

Tuberculosis: The Problem, Risks and Challenges



Patient and Family Education

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Introduction

The discovery of mycobacterium tuberculosis, the mechanism of transmission, the treatment, the Mantoux test, the vaccine and the prevention and control strategies are milestones in the disease's history. Healthcare professionals and society have contributed to both the steady reduction in the worldwide incidence of the disease and mortality from it.

Despite these achievements, 9.6 million new tuberculosis cases were reported in 2014, with 1.5 million dying from the disease. 58% of those diagnosed in 2014 were from Southeast Asian and Western Pacific countries. An additional 23% of the global cases were from India. In Qatar, almost all patients with tuberculosis came from India, Bangladesh and Sri Lanka.

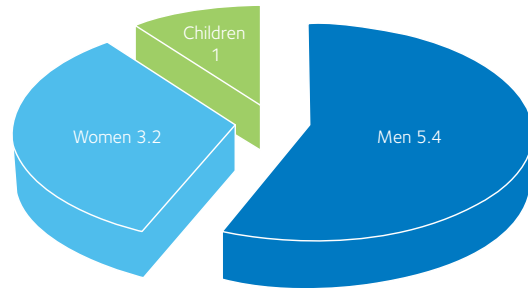
Our role as healthcare workers is not limited to early diagnosis and to providing safe and effective treatment, but also to providing the most compassionate care to our patients. It is our responsibility to help them return to society in good health; as productive members of the community.

This document will provide information about tuberculosis and related care provided at The Cuban Hospital. The information in this booklet is based on data from patients admitted to The Cuban Hospital during the 2015–2013 period.

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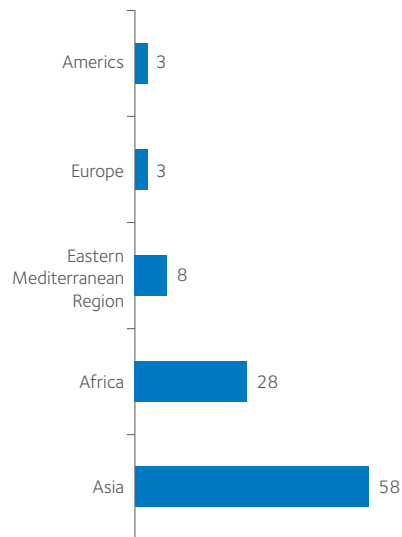
A Global problem

9.6 million people are estimated to have been diagnosed with tuberculosis in 2014



Millions Diagnosed with Tuberculosis

Asian and Sub-Saharan African countries account for the majority of new cases



Proportion of New Cases - WHO Region (2014)

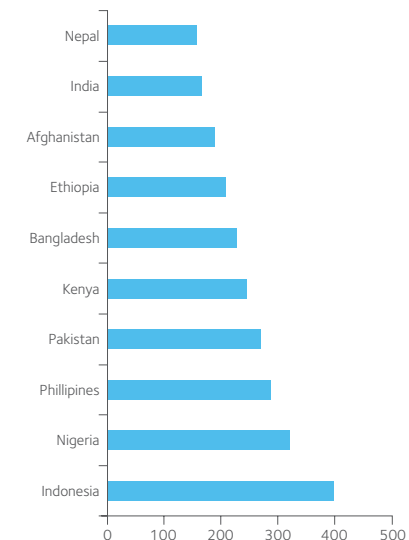
The 22 countries with high burden tuberculosis.
Most of our patient are from these nationalities

- | | |
|----------------|------------------------|
| 1. Afghanistan | 12. Myanmar |
| 2. Bangladesh | 13. Nigeria |
| 3. Brazil | 14. Pakistan |
| 4. Cambodia | 15. Philippines |
| 5. China | 16. Russian Federation |
| 6. Congo | 17. South Africa |
| 7. Ethiopia | 18. Thailand |
| 8. India | 19. Uganda |
| 9. Indonesia | 20. UR Tanzania |
| 10. Kenya | 21. Vietnam |
| 11. Mozambique | 22. Zimbabwe |

High Burden Countries, 2014

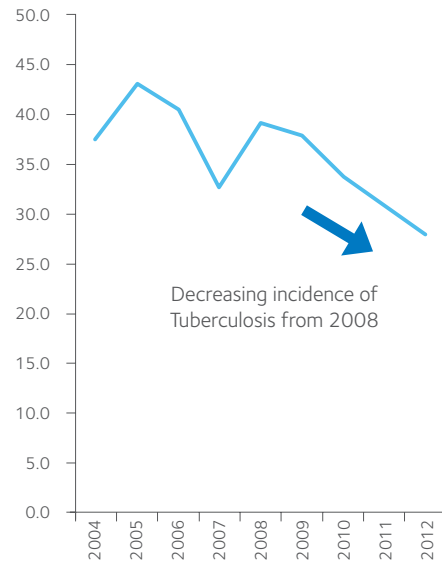
Underreporting is related to failure of notification in private healthcare facilities or under-diagnosis of people with TB.

This factor could explain the low incidence in Nepal.



Incident Rates of Tuberculosis in Selected Countries (per 100,000 Habitants) (2014)

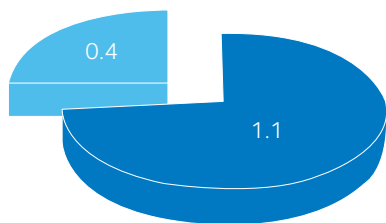
The incidence of tuberculosis in Qatar have a decreasing trend from 2008.



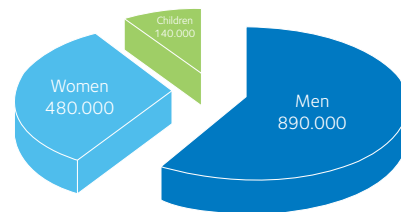
Incidence of Tuberculosis in Qatar 2012-2004
(per 100,000 habitants)

Globally in 2014, there were an estimated 1.5 million deaths from tuberculosis.

