BL 7

Business Plan
2008-2013

Accessible quality assured diagnostics

Draft Business Plan for JCB

May, 2007
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EXECUTIVE SUMMARY

Needs and Opportunities

Diagnostics are a critical component of efforts to reduce disease burden and help countries realize their health-related Millennium Development Goals and their use and need is increasingly promoted in WHO policies and strategies. Unfortunately, although many high-quality diagnostic tests for infectious diseases are available, they are neither affordable nor accessible to patients in developing countries. For example, 500,000 babies die in sub-Saharan Africa every year from congenital syphilis because women lack access to a screening test for syphilis in pregnancy, and only 16% of TB cases are reported with a laboratory-confirmed diagnosis. The few existing tests that may be appropriate for use in primary health care settings in developing countries are sold and used with little evidence on their effectiveness because diagnostics are not subject to strict regulatory approval standards. There is an urgent need for accessible quality-assured diagnostics for infectious diseases of poverty, and for research to gather objective evidence on the cost-effectiveness of these tests in real-life settings.

Overall Objective

To promote and facilitate the development, evaluation and application of diagnostic tests appropriate for use in primary health care settings in developing countries

Specific Objectives

- To define diagnostic needs for diseases of poverty and to set standards for diagnostics quality
- To facilitate test development
- To assess and assure diagnostic performance and quality
- To increase access to diagnostics in the developing world, taking into account socioeconomic factors and issues of gender equity

Activities

The activities that will be undertaken by this business line range from convening expert consultations to define diagnostic needs and product specifications, facilitating test development and test evaluation to test introduction for case management and disease control in DECs. The focus of research activities along the path from development to introduction vary between diseases according to needs, e.g. HAT, VL, and TB require intensive investment in test development as existing diagnostics are neither sensitive nor accessible. For other diseases such as malaria, VL and sexually transmitted infections (STIs), diagnostics are available but require a rigorous evaluation, or if evaluated and found to have acceptable performance, countries may need assistance with development of training materials, quality assurance programs and formulation of policy for sustainable adoption. The business line will promote standards for diagnostic research and advocate for regulatory control of diagnostics in DECs. A network of biobanks will be established to provide well-characterized reagents, strains and specimens to facilitate test development and evaluation.
Diagnostic trial sites will be provided with training in Good Clinical Laboratory Practice (GCLP) and capacity building modules will be designed with the ultimate goal of DECs leading their own diagnostics R&D, evaluations and quality assurance programmes.

End-Products

- Diagnostic needs and product specifications defined for each priority disease
- International standards and guidelines for the design and conduct of diagnostic evaluations published for each priority disease
- Novel diagnostic targets identified for HAT, schistosomiasis and tuberculosis (in collaboration with BL 3)
- Data on performance and operational characteristics of tests for priority diseases, with the publication of at least ten evaluations of diagnostics for primary health care settings in developing countries by 2012
- Pre-qualification evaluation schemes established for all priority diseases
- Preferential pricing and bulk procurement of new diagnostics, with at least 2 diagnostics included in the WHO Bulk Procurement Scheme for each priority disease
- A validated framework and roadmap to accelerate the introduction and sustainable adoption of promising diagnostics into the developing world (in collaboration with BL 8 - 11)
- Templates for Quality assurance schemes for diagnostics with accepted performance

Comparative Advantage

In the past few years, the diagnostics group within WHO/TDR has developed a strategic workplan based on WHO's comparative advantage which includes global convening power, setting norms and standards, and a strong network of regional offices that work closely with country disease control programmes. Specifically, the diagnostics group has convened global technical consultations to define diagnostic needs, and are developing quality standards for diagnostic evaluations, conducting diagnostic evaluations, working with countries to identify barriers to access to diagnostics and to conduct research to provide evidence for policy and sustainable adoption. It has also utilized TDR's extensive research networks and relationships with developing country control programmes to build capacity in diagnostic research, evaluation and test introduction. TDR has created a mechanism for diagnostic tests with acceptable performance and operational characteristics to be included in the WHO Bulk Procurement Scheme so that they can be available to all UN member states at negotiated pricing. This BL will build on this foundation and work closely with major test developers such as the Foundation for Innovative New Diagnostics (FIND) and the Program for Appropriate Technology in Health (PATH) to evaluate the tests developed. It will also work with WHO partners, country disease control programmes, research institutions, NGOs such as Médecins Sans Frontiers to conduct policy-driven test introduction and implementation research.
1. OBJECTIVE

1.1. OVERALL OBJECTIVE
To promote and facilitate the development, evaluation and application of diagnostic tests appropriate for use in primary health care settings in developing countries.

