

**RHINO Online Discussion Forum on
Is Integration of Health Information Systems Possible?
Some Issues and Considerations**



JULY 27-31, 2009



July 27, 2009 – DAY 1

DAY 1 INTRODUCTION: FORUM MODERATORS, FRANCIS KIEEWA AND ANWER AQIL

RHINO Intern and Monitoring and Evaluation Advisor

MEASURE Evaluation/JSI

Good morning colleagues.

Welcome to the fourth RHINO forum. We have sent you the Forum background and objectives earlier. We look forward to sharing experiences and learning from each other. As noted, we will discuss one objective per day. Today's objective is:

- Discuss rationale for HIS integration in general and RHIS in particular

To achieve this objective, we present a scenario to start the discussion. The Ministry of Health in country XYZ is reviewing its five years health policy. The Minister of Health has asked to prepare a brief on HIS integration. Like always, it is an urgent request and limit is one page.

- What would you advice the Minister on what the pros and con of HIS integration are, keeping in mind your experiences and country situation.

Please feel free to share you positive and negative experiences, as we learn from them. If you feel that scenario is restricting your contribution, then please feel free to discuss as you like, keeping the day's objective in mind.

Looking forward to a lively and informative discussion.

Warm regards,
Francis Kiweewa & Anwer Aqil
Forum Moderators

1.1) FRANCIS KIEEWA AND ANWER AQIL (JSI)

Good morning colleagues.

We had a small technical setback which has now been resolved. Welcome to the fourth RHINO forum and thank you to those who have already sent in their suggestions. We had earlier sent you the Forum background and objectives. We look forward to sharing experiences and learning from each other. As noted, we will discuss one objective per day. Today's objective is:

- Discuss rationale for HIS integration in general and RHIS in particular



To achieve this objective, we present a scenario to start the discussion. The Ministry of Health in country XYZ is reviewing its five years health policy. The minister of health has asked to prepare a brief on HIS integration. Like always, it is an urgent request and limit is one page.

- What would you advice the minister on the pros and con of HIS integration keeping in mind your own experiences and country situation.

Please feel free to share you positive and negative experiences, as we learn from them. If you feel that scenario is restricting your contribution, then please feel free to discuss as you like, keeping the day's objective in mind.

We look forward to a lively and informative discussion,
Francis Kiweewa and Anwer Aqil

1.2) PEPELA WANJALA

*Deputy Head Health Information System
Ministry of Health, Nairobi, Kenya*

Dear all,

Attached is my presentation or discussion on the questions. I will be in the bush out of network for almost the whole week hence I've tried to put something for discussion. If any clarifications are required let me know as I access mails in the late evening.

Regards,
PEPELA WANJALA

1.3) MARK SPOHR

*Technical Officer - Health Knowledge Systems, Health Care Informatics, IER/HIS
WHO*

I think it would be best to first establish a definition of 'Integrated HIS' since there is a technical definition which may be different than common usage.

If you use the technical definition of an integrated information system and apply this to the health sector, then you run up against a few problems. Integrated information systems require everyone to adopt the same application suite of software and limit the ability to use additional software tools. This highlights the problem that integrated information systems are very difficult to implement even when you have full operational control and that they are impossible to achieve when you have independent actors as is the case in our work.

I would like to introduce the concept on 'interoperability' as a solution that we have embraced as the solution to the problem of enabling a diverse variety of organizations to work together. Interoperable data allows disparate information systems to exchange information and achieve



the data integration that is the goal of integrated health information systems and at the same time allowing independent organizations to collaborate and express their strengths and creativity.

Integrated health information systems are impossible to achieve in anything other than small closed environments and undesirable in that they limit options of the actors. On the other hand, it is possible to implement interoperable health information systems widely and they provide vital communication of information among interested parties.

Integrated health information systems provide a common user interface, software platform, and data model to give the user access to information within the system. By their nature, they are usually developed by a single organization. One of the best examples of an integrated application is Microsoft Office which has a word processor, spreadsheet, presentation, and database integrated with a common user interface on a single platform (Windows) and data can be easily shared within the integrated suite. The problem is that if you want features not in the suite, you must export the data and the metadata into something else. By defining the metadata and exporting the data in a standard format, you are actually creating an interoperable system which is what you should have done in the first place. Hopefully, the metadata (data definitions, semantics, ontology, etc.) will be useful beyond the integrated system.

This is why the interoperable approach is better. When you design an interoperable system, you start with the metadata design and publish this as an open standard. The metadata establishes definitions of terms, the scope, and additional information such as communications formats and protocols. Anyone can then use this metadata to design specific software applications and implementations with the assurance that the data will be interoperable and useful beyond the specific application. As an example, the Ministry of Health can mandate that everyone use the same definitions and submit a core data set to the Ministry for use in planning and management.

Organizations which have an existing information system can modify their system to import and export data to meet the interoperability standards and also ensure that they are using the same definitions. They also can keep their existing information system which often represents a significant investment and which has commonly been tailored to meet their specific needs. The interoperability approach allows all organizations to participate in the health information ecosystem leading to a healthy, vibrant, diverse collection of tools which can evolve into maximum functionality while maintaining data compatibility for reporting, client exchange, and planning needs.

A good example of an interoperable system is email. Email is built around well defined open standards (metadata) that specifies the structure and content (address, subject, body, attachments, etc.) of the data. The result is that you have multiple systems on multiple platforms which can read and write email messages that can be easily read by other systems. Web email like Gmail and Yahoo... desktop applications like Outlook, Thunderbird, Eudora...



mobile applications like Blackberry and iPhone... they all understand the interoperable email standard. This is in contrast to the integrated suites which are much more limited in functionality and platform availability.

In the developing world, it is not unusual to have many different organizations creating health data through lots of different programs. They each have their own information systems which they have developed to meet the needs of their program for monitoring and evaluation, management, and client services. They also often have the need to share their information other related organizations. The shared information can be about individual clients when they are trying to coordinate care or aggregate service information for reporting. However, they are not going to replace their installed legacy systems quickly or easily with another "integrated" application that may meet the data sharing needs but may not be as functional as their existing system in all respects. This is why I say that it will be impossible to broadly implement an integrated health information system.

On the other hand, it is entirely feasible to publish the metadata for an interoperable health information system and have all of the relevant organizations create the ability to export (and import, where necessary) data in this format using the standard definitions. This will allow them to keep their existing systems if they desire and still share the data that they need to meet individual and aggregate reporting and client care needs.

The interoperable model will also allow the data collected from all of the diverse participants to be collected in a data warehouse at the national level. This can be used to give a comprehensive view of health and health activities nationally as well as having the option to compare regions. The national data warehouse can also be used for health planning as well as ongoing management of the health sector. The data warehouse can also incorporate information from census, surveys, civil registration, and finance to round out the view of the health sector.

Mark Spohr, MD

1.4) BAL RAM BHUI

Monitoring and Evaluation

JSI- PAIMAN Project

Hi everyone,

Well I would like to introduce myself first. I am Bal Ram Bhui, have just joined JSI-PAIMAN project. I have tried to understand health information system in Pakistan. Pakistan is implementing various programs to strengthen national HIS. One of the efforts is computer application for district health information system. It is currently focusing on public sector health care facilities. I see one of the major challenges for HIS integration is unregulated private sector. Public sector caters to only about one-third of population and the rest goes to private sector/providers. Public sectors do not get reports from private sectors. This limits usefulness of



national HIS data for program monitoring and evaluation as it is based only one-third of the population. Efforts have been made to regulate private health care sector but little success. Alternatively country can collect data from periodic population based surveys. The question is how often and at what level.

Annual survey is rarely useful because the potential change for many health indicators ranges from small to modest which is difficult to measure with usual sample size. Another thing is survey at what level? National level, provincial level or district level? Under decentralized a health care system, national or provincial health coverage estimates do not mean much for districts. Conducting survey by districts are immense job and costly. Despite the critical issues behind surveys, health programs have no clue of improvement (or lack of) between survey periods. Only a routine HIS that is functioning, has adequate coverage can serve the purpose. Hence, there is no alternative to regulating private sectors.

I would like to hear from colleagues who have similar experience and have done some work in such context.

Thanks,

Bal Ram Bhui

1.5) EVERLYNE NYAGAYA

Data Management Officer

JSI, PAIMAN Project

Halo,

HIS integration advice I would give the Minister of Health is that HIS integration improves good working collaboration with divisions and departments and capacity building in various vertical programs. For an integrated HIS to work better we need to have a good HMIS structures in place, otherwise dissemination of information, reporting and documentation of data would be a nightmare.

Capacity building would form a bigger part of HS integration, therefore, adequate finance for the training should be availed.

For a stable integrated HIS to be in place there is need for commitment of all stakeholders particularly staff from MOH headquarters, province, District, the NGO private and development partners.

Thank you.



July 28, 2009 – DAY 2

DAY 2 INTRODUCTION: FORUM MODERATORS, FRANCIS KIEEWA AND ANWER AQIL

RHINO Intern and Monitoring and Evaluation Advisor

MEASURE Evaluation/JSI

Dear Colleagues,

It seems that we had some glitches in sending the day's discussion agenda and that delayed the responses on day one agenda, especially from Africa and Asia due to time difference . However, we received good contributions and feel free to continue the discussion for day one. Thank you, Wanjala, for taking time and sharing his thoughts on the whole five days agenda, as he is going into bush without access to Internet. Bal Ram raised the issues of private sector and surveys and Mark talked about interoperability.

From the responses so far from Evelyn Nyagaya, Bal Ram and Wanjara Papera, I get the feeling that they are talking about HIS integration in terms of its functional characteristics. From this view point HIS integration aim to improve decision making rather than being merely a tool for data aggregation. Viewing it from that perspective, it seems, integration is a desired process to facilitate good decision making and good working relationships between the different stakeholders.

