

Landscape analysis of the private-sector diagnostic services industry in India

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MAILING ADDRESS

PO Box 900922
Seattle, WA 98109
USA

ADDRESS

2201 Westlake Avenue
Suite 200
Seattle, WA, USA

TEL: 206.285.3500

FAX: 206.285.6619

www.path.org



Table of Contents

Introduction.....	1
Market Overview	2
Profiles of Laboratories.....	4
SRL Limited (a part of Relegare Group)	4
Metropolis Healthcare Limited.....	6
Star Imaging & Path Lab, Pvt. Ltd.	8
PathCare Labs (P) Limited.....	10
Plasma Health Chek Diagnostics, Pvt. Ltd.	12
Summary of Five Private-Sector Diagnostic Services Companies.....	14
Recommendations.....	16
Appendix 1.....	17

Introduction

The private-sector provision of health services is quite large and growing in many low- and middle-income countries.¹ Recognition of the importance of private-sector health care providers has led to the formation of several international working groups, forums, and technical assistance projects in recent years.² Their discussions, however, have predominantly focused on provision of clinical health care by private-sector providers. Very little knowledge exists regarding the provision of diagnostic services by the private sector in developing countries in terms of market structure, size, and services being offered.

Through decades of work on diagnostics technology development, PATH is cognizant of the difficulty of introducing new diagnostic technologies and then attaining wide-scale use of them in low-income countries. In the past, PATH has primarily focused on delivering new technologies by using public-sector channels and did not fully exploit other types of service delivery models. In recent years, private-sector service delivery models have emerged in low- and middle-income countries and can be used for delivery of new diagnostic technologies.

Expanding the scope of delivery models used for introduction and scale-up of diagnostic products/services would have significant advantages, including:

- Gaining feedback from a larger network of potential users and service providers in order to develop user-centric product designs, which will increase acceptability of new products.
- Facilitating market entry of new diagnostic products by:
 - Evaluating how innovative products can be “piggybacked” onto the delivery models of existing products and then evaluating how both new and existing products can be subsequently scaled up.
 - Expanding the network of early adopters.
 - Demonstrating delivery of innovative diagnostic products on a relatively large scale in a timely manner.
- Creating incentives for manufacturers and distributors of new products by showing them potential new markets for those technologies.
- Creating a larger circle of potential collaborators for future introduction and scale-up of new diagnostic products in order to attract donors and investors interested in public-private partnerships.
- Gaining experience and knowledge and applying it to other projects at PATH.

¹ Lagomarsino G, Nachuk S, Singh Kundra S. “Public stewardship of private providers in mixed health systems.” 2009. Washington DC. Report from the Results for Development Institute. Available at: <http://www.rockefellerfoundation.org/news/publications/public-stewardship-private-providers>. Accessed April 30, 2013.

² For example, Center for Health Market Innovations (www.healthmarketinnovations.org), Strengthening Health Outcomes Through The Private Sector (SHOPS, www.shopsproject.org funded by USAID), and Private Healthcare Initiative at the University of California at San Francisco (<http://globalhealthsciences.ucsf.edu/global-health-group/private-sector-healthcare-initiative-pshi>).

As the initial step toward expanding our understanding of delivery models and developing a strategy to leverage them, we conducted a landscape analysis to investigate private-sector service delivery models, with a focus on India.

Market Overview

The Indian diagnostic services market is estimated to have generated INR97.3 billion in revenue during 2011 and is expected to grow at a compound annual growth rate of around 26% to INR235.8 billion by 2015.³ This rapid growth rate can be attributed to an increase in health care spending, awareness of health-related concerns, demand for accurate and timely medical care by the growing middle and upper classes, increased incidence of lifestyle-related diseases, and market penetration of health care insurance.