1.2. SPECIFIC OBJECTIVES

1. To define diagnostic needs for diseases of poverty and to set standards for diagnostics quality.
2. To facilitate test development.
3. To assess and assure diagnostic performance and quality.
4. To increase access to diagnostics in the developing world, taking into account socioeconomic factors and issues of gender equity.
2. NEEDS AND OPPORTUNITIES

2.1. NEEDS

Although many high-quality, sophisticated diagnostic tests for infectious diseases are available in the developed world, they are neither affordable nor accessible to patients in developing countries due to the lack of appropriate facilities and resources. In the developed world, as a result of market incentive, the diagnostic industry drives the processes from research through product evaluation, introduction to sustainable adoption into control programmes. The diagnostics development landscape for diseases endemic in developing countries is fragmented, with little interest from the private sector in producing diagnostics that will meet the needs of developing countries due to the (real or perceived) lack of a commercial market for new tests. The few existing tests that may be appropriate for use in primary health care settings in developing countries are sold and used with little or no evidence of their effectiveness because, unlike drugs, diagnostics are not subject to strict regulatory approval standards. The consequences of low quality diagnostics or lack of access are wasted precious resources and mismanagement of patients leading to serious sequelae or death.

The paucity of accessible quality-assured diagnostics for infectious diseases of public health importance in the developing world is due to multiple factors including:

- Lack of industry interest in developing diagnostics appropriate for resource-limited settings due to a perceived return for investment
- Lack of consensus on type of diagnostics needed and contexts for appropriate use
- A fragmented landscape of funders and researchers interested in test development and evaluation, and limited public and philanthropic sector funding to facilitate development and evaluation
- Lack of regulatory control on quality of tests sold in most countries
- Lack of norms and standards on how to assess the quality of diagnostics
- Lack of a coherent plan of action and leadership for driving the development of diagnostics for neglected tropical diseases

Without the tools to diagnose infections, many infected cannot benefit from the drugs/case management efforts. For example, of the estimated 346 million new cases of curable sexually transmitted infections occurring worldwide every year, 90% is in countries where there is no or limited access to diagnostics. An estimated 500,000 babies die in sub-Saharan Africa every year from congenital syphilis simply because many women lack access to a screening test for syphilis in pregnancy. Of the estimated 8 million new TB cases each year, only 16% are reported with a laboratory-confirmed diagnosis, and these often represent patients with advanced disease who have most likely already passed the infection onto their family members. Early detection of infection leads to improved case management that not only avoids the development of long-term complications but also improve disease control and prevention.
Diagnostics will continue to be a critical component of efforts to reduce disease burden. Availability of appropriate diagnostics could close the gap in global health equity and help countries realize their health-related Millennium Development Goals of reducing mortality in children under 5 (Goal 4), improving maternal health (Goal 5) and combating HIV, malaria and other diseases (Goal 6).

2.2 OPPORTUNITIES

Clear opportunities exist to realize the delivery of high-quality cost-effective diagnostics for the control and elimination of infectious diseases in developing countries through the convergence of scientific and technological advances and increasing advocacy and purchasing power of countries in the developing world.

Scientific and technological advancements:

- The human genome and the genome of many pathogens have now been sequenced. Advances in genomics and proteomics offer opportunities to utilize the genome sequences to look for novel diagnostic targets and biomarkers of infection
- Investments to counter the threat of bioterrorism and to provide early warning for pandemic preparedness in the event of infectious diseases outbreaks have accelerated progress in rapid detection technology
- There is increasing sophistication in the synthesis of knowledge, especially in conducting systematic reviews, to assess evidence needed for policy

Increasing public sector interest/investments:

- The Bill & Melinda Gates Foundation Global Health Diagnostic Forum
- The UK Foresight Project for the detection, identification and monitoring of infectious diseases, especially in Africa
- The establishment, in 2003, of a new public-private partnership, the Foundation for Innovative New Diagnostics, FIND.
- Countries have increasing purchasing power through the Global Fund and other donors if accessible quality-assured diagnostics are available.