Mark Spohr introduces an interesting concept, interoperability as opposed to integration. Reading his thoughts you get a feeling that he is discussing it from the perspective of the structural/technical view point. It sounds like Mark thinks that from this view point integration is not possible and that what should perhaps be discussed is interoperability (how software should be made to communicate between each other).

We need to bring new perspective on this issue. How do you view the concept of functional vs. structural integration of HIS? Also, as Mark Spohr noted, we do need a definition of integrated HIS to move the discussion on. Therefore, our day two agenda is along that line.

Today's discussion is going to focus on developing an operational definition of integration of HIS. Again consider the scenario below.

The Minister of Health liked your brief on pros and cons on HIS integration and decided to go for HIS integration. However, he is not sure what HIS integration would entail. Now he sent another request asking to prepare a brief on what would be included in HIS integration.

- What attributes/criteria will you use to describe HIS integration?

Hint: bear in mind the term - Health systems, HIS and RHIS, WHO/HMN and the need to improve the use of data for decision making.



As you know, there is no one correct answer to this question. Thus, feel free to share your opinion. Our purpose is to bring all perspectives to one place and document their variations. Like yesterday, if you feel that scenario question is restricting your contribution, then please feel free to discuss as you like, keeping the day's objective in mind.

Francis Kiweewa and Anwer

2.1) ALLEN WALIGO

*Program Officer, PMTCT, Care and Treatment, Monitoring and Evaluation
Elizabeth Glazer Pediatric AIDS Foundation*

Dear all,

The integration of HIS is a program driven action coming from how program should be implemented. In the part of the world where I am based integration of health services has been the buzz word with different meanings to different people and different models of integrating health services. With this mixed approach about the integration of services, the implementation of integrated services is still a dream to be realized.

That is where it all starts. If services are not integrated then the integration of HIS remains a myth. Of course, I would argue for integration of HIS but if the services are not integrated how then do we discuss integrated HIS at service provision level?

Imagine the different models of integration of services, where, for example, services are under one roof but in different rooms. How are we going to integrate HIS? It is impossible. We will still have fragmented HIS due to vertical implementation of health services/programs catering for the different components implemented.

Where services are fully integrated in the same room, then we can talk about integrated HIS. However, this will require big tools to capture the integrated HIS and require more time from the health provider to fill in these tools. This translates into long queues for the clients waiting for a service from a given health provider.

This means to have successfully integrated HIS (quality data) there is need to pay attention to space and personnel. Adequate staffing of health facilities would be critical to avoid long queues for clients and space for the health providers to see the patients and filling the integrated tools.

An operational definition of integrated HIS at a service provision level would be having fragmented tools to cater for the different models of service integration but pooled/networked together to provide comprehensive information for the users.

The causes of limited integration of HIS among others are the limited skills among the users to put together and use this information. All users at all levels including providers, policy makers



and donors need to be supported to use this information to improve service delivery for the beneficiaries.

The strategy to improve integration of HIS underlies with information use. If the users can demand for comprehensive information then those responsible for supply this information will make sure that we have defined minimum packages of information.

2.2) MIKE EDWARDS

Biostatistician/Senior Health Informatics Advisor

MEASURE Evaluation/JSI

Mark's point about interoperability of systems is a good one, but is often more difficult in practice than in theory. We usually have to deal with more than just exporting data from field 'x' is one database system to field 'y' in another, but we also need to link the basic facility records and administrative boundary records from one database to another. In many of the countries we work, systems have been developed without standardized district and health facility codes that can be used to link records, and using the facility and district names for matching can be problematic.

For instance, in Kenya, the US government PEPFAR program requires all organizations that receive funding for HIV/AIDS programs to report their program statistics using a PEPFAR database. At the time this PEPFAR database was developed, there was no standard health facility list available that could be used with this database. Recently (about 2 weeks ago), the Kenya Ministry of Health published on their website a wonderful list of the country's health facilities, each with a unique identifier (facility code). Now, we would like to match the health facilities in the PEPFAR database with this newly created list, but it will involve a lot of time consuming and tedious work to link the MOH facilities with the PEPFAR activity sites (which includes health facilities and non-facility sites). The USG PEPFAR Partners as well often have their own internal databases that they are working to link with the USG PEPFAR database. It was relatively straight forward to link an internal partner database that used the same activity site codes as the USG PEPFAR database, but other partners will have to struggle to match their sites with the PEPFAR database sites, and several partners have around 1000 sites in which they are working.

Another point about integration vs. interoperability is that our routine health information systems in many of the countries that we work begin at the facility level with a paper based system. There is a system of patient records, registers, tally sheets and monthly or quarterly reporting forms that need to be filled out and sent to a District Health Office for input. One strategy that has met success is to integrate these reporting forms into an integrated forms booklet. In several countries where I have seen this implemented, the rooms full of reports in stacks and stacks of loose pieces of paper that all of us have seen were replaced with form booklets neatly stacked in folders, and labeled by facility so that if a form needs to be found for data verification it can easily be done. When a facility reports to the District, all the health program reports get sent, and the District office has an easier task of managing the reports that



are submitted. Thus I think that an integrated system is much needed and appreciated at the District management level.

Best wishes,
Mike E

2.3) ALVIN MARCELO

*Director
UP Manila*

Hi all,

My input for this discussion on integration can be summarized in three points: 1) standards, 2) applications, 3) decisions.

Our own experience in the Philippines show that 'integration' (roughly defined as "to put together/to make as one") is impossible because it is precisely the people who work with HIS who refuse to integrate with each other (ie, "to each his own", "this is my data, get your own data"). I guess they are just following the laws of entropy :) It is therefore contentious to get HIS people to integrate on their own as they will probably not. On the other hand, HIS people have no choice but to "integrate" if the environments they are working in are constrained by data constructs.

This brings me to propose that integration starts with standards (1), that is, standard sets of defined data elements (minimum data sets, data types and file formats), standard data dictionaries (codes, vocabulary etc). These standards are then implemented into applications (2) (such as electronic medical records, surveys, etc); and to close the loop, actions/decisions (3) must be made based on the information produced. These decisions, in turn, can improve upon the standards (1) or the applications (2) to make for better/easier decision-making.

There is therefore a crucial leadership role for an entity (government?) to maintain the standards and monitor their implementation in the applications. The community of practice, with these two fundamentals in place, can then take over the iterative/reflective processes that are part of enhancing the discipline. "Integration", in this definition is not a state, but rather a "continuous disciplined process of iteration/reflection based on quality information in support of healthcare".

Alvin



2.4) MARK SPOHR (WHO)

Michael brings up a few good points and I would like to concur.

Before you can have interoperability, you must have standards and that is why you start with creating and publishing your metadata which includes the standard definitions for all of the items you need to communicate. There is no communication if the sender and receiver do not have a common definition.

In the matter of a district health information system (or any other specific information system) it is often useful for purposes of training and implementation to have a common software application. However, if you have good standard metadata, it doesn't really matter.

For instance, in Uganda they have a standard facility data set that is well defined. Different donors have each separately developed three different applications to collect and report this data set. They have a web solution, a standalone Windows solution, and a handheld solution. Since each of these collects the same data set and follows the ministry data standards, they can easily collect, analyze, and use data from these three systems as if they were the same system. This data is consolidated in a data warehouse at the national level. This is true interoperability.

Regards,
Mark

2.5) ISALINE GREINDL

Conseiller Technique, Chargée De Programme
AEDES

Dear colleagues,

I am following this online discussion with a very strong interest.

I would like to share these discussions with French speaking colleagues and I hope this will be possible in a close future.

At the moment we are precisely working on HIS integration in two countries: Madagascar and Burundi. In Madagascar the goal is to integrate HIV/AIDS and reproductive health data in the RHIS. In Burundi, the goal is to simplify the RHIS, integrating the vertical programmes HIS into the RHIS. This can only be done on a consensus based approach.

Looking at the topic for today:

In the answer to the Minister I would mention the following points:

Integration of the HIS should not be separated from integration of services to be delivered at each level of the health system.



The Health information (RHIS) is a tool to assess health needs, service delivery activities and to assess health system performance.

The key question at each level of the system is: What information do I need to take the appropriate decisions? Integration of HIS starts with a common agreement on the services to be provided at a same level of care.

I fully agree with the idea of a minimum standard of data common to all actors at a same level of services. Standard definitions need to be given for all of the items. This is the only way to create a common understanding of what is needed.

If there is a need to review the existing HIS, I would suggest to adopt a systemic approach looking systematically at the various elements of the health system and asking the following questions: In our field of intervention (Health centre, hospital, district, province....)

What "minimum" information do we need to:

- Measure the target population?
- Monitor the health needs?
- Monitor health services utilization?
- Monitor the results? (Outputs) in terms of coverage of services, benefit for the targets, quality of services.
- Monitor the process: workload, package of activities, number of interventions
- Monitor the inputs: HR, infrastructure, equipment, drugs...

Using this approach, it is quite easy to determine the "minimum core set of indicators" that will satisfy most of the stakeholders including the vertical programmes.

Another important issue is to make sure that clear distinction is made between:

- Patient management information
- Service management information
- System management information (See Design and implementation of health information systems, WHO, Theo and al....P 18)

And at the end, I agree on the fact that Integrated information systems do not require everyone to adopt the same application suite of software. If it is possible to produce the information needed, people should be able to use their own tools.

The idea of "Interoperationality is very interesting, how would you translate this word in French??? Inter-opérationnalité ne veut pas dire grand chose...

Best regards to all,
Isaline



2.6) MARK SPOHR (WHO)

It appears that interoperability in French is interopérabilité. This French Wikipedia entry adds more information: <http://fr.wikipedia.org/wiki/Interop%C3%A9rabilit%C3%A9>

I think we need to be clear in our discussions to distinguish between integrated HIS, integrated HIS data, and integration of services. It is easy to combine these terms and end up with a confusing situation.

