



**Strengthening
Laboratory Services
for Communities:
The Community
Diagnostics Programme
2006-2008**



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Strengthening Laboratory Services for Communities: The Community Diagnostics Programme 2006-2008

Summary

The Community Diagnostics Programme (CDP) started in November 2006 and aimed to design and operate a functional system for providing quality-assured diagnostic services for anaemia and malaria to poor communities in five states in Nigeria. In each state a team of four laboratory supervisors/trainers designed the programme during workshops facilitated by PATHS consultants. The supervisors introduced simple diagnostic tests for malaria and anaemia into 92 primary health care (PHC) and 12 secondary health care (SHC) facilities across the five states, achieving population coverage of about 1 million. Over 150 PHC staff were trained to implement the CDP. Mechanisms were

established to provide the trained staff with supplies and to monitor the accuracy of the tests. Patients and clinicians have utilised and demanded the new diagnostic services.

Using the Haemoglobin colour scale, Haemoglobin can be estimated with 70 percent accuracy by PHC staff. This was much better precision than achieved with clinical diagnosis of anaemia, which was the only option available before the CDP.

Initially 40 percent of malaria microscopy results performed by secondary health centres were incorrect, predominantly due to over-diagnosis of malaria. This high level of malaria over-diagnosis by unsupervised microscopists is well documented and is a major reason why rapid malaria tests may be advantageous if the quality of microscopy cannot be assured. The CDP introduced rapid tests into PHC facilities. Accuracy of the malaria rapid tests was 91 percent.

In addition, in just three months, targeted re-training improved the accuracy of haemoglobin results by over six percent and malaria microscopy by nine percent. But, given the limited time-span of the CDP, evaluation of the effectiveness in terms of improved diagnosis and management of the three diseases was not possible.

Cross-fertilisation of best practice during the workshops enabled the CDP teams to devise standardised and transferable guidelines for scale-based tools that were tested and evaluated through the CDP.

By early 2008, the CDP had only run for sixteen months, and although it was highly successful, it was not yet robust enough to be sustainable without some external support. The state laboratory supervisors and Federal representatives were committed to the CDP and were striving to utilise structures, programmes and logistics available in their individual states to sustain the programme after PATHS funding ceased in June 2008. They were successful in integrating the CDP into state structures at all levels, but threats to long-term sustainability remained. At state level these included lack of reliable supplies, understaffing and no state budget line for CDP activities. At federal level, despite commitment by those who participated in the CDP, there remained problems of ownership, and an institutional home for the CDP needed to be identified. In addition, central funds for cross-fertilisation through inter-state workshops were lacking.

For the first time in Nigeria, the CDP established a generic system for providing quality-assured diagnostics that operated across all tiers of the state health service and reached those living in poor rural areas. The system was able to monitor the quality of test performance, identify problems and deliver cycles of targeted training to improve the quality of the tests. The CDP provided a platform on which to build other simple tests that were appropriate for the health needs of the rural poor, and has produced an evidence base to inform national scale-up.

Introduction



Drawing blood from a child in Kaduna

Despite overwhelming evidence that laboratory services are absolutely critical for achieving the Millennium Development Goals (MDGs), they remain one of the most neglected components of health systems. The way this neglect manifests ranges from failure to engage laboratory staff in key decisions, to a dominant focus on technology at the expense of strengthening management systems. Marginalisation and chronic under-investment in laboratory services mean that results, in terms of diagnosis or treatment provided, are either inaccurate or unknown. Consequently, patients are mismanaged, drugs are wasted and surveillance data is unreliable. Instead of investing in strengthening existing laboratory services, projects that depend on high quality laboratory data tend to import their own project-specific technology thereby setting up parallel systems and diluting scarce resources. Until resource-poor countries develop laboratory services that they can rely on, they will continue to be dependent on externally funded and therefore unsustainable laboratory technology to monitor the impact of disease-control programmes and disease burden.

