



# **Developing an Information- based Culture: HMIS and PATHS 2003-2008**

**DFID** Department for  
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This Technical Brief was written by Arthur Heywood, the first STL in Benue and a HMIS expert .



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*HMIS officers capturing data*

## Developing an Information-based Culture: HMIS and PATHS 2003-2008

### Summary

The groundwork is established. The information system is functional in PATHS-supported states. There has been extensive progress made since 2003 in strengthening data handling processes and infrastructure and there is support from key role-players at all levels. Data is available for managers on a variety of issues and some health workers are getting feedback on coverage and quality of service delivery.

The challenge is to roll-out the system nationally by strengthening information management through improving access to, and use of reliable information for the management of health programmes and services. Key aspects that require strengthening are equipping managers with skills to interpret and analyse information, and to provide feedback to reporting units. The key to improving data quality is regular feedback through clearly defined report formats. This process has begun and clear lessons have been learned.

In order to sustain the National Health Management Information System (NHMIS), the gap between rhetoric and practice needs to be reduced so that managers and politicians practically support data collection, processing, analysis and dissemination by allocating and releasing realistic budgets for HMIS. Nigerian health information leadership needs to be developed by supporting

*“It is easy to lie with health statistics, but it is even easier to lie without them”*

*Unknown source*

local NGOs and programs to become viable and dynamic organisations that can scale up existing activities, implement and help enforce clear, action-led policies. The HMIS needs ongoing but gradual modification, maximum participation from all partners, meaningful feedback of information focused on MDGs and mandatory use at all levels.

This technical brief describes PATHS involvement in strengthening the National Health Management Information System (NHMIS). In 2003, an assessment revealed that the NHMIS was functioning poorly. Key problems included collecting too many data-elements; the lack of suitable indicators; and a non-functioning software package. As a result, both the quantity and quality of data was poor, and information was not used by managers. Starting in Benue in 2003, PATHS provided support in all states and at federal level. By 2007, the software system introduced (the District Health Information System – DHIS) was adopted nationally and the local consultant team was contracted to roll out the system across the country. This brief describes this story.

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*HMIS officer capturing data*

# Introduction

It is widely recognised that interventions in the arena of HMIS design and implementation are “a very cost effective technical and financial investment” (World Bank 1993). However, few countries have a HMIS that provides beneficiaries (individual clients, community members, service providers, managers, planners and policy makers) with timely and relevant information necessary to formulate policy, plan, implement, monitor, supervise and evaluate individual and public health program activities. Nigeria was no exception to this and PATHS realised very early on that they could not get meaningful information from the NHMIS, which was “bloated and inefficient, unable to produce meaningful information”<sup>1</sup>.

An initial assessment of the NHMIS<sup>2</sup> in March 2003 showed a “data driven” HMIS with:

- limited political and financial commitments at State and Federal levels;
- a large data set that required unsustainable levels of logistical support;
- a data set that did not reflect current diseases and health management challenges;
- major technical problems with the Health Information for Action (HIFA) software;
- a design that did not encourage and support local adaptations and innovation.

The system was driven by a set of forms whose problems included:

- Forms too complicated, voluminous, difficult to interpret and time consuming
- Too much information was required, while still leaving large gaps of crucial data
- Problems filling in the forms and getting vertical and horizontal totals
- Forms expensive to print and of poor quality, so illegible and often out of stock.

Fortunately the then Minister of Health realized this deficiency and from 2003 initiated a review process that would “*facilitate efficient, effective and accurate planning and evidence-based decision making.*” This was a major boost to the development of a more rational HMIS.

## The Fate of Data (R. Chambers)

Much of the material remains unprocessed,  
or if processed, unanalyzed,  
or if analyzed, not written up,  
or if written up, not read,  
or if read, not used or acted upon.

Only a minuscule proportion, if any, of the findings affect policy, and they are usually a few simple totals.

There is always enormous skepticism about trying to strengthen routine HMIS in low-income countries. PATHS’ management was initially reluctant to take on this challenge. However, the demand from some partners and the obvious need for better routine information to monitor systems improvement meant that HMIS strengthening rapidly became a key initiative, implemented as part of a systems development programme in all PATHS supported states.

1 Arthur Heywood, Assessment of Nigeria HMIS, March 2003

2 Arthur Heywood, Assessment of Nigeria HMIS, March 2003

# Strategies Adopted to Address Challenges

While a lot of data was being collected, the problem was essentially that of poor data quality and its non-availability for managers. Two key **strategies** involved the strengthening of **systems** for data handling and building the **capacity** of technical cadres to manage the programme.



## KEY STEPS:

### *Strategies for strengthening systems and building capacity*

#### Systems Development:

- Development of systems and structures to handle data, based on the information cycle (e.g. registers and tools for collecting data, data flow policy to manage flows of data within the health system).
- Establishment of monitoring systems and structures to manage the information system itself (e.g. systems to ensure the quality of the data produced)

#### Capacity Development:

- In-service training of local staff from HMIS, management and “vertical” programs to handle data and use information for local management
- Resurrection of a number of work groups to manage the process from SMOH, local government and the faith-based sector
- Training of technical cadres at the state HMIS unit and from local government (M&E officers) to manage the HMIS and ensure sustainability
- Institutionalisation of feedback to data collectors and provision of regular programme based reports to State and Federal Ministries of Health

These two strategies run throughout the HMIS re-design and implementation processes described below. The entry points in each state were different. For example, in Ekiti the initial focus was on stimulating staff to use data at all levels. Linked *Excel* spreadsheets were used initially for the analysis. As staff saw the use of the data so the systemic aspects were introduced and institutionalised.

## HMIS Re-design

The HMIS re-design process started in Benue, Jigawa and Enugu States in 2003. Prior to this a team visited Enugu and Bauchi, the states with the “best-performing” NHMIS, and realized that the prevailing system was unlikely to succeed. Following the visits, the head of the Federal HMIS unit attended a HMIS workshop in South Africa where he studied a better functioning HMIS and agreed that PATHS should set up a pilot project in a few states. This would:

- Utilize existing HMIS registers to ensure basic compatibility
- Create data collection and reporting tools to cover “new” data not covered by the NHMIS
- Pilot the use of the District Health Information Software (DHIS) for capturing and analyzing the data
- Explore the possibility of exporting data from the DHIS to the HIFA software



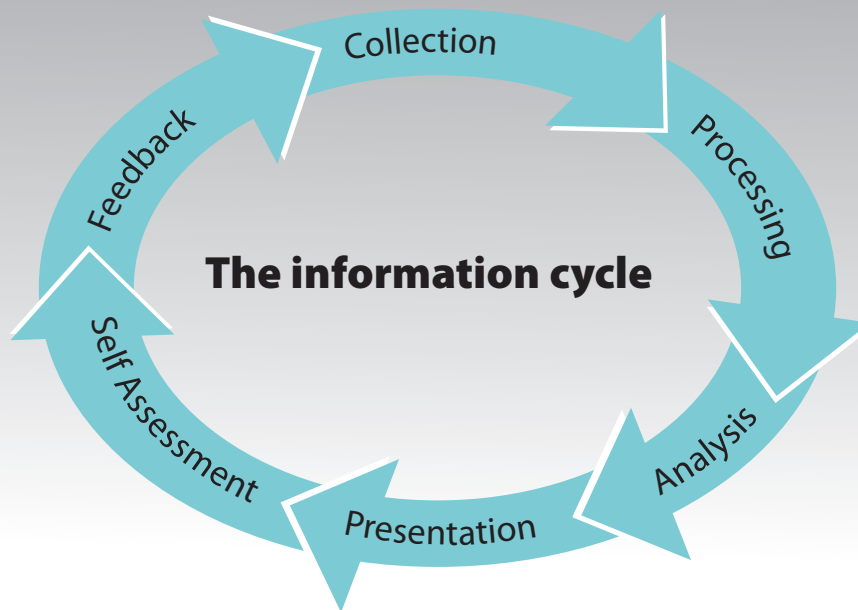
## KEY FACTS

One of the major principles of the DHIS is its free, open source collaborative nature. End users of the DHIS have access to a world-wide network of users with permanent e-mail technical support and problem solving. Advanced users and programmers become part of a free open source development process through which they can contribute to software development. The network is known as the HISP network – Health Information Systems Programme. HISP is based in several African countries (e.g. South Africa, Ethiopia, Zambia) and in other countries (e.g. Norway, India and Vietnam).

