



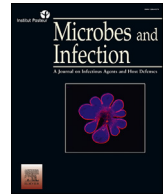
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Letter to the editor

SARS-CoV-2 testing in low- and middle-income countries: availability and affordability in the private health sector



SARS-CoV-2 testing is a major bottleneck globally, especially in low- and middle-income countries (LMICs). As the public health sector struggles to meet the increasing need for tests, there is a potential role for the private health sector to expand SARS-CoV-2 testing capacity [1,2]. We aimed to investigate the availability and affordability of SARS-CoV-2 testing in the private health sector in these settings.

We surveyed LMICs in which a large proportion of patients seek care in the private sector [3,4], sending the survey via email as a protected word document to 68 contacts across 22 countries. Contact information was obtained through attendee lists at passed global health conferences or through colleagues in the respective countries. The survey questions covered in which sectors (public, private or both) COVID-19 testing (serological and PCR) were available, what type of financing scheme was in place for testing (e.g. whether testing was paid out-of-pocket by patients), and what type of reimbursement mechanism (if any) exists for testing in the private sector (e.g. if the government is reimbursing the private sector for testing costs). The survey also collected data on costs of testing in the private sector, which components of testing were included in these costs (e.g. cost of test itself, transport costs, etc), and patient eligibility criteria (if any) for reimbursement. We received 30 responses from 15 countries between May and June 2020. Respondents held varied roles in the public and private sectors, some being directly involved in COVID-19 testing. No patient data nor individual subject data were collected. Beyond the name of the country, no identifying information was collected. As the survey covers country-level policies only, this does not constitute human subjects research and did not require ethical approval.

The number of respondents per country, respondent roles, the availability and price of private sector SARS-CoV-2 PCR and serological testing, and reimbursement mechanisms are summarized in Table 1. In 11 of the 15 countries, PCR testing (specifically real-time reverse transcription polymerase chain reaction, rRT-PCR) for SARS-CoV-2 is available in both the public and private sectors. In Myanmar, Nepal, Tanzania, and Uganda, SARS-CoV-2 PCR testing is available only in the public sector.

Various payment and reimbursement models were reported among the surveyed countries for private sector testing, including payment of the entire cost out-of-pocket by patients, reimbursement of the private sector through the government or donors, or the provision of resources (e.g. test kits) to the private sector directly from the government.

Private sector PCR testing is completely free of cost for all patients in the Philippines, whilst in Brazil, Mexico and Peru, the full costs of testing are paid out-of-pocket by patients. In

Afghanistan and Nigeria, private laboratories function as an extension of the network of public laboratories for the purpose of SARS-CoV-2 testing and receive samples and resources directly from the government (a recent change in policy however now allows a cost to be charged to patients in private facilities in Afghanistan, and some private facilities in Nigeria that are not part of the public network of laboratories can now also conduct testing, at a cost). Other countries reported a mix of the above financing schemes.

The price paid by patients for PCR testing ranged from 0 to 202 USD per test. In all countries not offering free private sector testing, respondents stated that the price includes not only the cost of the test (reagents, kits), but also sample collection and transportation costs, costs of healthcare worker personal protective equipment, and laboratory overhead and profits.

Respondents in Brazil, Mexico, Peru and South Africa reported that testing prices (ranging from 50 to 202 USD in these countries) were not capped by the government, and prices varied across the country. In countries that imposed a price cap (Bangladesh, India, and the Philippines), the price to patients ranged from 29 to 68 USD (median: 41 USD). However, respondents also highlighted that even in situations where the price of testing is capped, private facilities can charge additional costs (e.g. administrative fees). In addition, among countries offering PCR testing in the private sector, all except three countries (Afghanistan, India and the Philippines) reported that any patient able to pay can be tested in the private sector without meeting any additional criteria (e.g. symptoms).

Serological testing (i.e. rapid antibody testing) for SARS-CoV-2 is available in the private sector in only 6 of 15 countries (Brazil, Indonesia, Mexico, Pakistan, Peru, and the Philippines). Respondents in Bangladesh, India, Myanmar, Nepal, Nigeria, South Africa, and Tanzania stated that serological tests are currently being offered in neither the private nor public sector, whilst respondents from Afghanistan and Uganda stated that serological testing occurs in the public sector only. Respondents in South Africa and India however note that implementation of serological testing is currently under evaluation.

