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Diagnostics take centre stage

This supplement is the first in a series of user-friendly operational guides explaining how to conduct evaluations of diagnostic tests for infectious diseases that are of public health importance in the developing world. Here, Robert Ridley, Director of TDR, explains why the series is necessary.

When considering research priorities and the tools needed to control neglected tropical diseases in developing countries, there is a tendency to focus on vaccine research and drug development. However, improved, quality-assured diagnostics are equally important for disease control. They provide the rational bedrock for the appropriate treatment of patients, for monitoring disease-control efforts and for enhancement of disease-surveillance capacity.

Quality-assured, easy-to-use tests are desperately needed for a range of infectious tropical diseases, including tuberculosis, malaria, African sleeping sickness and schistosomiasis. Some tests are too complex to use in remote areas, resulting in the need to transport samples and, consequently, the need for patients to make a return trip for their results. If this requires a walk of several miles and a patient is ill then the return trip might never happen. There is therefore a need for simple tests that don't require refrigeration for storage or electricity for use. Alongside this, there is a need to design diagnostic evaluation trials that can be carried out in these environments while not compromising scientific rigour.

The development of diagnostics, particularly those relevant to the infectious diseases that are common in developing countries, is a neglected area. It typically involves relatively small manufacturers and inadequate regulatory controls. Although there are good manufacturers, the information provided on the performance of diagnostics is often inadequate and unverifiable. The design of many evaluations published in the peer-reviewed literature is often seriously flawed, as is the analysis.

The 'upstream' system is failing the end-users of diagnostics and it therefore frequently falls to these end-users (health services and disease-control programmes) to evaluate the potential of a new test. This is a complex undertaking, and although there are excellent textbooks on the evaluation of diagnostics, these are often not readily accessible and tend to be complex, targeted towards an academic audience.

It is both ethically appropriate and strategically important that scientists and institutions in developing countries are involved in this diagnostics evaluation process. This allows national authorities a greater sense of ownership of the data and a deeper understanding of its significance,

facilitating better policy decisions. Specimen and strain banks for a range of diseases are beginning to be established in several countries to facilitate this. In undertaking the evaluations, capacity is established for good laboratory and good clinical practice, laying the foundations for a strengthened regulatory infrastructure to monitor the quality of other diagnostic tests.

A recent example of how the implementation of appropriate diagnostics evaluation can impact positively on a disease is the case of syphilis (to be covered in this series in the future). Several existing rapid, point-of-care immunodiagnostic tests for syphilis, gonorrhoea and chlamydia were evaluated. Many were found to be inadequate, but several syphilis tests demonstrated acceptable performance with operational characteristics that are suitable for use in remote settings. This validation enabled these products to be placed in a WHO procurement scheme that is open to all UN member states. In expectation of wider markets, manufacturers lowered their prices, which, in turn, made them more cost-effective for use in developing countries. These validated, simple rapid tests, allowing for immediate treatment with a single dose of penicillin, have led countries in several WHO regions to develop plans to eliminate congenital syphilis in line with the Millennium Development goal to reduce child mortality.

This supplement on the evaluation of diagnostics is timely. The guidelines on how to test diagnostics, developed by a panel of internationally renowned scientists, provide a powerful framework for action. The members of the panel have a wealth of expertise and experience from the diagnostics industry, regulatory authorities, academia and disease-control programmes. They have sought to produce a best-practice guide to diagnostics evaluation, which, although simple and accessible, does not compromise in terms of scientific rigour or clinical and laboratory standards. The elements identified can facilitate evaluations that can assist policy-makers, health-service planners, control programme staff and other end-users to make informed decisions about the utility of a diagnostic test. It can also assist developers in their quest to improve on existing tests and might facilitate better regulation of diagnostic marketing in developing countries.

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