

MONITORING AND EVALUATION (M&E)



10 Tips for Developing a Data Management System for M&E

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Disclaimer

This guide and the methods and procedures described herein is the culmination of over 20 years practical experience developing monitoring and evaluation (M&E) data management systems. While I have made every effort to ensure the accuracy of the content, any judgments as to the suitability of information for the reader's purposes are the reader's responsibility. I extend no warranties, and assume no responsibility for the suitability of the information contained in this guide or the consequences of its use.

Monitoring and Evaluation (M&E)

When we read that newborn mortality rate in a country has gone down by 20%, we may ponder how this data was obtained. Or when we hear that the percentage of children under age five who had diarrhea in the prior two weeks declined from 72% to 33%, we may ask, how was this calculation derived?

These types of statistics and other similar information result from “monitoring and evaluation” or “M&E” efforts. M&E is the process by which data are collected and analyzed in order to provide information to policy makers, program managers, and the public, for use in program planning and project management.

Monitoring of a program or intervention involves the collection of routine data that measure progress toward achieving program objectives. It is used to track changes in program performance over time. Its purpose is to enable stakeholders make informed decisions regarding the effectiveness of programs and the efficient use of resources.

Monitoring is occasionally referred to as process evaluation, due to its focus on the implementation process and attempt to answer such key questions as:

- How well has the program been implemented?
- How much does implementation vary from site to site?
- Did the program reach its intended beneficiaries? At what cost?

Evaluation measures how well the program activities have met expected objectives and / or the extent to which changes in outcomes can be attributed to the program or intervention. The difference in the outcome of interest between having or not having the program or intervention is known as its “impact,” and measuring this difference is commonly referred to as “impact evaluation.”

Evaluations require:

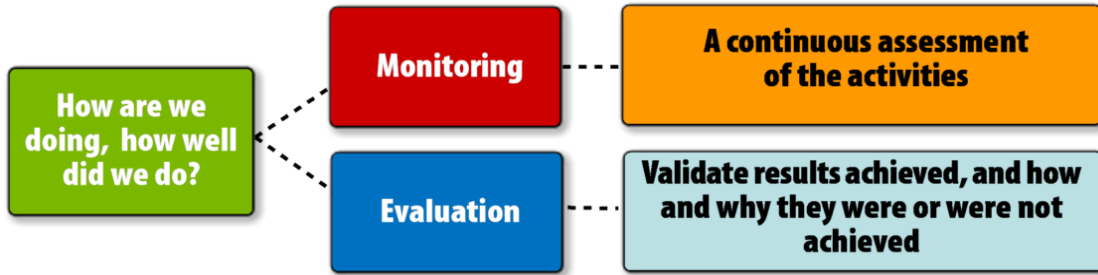
- data collection at the start of a program (to establish a baseline) and again at the end, rather than at specific intervals during program implementation;
- a control or comparison group in order to measure whether the changes in outcomes can be attributed to the program; and
- a well-planned study design.

Monitoring and evaluation helps program managers:

- make informed decisions regarding program operations and service delivery based on objective evidence;
- ensure the most effective and efficient use of resources;

- objectively assess the extent to which the program is having or has had the desired impact, in what areas it is effective, and where corrections need to be considered; and
- meet organizational reporting and other requirements, and convince donors that their investments have been worthwhile or that alternative approaches should be considered.

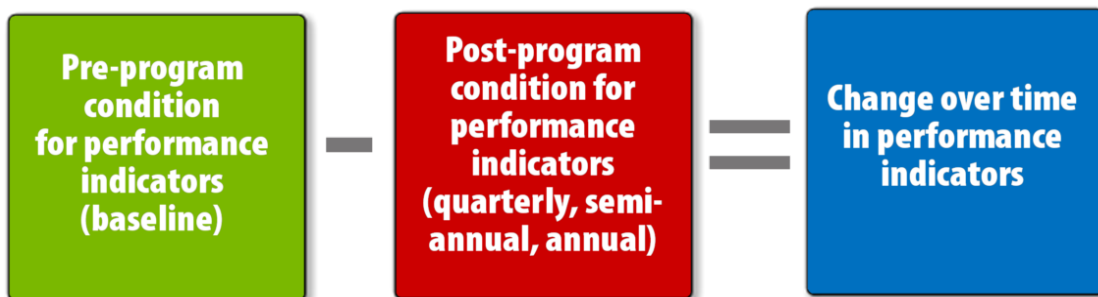
Figure 1 – M&E at a glance



Monitoring and evaluation are integral components of the program / project management cycle. Used at all stages of the cycle, monitoring and evaluation can help to strengthen project design, enrich quality of project interventions, improve decision-making, and enhance learning. Likewise, the strength of project design can improve the quality of monitoring and evaluation; poorly designed projects are hard to monitor or evaluate.

Performance indicators are at the heart of monitoring and evaluation, they provide a simple and reliable means to measure achievement, to reflect the changes related to an intervention, or to help assess the performance that is used to demonstrate change. Monitoring is generally carried out on a set of key performance indicators (KPIs) on a periodic basis (quarterly, semi-annual, annually) and the information is used to measure progress towards the achievement of targets, which will then be periodically compared against baseline.

Figure 2 – Performance Indicators

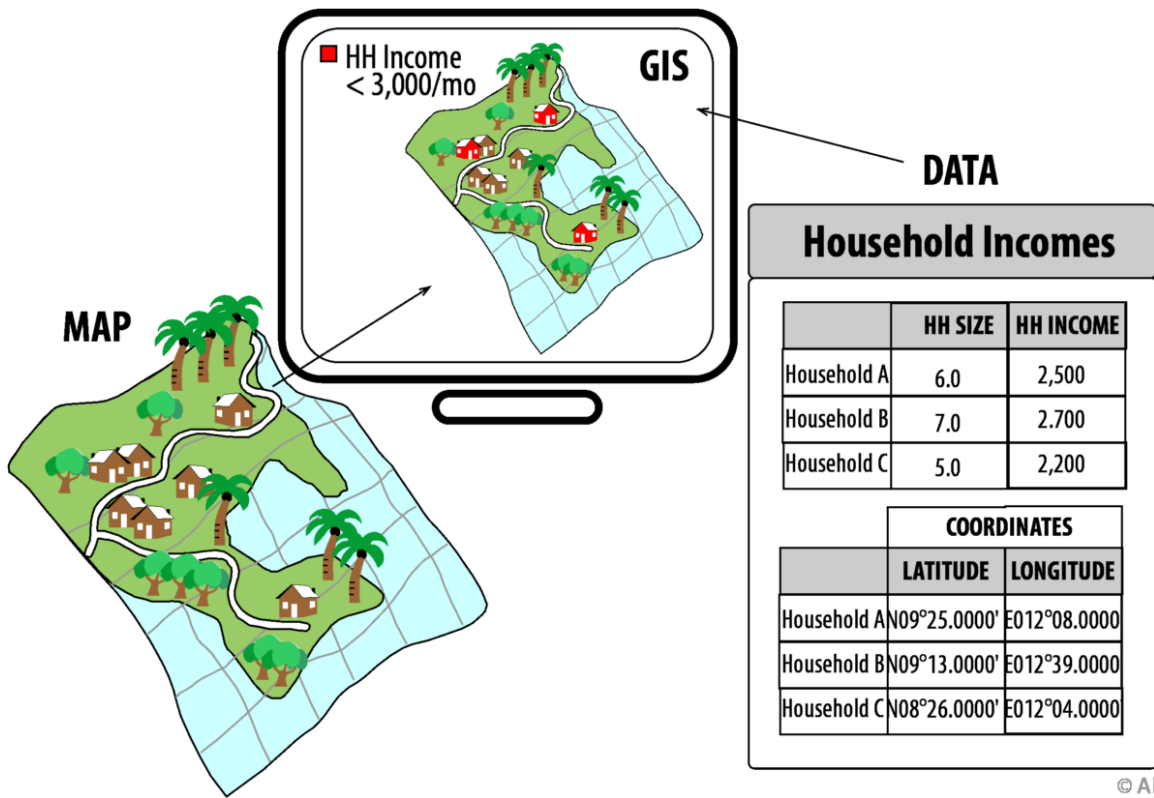


Geographic Information Systems (GIS)

On its own, Monitoring and Evaluation (M&E) serves as an effective management tool that improves the prospects of achieving desired outcomes for any given project. Adding a GIS-based map output can dramatically improve the effectiveness and communications of results to management, stakeholders and the public.

What is a GIS? In the strictest sense, a GIS is a computer system capable of assembling, storing, manipulating and displaying geographically referenced information, i.e. data identified according to their locations. A GIS makes it possible to link, or integrate information that is difficult to associate through any other means. Thus, a GIS is able to use combinations of mapped variables to build and analyze new variables. Presenting data in the form of a map helps to understand the significance of where, when, and by whom.

Figure 3 – Geographic Information Systems (GIS)



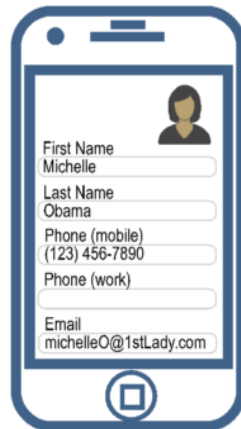
Database and Data Management

A database is an organized collection of structured information, or data, typically stored electronically in a computer system. A database is usually controlled by a database management system (DBMS). Together, the data and the DBMS, along with the applications that are associated with them, are referred to as a database system, often shortened to just database.

Data within the most common types of databases in operation today are typically modeled in rows and columns in a series of tables to make processing and data querying efficient. The data can then be easily accessed, managed, modified, updated, controlled, and organized. Most databases use structured query language (SQL¹) for writing and querying data².

Most often, we will first need to collect the data that goes into a database. A simple example of data collection is when you meet a friend, and you enter her / his name and phone number in your phone.

Figure 4 – Capturing your friend’s contact information with your phone is an example of data collection



An important function of a database is data storage. So, continuing with the earlier example, your friend's name and phone number that you entered in your phone will be stored in your phone's built-in database, "Contacts", so that you may access it whenever you need to reach your friend.

¹SQL is a programming language used by majority of relational databases to query, manipulate, and define data, and to provide access control.

²<https://www.oracle.com/database/what-is-database.html>

Figure 5 – Your phone stores your friends name and phone number in "Contacts"



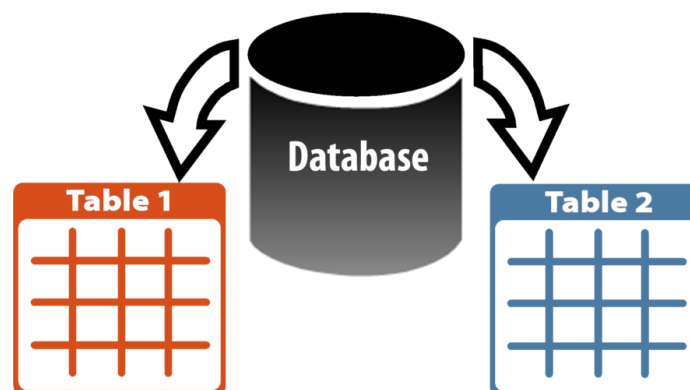
All databases, including your phone's built-in database store information in data fields. A **field** is the basic unit of data in a **record**. A field is defined to hold a specific, discrete category of data, such as **text** (your friend's First Name and, Last Name), **number** (your friend's Phone Number), **photo** (your friend's photo), or to display the result of a calculation

Other important functions of a database include

- Search
- Security
- Sort
- Output (Report)








What is a relational database? A relational database is what fundamentally makes a database different from a spreadsheet, or "flat file". A relational database is a collection of data items organized as a set of formally described tables from which data can be accessed or reassembled in many different ways without having to reorganize the database tables.

Figure 6 – Relational database is made up of "related" tables



For example, you operate a small, rapidly growing fresh vegetable shop, and you have decided that to be more efficient, you need a database. You invest in a brand new laptop, and put your budding database development skills to work. You develop a simple database, primarily to record your customers contact information. Your simple database starts out with a single table, which you aptly name, “customers”.