Integrated information systems usually refers to a set of software applications that work together on a common platform with a similar user interface that each perform a specific function. However, if you adopt a looser definition of integrated systems, it would be possible to call a diverse set of software applications (software from different vendors with different user interfaces and running on different platforms) an 'integrated HIS' if they are able to freely exchange data through commonly defined metadata. I would prefer to call this second system an 'interoperable' set of applications rather than 'integrated' but maybe I am just being pedantic.

Integrated HIS data is a collection of health data that has been put together in a data warehouse where the metadata of each element is defined.

Regards,
Mark

2.7) OLUSESAN MAKINDE

*Monitoring And Evaluations Manager
Pro-Health International*

Dear Mark,

I think your clarification is worthwhile. The main reason I believe there is usually a chaotic situation is owing to the lack of a coordinating mechanism. Since software is not manufactured to be country specific, it is difficult to integrate different databases across multiple countries where each has its own standard definitions for datasets. The possibility of having a standards setting institution that accredits HIS software companies (Globally) or that certifies their compatibility with certain standards towards integration of various health information system platforms will go a long way in improving data exchange across various software.

Regards



2.8) BAL RAM BHUI (JSI-PAIMAN PROJECT)

Hi everyone,

I would like to continue with our discussion for the second day. I believe that we are talking about integrated HIS as opposed to simply integration of HIS data. Talking about computer technology is secondary as well before we define an integrated HIS. We envisage a HIS system that collects, store, analyze and make the data available for national health program, vertical national program, data need for reporting to international and global health including Global Fund and PEPFAR. This is still a dream to be realized. The HIS are usually designed by central level by keeping central level perspectives and interest first. Failure to meet the data and information need of health facility that generate the primary data and of districts make HIS a ritual.

I would like to put forth some of the essential characteristics of from the view point of functional integrated HIS:

- 1) A users and reference guides with data definition (metadata as Mark Spohr pointed) and related details.
- 2) Designated HIS unit/staff at all level up to health facility to oversee all HIS business
- 3) Unified recording and reporting form and transmittal of report of routine plus vertical programs (as Michael Edward pointed out)
- 4) Data analysis and use guide designed for different level and especially for health facility level
- 5) HIS Training
- 6) Monitoring and evaluation of HIS.
- 7) Periodic review and up gradation of HIS.
- 8) The HIS should receive data from both public and private sectors.
- 9) There is a need for as policies to ensure use of data in day to day management and strategic decisions making. HIS people collect and generate data while the program managers and decision makers are supposed to use the data in their program decision. I see a great lacking of use of data on the part of program manager and by organizational hierarchy HIS folks tend to be junior to program managers.
- 10) The 21st century HIS should not remain to be paper based HIS. Human capacity have advanced, computer technology is easily accessible and can revolutionize the HIS. Health facility needs more computer aid because they need handle the patient data. Knowing aggregate number patients and children vaccinated is not enough. They need to know who are supposed to come for follow service on a day, who are defaulter and map them by geographic area, find out the program coverage by geographic/administrative area. Use of computer can greatly facilitate these necessities. If the health facilities in-charge see benefits of participating in HIS for themselves, then they will be more motivated to be serious about value and quality of data and what goes up would be more quality data.

Thanks, Bal Ram Bhui



2.9) ANWER AQIL (JSI)

Dear Colleagues,

Thank you for your excellent contributions on first discussing the rationale for HIS integration and now identifying the characteristics of HIS integration.

As noted, there is no consensus on what needs to be included to call a system “Integrated HIS”. I want to raise more questions to create more discussion and clarity on the definition of integration of HIS and why.

Most of you have stated that standard definitions of data elements are necessary based on information needs. That is a prerequisite for any information system but probably you will agree that it does not tell us about integration of HIS. As being pointed out, standard definitions of data elements are required for “interoperability” for different systems talking to each other. Is interoperability synonymous with integration of HIS? In other words, if interoperability exists, can it be declared integrated HIS? Alternatively, is it just one characteristic of integrated HIS or just a mechanism to integrate HIS? If it is one of the characteristics of the HIS integration then what are the other characteristics? If interoperability is a mechanism to integrate HIS then, are there other mechanisms to integrate HIS? A related fundamental question is, do information systems need to be defined as software applications only. Are paper-based information systems excluded from definition of information systems? If level of computerization in a country is limited, does that mean information systems do not exist or should not exist? In addition, interoperability needs a discussion and consensus among organizational units, indicating management coordination could be used as a characteristic of integration of HIS. Thus, defining HIS integration in information technology terms will probably restrict our discussion on HIS integration definition.

Another important dimension being discussed is that information systems reflect existing organization of the health systems and services, thus HIS integration is impossible if health services are fragmented. Again, this dimension of discussion only alludes to the constraint of integrating HIS but does not add to identifying the characteristics of integration of HIS. However, many of the times primary care services are provided through one service point and few specialized services are provided through special care facilities. Those primary care services may have their own information systems or exist in parallel to a combined information system. Does it mean that if we combine one or more of the parallel information systems, we are creating an integrated HIS? Can it be one of the characteristics of integrated HIS? On the other hand, does one unified information system addressing all or most or priority of health systems information needs to be there, to be called as integration of HIS.

Organization of health services also brings the issue of public and private sector information systems. Does integration of HIS mean that private sector involvement should be one of the characteristics of integrated HIS.



HIS is a cross cutting block of health systems functions (six building blocks). Does it mean inclusion of information on two or more building blocks in a given information system be considered as one of characteristics of integrated HIS. Alternatively, data from different sources of health systems functions communicating with each other could be another characteristic of integration of information systems. In addition, does creating a management structure dealing with different information sources should be a criterion of integration of HIS or only assuring availability and use of data from different sources at different level of health department be a criterion of integration of HIS.

As you can see, there is no one characteristic to define HIS integration. It has to be defined by multiple characteristics and I encourage you to add to this discussion for creating a standard HIS integration definition. We all are interested in standard definition of data elements for better communication and creating same meaning and understanding. Thus, it is crucial that we try to create an operational definition of integration of HIS. It will serve three purposes- use of the term with same understanding, the defined characteristics could be used to create an index of measuring level of integration of HIS. This standard measure could then be used for making comparisons of different countries on level of HIS integration.

The level of integration can also be constrained by many factors, probably a discussion for tomorrow.

Look forward to your comments.

Warm regards,
Anwer

2.10) RON HEBERT

CEO

Heron Technology

Hi All,

This subject area of 'integration' is very important and is one that evolves as a requirement over time when more than one application software module must/should share patient data with another module, or modules, in the same facility, or at other facilities. In Canada the matter of 'integration' of application software modules within a hospital, a clinic or in a doctor's office has been:

- a) Hard coded up until 1997, or
- b) Through the use of 'middleware' sometimes called an 'integration engine' since 1997. The following schematic relates to a multi-vendor integrated set of modules from 8 software vendors (plus the FITS middleware product) implemented in a three-site Canadian hospital in 1997 that I personally oversaw:



As Mark notes "However, if you adopt a looser definition of integrated systems, it would be possible to call a diverse set of software applications (software from different vendors with different user interfaces and running on different platforms) an 'integrated HIS' if they were able to freely exchange data through commonly defined metadata.

As Bal Ram Bhui points out: "The 21st century HIS should not remain to be paper based HIS. Human capacity has advanced, computer technology is easily accessible and can revolutionize the HIS."

As Anwer questions "A related fundamental question is, do information systems need to be defined as software applications only. Are paper-based information systems excluded from the definition of information systems?"

comment (RJH): I cannot see how paper-based systems can be integrated to anything - until the written data is converted to electronic data - then shared with other application software modules. Data should be captured in e-format at the point of care where the patient presents.

Our hospital clients in the Caribbean (all developing countries) will soon be moving beyond their Patient Administration Systems (PAS), so we will introduce them to our positive experience of working with middleware as they embrace new software modules in the multi-vendor world of health IT.

The developing countries are just now arriving at the point where multiple application software modules are starting to be implemented at a single location, so I wish to suggest that consideration be given to the use of middleware. It is typically very easy to use - doesn't require a programmer - and is extremely cost-effective. All 800 Canadian hospitals today use middleware to integrate their many diverse specialty application software modules - often as many as 30+ modules at one location.

Hoping that this is of some assistance - for as they say "a picture is worth a 1,000 words".

Best of success to all as you move forward with health sector computerization to meet your 2015 MDG goals.

Sincerely,

Ron Hebert



July 29, 2009 – Day 3

DAY 3 INTRODUCTION: FRANCIS KEEWIWA AND ANWER AQIL (JSI)

Dear colleagues,

I would like to thank you all for an excellent discussion for achieving the first two days objectives:

- Describe rationale for HIS integration
- Identify characteristics to define integration of HIS

Please feel free to continue discussing these objectives. We will try to develop an operational definition of integration of HIS based on the day's discussion and suggestions. Now, we would like to move forward and discuss the third day's objective:

- To formulate the underlying causes of limited or lack of integrated HIS.

All of you have examples on why integration of HIS is limited. Share those experiences with us. We suggest considering the following questions to streamline the discussion -

- Describe the contextual problems limiting or hindering the HIS integration
- Discuss any opportunities that may be utilized to facilitate the integration of HIS

Again, these are just questions to guide the discussion. Feel free to discuss in any way you want but keeping in mind the objectives of the day and relating this to discussion we have had so far.

Francis Kiweewa and Anwer Aqil

3.1) MARK SPOHR (WHO)

The most important thing is to have standards for data exchange which include precise definitions as well as the format for the exchange. At WHO we are working on collecting international common use for indicators in an indicator registry which will allow people to see the indicators that are in use as well as the variation in definitions. Eventually, a common set of indicators should emerge from this by consensus.