Millions HIV Positive

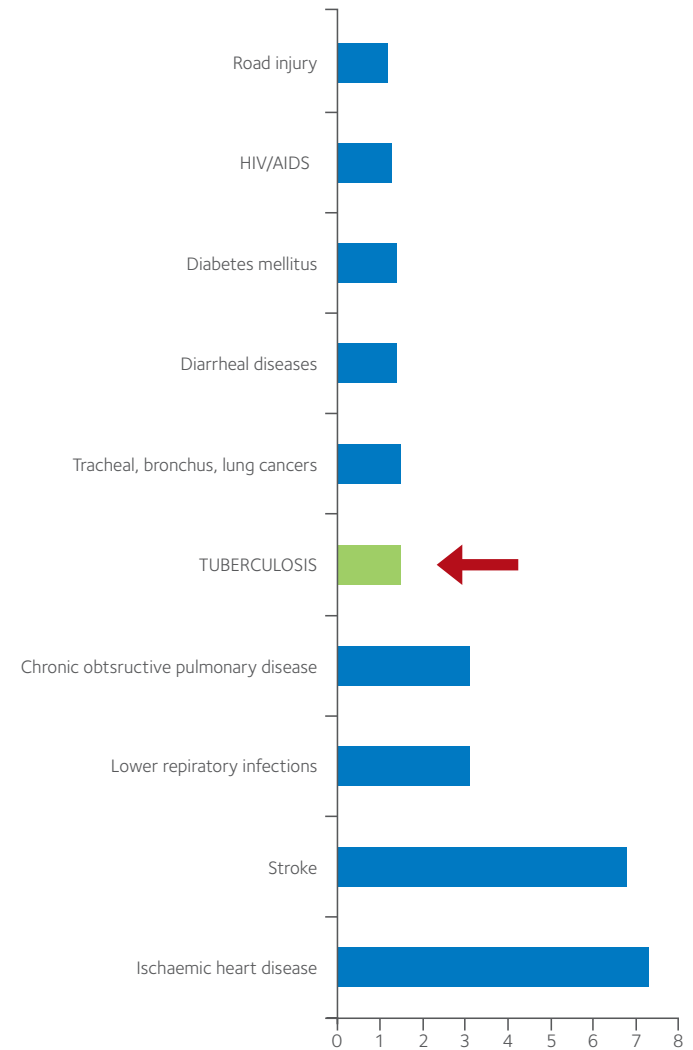


Millions HIV Negative



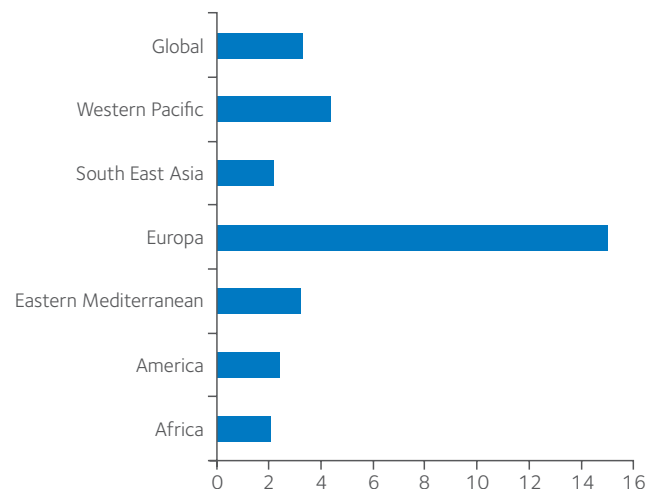
Million of Tuberculosis Patients

Fifth cause of death globally

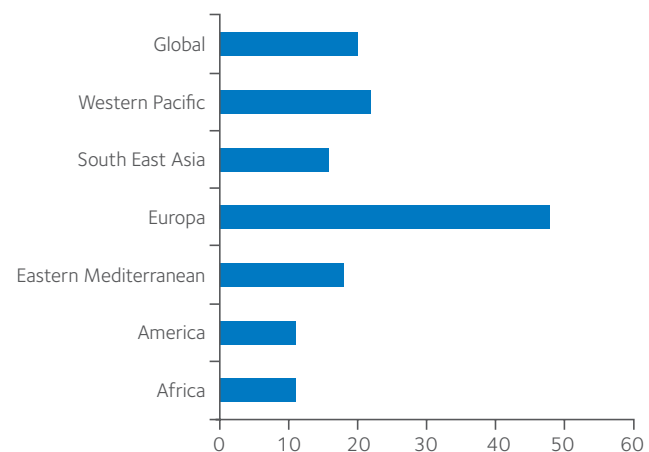


Top Causes of Death Worldwide in 2012

Drug-resistant TB continues to threaten global TB control and remains a major public health concern in many countries.