Nigeria's laboratory services are essential to guide patient management, to deliver national health programmes and to provide early warning about epidemics and outbreaks. Laboratory services are provided by public and private facilities, and although most of the disease burden was at community level, laboratory resources and personnel were concentrated at tertiary level. After decades of neglect, in 2007 the Federal Ministry of Health

Pro-Poor

Poverty, gender and equity issues

Poverty

- The poorest bear the greatest burden of disease due to anaemia, and malaria
- Poor households waste precious resources seeking diagnostic tests and purchasing inappropriate treatments
- Providing simple, but accurate, diagnostic services in communities with no access to laboratories will make diagnosis more accessible, especially for the poorest

Gender

- Women and children have the highest prevalence of conditions such as anaemia and malaria, but are the groups that are least empowered to access formal health care systems
- By reducing barriers of access to laboratory services, provision of accurate community-based diagnostics is likely to preferentially benefit these most vulnerable groups
- Better and earlier diagnosis of diseases will have the greatest impact on women and children

Equity

- Diagnostic laboratories are concentrated in urban areas and only the wealthiest can afford to purchase quality-assured tests
- Outreach testing services for common conditions in hard-to-reach communities will redress the balance of test availability and promote increased utilisation of PHC facilities



Mother and child after testing in Kaduna

(FMoH) began to draft policies for the development of laboratory services. In August 2007, the FMoH established a Task Force to drive implementation of the laboratory policy.

A key objective of PATHS was to strengthen health systems to deliver better quality services, particularly those related to achieving the MDGs. Systems strengthening activities aimed to strengthen the delivery of safe motherhood and child health services (Integrated Management of Childhood Illnesses and Immunization), and improve the control of communicable diseases such as malaria. As the PATHS programme developed it became apparent that the impact of service delivery strengthening activities on clinical outcomes would be severely compromised, especially at community level, unless they could be underpinned by high quality and accessible diagnostic services.



KEY FACTS

Justification for Focus on Malaria and Anaemia

Malaria

Malaria accounts for 40% of the disease burden at public health facilities in Nigeria. It causes 11-30% of all maternal and childhood deaths each year. Clinical diagnosis of malaria, which is used routinely in Nigeria, results in massive over-diagnosis and wastage of anti-malarial drugs (not to talk of the possibility of resistant strains of malaria parasites). New combination anti-malarial drugs are too expensive to be wasted on non-malaria cases. Thus, tests for accurate diagnosis of malaria have become essential, especially at community level where the burden of malaria is greatest. Rapid diagnostic tests (RDTs) for malaria are simple and can be used in communities where there is no electricity supply, but they have technical and operator-associated limitations so their performance needs to be monitored regularly.

Anaemia

Anaemia prevalence in Nigeria is 50-70% and is a major contributor to childhood and maternal illness and deaths. Anaemia is diagnosed clinically in the majority of cases, a technique which is unreliable, except in the most severe cases. It is critical to be able to detect mild and moderate anaemia as this can be easily treated and avoids the need for blood transfusions. The Haemoglobin Colour Scale is a simple tool that uses a finger prick blood sample to classify anaemia as mild, moderate or severe. The Scale can be used in communities where there is no electricity. The quality of the results can be regularly monitored using a simple, HemoCue 301 battery operated machine.