TDR in collaboration with WHO departments and disease control programmes will build on this window of opportunity and increased visibility to define diagnostic needs, facilitate the development and evaluation of diagnostics, develop international standards for the evaluation of diagnostics, and to empower developing countries to conduct their own diagnostics research to increase access to quality-assured diagnostic in the developing world.
3. COMPARATIVE ADVANTAGE

3.1 TDR COMPARATIVE ADVANTAGE

In the past few years, the diagnostics group within WHO/TDR has developed a strategic workplan based on WHO's comparative advantage which includes global convening power, setting norms and standards, and a strong network of regional offices that work closely with country disease control programmes.

The TDR Diagnostics programme has drawn on the comparative advantage of WHO and TDR as follows:

1. WHO as an Intergovernmental Agency
   - unique position to convene global meetings to assess diagnostic needs and define product specifications for its priority diseases
   - close relationship with Ministries of Health and national control programmes
   - works with WHO collaborating centres, Regional Offices and Country Offices
   - a globally recognized mandate to set and promote international standards, free of commercial influence
   - ability to negotiate pricing through the WHO Bulk Procurement Scheme

2. TDR as a unique research programme
   - strong track record
   - long term view
   - altruistic devolution of patent ownership
   - engagement with both research and control departments, basic science research and implementation

Specifically, the diagnostics group has convened global technical consultations to define diagnostic needs, and proceeded to address the needs by:

- Providing seed funding to facilitate diagnostics development (Bright Ideas programme) several of which have successfully competed for larger investments to produce prototypes
- Created networks of laboratory and field evaluation sites and specimen bank sites in over 34 countries to facilitate test development and evaluation
- Developed global diagnostic evaluation schemes for tuberculosis, malaria, sexually transmitted infections (STIs) and dengue
- Developed guidelines for the design and conduct of diagnostic evaluations for malaria and STIs
- Developed mathematical models to estimate the impact and cost-effectiveness of different strategies for test introduction.
- Developed guides for appropriate use of tests based on data from evaluations of diagnostic performance and operational characteristics
- Developed a mechanism for the inclusion of diagnostic tests with acceptable performance and operational characteristics in the WHO Bulk Purchase Scheme to allow UN member states access to quality-assured diagnostics at negotiated prices. This is also an incentive to test developers and manufacturers to invest in quality tests for the developing world.

The current diagnostics programme in TDR has built strong relationships with WHO's disease control programs and its global network of collaborating centres and regional offices. It has funding from the Bill & Melinda Gates Foundation, USAID and has leveraged funding from other public-private partnerships with an interest in diagnostics such as the Pediatric Dengue Vaccine Initiative. It has also received in-kind contributions to its activities from private foundations, public health laboratories and control programmes in developing countries. This business line builds on TDR's achievements in diagnostics for sexually transmitted diseases, malaria and tuberculosis over the last several years.

### 3.2 SYNERGIES WITH OTHER ORGANIZATIONS

Figure 1: Diagnostics "From Bench to Bedside" development pathway:

In the developed world, companies drive the diagnostics research agenda so that once a prototype is developed, the products will be driven through the various phases of evaluation, introduction and adoption. The lack of a profitable market has resulted in apathy on the part of the diagnostics industry to develop diagnostics appropriate for the developing world. Public sector efforts at funding diagnostic development has increased in recent years but have been uncoordinated and fragmented.

This BL will build on the foundation established as described and pull together public and private sector players in the existing fragmented landscape to ensure that patients in resource poor settings have access to new and appropriate diagnostic tools.
For test development:
TDR will facilitate the work of major public sector test developers such as the Foundation for Innovative New Diagnostics (FIND) and the Program for Appropriate Technology in Health (PATH) by providing well-characterized specimens and strains from its network of biobanks. TDR provides seed funding through its Bright Ideas Programmes for innovations which can be transitioned into FIND and PATH for larger investments into a diagnostic product.