The reformed system was re-designed in an integrated manner, based upon the minimum information requirements needed for decision-making. The information generated would support more effective managerial, clinical and community health-related decisions to improve individual and public health status. Success was measured in terms of informed decisions which lead to action and positive change in the health system or health

status, rather than by the quantity or quality of data produced.

As the initial work was focused on Benue, external Health Information Systems Programme (HISP) consultants worked closely with the Benue State HMIS team and Local Government M&E officers to develop a Nigerian team to take responsibility for HMIS implementation in the state. This team rapidly



## CASE STUDY

### *The DHIS in Enugu*



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*Louisa Williamson, the consultant, training the M&E officers in the renovated SMOH conference room*

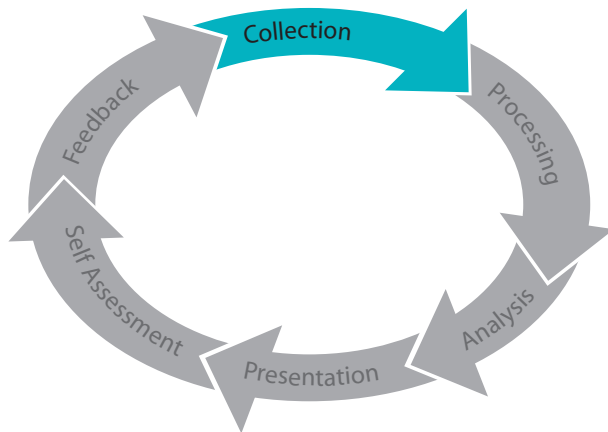
In the latter part of 2003, a pilot project was initiated with PATHS support to test the implementation of a streamlined indicator-based essential dataset (EDS), with a simplified reporting process in four LGAs in the state. In May/June 2004, this process was rolled out in all the 17 LGAs in the State. About 400 facility staff were trained during the exercise. In addition, PATHS renovated the Directorate of Planning Research and Statistics (DPRS) building; supplied computers to the HMIS unit within the DPRS; and supplied computers and generators to all the seven health districts of the state.

developed skills to be able to support other states, and some members formed a local NGO – “HISP Nigeria” – that was at the forefront of a national roll-out promoted by the FMoH, starting in 2007.

The other PATHS supported states rapidly took up the revised system, with training initially taking place in Benue, using locally generated data. Each state then held a series of workshops, focusing on the information cycle and slowly developed the complex set of technical, supervision and management skills needed to roll-out the HMIS. States developed at different speeds, depending on local capacity and infrastructure. All contributed towards the whole exercise through an ongoing process of consultation and mutual support described below.

The HMIS re-design was based on the four components of the information cycle – Collection; Processing; Analysis and Presentation; and Use (self-assessment and feedback).

## Data Collection



The HMIS uses paper-based collection tools for facility level. Because health workers were already collecting and reporting data, the data collection process was changed as little as possible, reducing data elements rather than changing the functioning procedures.

The focus of the HMIS intervention was to reduce the amount of data collected and to standardize data collection to stimulate self-assessment and peer review.

### **The Essential Data Set (EDS) and Indicators<sup>3</sup>**

The focus of the HMIS reform was on developing a state-specific indicator set, based on the MDGs but expanded to include the Federal National Economic Empowerment and Development Strategy (NEEDS) and Health Sector Strategic Plan (HSSP) and State indicators. Data-element sets were developed to accommodate these indicators and collection tools were developed to collect the data-elements as easily as possible. The initial indicator set was modified with time, as users decided which indicators were useful and which were not. Development of a set of indicators was a major shift from the “old” system to the “new”.

<sup>3</sup> Indicators are composed of two data-elements—the numerator and the denominator. Data-elements are collected and then converted into indicators. For example, ANC coverage rate is an indicator; the numerator is the number of pregnant women seen at the ANC clinic, while the denominator is the number of pregnant women in the facility catchment population

Previously, screeds of data were collected with little thought of indicators.

Denominator data from populations was also problematic as census data was unreliable, so emphasis was on proportional indicators with service denominators (e.g. bed occupancy rate), rather than population based denominators (e.g. admission rate per 1,000 people in catchment population). Comparison of similar facilities was promoted, based on indicators, as was comparison to other LGAs and to international “norms”. Ideally, each level used indicators to compare itself to targets set in annual plans. For example, a LGA with an immunisation coverage rate of 10% (fully immunized children at one year) might set a target for the following year of 20%.

The development of the EDS led to a common understanding of indicators and data elements amongst the HMIS teams in the different states.

### **Client Cards and Registers**

The pilot HMIS simplified, streamlined and re-designed data collection tools to fit the new indicator-based data set, starting with child health, ANC and delivery data:

- Client cards were distributed to collect data needed for the indicators and, where possible, to provide a quality of care checklist.
- Registers were re-designed to provide continuity of care and to activate the process of tracing defaulters.
- Tick sheets were introduced to count activities.

These tools were shared among states; and modified as needed.

Data collection has improved considerably, with client cards, registers and report forms generally available and a standardised facility list available for all states.

## Population Data

Population data was a nightmare. As the census data was from 1991<sup>4</sup>, estimated populations of states varied by 50% and LGA population figures were inflated for political reasons. The 1991 census was computerised on the DHIS, aggregated to ward level and updated to 2004. However, the accuracy of indicators based on these populations was always doubtful, though they were still used to monitor trends through keeping the faulty denominator the same. The 2006 census data substantially improved quality of population estimates, though it still has many of the same political problems.



© PATHS Photo grapher

Entering records for new born babies – Fadan Kagoma PHC, Kaduna

4 Another census has been done in 2006

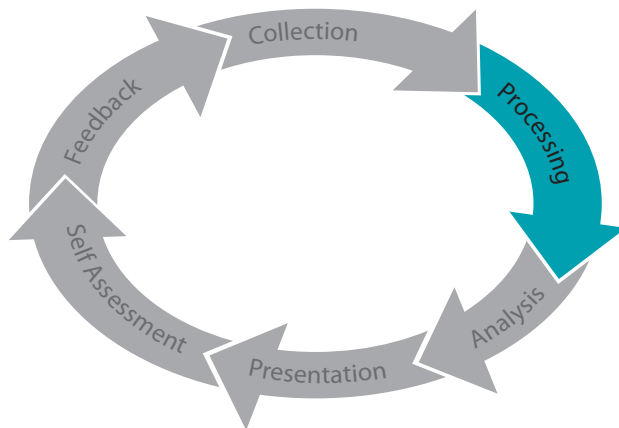
## KEY STEPS:

### The information pyramid

The pyramid illustrates that each level needs to collect the data needed by the levels above, while they add on data that is needed at their level as well. Thus, all levels collect the data needed for the “core” international indicators (the yellow dots in the diagram). Lower levels add more and more data for the different indicators (the different coloured dots). The pyramid shows that the higher you go in the health system, the less information is required for effective management. For example, at the international level information is needed on maternal and child mortality to measure progress towards the MDGs; while at the local level more information is needed on ANC attendance, immunisation coverage, nutrition status and so on.



## Data Processing



### Data Quality

For data to be useful to managers, errors should be small enough to not bias decision making. Data also needs to be available on time, correct, complete and consistent, reliable, represent all collectors, and be comparable by different people. Quality assurance needs to be done by all data handlers, from collectors to top managers.

Data was of very poor quality to start with. In order to improve this, new tools were designed, data definitions were developed, and a “comments” column in the collection/collation tools was introduced. Supervisors were encouraged to check and sign off data before submission. M&E officers were taught to “eyeball” data for missing values, obvious fluctuations and mathematical errors. All data handlers checked reports before computerizing them. All reports had the name and signature of the person completing it. Data from larger facilities was collated by hand from different units into one facility report; facility aggregation was done using the DHIS software and a number of data quality assurance (validation) rules were built in.