Figure 7 – example of what your first table might look like








Customer ID	Name	Address	Telephone	Email	Photo
CUST-00001	Catherine Samba-Panza				
CUST-00002	Bidhya Devi Bhandari				
CUST-00003	Ameenah Gurib				
CUST-00004	Saara Kuugongelwa				
CUST-00005	Dilma Rousseff				
CUST-00006	Ellen Johnson Sirleaf				
CUST-00007	Jacinda Ardern				

As your business continues to grow, your inventory is also growing, so you decide to add a second table to the database, “products”, which contains a list of all the fresh vegetables sold at your shop.

You decide to also brand your business



Figure 8 – example of what your second table might look like

Product ID	Name	Quantity	Price / Qty	Date	Image
PROD-00001	Broccoli				
PROD-00002	Carrot				
PROD-00003	Cabbage				
PROD-00004	Eggplant				
PROD-00005	Peppers (Red)				
PROD-00006	Radish				
PROD-00007	Tomato				

As your business flourishes, the number of customers patronizing your shop is growing nicely, and you realize that they have individual preferences for particular vegetables, how often, and the quantity they buy, and you want to be more responsive to their needs, so you create a third table within the database, “preferences”. Note that all three tables are part of a single database!

Figure 9 – example of what your third table might look like

Record ID	Customer ID	Name	Product 1	Product 2	Product 3
PREF-00001	CUST-00001	Catherine Samba-Panza	Product ID Name Quantity Frequency Price	Product ID Name Quantity Frequency Price	Product ID Name Quantity Frequency Price
PREF-00002	CUST-00002	Bidhya Devi Bhandari	Product ID Name Quantity Frequency Price	Product ID Name Quantity Frequency Price	Product ID Name Quantity Frequency Price
PREF-00003	CUST-00003	Ameenah Gurib	Product ID Name Quantity Frequency Price	Product ID Name Quantity Frequency Price	Product ID Name Quantity Frequency Price

Figure 10 – example of what your relational database, with all three tables might look like

Customers	Products	Preferences	
ID Name Address Tel Email 	ID Name Quantity Price / Qty Date 	ID Customer Product Quantity Frequency	RECORD 1
ID Name Address Tel Email 	ID Name Quantity Price / Qty Date 	ID Customer Product Quantity Frequency	RECORD 2
ID Name Address Tel Email 	ID Name Quantity Price / Qty Date 	ID Customer Product Quantity Frequency	RECORD 3

To ensure you do not mix up your customers, or their buying preferences, you would assign each customer a unique ID (a customer’s first or last name would not be a good unique ID; as your list of customers grows, you may have several customers with similar names). This unique ID may often be referred to as a primary key. The purpose of the primary key in a “related” table is to uniquely identify each record in the table. A relational database uses these keys to compare, sort, and store records, and to create relationships between records.

1: KISS-ME; Keep It Simple, Structured, Modular and Elegant

- 1.1 A well designed data management system is essential for effective, and efficient monitoring and evaluation (M&E). A data management system for M&E is not merely a repository of performance indicators, it must include processes and tools for the routine monitoring of results that can be used by all stakeholders to make timely strategic decisions about overall program/project implementation, quality of interventions and status. Following are 10 tips that should guide the development of a database management system that supports effective monitoring and evaluation

Figure 11 – Your M&E database is more than simply a repository of performance indicators



- 1.2 This document is intended to assist the M&E Officer as well as the developer, to understand what constitutes a good data management system for M&E and in so doing, encourage effective collaboration towards developing a system that adequately supports and adds value to current and future M&E efforts

Key Principles

- 1.3 A set of key principles represented by the acronym KISS-ME should ideally guide the development of data management systems for M&E. Keep in mind that performance

data are fundamental to strategic planning, decision-making, delivering objectives and ensuring achievement of goals, as such, donors, stakeholders, and the public must have confidence in the accuracy and veracity of the information contained in the data management system. Inaccurate information, and unreliable data do not support informed decision making.

- 1.4 **Keeping it simple.** A simple interface is almost invisible to the user! It avoids unnecessary elements and is clear in the language used on labels and in messaging. Keeping the interface simple, and intuitive enhances the user experience.
- 1.5 While the emphasis is on reliability of the underlying code, it too must be kept simple in order to allow for the easy and efficient adaptation and modification of the data collection forms and tables as performance indicators change.
- 1.6 **Structured;** a well structured database has less to do with a computer system than with research and planning. The database design process should be completely independent of software choices. The basic elements of the design process should include:
 - *Define the problem or objective* (extensive consultation with program managers and stakeholders)
 - *Understand the indicators* (study the performance indicator reference sheets (PIRS), performance indicator tracking tables (PITT), extensive consultation with program managers and stakeholders)
 - *Develop the data structures* (Review all existing paper-based data capture forms, templates, and reports)
 - *Construct database relationships;* how each table relates to the others
 - *Document the entire development process* (database design report);
- 1.7 **Modular;** the system should be developed as a module compilation of applications and utilities; this will render the system fully scalable. In this way, each module will rely on basic information contained in a central file, but is otherwise independent of other modules. This approach allows for tailored access dependent on a user's specific needs. Complete integration of the modules provides the ideal platform for re-engineering and aligning national and sub-national M&E processes
- 1.8 **Elegant;** The system overall design should be elegant. By elegant I mean for instance, enforcing a consistent naming convention; "animalVaccination", "AnimalVaccination", or "animal_vaccination", which ensures that the M&E data management system will have "cleaner" code, logical joins, and easier maintenance

The first KIS; Keep It Simple

- 1.9 The “Home Screen” is the first point of entry for users; it must be simple and intuitive. Users should be able to immediately “intuit” the purpose of each interface element, and any other features available from the home screen. The home screen should, to the extent possible, anticipate what various levels of users might need to do and ensure that it has elements that are easy to access, understand, and use to facilitate those actions. The home screen along with all the user interfaces that comprise the system, must be kept simple and uncluttered.

Figure 12 – Home screen of the performance management system developed for the Somali Regional Bureau of Finance and Economic Development (BoFED)



Performance Management Database System developed for the Somali Regional State Bureau of Finance & Economic Development (BOFED)

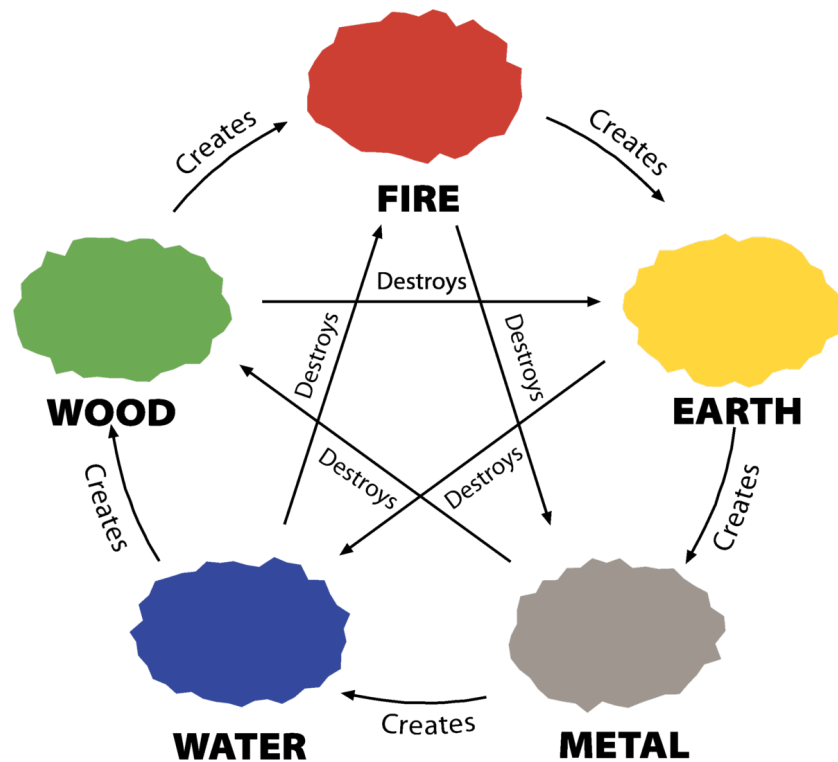
2: The Interface; yes, the book will be judged by it's cover

The User Interface (UI)

- 2.1 While you'll find a lot of advice online about what constitutes a good interface, including sites recommending applying Feng Shui, the truth is that your user interface will have a greater chance of success if in the design, you take the time to understand your user's needs, including their goals, skill level(s), preferences, and idiosyncrasies.
- 2.2 Don't be fooled into believing that users will forgive an ugly interface as long as they understand that you have bestowed upon them, a superior database; wrong! Like the saying goes, you don't get a second chance to make a first impression. The UI is the first impression that users will form of a system, and if it's unfriendly, or intimidating, or downright tacky, the first and often lasting impression will most certainly be adverse.
- 2.3 No matter how complex the system you have developed, it will benefit greatly from a friendly UI or it will fairly quickly be destined for the database graveyard. There are no hard rules to designing the UI, other than keeping the interface simple, additional factors to consider are;
- 2.4 Create consistency and use common UI elements. By using common elements in your UI, users feel more comfortable and are able to get things done more quickly. It is also important to create patterns in language, layout and design throughout the system for greater efficiency. Once a user learns the function of a particular feature, they are better able to apply that knowledge in using other features of the system.
- 2.5 Be purposeful in designing layouts. Consider the spatial relationships between the items on the UI, and then structure the interface based on importance. Carefully placed items on the UI can help draw user attention to the most important aspects of the interface. For iOS devices (iPhone, iPad) Apple recommends that interface elements be separated with sufficient space between them, and each element measure at least 44 pixels by 44 pixels, to make it easier to tap using a fingertip.
- 2.6 Strategically use color and texture. There is no shortage of online resources advocating the use of Feng Shui in color selection. If you are challenged with

color selection, then the Feng Shui principles on applying color may be able to provide some guidance on how to intentionally elicit certain emotions from users, as well as how to direct attention toward or redirect attention away from items using color, light, contrast (very important consideration when integrating accessibility options), and texture.

Figure 13 – Feng Shui Colors



- 2.7 Use typography to create hierarchy and clarity. Legibility and readability are key to engaging and holding the user's attention. The careful use of different fonts and sizes, and placement of text on the UI can help to increase legibility and readability. It is most likely that the system you develop will be accessed on multiple devices, with different screen sizes and resolution, in which case, the challenge then is to create, to the extent possible, the best "typographic experience" on all the different devices.
- 2.8 Ensure the system provides constant feedback. Always inform users of location, actions, changes in state, or errors. The use of various UI elements to communicate status and, if necessary, next steps can reduce frustration for users. Don't create situations where users are wondering how they were

“automagically” transported to a new destination, and then try to figure out how to return to somewhere recognizable.

- 2.9 Think about the defaults. Extensive consultation with end users can help to better anticipate and accommodate their expectations of the system. You can create defaults that reduce data entry burden, especially when it comes to form design where you might have an opportunity to create pre-selected or filled out data fields. Ensure a logical tab order. If you have two fields, “First Name”, and “Last Name” side by side, a user in the “First Name” field would logically expect the cursor to move to the next field, “Last Name” when the tab key is pressed; the cursor jumping to any other field on the UI can be quite frustrating.
- 2.10 Test your UI exhaustively, and if your system is intended for multiple device access, then test it on as many devices as possible

Figure 14 – Speaks for itself



Figure 15 – Mobile Activity Management Information System (AMIS) developed for USAID/Kenya (iPad version)



2.11 A colleague who is an excellent database developer was contracted to develop a database for an organization. He worked tirelessly and produced an exceptional database, unfortunately, with a horrible interface (unbeknownst to me at the time). We invited management of the organization to a presentation of the database, which went very well till my colleague pulled up the database on an overhead projector. The immediate reaction in the room was unforgettable; the management were clearly unimpressed, and they had not even seen the rest of the presentation. The database main menu displayed on the overhead projector looked infantile and unprofessional, which, quite frankly, I too thought was terrible, and the management thereafter showed no further interest in learning about any other features of the database or about potential performance

improvements. The presentation ended abruptly and left my colleague quite disheartened.