Estimated % of new TB cases with MDR-TB, 2014



Estimated % of retreatment TB cases with MDR-TB, 2014

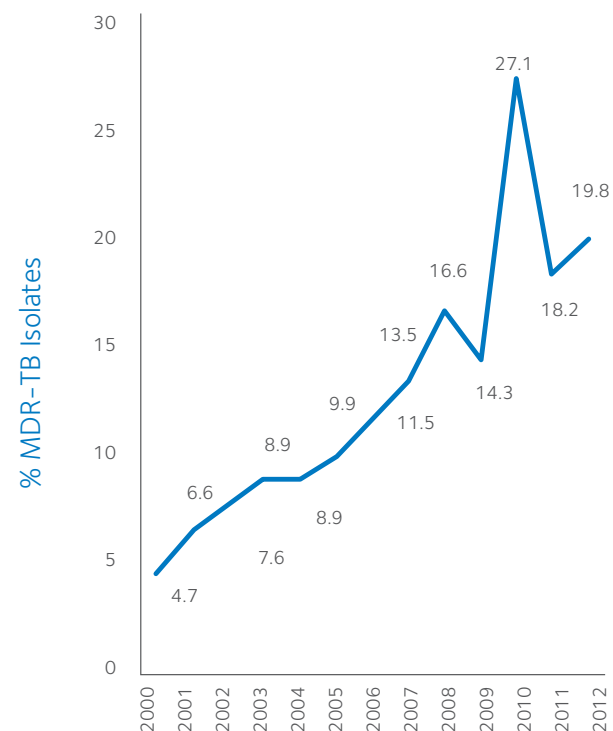
Multidrug-Resistant Tuberculosis (MDR TB)

MDR TB is a form of drug-resistant TB in which TB bacteria can no longer be killed by at least the two best antibiotics, isoniazid (INH) and rifampin (RIF)

As a result, this form of the disease is more difficult to treat than ordinary TB and requires up to 2 years of multi-drug treatment.

Extensively Drug-Resistant Tuberculosis (XDR TB)

XDR TB is a less common form of multidrug-resistant TB in which TB bacteria have changed enough to circumvent the two best antibiotics, INH and RIF, as well as most of the alternative drugs used against MDR TB. These second-line drugs include any fluoroquinolone, and at least one of the other three injectable anti-TB drugs: amikacin, kanamycin, or capreomycin.



World Health Organization
The Stop TB Strategy at a Glance (2006–2015)

Vision	A TB-free world.
Goal	To dramatically reduce the global burden of TB by 2015, in line with the Millennium Development Goals (MDGs) and the Stop TB Partnership targets.
Objectives	• Achieve universal access to high-quality care for all people with TB. • Reduce the human suffering and socioeconomic burden associated with TB. • Protect vulnerable populations from TB, TB/HIV and drug-resistant TB. • Support development of new tools and enable their timely and effective use. • Protect and promote human rights in TB prevention, care and control.
Targets	• MDG 6, Target 6.c: Halt and begin to reverse the incidence of TB by 2015. • Targets linked to the MDGs and endorsed by the Stop TB Partnership: • 2015: reduce prevalence of, and deaths due to, TB by 50% compared with a baseline of 1990. • 2050: eliminate TB as a public health problem (defined as <1 case per 1 million population per year).

World Health Organization
The End TB Strategy at a Glance (2016–2035)

Vision	A World Free of TB: • zero deaths, disease and suffering due to TB.			
Goal	End the global epidemic.			
Indicators	Milestones		Target	
	2020	2050	Sustainable Development Goals	End TB 2035
Reduction in number of TB deaths compared with 2015 (%)	35%	75%	90%	95%
Reduction in TB incidence rate compared with 2015 (%)	20%	50%	80%	90%
TB-affected families facing catastrophic costs due to TB (%)	0	0	0	0

Profile of Tuberculosis Patients Treated at The Cuban Hospital (2012-2015)

The Cuban Hospital

The Cuban Hospital offers patients dedicated, specialized care and a unique range of services, including comprehensive dentistry, dermatology, diabetes, gynecology, ENT and audiology, emergency services for children and adults and general medicine.



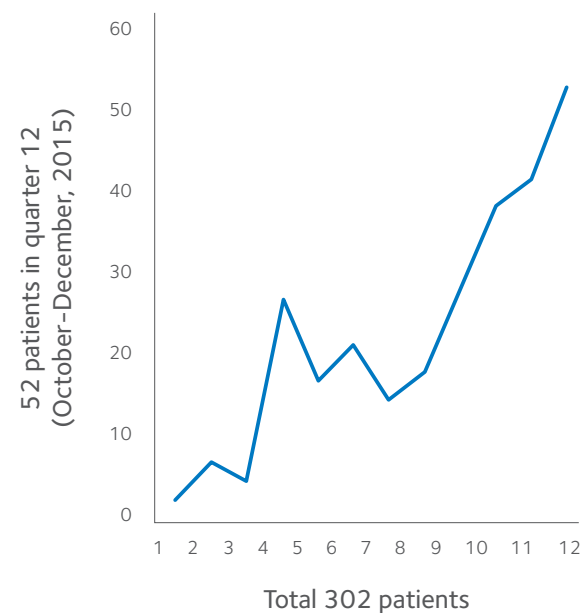
Patient Recovery Hostel

Patients admitted to the 16-bed unit will require time to fully recover.



A total of 302 patients were treated at TCH during a three-year period.