This market is highly fragmented. India has approximately 100,000 laboratories including specialized laboratories, laboratories in hospitals and nursing homes, and small testing centers that have only basic capacity. Test volumes range from 50 to 100 samples per day for one laboratory located in a small town to several thousand samples per day for a major laboratory. The quality of services provided by these laboratories also varies widely. The National Accreditation Board for Testing and Calibration Laboratories (NABL) was established to accredit the laboratories; however, the number of accredited laboratories remains low since accreditation, so far, is voluntary.^{4,5} Currently, only about 10% of the market is organized and composed of laboratories with proper accreditation. SRL Limited, the largest laboratory in India, holds a 43% share of this organized market.³

In the future, this market is expected to become more organized and consolidated as the government exerts greater control over it and as small and independent laboratories become franchisees in the hub and spoke model of the larger players. By 2015, 30% of the market is predicted to be organized.³

In terms of services provided, the market is dominated by pathology services, which account for approximately 70% of the market, and biochemistry and immunochemistry testing comprise the major chunk of pathology services. Most of the larger laboratories have fully automated equipment. As competition intensifies, laboratories are trying to differentiate themselves by offering specialized tests such as drug screenings, extended lipid profiles, and therapeutic drug monitoring. They are also expanding their services to Tier II and III cities, and even outside India by establishing satellite laboratories and sample collection centers in these cities/countries.

³ “Indian Diagnostic Services Market Outlook 2015.” Report published by RNCOS Industry Research Solutions, June 2012.

⁴ “Diagnostic Laboratory Market.” The US Commercial Service in India at the American Center website. Available at: <http://www.ita.doc.gov/td/health/india/VD05.pdf>. Accessed March 28, 2013.

⁵ “Excellence in Diagnostic Care.” KPMG website. Available at: http://www.kpmg.com/IN/en/IssuesAndInsights/ThoughtLeadership/Excellence_in_Diagnostic_Care.pdf. Accessed March 28, 2013.

In this landscape analysis, we interviewed five diagnostic laboratories that range in size from small to large (refer to Appendix 1 for a list of interviewees). The following section provides profiles of these laboratories.

Profiles of Laboratories

SRL Limited (a part of Relegare Group)

Plot No. D-3, District Centre, A- Wing, 2nd Floor, Saket

New Delhi – 16

Tel: 011-42295333

www.srlworld.com

Year of establishment	1996 (SRL's acquisition of Piramal Diagnostic Services Private Limited in 2010 made it the largest private diagnostic laboratory in India).
Geographical coverage	Nationwide
International presence	Has laboratories in Nepal and Dubai.
Accreditations	College of American Pathology (CAP), NABL, National Glycohemoglobin Standardization Program, Clinical Pathology Accreditation (UK), Clinical Laboratory Standards (USA), Health Insurance Portability and Accountability Act of 1996 (HIPAA) compliance, International Organization for Standardization (ISO)-27001:2005
Business model	Hub and spokes (uses franchise model for sample collection centers).
Business areas	<ol style="list-style-type: none"> 1. Imaging laboratory business. 2. Pathology laboratory business. <ul style="list-style-type: none"> • Clinical laboratory medicine (offering screening to confirmatory diagnostic testing). • Preventive care (i.e., wellness centers). • Laboratory services for clinical trials. • Home collection services (i.e., tests can be ordered through the Internet, and samples are collected at home by laboratory technicians). • Management of hospital-based laboratories. 3. Research and development (R&D).
Business size	<ul style="list-style-type: none"> • Owns 12 reference centers, 4 centers of excellence (for molecular biology, hematology, cytogenetics, genomics and histopathology), 21 wellness centers, 236 network labs, and 19 radiology/imaging centers. • Has 4,000 collection points, including 1,300 collection centers (either directly owned or franchised by SRL), nursing homes, and hospitals. • Has a client referral network in 465 cities and with 1,000 hospitals and 100,000 doctors.

SRL Limited (a part of Relegare Group) (Cont'd.)

