely Accurate Diagonostics for a TB-Free Africa

LABORATORY INFORMATION MANAGEMENT TRAINING

Module 3

Paper-based and Electronic Information Management

Module Objectives

At the end of this module, participants will be able to:

- Discuss the advantages and disadvantages of a paper-based laboratory information management
- Discuss the advantages and disadvantages of an electronic laboratory information management

Module Objectives

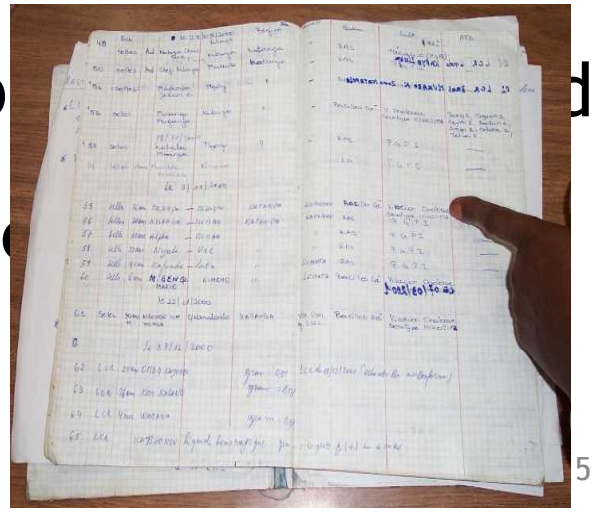
- Discuss key considerations when developing a paper-based and an electronic laboratory information management system?

Overview

- Laboratory Information Management may be paper-based or electronic
- Both require a similar framework, including unique identifiers, forms, logs and worksheets

Paper-based Information Management

- Various constraints may cause that a laboratory uses a manual, paper-based system for all its information management
- Manual registers, logs and wo d for managing samples through th

