

1 **Exploring the role of the private sector in tuberculosis detection and management in Lima,**  
2 **Peru: a mixed-methods patient pathway analysis**

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15

16 **ABSTRACT**

17 In Latin America, little is known about the involvement of private healthcare providers in  
18 TB detection and management. We sought to gain a better understanding of current and potential  
19 roles of the private sector in delivering TB services in Peru. We conducted a mixed-methods  
20 study in Lima, Peru. The quantitative component comprised a patient pathway analysis assessing  
21 the alignment of TB services with patient care-seeking behavior. The qualitative component  
22 comprised in-depth interviews with 18 private healthcare providers and 5 key informants. We  
23 estimated that 77% of patients initially sought care at a facility with TB diagnostic capacity and  
24 59% at a facility with TB treatment capacity. The lack of TB services at initial care-seeking  
25 location was driven by the 41% of patients estimated to seek care first at a private facility.  
26 Among private facilities, 43% offered smear microscopy, 13% offered radiography, and none  
27 provided TB treatment. Among public sector facilities, 100% offered smear microscopy, 26%  
28 offered radiography, and 99% provided TB treatment. Interviews revealed that private providers  
29 believed that they offered shorter wait times and a quicker diagnosis, but they struggled with a  
30 lack of follow-up systems and communication barriers with the public sector. While expressing  
31 willingness to collaborate with public sector programs for diagnosis and referral, private  
32 providers had limited interest in treating TB. This study highlights the role of private providers in  
33 Peru as an entry point for TB care. Public-private collaboration is necessary to harness the  
34 potential of the private sector as an ally for early diagnosis.

## 35 INTRODUCTION

36 Tuberculosis (TB) has once again surpassed COVID-19 to reclaim its position as the  
37 world's deadliest infectious disease, responsible for approximately 1.6 million deaths in 2021.<sup>1</sup>  
38 Nearly one-third of all people with TB may not receive an accurate diagnosis and suitable care.<sup>1</sup>  
39 Limited access to healthcare services and insufficient means of detecting cases contribute to  
40 delayed or missed diagnoses.<sup>2</sup> To ensure timely diagnosis for all patients, TB services must be  
41 accessible where people with TB seek care.

42 Patient pathway analyses (PPA) from multiple countries revealed that a sizable portion of  
43 people with TB seek care first in the private sector.<sup>3-7</sup> After this initial care-seeking, many people  
44 with TB visit multiple facilities, moving between private and public sectors, before receiving a  
45 TB diagnosis.<sup>8-10</sup> Despite the importance of the private sector in the pathway to diagnosis for  
46 many people with TB, many national TB programs engage less with private providers than the  
47 public healthcare system. Some PPA studies have revealed a lack of basic information on TB  
48 diagnostic service availability in the private sector, as government regulatory agencies do not  
49 comprehensively cover private facilities.<sup>3, 7, 11</sup> Yet in Asia and Africa, engaging the private sector  
50 has consistently been shown to increase TB case detection and improve treatment outcomes, and  
51 various models for partnership exist.<sup>12</sup>

52 Despite private healthcare providers playing an increasingly significant role in healthcare  
53 delivery in Latin American nations, the literature on the involvement of private healthcare  
54 providers in TB detection and management for this region is limited. Studies from Mexico,  
55 Nicaragua, and Peru have shown that substantial proportions of people with TB initially seek  
56 care in private sector facilities.<sup>13-15</sup> A study from Brazil found that a relatively small, albeit  
57 growing, percentage of TB diagnostic tests were performed in the private sector.<sup>16</sup> However,

58 among the 78 studies included in a systematic review of public-private partnership models for  
59 TB,<sup>12</sup> only one originated from Latin America, and it focused on the involvement of private  
60 pharmacies rather than private health facilities.<sup>17</sup> We sought to gain a better understanding of  
61 current and potential roles of the private sector in TB diagnosis and management in Peru. We  
62 therefore carried out a mixed-methods study, combining the first TB PPA in a Latin American  
63 country with a qualitative examination of private sector providers' perspective on their role in  
64 TB care.