No mechanism of reimbursement through the government was available for private sector serological testing in any of the six countries. Respondents in Brazil, Indonesia, Mexico, Pakistan (at some but not all facilities), and Peru reported that the full cost of serological testing is paid out-of-pocket by patients (price range: 18 to 68 USD per test). The price of serological testing was not capped by the government in any of the six countries conducting testing in the private sector. Across all countries, respondents reported that anyone able to pay could be tested.

Table 1

Availability and price charged to patients for private sector SARS-CoV-2 PCR and serological testing in 15 low- and middle-income countries.

Country *	N Co	N Re	Respondents' roles	Sectors testing	N private facilities testing	Private sector reimbursement scheme				Out-of-pocket payment by patient			Price to patients (USD)	Price cap (USD)	Patient eligibility criteria for reimbursement via government
						Pat	Gov	Ext	Don	Full	Partial	None			
Afghanistan	1	1	MOH	Public & Private	1		✓	✓		✓		✓(a)	0 (a)	NA	All eligible
				Public Only (b)											
Bangladesh	1	1	PLM & ACA	Public & Private	26	✓		✓	✓	✓		✓	0, 41 (c)	41	All eligible
				None											
Brazil	10	4	PLM (n=2), PLT (n=2)	Public & Private	u	✓			✓	✓			60-88	No cap	No reimbursement (d)
				Public & Private	u	✓					✓				50-68
India	3	1	PLM	Public & Private	176	✓	✓			✓	✓	✓	29 (f)	29	u
				None (g)											
Indonesia	2	1	MOH	Public & Private	>5	✓	✓	✓	✓	✓			72-143	u	All eligible
				Public & Private	u	✓					✓				21-35
Mexico	2	1	MOH	Public & Private	55	✓				✓			69-137	No cap	No reimbursement (d)
				Public & Private	10	✓					✓				26
Myanmar	1	1	NGO	Public Only											
				None											
Nepal	5	4	PLM, PLT, MOH, ACA	Public Only											
				None											
Nigeria	5	4	MOH (n=2), CIV, Public sector consultant	Public & Private	7		✓	✓	✓	✓		✓(h)	0, 112 (h)	NA	Within network: must meet case definition. Outside network: No reimbursement. (i)
				None											
Pakistan	3	3	MOH, ACA, Not-for profit health network	Public & Private	10-15	✓	✓	✓	✓	✓		✓	0, 18-48 (j)	(k)	u
				Public & Private	10-15	✓			✓		✓				0, 18-42 (j)
Peru	6	3	PLM (n=3)	Public & Private	6	✓		✓		✓			100-202	No cap	No reimbursement
				Public & Private	>10	✓			✓		✓				25-67
Philippines	2	1	Technical advisor	Public & Private	24		✓		✓			✓	0	68	All eligible
				Private Only	u	✓			✓		✓	✓(l)	30	No cap	No reimbursement
South Africa	12	3	PLM, ACA, ACA & Provincial COVID-19 scientific advisor	Public & Private	10	✓	✓	✓	✓	✓		✓	50-73	No cap	(n)
				None (o)											
Tanzania	1	1	Private sector umbrella organization	Public Only											
				None											
Uganda	2	1	ACA	Public Only											
				Public Only											

□ SARS-CoV-2 PCR testing; – Testing not conducted in private sector; ✓ Yes; ACA, Academic; CIV, Civil society organization member; Don Other donors (such as philanthropic organizations) are involved in funding testing in the private sector; Ext, Private laboratories function as an extension of the network of public laboratories for the purpose of SARS-CoV-2 testing and receive samples and resources directly from the government; Gov, Private laboratories are reimbursed by the municipal, state or central government; Serological testing for SARS-CoV-2 antibodies; MOH, Ministry of health official or staff; N Co, Number of individuals contacted; N Re, Number of responses received; NA, Not applicable; NGO, Non-governmental organization member; Pat, Patients pay in full or in part for the cost of testing in the private sector; PLM, Private laboratory manager or CEO; PLT, Private laboratory technician/medical staff; u, Information unavailable; USD, June 2020 United States Dollar.

* The survey was also sent to contacts in Cambodia (n = 4), Côte d'Ivoire (n = 1), Egypt (n = 2), Ghana (n = 1), Kenya (n = 1), Senegal (n = 1), and Vietnam (n = 2), but no survey responses were returned.

(a) Private sector testing was previously free for patients, but after a recent (June 2020) change of policy, a cost can now be charged to patients for testing in the private sector. Specific prices in private facilities were not provided.