<p>Business size (cont'd.)</p>	<ul style="list-style-type: none"> • Manages 62 hospital-based laboratories. 22 of them are located within Fortis hospital chain (Fortis and SRL have the same parent company). • Offers over 3,300 types of diagnostic tests. • Performs 62,000 tests per day and 2,000 radiology tests per day.
<p>Client bases</p>	<ul style="list-style-type: none"> • 70% to 80% of patients are on a referral basis. • The wellness centers provide health checks mostly for corporate employees. However, fewer than 25% of their customers come for health checkups, responding to SRL's campaign advertisements. • 50% of patients who use home collection services are corporate employees (for their health checkups), and the other 50% are individuals referred by doctors.
<p>Revenue structure</p>	<p>Approximately 75% of their revenue comes from their laboratory medicine. The remaining 25% comes from the other business areas (the breakdown of this percentage is unknown).</p>
<p>Insurance coverage</p>	<p>They accept various types of insurance. However, most of their patients pay for diagnostic tests out of pocket due to lack of insurance coverage for diagnostic tests.</p>
<p>Sample transfer and use of information technology</p>	<ul style="list-style-type: none"> • Has an in-house logistics team to transfer samples from 500 cities to laboratories in a timely manner (60% of the samples collected within India are transported to laboratories within 6 hours, while samples collected outside India reach laboratories in India within 24 to 48 hours). • Information management is one of their strengths. They created software for patient record management.
<p>Growth strategy</p>	<ul style="list-style-type: none"> • Focus areas: obstetrics and gynecology (OB/GYN), diabetes, cardiovascular diseases, oncology, and infectious diseases. In terms of technologies, they focus on molecular tests, applied genomics, etc. • No significant geographical expansion is planned since SRL currently operates at 40% to 50% of its full capacity. They plan to increase the operation capacity to 80% by increasing their brand recognition among doctors who refer patients. • They are not keen on expanding their business to the population below the poverty level due to concern about their purchasing power.
<p>Technology of interest</p>	<p>They focus on automated tests because of their quality and turnaround time. Expressed slight interest in such tests as careHPV™, TB MODS (microscopic observation drug susceptibility test for tuberculosis), and noninvasive anemia tests.</p>
<p>Evaluation of new tests for their use</p>	<p>The R&D division evaluates technologies and decides which technologies to use at SRL by reviewing publications and attending conferences. Accuracy or quality, cost, and availability of tests in India are important factors.</p>

Metropolis Healthcare Limited

250-D, Udyog Bhavan, Hind Cycle Marg,
Behind Glaxo, Worli
Mumbai – 400 030
Tel: 022-66505555
www.metropolisindia.com

Year of establishment	1981
Geographical coverage	Nationwide
International presence	Has laboratories in Sri Lanka, United Arab Emeritus, South Africa, Mauritius, and Kenya.
Accreditations	NABL, ISO, CAP
Business model	Hub and spokes (uses a franchise model for sample collection centers).
Business areas	<p>Pathology laboratory business.</p> <ul style="list-style-type: none"> • Clinical laboratory medicine. • Preventive care (health checkups). • Management of hospital-based laboratories. • Laboratory services for clinical trials. • Home health services.
Business size	<ul style="list-style-type: none"> • 85 laboratories and 400 sample collection centers (only 50 centers are owned by Metropolis and the rest are franchisees). Laboratories are open 24/7. • Has reference labs in Mumbai, Bangalore, Delhi, and Ahmedabad, which are directly managed by Metropolis. • Has a network of 10,000 small labs, nursing homes, and hospitals and more than 20,000 consultants all over India. • Has home collection services in limited areas (Mumbai, Chennai, and Bangalore). • Manages 14 laboratories within hospitals. Metropolis manages activities such as setting up laboratories and quality assurance (QA) in exchange for a certain percentage of profits from hospitals. • Processes over 10 million tests a year. (The Mumbai laboratory alone processes about 6,000 samples per day.) • Offers 4,000 different types of tests. • Assisted 120 clinical trials; 30% of these are Phase 3 to 4 clinical trials.
Client bases	Most of their clinical laboratory medicine is for patients referred by doctors, while preventive health checkups are for corporate employees.
Revenue structure	70% of their revenue comes from laboratory medicine, 12% comes from diagnostic services for clinical trials, 5% comes from preventive medicine, and the rest comes from management of hospital-based laboratories and other.