65

## 66 **MATERIALS AND METHODS**

67 We used a convergent mixed methods design. The quantitative component comprised a  
68 PPA.<sup>18</sup> Qualitative data was collected to elaborate, clarify and explain the quantitative results by  
69 exploring the role of private healthcare providers in TB care. While the PPA encompasses all  
70 sectors of the healthcare system, the qualitative data focus specifically on the private sector  
71 because public sector TB services are in general better understood.<sup>15, 19, 20</sup> Data were collected  
72 between May and October 2022.

73

### 74 **Study setting**

75 Lima, the capital of Peru, is divided into four administrative regions that are each  
76 overseen by a regional health authority of the Ministry of Health. This study was conducted in  
77 the North Lima region, which comprises nine districts and a population of ~2.5 million. Peru's  
78 public healthcare sector mainly comprises the Ministry of Health (MINSa) system, which serves  
79 people with government insurance provided to those who lack other forms of insurance, and the  
80 EsSalud system, which is affiliated with the Ministry of Labor, and which serves people with

81 employer-funded social insurance. The private sector provides services to people who pay out-  
82 of-pocket or who possess private insurance. The Ministry of Health establishes national  
83 healthcare standards, but it does not actively supervise EsSalud or the private sector.

84

### 85 **Patient Pathway Analysis (PPA)**

86 The study's quantitative component comprised a PPA, a standardized approach to  
87 evaluate the alignment between care-seeking behavior and the TB services.<sup>18</sup> Data on healthcare-  
88 seeking behavior among people with TB was drawn from a previous study from Lima.<sup>15</sup> Because  
89 no information on TB service availability in the private sector was available, we conducted brief  
90 surveys with providers working in private healthcare facilities about the availability of  
91 radiography, smear microscopy, and TB treatment. For feasibility, we limited the surveys to  
92 Carabayllo, one district of North Lima, and extrapolated the results to the other districts. We  
93 obtained data on TB service availability in Ministry of Health facilities from the regional health  
94 authority (DIRIS Lima Norte) and in the EsSalud network from their public websites. We used  
95 World Health Organization TB incidence estimates for 2021<sup>1</sup> and data on 2021 TB notifications  
96 and treatment outcomes for the 2019 and 2020 treatment cohorts from the National TB Program  
97 portal;<sup>21</sup> these data were only available at the national level, so we assumed that they applied to  
98 North Lima.

99 To estimate the number of private sector facilities where a person with TB could seek  
100 care, we obtained a list of all registered private healthcare facilities in North Lima from the  
101 National Health Regulatory and Supervisory Agency (SUSALUD). We filtered the list to  
102 categories that include general medical attention, then excluded those that provided only  
103 specialist care (e.g. dental, psychological, ophthalmological). We visited the remaining

104 registered facilities in Carabayllo and determined how many were functioning. We used the ratio  
105 of functioning to registered facilities to estimate the total number of functioning private facilities  
106 in North Lima.

107 We categorized Ministry of Health facilities into primary care centers and hospitals. We  
108 considered EsSalud and private sector facilities each as a single category because distinctions  
109 between different types of facilities were not as standardized. Within each category, we  
110 estimated *diagnostic coverage* of smear microscopy and radiography, defined as the proportions  
111 of facilities with these capabilities; rapid molecular testing is not widespread in Peru. Combining  
112 the published data on initial care seeking location with diagnostic coverage for each facility  
113 category, we estimated the percentage of people with TB who had *diagnostic access at initial*  
114 *care seeking*, defined as first seeking care at a facility offering either smear microscopy or  
115 radiography. We used a similar approach to estimate *treatment coverage* (the proportion of  
116 health facilities that TB treatment) and *treatment access at initial care seeking* (the proportion of  
117 people who first sought care at a facility offering TB treatment). We estimated *notification*  
118 *location* (the proportion of people with TB who were diagnosed and notified, by sector) by  
119 combining national-level TB notification data with WHO's 2021 total TB incidence estimates.  
120 We estimated *treatment outcome* (the proportion of people with TB who were successfully  
121 treated) by applying treatment success rates for sensitive- and drug-resistant TB to the  
122 corresponding notification numbers, and applying this overall treatment success rate to the  
123 WHO's 2021 total TB incidence estimates.