However, you can establish national standards (and draw on existing international standards) and require people working within your country to support these standards. This usually requires a period of time with stakeholder consultations to ensure that everyone understands the problem and is willing to support the interoperability standards solution. The US is currently establishing standards for software functionality and for data interchange. I don't think the standards for functionality are very useful but the interoperability standards will be very valuable in ensuring that data can be easily communicated. I am not aware of any international



certification work on interoperability standards beyond the indicator registry that we are developing.

Regards,
Mark

3.2) OLUSESAN MAKINDE (PRO-HEALTH INTERNATIONAL)

Hello Mark and Everyone,

I am glad that the WHO is taking the lead on this. Soon there will be software that will advertise as being compatible with the WHO standards.

I am looking forward to the completion of that registry. I designed a database on MS Access for data storage and had to use the ICPC-2 coding system to streamline my health reasons for encounter and diagnosis. I was really wondering if there was anywhere I could compare across other researchers who have done the same elsewhere but if we have a coordination that we all make reference to, it would make a whole lot of difference. Is there anyone on this forum that has worked with ICPC-2? Please let's talk if there is.

Thank you.

3.3) NORAH STOOPS

Facilitator

Health Information Systems Programme (HISP)

Hi to all those interested/passionate about HIS and particularly RHIS.

As has been pointed out - what do we mean about integration? Mike indicated that he saw it as the reduction in the forms leaving the facility and the integration of these forms into one format that would provide all the necessary routine data for the facility that would go to one place. I would like to use that understanding to discuss integration. This implies are all the vertical health programmes are part of the system. I am also using the understanding that data is captured at a lower level than centrally and then sent to central level. This means that no paper is sent to the central level, all paper systems stop at the district (or equivalent level).

What has happened in many (low income/developing) countries is that there is a plethora of vertical parallel programmes with their own funding and own systems and own staff (M&E officers). These have frequently developed due to the following (this list is not exhaustive, but highlights some of the main reasons)

- The rigidity of the existing HIS (i.e. not able to rapidly adapt to a changing need for health information with PMTCT being a good example),



- A reputation for not being timely, not having good quality data (not always, but frequently).
- Producing reports long after the actual need for the data/information in the report is required. HIS Units are frequently seen as reactive and not proactive.
- Not being able to provide the (timely/good quality) data that is actually needed for information/decision making
- The relationship (frequently poor or nonexistent) between the HIS Unit and the programme managers/donors/etc
- Donors coming in with their own agenda and (HIS) funding and (frequently) own reporting demands. (They can be called 'fragmentation grenade specialists' due to the chaos -fragmented vertical systems created - left behind!)
- The lack of understanding of the role of a routine information system
- Sub national level programme staff attending meetings at a national level where a new form gets handed out with the expectation that the facilities must now collect this new data

If the RHIS is to be integrated, then the HIS Unit has to breakdown these perceptions. It is possible to force everyone to use standard booklet as Mike describes, but if the whole HIS Unit does not change its functioning, perceptions and move towards being proactive and out in front, then integration will not be successful.

One of the main challenges of this integration process is how to get the data as fast as possible from the peripheral level to the central level and out to the programmes on whose behalf the data is actually being collected. If that process can be speeded up, then integration has a chance. The traditional dataflow diagrammes show the data from facility to district (or equivalent) and on to central (national, MOH) level. This mechanism is seldom 'good enough' to provide the programme managers with the data that they require. As the HIS Unit cannot perform, vertical systems will creep in by the backdoor again. Consideration can be given to the sub national level to send the data to BOTH the national HIS Unit as well as the various programmes at the same time. In theory the data is the same as it comes from the same source and is sent at the same time. This could be called a 'fan' information flow. This is only one of the possible solutions that can be implemented as to strengthen the integration process of the RHIS.

About my 1 page proposal for the Minister of Health.

I assume that the budget is limitless and so are the human resources needed...I am also using the PHC clinics as the basis for this discussion, hospitals are not yet included, except where they need to report on certain data like delivery, immunisation etc.

- Get everyone to agree that there needs to be a revision of the HIS functioning of the country and integration is the future. Offer 'proof' of how the new system can fulfill



their needs. This includes all the programmes as well as the NGOs (where necessary and possible)

- Define a national essential dataset for the country that is based on the routine data. These indicators will measure coverage and quality of health care services that relate to issues affecting public health. Less data collected = better quality, more data collected = poor data quality. Only data that can be used for decision making at a central level will be collected. Everything (almost) else will be discarded.
- Develop a strategy for supplementing the routine system. The role of sentinel sites, record reviews, and yearly surveys can be planned to provide more detail where required. Note that this routine system does NOT replace the response to epidemic diseases (cholera, typhoid, measles, etc), that system remains untouched.
- Develop the appropriate data reporting tools, training the facility staff on the data to be collected - the standardised definitions as we have been reminded by Mark.
- Strengthen the data capture process at the district (or equivalent level). This includes the actual data capture process, data quality checks, supervision to the facilities and feedback on data integrity. Use an appropriate software tool. Define the job description of the various staff involved in the RHIS. Develop a career path for this cadre of staff.
- Also strengthen both the facility and district level in terms of use of information. This needs training and support. Help facilities understand how to use the data that they collect in order to assess their own performance. Making decisions based on data and information is a new thing and needs to be nurtured.
- Develop a data flow policy that reflects the reality on the ground. Some districts will be able to capture and submit their data faster than others.
- Develop capacity in the M&E officers (at programme level) to import the data from the districts and to generate reports. These M&E Officers can also be developed to provide support for the districts from the central level. This support is not only aimed at their specific programme, but at the whole process. Run training programmes for the managers in how to use this data. Make the shift from looking at raw data to understanding indicators and targets etc in order to assess programme performance. Interpretation and analysis is the responsibility of the programme manager and NOT the M&E officer. They are there to provide support.
- Strengthen the HIS Unit by providing them with sufficient staff with sufficient skills. Have a mix of staff with IT and public health knowledge. Create a culture of being responsive to requests for data.
- Be up to date with happening in the various programmes in terms of new projects and policies being implemented; get the information system on the table right in the beginning, not as an afterthought.
- Understand that health information system needs change constantly, develop a strategy to deal with these changes. Does the national essential dataset need to be revised every 2 years. How will this be done? Who takes the lead for this function?

Hope this adds to the discussion, Norah



3.4) MARK SPOHR (WHO)

The ICPC-2 coding system is excellent for use in general practice because it is comprehensive but not too detailed so that it is possible to use it to code quickly and accurately. The more comprehensive coding systems such as ICD and SNOMED offer tens of thousands of codes but are not accurate unless you have a highly trained coder and spend a lot of time coding. The result is that most of the data that I have seen captured in ICD and similar systems is of very poor quality.

I believe that Mark Shields (CDC) is working on implementing ICPC in Malawi.

Regards,
Mark

3.5) ANWER AQIL (JSI)

Hi everyone,

As a moderator, I am supposed to focus on the discussion on today' agenda of underlying causes of limited or lack of integration of HIS. However, there was some misunderstanding about my raising questions on the identification of characteristics for defining integration of HIS. Since we will discuss these underlying causes, we will also see that causes are linked to how one define integration of HIS.

In that context, I want to make a clarification. Most current information systems in developing countries are a combination of paper based and electronic data bases and computers are at the district or higher level. Uganda HMIS, which was alluded to in earlier emails is no different. I totally agree that computerized HIS is the future. However, moving towards future we take into consideration the existing situation or transitional phase where in developing countries computerization is moving with slow pace. Thus, I was raising the question for discussion that defining integration of HIS should not be limited to integration of electronic database. In addition, one of the ways integration is done in paper based system is to bring two parallel systems by having an integrated data collection form. That also clarifies my other question that, "is interoperability the only mechanism or are there other mechanisms to integrate HIS?" to make it part of definition of HIS integration. The point was what broad characteristics need to be included to create an operational definition of integration of HIS, keeping the existing systems in mind. With this clarification, I want to rest this discussion here and let us concentrate on the underlying causes of limited to lack of integration of HIS.

Thank you, Anwer



3.6) ZANELE MASHAO

*Training, Monitoring And Evaluation, Manager
Khomani Campaign*

Is this for Community outreach only or does it include Media analysis?

3.7) MARK SPOHR (WHO)

I think several people have pointed out here that there are many different information systems installed in most developing countries. There is usually a national RHIS and in addition, the national health service usually support many vertical programs such as malaria, TB, maternal and child care, immunizations, family planning, etc. Each of these usually has a special register and reporting forms which constitute an information system for that program. In addition, there are often many vertical programs run by aid agencies. In Uganda, we counted between 70 and 100 of these. Each of them has their own information system.

So we really don't have a lack of data. We have lots of data on lots of different systems and there is no way to collect all of this together in one place for use and there is no way for individual programs which should be able to communicate (such as MCH notifying immunization that there is a new child who will need immunizations or a TB program coordinating care of a patient with the AIDS program).

If we try to install a traditional 'integrated system' where we try to replace all of these information systems with a standard application, it just will not work. There is no way that most of the independent programs and agencies will replace their systems.

However, it is feasible to define a standard set of data that the government needs to plan and manage and that programs need to communicate patient information. Once this is agreed and published, then everyone can work on making their packages meet the data definitions and data exchange standards. The incentives for this can be a combination of mandates (you must submit your data in this format) and desirable attributes (if you meet these standards then we can better coordinate care for patients). This is the interoperability approach.

By the way, I would include both paper and computers in the definition of 'information system'. The paper information system, of course, has its limitations but it should be considered part of the entire information system since it is often the original source of data.

Regards,
Mark



3.8) MARK SPOHR (WHO)

The ICPC-2 coding system is a comprehensive system: "For the first time health care providers could classify, using a single classification, three important elements of the health care encounter; reasons for encounter (RFE), diagnoses or problems, and process of care. Problem orientation of the medical record and linkage of encounters over time permits classification of the episode from the beginning with an RFE to its conclusion with a more defined problem, diagnosis, or disease."