- 2.12 Although my colleague is an excellent database developer, he unfortunately lacks graphic and visual design skills. Both he and I knew he had developed an exceptional database, if only the management would give it a second chance, they too would realize this. Unfortunately, we could not convince the management to give the database a second chance. This experience was an eye opener for me; you simply cannot underestimate the importance of that “first impression”!

It’s pretty cool, but what exactly does it do?

- 2.13 Adding interface elements, and features simply because you, the developer think they are “cool” is strongly discouraged. Interface elements that you place on the user interface must have a designated and clear function. There should not be a button or icon that will become functional at some time in the future. If it serves no immediate purpose, then it has no place on the interface.
- 2.14 Using images alone as buttons should, to the extent possible be avoided. Users have become familiar with interface elements providing a certain functionality, so you need to be consistent and predictable in your choices and their layout. Doing so will help with task completion, efficiency, and satisfaction. As in figure 16 below, the two icons typically used on user interfaces, are open to varying interpretations; the check mark could mean, “Add”, “New”, “Proceed”, or “Go”, and the X, could mean, “Cancel” or “Delete”. An image serving as a button or link should whenever possible, have accompanying text clearly explaining its function

Figure 16 – Icons used on user interface open to varying interpretations



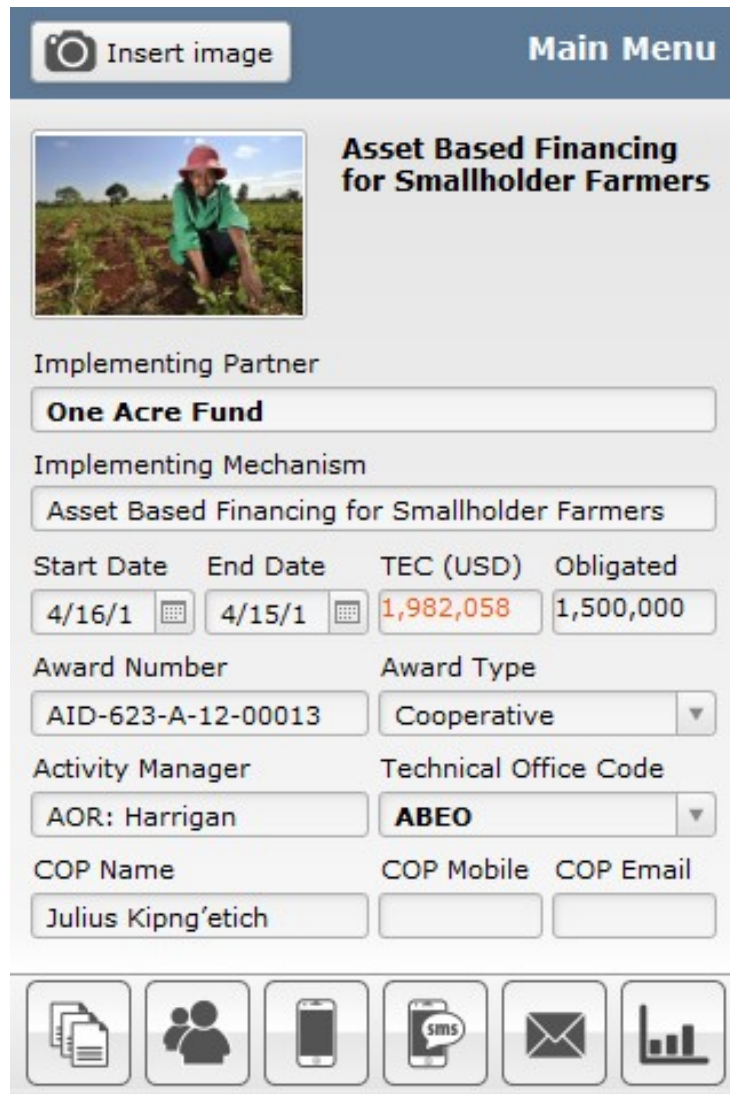
- 2.15 Navigating the database modules or navigating the records should not be an exercise in frustration. The user should be able to seamlessly move from one record to another, or from one module to another without having to spend time wondering how they were “automagically” transported to a new destination and then try to figure out how to return to somewhere recognizable; sound familiar?

Figure 17 – Navigation should be seamless, even if a bit quaint



2.16 In figure 17, these arrows may seem quaint, but are a familiar records navigation method, which facilitate movement forward or backward one record at a time, or jumping to the first or last record. It is a good idea to integrate other navigation options, especially navigating with the fingertips (swiping), which is becoming by far the most popular navigation method.

Figure 18 – Mobile Activity Management Information System (AMIS) developed for USAID/Kenya. iPhone version; navigation exclusively by fingertips!



Start Date	End Date	TEC (USD)	Obligated
4/16/1	4/15/1	1,982,058	1,500,000

Award Number	Award Type
AID-623-A-12-00013	Cooperative

Activity Manager	Technical Office Code
AOR: Harrigan	ABEO

COP Name	COP Mobile	COP Email
Julius Kipng'etich		

10 tips for developing a data management system for monitoring and evaluation (M&E)

- 2.17 Given the rapidly expanding use of touchscreens and the ubiquity of touch devices, you will need to consider integrating records navigation using fingertips. The way users navigate a system is dramatically different on a touchscreen than a desktop or laptop computer. Touch device users are using their fingers — not a mouse, keyboard, or stylus, which means that buttons and links should be easy to identify and large enough that users don't accidentally activate other features with their fingertips.
- 2.18 To facilitate navigation on iOS devices, Apple recommends that interface elements be set to occupy at least 44 pixels by 44 pixels of space, which makes it easier to tap them using a fingertip. This recommendation is based on the size of a finger, and not on the resolution of the device or the size of the screen, and so it applies to both the iPhone and iPad.
- 2.19 Whichever navigation method or combination of methods you choose to integrate in the M&E data management system, it should aim to enhance the user experience, rather than frustrate users. The navigation method should be intuitive, and consistent; do not use rectangular navigation buttons on one interface, and round buttons on the next, or place navigation icons in different locations from one interface to the next.



3: Only techies read the user guide!

- 3.1 As software become increasingly sophisticated and complex, so also are the accompanying user guides, voluminous tomes containing hundreds and hundreds of pages. I was horrified to discover that the District Health Information System (DHIS2) user guide contains over 300 pages! Granted, the user guide is a helpful document that has been in many cases meticulously developed to help the end user make the most of the software, unfortunately, most regular users will tend to avoid them.
- 3.2 The goal of the M&E data management system is to increase user productivity and ensuring that the time spent at work is productive; as such, it is imperative that the system be easy to use and that in the shortest possible time, users can be up and running. Most regular users are not techies, and most will admit, they prefer to focus on their work rather than spend many hours troubleshooting!
- 3.3 Consider integrating an online help system, along with, "tooltips", that will display information in a small "hover box", when a user hovers the pointer over a specific item, without clicking. You may use "tooltips" and messages to provide information about various features of the system, including program / project monitoring, and performance indicator guidelines.
- 3.4 Anyone who has worked on a PEPFAR³ project is familiar with the indispensable PEPFAR MER Indicator Reference Guide, which must be referenced on a very regular basis. To minimize the need to constantly have to reference the MER Indicator Reference Guide, and thereby preserve the sanity of the user, the client tracking system (CTS) developed for the LINKAGES⁴ project uses messages to provide quick guidance on the specific PEPFAR indicators that are integrated in the system. Clicking on the icon next to an indicator code displays a dialogue box that provides an overview of that indicator. The dialogue box also features a "More" button that will open a PDF copy of the MER Indicator Reference Guide, integrated in the system.

³President's Emergency Plan for AIDS Relief

⁴Linkages across the Continuum of HIV Services for Key Populations Affected by HIV Project (LINKAGES), is a five-year cooperative agreement funded by the United States Agency for International Development (USAID) under the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), and implemented by FHI360 in collaboration with PACT, IntraHealth International, and the University of North Carolina at Chapel Hill. LINKAGES aims to accelerate the ability of governments, organizations working with key populations at risk of HIV, and private-sector providers to plan and implement services that reduce HIV transmission among key populations and their sexual partners and extend the lives of those already living with HIV.

10 tips for developing a data management system for monitoring and evaluation (M&E)

Figure 19 – The Prevention Services screen of the Client Tracking System (CTS) allows for data to be captured for the PEPFAR indicators, KP_PREV; HTC_TST; GEND_GBV; GEND_NORM, and PP_PREV. Clicking on the icon next to an indicator code provides an overview of that indicator.

The screenshot displays the 'Prevention Services' screen of the Client Tracking System (CTS). At the top, there is a navigation bar with icons for 'Add New', 'Show All', 'Remove', 'Search', 'Scan Barcode', 'Finger Scan', 'Cascade', and 'Export'. Below this, the main interface is divided into four tabs: 'General', 'Prevention Services', 'Care and Support', and 'Treatment Services'. The 'Prevention Services' tab is active, showing a form for data entry. A red circle highlights an information icon (i) next to the 'KP_PREV' indicator code. A pop-up window titled 'AIS' is open, displaying the text: 'Percentage of key populations reached with individual and/or small group level HIV preventive interventions that are based on evidence and/or meet the minimum standards required'. The form includes fields for 'New Contact' (Yes/No), 'Risk Assessment' (Yes/No), 'Targeted IEC 1 Type' (Group/Individual), 'Targeted IEC 1 Date' (1/30/2016), 'Targeted IEC 1 Topics' (FP (FSW)), 'Risk Assessment 2' (Yes/No), 'Targeted IEC 2 Type' (Group/Individual), 'Assessment 2 Date' (1/30/2016), 'Targeted IEC 2 Topics', 'Referral to at Least...' (HTC), 'Lubricant' (Yes/No), 'Male Condoms' (Yes/No), 'Female Condoms' (Yes/No), 'Referred From...', and 'HTC Provided' (Yes/No). There are also dropdown menus for 'Service Delivery Point' (CAI), 'Facility Name' (Hospital Nacional), 'Priority Geo Area' (San Pedro Sula), and 'Facility Location'. At the bottom, there are sections for 'HTC_TST' (HIV Test 1, Date Tested) and 'GEND_GBV | GEND_NORM' (Initial Assessment, PEP Received, Screened for, Services Received, Rapid HIV Test, Referral to, Intervention Type, Participatory Method, Topic(s) Discussed, Completed...).

4: “You can’t manage what you don’t measure”⁵

- 4.1 Performance indicators are at the heart of developing an effective monitoring and evaluation system – they define the data to be collected and enable actual results achieved to be compared with planned results over time. Hence, they are an indispensable management tool for making evidence-based decisions about program strategies and activities.
- 4.2 The extent to which the indicators are well developed will determine the quality of the data management system. The resulting system, much like an indicator will serve as a signal that reveals progress (or lack thereof) towards objectives. The system output (reports) will provide a means of measuring what actually happens against what has been planned in terms of quantity, quality and timeliness. As you develop a data management system for M&E, keep in mind that performance indicators can be either quantitative or qualitative variables intended to provide a simple and reliable basis for assessing achievement, change or performance.
- 4.3 Each performance indicator in your M&E data management system should integrate complete details of that indicator, and if possible, link to corresponding performance indicator reference sheet (PIRS). If you are developing the system for a USG partner, then you should be guided by the Standardized Program Structure and Definitions (SPSD). The SPSD is a complete inventory of broadly agreed-upon definitions for indicators of performance of U.S. foreign assistance programs, that facilitates the comparison and analysis of budget and performance data across countries, regions, and globally.
- 4.4 In developing your M&E data management system you could setup the SPSD as a “Lookup” table, thereby allowing the programs / projects in your system to reference relevant indicator(s) in the SPSD
- 4.5 The SPSD is made available in PDF and Excel formats; good luck locating an indicator in either of those! While developing the Activity Management Information System (AMIS) on behalf of USAID Kenya, I needed the activities to “lookup” related indicators from the SPSD (as opposed to having to key in each indicator), so I created a searchable electronic version, the eSPSD.