124

125 **Qualitative data collection and analysis**

126 We recruited for interviews key informants who were knowledgeable about policies that  
127 affect TB services in the private sector and healthcare providers working in the private sector in  
128 North Lima. We used existing professional connections of the study team to recruit key  
129 informants, which included representatives of the DIRIS Lima Norte, national-level Ministry of  
130 Health, SUSALUD, and Socios En Salud, a non-profit non-government organization (NGO)  
131 active in the field of TB care. We recruited private sector providers from among those who  
132 completed the PPA survey. We purposively sampled an equal number of participants who  
133 reported having diagnosed TB within the past year and those who had not. Because our PPA  
134 survey sample had a limited number of providers who had diagnosed TB, we employed snowball  
135 sampling to reach our initial target for interviews, requesting interviewees to refer other  
136 information-rich private health providers practicing in North Lima for participation. In total, we  
137 conducted 22 interviews involving 23 participants: 5 key informants, 12 private providers who  
138 were a subset of the survey sample, and 6 additional private providers identified through  
139 snowball sampling. Eight interview participants were female and 15 were male. All but two of  
140 the private providers were medical doctors (one was a nurse, and one was a midwife). Ten  
141 survey participants were not interested in being recruited for interviews, and no recruited  
142 interview participants declined.

143 We conducted interviews using semi-structured interview guides (Supplementary File).  
144 Interviews were conducted in Spanish by trained Peruvian nurse technicians (SF, DA, IT)  
145 working for the NGO Socios En Salud, all of whom had experience in qualitative research. The  
146 interviewers did not previously know the participants, except for one key informant who worked  
147 for Socios En Salud in a different department. Interviews lasted 30–90 minutes. Three interviews  
148 were conducted via videoconference and the rest in person. All interviews were audio recorded,

149 and a note-taker was present during each interview (either one of the other interviewers or CW, a  
150 medical doctor).

151 Interview transcripts were created using artificial-intelligence-assisted software  
152 (HappyScribe, Barcelona). Transcripts were checked and corrected by SF and CW. CW  
153 translated the transcripts into English; SF provided knowledge about the local context to ensure  
154 accurate translation. We employed a content analysis approach to data analysis.<sup>22</sup> CW open-  
155 coded a subset of high-quality transcripts, discussed the results with HNG (a medical  
156 anthropologist) and CMY (an epidemiologist), and developed a final codebook with 34 codes.  
157 CW coded the entire dataset using Dedoose v9.0.17 (SocioCultural Research Consultants LLC,  
158 Los Angeles, CA). CW, HNG, and CMY analyzed the coded data using an inductive approach,  
159 generating a preliminary set of descriptive categories, which were refined through iterative  
160 examination. LL helped with interpretation.

161 We integrated quantitative and qualitative results by overlaying the qualitative insights  
162 onto the PPA indicators using a joint display technique.<sup>23</sup> This approach allowed us to  
163 understand how the private sector might serve as a facilitator or barrier to TB care at different  
164 points along the patient pathway.

165

## 166 **Ethical considerations**

167 This study received approval from the Socios En Salud Institutional Research Ethics  
168 Committee and was exempted by the Harvard Medical School Institutional Review Board. We  
169 obtained verbal consent from survey respondents and written consent from interview  
170 participants.

171

## 172 RESULTS

173 Figure 1 shows the quantitative PPA results and qualitative themes structured around the  
174 main components of the patient pathway. Tables 1-3 show supporting quotes for qualitative  
175 themes corresponding to components I through IV of the patient pathway illustrated in Figure 1.