For test evaluation:
TDR is an unique position to provide independent or bias-free evaluation data to member states so that they can select the most appropriate test for their control programmes. Private companies and public sector test developers such as FIND and PATH are perceived to have an inherent conflict of interest in conducting evaluations of the tests on which they have made large investments. TDR collaborates with over 30 public health and research institutions on field trials and demonstration projects on the utility and cost-effectiveness of new tests to provide UN member states with evidence for policy. These include the US Centers for Disease Control and Prevention, Institute for Tropical Medicine, Antwerp, Belgium, London School of Hygiene and Tropical Medicine, International Consortium on Diagnostics in Canada, Infectious Diseases Research Institute in Seattle, USA, National Institute for Medical Research in Tanzania, Kenyan Medical Research Institute, Fundacao Alfredo da Matta in Brazil, Instituto de Medicina Tropical "Pedro Kouri" in Cuba and the National Center for STIs in China.

For test introduction and sustainable adoption:
TDR works with WHO partners, including the STOP TB Partnership, the Global Malaria Programme, WHO's Neglected Tropical Diseases, WHO's Reproductive Health Research Programme, country disease control programmes, research institutions, NGOs such as Médecins Sans Frontiers to conduct test introduction and implementation research to increase access to diagnostics and to ensure that diagnostic tools are used appropriately.
4. ACTIVITIES AND END PRODUCTS

4.1 KEY ACTIVITIES

Objective 1. To define needs and set standards for diagnostic quality by:

a) synthesizing existing knowledge by conducting systematic reviews to identify gaps in knowledge and define needs
b) modelling the test performance needed to maximize impact and cost effectiveness
c) convening meetings to define diagnostic needs, product specifications and contexts for use, with special considerations for diagnostics that will enhance access for the poor and address issue of gender inequity
d) developing and promoting standards for diagnostic research by convening consultations to develop guidelines for the design and conduct of diagnostic evaluations
e) advocating for more stringent regulatory control of diagnostics in the developing world

Objective 2. To facilitate test development by:

a) providing information on needs and product specifications to promote, facilitate public and private sector developer engagement
b) providing a diagnostics target prioritization forum for accelerating the discovery or novel diagnostic targets (in collaboration with Business Line 3)
c) funding "bright ideas" projects for novel or improved test formats
d) establishing a network of biobanks to provide well-characterized reagents and strains and specimens to facilitate test development and evaluation

Objective 3. To assess and assuring diagnostic performance and quality by:

a) assessing and strengthening diagnostics trial sites, including the provision of training and accreditation for Good Clinical Practice and Good Clinical Laboratory Practice (GCLP)
b) establishing international standards for the design and conduct of diagnostic evaluations
c) funding assessments of diagnostic test performance and operational characteristics to determine whether they are appropriate for settings intended use
d) improving quality of diagnosis by assisting countries with the establishment of quality assurance and proficiency networks
e) developing a prequalification scheme to ensure UN member states have access to quality-assured diagnostics
Objective 4. To increase access to diagnostics in the developing world by:

a) inclusion of diagnostics of acceptable performance and operational characteristics into the WHO Bulk Procurement at negotiated pricing

b) developing a policy platform for accelerating the translation of research evidence on the utility of diagnostics into control policy

c) developing a road map and framework for the introduction and sustainable adoption of appropriate diagnostics in the developing world, including the development of a advocacy package that details estimation of disease burden, attributable benefit of accessible and/or improved diagnostics in alleviating disease burden, results of systematic reviews on the effectiveness of current tools and mathematical model outputs on estimated impact and cost-effectiveness

d) convening consultations to develop user guides and manuals

e) conducting studies to validate model outputs to provide evidence for policy development

f) conducting operations research to demonstrate feasibility and effectiveness of new tools, and socioeconomic and gender-based research to ensure equitable access.