Data quality had improved considerably using these simple techniques, but still had some way to go at the time PATHS ended. A lack of faith in data quality was a major constraint on the next step, analysis of data.

### Data Flow and Reporting

Regular and timely data flow was crucial for HMIS. Each level sent a monthly summary of activities to the level above, after checking for quality (the 3 Cs – correct, complete, and consistent). Each level reported only data directly connected to analysable indicators; other information was retained at the facility in registers and other data capture tools.



## KEY FACTS

### *DHIS Data validation and quality assurance*

The DHIS has built-in functionality for data validation to improve the quality of the data being collected;

Absolute rules apply when one value cannot be higher than another (e.g. if child attendance is 234, then the total headcount, inclusive of child attendance, cannot be 225).

Statistical rules are more flexible and are designed to ensure that the ratios between data elements are not transgressed (e.g. children with diarrhoea is correlated with the headcount for children under 5 years. Therefore, if the headcount goes up, the number of cases of diarrhoea should increase in the same proportion.)

The Min/Max values will catch typing errors, e.g. 122 instead of 12.

Outlier and gap analysis can be run to identify outlier values and gaps in the data collection

Smaller gaps in reporting can be automatically filled through extrapolation

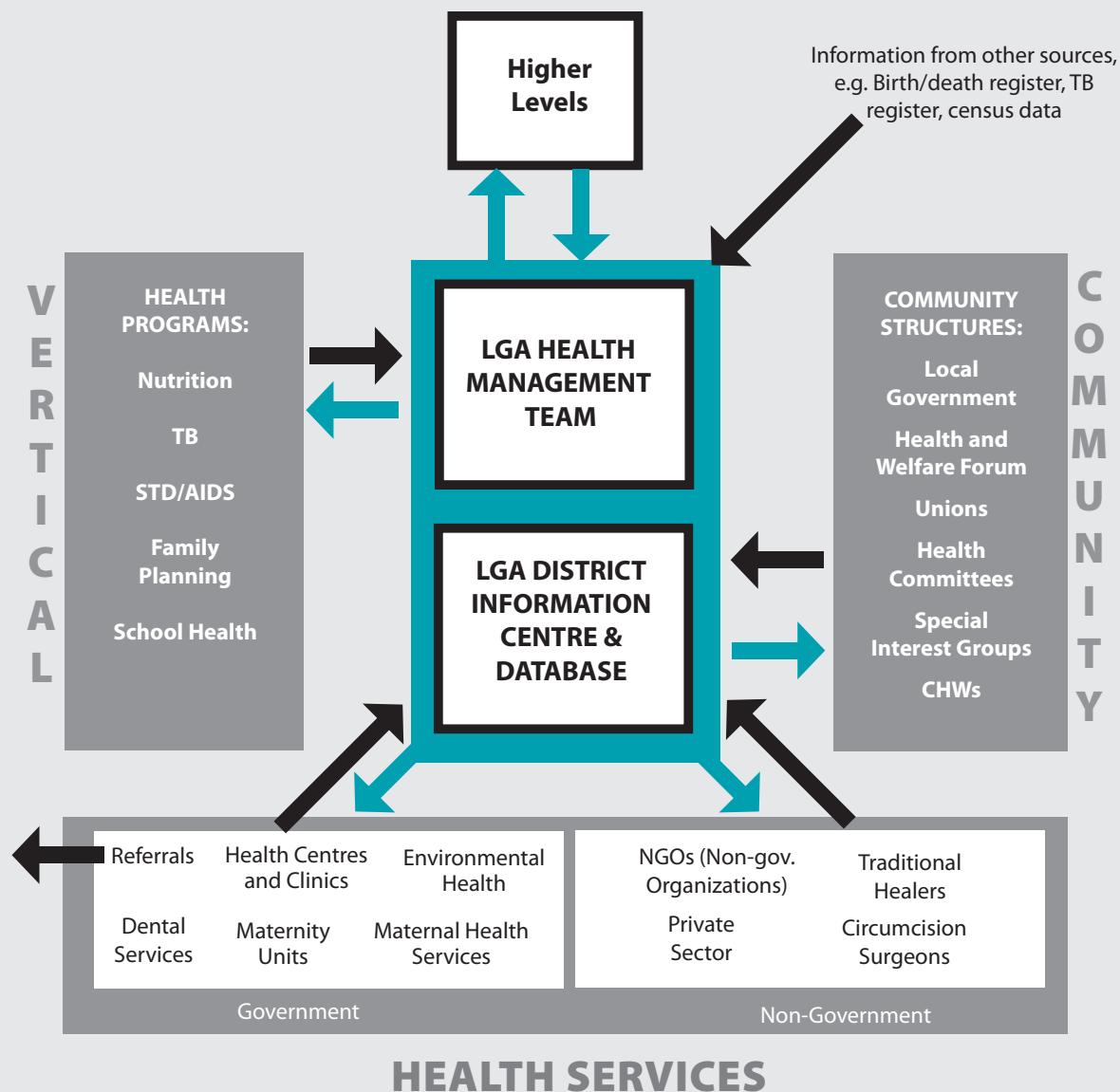
The check-it functionality allows for “starring” (marking) of interesting data during data collection that later can be automatically looked up and analysed

The official data flow diagram shows all data going through the LGA M&E office for local use before being reported to the next level. This detailed LGA data flow diagram (a re-inforcement of existing federal policy) was developed early on in the reform process, and adopted by all states.

In order to simplify reporting, the DHIS produced special reports for each of three different types of facility – health post, Minimum Service Package (MSP) health centre and hospital. Each facility reported only those activities they were actually carrying out – Basic PHC, MSP health centre and Hospital - as shown in the table on the next page:

## HMIS Data Flow diagram for LGAs

The diagram shows the LGA information centre in the middle of the information web. All data from facilities and programmes is submitted to this centre. In turn, the data is then submitted to higher levels, to health programmes at the LGA level, back to the facilities and to community structures. The type of data sent to these different institutions is dependent on their needs.



### Links between Facility Type, Services offered and Data collected

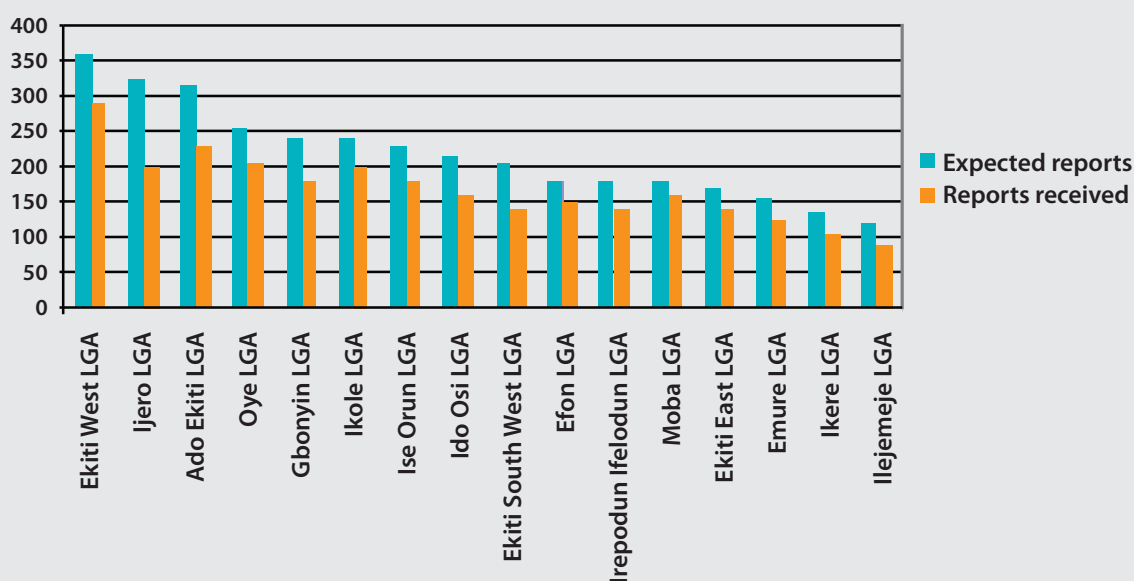
Type of facility	Number of Data Elements	Type of services
Health post	42	Attendance, Notifiable diseases, Immunisation, IMCI
Minimum Service Package Health centre	42+73 = 115	Above + Maternity, BEOC, TBDOTS, Laboratory, DRF
Hospital	42+73+26 = 141	Above + inpatient, theatre and OPD

Timing of data flow was often problematic, with most reports coming in late. Therefore, a data handling and monitoring tool<sup>5</sup> was developed to monitor data flow as well as feedback and data quality. Where implemented, this tool improved timely submission rates considerably. Some states were achieving over 95% submission rates, while others still languished.