176

### 177 I. First contact with healthcare facility

178 In North Lima in 2022, there were 1,687 registered private health facilities, of which we  
179 estimated that 859 provided general medical services. In the district of Carabayllo, we were able  
180 to find 26 functioning private facilities, compared to the 45 registered. Applying a similar ratio  
181 throughout North Lima yielded an estimated 496 functioning private facilities. Public health  
182 facilities in North Lima with general medical services included 100 Ministry of Health primary  
183 care centers, 3 Ministry of Health hospitals, and 9 EsSalud facilities. A previous study from  
184 Lima found that 41% of people with TB first sought care in the private sector, 31% at Ministry  
185 of Health primary care centers, 26% at Ministry of Health hospitals, and 2% at EsSalud  
186 facilities.<sup>15</sup>

187

#### 188 A. Lack of awareness of TB symptoms

189 Private healthcare providers perceived that although the general population is aware that  
190 treatment for TB is provided in public programs, people may not recognize their symptoms as  
191 indicative of TB and therefore initially seek care in a private facility, which may be the nearest or  
192 most convenient facility.

193

#### 194 B. Shorter wait times and quicker diagnosis



195 Private healthcare providers viewed shorter wait times for appointments and during  
196 healthcare visits, as well as being able to obtain diagnostic results faster as both reasons why  
197 patients seek care in the private sector and the strength of their services. By providing patients  
198 with earlier appointments, quicker test results, and more thorough consultations, private  
199 providers believed that they could make a TB diagnosis sooner and thereby reduce delays to  
200 treatment initiation compared to the public sector.

201

## 202 **II. Diagnostic process**

203 Providers from 23 of the 26 (88%) private facilities in Carabayllo agreed to take the  
204 survey on TB service availability. Smear microscopy was offered in 43% of the surveyed private  
205 facilities and 100% of Ministry of Health primary care centers, hospitals, and EsSalud facilities.  
206 Radiography was offered at 13% of private facilities, 17% of Ministry of Health primary care  
207 centers, and 100% of Ministry of Health hospitals and EsSalud facilities.

208

### 209 *A. Diagnostic procedures depend on patients' economic means*

210 Private providers believed that one of the strengths of the private sector is the ability to  
211 arrive at a faster diagnosis in part because of the availability of more advanced technologies.  
212 Collaborations with private laboratories and more advanced diagnostic technologies such as  
213 MRI, CT scans, and GeneXpert in better-equipped facilities can promote faster diagnosis.  
214 However, the accessibility of these services is dependent on the patient's financial means, as they  
215 typically pay out-of-pocket. A key informant from an NGO mentioned that certain private  
216 facilities may bypass basic tests like smear microscopy and immediately proceed with more  
217 advanced, and sometimes unnecessary, tests.

218

219 *B. Impact of insurance type on diagnosis*

220           While some private providers indicated that patients' insurance status did not affect the  
221 quality or type of services they received since services were all paid for out-of-pocket, others  
222 noted significant disparities in diagnostic services depending on insurance coverage and the  
223 patient's economic means. These providers explained that they tended to offer their patients with  
224 private insurance more advanced and expensive tests, while those without insurance or with state  
225 insurance were more likely to be offered basic and cheaper tests.

226

227 *C. Thorough consultation for a better diagnosis*

228           The majority of private providers interviewed exhibited familiarity with the clinical  
229 indicators that raise suspicion of active TB. They noted that combining these with a thorough  
230 social history – including details such as socioeconomic status, living conditions, and social  
231 contacts – considerably aids the diagnostic process.

232

233 *D. Lack of TB training in the private sector*

234           However, private healthcare facilities do not provide any training for their staff on TB,  
235 and there are no external training programs available for private providers. As a result, private  
236 providers' knowledge of TB is largely based on their prior medical training in academic  
237 institutions or their experience working in the public sector. Some private providers reported  
238 engaging in self-training out of personal interest.

239

240 **III. Reaching a diagnosis**

241 Overall, we estimate that 77% of people with TB initially sought care at a facility with  
242 TB diagnostic capacity (sputum smear microscopy or radiography). The lack of TB services at  
243 the initial care-seeking location was driven by the people who initially went to a private facility,  
244 since all public health facilities offered at least smear microscopy. Of the surveyed private  
245 providers, 35% reported that they had diagnosed at least one person with TB in the past year.