⁵Famous quote by management guru, Peter Drucker

Figure 20 – Home Screen of the electronic version of the standardized program structure and definitions (eSPSD)

The screenshot shows the home screen of the eSPSD system. At the top, there is a navigation bar with icons and labels for 'Main Menu', 'Objective', 'Show All', 'Search', and 'PIRS'. Below this, the main content area is titled 'OBJECTIVE 3 INVESTING IN PEOPLE' and includes a descriptive paragraph. On the left side, there are three stacked boxes: 'Objective 3' with a description, 'Program Area 3.1 Health', and 'Program Element 3.1.1 HIV/AIDS'. On the right side, there is a table with two columns: 'Program Area' and 'Indicator Number/Title'.

Program Area	Indicator Number/Title
3.1 Health	
3.1 Health	3.1-5 Development stage for an essential package
3.1 Health	3.1-6 Number of civil society organizations
3.1 Health	3.1-7 Percentage of providers complying with
3.1 Health	
3.1 Health	3.1.1-6 Number of adults and children with
3.1 Health	3.1.1-10 Number of adults and children with
3.1 Health	3.1.1-24 Number of individuals who received
3.1 Health	3.1.1-59 Number of pregnant women with
3.1 Health	3.1.1-60 Percent of pregnant women with
3.1 Health	3.1.1-61 Percent of HIV-

- 4.6 The version of the eSPSD for desktop / laptop (WIN / MacOS) and iOS (iPad / iPhone) are available for download. Please note that the eSPSD contains the SPSP deployed for use at State and USAID—March 18, 2013 version; it has not been updated with the latest SPSP approved by F for deployment in conjunction with FY 2017 Budget Formulation

Figure 21 – The Activity Management Information System (AMIS) developed for USAID Kenya looks up indicators from the eSPSD

USAID | KENYA
FROM THE AMERICAN PEOPLE

PERFORMANCE INDICATORS

Reporting Mechanism Feed the Future F Standard Custom PPR

Indicator Lookup

RAA: blank | Category: Active | Type: Output

3.2.1-14: Number of learners enrolled in primary schools and/or equivalent non-school-based settings with USG support

Number: F Program Element

3.2.1 Basic Education

Number: Indicator Title

3.2.1-14 Number of learners enrolled in primary schools and/or equivalent non-school-based settings with USG support

Number: Disaggregated By

Precise Definition

Rationale or Justification

Data Source 1: | Data Source 2: | Baseline: | Baseline Time Period:

Implementing Partner: Aga Khan Foundation USA

Implementing Mechanism: Education for Marginalized Children in Kenya

Award Number: AID-623-A-00-06-00062 | Award Type: Cooperative Agreement

Technical Office: Education and Youth Office

Targets: LOP: 471,983

Year 1	Year 2	Year 3	Year 4	Year 5
2013	2014	2015	2016	2017
202,196	269,787			

Actuals


Year 1	Year 2	Year 3	Year 4	Year 5
2013	2014	2015	2016	2017
164,221	203,999			

4.7 The Activity Management Information System (AMIS) also links to the Mission’s results framework, and thereby serves as a comprehensive performance management and reporting system and tracking tool that enables USAID/Kenya fulfill performance monitoring, evaluation, reporting, and dissemination requirements as mandated in the ADS⁶.

4.8 Additionally, the Activity Management Information System (AMIS) supports the Kenyan Mission in the preparation of the PPR. The PPR is an annual report of the year’s progress against achievement of development objectives, indicators, and key issues; the AMIS provides support specifically for preparation of the numerical section of the PPR. The AMIS has been used to aggregate all indicator values for each technical office in preparation for PPR 2015 data call.

⁶The Automated Directives System (ADS) contains the organization and functions of USAID, along with the policies and procedures that guide the Agency’s programs and operations

Figure 22 – The Activity Management Information System (AMIS) developed for USAID Kenya aggregates results for the PPR

Back 

EDY - PPR Indicators Aggregate Values

ID	Indicator Title	Target 2013	Actual 2013	Target 2014	Actual 2014	Target 2015	Actual 2015	LOP
EDY-AKHF-EMACK-05	3.2.1-3d: Number of administrators and officials successfully trained with USG support: Goal 3	184	184					184
EDY-AKHF-EMACK-06	3.2.1-3e: Number of administrators and officials successfully trained with USG support: Direct attribution	184	184					184
EDY-AKHF-EMACK-07	3.2.1-3f: Number of administrators and officials successfully trained with USG support: Indirect attribution							
EDY-AKHF-EMACK-08	3.2.1-12: Number of laws, policies, regulations, or guidelines developed or modified to improve equitable access to or the quality of education services	0	2					0
EDY-AKHF-EMACK-09	3.2.1-14: Number of learners enrolled in primary schools and/or equivalent non-school-based settings with USG support	202,198	164,221	269,787	203,999			471,983
EDY-AKHF-EMACK-10	3.2.1-14a: Number of learners enrolled in primary schools and/or equivalent non-school-based settings with USG support: Men	101,098	85,612	153,818	107,190			254,916
EDY-AKHF-EMACK-11	3.2.1-14b: Number of learners enrolled in primary schools and/or equivalent non-school-based settings with USG support: Women	101,098	78,609	115,969	96,809			217,067
EDY-AKHF-EMACK-12	3.2.1-14c: Number of learners enrolled in primary schools and/or equivalent non-school-based settings with USG support: Goal 1	202,195	164,221	269,787	203,999			471,982
EDY-AKHF-EMACK-13	3.2.1-14d: Number of learners enrolled in primary schools and/or equivalent non-school-based settings with USG support: Goal 3	120,000	62,389	157,503	71,917			277,503
EDY-AKHF-EMACK-14	3.2.1-14e: Number of learners enrolled in primary schools and/or equivalent non-school-based settings with USG support: Direct	202,198	164,221	269,787	203,999			471,983
EDY-AKHF-EMACK-15	3.2.1-14f: Number of learners enrolled in primary schools and/or equivalent non-school-based settings with USG support: Indirect							

USAID / KENYA | Reports Page ?

4.9 If you are developing a system that will monitor and report on a PEPFAR⁷ program, then the indicators should be derived entirely from the PEPFAR MER Indicator Reference Guide. An M&E data management system that integrates indicators from the PEPFAR MER Indicator Reference Guide, is blessed with ample information on each indicator, and such a system should be able to adequately respond to all PEPFAR reporting requirements. PEPFAR indicators

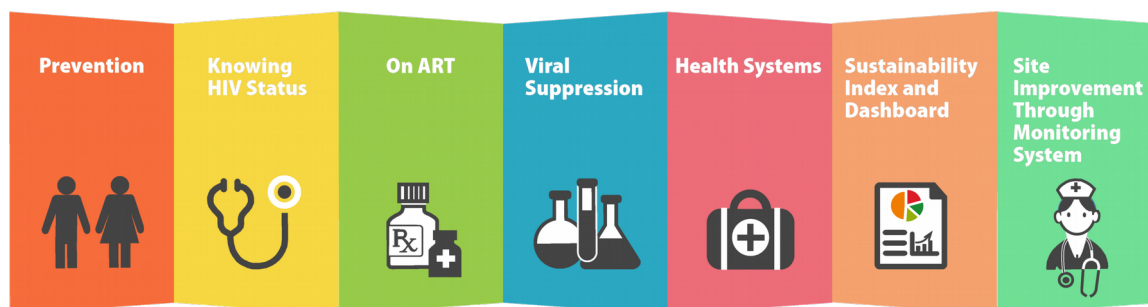
⁷ President's Emergency Plan for AIDS Relief

10 tips for developing a data management system for monitoring and evaluation (M&E)

have evolved over the years, and are quite comprehensive, and for the most part, very clear on what is being measured, as well as measurement criteria.

- 4.10 The client tracking system (CTS) developed on behalf of the LINKAGES⁸ project, is a complete program monitoring / management model that provides both Civil Society Organizations (CSOs) and clinical sites a comprehensive tool for collecting individual level data and reporting against the core PEPFAR indicators, as well as supporting real-time cascade analysis.
- 4.11 The CTS provides for data on PEPFAR core indicators to be collected without undue and costly time inputs. Additionally, the CTS goes beyond aggregate indicator reporting to support more detailed evaluations of individual program outcomes. This is particularly important in order to construct an HIV cascade showing a key population (KP) access to the continuum of prevention, care, and treatment (CoPCT) services. These outcomes are critical for individual programs to assess how well they are meeting the clinical and treatment needs of KP, to determine the extent of loss to follow-up and how to address it, and to determine whether the choice of treatment regimens being used are appropriate for their context. Inconsistent data means that measures of adherence will be difficult to interpret.

PEPFAR Monitoring



⁸ Linkages across the Continuum of HIV Services for Key Populations Affected by HIV Project (LINKAGES), is a five-year cooperative agreement funded by the United States Agency for International Development (USAID) under the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), and implemented by FHI360 in collaboration with PACT, IntraHealth International, and the University of North Carolina at Chapel Hill. LINKAGES aims to accelerate the ability of governments, organizations working with key populations at risk of HIV, and private-sector providers to plan and implement services that reduce HIV transmission among key populations and their sexual partners and extend the lives of those already living with HIV.

Figure 23 – The Care and Support screen of the Client Tracking System (CTS) allows for data to be captured for the PEPFAR indicators, CARE_NEW; CARE_CURR, and CARE_COMM

4.12 The CTS incorporates the variables required for reporting against each of the PEPFAR core indicators. These variables are derived from the PEPFAR MER Indicator Reference Guide so as to ensure that data collection and reporting are in line with PEPFAR guidelines, thereby minimizing compliance risks.

4.13 The CTS is comprised of 2 “related” main tables;

- 1. Indicator**
- 2. Client (General)**

- 4.14 Three (3) other tables “lookup” data from the indicator and client tables;
- Prevention Services
 - Care and Support
 - Treatment Services
- 4.15 The Client table is where basic client information such as names, nicknames, sex and contact information, as well as location information, such as facility or service delivery point, and hotspot are captured.
- 4.16 The client table is accessed from the General screen. Once a client’s data is entered on the General screen, a Unique Identifier Code (UIC) is automatically generated for that client. As the client progresses through the continuum of prevention, care, and treatment (CoPCT) services, only the client’s UIC is in use.
- 4.17 Unique identifier codes (UICs) allow an individual to be identified by either a set of alpha-numeric codes or other unique property of that individual that can be used to match related records for that individual only. In general, **UICs fit into two broad categories, non-biometric and biometric; the CTS integrates both types of UIC.**
- 4.18 The use of UICs may play an important role in the fight to end the AIDS epidemic. Where stigma and discrimination deter KP from seeking care and treatment services, the use of a unique identifier can provide the needed assurance of privacy and confidentiality, while providing valuable individual-level program data.
- 4.19 In the absence of the CTS, peer educator daily diaries may be modified to integrate a client-generated UIC, which is constructed from, and relies on accurate client responses to a set of simple prompts

Table 1 – Sample prompts to construct a UIC

Province Code	From map (<i>figure 24</i>)
Prompt 1	Mother’s maiden name
Prompt 2	Father’s middle name
Prompt 3	Sex
Prompt 4	Year of birth
Prompt 5	Birth order

10 tips for developing a data management system for monitoring and evaluation (M&E)

4.20 The UIC is then constructed from the province code, first two letters of mother's maiden name, first two letters of father's middle name, sex, 2-digit year of birth, and birth order.