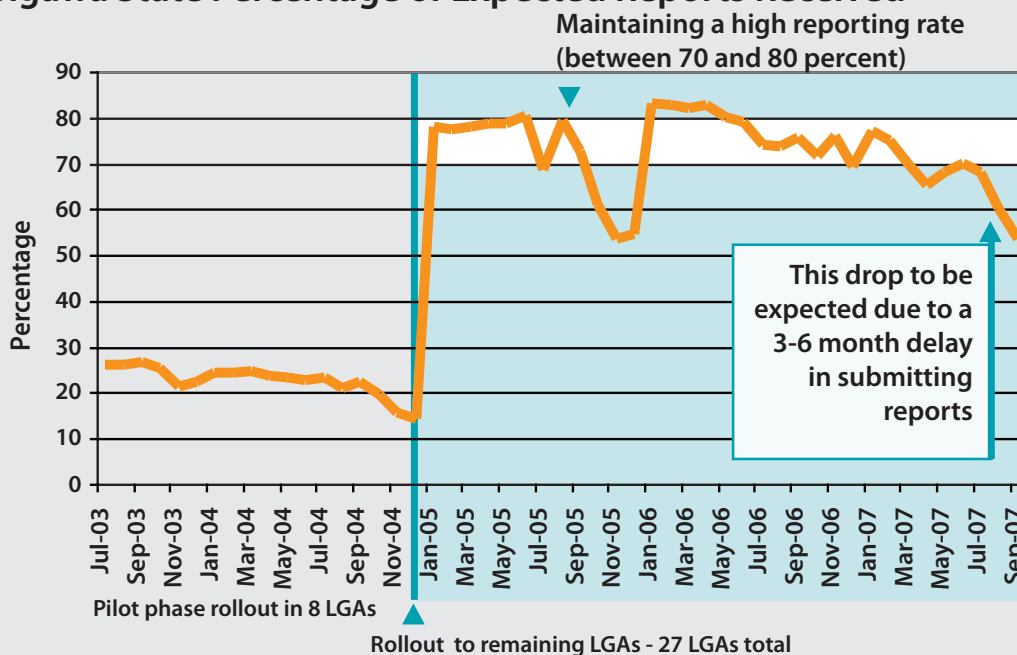
Another major reporting problem was the multitude of “vertical” reports sent to various “specialist” programs such as the Epidemiology unit, Immunisation, TB, HIV/AIDS, Nutrition and Maternal health – up to 10 separate forms from any one facility! Moreover, NPHCDA facilities had their own reporting system directly out of the states! Most often these reports bypassed the LGA information centre. Much data was duplicated. Parallel submission was a key issue and there was limited progress by early 2008. While some parallel data collection systems (e.g. NPHCDA and NPI) planned to move to the DHIS, other developmental partners continued to run their own systems.

5 All the tools, forms and other materials are available on the CD that accompanies this Technical Brief series

**Ekiti LGA Reporting Rates July 2005 - June 2006**



**Jigawa State Percentage of Expected Reports Received**



The ideal data flow system, whereby each level collects data at one point from the level below and then anyone can ask that point for information, was not happening. This fragmented, multiple vertical reporting system situation weakened the whole system. To resolve this problem will need strong top-level support.

## Computerisation

Computerisation was initially a thorny issue because the FMOH already had a database known as HIFA and the Federal HMIS office was initially reluctant to discard it, even though it was not working well. At first (with FMOH approval) the District Health Information Software (DHIS) was introduced and adopted by all the PATHS supported states. Later, it was adopted by all 36 states.

Though the DHIS program was initially seen by some as complex and difficult to use, all PATHS-supported states, the Federal Ministry of Health, NPHCDA, NACA/ NASCAP and a number of donor-supported projects (GHAIN, PPRINN) opted for the free open-source DHIS. This was because of its great flexibility; capacity to handle new data elements and facilities; built-in data quality checks; ability to produce

standard reports; and capacity to view data in pivot tables<sup>6</sup>.

In addition, the DHIS incorporated census data; was used to do equipment, staff and infrastructural audits; and was used in surveys, including PPRHAA, BEOC service delivery, MSP, quality assurance, EPI audits and other data collection processes for the Strategic Planning process. The DHIS thus became an effective repository for all health-related data in the states.

With the adoption of the DHIS, a decision was made to decentralise computerisation to allow:

- Capturing of facility level data, rather than aggregated LGA data
- Data entry to be done by LGA M&E officers

This decision required huge investment in up-skilling information teams and in purchasing computer hardware, but had enormous impact on data ownership. In addition, this ICT decentralisation had implications for basic day to day maintenance of the system in terms of issues such as electricity supply, antivirus software and running costs. Many LGAs did not obtain funds or capacity to handle this during PATHS lifetime and this had enormous consequences for nation-wide roll-out.

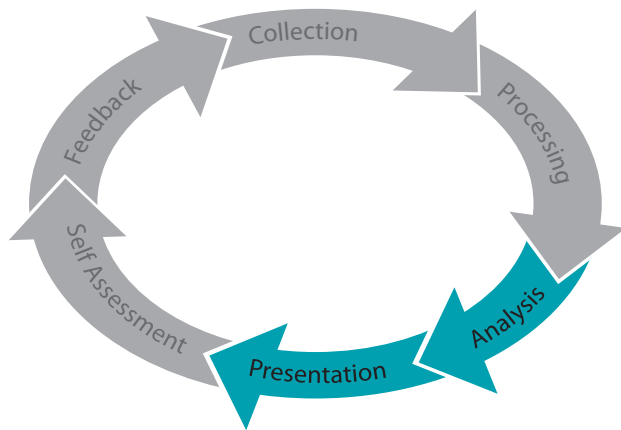
<sup>6</sup> The data that is captured in the DHIS database is exported into pivot tables which allow for extraordinary manipulation of the data

## Data capture at the state HMIS office, Kano



© PATHS Photographer

# Data Analysis and Presentation



Analysis was still in its infancy because analysis requires reasonably good quality data, as well as reasonable technical skills of supervisors. There was also little incentive for managers to analyse data as distribution of funds was not linked to performance assessment or the availability of analysed data.

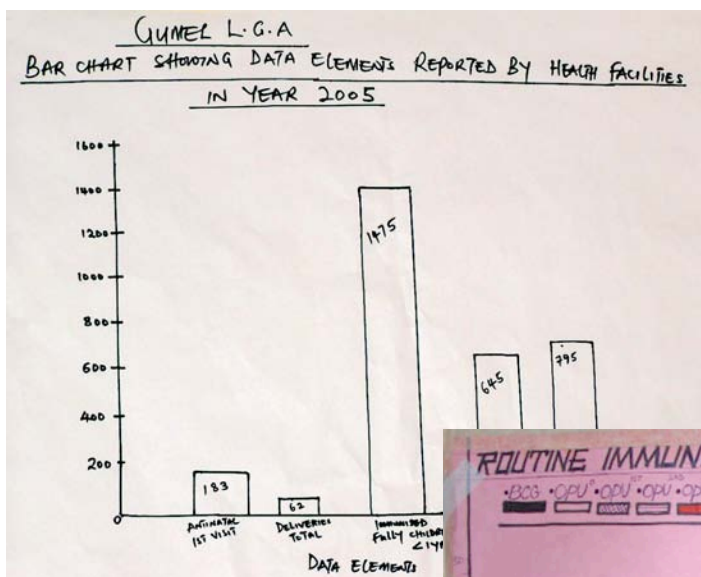
Because the level of service utilisation was so low, figures from health facilities are often not representative of the real situation on the ground. Most Nigerians did not use formal health services

and the public health services were under-utilized. Thus, all analysis of routine data had to be taken with a degree of skepticism. However, the only way to improve data was to analyse and use it, and over time there was some progress in promoting “epidemiological thinking” amongst the health workers of most states.