246

#### 247 *A. Role of private sector in early TB detection*

248 Private providers agreed that the private sector's main role lies in the early detection and  
249 diagnosis of TB as opposed to treatment. They perceived the availability of resources, speed of  
250 diagnosis, and access to cutting-edge technologies as strengths of the private sector. A key  
251 informant from the Ministry of Health agreed that there was value in the private sector's  
252 contribution to early TB detection and expressed a general openness to expand the role of the  
253 private sector in this capacity. Some providers proposed expanding the private sector's early  
254 detection potential with more widespread use of advanced diagnostic tests, such as GeneXpert,  
255 or by implementing a screening program that would test every patient with respiratory symptoms  
256 for TB.

257

#### 258 *B. Duplication of diagnostic tests*

259 Some private providers described having diagnosed patients with TB and referred them to  
260 the public sector, only to have the diagnostic test results rejected by the public sector and  
261 repeated, causing distress to the patient. The Ministry of Health's key informant explained that  
262 this stems from a lack of oversight and validation of private laboratories, which are not

263 supervised or monitored as part of the public network, leading to lower levels of confidence in  
264 their results.

265

#### 266 **IV. Treatment initiation**

267 None of the private providers offered treatment for TB, while treatment was available at  
268 all Ministry of Health facilities and 89% of the EsSalud facilities. Thus, we estimate that 59% of  
269 people with TB had access to treatment services at their initial care location.

270

##### 271 *A. Referral for treatment*

272 There was a clear consensus that the private sector does not provide TB treatment, with  
273 interviewees citing legal prohibitions, medication inaccessibility, and the belief that the public  
274 program is performing well. While many private providers asserted that the private sector's  
275 responsibility ends with referral of people with TB to the public sector, some suggested that they  
276 should have the option of providing initial treatment after diagnosis until the patient reaches the  
277 public sector to avoid delay in starting treatment.

278

##### 279 *B. Passive follow-up and lack of communication between sectors*

280 Upon referral to the public sector, the responsibility for treatment often shifts to patients  
281 themselves. For most private providers, the referral process is viewed as a handover to the public  
282 program, with the expectation that the patient will receive appropriate treatment. There are no  
283 standardized systems for sharing patient information from the private to the public sector after a  
284 patient is diagnosed with TB and referred, or to inform the referring private facility that a patient  
285 has arrived and initiated treatment in the public facility. Private providers expressed the desire

286 for better feedback from the Ministry of Health system about the status of referred patients. A  
287 digital platform for sharing patient information exists for public facilities, but private facilities  
288 are currently excluded. During the COVID-19 pandemic, this system was made accessible to  
289 private facilities for the purposes of sharing vaccine-related data with the public sector, which  
290 raised the question of why something similar could not be achieved for TB.

291

### 292 *C. Regulatory TB policies*

293 Private healthcare providers believed that regulatory policies prohibit the private sector  
294 from treating TB patients, although they did not generally know the details of the policies.  
295 However, the NGO key informant mentioned that regulatory policies provide for a mechanism  
296 that could allow private facilities to enter into an agreement with the Ministry of Health to treat  
297 drug-sensitive TB. However, the private facility would have to fulfill strict requirements at their  
298 own cost, including specialized staff, provisions for contact tracing, follow-ups, supplemental  
299 services, and biosafety. No private facility had entered into such an agreement at the time of this  
300 study. High levels of bureaucracy and few financial incentives were mentioned as possible  
301 reasons for the low levels of interest in this mechanism.

302

### 303 *D. Resource limitations*

304 Many private providers felt it would be difficult for their facilities to deliver quality TB  
305 care, given the diverse services required to address patients' needs. Specialist staff like  
306 pulmonologists, nutritionists, and psychologists are often not part of the regular staff of private  
307 facilities, and it can be financially challenging to retain them on standby. In addition, a lack of

308 adequate space and biosafety infrastructure were mentioned as possible limitations for the  
309 provision of treatment in the private sector.