(b) Following a policy change, private sector serological testing will also be implemented.

(c) Mixed reimbursement scheme. No fee scheme: Some private laboratories provide free testing, with samples sent by private/government hospitals and testing kits supplied by the government, with additional funds provided by donor organizations. Some private hospitals charge patients an administrative fee, even if sending samples to a laboratory that offers free testing. Fixed fee scheme: At a limited number of private hospitals, patients willing to pay can get tested for a fixed fee (41 USD) as inpatients. One private hospital has approval to test outpatients and charges an additional sample collection fee (20 USD).

(d) A common scenario in Brazil (which is not considered direct reimbursement through the government) is that some patients seen in public health facilities may have their samples sent to private facilities, and municipal or state governments then pay the private laboratories through a commercial contract. Patient reimbursement also possible through some health insurance providers.

(e) No reimbursement through government, but some companies fund serological testing for their employees.

(f) As supplies for testing materials and PPE are stabilising, private sector prices are decreasing in order to remain competitive.

(g) Not yet conducted in the country but planning to start. Testing criteria, payment mechanisms, and eligibility for reimbursement to be decided by the state.

(h) The state government pays 26 to 38 USD per test on behalf of the patient, to cover laboratory overhead and profits. Patients tested in private facilities that function as part of the public network of laboratories are tested free of cost, however, additional private laboratories that do not function as part of the public laboratory network have recently also been allowed to conduct testing, and these may charge a cost to patients (approximately 112 USD).

(i) Patients tested within the national network must meet case definition criteria and have a referral for testing. For patients tested outside of the network, no reimbursement is available.

(j) Some not-for-profit organizations provide free testing, with resources supplied by the government, and transportation and other costs borne by the organization.

(k) The government has recently capped testing costs. Information on specific cap amount unavailable.

(l) There is no reimbursement via the government, but free testing is available for some employees through private sector donors.

(m) The government reimburses the private sector via a solidarity fund (mixed government and donor reimbursement model).

(n) Those unable to pay AND meeting the following clinical criteria are eligible for free testing: Individuals with acute respiratory symptoms meeting one of the following criteria: in the last 14 days - had direct contact with a COVID case, attended a health care centre where COVID patients are being treated, arrived from outside the country, or have been admitted to hospital with pneumonia of unknown etiology. For other patients seeking to be tested, extent of coverage is dependent on availability of private medical insurance.

(o) Responses conflicted between serological tests being conducted at both public and private laboratories vs. not being conducted in the country.

As LMICs are now seeing a rise in COVID-19 cases, particularly in South Asia, South America, and Africa [5], harnessing the additional testing capacity of the private sector provides relief to resource-constrained public systems; however, a number of countries reported persisting barriers with regard to engaging and integrating the private sector into the national COVID-19 response. Such barriers included the limited number of laboratories with the appropriate biosafety level (BSL) classification and available safety cabinets for processing samples associated with SARS-CoV-2 (Pakistan, Myanmar). Moreover, as indicated by some respondents, even in private laboratories operating at the required BSL, obtaining governmental approval to conduct SARS-CoV-2 testing remains challenging. In addition, being primarily concentrated in urban centres, private sector testing may be less accessible to rural populations.

Other concerns include the high cost of testing and the challenges of cost regulation in the private sector. High demand for testing in a non-regulated market contributes to high prices in the private sector, and the high patient-borne costs reported present a major barrier to testing, especially in LMICs. Even in settings where the government has capped prices, private facilities can still charge patients additional fees that are not restricted by the cap. High costs in the private sector mean more reliance on public sector testing, limiting the ability of the private sector to reduce the burden on the public sector. Lastly, our finding that most individuals able to pay can receive a PCR or serological test in the private sector demonstrates that current private sector testing practices may not necessarily align with government priorities or policies.

Important limitations of our survey include its small sample size. Firstly, responses were received from only 15 (68%) of the 22 countries contacted, and of the 15 countries for which responses were received, 9 (60%) included only one respondent. Therefore, not all countries surveyed are represented, and furthermore, our results reflect only the knowledge and expertise of specific respondents and are not necessarily representative of the overall situation in a country. This is particularly important to note given that respondents held different roles within their countries (e.g. public vs. private health sector), and their experiences and knowledge of COVID-19 testing in the private sector may therefore differ. In addition, as contacts were obtained from prior global health conference attendees and through colleagues in the respective countries, the survey does not fully represent the relevant experts in a particular country. Further, it is possible that reporting bias influenced survey responses, as respondents may report aspirational scenarios rather than what most accurately represents the current situation in their country. Lastly, given that the COVID-19 situation is continuously changing, these survey results only reflect the situation as reported by the respondent(s) at the time of the survey, and is likely to change as countries continue to work to improve testing capacity and engage the private sector.