More information here:

<http://www.fmrc.org.au/icpc2/>

Regards,
Mark

3.9) FRANCIS KIWEEWA (JSI)

Good morning colleagues,

I have liked the excellent exchange of information so far on the forum. The goal of the forum is to discuss attributes of HIS integration, and to offer guidelines towards designing HIS integration interventions, and their monitoring and evaluation. The discussion so far has provided very good opinions. However, I feel that integrated HIS has been narrowed down to the HIS tools (computers, soft ware, paper based forms etc). I would like us to broaden the discussion away from simply looking at integration of HIS as simply being hardware and software. For example when we talk about integration, what data sources are we talking about? What about the HIS resources (other than the computers and data software)? How should integrated HIS interact with the other building blocks of the Health System? Assuming I am a physician or program manager with no IT experience, what role should I play in the context of HIS integration? Etc etc

Today's objective aims to discuss the underlying causes of limited or lack of integrated HIS. I would like to add my opinion to the discussion as a participant in the forum.

Describe the contextual problems limiting or hindering the HIS integration

1. One of the fundamental problems seems to be the lack of a consensus on what constitutes HIS integration. As we have already seen in this discussion the different contributors have tended to define HIS as simply data collection tools (thus the discussion on computers and software, etc). We need to come up with an acceptable operation definition of integrated HIS that goes beyond data collection and aggregation. In my opinion such definition should take into account the sources of data at each level of the health care delivery system, the minimum core indicators based on local/country information needs



- and these should form the basis for the HIS framework adopted and modified by the other players according to their specific needs, a common coordination mechanism, HIS resources
2. The second major cause of limited integration is the fragmentation of the Health system itself. With so many vertical programs that are financially independent from the national ministries of Health or the district health services it is very difficult to have an integrated HIS
 3. Donor dependency in the developing countries ensures that the agenda will be dictated by the donors but not the national governments
 4. Organizational culture and the lack of a positive data attitude.
 5. Suspicion and lack of trust between the various players in the health delivery system
 6. Limited resources and in many cases limited skills. This is currently compounded by the existing global economic down turn
 7. Lack of or inadequate leadership from the MOH and corruption

Discuss any opportunities that may be utilized to facilitate the integration of HIS

1. The focus on the MDGs works to unify the goals of the different players. This should create a forum for discussing the common interests and identifying those core indicators that should constitute the integrated HIS
2. A realization that strengthening national health systems is essential for sustainable gains in health
3. Major donors like the global fund, PEPFAR, GAVI etc beginning to committing some of their money towards system strengthening
4. Increasing capacity and demand for information as a basis of decision making in much of the developing countries

I hope this adds to the discussion.

3.10) OLUSESAN MAKINDE (PRO-HEALTH INTERNATIONAL)

Hi,

I once took a good look at the ICD 10 coding system and just knew outright that it would take a while before it could be used in Sub-Saharan Africa. Some of the details require highly finesse equipment for diagnosis which is most times not available around here and as such the ICPC-2 is somewhat very effective for disease grouping.

I appreciate your comment on the quality of data in the ICD-10 coded data because I was also confused when I tried using it.

Now for integration, is there anyway we can make our systems compatible with multiple coding systems? Like initially data captured with ICD-10 but easily movable into ICPC-2 or other coding systems?



3.11) EVERLYNE NYAGAYA (JSI-PAIMAN PROJECT)

Hi,

Thanks Francis I fully concur with you. We seem to have narrowed integration of HIS to software and hardware. I think HIS is much broader than the data manipulation systems. We need to look at integration from service delivery points. Right from community health information system level I to the highest level of service deliver and information dissemination.

Integrations must begin at point of service delivery this will enable use to integrate related indicators thus design tools that would enhance decision making through integration. I happen to work in an M & E department and a highly integrated organization and I have seen integration work for us both at program level and data management level.

The major problems hindering integration of HIS is inadequate knowledge about integrated HIS and the benefits of HIS.

Other than that, Vertical programs are too have hindered integration. In my view integration of HIS here has been hindered merely because of fear of being rendered redundant in some settings and resistance by vertical program managers to embrace new policies and strategies that enable integration.

With integration we would be able to get all information needed at a point for example in my country you can not get accurate data for TB/HIV from the district health record information officer merely because TB program is a vertical program with its own funding and therefore the district TB and leprosy coordinator is the custodian of the data.

This takes me to my second point of what hinders integration programs lack of trust between people in vertical programs and divisions in the ministry of health for example we now have ministry of public health and ministry medical services which complicates integration even further.

Inadequate use of data to create demand on correlated indicators in the Ministry of Health has also hindered integration.

Focus on donor demands has also hindered integration of HIS.

Finally, funds for training or capacity building and production of M & E tools to sustain has greatly hindered Integration of HIS.

Eve



3.12) JØRN BRAA

Director

University Of Oslo

Dear all,

Sorry for jumping late into the discussion on integration (and writing too much!), but I'm just (semi-) back from the wilderness (i.e. still in the wilderness, but now with power and keyboard available). I have followed the discussion on my mobile with a broken screen with my ailing sight, in between fighting with mosquitoes and on operational battery saving, so I may have missed some arguments and issues.

Coming from the field of "general" information systems (IS), I would like to bring in some perspectives on integration and interoperability from this field, which as seen from the IS community includes HIS.

I have noted that while some argue for taking the health services providers' needs as a point of departure, or a wider health system approach by e.g. using the MDGs as an opportunity and cause for integration, others argue at the more technical level. I think the different perspectives can be better bridged by acknowledging the different perspectives. In the IS world we normally distinguish between the users' perspectives (needs and requirements for integration, health services providers' and managers points of view, etc.) and the more technical perspectives (how to develop the technical solutions satisfying the above needs, make systems interoperate, etc.). Those perspectives are by nature different, they cannot be unified in "One" definition of integration, but, I think, they may be unified within one "framework" where both integration and interoperability are key issues:

INTEGRATION is part of the users' perspective and their need for data from e.g. across all health programs. For example, district and facility managers as well as the MOH need data from across programs on a consistent format. This is both the justification for, and important parts of the definition of, integrated HIS. While integration of data (or data based services) is the purpose of the systems development, interoperability is (part of) the means with which to achieve integration.

INTEROPERABILITY is the systems developers and designers challenge – and naturally their focus. It is about making systems interoperate at the technical level (e.g. data exchange protocols), but also at the semantic level (data standards, higher levels meta data).

Given the above, we cannot say that integration is more or less important than interoperability. They belong to two different dimensions, but within one framework.

IS practitioners, system designers & analysts has discussed integration for decades ("since the second IS emerged"), but there is not one precise definition. Use of the term "integration" tends to depend on context and level of technical abstraction; if you deal with software you will



(as Mark argues) think data interchange and technical protocols, if you deal with data bases, you will think about data definitions at various levels (meta data), both exemplifying interoperability.

BUT, if you deal with users, and in our context data usage (or M&E) (more in line with Anwer), the technical layers become secondary – ideally they should become “ubiquitous” to the user - you will focus on the users needs / requirements for integration of data and data based services.

As was stated by the director of health in Zanzibar prior to the “integration” project there; “In order to get an overview of key data across programs I need to contact each program to get their data and collate it myself (or get somebody to do it) – what I want to get out of this project is to have that information easily available, at my desk - at the push of a button, but lets start with monthly integrated reports”.

I think this latter statement is very close to what many RHINOs understand as a central aspect of the term integration. And I think this understanding is valid. In the case of Zanzibar, integration was (at least to some extent) achieved by integrating the paper forms from the various programs and the MOH&SW, establish the routine reporting system, capture the data databases at district and national levels, and start improving data quality and data usage. This process may be labeled integration “RHINO style”. Ron, however, argued that paper cannot be integrated. To this I will argue that by taking the users’ perspective, integration is not interchange of e-formats, but a requirement to a system “whether paper or computer”. Since there were no computer based systems to “interoperate”, the term “interoperability” cannot be used in its technical sense, but at the data use level, or the semantic level – and also at the “political/organisational” level; get the programs to work together.

Another case; I have followed the national academic hospital in Norway since the 80’s. In the early 90’s they wanted integration and understood the term as meaning “one system”. That effort (of course) failed. At the last count there were 230 (or something) different systems. Their new and revised integration strategy is, wisely enough, based on interoperability. The requests for integration is coming from management at all levels, and from nurses, doctors, radiologists, etc. and the systems developers are now trying to come up with solutions based on transferring data from one system to another, and for different systems to share information from a third system, etc.

These two examples from Zanzibar and Norway represent two extremes; mostly paper based (Zanzibar) and mostly computer based (Norway). While in Zanzibar, integration is addressed by means close to what has always been the RHINO approach (and as Anwer argued), in Norway the approach to integration has been by the means of interoperability.

Conceptualising INTEGRATION and Interoperability:



I don't like one conceptualisation of integration in Norway (with computer based systems) and another in Africa (with few computer based systems). I suggest that we are more general in our approach to integration – and scalable (computers are coming, also to Africa). Therefore I will suggest, in the context of HIS, that we understand INTEGRATION to focus on the use /user level, which is also the data /information level. The more precise definition will typically be case and context based. But the Zanzibar case of having essential data from all programs in one database (data warehouse) – similar to the HMN definition – is a good working example. Quite similar needs in all countries.

INTEROPERABILITY is located at the technical level (layer). It is the means, in most cases, if not now, later, also in Zanzibar, to achieve integration.

So how is INTEROPERABILITY best understood in a low-tech African environment? As much as I like to bring integration into high-tech Norway, I would like to bring interoperability into low-tech Africa.