310

## 311 **V. Treatment completion and outcome**

312 At the national level, the WHO estimated 44,000 cases in 2021. A total of 26,437 cases  
313 were reported (60% of estimated incidence): 71% by Ministry of Health facilities, 20% by  
314 EsSalud facilities, and 9% by other government sectors, such as penitentiaries, the military, and  
315 the police <sup>21</sup>. No cases were reported by the private sector. Among people who initiated  
316 treatment, 84% were treated successfully. Thus, an estimated 50% of all people with TB were  
317 treated successfully given that 40% were not diagnosed.

318

## 319 **DISCUSSION**

320 Our study highlights the role of the private sector in the diagnosis of TB in North Lima,  
321 Peru, and the need for enhanced public-private collaboration. Private facilities greatly outnumber  
322 public facilities in this setting, and many people with TB use the private sector despite having to  
323 pay out-of-pocket.<sup>15</sup> However, the limited availability of TB diagnostic services in the private  
324 sector meant that around a quarter of people with TB are estimated to have initially sought care  
325 at locations without TB diagnostic services. While the private providers we interviewed believed  
326 that they could offer shorter wait times and a quicker diagnosis, they placed the responsibility for  
327 treatment on the public sector, citing human resource and space limitations, as well as current  
328 regulatory policies. However, private providers struggled with a lack of standardized systems for  
329 following up people referred into the public sector.

330 Our findings highlight the potential benefits of closer collaboration between private  
331 providers and the Peruvian national TB program to improve TB detection. While studies from  
332 other settings have generally documented willingness of private providers to engage with the  
333 national TB program,<sup>24</sup> some studies have documented low motivation and even resistance to  
334 transferring patients to public sector facilities.<sup>25, 26</sup> Providers in our study were comfortable with  
335 referring TB patients to the public sector for treatment and did not make a clear call for treatment  
336 in the private sector. Thus, public-private partnership efforts in Peru should focus on strategies to  
337 improve TB diagnosis in the private sector and facilitate efficient referral to the public sector.

338 While our qualitative findings depicted a generally positive outlook concerning TB  
339 diagnosis in the private sector with private providers believing they were performing well, our  
340 quantitative results indicated that most private facilities lacked TB diagnostic capabilities, and a  
341 minority of surveyed private providers had diagnosed a case of TB in the past year. In part, this  
342 inconsistency is likely attributable to the characteristics of our interview sample: providers who  
343 agreed to interviews were predominantly from facilities with diagnostic capacities, and we  
344 purposively sampled providers such that half had diagnosed TB recently. Even so, the  
345 interviewed providers who had not recently diagnosed TB did not highlight challenges or  
346 limitations to TB diagnosis in the private sector. This suggests either that they were unaware of  
347 these limitations, or that social desirability bias prevented them from discussing these issues.  
348 Studies of the quality of private sector TB diagnostic services in Asian and African countries  
349 have found wide variation in quality within settings, and have documented low TB testing rates  
350 even for people with typical TB symptoms.<sup>27</sup> It is likely that such variation in quality exists in  
351 Peru and other Latin American countries as well, and that diagnoses are being missed in the  
352 private sector.

353           The main barrier that hinders effective cooperation between the private and public sectors  
354 in Peru is the lack of communication and information sharing. Effective strategies for public-  
355 private partnership include the national TB program providing technical support to private  
356 providers and establishing formal collaborative relationships with defined expectations.<sup>12</sup> In  
357 Peru, the Ministry of Health could help harness the potential of the private sector by providing  
358 training for private providers and formally recognizing private facilities that offer high-quality  
359 diagnostic services so that public facilities can accept their diagnostic test results without  
360 repeating them. Successful public-private partnerships have also highlighted the importance of  
361 formal feedback mechanisms that inform private providers about what happens to their patients  
362 who have been referred to the public sector for treatment.<sup>28, 29</sup> In Peru, a simple way to formalize  
363 the referral process would be to give private providers a standardized paper referral form that  
364 would be recognized by public facilities. Granting them access to the electronic system through  
365 which public facilities to refer and monitor patients would enable both referral and feedback  
366 between sectors.