The Response

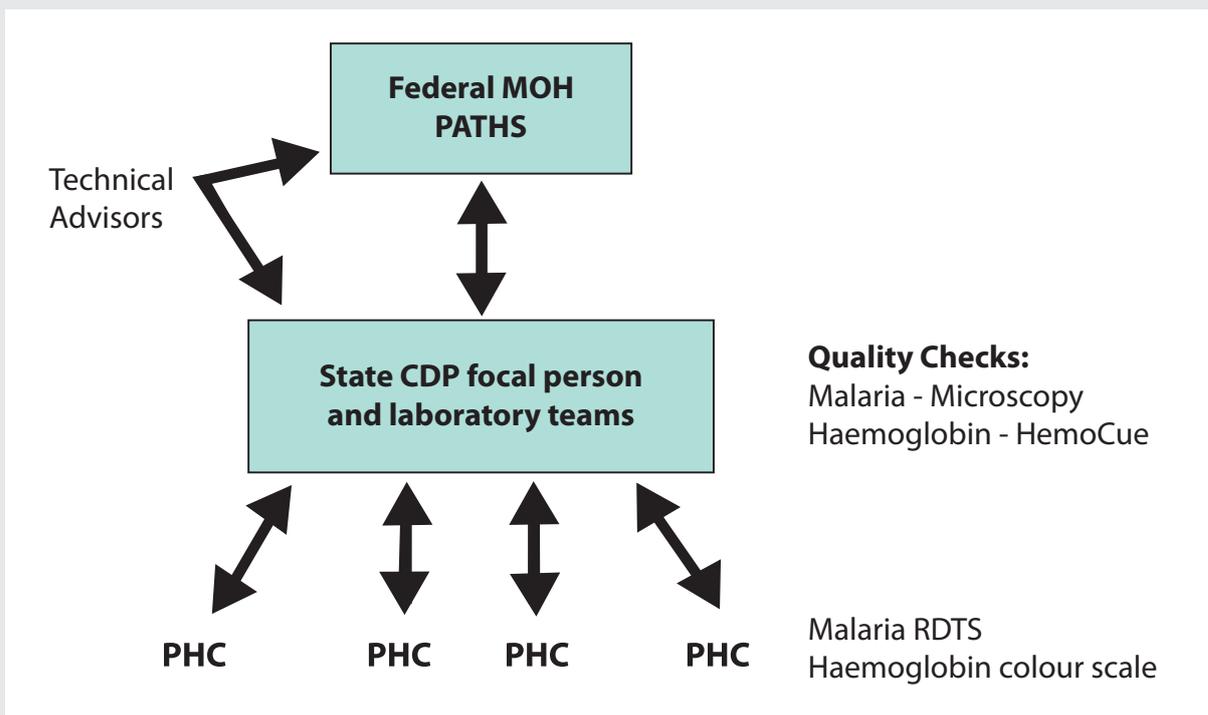
The Community Diagnostics Programme started in November 2006 and aimed to provide simple diagnostics for anaemia and malaria for communities, especially pregnant women and children, who had no local access to laboratory services. The CDP aims were achieved through a team of four supervisors in each state who trained PHC and SHC workers in selected facilities to use the haemoglobin colour scale (for anaemia) and rapid diagnostic tests (for malaria). The supervisors monitored the quality of these services through an external retrospective review and through on-site observational assessments. The targets were to:

1. focus on approximately 12 PHC facilities in each of five states and in some states a small number of SHCs;
2. demonstrate that it was feasible to perform these simple diagnostics within PHC facilities; and
3. establish monitoring mechanisms to measure the accuracy of each test.

The principles on which the CDP was designed were adapted from successful laboratory development programmes in Ghana and Malawi. These included:

- Tests in PHC facilities should be simple and not require mains electricity. Tests selected were therefore Rapid Diagnostic Tests for malaria and Haemoglobin Colour Scale for anaemia;
- Tests should only be introduced in conjunction with a system for assuring quality (e.g. malaria microscopy), as tests without any quality monitoring would be unreliable, wasteful and demoralise health workers and patients;
- A pilot system should be established in each state comprising of four state laboratory supervisors based in 1-2 central/zonal laboratories and involving approximately 12 PHC facilities;
- All states worked towards the same six monthly targets but utilised different, state-specific mechanisms to achieve the targets;
- Consultants supported a state team of senior laboratory scientists to implement, monitor and sustain the CDP.

Structure of Pilot System for CDP



CASE STUDY:

Jigawa

In Jigawa, support from PATHS to improve the quality of laboratory diagnosis of malaria started in August 2004. Through a combination of workshops, site visits and e-mail support, the technical and supervisory skills of local laboratory staff were strengthened. With time they were able to establish high quality malaria microscopy services and quality improvement cycles in peripheral laboratories. The programme in Jigawa included limited refurbishment of laboratories, provision of essential equipment and reagents, development of tools to measure and analyse changes in quality performance indicators, and feedback to participating laboratories and other stakeholders. Once the feasibility and usefulness of the systems for improving malaria microscopy had been established, the programme was extended to incorporate microscopy for tuberculosis. Lessons learnt from the Jigawa laboratory programme were presented at national meetings and were incorporated into the Community Diagnostics Programme, in which laboratory activities in all PATHS states were harmonised within a common framework.

Development of the CDP

In 2002, PATHS provided piecemeal support to individual states (initially Enugu and then Jigawa) in response to specific requests to support the development of laboratory services. In 2005 Kano joined the PATHS programme and also identified laboratory services as an important priority. It was apparent that the PATHS-supported states all had very similar requirements for technical assistance to support improvements in essential laboratory services. The states recognised that to achieve greater efficiency and to promote inter-state collaboration, inputs to develop laboratory services should be harmonised. A workshop was held in Enugu in 2005 with key stakeholders from all PATHS supported states; the outcome was a laboratory strengthening strategy based on common goals and priorities agreed by all the states. This strategy was implemented in 2006 using the following agreed approaches:

- Tests focused on high burden diseases (malaria and anaemia)
- States utilised similar six monthly plans and targets (developed in the workshops)
- Activities were evaluated and adapted every six months
- State laboratory teams implemented plans, supported by consultants
- Simple tests (not requiring electricity) were used for PHC facilities
- Monitoring and quality assurance systems were vital.