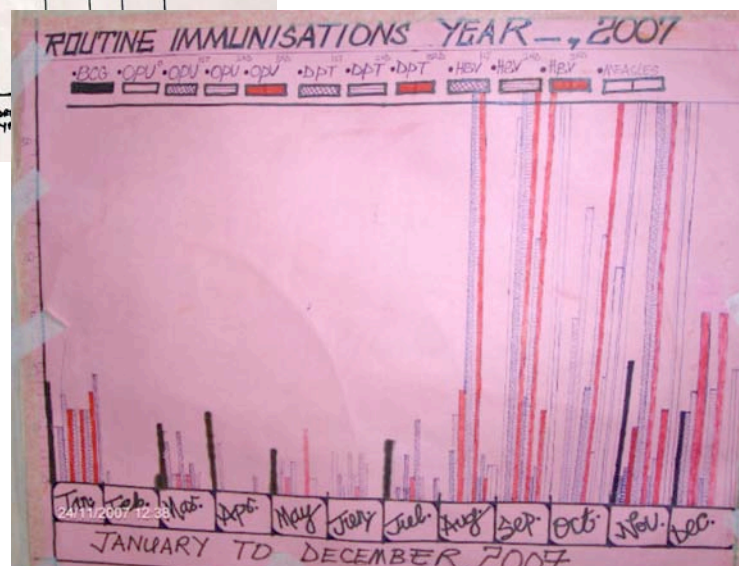
## Data Presentation

The DHIS provided data collectors and managers with collated and analysed data in the form of feedback tables, to be checked against submitted data. The generally poor infrastructure to support printing and dissemination of feedback reports across all states created real problems with this and in practice it rarely happened.

Each level of service delivery was encouraged to graph a limited set of indicators, display them on the walls using line graphs, cumulative coverage graphs and bar graphs and to use them to stimulate discussion about performance of facilities.

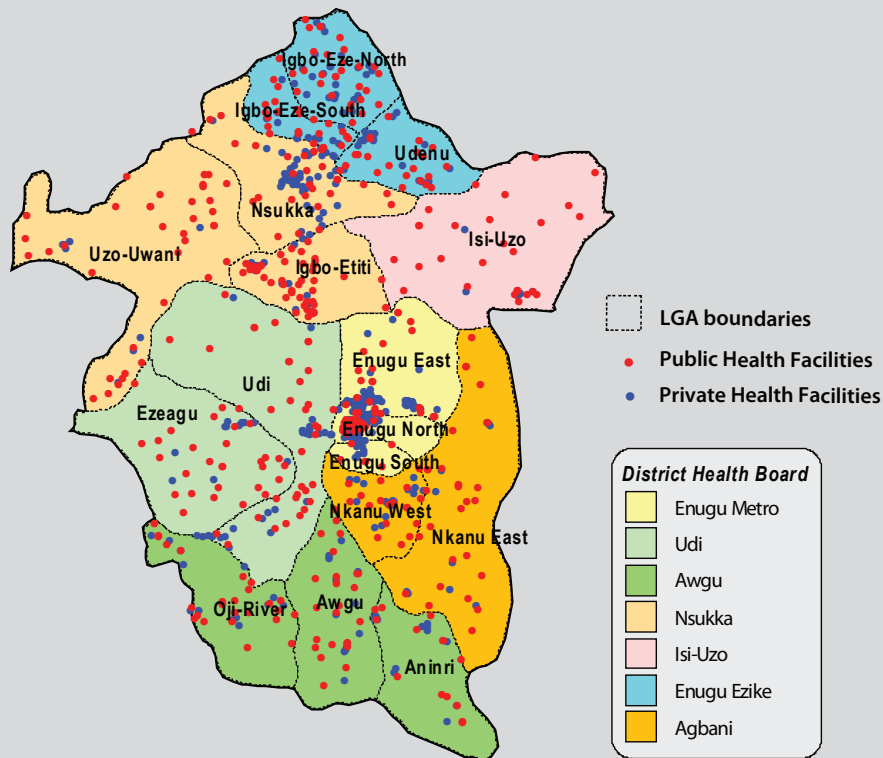


Left: Hand drawn graph from Gumel LGA, Jigawa



Below: Hand drawn immunisation graph from a PHC clinic, Kaduna

## Map Showing Enugu State District Health Board with Health Facilities as at February, 2006



GIS was started in Benue. GIS co-ordinates were collected for Benue, Enugu, Kaduna and Jigawa. All health facilities were geo-referenced and detailed maps of the wards were developed, both to display HMIS data and for other functions (e.g. to support the facility rationalisation process in Benue, aiming at one MSP facility per ward).



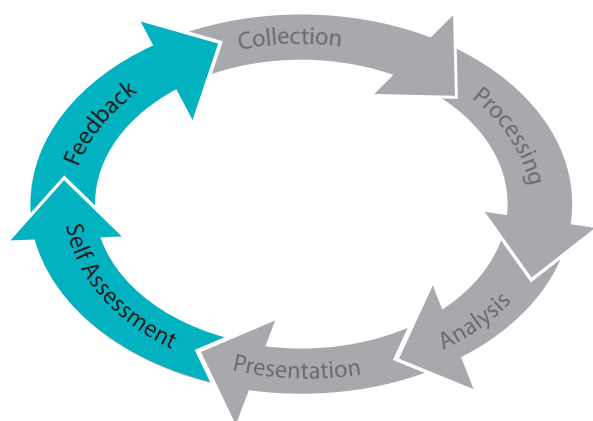
## KEY FACTS

### *DHIS Data analysis and presentation*

The DHIS supports a range of opportunities for analysing and presenting data:

- Standardised reports can be defined to replicate the formats of the paper-based system and automatically generate reports for the desired level and period;
- Various types of tables, charts and graphs can be automatically generated from the report generator and pivot tables;
- Excel pivot tables are used for dynamic data analysis where a manager can easily zoom between the various organisational levels and do cross tabulations to view and compare data across multiple dimensions;
- The DHIS integrates with GIS tools to present indicators on thematic maps.

## Information Use (Self-Assessment and Feedback)



The culture of information use was not strong in Nigeria and, to be established, needed strong leadership by managers at all levels. States that were developing decentralised, district-based health systems were using information more than before. Where data was used for local management decisions, there was an increasing demand for quality information by skilled managers. There was a need for a pool of good quality data, but this takes a long time to achieve.

### Self-assessment

The revised HMIS introduced the concepts of self-assessment and peer review. Staff at all levels were trained to review their individual performance and the overall performance of their health facility or management team. This required tools for aggregation of information, in an appropriate format, for every level in the system. The specific tools and training included:

- Data analysis tools to facilitate the calculation of MDGs and other indicators were part of the DHIS.
- HMIS unit and M&E officers were trained to use pivot tables of indicators to compare LGAs and facilities.
- Program managers and supervisors were trained to use analysed information to identify problems within individual programs.

Reporting was promoted as a key element in the process of self-assessment.

These became the basis of a process of performance and peer review.

### Planning

In Benue State, the HMIS was the basis for the Benue Strategic Planning process. Routine data was fed back to zonal meetings with community representatives, LGA and health facility staff to decide on priority programs and plan for their improvement. The Catholic Diocese of Otukpo effectively used HMIS data to improve their services by re-distributing staff to busy facilities and ensuring that new BEOC equipment was distributed to facilities that were actually providing emergency care.

In Enugu, HMIS data was used for budget planning, with patient head counts (from the HMIS) determining financial allocations for facilities.

In Jigawa and Kano, through the establishment of regular (quarterly) information reviews, PATHS supported a mechanism that provided opportunities for feedback to LGA's on data quality. Perhaps more importantly, a forum was created for sharing experiences on how health services could be improved. Initially the experiences shared were orientated towards "how to improve the HMIS components" (e.g. data collection, data accuracy). But they also provided opportunities for staff to share strategies that resulted in improved services. For example in a review in Jigawa, one LGA described how it had increased Vitamin A coverage by sourcing Vitamin A directly through UNICEF, rather than through traditional channels; another facility held meetings with traditional birth attendants to educate them about their role in reporting deliveries in the community – a step which had improved their reporting rates.