367           One strength of our study is the use of in-depth interviews with private healthcare  
368 providers in combination with a PPA. This approach provides insight into what happens when  
369 people with TB seek care in the private sector, which was poorly understood in our setting, as in  
370 other Latin American countries. There are several limitations to our research. Firstly, because the  
371 list of private facilities was not updated to reflect closures and data were not available on TB  
372 services in the private sector, we collected data by directly identifying facilities and conducting  
373 surveys of TB service availability. This was only feasible to do for a single district. Carabayllo is  
374 one of the larger but less urbanized districts of North Lima, so extrapolating the findings from  
375 this district to others may underestimate service availability in the private sector in North Lima.



376 Additionally, we relied on healthcare-seeking data from a prior study of people with TB in  
377 Lima,<sup>15</sup> which included only people being treated within the Ministry of Health system. People  
378 treated in the EsSalud system are more likely to have utilized EsSalud facilities as well as private  
379 facilities due to existing insurance partnerships. Given that EsSalud facilities have TB services  
380 and private facilities may or may not, it is unclear how including these individuals would change  
381 the results of the PPA, although the magnitude of any changes would likely be small since only  
382 20% of people with TB are treated in the EsSalud system.<sup>21</sup>

383 In conclusion, our study highlights the role private providers play as an entry point of  
384 care for a sizable portion of people with TB, even in a country where treatment is restricted to  
385 the public sector. Improving linkages between the private and public sectors by establishing a  
386 formal referral system and improving communication between sectors could lead to higher case  
387 detection rates and improved continuity and timeliness of care for people with TB. To harness  
388 the potential of the private sector in TB diagnosis in Peru, it is necessary to begin a dialogue  
389 between the public and private sectors in order to explore possible public-private partnership  
390 models.

391

392

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399

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401

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416 **Figure 1. Joint display of integrated results presented longitudinally across the patient**  
 417 **pathway.** Quantitative results are stratified by sector, considering the private sector, the public  
 418 system operated by the Ministry of Health (“MINSA”), and the public system operated by the  
 419 Ministry of Labor (“EsSalud”). Notification data (\*) were used from 2021, when case  
 420 notifications had decreased by approximately 20% during the COVID-19 pandemic; therefore,  
 421 the percentage of missed people with TB is higher than in prior years.  
 422



423

424

425

426 **Table 1:** Quotes illustrating themes related to first contact with health facilities (step I in patient  
427 pathway)  
428

Theme	Quote
I-A. Unawareness of active TB symptoms in patients	<i>“I think that the main reason why a person would come to a private establishment with tuberculosis is to learn about their disease. They might confuse the symptoms and think that it is another respiratory problem and not TB, because most people know that TB is managed in public centers.” (Interview 10, Private provider who had diagnosed TB in the past year)</i>
I-B. Shorter wait times and quicker diagnosis	<i>“If there is suspicion [for TB], we request a sputum BK [smear microscopy] test. This BK test can be done privately or publicly at MINSA. Publicly, it's free, but the results take a month. [...] The patient arrives at the public sector with a diagnosis, and what does the TB program do? They start the treatment. You skipped the whole month or two months that the pulmonologist would have taken to get the x-rays at MINSA, the CT scan, and the BK test. That time was shortened, and you already have the diagnosis and can start treatment. (Interview 18, Private provider who had diagnosed TB in the past year)</i>