4.2 END PRODUCTS

The end products associated with these activities are in 2 broad categories:

1. Disease-related products including:
   - diagnostic needs and product specifications defined for each priority disease
   - novel diagnostic targets for priority diseases
   - data on the performance and operational characteristics of commercially available tests for priority diseases
   - inclusion of at least 2 diagnostics in the WHO Bulk Procurement Scheme for each priority disease

2. Products that are cross-cutting for all diseases including:
   - Diagnostics pre-qualification schemes established for all priority diseases
   - Quality assurance schemes for diagnostics with accepted performance
   - International standards for the design and conduct of diagnostic evaluations published for each disease
   - A framework and policy platform for accelerating the translation of diagnostic research evidence into policy
   - A validated framework and roadmap for the introduction and sustainable adoption of promising diagnostics into the developing world
Specifically, the end products by objective are as follows:

1. **To define diagnostic needs and set standards for diagnostic quality:**
   - Diagnostics needs and product specifications defined for each priority disease (2010)
   - Publication and dissemination of systematic reviews (2010)
   - Published guidelines for design and conduct of diagnostic evaluations (2009)
   - Network of diagnostic trial sites that are GCP and GCLP compliant (2012)
   - Improved regulatory control of diagnostics in countries (2009-2013)
   - Mathematic models available for countries to adapt for estimating impact and cost effectiveness of improved diagnostics (2011)

2. **To facilitate test development**
   - TDR biobanks as source of reference materials for test developers (2009)
   - Enlarged spectrum of stakeholders engaged in diagnostic test development (2011)
   - Annual funding of Bright Ideas Projects (ongoing)
   - Launch of a forum for accelerating diagnostic target prioritization with engagement of developing country scientists (2008)

3. **To assess and assure diagnostic performance and quality**
   - Network of diagnostic trial sites established with the capacity to conduct their own diagnostics research (2011)
   - Diagnostics clinical trial site directory available online (2008)
   - Publication of the results of at least ten evaluations of diagnostics appropriate for primary health care settings in developing countries (2012)
   - Establishment of a diagnostics pre-qualification scheme for priority diseases (2012)
   - National quality assurance programme established in countries planning to adopt new diagnostics (2012)

4. **To increasing access to diagnostics in the developing world:**
   - Preferential pricing and bulk procurement of new diagnostics available (2013)
   - Countries adopting new diagnostics based on assessment of evidence (2013)
   - Framework and policy platform developed for accelerating the translation of research evidence into policy for countries considering adoption of new diagnostics (2011)
   - Validated roadmap for the adoption, introduction and sustainable implementation of new diagnostics (2011)
   - User guides developed by countries for the use of diagnostics for each priority disease (2012)
• Dynamic models for estimating the impact and cost-effectiveness available to countries for different strategies for introduction and implementation of new diagnostics (2013)

• Systems for monitoring continued effectiveness of diagnostics in countries (2013)

• Increased access to diagnostics for women and poor or marginalised populations (2013)
### Business plan: Business line 7 – Accessible quality assured diagnostics

<table>
<thead>
<tr>
<th>Objective</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
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<tbody>
<tr>
<td>Objective 1</td>
<td><img src="image1" alt="Graph" /></td>
<td><img src="image2" alt="Graph" /></td>
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<td><img src="image5" alt="Graph" /></td>
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<td>Objective 2</td>
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<td>Objective 4</td>
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<td><img src="image23" alt="Graph" /></td>
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</tbody>
</table>

**Disease:** TB, STI, VL, Schisto, Malaria, Dengue

**Activity level:** Intense, Medium, Min

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### 4.3 INTERIM IMPLEMENTATION MILESTONES

As the diagnostic business plan involves a matrix of activities under 4 objectives for 7 diseases along a path leading from test development through test evaluation to their eventual introduction and adoption, the description of the implementation plan can be somewhat complex.

The focus of diagnostic activities for each of TDR's priority diseases depend on the current needs for that disease in terms of test development, test evaluation or test introduction and sustainable adoption.

For example, Human African Trypanosomiasis (HAT), visceral leishmaniasis (VL) and tuberculosis (TB) require intensive investment in the area of test development as existing diagnostics are neither sensitive nor accessible. For schistosomiasis and dengue, a number of diagnostics are currently being evaluated. For sexually transmitted infections and malaria, commercially available tests have been evaluated in laboratory and field trials and some have acceptable performance. Thus TDR's current efforts are focussed on assisting countries with developing training materials, user guides and quality assurance programmes and formulating policy for introduction and sustainable adoption. Sites in 34 countries are currently engaged in different stages of this work for different diseases as shown in the figure below:

<table>
<thead>
<tr>
<th>Disease</th>
<th>WHO/TDR Diagnostics R&amp;D Sites in 34 Countries</th>
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<tbody>
<tr>
<td>HAT</td>
<td>Angola, Congo, Kenya</td>
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<tr>
<td>VL</td>
<td>Ethiopia, India, Kenya, Nepal, Sudan</td>
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<td>TB</td>
<td>Bangladesh, Brazil, Colombia, Gabon, Peru, South Africa, Spain, Uganda, Vietnam</td>
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<tr>
<td>SCHISTO</td>
<td>Brazil, China, Egypt, Kenya, Venezuela</td>
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<tr>
<td>DENGUE</td>
<td>Argentina, Brazil, Cambodia, Cuba, Malaysia, Puerto Rico, Thailand, Vietnam</td>
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<tr>
<td>MALARIA</td>
<td>Cambodia, DRC, Kenya, Nigeria, Philippines, Tanzania</td>
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<tr>
<td>STI</td>
<td>Senegal, Brazil, China, Gabon, Haiti, India, Madagascar, South Africa, Russia, Sri Lanka, Tanzania</td>
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</table>
Gender Mainstreaming

Gender-based issues are considered throughout all business line activities. For example, for sexually transmitted infections, women are more likely to be asymptomatic than men. Hence the focus of test evaluations is currently on whether these tests can be used for screening for asymptomatic infection in women before they develop long term complications or pass their infection on to their babies if they become pregnant. Women with tuberculosis tend to have poor follow-up rates as they are the main provider of care for the family and often do not return for treatment until their disease have progressed to a late and serious stage. TDR's current projects on same day smears versus the current WHO recommendation for 3 smears will enable all patients, but in particular women, to access treatment much earlier. Under Objective 4, gender and socioeconomic issues will be incorporated into all programmes and mathematical models for increasing access to diagnostics.

In general, to reach the overall objective for this BL, progress needs to be made with activities under Objective 1 before proceeding to activities under Objective 2, 3 and 4. This makes achieving Objective 1 a milestone for Objective 2, achieving Objective 2 a milestone for Objective 3, and so on.

Although some of the activities will have an end date, most activities are best described as ongoing. This applies to cross-cutting activities such as GCLP training, trial site assessment and strengthening. Activities such as diagnostic evaluations will only happen when tests are available for evaluation. The frequency of evaluations varies with each disease and is largely unpredictable. Likewise, modules for training and quality assurance will only be developed if a promising test becomes available for introduction.

The other dimension of this work is that, within the 6 year time frame, it is likely that more progress will be made in some diseases than others. Hence for simplicity in the proposed timelines table, 2 major activities under each objective have been selected, and the milestones shown below mean by year x, that activity for a disease should be completed.
Proposed Timelines for Activities:

<table>
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<tr>
<th>Objective</th>
<th>Milestone</th>
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<tbody>
<tr>
<td>1.</td>
<td>Diagnostic needs and product specifications defined</td>
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<td>Malaria, dengue, VL, TB</td>
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<td></td>
<td>GCLP-compliant laboratory networks</td>
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<td></td>
<td>Dengue, Malaria, TB, VL</td>
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<td>2.</td>
<td>Forum for accelerated, target discovery launched</td>
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<td>B, Schisto, Dengue</td>
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<td></td>
<td>Biobanks established</td>
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<td>3.</td>
<td>Clinical trial site strengthening and certification</td>
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<td>STI, Dengue, TB, Malaria</td>
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<td></td>
<td>Test prequalification scheme established</td>
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<td>4.</td>
<td>Bulk procurement and preferential pricing</td>
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<td>Validated roadmaps</td>
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## 5. FUNDING

### 5.1 RESOURCE REQUIREMENTS

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<th>Objective</th>
<th>Description</th>
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<td>To define needs and set standards for diagnostics quality</td>
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5.2 RATIONALE FOR RESOURCE REQUIREMENTS

Objective 1: to define needs and set standards for diagnostic quality

Three types of activities will be carried out to achieve this objective:

- systematic reviews of diagnostic methodology: 5 reviews will be done over 3 years to be completed by 2010.