In Ekiti, the planning and advocacy to politicians for prioritizing facilities for the implementation of the Essential Services and Systems Package was based on HMIS data analysis. This analysis compared performance of LGAs and in some cases, of facilities, mainly hospitals.



## Lessons Learned

Improved use of data by managers was strengthened through:

- Regular feedback which improved data quality as feedback improved.
- Health sector reform activities and strategic health planning in Enugu and Ekiti provided a stimulus for managers to develop evidence-based planning
- Ongoing training (e.g. through the quarterly data review process) was developing a pool of managers (HISP-Nigeria and some LGA and SMoH staff) skilled in information use that will slowly promote epidemiological thinking and the information culture.

### Feedback

“It is only when those providing the data begin to receive meaningful and useful feedback that they will begin to appreciate the value of data and will therefore take appropriate steps to improve the quality, timeliness and quantity of the data they provide.”

*John Ochoga, Local Government Service Commission Chairman, Benue State*

A critical aspect of the HMIS reform process was to provide feedback of relevant information and decisions to all agencies and individuals concerned. By providing regular feedback, service providers and managers are encouraged to pay more attention to the quality and consistency of their own data and analysis.

In Jigawa and Kano, workshops were held with managers of hospitals, record clerks, and LGA M&E officers. At these meetings a very interesting process of requiring hospitals to report on their data resulted in a dynamic process whereby hospitals competed with each other to improve their data quality and lessons were shared amongst different hospitals. Examples were shared of instances where previous interventions resulted in positive change. In Jigawa,

the Director for Planning Research and Statistics initiated a “Consultative Forum” meeting which was very useful and successful, and which became a quarterly meeting of HMIS stakeholders.

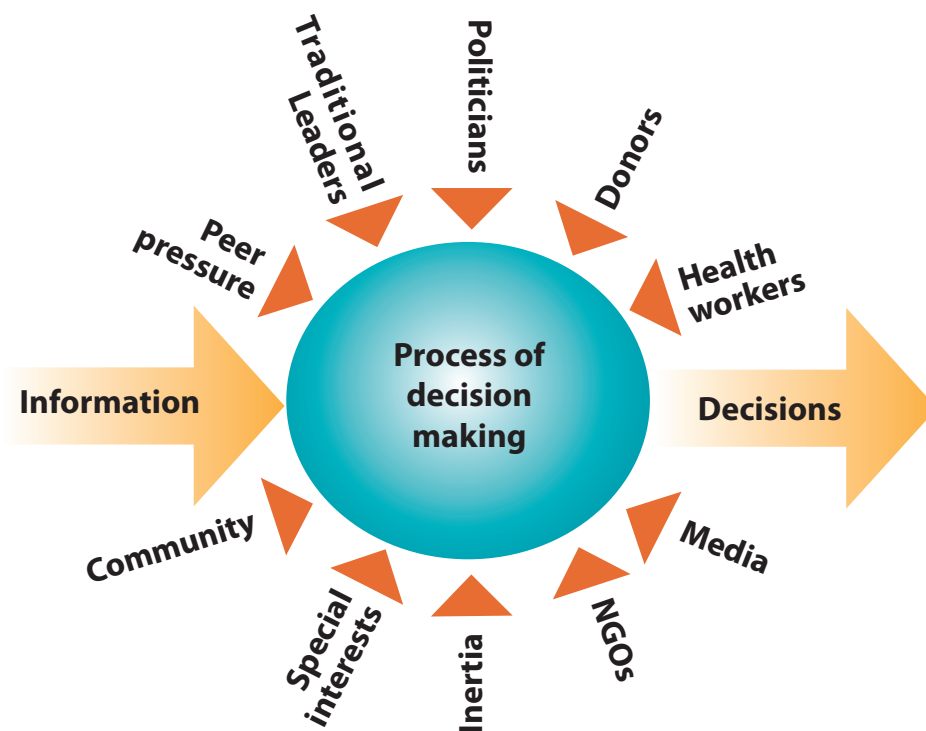
In Enugu, the LHAs<sup>7</sup> quarterly review process brought together the Permanent Secretary (PS) SMoH as Chair; the PS, Ministry of Local Government; the PS, Local Government Services Commission and representatives of the State Health Board as the review panel. The LHAs reported against an agreed format on all the happenings in their respective LHAs for the three month review period. A set of indicators was developed and each LHA was scored against the indicators. Some of the data for the indicators was sourced from the HMIS - data collection was one of the indicators against which the LHA was measured. If an LHA remained at the lowest score possible on more than three occasions, then the LHA Executive Secretary was removed. The respective DHB members were expected to be in attendance and could also be held accountable for the poor performance of their LHAs.

### Decision-making informed by the HMIS

Unfortunately many decisions tended to be made by politicians and donors who were influenced by financial considerations, special interests and external pressures, rather than evidence coming from service delivery or surveys. By developing the self-assessment tools and encouraging presentation, self-assessment and peer review during routine team meetings, it was hoped that the number of decisions informed by the HMIS would increase. Such decisions would then provide the rationale with which to counter political arguments. The HMIS was now better able to provide evidence and relevant feedback that could promote better decision-making. While we can never remove the other influences on decision making, Information should increasingly have more influence, as in the picture below.

<sup>7</sup> LHAs (Local health Authorities) are sub district structures

## Evidence based decision making



## Lessons Learned

### *Using Information to Strengthen Maternal Health Services*

In the 5 PATHS states, 1.6% of all facilities (public and private) are responsible for 52.5% of all deliveries. This has remarkable implications for strengthening maternal health programs, and could be used to target efforts at addressing the main causes of maternal mortality. The table below summarises the data:

State	Total facilities	Facilities that deliver >240/annum	Percentage of total facilities	Percentage of all deliveries covered
Benue	980	7	0.7	37.4
Ekiti	291	3	1.0	40.1
Enugu	457	1	0.2	38.5
Jigawa	573	10	1.7	64.7
Kano	992	33	3.3	81.7
Totals/ Average	3,293	54	1.6	52.5

# Results

"I now have an information system that can show performance changes from 2005 to 2008."

*Enugu DHB CEO*

## Capacity Development

Extensive efforts were made to strengthen the capacity of state and LGA Information Officers and other members of management teams through formal training and active involvement in all initiatives.

### State HMIS Core Group

Each state had a HMIS core group trained on both systems development and technical skills. After the initial training they were given specific responsibility to supervise LGA level data handling processes and training. However, with notable exceptions, due to a lack of skill, commitment and logistical resources this was only partially successful. This was an ongoing problem that needs proactive leadership and top-level management support.

### LGA M&E officers

M&E Officers were the cornerstone of the routine HMIS as they were responsible for collecting data and submitting it to the state level, as well as supervision, monitoring and evaluation of facility level service delivery. In all states they have had considerable training. However, they were junior officers who did not have a significant voice in local government management and generally did not inform local service managers about coverage and quality of service delivery. There was little demand for local level feedback and performance review, which meant that there was a weak culture of accountability, data analysis and information use and limited local support for generating good quality data.

### HISP Nigeria

A group of four HMIS facilitators formed an NGO called HISP Nigeria, associated with the global HISP network (currently operating in 12 countries in Africa and Asia). HISP Nigeria was contracted by the FMOH to conduct HMIS training in all 6 geo-political zones. They developed a facility list with over 31,000 facilities from 36 states, using a standardised nomenclature of health facilities. This represented a significant step towards standardisation. In this process they were supported by the HISP-South

*Photo The core state HMIS team and the 17 LGA M&E officers (Enugu)*



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Africa team. There were written plans to expand numbers to strengthen both the competency base and the skill mix of HISP Nigeria early in 2008 through mentoring and practical computer training. The HISP-Nigeria team was established, and although still far from a viable and independent Nigerian-grown NGO, they were poised to be able to support and grow alongside a long term project to strengthen HMIS in the country. They need continued financial and technical support over the next few years to achieve this.