International and national consultants coached four laboratory staff from each state (the 'state laboratory team') using a mixture of workshops and desk-based support via e-mail. The in-country team took responsibility for training laboratory staff in peripheral facilities and for supervising the staff running the diagnostic services. A major challenge was establishing a system for ensuring that the tests were consistently performed properly and gave accurate results. There was no precedent for how this should be done and so the state laboratory teams devised their own solutions which they tested and evaluated. Test performance was therefore monitored in different ways including via on-site observation; testing of known samples by PHC staff; and re-checking of samples stored at PHC facilities by supervisors.

Establishing the CDP in primary health centres was a complex process for the state teams, and included:

- Provision of training
- Getting buy-in from stakeholders at all levels
- Achieving consensus within the state about which primary centres to include
- Sourcing supplies
- Ensuring supplies were of good quality, were stored correctly and were regularly distributed to the PHC centres
- Engaging with communities and clinicians to promote uptake of the service
- Setting up documentation and laboratory test requesting systems within the facility
- Devising mechanisms for measuring quality, defining 'accuracy' and organising quality monitoring visits and re-training sessions.

KEY STEPS:
Methods for ensuring accurate performance of tests at PHC level

- On-site observation of testing process by supervisors
- Examination of laboratory records
- PHC staff test known samples provided by supervisors
- Supervisors check malaria RDT results against blood film microscopy
- Supervisors check haemoglobin colour scale results against HemoCue measurements

Lab training in Jigawa





KEY FACTS

Test Descriptions



Screening test for anaemia

The Haemoglobin Colour Scale is a 'dipstix' type test in which the colour of a drop of blood absorbed onto special filter paper is compared to different shades of red on a pre-printed chart. Because samples for anaemia screening cannot be stored, the laboratory team will check the results during on-site visits with a HemoCue 301 machine. This is a portable, accurate battery operated machine that has been used for decades in blood transfusion services to assess blood donors.



Malaria tests

Malaria rapid diagnostic tests produce a coloured line on a wet strip in the presence of blood infected with malaria. There are several types on the market and generally they are better at picking up the severe form of malaria ('falciparum') than other species of malaria. Quality monitoring includes comparing rapid diagnostic test results to malaria microscopy of thick blood films taken from the same patient.

Cross-state work and work at federal level

Via four six-monthly, one-week workshops held from late 2006 to early 2008 the laboratory supervisors' teaching, technical and supervisory skills were strengthened. Facilitated by PATHS consultants, the workshops helped the supervisors identify, share and solve problems; review progress; and devise six-monthly plans. Although all states agreed on the same six-monthly targets, the supervisors developed their own state-level plans to achieve these targets. Early workshops focused on technical issues of test

methodology, teaching skills and quality checking techniques; later workshops were aimed more at advocacy, management and sustainability issues. The content of each workshop was generated in response to the needs of the participants and the states. Detailed reports of each workshop were disseminated to facilitate sharing of lessons.

Workshops were attended by all four members of the five states' laboratory teams and also by a number of representatives of Federal MoH programmes and organisations including malaria, tuberculosis,



KEY STEPS: Key CDP workshop activities

	Duration	Key Activities
Workshop 1 Nov 2006	5 days	<ul style="list-style-type: none"> • Develop/refresh skills in malaria diagnostic tests (RDTs and microscopy) • Develop teaching/supervision skills • Produce six-month plan for establishing QA systems for malaria diagnosis at primary and secondary levels
Workshop 2 Mar 2007	5 days	<ul style="list-style-type: none"> • Develop skills in haemoglobin measurement • Evaluate usefulness of Hb techniques and their benefits and limitations • Strengthen educational and supervisory skills • Develop skills in presentation and handling of lab data • Strengthen skills in development of QA systems for essential tests
Workshop 3 Oct 2007	4 days	<ul style="list-style-type: none"> • Review progress of CDP implementation • Begin to identify common elements from all states that can inform scale-up • Determine details of quality monitoring assessments • Manage data obtained from primary health facility tests • Problem solve issues of sustainability
Workshop 4 Mar 2008	4 days	<ul style="list-style-type: none"> • Share experiences and lessons learned to ensure institutionalisation and sustainability • Collate and compare results of test quality monitoring • Plan for incorporating more tests and scale-up

hospital services, and family health. Representatives of both the Council and Association for laboratory professionals also attended.