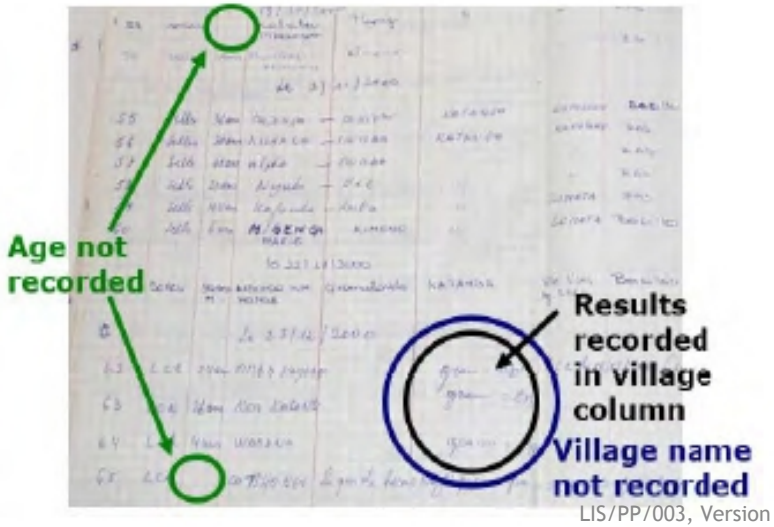


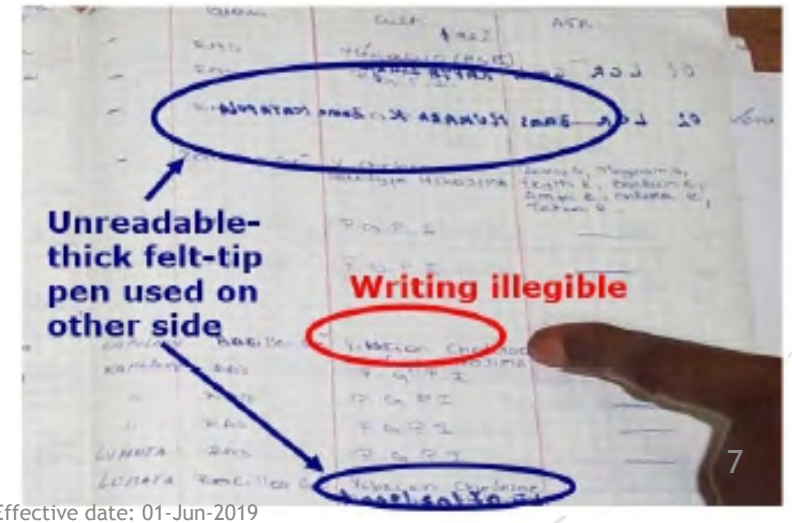
Paper-based Information Management…

- Requires registers, logs and worksheets with good design that are;
  - practical to use and easy to complete
  - make it easy to find data
  - make summarizing data and writing reports easier
- Careful planning, attention to detail, and awareness of information management needs can allow for the development of a good paper-based system that will provide satisfactory

Paper-based Information Management

- While using a paper-based, the following points are important:
  - All data entry must be complete. Handwritten logs must be





THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

UGANDA Supranational® Reference Laboratory
Timely Accurate Diagonostics for a TB-Free Africa

Paper-based Information Management..

- If issuing handwritten reports, the laboratory must always make a copy for its files or archives. Not having an exact copy of the report can lead to later problems, if errors in transcription occur

Paper-based Information Management

- Paper is brittle, and susceptible to water, fire, humidity, and vermin (rodents and insects). Use a storage area that will protect against these elements as much as possible

THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

UGANDA Supranational® Reference Laboratory
Timely Accurate Diagonostics for a TB-Free Africa

Paper-based Information Management

- When storing paper-based materials, the goals are;
  - Find results
  - Trace samples
  - Evaluate problems/occurrence to

THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

nal®
atory
Timely Accurate Diagonostics for a TB-Free Africa

Paper-based Information Management…

- Useful rules:
  - keep everything for a designated time
  - ensure easy access
  - use a logical system for filing
  - number in chronological order

THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

UGANDA Supranational® Reference Laboratory
Timely Accurate Diagonostics for a TB-Free Africa

Electronic Information Management

- An electronic system for managing laboratory data is often called a laboratory information management system and is referred to by the acronym LIMS or LIS
- A well planned and installed LIMS brings accuracy and accessibility to the flow of samples and data in the laboratory

Electronic Information Management

- A LIMS facilitates;
  - Management of lab data from sample log-in to reporting
  - Interfacing with analytical instruments
  - Sorting and organizing data into various report formats
  - Storing of data for future reference and use

Electronic Information Management…

- Decisions about development/procurement of a LIMS should be based on information that will support delivery of a solution that will best serve the needs of the laboratory.
- **The LIMS decision is influenced by;**
  - Type of lab (Reference/research/public health; Clinical; Hybrid)

Electronic Information Management...

- Volume of specimens
- Types and number of tests
- Size of staff/users
- Existing system (Determine which areas will be affected)
- Requirements and expectations (Avoid 'culture shock')

Advantages of Electronic Information Management

Advantages of Electronic Information Management

- **Turn around time reduction. -** period between sample reception to the reporting of result report is shortened while using electronic information management system.
- **Reporting.** Compilation of monthly and weekly reports becomes easier and faster. Examples of the reports include Monthly QCs, weekly laboratory updates, and quarterly report to the programme.

THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

UGANDA Supranational® Reference Laboratory
Timely Accurate Diagonostics for a TB-Free Africa

Advantages of Electronic Information Management

- **Quality control management** - It becomes easy to keep good quality control records, perform analysis on QC data, and generate statistics automatically.
- **Provision of options for data searching** - A variety of parameters can be used for data retrieval, e.g. it is usually possible to access data by name, by laboratory or patient number, and sometimes by test result or analysis performed. This kind of data searching is almost impossible with paper-based systems.

Advantages of Electronic Information Management…

- **Ability to track reports** - A computer system makes it much easier to track reports; to know when work was finished, who performed the work, when the data was reviewed, and when the report was sent.

Advantages of Electronic Information Management…

- **Access to patient information** - Most computer systems allow access to all recent laboratory data for a patient. This is very useful in the process of checking the most recent results against previous data to look for changes, which is a good practice, and helps to detect errors.