Figure 24 – Map of Mozambique with province codes

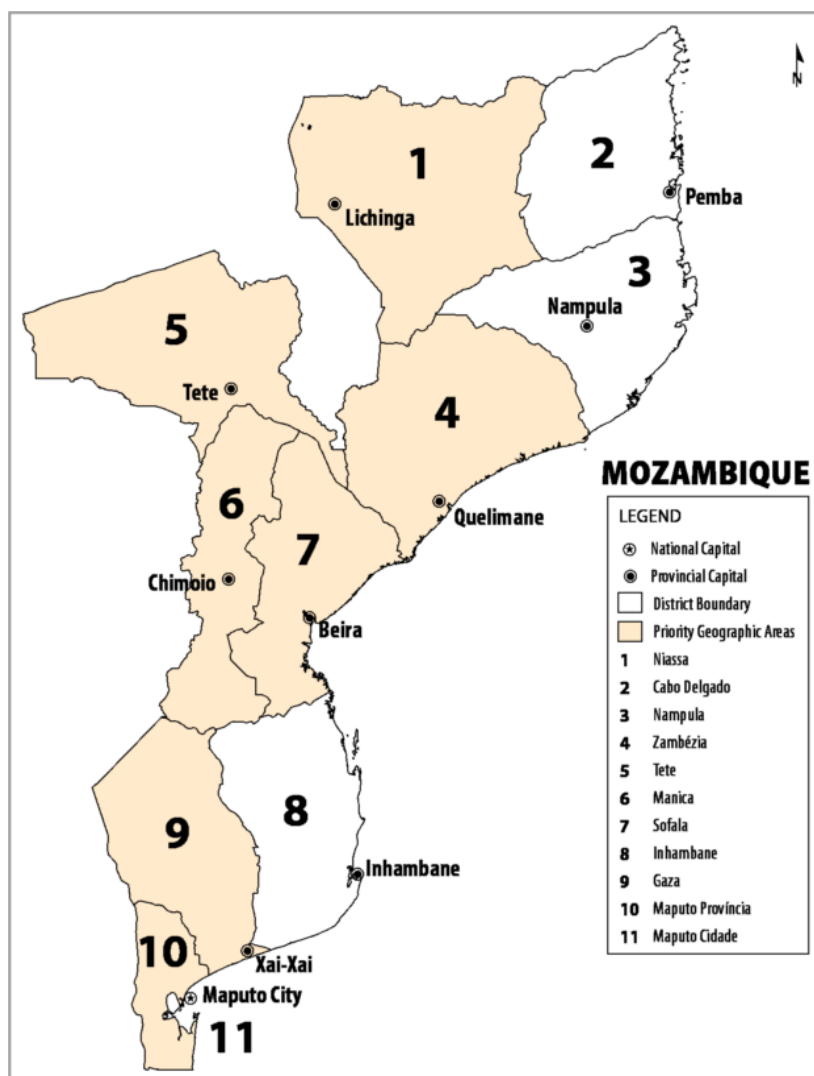


Table 2 – example UIC constructed from client response

Province Code (from map)	Mother's maiden name	Father's middle name	Sex 1=Male 2=Female	Year of birth	Birth Order
11	Gonzalez	Pedro	2	1980	3

10 tips for developing a data management system for monitoring and evaluation (M&E)

- 4.21 For example, a female born in 1980, her mother’s maiden name is Gonzalez, her father’s middle name is Pedro, she is the third child of six children, and resides in Maputo City, the generated code for this person would be **11-GOPE-2-80-3**
- 4.22 The Prevention Services table of the CTS allows for data to be captured for the following indicators
- KP_PREV
 - HTC_TST
 - GEND_GBV
 - GEND_NORM
 - PP_PREV

Figure 25 – The Prevention Services screen of the Client Tracking System (CTS) showing panels for PEPFAR indicators, HTC_TST; GEND_GBV; GEND_NORM, and PP_PREV

The screenshot displays the Prevention Services screen of the Client Tracking System (CTS). It features several distinct panels for data entry:

- Top Panel (Grey):** Contains fields for Service Delivery Point (CAI), Facility Name (Hospital Nacional), Priority Geo Area (San Pedro Sula), and Facility Location.
- GEND_GBV | GEND_NORM Panel (Blue):** Includes sections for Initial Assessment, PEP Received, Screened for, Services Received, Rapid HIV Test, Referral to, Intervention Type, Participatory Method, Topic(s) Discussed, and Completed...
- HTC_TST Panel (Light Green):** Contains fields for HIV Test 1 (Yes/No), Date Tested (2/27/2016), Counseling Provided (Yes/No), Type of Counseling (Individual), Received Test Result (Yes/No), HIV Status / Result (Negative), Previously Tested (Yes/No), Confirmatory Results (Negative), Repeat Test (Yes/No), and Date of Repeat Test.
- PP_PREV Panel (Yellow):** Includes sections for Intervention Type (Group/Individual), Intervention Date, Risk Assessment (Yes/No), Risk Assessment Date, Condom Promotion (Yes/No), Session on HTC (Yes/No), Demand Creation (Yes/No), and Activities.
- Left Panel (Light Green):** Contains Targeted IEC 1 and 2 Type (Group/Individual), Targeted IEC 1 and 2 Date (1/30/2016), Targeted IEC 1 and 2 Topics (FP (FSW)), Risk Assessment 2 (Yes/No), Assessment 2 Date (1/30/2016), Referral to at Least... (HTC), Lubricant (Yes/No), Male Condoms (Yes/No), Female Condoms (Yes/No), Referred From..., and HTC Provided (Yes/No).

4.23 The Care and Support table allows for data to be captured for the following indicators

- CARE_NEW
- CARE_CURR
- CARE_COMM

4.24 Correctly capturing data on the indicator CARE_COMM often presents a challenge, owing to the fact that it tracks both Pre-ART and ART patients. The CTS simplifies data capture for CARE_COMM by providing guidance on criteria.

Figure 26 – The CARE_COMM panel on the Care and Support screen; notice the data fields with red borders!

CARE_COMM

Enrolled into Community Care and Support
 Yes No

Enrollment Date
[Date Picker]

Pre-ART Yes No

On ART Yes No

Pre-ART Support (Select all that apply)
[Dropdown Menu]

ART Support (Select all that apply)
[Dropdown Menu]

ART Refill Date [Date Picker] **ART** [Text Box]

Registered at Facility Yes No

Facility Name [Dropdown Menu]

4.25 Data capture fields that are encircled with a red border, collectively represent the absolute minimum criteria that a client must meet in order to be counted against that particular indicator. If no data is provided in only one of the fields with a red border, then the criteria for reporting against that indicator have not been met.

- 4.26 It is important that an M&E data management system standardize and streamline data capture so as to make less room for errors, and omissions, that make data susceptible to compliance risks.
- 4.27 The Treatment Services table allows for data to be captured for the following indicators
- TX_NEW
 - TX_CURR
 - TX_RET
 - TX_VIRAL
 - TX_UNDETECT
- 4.28 The Care and support, and Treatment Service screens both link to a clinical form that allows for the capture of periodic testing (as mandated by PEPFAR), and ART refills for patients receiving treatment services.

Data entry screens, data capture forms, and methods

- 4.29 Data entry screens, and data capture forms should be simple and easy to use, especially paper based forms that are intended for field data collection.
- 4.30 I have received frequent feedback from those responsible for data entry, that when the data capture forms are more or less, identical to the data entry screens, data entry is less burdensome, and less prone to data entry errors. So, my advise is to create data entry screens that mirror the data entry forms. See figures 24 and 25.
- 4.31 A good M&E data management system will be supported by a collection of well designed and standardized forms and templates for capturing and reporting performance data.
- 4.32 Rather than rushing ahead to develop new data capture forms, you should first consult with program managers, M&E officers, and stakeholders, and review any existing forms and templates currently in use, to determine if they contain items that could be incorporated in the design of new ones.

Figure 27 – Data entry screen of the performance management system developed for the Somali Regional Bureau of Finance and Economic Development (BoFED)

The screenshot shows a web-based data entry interface. At the top, there is a 'Main Menu' button, a search bar, and icons for adding, deleting, and reporting. The left sidebar is titled 'Indicators by Bureau' and lists various bureaus: Agriculture, Audit, BoFED, Education, Health, Justice, Revenue, Road and Housing, Trade, Water works, and Women's Affair. The main content area is for 'Animal vaccination coverage' in the 'Agriculture' bureau. It includes fields for 'Serial Number' (0501-000-211-01-07), 'Implementing Bureau' (Agriculture), 'Performance Indicator' (Animal vaccination coverage), 'Animal Species Vaccinated' (Cattle, Sheep, Goat, Camel, Donkey), 'Vaccinated Against' (Anthrax, Blackleg, Pleuro-Pneumonia, Hemorrhagic-Septicemia, Other), 'Zone' (Jijiqqa), 'Woreda', 'Performance Measure' (Animals Vaccinated (%), Total Animals Vaccinated), 'Target' (Quarterly Target (Count), Species Population), 'Program Unit Cost' (Total Expenditure (ETB), Total Animals Vaccinated), 'Specified Period' (Start Date, End Date), 'Resource Utilization Index' (Available Vaccines (Start), Total Vaccines Used (End)), and 'Staff Productivity Index' (Total Animals Vaccinated (%), Total number of Employees).

- 4.33 The tool kit should include both electronic and paper-based forms and templates to be used for field data collection. This will allow for data collected at district and community levels to be captured on paper forms, and later keyed in to the system. Mobile data collection (MDC) should be fully integrated. The reliance alone on paper-based data collection tools and the use of unstructured documents, creates room for errors, and omissions, which makes the data susceptible to compliance risks. It is strongly recommended that field names on data entry screen(s) match those on data capture forms; this greatly minimizes confusion and data entry errors.

Figure 28 – One of the paper-based data capture forms generated by the performance management system developed for the Somali Regional Bureau of Finance and Economic Development (BoFED)

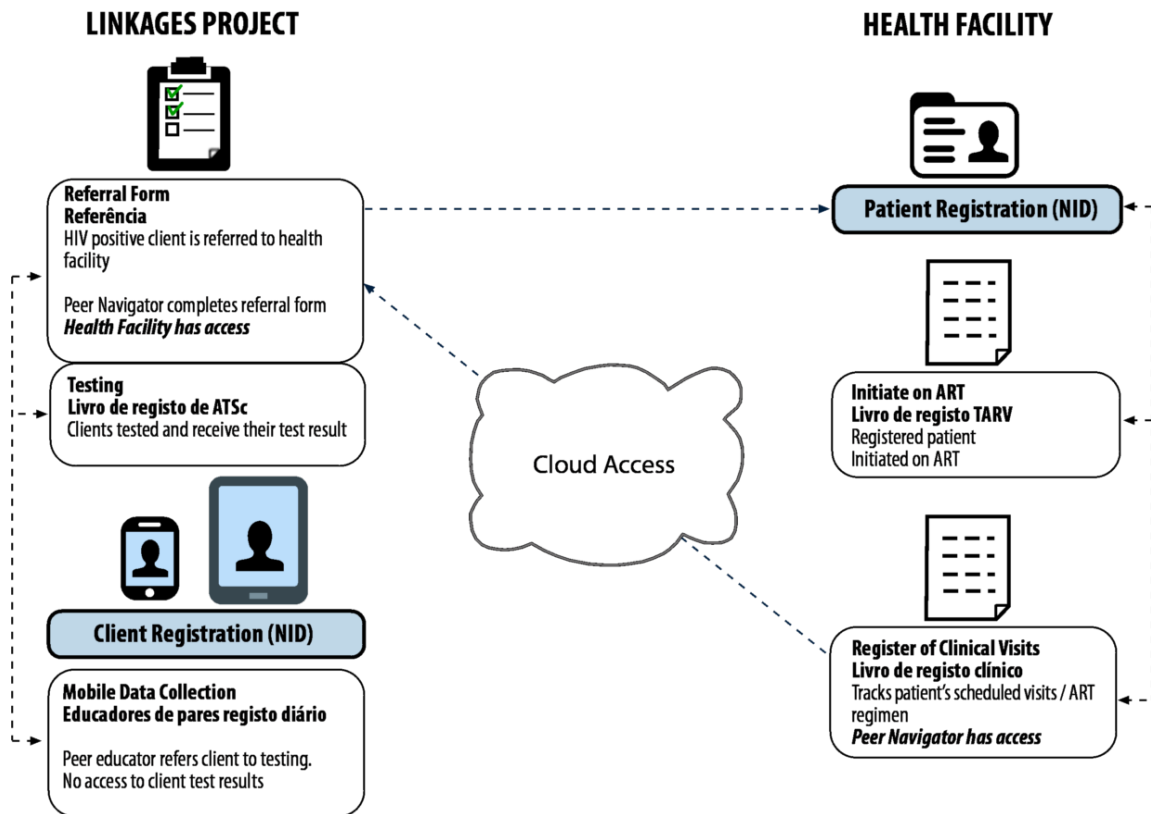
Somali Regional State Bureau of Finance & Economic Development - BoFED
Animal Vaccination Coverage Data Capture Form