Support for implementing the state plans between workshops was provided by a national consultant (approximately 30 days/year) through telephone contact, and by international consultants (approximately 5 days/year) through e-mail. These support mechanisms allowed the state supervisory teams to build and sustain the networks required to run the CDP.

For communication purposes, one of the four CDP supervisors in each state was nominated as the focal person to act as the link between the state teams and the consultants. The focal person provided a monthly summary report about state CDP activities to the national consultant. The national consultant formed the communication channel between the state teams and the international consultants. The national consultant's activities included:

- Assisting the state laboratory teams to establish reliable supplies of consumables for the CDP
- Informing state teams about relevant national policies and strategies
- Collating quality assurance data
- Disseminating best practice examples between states
- Organising workshops, providing updates and highlighting problems to the PATHS Abuja office and the international consultants.

The international consultants designed the workshops; monitored overall progress of the CDP against set targets; provided resources and advice for state teams, national consultants and PATHS staff; produced reports and technical documents; and advocated for the CDP with Federal programmes.

Results

It is important to note that the CPD programme had only run for 16 months by early 2008. Thus, the results presented are output related rather than impact related. Proper evaluation of the effectiveness of the interventions needs to be done at a later stage.

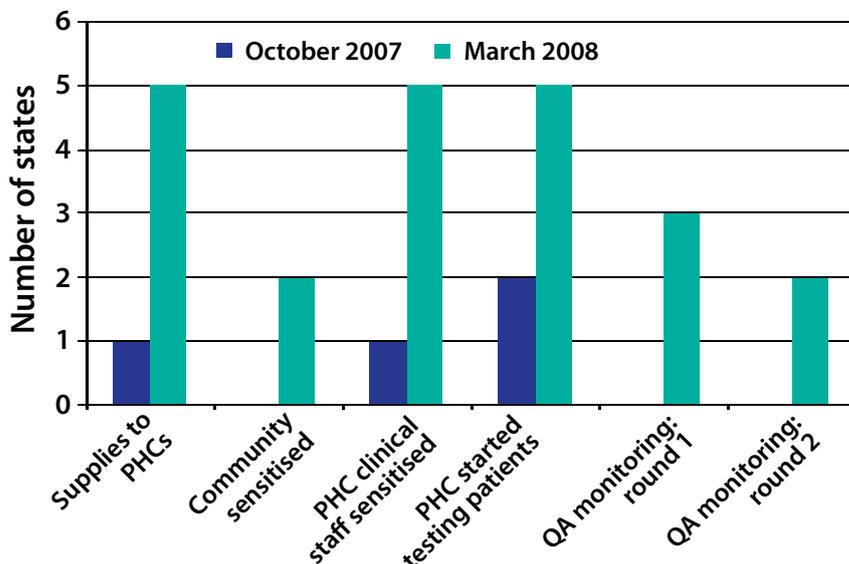
By March 2008, the CDP had far exceeded the original targets set in November 2006. Instead of providing diagnostics in approximately twelve PHC facilities in each state, the state laboratory teams had managed to set up diagnostic tests for malaria and anaemia using finger prick blood samples in 92 PHC and 12 SHC facilities across all the states. They had trained 151 staff and, using a conservative estimate of an average catchment population of 10,000/PHC facility, the CDP achieved population coverage of about 1 million. Mechanisms for monitoring the quality of tests were established. This was a major achievement since prior to the CDP there was no quality monitoring at all in the states at any level for either malaria or haemoglobin. A visit to two PHC centres involved in the CDP demonstrated that having haemoglobin estimations enabled clinicians to reduce the number of blood transfusions, while accurate malaria diagnosis had reduced prescriptions for anti-malarial drugs.

Although the original target was to set up the quality monitoring system in 2008, by March 2008 two states had conducted two quarterly rounds of quality monitoring. Overall, the results showed that even at the first round of monitoring accuracies of 70 percent were possible for haemoglobin estimations. The second monitoring round showed that the results could be further improved by re-training (e.g. by 6.4 percent in Enugu). Re-training also achieved a reduction in malaria microscopy false positive rates of 10 percent. Accuracy of the rapid test kits in the primary facilities was around 91 percent. Initially 40 percent of malaria microscopy results at the secondary facilities were incorrect, but re-training reduced this to 31 percent. The vast majority of the incorrect results were false positives.