The main source of patients are transfer from others facilities

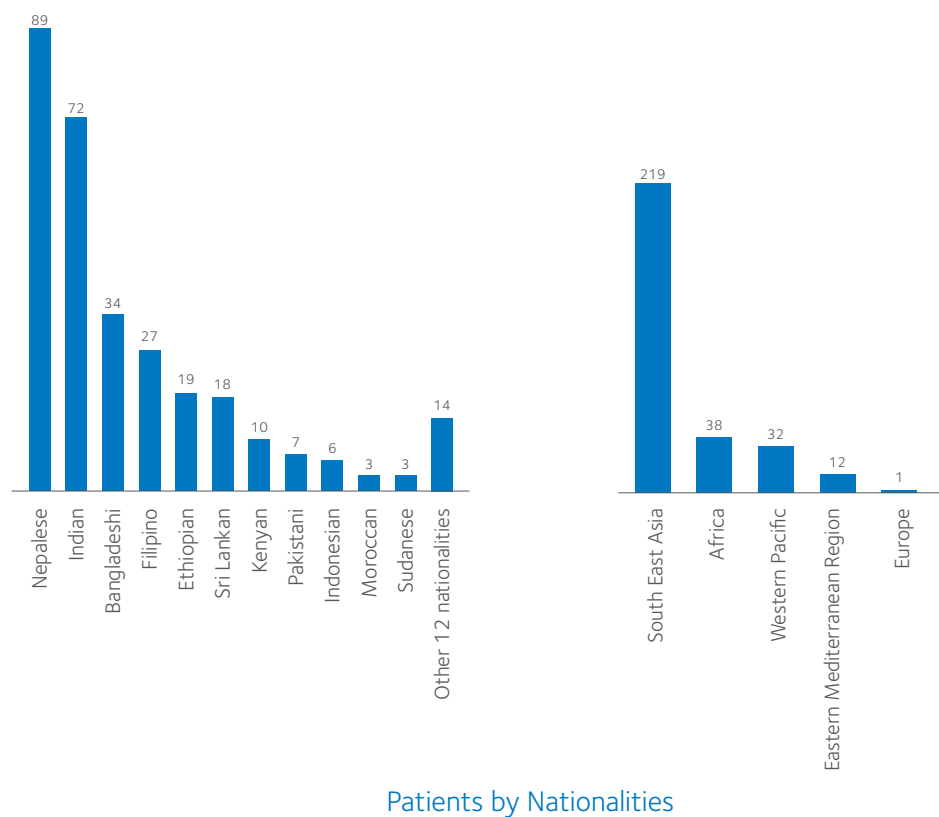


Number of new tuberculosis patients admitted, by quarter.
The Cuban Hospital, January 2013 - December 2015

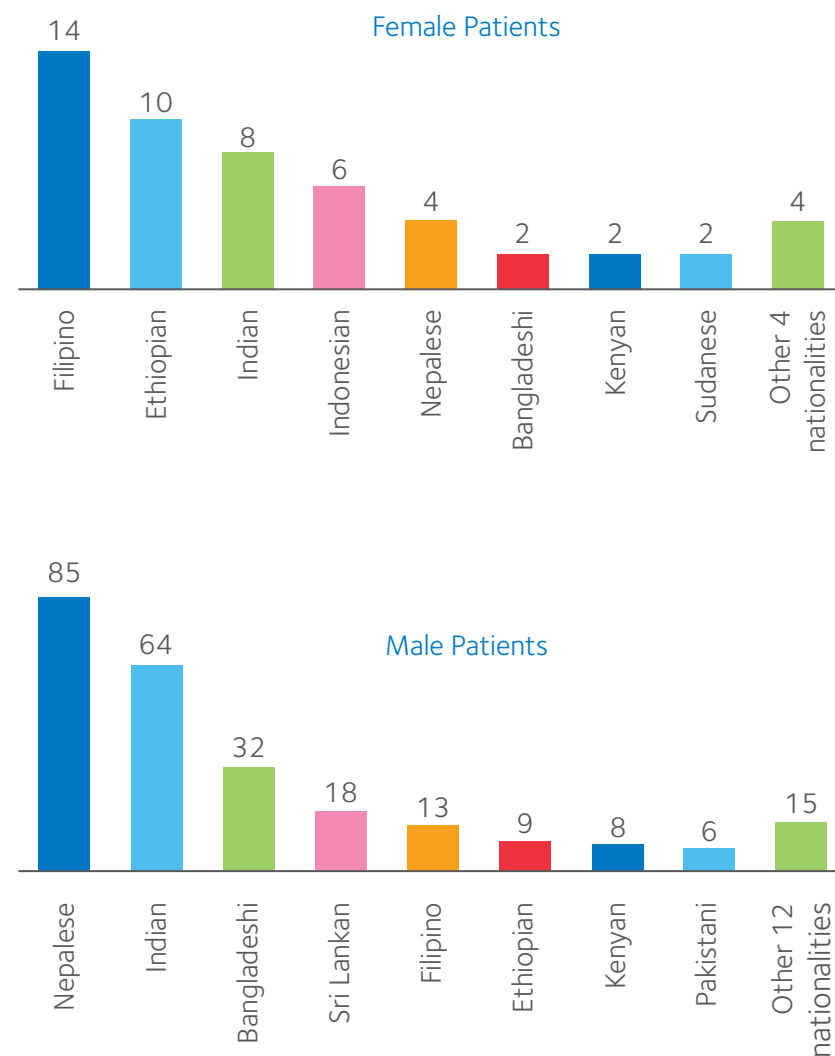
Patients representing 23 nationalities.

65% from Nepal, India and Bangladesh.

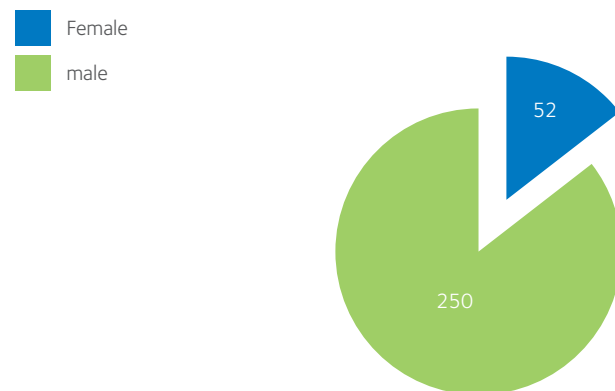
72.5% from Southeast Asian countries.



Distribution by gender according to nationality represent the characteristics of the population in Qatar, not the morbidity in their respective home countries.