The major problems in HIS integration in Africa, as elsewhere, have been

- 1) data standards, and
- 2) political willingness to integrate – or interoperate.
- 3) and training and institutional capacity development, but I leave that issue for later)

In order to render the term INTEROPERABILITY more general, and more useful in the current African context, and more scaleable, I suggest to specifically include the three levels of:

- 1) The syntactic/ technical level; how to achieve (technical) interoperability
- 2) The semantic level; data definitions, meta data, where 1) is the container, this is the content.
- 3) The political/organisational level; get the actors to agree to interchange data, e.g. the different programs, maybe the hardest task! And very relevant in the African context.

By extending the understanding of “interoperability” to include these three levels, it is easier to get a consistent framework across contexts (as valid in Norway as in Africa). To achieve integration we need to solve the problems of interoperability at each of the three levels. In Africa, 2) and 3) are as important as in Norway.

Answer's integrated reporting forms will first of all depend on political agreement to initiate and run the process, (3) above), then to agree about what data do include, definitions, indicators (2 above). Then how to do it technically (1 above). All of this is now conceptualised within the term “interoperability.

These three levels /layers are building on the ISO 7 layers communication model, which is brought forward within “knowledge management” (yet another field dealing with same issues as us!) and “enterprise architecture”, among others.



When it comes to INTEGRATION, I think it will have to be case /context based. Generally, in the IS field, one use the term quite loosely, for example, a web portal represent a relatively loose integration, whereas a data warehouse is more or less tighter. Then we have the “one software” approach, which is tight. Thus, integration should not be understood as ONE SOFTWARE approach, integration is a relative term; more or less tighter or looser.

All this said. Integration must have a concrete approach; in our case: data warehouses, as HMN propose, and maybe later more realistically: web-portals (which for a long time (our time) will have solid data warehouse components). Interoperability will always need some structure and system design, you need to get / access the integrated data somewhere!

In the current world, the data warehouse – as proposed by HMN – is the only practical way to achieve the RHINO goals; integrated routine health information. But I am afraid the current trend is pushing us away from the original – and still valid – goal; strengthen district and local management and health services provisions. Now everybody promoting national data warehouses; a death to decentralised health management if anybody asks me! Integration only for national managers!

What about district/local level?

Therefore; I suggest to go for district based data warehouses as a key to achieving integrated HIS. Integration closer to the data sources, and with the purpose to serve local level management.

Regards,
Jørn Braa



July 30, 2009 – Day 4

DAY 4 INTRODUCTION: FRANCIS KEEWIWA AND ANWER AQIL (JSI)

Dear forum participants,

We cannot thank you enough for sharing your ideas and opinions about this topic. Thanks too to those who are following the discussion through readings. We encourage you to write and share your thoughts. As the deliberations have shown there is no one answer to this complex issue of integration of HIS. Therefore, continue feeling free to discuss your ideas with the rest of us.

As we have said, you might disagree with our sequencing of the days' agenda following a problem solving approach. First, creating a rationale for having a debate on integration of HIS to defining the characteristics of integration of HIS; moving from defining to understanding the underlying causes of limited or lack of integration.

We hope you would all agree that these are important steps to streamline this debate. We now want to move on to the fourth objective.

- To recommend strategies/interventions to improve integration of HIS

Some of you might have already alluded to the strategies in the past three days. However, we feel that there is a lot to be discussed about strategies.

Keeping in mind the underlying causes of lack of or limited integration of HIS, consider the following questions to structure your thoughts-

1. Using your specific country and personal experiences, suggest the possible interventions we should adopt to achieve or improve upon HIS integration.
2. Also share with us the interventions you have implemented for HIS integration and their outcomes – both positive and negative
3. In your opinion, what conditions should be present to facilitate HIS integration?
4. Suggest a list of criteria that can be used for prioritizing which elements or types of HIS to be integrated.

Like before, feel free to express yourself on strategies in any way you want keeping as close to the day's objective as you possibly can.

Once again, we look forwards to an excellent discussion.

Regards
Francis Kiweewa



4.1) PEPELA WANJALA (MINISTRY OF HEALTH, NAIROBI)

Dear Rhino,

Thanks for your continued discussions on the topics. I do acknowledge what you've discussed so far. My discussion covered the whole topics as earlier proposed.

I'll add that Integration and interoperability are the current terms used. However, Health Information can be as simple as requiring only a piece of paper and a pencil or pen but can be complicated requiring a robust electronic system with powerful machines. Integration of a HIS just requires the stewardship, coordination and partnerships. Interoperability on the other hand the system should be able to link with other sub systems and tap the available evidence for informed decision making. It can be paper based or electronic. Electronic systems only ensures, efficiency and enhances the system to quick produce quick wins for policy and managers to make evidence based decisions.

Where we need to integrated is having well structured structures, support them to function efficiently in a comprehensive manner (all Inclusive). While Interoperability should be able to interact with other subsystems and share the available data for evidence based decisions, all must work if the coordinating structures are actively working.

Regards

4.2) PEPELA WANJALA (MINISTRY OF HEALTH, NAIROBI)

Dear all,

Areas of possible integration are:

- Planning and having one strategy data sharing, analysis and dissemination using one set of guidelines
- multi- tasking of personnel to capture the required information
- capacity building
- joint monitoring of activities of HIS.
- Minimum data sets/ indicators
- What we've already initiated are
- Developed one HIS strategic plan including other statistical constituencies (National bureau and Vital registration)
- Developed one HIS policy that will guide the operation of the HIS and link up structures. Established a HIS TWG to guide the process
- Determining the minimal data sets and indicators to collect data.
- Using the personnel.
- Printing of the HIS annual reports by the National bureau.



- Including health statistics into their reports e.g. the Economic survey, Data sheets.
- Developing tools together.
- Conditions that can make this work
- Having the coordinational committees, HIS TWGs financing one plan, one M&E/HIS, One information system/ warehousing.
- Planning and facilitating provincial and districts stakeholders forums
- Establishing the network and identifying HIS champions among others

4.3) MARK SPOHR (WHO)

I think it has become clear that people have been talking about two types of integration. The topic of this discussion, "Is integration of health information systems possible?" speaks to integration of information systems which is integration of the applications and platforms.

In addition, many people have been arguing strongly for the need to integrate health information. I think most of us here agree that it is important and improves the usability of data to have it integrated so that it can be analyzed and used across units, programs, districts, etc. Since I haven't heard anyone argue that we don't need integrated information, I think we can take it as a given that this is a desirable goal.

The question then becomes Can we? Or Should we? Integrate health information systems.

I think it is possible to achieve some integration of health information systems when you have a strong organization that has direct control of all of the relevant areas. However, this is a limited case and doesn't need to be a priority. I certainly wouldn't go around ripping out functioning health information systems (and losing the significant investment in training, software, and data) to spend more time and money on an integrated health information system. It is usually much easier to modify a functioning system to support national data standards than it is to install a new system and train everyone. This, of course, needs to be evaluated on a case by case basis.

As I mentioned earlier, in Uganda they have three different health information systems (developed by different partners: web, hand-held, and PC) to collect their facility routine health information for national reporting. Fortunately, they all follow the national data standards so the information they collect can be integrated at the national level even if the three different systems which collect the data are not integrated.

This leads me to my answer to today's question. I do not feel that there needs to be an effort to improve the integration of health information systems. I do feel that there should be a strong effort to improve the integration of health data.

You can improve the integration of health data by:



1. Establishing national data standards (metadata: definitions, representation and communications);
2. Encouraging/requiring those who collect health data to use these standards and to submit data to;
3. One or more national data warehouses where it can be organized, analyzed, and made available for decisions at all levels.

This model also permits individual patient information to be readily exchanged among those providing patient care to improve the coordination of services.

Regards,
Mark

4.4) ALVIN MARCELO (UP MANILA)

Hello all,

I concur with Mark (snippet below) and is pleasantly surprised that my previous post maps very well with his own points that is -- 1) standards 2) applications (that implement the standards) 3) decisions (from data in the warehouse). Integration may not necessarily happen even if you have these three points but it definitely will not happen without them.

If we can encourage countries to seriously manage their standards (1), to ensure that applications use the standards (2), and to promote decision making based on the information (3) then we would have created a self-energizing loop which can start countries on the road to integration.

As I said, integration in my opinion is not a state of being but rather a self-conscious process of trying to bring things together. Therefore, HISs may probably never ever be "integrated" (read: finished and done) but HISs can always attempt to get closer to each other to achieve common goals.

Alvin

4.5) MARIA KAMAU

HMIS Zonal Cordinator

Comitato Collborazione Medica (Ccm) Italy

Greetings All,

I come in rather late and as a silent participant thus far, truly appreciate the thought provoking and highly informative contributions and discussions.

Here I share a few of my own thoughts:



While I do agree that there may not be need to integrate HISs and perhaps focus our energies on integrating HIS data, I would want to suggest that this is appropriate with reference to ALL HISs in their entirety. However, when it comes to HISs purportedly run and managed by government (MOH), I would beg to differ. I say purportedly because many of them are designed and implemented by helpful development partners who eventually move out and leave 'strengthened systems' in place for MOH to sustain. What turns out is that the system operates for as long as partner is around. I say this from my own experience over two years back (with successes and failures) implementing an integrated HIS (meaning software and paper based system collecting data for various parallel managed health services) which was quite successful at the point of use, which was at district level across one region, but was however 'disowned' at higher levels up. The system is still in operation three years going, even with the introduction of another software to collect data for updated paper-based system because it facilitates analyses for the district management teams, in a way that the new one does not. However, those managing it do have their struggles with sustaining it.

One of the challenges we faced was political will to implement integrated HIS because it would have rendered some departments redundant, and it was also difficult to get consensus on a minimum data set, mostly because no one wanted to accept the argument that 'Less data for each individual program makes better quality data for everyone'. Additionally, some vertical program indicators changed as often as every three months, and it was difficult to keep up, especially with the paper based system applied at the lowest level (health facility).

Eventually a national indicator list has been defined with about 86 in the list, and still there are those departments continue to complain of being left out (and list is not quite strictly enforced).