## CASE STUDY

### *Rollout in Kano*

PATHS began operations in Kano in 2005. The Kano HMIS initiative followed the approach developed in Jigawa. Whilst an information audit was not conducted and a core team not appointed, the Jigawa EDS was adopted; a programme of strategic capacity building started; and the DHIS was adopted as the default for data capture and analysis. M&E and medical records officers from across the 44 LGAs were trained in data handling techniques. The HMIS unit in the State Ministry of Health was computerized and the backlog of paper-based data was captured into the DHIS. However, institutional dysfunctionality meant that HMIS remained largely on “level one”; health facilities collected data and sent to the next level, but analysis and use was not happening except at formal data use workshops. Institutional re-structuring was proposed: the department of planning in the SMoH was to be separated into two departments, with the HMIS unit becoming a fully fledged department. This was a small victory for the re-conceptualization of HMIS in Kano and led the way to create a legacy of health delivery reforms initiated around empirical processes.

## *HMIS Infrastructure*

The technical infrastructure was weak and initially required significant computer hardware and software support and investment to ensure that it was able to keep pace with demand in an increasingly sophisticated technological environment. PATHS and HSDP2 made considerable investment in providing adequate infrastructure for HMIS (e.g. data collection forms, motorcycles to collect forms and computers for entering data).

## *Synergy With Other Paths Supported Work*

PATHS supported development of overall management systems – including strategic planning, DRF, financial management. Numerous PPRHAA, EOC, Minimum Service Package and other surveys were conducted and their data incorporated into the DHIS software. All of these initiatives had a HMIS component and had a synergistic effect on routine HMIS, fuelling the demand for more and better quality information. While some of these initiatives (e.g. the district-driven DRF in Enugu, PPRHAA) utilized the routine HMIS, others used alternative sources of information.

## *Assessing the Status of the HMIS*

PATHS used the Tool for Assessing Levels of Intervention (TALI) to assess the results of the HMIS. In essence, level 1 implied collection of quality data; level 2 showed feedback of analysed data, while at level 3 the unit actively used information to monitor priority action plans.



## **TOOLS**

By early 2008, most PATHS states were still at level 1, collecting data, though some states were starting to move towards level 2 where feedback was being provided to service providers and decision makers.

## Nigerian TALI tool - Tool for Assessing Levels of Information Usage for PHC

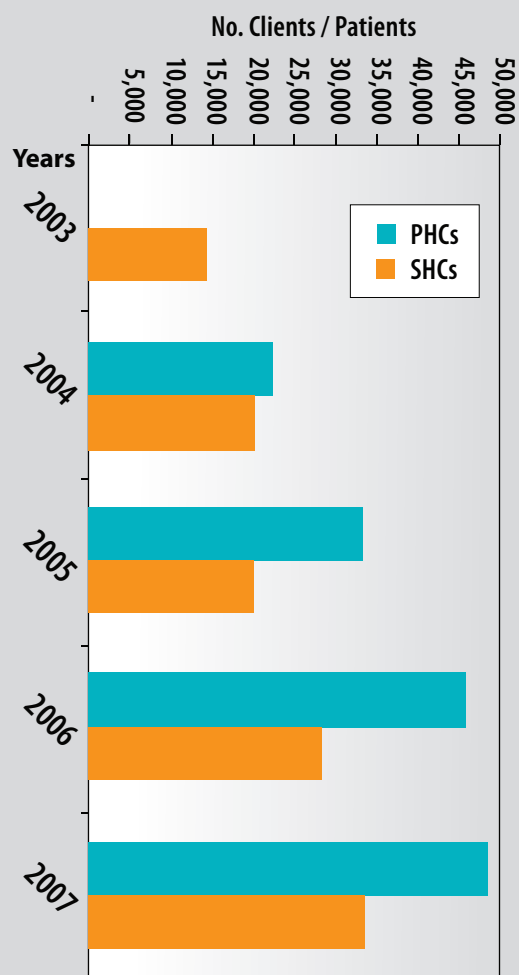
Level 1: Collection	Level 2: Feedback	Level 3: Use
<b>FACILITY:</b>		
<p>Essential Dataset defined</p> <p>100% expected reports for the last year submitted on time</p> <p>The facility manager has validated 80% of the feedback reports.</p>	<p>4 up-to-date MDG/ priority indicator graphs displayed.</p> <p>3 self-assessment meetings held and documented in the last 6.</p>	<p>One MDG/ priority problem addressed through an action plan.</p> <p>The plan visibly monitored using HMIS indicators.</p>
<b>LGA:</b>		
<p>Essential Dataset defined</p> <p>95% of expected facility reports received on time</p> <p>100% of expected feedback reports issued on time.</p> <p>Validation checks run quarterly for each facility.</p>	<p>MDG/ priority reports defined for each manager.</p> <p>80% of expected reports available on time.</p> <p>4 up-to-date MDG indicator graphs displayed</p> <p>3 self-assessment meetings held and documented in the last 6 months.</p>	<p>Three MDG/priority problems addressed through an action plan.</p> <p>The plan visibly monitored using HMIS indicators.</p> <p>Actions documented in a written report</p>
<b>STATE:</b>		
<p>Minimum Essential Dataset defined</p> <p>95% of expected LGA reports received on time</p> <p>100% of expected feedback reports issued on time</p> <p>Validation checks run quarterly for each LGA.</p>	<p>MDG/ Priority reports defined for each manager</p> <p>80% of expected reports are available on time</p> <p>Up-to-date graphs for 8 MDG indicators</p> <p>3 self-assessment meetings held and documented in the last 6 months</p>	<p>5 priority/MDG problems addressed through an action plan.</p> <p>The plan visibly monitored using HMIS indicators</p> <p>A written report documents</p>
<b>FEDERAL:</b>		
<p>Minimum Essential Dataset defined</p> <p>95% of State reports received on time</p> <p>100% of expected feedback reports issued on time</p> <p>Validation checks run quarterly for each State.</p>	<p>MDG/ priority Reports defined for each manager.</p> <p>80% of expected reports available on time</p> <p>Up-to-date graphs for 12 MDG indicators</p> <p>3 self-assessment meetings held and documented in the last 6 months.</p>	<p>8 MDG/ priority problems addressed through an action plan.</p> <p>The plan visibly monitored using HMIS indicators</p> <p>A written report documents</p>

## Uses of Data

By early 2008, data from the HMIS, though patchy and of varying quality, provided comparative data for the LGA and state levels as well as data to monitor the quality and coverage of many service delivery interventions. In addition, the overall picture that emerged from the routine data matched other key data sources and largely fitted the picture emerging from other surveys e.g. the Demography and Health Survey of 2003 and the Multiple Index Cluster survey.

### Using the HMIS to Monitor Workload in Enugu

#### Enugu State Sentinel Sites Utilization, 2003 - 2007



2007 Data provisional (December outstanding)

## CASE STUDY

### Using the DHIS for Survey Data in Benue

Using the DHIS, a **Minimum Service Package (MSP)** survey was done of equipment, staff and infrastructure of 50 mission facilities and the 100 busiest facilities in four LGAs in Benue. The data was used to assess whether they were able to provide the prescribed minimum services for the level of facility. Based on this, PATHS allocated additional equipment to ensure that strategic facilities had sufficient equipment to provide the MSP.

An **Emergency Obstetric Care (EOC)** survey of every maternity facility in Benue looked at the capacity to provide basic and comprehensive EOC. This survey included an inventory of equipment, supplies, staff and infrastructure and enabled the implementation of a rational program for midwife training, equipment allocation and infrastructure refurbishing.

In both cases the data was captured on and analysed by the DHIS.

### Use of the DHIS

The HMIS was rolled out in all six PATHS supported states, and 12 other states in all 6 geopolitical zones<sup>8</sup>. Where PATHS support ended earlier (e.g. in Ekiti in December 2006), the HMIS continued to be used, though to differing degrees. This ongoing use depended largely on the quality of leadership and the degree of motivation of the partners involved. A number of government institutions (e.g. FMOH, NACA), Faith-based Organisations (CHAN, Catholic Diocese in Otukpo) and other projects (GHAIN, PPRINN) started to use both the HISP approach and the DHIS software for data gathering, analysis and presentation.