SERIAL NUMBER	IMPLEMENTING BUREAU
0501-000-211-01-07	Agriculture
PERFORMANCE INDICATOR	
Animal vaccination coverage ▼	
Number of animals vaccinated for each selected animal species against a disease in question during a specified period divided by that livestock population (expressed as a percentage.)	
ZONE	WOREDA
Jigjiga	
ANIMAL SPECIES VACCINATED	VACCINATED AGAINST
<input checked="" type="radio"/> Cattle <input type="radio"/> Goat <input type="radio"/> Donkey <input type="radio"/> Sheep <input type="radio"/> Camel	<input checked="" type="checkbox"/> Anthrax <input checked="" type="checkbox"/> Pleuro-Pneumonia <input type="checkbox"/> Other <input checked="" type="checkbox"/> Blackleg <input checked="" type="checkbox"/> Hemorrhagic-Septicemia
PERFORMANCE MEASURE	TARGET
Animals Vaccinated (%)	Quarterly Target (Count)
5.00	21,950
Total Animals Vaccinated	Species Population (Count)
21,950	439,000
PROGRAM UNIT COST	SPECIFIED PERIOD
Total Expenditure (ETB)	Start Date (M/D/YYYY)
337,500.00	4/1/2012
Total Animals Vaccinated	End Date (M/D/YYYY)
21,950	6/30/2012
VACCINE UTILIZATION INDEX	STAFF PRODUCTIVITY INDEX
Available Vaccines (doses, ml, liter)	Total Animals Vaccinated
405,000	21,950
Total Vaccines Used (doses, ml, liter)	Total Employees involved in the process
135,000	75
LOCATIONS	STAFF COST INDEX
Lat/Long (Decimal Degrees)	Total Expenditure (ETB)
1	337,500.00
2	Total Employees involved in the process
3	75
COMMENTS/OBSERVATIONS (also use this area to enter contact person information)	
No baseline data exists for animals vaccinated disaggregated by species. The baseline has been "reconstructed" from secondary data	

4.34 A mobile data collection (MDC) exercise was conducted in Mozambique on behalf of the LINKAGES project implemented by FHI360. Prior to the MDC exercise, LINKAGES project partners were collecting individual-level outreach,

testing and referral data using paper forms, and occasionally unstructured documents (journals, notepads, scraps of paper, etc.). The exclusive reliance on paper-based data collection tools together with the use of unstructured documents, created room for errors, and omissions, making the data susceptible to compliance risks.

Figure 29 – Mobile Data Collection | Successful Referral and Patient Tracking - LINKAGES Mozambique



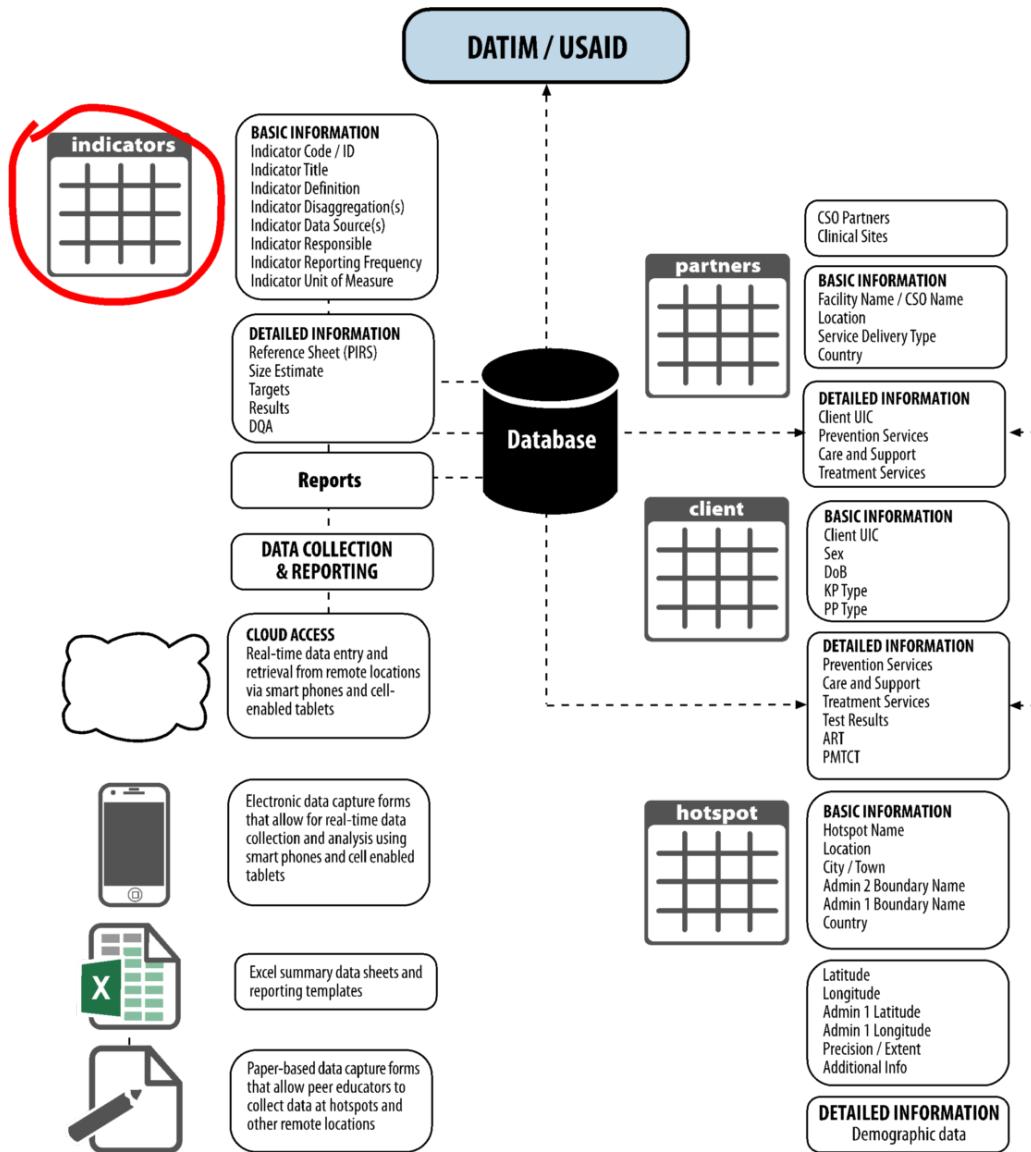
4.35 The MDC focused on collecting individual-level outreach, testing and referral data, which in addition to ensuring accuracy of the data, facilitated tracking individual key population (KP) as he/she progresses through the continuum of prevention, care, and treatment (CoPCT) services.

4.36 The full report of the pilot may be downloaded by following this link <http://home.magpi.com/case-study/mozambique-hiv-data/?sectors=true&id=12>

5: Scale-ability; growth doesn't have to be painful

- 5.1 A data management system for monitoring and evaluation should be developed as a module compilation of tables and utilities; this will render the system fully scalable. In this way, each table will rely on basic information contained in a central file, but is otherwise independent of other tables. This approach allows for tailored access dependent on a user's specific needs. Complete integration of the tables provides the ideal platform for re-engineering and aligning national and sub-national M&E objectives.
- 5.2 The client tracking system (CTS) is developed as a modular compilation of "related" tables; with two main tables;
1. Indicator
 2. Client
- 5.3 Three (3) other tables "lookup" data from the indicator and client tables
- Prevention Services
 - Care and Support
 - Treatment Services
- 5.4 Two additional tables, "partners" maintains information on CSO partners and supported clinical sites, and "hotspot", which captures the LAT/LONG geographic coordinates that refer to a hotspot. The LAT/LONG coordinates of hotspots are used in hotspot mapping
- 5.5 The indicators table is the repository of all the indicators in the system, and can be modified independent of the other tables.
- 5.6 If you are managing a PEPFAR program, then your performance indicators are derived from the PEPFAR MER Indicator Reference Guide, and as a program manager, you are all too aware that the MER Indicator Reference Guide is updated frequently, which can be both a good, and bad thing. It is good, because measurement criteria, and drug protocols change, and the performance indicators must reflect these changes. It is a bad thing when the systems developed to support M&E on a PEPFAR project have been developed without sufficient flexibility to accommodate the periodic updates to PEPFAR indicators.

Figure 30 – Structure of the client tracking system (CTS)



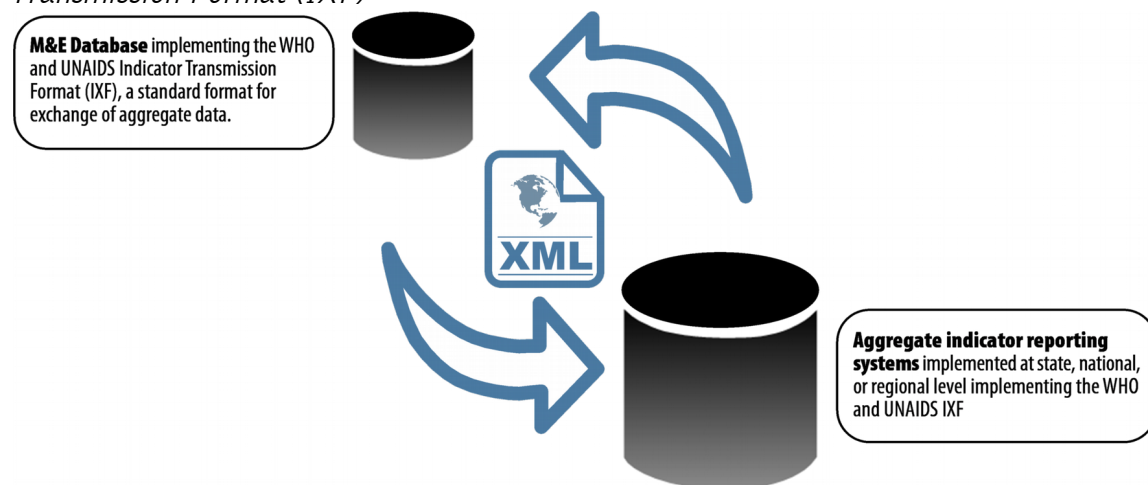
5.7 For the client tracking system (CTS), the indicators table (circled in red in figure 30) can be updated as necessary, without the need to modify the other tables that comprise the system.

5.8 Growth doesn't have to be painful! The most compelling argument for modular design is the promise of near effortless scaling. For the client tracking system (CTS) developed for the LINKAGES project, the modular design allows for easy and efficient adaptation and modification of the data collection forms and indicators table as PEPFAR indicators and ARV drug protocols change.

6: Compatibility and interoperability; no system should be an island

- 6.1 Your M&E data management system should have the ability to exchange data with any existing and planned aggregate indicator reporting systems implemented at the national level
- 6.2 If your M&E data management system is collecting data on HIV/AIDS, then it needs to be compatible with the Country Response Information System (CRIS)⁹, as well as the Emergency Plan Country Operational Plan and Reporting System (COPRS) along with a host other “questionable”¹⁰ systems.
- 6.3 Consider implementing the WHO and UNAIDS Indicator Transmission Format (IXF), a standard format for exchange of aggregate data. The IXF format, written in the Extensible Markup Language (XML), is based on the ISO Statistical Data and Metadata Exchange (SDMX) standard. IXF format carries information in a standard structure and format permitting applications to exchange data without negotiation; any application incorporating the IXF will be able to utilize the data. For example, each indicator and associated data, as well as desegregation categories are assigned identifiers at the global level to facilitate data exchange. Each value is self contained, carrying all metadata and enabling independent transmissions of data.