- meetings will be convened with disease experts and control programme managers to refine diagnostic needs for each of the priority diseases, and with regulatory authorities to strengthen regulatory control of the quality of diagnostics. Over the 6 year period, 10 meetings will be convened for all the priority diseases and 3 will be held for regulatory strengthening.

- guidelines for the design and conduct of diagnostic evaluations for priority diseases: contracts will be issued for small working groups to revise guidelines as needed

<table>
<thead>
<tr>
<th>Activities</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
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<tr>
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<td>150,000</td>
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</table>

Objective 2: To facilitate test development

Three types of activities will be carried out to achieve this objective:

- Diagnostic target prioritization: this comprises of network meetings for test developers from both public and private sectors, and training developing country scientists to participate in the scheme. The budget should decrease over time as participants take more ownership of scheme.

- Bright Ideas Grants: funding of investigator driven proposal for novel diagnostic platforms and tests as well as proposals to improve test formats and performance. This should be a core activity maintained over the 6 years.

- Biobanks: banks of well-characterized specimens, strains and reagents for accelerating test development and evaluation will be maintained for all the priority diseases. As more diagnostics of acceptable performance become available, and countries take more ownership of setting up their own banks and of evaluating diagnostics in their own country and region, it is anticipated that there will less demand for TDR biobanks.
Objective 3: To assess and assure diagnostic performance and quality

Three types of activities will be carried out to achieve this objective:

- **Establishment of Pre-qualification schemes for diagnostics**: This comprises of meetings to define diagnostics specifications acceptable for pre-qualification and assessment of dossiers submitted by manufacturers and contracts for inspection of manufacturing. This scheme is being established for HIV by WHO/Essential Health Technologies (EHT) and for malaria by TDR in collaboration with EHT as many of the companies manufacture multiple tests for infectious diseases. EHT will contract out manufacturing inspections of companies. Networks of evaluation sites have been set up for each of the priority diseases. They will be funded to carry out laboratory and clinic based evaluation of new and improved tests.

- **Good Clinical Practice and Good Clinical Laboratory Practice training**: GCP/GCLP training workshops will be conducted for all TDR funded sites to ensure trial quality. Site assessment and certification visits will be contracted to experts in this area.

- **Quality Assurance/Quality Control (QA/QC) Schemes**: TDR will assist countries with setting up QA/QC schemes for monitoring the quality of diagnostics and diagnostic testing. If an international external QA scheme does not exist, TDR will set up a network of national laboratories and provide QA/QC materials as necessary.
Objective 4: To increase access to diagnostics in the developing world

Two types of activities will be carried out to achieve this objective:

- Development and validation of a test introduction framework and road map: This activity will take place as diagnostics with acceptable performance and operating characteristics become available for each of the priority diseases. This will comprise mostly of meetings with stakeholders and policy makers, and contracts to develop a generic package for countries to adopt for test introduction.

- Field trials to pilot test introduction and to validate model outputs of potential impact and cost-effectiveness: A network of field sites have been established for each of the priority diseases, it is anticipated that each field trial will cost US$ 80,000 to 120,000. This budget will allow for approximately 4 sites for 3 diseases a year in the first 2 years, increasing sufficiently to cover more diseases or larger scale test introduction/implementation research studies.

<table>
<thead>
<tr>
<th>Activities</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
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<tr>
<td>Test introduction trials</td>
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<td>3,500,000</td>
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</table>
6. RISKS

The three primary risks associated with this project are:

1. Diagnostics have been a very neglected area until recently; even if good quality diagnostics are developed, countries may lack funding for purchasing (unless donors pay). To mitigate this risk, the BL will focus on finding Public-Private Partnerships (PPPs)/donors to finance purchase of diagnostics to guide treatment and bring about a substantial decrease in disease burden, or to a point when control programmes can be sustained by countries.

2. Funding for test development may not be fruitful (i.e., bright ideas may go nowhere) and there may be competition for funding with PPPs such as FIND. To mitigate this risk, the BL will develop smart partnerships with industry, research institutes, academia and with PPPs to carry out complementary activities.

3. The profit margin for diagnostic companies may be too slim to buy into a partnership with TDR. To mitigate this risk, the BL will work with PPPs/donors to develop royalty sharing schemes when splitting markets between the developed and developing world.