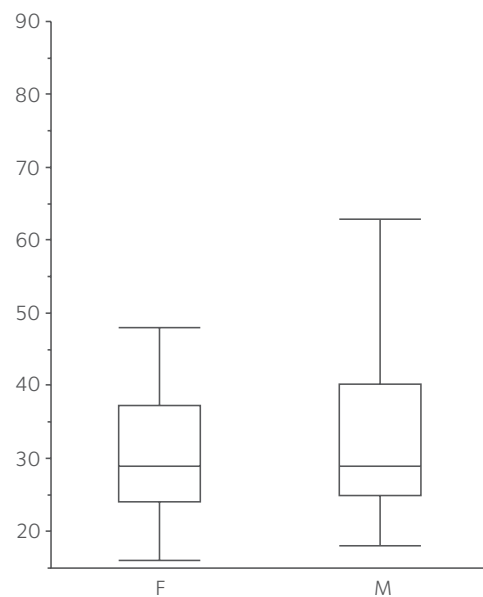


Male patients account for 78% of patients



Distribution of Patients by Gender

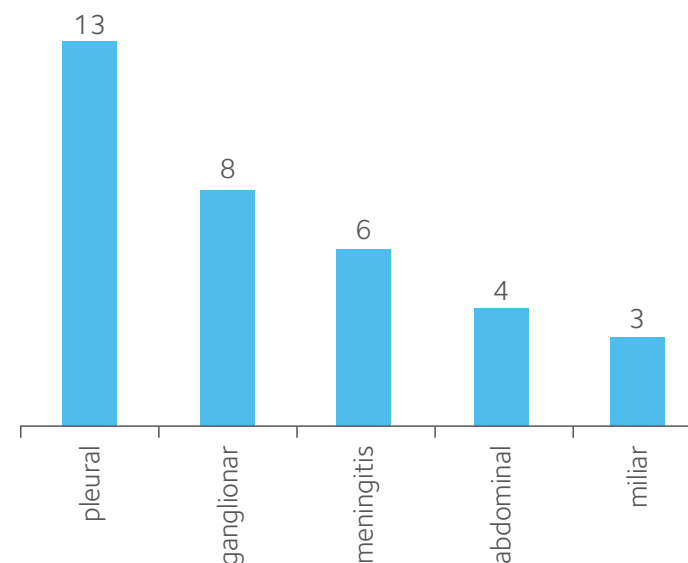
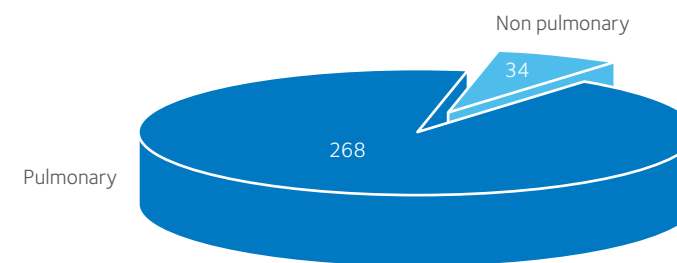
Similarities in age distribution in both genders, with 75% of patients under 40 years old



Percentile Distribution of Age (years)

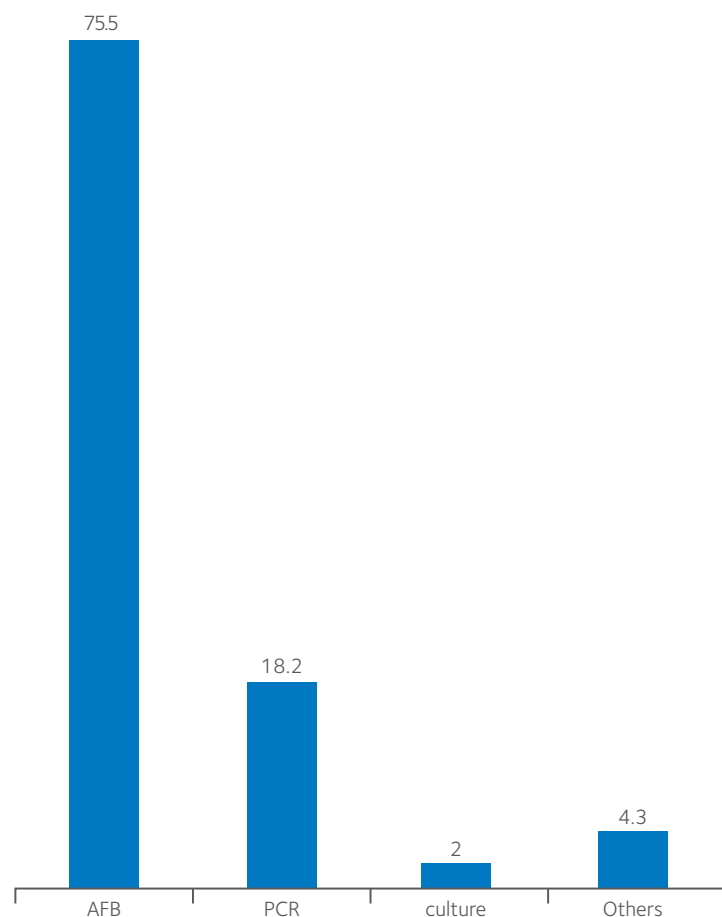
Gender	minimum	25%	median	75%	maximum
Female	16	24	29	37,3	64
Male	18	25	29	40,3	86

Pulmonary tuberculosis accounted for 88.7% of patients



Localization of Tuberculosis

The majority of patients could be considered infectious because positive sputum smear for acid fast bacilli



Others included a combination of clinical, radiology and laboratory evidence of tuberculosis (mainly positive Quantiferon TB Gold). Identification of mycobacterium tuberculosis complex in body fluids (sputum, pleural, cerebrospinal, others) through Gene Xpert PCR.

Factors that should be considered when determining the infectiousness of patients.