Prior to the start of the CDP, laboratory scientists and technicians in Jigawa had received support to monitor and improve the quality of malaria microscopy in secondary level health facilities. The CDP findings reinforced those from Jigawa which showed that in five secondary health centres the number of false positive malaria reports had fallen from >95 percent to 0-40 percent.

Cross-fertilisation of best practice and lessons learnt occurred at the workshops. Each state initially used slightly different techniques for conducting their quality monitoring. Through review of all the advantages and disadvantages of the different techniques, examples of best practice were agreed. These will be used by all the states and the standardised methods will be included in the recommendations for national scale-up of the CDP.

CDP activities completed: October 2007 - March 2008



CDP coverage (March 2008) = 1,000,000
 92 PHC
 ~10,000 people/PHC

Sustainability

For the first time in Nigeria the CDP established a generic system for quality-assured diagnostics that operated across all tiers of state health services and reached those living in poor rural areas. The system was able to monitor the quality of test performance, identify problems and deliver cycles of targeted training to improve the quality of the tests. The CDP produced evidence-based tools and guidelines for scaling up; and provided a platform on which to build other simple tests appropriate for the health needs of the rural poor.

By March 2008, the CDP had only run for sixteen months and, although it was highly successful, it was not robust enough to be sustainable without some external support. Both State and Federal level engagement were vital in establishing the CDP and in promoting its long-term sustainability. The presence of Federal representatives at every workshop was invaluable in advocating for ownership of the CDP at national and state level.

These federal representatives developed a three-pronged approach to sustain the CDP which involved fact-finding visits to the CDP sites; a proposal to senior FMOH officials to mobilise funds; and use of the QA teams as a resource to implement Nigeria's National Laboratory Policy.

At state level the CDP was enthusiastically welcomed, but because laboratory services did not have their own budget line, laboratory supervisors had to find ways to link CDP activities with existing programmes. Although this process was complex and required strong advocacy, it was crucial for sustainability. Around 60 percent of CDP activities (e.g. sharing of training venues, linking into local government communication networks, building CDP malaria QA mechanisms, and provision of start-up supplies through drug revolving fund stores) were integrated with other state programmes.

The greatest threat to the CDP at state level was the failure to secure direct funds for the remaining 40 percent of activities; for example, communication, transport and other logistic costs. This needed resolution through incorporation of CDP activities into state annual health plans and budgets.

Using lab equipment at Annunciation Specialist hospital lab in Enugu



The CDP faced two key challenges for sustainability – ensuring federal ownership and an institutional home; and developing and maintaining a strong and targeted state advocacy strategy.

1. Because laboratory services for anaemia and malaria at secondary and primary level were such cross-cutting issues there was no obvious 'home' for the CDP at federal level and it was therefore difficult to know where to target an advocacy strategy. These issues were partially resolved at a workshop held in Abuja in October 2007 when key federal programmes agreed to form a collaborative team to house the CDP. Further discussions with several federal level programmes resulted in a proposal that the CDP should be housed within the Coordinating Unit of the Department of Public Health, with technical oversight from the TB programme and Hospital Services (Laboratory) Department, in collaboration with malaria and MNCH programmes. The idea was that the Federal CDP Collaborative Group would jointly identify federal level funds and strategies to ensure that the CDP was durably embedded into national and state structures.
2. At the same workshop in Abuja, an advocacy strategy that was transferable between states was identified. The state advocacy strategy identified influential players at all levels, from Commissioners for Health and Directors of Medical Services, through to local government, PHC facility committees and community leaders. The purpose of the advocacy strategy was to:
 - Raise awareness about the CDP, and the role laboratories play in achieving the MDGs
 - Identify all possible links between CDP and other health programmes to facilitate integration
 - Recruit laboratory 'champions' who could ensure laboratories were incorporated into state plans and budgets
 - Engage funders operating in specific states (e.g. NGOs, World Bank programmes) in supporting individual components of the CDP (e.g. provision of malaria rapid tests, expansion of role of TB supervisors to include malaria QA activities)
 - Promote good communication around laboratory issues between primary and secondary health tiers and between health and other sectors such as local government.