In summary, given the large contribution of the private sector to healthcare provision in LMICs and the WHO recommendation of adopting a whole-of-society approach in responding to COVID-19, engaging the private sector in COVID-19 testing in LMICs is critical to building up surge capacity [1,6]. Although recognizing the limitations of this small sample size, the results of our survey highlight that engagement of the private sector in SARS-CoV-2 testing is not uniform and remains weak in many countries. Governments must effectively regulate the private sector, establish mechanisms for strategic purchasing of essential services, address supply chain issues and supplier price control, and facilitate public-private partnerships [1]. Such partnerships have been able to address similar issues with high private health sector test prices for conditions such as TB and HIV [4,7] and therefore increase affordability and access to testing.

Conflicts of interest

The authors have no conflicts of interest.

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Lena Faust¹, Alexandra J. Zimmer¹, Mikashmi Kohli
McGill International TB Centre, Montreal, Canada

Department of Epidemiology, Biostatistics and Occupational Health,
McGill University, Montreal, Canada

Senjuti Saha
Child Health Research Foundation, Dhaka, Bangladesh

Jody Boffa
Dahdaleh Institute for Global Health, York University, Canada
Centre for Rural Health, University of KwaZulu-Natal, South Africa

Marlon L. Bayot
Coach MLB Consulting, Metro Manila, Philippines

Ifeanyi Nsofor
EpiAFRIC, Abuja, Nigeria

Leonel Campos
Hospital Sírio-Libanês, São Paulo, Brazil

Tivani Mashamba-Thompson
Department of Public Health, Faculty of Health Sciences, University of
Limpopo, South Africa

Rosa Herrera
Instituto de Servicios de Salud Pública del Estado de Baja California,
Mexico

Elom Emeka
TB Laboratory Services Unit, NTBLCP, Federal Ministry of Health, Dept
of Public Health, Federal Capital Territory, Abuja, Nigeria

Suvesh Shrestha
Save the Children, Kathmandu, Nepal

Cesar Ugarte-Gil
Instituto de Medicina Tropical Alexander von Humboldt, Universidad
Peruana Cayetano Heredia, Lima, Peru

School of Medicine, Universidad Peruana Cayetano Heredia, Lima,
Peru

Achilles Katamba
Clinical Epidemiology & Biostatistics Unit, Department of Medicine
School of Medicine, Makerere University College of Health Sciences,
Uganda

Uganda Tuberculosis Implementation Research Consortium, Kampala,
Uganda

Imran Pambudi
National TB Program, Jakarta, Indonesia

David Bichara
Scientific Department of Amaral Costa Laboratory, Belém, PA, Brazil

Roger I. Calderon
Socios En Salud Sucursal Peru, Lima, Peru

Programa Acadêmico de Tuberculose, Faculdade de Medicina,
Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil

Namatullah Ahmadzada
National TB Control Program, Kabul, Afghanistan

Muhammad Aamir Safdar
National TB Control Program, Pakistan

Chaitali Nikam
Thyrocare Technologies Limited, India

Carolina dos Santos Lázari
Infectious Disease Medical Department, Grupo Fleury, Brazil

Molecular Biology Section, Central Laboratory Division, University of
São Paulo Clinical Hospital, Brazil

Hamidah Hussain
Interactive Research and Development (IRD) Global, Pakistan

Myint Myint Win, Kyaw Zin Than
PATH, Myanmar

Anthony Ahumibe
Nigeria Centre for Disease Control, Nigeria

Brenda Waning
Stop TB Partnership, Geneva, Switzerland

Madhukar Pai*
McGill International TB Centre, Montreal, Canada

Department of Epidemiology, Biostatistics and Occupational Health,
McGill University, Montreal, Canada

* Corresponding author. McGill International TB Centre, McGill
University, Dept of Epidemiology & Biostatistics, 1020 Pine Ave
West, Montreal, QC, H3A 1A2, Canada.
E-mail address: madhukar.pai@mcgill.ca (M. Pai).

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¹ Contributed equally.