Advantages of Electronic Information Management…

- **Ability to track and analyze trends** - The computer and its data bases provide very strong search capabilities, and with careful design it will be possible to retrieve and use large amounts of data effectively to track and analyze trends of various kinds.
- **Error reduction** - A well planned computer system, with check systems for errors, will help to alert the user of inconsistencies, and reduce the number of errors. It will also provide

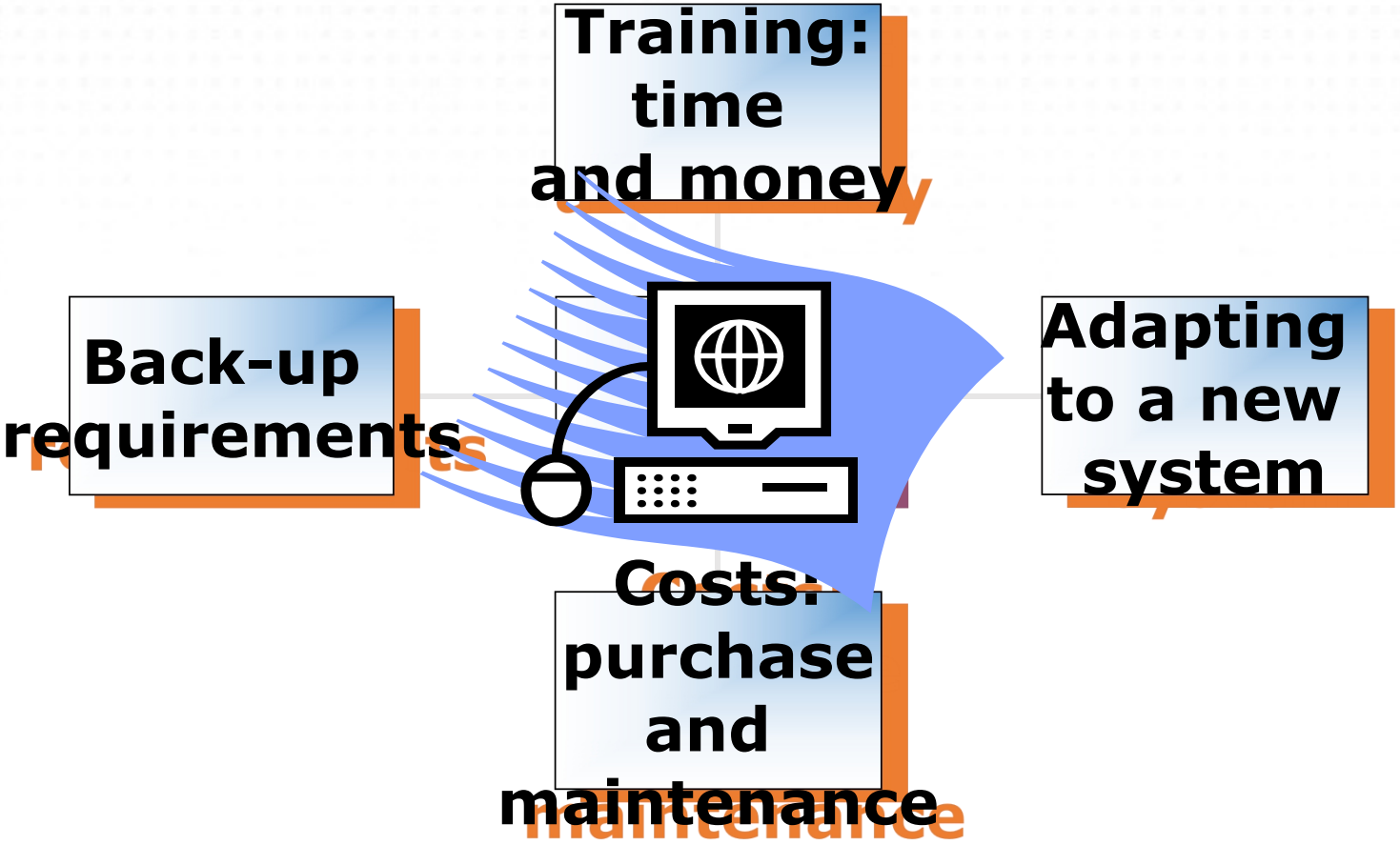
Advantages of Electronic Information Management…

- **Improved capability for maintaining patient confidentiality** - It is often easier to maintain confidentiality of laboratory data when using a computer than when dealing with a hand-written report form by establishing computer user access rights that control access to the data.