Since the technical side of integration has already been outlined quite precisely (standards, metadata, etc), let me add my suggestions on the operational definition of an integrated HIS and how it could be achieved (focusing on management of Public HIS by MOH).

- All implemented HIS data should be available at one central office; whether it refers to manual (paper-based) systems or software systems. The technical staff should be able to be aware of at least 80% of all software or manual data collection systems in place (and functional) countrywide. Additionally, a mechanism should be in place such that periodic data is forwarded or updated in this centralized institution. This is possibly where the data warehouse, or various software should be available. This assumes that the technical staff are able to operate the various systems to access whatever data is required for analysis on demand (however this is a separate matter).
- The types of data available at this centralized location should constitute the various HIS including surveys, routine data, census, etc. across the health sector



- To support the above, there should be strengthened management systems in place at all levels, enough to prevent new HIS being introduced without proper vetting and authorisation. The idea would be that not only are HIS implemented on a 'need' basis, duplication of efforts are reduced because whatever is available to suit the needs is utilized as well. The burden on MOH HIS staff will also be reduced at the lower levels.
- While donors should commit part of their funds for systems strengthening (as already mentioned), they should also strive to integrate their HIS internally! It is amazing to see organizations like UNICEF implementing health strengthening projects in one location, and implementing different HIS to suit the needs of the individual projects, financed from same organization, and at times same office! While I cannot put all blame on them, they certainly make a contribution to the confusion of varied repetitive HIS. Donors should also be a little more keen in establishing what has been done before, before funding HIS projects already done by others (well, this applies to all aspects of development projects but let's focus on HIS here). Probably when funding national programs, the donor policy should be to finance a certain percentage to the HIS dept. to ensure it is strengthened, so as to prevent the often used excuse that that department is weak.
- There's need for political will (by action more than talk and fancy policy docs) to enforce integration within the health sector, again, especially for those HIS operated by MOH staff at whatever level.
- Policy requiring those with their own internally managed HIS (e.g. private for profit sector and NGOs) to regularly submit minimum data sets to centralized level of MOH

Hopefully this (somehow) covers my contribution over the past 4 days of discussion.

Regards,

Maria Kamau

4.6) ANWER AQIL (JSI)

Dear all,

It seems as we are coming closer to the end of the forum, more clarity and focus has emerged. I appreciate Braa's attempt to summarize the main points for discussion mixing it with some generalization and adding his pearls of wisdom. However, I would like to add a qualifier to avoid



being boxed under Anwer/RHINO approach. I think there is no one RHINO approach per se for Integration of HIS. Probably, its approach is as eclectic as its membership. RHINO general goal is to create state of art and advocate it on different aspects of HIS in general and RHIS in particular, as per my understanding.

This forum is an attempt to bring all perspectives on integration of HIS together, find commonalities and differences and creating an operational definition of integration of HIS to which we can relate to, as we all agree that standard definitions are important to communicate and compare notes. We are keeping notes of the discussions which are highlighting its complexity as well as means to deal with it. We will share the synthesis after the forum for feedback to create some consensus on HIS integration.

As a moderator, I am grateful for your continued participation, provocative and productive discussion.

Warm regards,
Anwer

4.7) CHARLES TELLER

Bixby Visiting Scholar

Population Reference Bureau

Hi y'all,

Great to hear from diligent, field HIS folks who are struggling with this "integration" beast, and from experienced HIS gurus like Anwer. Let me add my sociologist/demographer's perspective from very recent evaluations, research and demographic/health surveillance in East and Southern Africa, with quick suggestions:

1- Broaden the definition of "health" information: Use the WHO definition (social, physiological, mental well-being, etc) and look at what the MDGs require. To be more relevant to RHINO principles of timely use of info. for decision-making, a lot of important health data come from systems other than the MOH's routine HIS. The Central Statistical Authority, the university, research and think tanks, NGOs, the ministry of planning and economic development, etc. are the more common sources.

2- The multisectorial nature health info use requires triangulation- the highest priorities issues that require evidence are often multisectoral: poverty, hunger, illiteracy, environment, population, gender, etc., and these data often come from outside the narrow HIS. This is what the political authorities pay attention to, so let's make sure health data is "at the decision-making table", which is often in the Office of the President/Prime Minister, or in the tribal leader's compound.



3- Our demographic denominators don't come from HIS: they come from census, enumerations, vital statistics, surveys and surveillance and other governance and civil society-related record systems. They are crucial for indicators of outcome and impact, and longitudinal analysis of trends (eg., MDGs). Thus integrating these means accessing them in a timely, disaggregated and user-friendly way (see PRB's recent "Demographic Data for Development Decisionmaking" report for Ethiopia and Uganda", www.hewlett.org/new/demographic-data)

There is a movement in Africa towards strengthening central statistical and/or information authorities at national level, and district development information systems can facilitate integration of the most reliable, timely and acceptable health information for the major policies and programs. But international partners need to provide long-term support for the institutional and technical capacity for such statistical/information system strengthening efforts, and governments need to allocate their fair share of the financial and technical resources with sufficient political will.

Charlie

4.8) JOSEPH WU

Country Manager

Luke International Malawi

Dear All,

Just want to thanks for all these valuable discussion and information. I will share all of them with my beginner colleagues. :-)

We're now in Malawi and hope we can really practice on the system interoperability and integration with a successful story....

From my personal point of view, get the needs and feedback from users (whether they're health care worker or decision makers) is the first priority.

As a part of system developer (although I don't do program work), I really hope that any system could be designed from the data generator's perspective.

Also according to my experience in Taiwan, to build up an integrated HIS for disease surveillance or M&E, it must have administrative support. The health authority may contribute a lot of assist and makes everything easier....

Anyway, please take my regards and appreciate to the RHINO conference and hope we can have more discussion in near future.

Zikomo!

Sincerely yours, Joseph



July 31, 2009 – Day 5

DAY 5 INTRODUCTION: FRANCIS KEEWIWA AND ANWER AQIL (JSI)

Dear all,

We are approaching the end of a wonderful exchange of ideas on HIS integration. These varied perspectives have not only enriched the debate but have also exposed the practical complexity of the subject.

Having discussed the rationale, operational definition, obstacles, and the interventions/strategies, we would now like to move on to look at the final objective of the forum.

- To develop illustrative outcomes for HIS integration, monitoring and evaluation

To facilitate the discussion, assume that a decision to integrate the HIS has been reached. And you are asked to:

1. Determine what outcomes you would expect to get from HIS integration
2. List the possible indicators that will be used to measure integrated HIS performance.

Like before, we look forward to a productive discussion.

We will produce a summary report on the forum and would share for creating feedback and consensus on the major ideas expressed on integration of HIS.

Appreciate again all of you for your energy, efforts and making it a very successful event.

Warm regards,
Francis and Anwer

5.1) JØRN BRAA (UNIVERSITY OF OSLO)

(Sorry, I now see that I have posted on the Friday session - which I assume should be for Thursday - but I'm on my mobile telephone, and on the move, so ...)

Dear all,

Moving between islands of infrastructures here in the arctic north, I tend to have a little lag in my comments. Now, a comment on

Strategies for Integration - the data warehouse approach:



In my view, the data warehouse approach represents the most appropriate integration strategy in the global South (as well as in the global north). In this I concur fully with the HMN Technical Framework. However, I see two problems with the HMN description:

Problem 1. It is presented as being too technically sophisticated, assuming a fully electronic environment where multiple computer based systems are to be integrated, the HMN description focuses on technical terms for getting data electronically out of one system, transform it to the appropriate standard /format, and load it into the data warehouse. As most /many systems are to a large extent paper based, the data warehouse concept becomes intimidating – unreachable – for health administrations in the South. We need to translate the concept to the situation in e.g. Africa, and provide good learning examples and solutions. Google the term “data warehouse” and you will find that most practitioners and scholars alike focus on the use and users aspects when defining the term. It doesn’t have to be too sophisticated. If the data sources are paper-based, so be it.

Problem 2: The HMN framework describes one (or more) central data warehouses. Problem; this approach assumes Internet/web access to this data warehouse for “everybody”, such as for all districts. That is, of course, if we still go for the decentralised district approach, and not further centralisation. As web-access is still not a given in e.g. Africa, we need an “intermediate” solution; which I suggest as a “district based (national) data warehouse”; an integrated “information tower” in each district, including all available data/information, with the district data warehouse as a central component.

Even when – in the future – we can use accessible web-based warehouses all over Africa, we will have a problem of centralisation/decentralisation, because the central data warehouses will be managed by “central IT people” – institutionally control freaks who may become important obstacles for decentralisation. Web based central data warehouses will need to have “district views” controlled by the local level (well, the next battle ground!)

WHY the data warehouse approach is appropriate:

It is flexible and it enables evolutionary standardisation. Standardisation is the core of data warehouse design. But as proven through experience, standardisation is a process, it takes time (forever), and the target is moving. By including the data sets in the warehouse as they are ready, and update them when appropriate (but hopefully not too often!); evolutionary, step by step, integration and systems development are enabled.

Example 1; in Tanzania, the first data sets to be included are (some of) the HIV/AIDS reporting, the newly revised RCH and HR datasets, then the other programs, and efforts are under way to define a “rest-data set” from the MOHSW reporting formats, i.e. the data not included by programs, such as morbidity. Each program gets their view in the data warehouse. For patient management in the hospitals, facilities, and ART various softwares are in use, or are coming. Here interfaces for interoperability are being developed; extracting patient data, transforming



into aggregates , and loading into the data warehouses. All this is work in progress, but the approach is easy to understand, and the results (i.e. the evaluation of the integration) are immediately available, and also easy to see (also if it doesn't work).