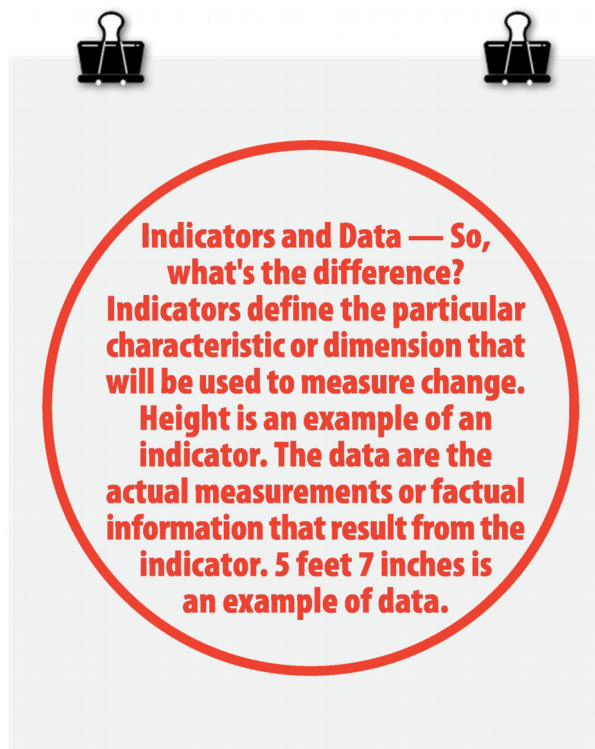
Figure 31 – M&E database implementing the WHO and UNAIDS Indicator Transmission Format (IXF)



⁹ The Country Response Information System is no longer supported by UNAIDS

¹⁰ Questionable in the sense that the proliferation of reporting platforms only increase data entry burden, and create more confusion, and are more often an unnecessary duplication of effort

- 6.4 Implementing a standard data exchange format greatly reduces redundancy, and data collection / reporting burden. In the republic of Uganda, there were numerous reporting requirements of USG implementing partners (IP), including the US Centers for Disease Control (CDC) quarterly report, PEPFAR aggregate indicator reporting, the Government of Uganda Ministry of Health (GOU/MOH) health management information systems (HMIS) reports and ART cards, quality of HIV care through building capacity and capability to sustain quality improvement in HIV care (HIVQUAL) assessments for those facilities being evaluated, and early warning indicators (EWI) and acquired drug resistance, surveys of the GOU/MOH HIV Drug Resistance Working Group. And although all these reporting requirements and most of the indicators overlapped, they were being assessed separately, and invariably resulted in the inefficient use of IP data management capacity, incomplete reporting of the indicators across sites, and variable data that was difficult to compare.
- 6.5 A standardized aggregate data exchange format, streamlines data processing and circumvents the problems with multiple file formats, translation, and data entry errors.



7: Reports; from the menu, or buffet-style

- 7.1 The ease and flexibility with which reports are generated and the quality of the reports is one way to gage how good is your M&E data management system.
- 7.2 The performance management system (PMAN) developed for the Somali Regional Bureau of Finance and Economic Development (BoFED) generates a number of easy-to-read graphical reports; however, the quarterly report effectively showcases the results of strategic performance monitoring in the region.
- 7.3 The quarterly performance report is simple yet very effective in providing at a glance, progress updates to BoFED management, and stakeholders, on the implementation of the bureaus' Annual Performance Plans, with particular reference to monitoring delivery against quarterly performance targets.

Table 3 – Performance symbols used in the quarterly report






	Performance is significantly better than planned
	Performance is significantly below planned levels
	Performance is within tolerance – neither significantly above nor below planned levels
	Indicates missing data
	Indicates no target

Table 4 – Performance indicator risk assessment incorporated in the quarterly report

Risk Likelihood	Unlikely	Likely	Probable	Possible	Certain
Numeric Value	1	2	3	4	5

Impact Consequence /	Insignificant	Minor	Moderate	Major	Critical
Numeric Value	1	2	3	4	5

Table 5 – Performance indicator risk rating incorporated in the quarterly report
(Calculated by multiplying the Impact/Consequence by the Likelihood of the risk)

5	10	15	20	25
4	8	12	16	20
3	6	9	12	15
2	4	6	8	10
1	2	3	4	5

Level of Risk	Score	Black & White Printer
Low	1 – 6	30% Grey
Moderate	7 – 12	65% Grey
High	13 – 25	80% Grey

◀ **Intervention required!**

Buffet-style

- 7.4 The M&E data management system should at a minimum allow the user to mix-and-match, in other words, provide the option to select single or combination of criteria to generate a report. I have seen many systems that only generate reports based on pre-defined parameters, without the option for the selection of any other parameters outside those already defined. This can seriously limit the “range” of the M&E system and deny the end user the opportunity to view the data from a number of perspectives.

Figure 32 – Quarterly performance report generated by the performance management system developed for the Somali Regional Bureau of Finance and Economic Development (BoFED)



ANIMAL VACCINATION COVERAGE														
Number of animals vaccinated for each selected animal species against a disease in question during a specified period divided by that livestock population (expressed as a percentage.)														
Cattle														
Jigjiga														
YTD	Q1 Actual	Q1 Target	Q1	Q2 Actual	Q2 Target	Q2	Q3 Actual	Q3 Target	Q3	Q4 Actual	Q4 Target	Q4	Risk Rating	Action
	27,000	21,950	↑↑	21,950	21,950	↓↑							5	No Action Needed

Key to Report Symbols

↓↓	Performance is significantly below planned levels
↑↑	Performance is significantly better than planned
↓↑	Performance is within tolerance – neither significantly above nor below planned levels
⊗	Indicates missing data
⊘	Indicates no target data

Level of Risk	Score
Low	1 – 6
Moderate	7 – 12
High	13 – 25

Year-to-date (YTD) is the period starting from June 01 to the latest reporting date

Somali Regional State Bureau of Finance and Economic Development (BoFED)

7.5 Sometimes, we are inclined to learning the hard way. A data management system I developed for a USAID mission was configured to generate a number of pre-defined reports, which I felt were sufficient to meet the Mission’s needs. On a certain occasion, the mission director travelled to Washington and was making a presentation, and during a short break, she telephoned the mission and requested that certain information be sent to her immediately, although the data management system contained the requested information, it was not reflected on any of the standard reports. And to make matters worse, I was not in the office on that particular day! This situation is clearly avoidable (as I have now learned) by making it easy for users to output in every possible combination, the data contained in the system.

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Figure 33 – Buffet Style reports screen of the BoFED performance management system

Main Menu

Search

Excel PDF Print

All Indicators Indicators by Bureau

Select Indicator

Animal Vaccination Coverage

Quantity of forage feed stored

Number of animal health facilities

Number of PSNP beneficiaries assessed as food secure

Land under cultivation

Quantity of fertilizer used

Extension service coverage

Access to potable water/rural

Access to potable water/urban

Functioning water schemes

Number of fully capacitated classrooms

Net enrolment rate (NER) in primary education

Primary repetition rate

Secondary school student-teacher ratio

Literacy rate of 15-24 year-olds

Percent of certified and qualified primary teachers

Gender Parity Index

Primary health care coverage

Access to sanitation facilities

Number of health workers

Under five mortality rate

Births attended by official health personnel

Road network coverage

Number of low cost housing units constructed

1 Select Indicator

2 Select Variables

3 Select output format

Current Selection:
Animal Vaccination Coverage

? SPECIFIED PERIOD
(Start and End dates must conform to a valid quarter!)

Start Date (M/D/YYYY)

End Date (M/D/YYYY)

Animal Species Vaccinated

Camel Goat

Cattle Sheep

Donkey

Vaccinated Against

Anthrax

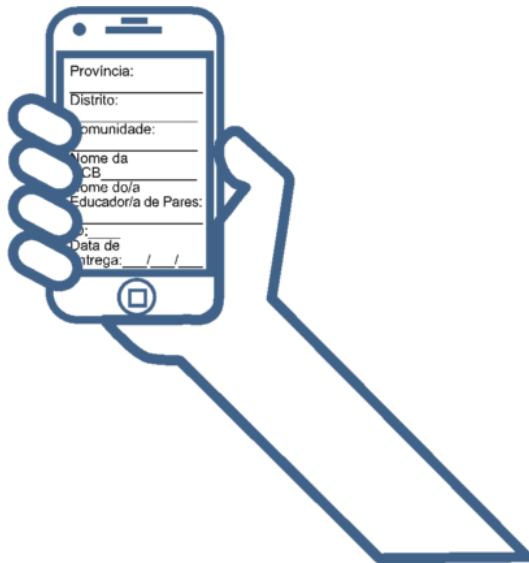
Blackleg

Hemorrhagic-Septicemia

Pleuro-Pneumonia

Other

8: Data on the go!



- 8.1 Let's face it, we live in exciting times, where we can access information anywhere, at anytime. This level of mobility has questioned the age old idea of workers commuting to work, and sitting at a desk for 40 hours a week. Employers are realizing that there is really no compelling argument to keep staff tethered to a desktop computer, and there is ample evidence to support the fact that staff are more productive when they have the option of telecommuting.
- 8.2 Developing an M&E data management system that is mobile will allow users to access the data from anywhere in the world using any Internet-enabled mobile device. While a system that is accessed in this way eliminates cross-platform issues, you are still confronted with the challenge of the different screen sizes, and resolutions of a myriad mobile devices. For your M&E data management system to provide real mobile computing experience, it will need to be cloud based, which has numerous advantages
- 8.3 Real-Time Data Availability means that the data contained in your M&E data management system will always be the most recent. If field data collectors are able to access the cloud-based system, then they will be able to update the information in real-time, and the changes will be reflected also in real-time for anyone with access to the system.
- 8.4 Chapter 10 of this guide deals with data backup and restoring. Backing up your data to the cloud is safe, secure, and worth the effort. Cloud automated backup, and disaster recovery, which will most likely be provided by the hosting company,

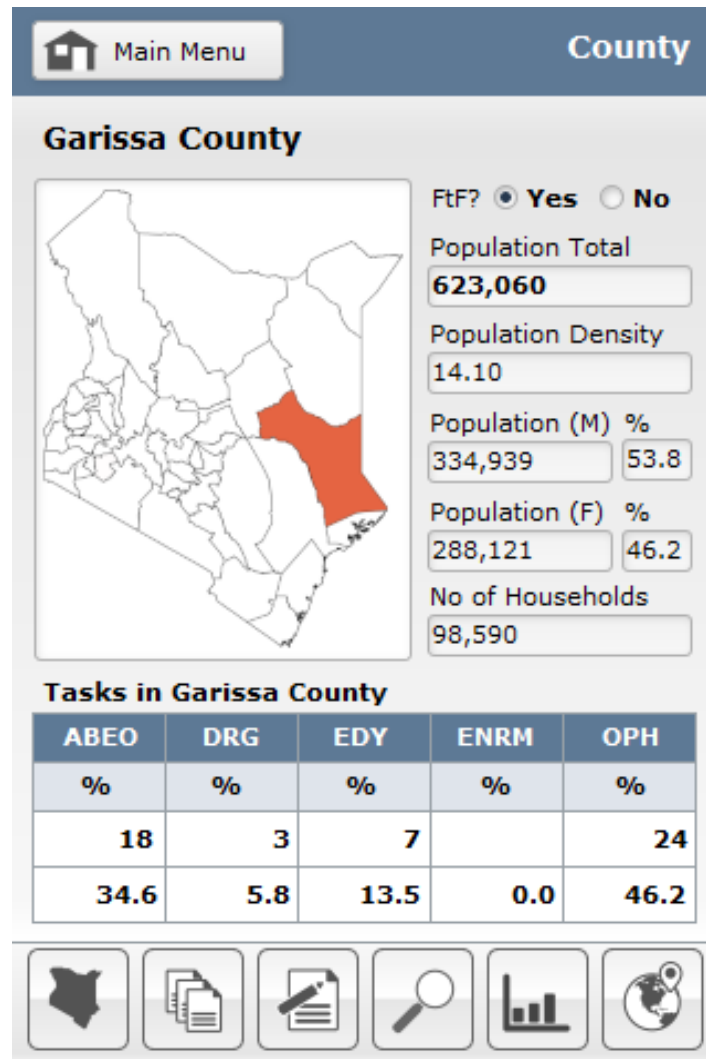
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- involves creating and storing copies of your database on redundant cloud-based servers in order to mitigate the incident of accidental loss.
- 8.5 Data security for your cloud-based system will largely depend on your provider. Some of the data that your system will contain may be of a sensitive nature, especially financial data, so it is advisable to carefully evaluate potential service providers in order to determine the one that guarantees the best security and protection for your data at reasonable cost
 - 8.6 While most of the West take high-speed Internet for granted, the Rest still have to contend with intermittent or poor Internet connectivity. A cloud-based system means that users will, for the most part require a reliable and secure Internet connection in order to access the data, and this is not always guaranteed in many of the infrastructure challenged parts of the world.
 - 8.7 As cloud computing continues to evolve, it is giving rise to the emergence of cloud tools that significantly reduce the mobile users' need for increased data processing and storage capacities on their mobile devices. As a developer experienced in developing for native platforms such as iPhone or Android, developing for mobile cloud means taking into account the integration of cloud tools, which significantly alters the way you would typically approach development for native platforms.
 - 8.8 Dependency and vendor Lock-In. In some instances, the decision to change providers could present the formidable problem of vendor lock-in, wherein your current provider will "intentionally" make it difficult for you to migrate your data. I suggest carefully reviewing the terms and conditions of service, prior to deciding on a provider, in order to avert any potential problems of vendor-lock-in.
 - 8.9 The USAID Kenya Activity Management Information System (AMIS) was originally developed for desktop systems only. Then on one occasion, the mission director returned from a visit to DC, and said to me, "Andrew, while attending a meeting of mission directors, whenever any of the mission directors was asked a question about their programs, they immediately whipped out their iPhone, or iPad, hit a few keys, and voila, they had all the data right there at their fingertips; why can't we have the same?"
 - 8.10 The resulting mobile version of the Activity Management Information System (AMIS) provides USAID/Kenya senior staff with quick and convenient access to active awards data on the go—on their iPhones and iPads. Since the mobile AMIS runs on mobile devices, it allows for information to be collected from anywhere—whether it involves manually entering data using the mobile device's

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touch screen and virtual keyboard, capturing geographic coordinates at a facility, or taking photos in the field for a "Success story" using one of the mobile device's built in cameras.