Metropolis Healthcare Limited (cont'd.)

Insurance coverage	Only diagnostic tests provided during patients' hospitalization are covered by insurance in India. As a result, patients pay for diagnostic tests out of pockets (unless they are covered by corporations such as for health checkups).
Sample transfer and record management	Not explored.
Growth strategy	<ul style="list-style-type: none"> • Focus areas: hepatitis, oncology, and HIV. They also focus on early-stage diagnosis. • Expand their laboratory business internationally through acquisitions in Nigeria, Uganda, Ethiopia, Angora, and Ghana. Africa is their target region since economic development in the region is significant. They are also targeting to expand to Southeast Asian countries. • For expanding their business to Africa effectively, they are: <ul style="list-style-type: none"> ○ Trying to source laboratory materials locally for cost reduction. ○ Ensuring quality by seeking accreditations, evaluating samples in India (external QA), and monitoring laboratories in Africa by an internal team on a regular basis.
Technology of interest	<ul style="list-style-type: none"> • Low-cost technologies for Africa. • Automated tests; however, they are open to using non-automated laboratory equipment.
Evaluation of new tests for their use	<ul style="list-style-type: none"> • Selection criteria for new tests: cost, time required to perform a test, commercial viability, customer need, availability in India. • Receive information on new technologies from scientific committees, key opinion leaders, manufacturers, and conferences.
Others	Collaborated with PATH on clinical trials (on a vaccine trial), and they also collaborate with other international pharmaceutical companies.

Star Imaging & Path Lab, Pvt. Ltd.

4B/4, Tilak Nagar

New Delhi - 110018

Tel: 11 4560 2200, 4510 6300

www.starimaging.in/index.aspx

Year of establishment	1978
Geographical coverage	Delhi and National Capital Region
International presence	None
Accreditations	NABL for pathology labs and National Accreditation Board for Hospitals and Healthcare Providers for imaging laboratories.
Business model	Hub and spokes (no franchising).
Business areas	<ol style="list-style-type: none"> 1. Imaging laboratory business. 2. Pathology laboratory business. <ul style="list-style-type: none"> • Clinical laboratory medicine. • Preventive care (health checkups). • Management of hospital-based laboratories. <p>(Does not provide home collection services because of the lack of robust tests for home collection services, challenging logistics, and difficulty in controlling sample transport.)</p>
Business size	<ul style="list-style-type: none"> • Has 4 mega hubs, 5 hubs, 15 branches, and 10 patient service centers. All these provide both pathology and imaging services. <ul style="list-style-type: none"> ○ Hubs have either computed tomography or magnetic resonance imaging, or both. ○ Branches have ultrasound. ○ Patient service centers have digital X-ray and pathology. • Has a client referral network with 9,000 doctors. • Manages 20 laboratories in hospitals (e.g., Genesis hospital chain) and nursing homes. • Has 2,000 walk-ins per day. • Offers about 3,000 types of tests.
Client bases	Government panels (insurance schemes for government employees), referrals from doctors, and preventive health packages to corporate employees (health checkups).
Revenue structure	<ul style="list-style-type: none"> • 55% of their revenue comes from their radiology business and the other 45% comes from their pathology business. Radiology tests are more expensive because they require capital equipment, which accounts for the higher revenues from the radiology business. • 25% of their revenues are from government panels (Central Government Health Scheme, employee state insurance, etc.), 70% is from referrals by doctors, 5% is from preventive health packages.
Insurance coverage	Not tied with any health insurance other than the government panels.

Star Imaging & Path Lab, Pvt. Ltd. (Cont'd.)