<sup>8</sup> In 2007 HISP Nigeria was contracted by the FMOH for training in these additional states

## Summary

The groundwork has been established and the HMIS is basically functional, particularly in states where Health Sector Reform and decentralisation have increased the power of local government and program managers. Data handling processes and infrastructure were strengthened Strengthening HMIS is a time-consuming and complex process and the transformation of the HMIS cannot be achieved in isolation from major reforms in other systems (e.g. decentralisation, accountability, financial management, performance improvement) and with local level leadership. The HMIS will only fulfil its potential if there is a sustained demand for quality information by managers. In addition, managers need to actively use information to monitor the implementation of plans that are linked to resource allocation and accountability.

### Key results included:

- A Nigerian HMIS team that supported the roll-out of the HMIS process.
- A fully functional DHIS software package adapted to Nigerian use
- Training manuals with effective and practical teaching methods
- A HMIS explanatory package, developed for advocacy purposes
- Indicators and data analysis tools
- A Cross-state data analysis that was completed in 2006 and 2008
- Annual data review workshops held in 2006 and 2007

“The most poorly performing state at this DHIS workshop has better information than the best-performing states not using the DHIS”

*Dr Akin Oyemakinde, Head, Federal HMIS, at the November 2007 data review workshop*

## The DHIS Software Achievements

The DHIS has been successfully adapted for Nigeria and contains:

- a reasonably accurate facility list (over 31,000 facilities from all 36 states),
- a set of essential indicators with a linked data set,
- the 2006 census data, updated to 2008 by ward
- data from surveys such as PPRHAA and other state-specific surveys on MSP, EOC, (from Benue) financial information (Enugu)
- GIS co-ordinates for most facilities in PATHS supported states

# Sustainability

Senior management in the FMoH and in states identified the HMIS as a priority area for support and development and saw developing a culture of information use as critically important.

A report commissioned in 2007 by the FMoH (Abuja M&E Assessment, September 2007) identified three broad areas of recommendations. The first broad area suggested **principles** that should guide the implementation of recommendations in the second and third areas. The second broad area of recommendations targeted the flow of information at the federal level (between the divisions and departments within the FMoH, and between the FMoH and external MDA's). The third area of recommendations targeted the flow of information between the states and the federal level.

**The principles recommended** to ensure a sustainable, developmental HMIS in Nigeria are:

A **developmental approach** to information systems development was proposed, as suggested in the NHMIS Policy document. In the absence of technology, there was a need to develop appropriate paper-based information systems, in a way that they can easily be replaced by computerised systems as access to technology improved.

**Senior management** within the FMoH (for example the Technical Management Committee - TMC) should place the use of information at the forefront of their decision making processes. In addition, the DHPRS should provide the TMC with an integrated report on a monthly basis. The TMC should demand information from the divisions and departments and send out the message that information was important, and was used. Further, the quarterly zonal meetings with states needed to be coordinated and strengthened by senior management to ensure that they received a high priority and were seen to be an important process for reviewing information. Within states, LGA's should also be required to report on a quarterly basis to state management.

The third principle related to **co-ordination of investments** in HMIS. Currently, investment in HMIS activities was largely donor driven with a relatively narrow focus. The focus addressed programmatic information needs, but did little to strengthen the NHMIS processes. By co-ordinating donor support, the level of investment in the NHMIS would increase from the current low levels to a level similar to that invested by the PATHS project in 5 states over the

last 3-4 years. It was estimated that an investment of close to ₦11million (£44,000) per annum per state is needed to improve the NHMIS across the country.

The key to sustainability is to identify individuals who will translate these statements of intent to concrete actions (backed with resources) to strengthen the routine HMIS. It will take substantial leadership to create a "virtuous cycle" whereby better quality data is analysed, fed back to data collectors and used to monitor priority programs.

Government-driven donor co-ordination is fundamental to sustainability as currently HMIS officers and service managers are getting mixed messages from individual donors. Each donor has their own information agenda and, in the absence of a HMIS leadership, are imposing a multitude of different forms, registers, procedures and systems that cause confusion rather than clarity.

Institutionalisation of a sustainable HMIS is a long term process and requires substantial financial commitment from Nigerian health budgets and focused technical and financial support from donors. HMIS expertise is required to ensure flexible approaches, sound strategies and streamlined processes to fast track key initiatives. Initiatives to date have focused on improving data completeness and data quality, the development of feedback reports and the capacity building of information officers and health service managers. These need to be followed up and supported.

## Lessons learned

The reasons for poor data quality and lack of use of information were largely related to a historical lack of good information systems infrastructure and technical capacity, as well as a lack of managerial and financial commitment by all levels of the MoH. In addition, a systemic lack of accountability to consumers of services by health workers meant that there was little community demand for information about the services provided. Five key lessons were identified:

### *The Importance of Institutional Re-structuring*

Greater compliance with the stated objectives of the HMIS initiative was expected. It was recognized that this was difficult, given the socio-political framework of health service delivery in Nigeria. However, some states have shown that it was possible, when done in conjunction with an overall reform of health systems and a decentralisation of authority to districts. Integration and decentralisation of services fuelled the need for quality data.

*"We cannot depend only on what you say you are doing. We will cross check your activities using your own data"*

*Dr Orchili, CEO District Health Board, Nsukka District, Enugu*

### *Appropriate Capacity is Critical (Infrastructure and Human)*

Although the HMIS staff was usually enthusiastic, they often lacked the knowledge, skill and experience in general health information systems management to translate this interest into concrete results. The importance of building the human resource capacity at all levels was recognised as being a key intervention. The need for the tools of the trade (e.g. registers, computers) was equally recognised.

### *Data-driven Systems Are Not Enough*

The National HMIS policy, while a major step forward, still reflected a data-driven rather than an action-led approach. The thinking on HMIS focused on forms rather than an integrated information culture; promoted vertical reporting of raw numbers rather than providing feedback on analysed indicators; and stimulated data collection rather than self-assessment using quality data. The proposed list of indicators did not include all the MDGs; the essential dataset was too narrowly focused to address the needs of PHC and hospitals.

### *Creating Dependency Creates Problems*

PATHS and other international organisations gave M&E officers small "top-ups" of petrol money to ensure data collection. This money was usually seen as being for specific data sets (e.g. EPI, Disease control), rather than for co-ordinated data collection. When money was withdrawn (as when PATHS left Benue), no routine data was collected, with catastrophic results. Other data, for which they are still paid, continued to be collected. LGAs and the SMOH should work with donors to make it clear that timely submission of data and feedback is the basis of their job and that non-compliance will impact on their salaries, positions, and/or bonuses.

In addition, donor support for capacity building and equipment appeared to have created complacency on the part of state and local government. With the apparent exception of Ekiti state (which PATHS left, but where there was a dynamic HMIS manager), no state or local government managed to provide regular supplies of forms, preventive maintenance of hardware/software or fuel to put into donated motorcycles to ensure data collection. Budgets were allocated, but HMIS budgets were largely not released, resulting in chronic under-funding.

## *Importance of Leadership*

However, in some states, PATHS support showed that it was possible, with a minimum of committed leadership, to set up and sustain an effective data collection system in the current managerial environment of Nigeria. There was a need for strong, strategic Nigerian leadership on the HMIS, a need for a break from centralised, vertical data collection to an inquiring, action-oriented approach. The MDG goals, targets and indicators presented a catalytic mechanism. If combined with the attractor of the DHIS software and made the focus of regular local level self-assessment using routine HMIS data, they could galvanise a new approach to decentralised M&E, focusing on the implementation of Health Sector Reform activities.

## The way forward to an information culture

The challenge is to build on the foundation of a functioning HMIS by strengthening overall management; and developing meaningful partnerships between government, donors, programs and the faith based organisations that will transform the use of HMIS. The information system must be reproducible and listen to managers, give them faith in the data they collect and provide them with reliable data and information they need for monitoring health programmes and services. The key to this is regular and relevant feedback to reporting units by program managers with skills to interpret and analyse. This process has begun and needs systematic support, through linking information to release of funds and equipment to achieve realistic targets and plans.



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*Nursing Staff filling in the Register*

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Partnership for Transforming Health Systems (PATHS)



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