Lessons Learned

1. Local ownership and sustainability were effectively promoted in the CDP by building the capacity of laboratory supervisors to take responsibility for implementing diagnostic systems at secondary and primary levels within their states.
2. There was no 'right' way to supervise and ensure the quality of tests performed in peripheral health facilities. Each state had to develop and test its own systems and adapt these to the local context. Identification of good practice approaches for quality checking informed recommendations for national scale-up.
3. At the start of the CDP a strong advocacy programme at state level was vital to get buy in from all the key players. The MoH and LGAs were overwhelmingly supportive of the programme. By analysing the different strategies adopted by each state it was possible to identify commonalities in the advocacy activities and to use this information to develop a 'blueprint' advocacy strategy for CDP scale-up, with relevant stakeholders from primary (i.e. LGA) to state level within the states.
4. Finding a federal 'home' for the CDP programme was a major challenge. This was partly due to lack of clarity about who was responsible for driving this process; the cross-cutting nature of the CDP; and the short time frame of PATHS support for the CDP (less than 18 months).
5. CDP progress reviews should involve independent assessors from relevant Federal MoH programmes, as well as funders (i.e. DfID) and PATHS managers. Despite early recognition of the importance of laboratories in achieving the MDG targets, instigation of a programme to provide laboratory support was slow. Commitment to the CDP was sometimes unreliable; for example, workshop times were changed, the timing of state plans was altered after consensus was achieved at workshops, unplanned budget cuts affected implementation, and there was initially inadequate support for state teams between workshops. Many of these issues could have

been avoided by better communication with the consultants and a broader-based programme review process.

6. Weak management and supervisory skills and systems in the laboratory sector in Nigeria are not fully recognised. Laboratory scientists could make a significant difference to the quality of laboratory services and could strengthen laboratory systems in their state if they were empowered through small funds and a strategy that ensured they had a strong peer network.
7. Laboratories have the potential to make significant amounts of money in Nigeria and therefore to operate a system parallel to, or in conjunction with, drug revolving funds. Models for laboratory revolving funds needed to be explored and tested.



CROSS CUTTING:

Links with other DFID Programmes

The CDP cut across many major health programmes and all tiers within the health system in Nigeria. Improving access to essential tests for anaemia and malaria were key components of several major programmes including those for malaria, neglected tropical diseases, primary care, pregnant women, neonates and children. Although the focus of the CDP was primary care, the critical supervisory and quality checking mechanisms are located within the secondary health tier. Because ownership of the CDP at national level was shared between several programmes, finding an obvious institutional home for the programme proved challenging. The extensive cross-cutting nature of the CDP also posed many challenges for sustainability, particularly in establishing and maintaining good communications between programmes and health tiers.

Future of the CDP

The importance of laboratory services has been gradually recognised. Although the CDP was a relatively new initiative, by early 2008 there were established state wide networks of laboratory supervisors with skills to train, deliver and monitor tests. These supervisors, with overwhelming support from local stakeholders, conducted baseline surveys in primary and secondary facilities and began to establish and monitor tests for anaemia and malaria in primary facilities. The CDP approach was largely developed by a small team of Nigerian laboratory supervisors, supported by PATHS consultants. In the short- to medium-term the CDP model should be consolidated, adapted and scaled-up to include more facilities and a wider range of tests. To this end, federal and state ministries of health need to demonstrate their ownership of CDP by taking on responsibility for funding the programme. This could be complemented through an approach to the Global Fund to fight AIDS, Tuberculosis and Malaria (GFATM). The CPD would fit neatly into the health systems strengthening component of the GFATM.

Local stakeholders involved in the CDP identified the following as activities that will help strengthen the CDP in future:

- Raising awareness at community level of the new diagnostic services in order to increase demand;
- Strengthening and expanding the laboratory supervisors' network and establishing mechanisms to ensure that it is robust and durable;
- Extending the range of services taught and 'outreached' by the supervisors, including provision of safe blood for transfusion;
- Identifying an 'institutional home' for the laboratory services at national level and mainstreaming laboratory services across the major health programmes;
- Undertaking operational research to investigate mechanisms for self-financing of laboratories, for example through laboratory revolving funds;
- Evaluating the impact of improved access and quality of laboratory services on clinical outcomes.



Partnership for Transforming Health Systems (PATHS)



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