Advantages of Electronic Information Management…

- **Integration with sites outside the laboratory** - A LIMS can be set up so that data comes into the laboratory system directly from a patient or client registration point; and Data can be transmitted to many sites or interfaces as needed

Concerns with Electronic Information Management



Concerns with Electronic Information Management

- **Training** - Personnel training is required, and because of the complexity of LIMS, this training can be time consuming and expensive.
- **Customization of LIMS/interfaces** – There is always need for customization of the LIMS or some interfaces in order to meet specific lab/client needs

Concerns with Electronic Information Management…

- **Time to adapt to a new system** - When starting up a computer system it may seem inconvenient and unwieldy to laboratory staff. Personnel accustomed to manual systems may be challenged by such tasks as correcting errors and uncertain of how to proceed when encountering situations where a field must be filled in.

Concerns with Electronic Information Management

- **Cost** - Purchase and maintenance are the most expensive parts of a computerized system, and the costs can be prohibitive in some settings.
- **Physical restrictions** - Adequate space and dedicated electrical requirements are necessary, as well as placement of the computer away from heat, humidity, and dust.

Concerns with Electronic Information Management…

- **Need for back-up system** - All computer information must be carefully backed up. Loss of data due to a damaged disk or system crash cannot be tolerated, and backup systems will be critical.

Hybrid Systems

- It is unlikely that the ultimate goal would be to have a completely paperless system of managing information
- There is often a hybrid of paper and electronic patient records
- Standardized paper-based registers, forms and report templates have been long-standing features in DOTS and the Stop TB Strategy. TB control staff are familiar with their use.

Hybrid Systems

	Could be transferred to an electronic system?
Patient records	
Patient identification card	Possibly (2)
TB treatment card (including DR-TB treatment card)	Possibly (1)
Clinical records for TB patients	Possibly (1)
TB patient appointment card	Possibly (2)
Discharge letters from facilities	Possibly (2)
Patient registers	
Register of TB suspects	Yes
Register of TB contacts	Yes
District TB register	Possibly (3)
Laboratory registers (results for sputum smear, culture, drug susceptibility testing or Xpert MTB/RIF)	Possibly (3)
Patient referral	
Patient notification	Yes
Patient referral for TB care or specialist services	Possibly (1)
Request for investigations (radiology, smear, culture, DST, Xpert)	Possibly (4)
Drug prescriptions	Possibly (4)
Management of drugs and supplies	
Drugs and devices order form	Possibly (4)
Laboratory supplies order form	Possibly (4)
Drug stocks register	Yes
Laboratory supply register	Yes
Reports	
Managerial and operational reports	
Stocks of drugs	Yes
Stocks of laboratory supplies	Yes
Programme performance, supervision checklists, activity report	Yes
Routine reports	
Case detection	Yes
Sputum conversion	Yes
Treatment outcome and TB/HIV activities	Yes
MDR-TB indicators	Yes

(1) Only if electronic recording and reporting is routinely used for case management and recovery of electronic records is reliable at the point of care; if records are home-based then keeping to paper format is recommended.
(2) Only if electronic recording and reporting is routinely used for case management and patients can store appointment details, for example on their mobile phones.
(3) Only if electronic records are reliably available where the register is kept.
(4) Only if integrated systems exist between the requesting centre and the other services.

THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

UGANDA Supranational® Reference Laboratory
Timely Accurate Diagonostics for a TB-Free Africa

Exercise

1. Discuss the advantages and disadvantages of a paper-based laboratory information management

2. Discuss the advantages and disadvantages of a computerized laboratory information management

3. Discuss key considerations when developing a paper-based and a computerized laboratory information management system?

THE REPUBLIC OF UGANDA
MINISTRY OF HEALTH

UGANDA Supranational® Reference Laboratory
Timely Accurate Diagonostics for a TB-Free Africa

Acknowledgments