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432 **Table 2:** Quotes illustrating themes related to the diagnostic process and reaching a diagnosis  
 433 (steps II and III in patient pathway)  
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Theme	Quote
II-A. Diagnostic procedures depend on patients' economic means	<i>"Normally in all private centers, we have more access to blood, ultrasound, and radiological tests, because the person who goes to a [private] clinic usually has the economic means to afford to afford it. So, we reach a diagnosis more easily because we ask for everything that is needed, they do all the tests, and the diagnosis is made quickly." (Interview 17, Private provider who had diagnosed TB in past year)</i>
	<i>"The cost of the consultation is low and they make the most money with the laboratory. For example, with [facility name], I know of many patients I have seen with TB that have gone through [facility name] and they all come with spirometry and many expensive tests as well. And they did not do a smear because it was very cheap." (Interview 1, Key informant from NGO)</i>
II-B. Impact of insurance type on diagnosis	<i>"If I were in a clinic that had everything, and the patient had an EPS [private insurance] that covers everything, I would order everything, from a sputum BK [smear microscopy] to a tomography scan. But we are talking about the poorest portion of the population, we have to think carefully about what we order for them because sometimes the patient does not have the means to pay for everything. [...] I take a good medical history and a physical exam, and if they have respiratory symptoms of a contagious disease such as tuberculosis, I order them to get a serial sputum BK – usually, because those are the cheapest, the sputum BK and a chest x-ray." (Interview 10, Private provider who had diagnosed TB in past year)</i>
II-C. Thorough consultation for a better diagnosis	<i>"Ideally, they [healthcare providers] take their time to take a good medical history for the patient. If they achieve this, it's already 80% – the diagnosis is 80% in the medical history. [...] They have to dig for things, and then they will find out what the problem is." (Interview 2, Private provider who had diagnosed TB in past year)</i>
II-D. Lack of TB training in the private sector	<i>"Here, in this establishment, I have not received any training, neither for diagnosis nor for management of TB. I have been practicing here in the country since [date] 2020. [...] Until now, I have not had any training here, at least not with respect to TB." (Interview 5, Private provider who had not diagnosed TB in past year)</i>
III-A. Role of private sector in early TB detection	<i>"Well, in our case as a country, as I mentioned, one of the main advantages that could be considered for their case is early detection. That is, the ability to detect or at least identify probable cases for quick referrals. I mean, in that they could contribute a lot." (Interview 22, Key informant from Ministry of Health)</i>
III-B. Duplication of diagnostic tests	<i>"There may be requests for sputum smear tests to private laboratories, but we do not know if they are truly capable of providing that type of test. [...] It has always been considered that if diagnoses are made in the private sector, they must be validated because if they are not evaluated by the [National Health Institute] that gives a certain guarantee, we will not have the confidence in</i>

	<i>knowing that those diagnoses are truly what they are.” (Interview 22, Key informant from Ministry of Health)</i>
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437 **Table 3:** Quotes illustrating themes related to treatment initiation (step IV in patient pathway)  
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Theme	Quote
IV-A. Referral for treatment	<i>“Unfortunately, the private sector refers patients to the Ministry of Health system for treatment because they don't have the treatment regimens. It would be ideal to give the patient a week of treatment and instruct them to follow up at a nearby health center for monitoring, but that's not something that we are currently doing.” (Interview 20, Private provider who had diagnosed TB in the past year)</i>
IV-B. Passive follow-up and lack of communication between sectors	<i>“Patients usually reach out to me... and update me on the progress of the tests and results or if they have been cleared. So it is the opposite – patients reach out to me rather than me reaching out to them.” (Interview 13, Private provider who had not diagnosed TB in the past year)</i>
IV-C. Regulatory TB policies	<i>“I am not familiar with any regulations in the private sector for TB. What I do know is that all TB cases should be referred to the nearest Ministry of Health facility.” (Interview 18, Private provider who had diagnosed TB in the past year)</i>
	<i>“There are private facilities that, depending on the level of complexity, are definitely capable of treating tuberculosis [...] They should treat tuberculosis, they are prepared, they even have their pulmonologist, and they have their areas. That is why this should be only reserved for the [more complex] clinics, because now they have to comply with new regulations.” (Interview 3, Private provider who had not diagnosed TB in the past year)</i>
IV-D. Resource limitations	<i>“And seeing it from the point of a private provider, I think it would be a bit difficult, financially speaking [to have a pulmonologist on standby in case we need one]. So, I am seeing it from the perspective of how much that would cost me.” (Interview 11, Private provider who had not diagnosed TB in the past year)</i>

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