Samples transfer and use of information technology	Use information technology to transfer radiology images to external radiologists for confirmatory readings.
Growth strategy	<ul style="list-style-type: none"> • Focus areas: Gynecology • Trying to expand their services to smaller cities (Tier II cities in the neighboring states such as Uttar Pradesh, Punjab, and Haryana) and rural/peri-urban areas that have demand for diagnostic services but actually have insufficient services. Also, lower rents provide a larger profit margin. They are currently testing their services in 500 villages. • Believe that purchasing power is not an issue in rural/peri-urban areas. They consider linking their services with insurance as a future opportunity. • Predict that their pathology business would increase more quickly than their radiology business, since pathology laboratories require less capital investment. • Believe that growth of the pathology business is driven by “knowledge.” Educating doctors and increasing referrals will drive the business. Doctors are aware of only 50 to 100 tests out of the 3,000 tests they offer. • Want to increase the number of samples processed per time unit and/or increase the number of disorders diagnosed per sample (multiplex testing), both being key to increasing revenues.
Technology of interest	<ul style="list-style-type: none"> • Like automated, high-throughput machines since QA is built in. • Are interested in low-cost tests for smaller towns.
Evaluation of new tests for their use	<ul style="list-style-type: none"> • Test performance compared to existing technologies, revenue opportunities, opinions of knowledge partners (i.e., doctors) are key factors.

PathCare Labs (P) Limited

Sy. #34, Opp: Geethanjali Engineering College
 Cheeryal (V), Keesara (M)
 Greater Hyderabad 501301
 Tel: 040-30913333
www.pathcarelabs.com/home.html

Year of establishment	2008
Geographical coverage	Strong base in Andhra Pradesh and southern India. Limited presence outside southern India.
International presence	Have collection centers in Bangladesh, Sri Lanka, and Nepal.
Accreditations	NABL
Business model	Hub and spokes (franchising with the majority sample collection centers).
Business areas	<p>Pathology laboratory business.</p> <ul style="list-style-type: none"> • Laboratory medicine. • Hospital laboratory management services. • Camps on a periodic basis to generate awareness and provide preventive packages directly to customers.
Business size	<ul style="list-style-type: none"> • Has a central laboratory in Hyderabad and 11 regional laboratories in New Delhi, Nasik and Pune in Maharashtra, and other major cities. • Has 1,700 sample collection centers (5,000 are direct outlets). • Plan to open an additional 14 laboratories in Rajasthan, Delhi, Haryana, Uttar Pradesh, Bihar, and a few other states by June 2013. • Has a client referral network with 2,500 doctors. • Performs 25,000 tests per day and handles 25,000 clients per day.
Client bases	<p>70% of the clients are referred by doctors.</p> <p>90% of patients using preventive packages are corporate employees.</p>
Revenue structure	65% of revenue is generated by laboratory medicine, 30% is generated by corporate clients and camps, and 5% is generated by hospital laboratory management.
Insurance coverage	<p>Impaneled by Central Government Health Scheme.</p> <p>Insurance tie-up is limited to pre-policy checking.</p>
Sample transfer and use of information technology	Use a courier service to transfer samples.
Growth strategy	<ul style="list-style-type: none"> • Focus areas: OB/GYN as they are largely into cord care. • Expand geographically into northern and eastern India. • Increase client base (the central laboratory operates at under full capacity—conducts 15,000 tests/day when the full capacity is 65,000 tests/day).

PathCare Labs (P) Limited (Cont'd.)

Technology of interest	<ul style="list-style-type: none">• Latest, state-of-the-art, accurate, technologies, and technologies with low turnaround time.• Point-of-care tests because these are low cost and take much less time to generate results.
Evaluation of new tests for their use	Not explored.
Others	<ul style="list-style-type: none">• Strategic alliance with Alere Inc.• Collaboration with Vimta Labs for umbilical cord storage.

Plasma HealthChek Diagnostics Pvt Ltd.