Figure 34 – the "County" screen of the mobile Activity Management Information System (AMIS) developed for USAID/Kenya (iPhone version)



8.11 Due to security concerns, which limit access to USG systems, the mobile version of the Activity Management Information System (AMIS) is not cloud hosted, and as such, does not update automatically when new information is added by a user. All the Mission's Awards data are contained on the mobile device, on which the AMIS is installed, and any changes made to the data on that device by the user are not reflected anywhere else, except on that user's device. Pending clearance

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from USAID Washington, the temporary workaround was that whenever staff updated the information on their device, they were to bring it to me so that I could download the data, and update the main system. While the staff appreciated having Awards data on their mobile device, it was inconvenient that the changes did not update automatically. And this was evident on occasions when staff went on field visits to an implementing partner, collected updated program information, and chose to avoid the inconvenience of having to leave their device with me. In effect, we had a system, and multiple devices that all contained data that were not always in synch!

Figure 35 – the Awards Summary screen of the mobile Activity Management Information System (AMIS) developed for USAID/Kenya (Phone version)



9: Accessibility? Shouldn't really be optional

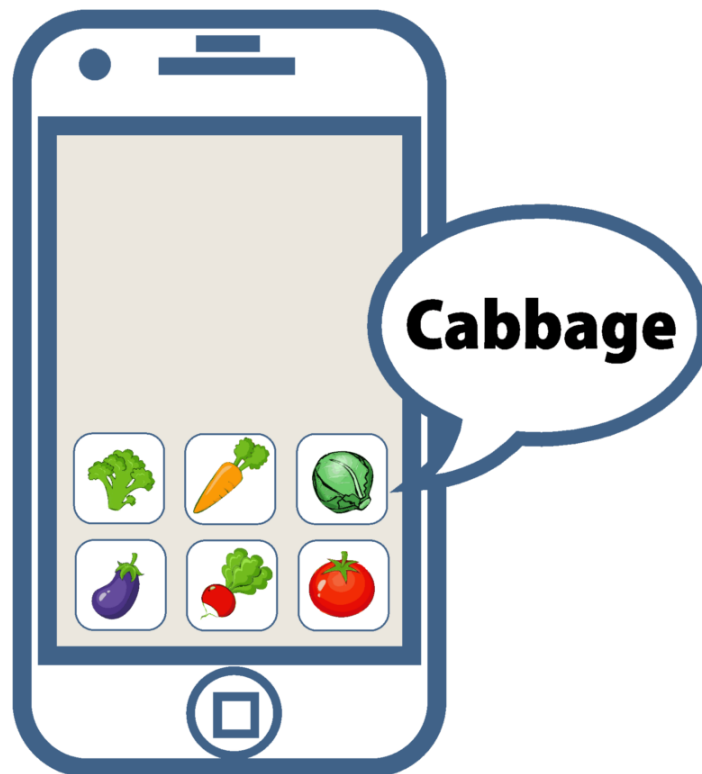


- 9.1 Information Technology has dramatically changed the world we live in today, and most of these changes we simply take for granted. However, in order for people with disabilities to fully participate in today's high tech world, access to Information Technology, including smart phones, tablets, computer hardware and software is essential. Much as the increasing use of technology provides tremendous opportunities for people with disabilities, it also presents major challenges.
- 9.2 Section 508 (Access for persons with disabilities) requires US Federal departments and agencies that develop, procure, maintain, or use electronic and information technology to ensure that Federal employees and members of the public with disabilities have access to and use of information and data, comparable to that of employees and members of the public without disabilities! In addition to IT tools and systems, the Revised 508 Standards has been broadened to include electronic content such as documents, web pages, presentations, social media content, blogs, and certain emails.
- 9.3 While the law (29 U.S.C § 794 (d)) applies only to Federal agencies when they develop, procure, maintain, or use electronic and information technology, there is a compelling business case for incorporating accessibility options in software development. Consider this; there are over 56 million people in the United States alone (nearly 1 in 5) and over 1 billion people worldwide who have a disability. In 2017, there were 814 website accessibility lawsuits filed in federal and state courts!
- 9.4 There is a persistent misconception that integrating accessibility options may be resource intensive, this couldn't be further from the truth. Typically, the best time to integrate accessibility options is at the very start of the development process. Re-engineering an app or system to meet the requirements for accessibility will

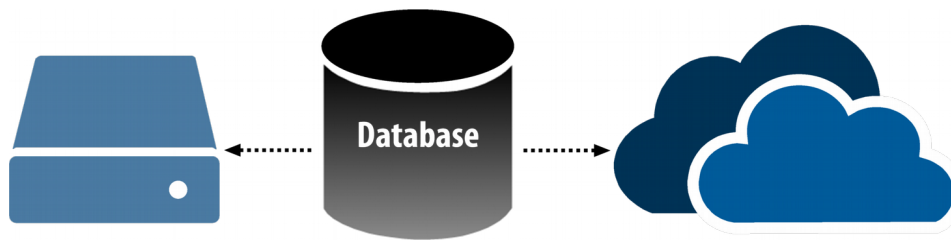
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usually require the addition of extra features and functionality, which can be time consuming.

- 9.5 Still, a good number of applications are developed with little consideration of access for persons with disabilities. As a developer, you do have a responsibility to ensure that you integrate section 508 recommendations for creating accessible digital products. It will be worth the effort to take the time to understand how the Revised 508 Standards (36 C.F.R. Part 1194) apply to your work, a useful guide can be found here <https://www.section508.gov/create/software-websites>
- 9.6 There are available resources that provide guidance on conducting baseline tests of systems. These baseline tests establish the minimum steps required to determine whether an application passes or fails applicable Section 508 technical and functional performance requirements; “Harmonized Processes for Section 508 Testing: Baseline Tests for Software & Web Accessibility” is a good resource. For additional information on the baseline tests and links to published streamlined test processes, training and certification programs, visit: <http://www.dhs.gov/compliance-test-processes>, or <http://www.ssa.gov/accessibility>



10: Backup and maintenance; sh!t happens!



- 10.1 Have you at any time had the opportunity to visit the M&E or IT department of a ministry of health, or public hospital in a developing country? You will typically find, a pile of dead uninterruptible power supply units (UPS), computers, monitors, keyboards, and mice stacked in a corner, covered in dust, with most still proudly displaying the sticker of some donor agency (the hardware die, but the stickers survive!). Piles of dusty documents, mostly data collection forms, that have either been keyed into a system, or waiting to be keyed in. A mish-mash of cables, cords, and wires criss-crossing the floor, and ending in makeshift, hazardous electrical connections. It is truly a testament to the dedication of the staff at these offices that they are actually able to produce reports and statistics, on which we all desperately rely.
- 10.2 So now you have a mental image of the M&E or IT office, now add to that, frequent power outages (there's usually a standby power generator, but no diesel to power it), unstable and unreliable power supply, faulty electrical outlets, sub-standard electrical wiring, poor or intermittent Internet connectivity, too much humidity (during the rainy season), too much dust (during the dry season); these are but only a few of the factors that the M&E and IT professionals in the developing parts of the world have to contend with, and data users in other parts of the world simply can't imagine. In the infrastructure challenged parts of the world, a combination of factors makes it more likely that sh!t will happen!
- 10.3 At many of the M&E offices that I have visited, the M&E officers are compelled to backup important documents and files to external USB flash drives, that share the space with their personal files. The explanation that I have frequently received is that the ministry or hospital failed to provide any resources for backing up the data, and so they inevitably resort to using their personal drives. Whether the USB drive is provided by the institution, or it is a personal one, the important thing is that these folks are being proactive, and diligent in backing up data. Creating frequent backups of files and databases is the best strategy to protect important data, and avert potential disaster!

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- 10.4 In many of the instances that I have witnessed, backups are infrequent, and manual. Even if you have to backup to an external USB flash drive, you can still automate the process of backups by using an automated backup utility, often times already installed with your operating system.
- 10.5 Automating the system of data backups is highly recommended. While there are numerous third-party utilities for automated data backups, most modern operating systems already include utilities that allow you to setup full automated backups at specified intervals, as well as disaster recovery.
- 10.6 Where, and when possible, cloud backup should be the preferred option for data backups. Should fire, floods or other natural disasters hit where your system is located, the advantage of cloud backup is that it is not in the same physical location as your system. This is the most compelling argument for backup systems to be remote, and data restoration and retrieval be located away from the original data storage location. Natural disasters aren't the only threats to data, system or hardware failure accounts for about 78% of data losses, including software corruption, malware – viruses, worms and Trojans – and human error!
- 10.7 Where backup to a remote system is neither available nor feasible, it is highly recommended that, external USB devices, removable media and external drives used for backup should have a designated secure location for their storage. A steel filing cabinet with a lock is a good cost-effective storage option.
- 10.8 While the process of setting up automated cloud backup may call for writing shell scripts, batch files, or custom programs, and executing cron jobs, here too, you have at your disposal, several open-source automated data backup packages.
- 10.9 Archive old data. As the number of records in the M&E data management system increases, you may want to consider archiving the old data. Archiving is the process by which you periodically move older records from the system to an archive or specific archival system. Comprehensive guidance on the process of archiving is technically beyond the scope of this document

How often to backup?

- 10.10 Folks who handle sensitive data, such as financial information usually won't take any chances and will typically back up their data on a daily basis, sometimes utilizing both cloud and backup to local facility. Granted that such a setup may be cost-prohibitive for many; however, for the purposes of backing up the M&E data management system, external USB devices, removable media and

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hardware, such as RAID drives¹¹, will do. If you opt for a RAID, you can set the system to data protection mode (also known as mirrored mode or RAID 1), which splits the capacity of the drive in half. One half is used to store the data, and the other half is used to store a duplicate copy. If one drive goes down, your data can be recovered from the duplicate copy.

- 10.11 Consider how often the M&E data management system will be updated with new information. At a minimum, you should backup once a week, and once every 24 hours, during reporting periods. While you can backup manually, automated backups are highly recommended. If you are using cloud backup, then your provider will most likely include automated backups as part of standard service offering. Many software today come with built-in automatic backup options, which you can setup to create backups at specified intervals. There are also companies setup specifically to provide data backup services.



¹¹RAID (Redundant Array of Inexpensive Disks or Drives, or Redundant Array of Independent Disks) is a data storage virtualization technology that combines multiple physical disk drive components into one or more logical units for the purposes of data redundancy, performance improvement, or both. RAID - Wikipedia

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