Factors Associated with Non-Infectiousness

1. No cough
2. No cavity in the lung
3. No acid-fast bacilli on sputum smear
4. Extrapulmonary (non pulmonary) TB disease
5. Receiving adequate treatment for two weeks or longer
6. Not undergoing cough-induced procedures
7. Negative sputum cultures

Factors Associated with Infectiousness

1. Presence of cough
2. Cavity in the lung
3. Acid-fast bacilli on sputum smear
4. TB disease of the lung, airway or larynx
5. Not receiving adequate treatment
6. Undergoing cough-inducing procedures (e.g. bronchoscopy, sputum induction, and administration of aerosolized medications)
7. Positive sputum cultures

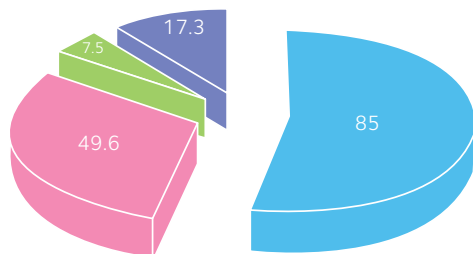
Criteria for patients to be considered non-infectious

Patients can be considered non-infectious when they meet all of the following three (3) criteria:

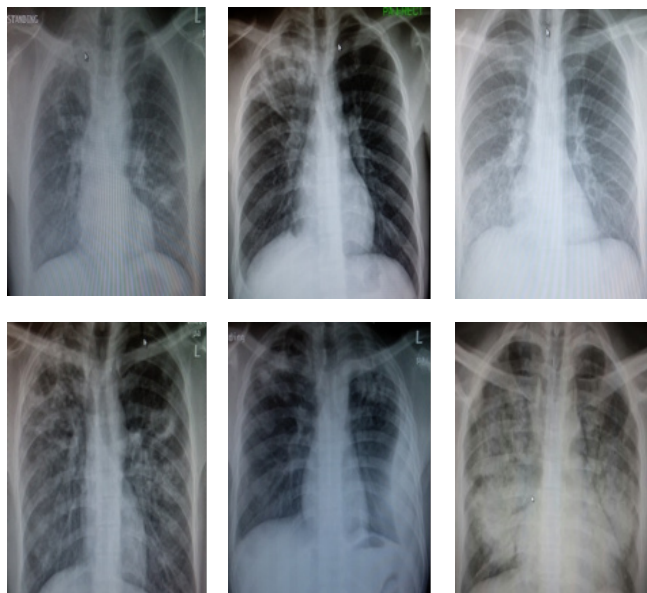
1. They have three (3) consecutive negative AFB sputum smears collected in 8 to 24 hour intervals (at least one being an early morning specimen).
2. Their symptoms have improved clinically (for example, they are coughing less and they no longer have a fever); and
3. They are compliant with an adequate treatment regimen for two (2) weeks or longer.

Predominance of consolidation with cavitations in the chest x-ray

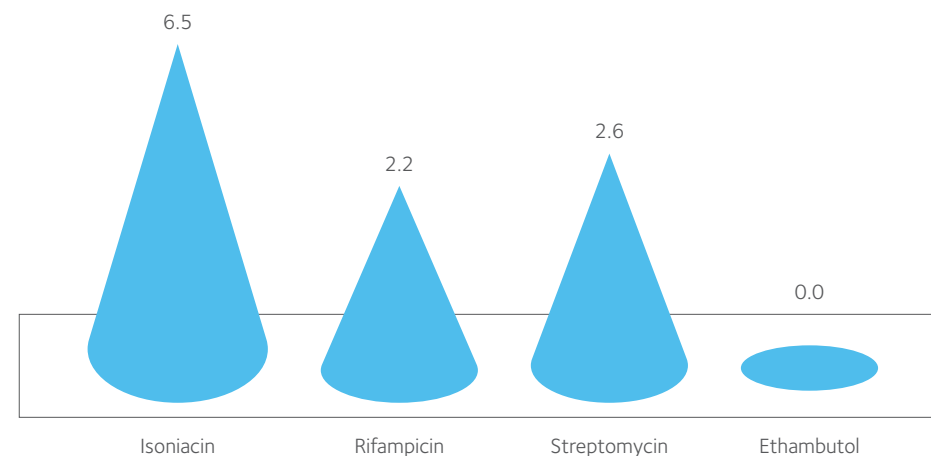
- Consolidation
- Pleural effusion
- Cavitation
- Bilateral involv



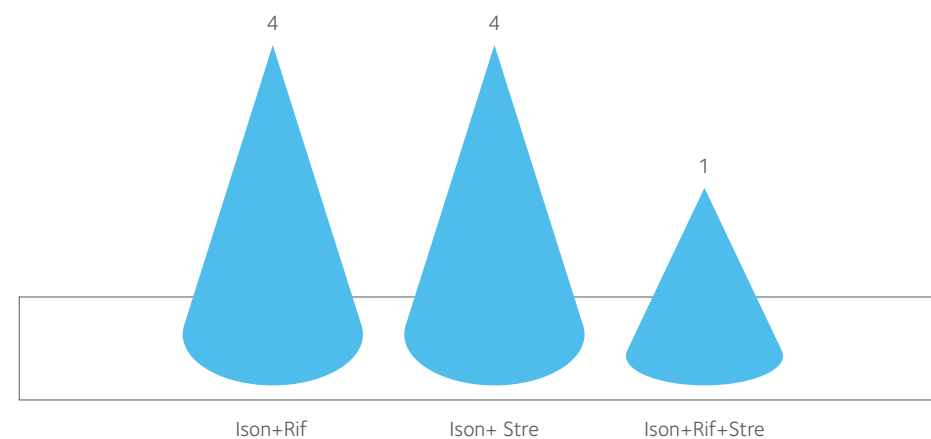
Proportion of Patients with Pulmonary Tuberculosis According to Radiological Findings



Resistance to anti-TB drugs was demonstrated in twenty-two (22) patients (7.8%)