197-A, Pocket-A, Mayur Vihar Ph-2,

New Delhi-110091

Tel: 9871302004

www.healthchek.in/healthchek.htm

Year of establishment	Ten years of history.
Geographical coverage	Delhi, Gurgaon (Haryana), and Ghaziabad (Uttar Pradesh).
International presence	None
Accreditations	NABL
Business model	Hub and spokes (no franchising).
Business areas	Pathology laboratory business. <ul style="list-style-type: none"> • Clinical laboratory medicine. • Preventive care (health checkups). • Home collection service.
Business size	<ul style="list-style-type: none"> • Has a main laboratory (Delhi) and two satellite laboratories. (The main laboratory uses automated equipment. Satellite laboratories perform point-of-care tests (biochemistry, blood glucose, kidney function, and lipid profiles) and send samples to the main laboratory only for limited tests such as hormone tests. • Performs about 700 to 800 tests per day and has about 100 patients per day. They are not connected with any hospitals or doctors.
Client bases	<ul style="list-style-type: none"> • Preventive care is mainly for corporate employees. • No network with doctors and thus no referrals by doctors. • Patients who use home collection services are relatively affluent since they charge more for home collection (INR50 to INR100).
Revenue structure	Roughly 50% of their revenue comes from routine diagnostics, and the remaining 50% comes from preventive care.
Insurance coverage	They are not tied to government insurance schemes. They accept life insurance.
Sample transfer and use of information technology	Not explored.
Growth strategy	Focus areas: Gynecology.
Technology of interest	Not explored.
Evaluation of new tests for their use	Not explored.

Plasma HealthChek Diagnostics Pvt Ltd. (Cont'd.)

Others	They would like to offer a comprehensive program for management of diabetes by creating a network of general physicians, diabetes specialists, primary health centers, community health centers, products (tests), and diabetic care centers. They are looking for funding to initiate this program; however, their business model for this program has not yet been established.
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Summary of Five Private-Sector Diagnostic Services Companies

This section summarizes findings of the interviews with the above five companies under four themes: business models, business strategies, interest in new and innovative technologies, and potential for collaboration with PATH.

1. Business models

The predominant business model is the “hub and spoke” model, which consists of a limited number of reference labs with comprehensive diagnostics capabilities in metropolitan areas linked to satellite labs with restricted diagnostic capabilities⁶ in smaller cities. A large number of collection centers such as hospitals, pathology labs, clinics, and stand-alone collection centers feed samples into the hub and spoke system. Four of the five researched companies fall into this business model category. The hub and spoke model allows the prospect for greater capital expenditure control but requires well-managed transportation systems and well-developed information systems for sample collection as well as technological infrastructure for reporting. Interviewed companies are, therefore, required to outsource logistics management (PathCare Labs) or develop their internal capacity (SRL) for their sample transportation. Consistently, interviewed companies highlighted their information and communication technologies as one of their core competencies.

As part of the hub and spoke model, these companies establish a network of physicians to refer patients to their laboratory services. The number of physicians range from 2,500 (PathCare Labs) to more than 100,000 (SRL). The collection centers they operate are a mix of directly owned and franchised ones.

HealthChek is a relatively new and smaller company that intends to establish a specialty model offering broader diabetes-related services. The single (or limited) specialty model offers advantages such as limited investment in terms of infrastructure and workforce and the possibility of offering end-to-end comprehensive services.

In addition to medical diagnostics services, these companies generate revenues from businesses such as management of hospital laboratories (Metropolis, SRL, and PathCare Labs), clinical trials (Metropolis and SRL), and preventive health checkups mainly for corporate clients. Some companies offer home sample collections combined with ordering and reporting through the Internet to provide convenient services.

They prefer automated, high-throughput machines to capture economies of scale and built-in quality control functions. One company quoted “increasing sample size processed per time is a key.” This, however, does not mean that they would not consider semi-automated, point-of-care, or culture-based diagnostics technologies. They are beginning to recognize that these

⁶ “Indian Diagnostic Services Market Outlook 2015.” Report published by RNCOS Industry Research Solutions, June 2012.

technologies could be aligned with their business strategies as they try to expand their business into smaller cities in India or other low- and middle-income countries.

2. Business strategies

The companies' business strategies range from expansion of geographical coverage to semi-urban to rural populations, development of focus on particular health issues, expansion to other low- and middle-income countries, and increasing loyalty among networked physicians. OB/GYN and noncommunicable diseases including diabetes and oncology are frequently mentioned areas of interest.