Example 2: In Sierra Leone a multitude of overlapping forms were harmonised within the data warehouse, each form got its own "view" and data entry screen, or as initially designed, a mechanism to load the data from other computer based systems. This allowed for step-wise standardisation. After a while, the programs where convinced, through seeing the results, to revise the forms and thereby to resolve overlaps and inconsistencies also at the data collection and paper form level. In this case the other software applications in use ceased to exist because they were no longer supported by various agencies. "Unfortunately", since we could not then demonstrate true electronic district based interoperability in an African context.

In my view, the data warehouse approach is well suited for HIS integration – or HIS interoperability (whatever the different camps are labeling it) in the context of the global south.

A Final Comment on Integration:

I agree with Mark generally, but not on his definition of integration, or in fact definition of "systems". He says that Systems should not be integrated, data should be integrated. To me, data and information are central components of information systems. By leaving out "systems" I think you are simplifying, because the systems design and development components become invisible. This is of course about semantics, but when we debate across long distances, it is useful to understand what the others are saying. Shared understanding/ use of the terms being used is one way to achieve this.

Mark is using "systems integration" the way I use "software – or application – integration". I think we have a different understanding of the term "system". To me, "system" is much – much wider than the software applications included. Systems integration is therefore not about integrating software and technical platforms, but about getting the various systems to "communicate" and interoperate in a meaningful - integrated – manner.

To me, Uganda, as presented in previous mails, is a good example of HIS integration – using the data warehouse approach.

In fact, most information systems integration on the technical side is about constructing gateways between old (legacy) systems, and about constructing layers on "top" of them so that they can interoperate in an environment of multiple systems. The most time consuming part of this work is not on the software, but on systems design, business re-engineering etc. etc.

This is probably what Mark calls interoperability. If I was the only one who understood "system" differently, I could change, I'm flexible, but since I'm not alone we should try to work



out a shared understanding of, at least, how the different actors are using the term HIS-integration. Let's try to do that a little later. I volunteer to initiate a discussion with Mark, etc.

Thanks for this RHINO initiative! I'm heading south – west for a few thousand kilometres and will not be able pester anybody with as long e-mails anymore.

Regards,

Jørn Braa

5.2) EVERLYNE NYAGAYA (JSI-PAIMAN PROJECT)

Hi Forum Members,

It's been a very educational discussion thanks for all your valuable contributions. I will discuss outcome and measures of integration in relation to our program here in Kenya.

Our strategies are

- 1 - Improving and expanding sustainable HIV, TB and other Reproductive Health prevention, treatment, care and support by: Building capacity of all health facilities and staff to design, implement and evaluate services (VCT, ART, PMTCT, TB-DOTS, Safe motherhood, Family Planning and Child Survival); linking the above services to the Community through a well-planned Network and partnership
- 2 - Improving and expanding civil society activities in order to increase healthier behaviors through the following areas of intervention; Work site program, Community Strategy Component, Youth Agency, FBO prevention, Beach Intervention, PHO/PHT support, outreaches and the Radio Program.
- 3 - Improving and expanding care and support for people and families infected and affected by HIV/AIDS through: Expanding and improving home and community support programs for OVC and PLWA; reducing stigma and providing safety nets

The above 3 result areas were able to fully integrate by the 2nd year of the project and the result was as follows:

1. By improving and expanding civic societies to increase healthier behaviors in result area two, the M & E department was able to notice increase in service uptake especially in the sites where the strategy worked best.

In addition to that, the community health care workers could easily refer clients for further treatment and tracking effective referrals was made easy because of the



introduction of the referral booklet which provided referral forms filed at the service delivery points.

2. The result area one indicators have played a big roll in ensuring the successes of integration of the 3 areas in our project are achieved. Through GIS were able to map the coverage areas where we had all the result areas present and where we had one or two result areas and realized that where we had more than one result area working together coordination and service utilization was very good.

3. In result area 3 that is Care and support we are able to help in tracing defaulters in TB program and ART and through our result area one these defaulters are linked back to the service deliver points. In this area the Community health care workers are able to identify the sick in the community refer them for treatment as program officers in result area one linked them to support groups at service delivery points.

Through this project I have been able both to see the outcome and the indicators that measure integrated HIS performance.

My summary of the outcome is as follows:

1. % increase in service utilization
2. Increase coordination
3. Sharing needs
4. Correlation of indicators on performance
5. Joint planning
6. Increased interaction between community and service delivery staff
7. Among the program staff there has been demand to know who is creating a gap and who is contributing more to the integration
8. Information demand from M & E has increased due to the integration.

Regards

5.3) MARK SPOHR (WHO)

Thank you for your comments, Jørn.

I think we are pretty much in agreement and that the differences come down to semantics.

I was somewhat frustrated in the conversation since "Integrated Health Information Systems" were not defined anywhere. Even though the Tuesday discussion was supposed to be about definition, I don't think we had much input on that and certainly didn't reach consensus.



Different people were assuming different meanings so that sometimes it was difficult to understand their points. I attempted to both define the terms and then argue my points. I was just using my current working definitions for integrated systems but since the term is widely used and abused, others have equally valid definitions.

I would hope that one thing that could come out of this discussion would be a clear definition of the terms.

All the best,
Mark

5.4) BAL RAM BHUI (JSI-PAIMAN PROJECT)

Hi Francis,

I am enjoying the discussion and experts' experiences. Below I would like to share my thoughts on today's topic of discussion in red color/bullets

1. Determine what outcomes you would expect to get from HIS integration A functioning, representative, inclusive HIS that provides data/information needed for decision making at all level up to health facility and include data need of all program and stakeholders.
2. List the possible indicators that will be used to measure integrated
 - HIS unit/staff sanctioned at level
 - Manual on data standards – definition-numerators and denominators, sources, interpretation, limitation – exist
 - HIS coverage at least 80% reports of 80% of health facilities – public and private
 - HIS monitoring and evaluation working group at national and provincial level
 - District ownership and control of HIS
 - Data disaggregated by age, sex, geographic area, socioeconomic factor and related risk factors

Thanks
Bal Ram Bhui

5.5) ALVIN MARCELO (UP MANILA)

Hi all,

My own experiences here in the Philippines subscribe more closely to Jorn's definition of 'system'.



And if it is possible, may I propose a step back and settle the basic definitions first before moving forward to other objectives as that is a crucial strategic issue at hand where further conceptual exchanges (implementations, outcomes, etc) will be hinged upon.

It would be a big missed opportunity if we continue discussing without a shared (standard?) set of definitions. But if we do proceed without the set of definitions, that would be an interesting demonstration of why it is so difficult to integrate systems -- the experts cannot agree on the standards!

My two cents. :)

Alvin

5.6) MIKE EDWARDS (JSI)

Thank you RHINO forum for this discussion.

I truly appreciate Mark's excellent presentation of both points of view of the Integration vs. Interoperability continuum. On one extreme, we have our one integrated system, and the other we have the freedom to design, on any platform, using any software, systems where their metadata and standards are used as the basis to combine data from all systems into an integrated data warehouse.

Jørn points out that the way forward is the integrated data warehouse approach, and most importantly the need for district based (national) data warehouses, where data towers in each district include all available health data and information.

HMN as well places the development of national data warehouses as a high priority for strengthening the HIS.

So we need to look at a definition of data warehouse: A data warehouse is a repository of an organization's electronically stored data. Data warehouses are designed to facilitate reporting and analysis.

This definition of the data warehouse focuses on data storage. However, the means to retrieve and analyze data, to extract, transform and load data, and to manage the data dictionary are also considered essential components of a data warehousing system. Thus, an expanded definition for data warehousing includes business intelligence tools (application software designed to report, analyze and present data), tools to extract, transform, and load data into the repository, and tools to manage and retrieve meta-data. In contrast to data warehouses are operational databases that support day-to-day transaction processing.



Under the HMN Framework, the data warehouse stores and retrieves data from the six sources of data (census, civil registration, population surveys, resource records, service records and individual records). Linked to the data warehouse is a decision support tool that can provide users with dynamic multidimensional analyses capabilities (data triangulation).

Charlie makes an excellent point that our data sources are expanding beyond the current MOH RHIS, and our use of triangulation as an analytic tool is needed, due to the multi sectoral nature to this broader definition of health data and health information.

HMN, as part of a strategy towards strengthening country Health Information Systems, is working with countries to complete their HMN Country Assessments, and then to complete their Strategic Plans. As Mark has pointed out the excellent work in Uganda where the meta-data of various systems was used to integrate their data into a data warehouse, we can also see that the published HMN Assessment for Uganda (http://www.who.int/healthmetrics/library/countries/hmn_uga_his_2007_en.pdf) makes the recommendation to support the development of a web-based national data warehouse. Another important recommendation is to train health information officers in statistics and data analysis (data use) at all levels. We can look across the HMN assessments and see that the task of building data warehouses is a common recommendation.

So, as a way forward, how do we achieve our goal of district based data warehouses that include an expanded definition of health information systems and information? I think we need to adopt Mark's strategy of using the meta-data of all the various components of the health information systems as a way to integrate our data into a data warehouse. The meta-data database is also the building block database for a decision support system. I hope that in the future Mark will continue to use the RHINO network to further expose us to the meta-data tools that he and his team at WHO are working on.

Best wishes,
Mike E



August 3, 2009 – Post Forum

CLOSING REMARKS – FRANCIS KIWEewa AND ANWER AQIL

Dear all,

Thanks a lot for your excellent contributions, sharing your opinions, highlighting the complexity and practical challenges of HIS integration.

As promised, we shall synthesize the responses and contributions in a report that will be distributed in the next two weeks for your feedback. The report will add a literature review of this topic to broaden the existing discussion and missing points. It will be organized in relation to the forum objectives. The report will attempt to create an operational definition of integration of HIS based on the received inputs, which is also suggested by many forum participants.

We request you to fill in the attached evaluation form to help us improve on the future forums. The evaluation form will take less than 5 minutes.

Please stay tuned for the coming HIS integration forum report draft and feedback for final report.

Warm regards,
Francis Kiweewa and Anwer Aqil