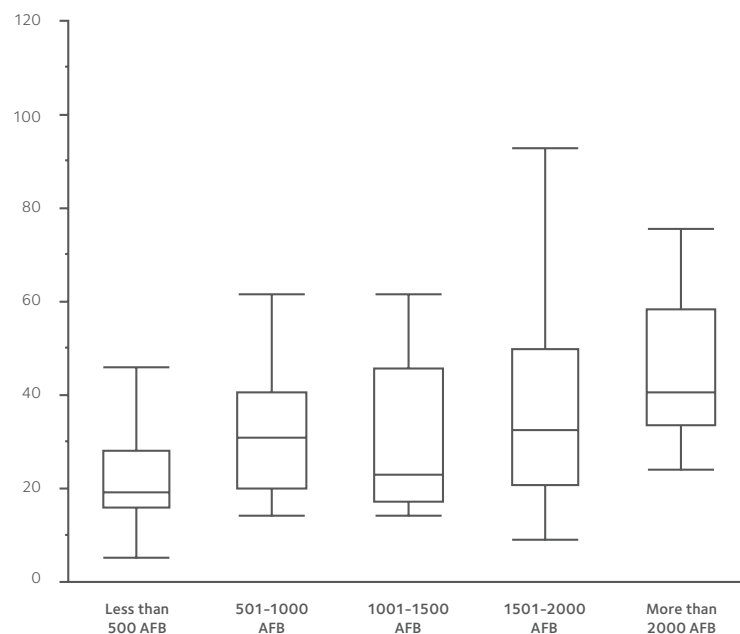
Proportion of Resistance to First-Line Antituberculosis Drugs



Number of Patients with Combined Resistance to Anti-TB Durgs

The sputum smear conversion constitutes an important indicator for the effectiveness of treatment and the infectivity of patients.

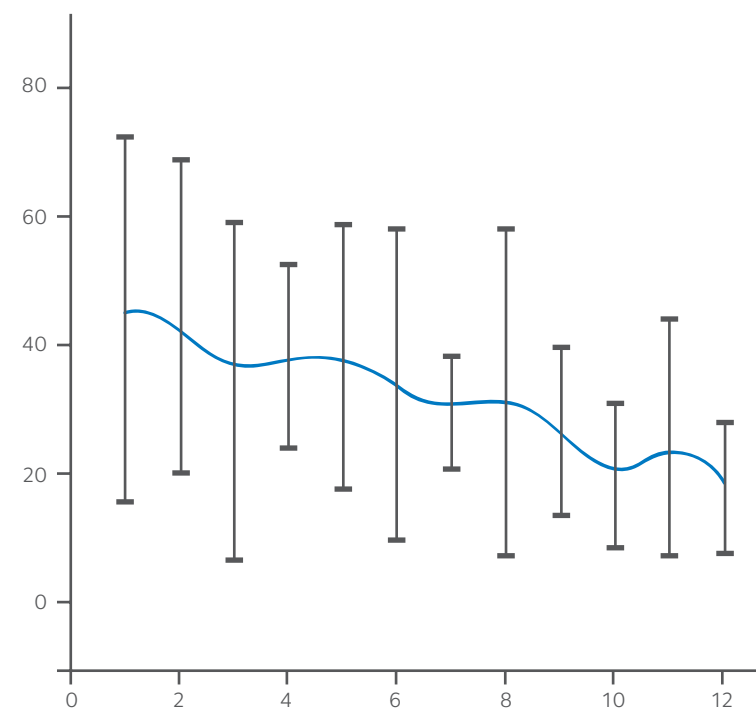
Increased AFB at diagnosis is related with prolonged conversion time.



Sputum conversion time (days) according maximum number of AFB at diagnosis

Percentile distribution	Conversion time (days) according to maximum number of acid fast bacilli per 100 field at diagnosis				
	1-500	501-1000	1001-1500	1501-2000	≥ 2001
minimum	12	14	14	9	24
25%	16	20	17.3	20.8	33.5
Median	19	31	23	32.5	41
75%	28.5	40.5	45.8	50.0	58.5
maximum	117	62	90	115	76

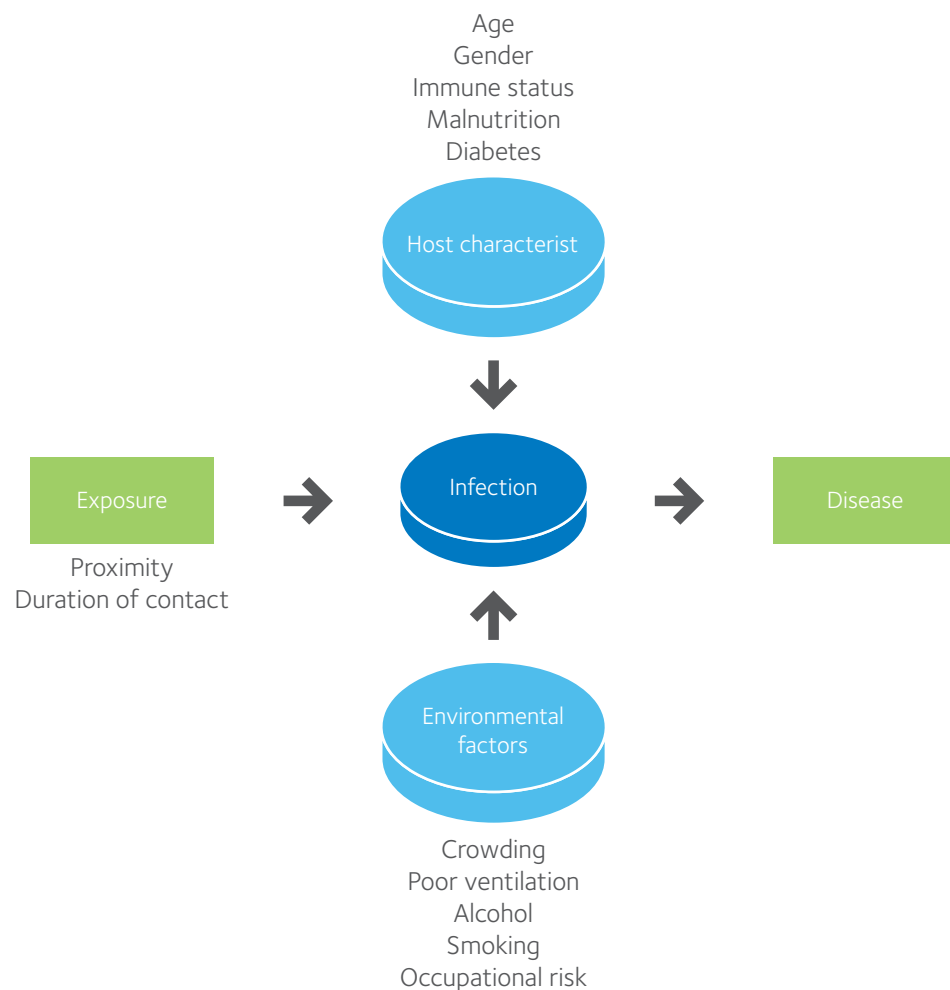
Improvement of bed use was observed as consequence of quality improvement initiatives