Revenue sources include government and private insurance, out-of-pocket expenditure, and company subsidies. This indicates that their client base is currently dominated by high- to middle-income populations. SRL explained their lack of interest in lower-income populations at this moment because of lack of capacity to pay.

Companies such as SRL and Metropolis operate internationally, mainly targeting other South Asian countries, Arab countries and selected African countries (Kenya, Ghana, Uganda, Ethiopia, and South Africa). International expansion is mainly through acquisition of existing businesses.

3. Interest in new and innovative technologies

Generally, all companies are interested in new and innovative technologies if these new technologies offer cost savings by shortening processing time, improving quality control, increasing throughput, or reducing cost. The companies also consider opinions and acceptance by their client doctors.

4. Potential for collaboration with PATH

The companies do not outright dismiss the potential for collaboration with PATH, but the reality of collaboration will be determined by the level of alignment with their business needs and models and the profit potential. Metropolis has collaborated with PATH for clinical trials in the past. Outside of clinical trials, potential for collaboration may exist when a company considers expanding its network to rural populations or lower-income countries. In those settings, high throughput is less critical in the business model if a technology can offer other advantages, such as low cost and/or low demand for infrastructure, logistics/supply, and technical capacity on the part of operators.

Recommendations

In the future, there could be a few areas for potential collaboration between PATH and these types of private diagnostic laboratories:

1. Private diagnostic laboratories could become users of technologies that PATH develops. The diagnostic laboratories use automated, high-throughput machines for testing in order to increase turnaround time and reduce cost per sample. However, as private diagnostic laboratories expand their services to Tier II and III cities of India, there could be a demand for lower-cost technologies, for technologies that provide results on the spot or in a timelier manner, and/or for technologies that require less infrastructure. Although the current clientele of these laboratories is not low-income families, PATH could collaborate with them to encourage them to begin providing services to low-income families by using tiered pricing or creative financing models. In addition, these private diagnostic laboratories could adopt diagnostic tests that PATH's partners develop, produce, or commercialize for developing countries.

Furthermore, new technologies might not necessarily be limited to diagnostic tests. Private diagnostic laboratories currently transport a large volume of samples from sample collection centers to satellite laboratories or reference laboratories. Some of these samples require temperature control, which is an added cost. Sample transfer technologies that enable easier or less-costly transportation would be of interest to them.

2. Private diagnostic laboratories could provide diagnostic services for clinical trials conducted by PATH.

Since it is often difficult to export samples outside of the developing countries in which the clinical trials are being performed, reference diagnostic or pathology testing must be done inside those countries. However, PATH has found that the quality of diagnostic services inside developing countries is frequently suboptimal. As private diagnostic laboratories expand their services to other resource-limited countries along with proper quality control/assurance mechanisms, there might be an opportunity for PATH to use these laboratories for future clinical trials.

3. Private diagnostic laboratories could be our partners for new technology development. PATH could incorporate the needs of private diagnostic laboratories into future technology development, or these laboratories could evaluate beta prototypes that PATH develops. Additionally, large private diagnostic laboratories have R&D divisions that could collaborate with PATH to co-develop new technologies in the future.

The private-sector diagnostic services market has significant growth potential. National insurance schemes are expected to expand in developing countries (including Africa) and will reimburse for diagnostic tests provided by private laboratories. For example, Ghana has already started reimbursing for them. The private diagnostic laboratories then will proliferate and grow, and their services will likely be used by public hospitals in the near future. Therefore, addressing private diagnostic laboratories' needs will, in turn, address the interests of the public sector.

Appendix 1

List of interviewees

1. SRL Limited
Mayank Upadhyay, Business Manager

2. Metropolis Healthcare Limited
Avdhut Joshi, Vice President Marketing (Joined via phone)
Tarun Puri, Business Development Manager, Clinical Research

3. Star Imaging & Path Lab, Pvt. Ltd.
Sudhanshu Gupta, Chief Operating Officer

4. PathCare Labs (P) Limited
Raja Ghosh, Associate Vice President

5. Plasma HealthChek Diagnostics Pvt Ltd.
Sandeep Singhal, Chief Executive Officer
Preeti Handa