Mean and standard deviation of the length of stay in patient with tuberculosis (in days)

LOS (days)	Quarters											
	1	2	3	4	5	6	7	8	9	10	11	12
Mean	43,4	43,6	32,4	37,6	37,7	33,4	29,4	32,4	26,4	20	25,3	18
SD	27,7	23,4	25,5	14	20	23,5	8,5	24,6	12,8	10,8	17,8	9.7

An interaction between host characteristics, environmental factors and exposure to mycobacterium tuberculosis are key factors related to the risk of progression from infection to disease.

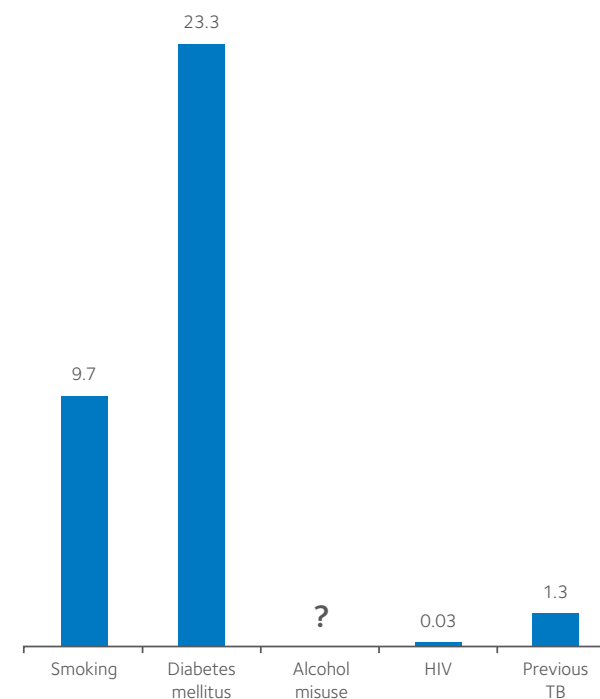


Risk factors for Tuberculosis

Host Characteristics

Systematic reviews have shown that undernutrition, smoking, diabetes, and alcohol misuse are individual risk factors that can double or triple the risk of development of active tuberculosis.

A wide range of comparatively uncommon medical disorders, i.e. silicosis, malignant diseases, and chronic systemic illnesses, and immunosuppressive treatments, are established risk factors for tuberculosis.

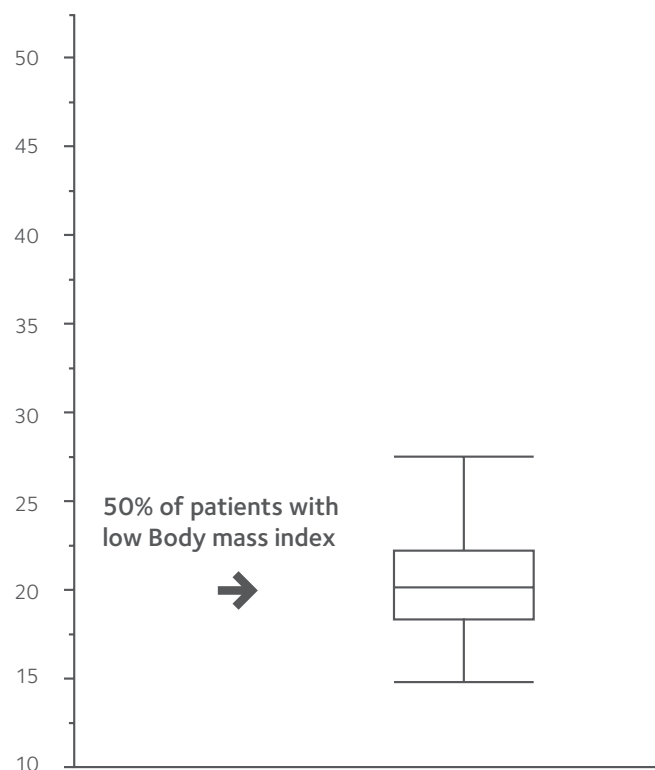


Proportion of TB Patients with Specific Factors

Host Characteristics: Body Mass Index

An assessment of nutritional status in adults may include a comprehensive evaluation consisting of a tailored history and physical examination, laboratory assessment, anthropometrics, body composition and functional data.

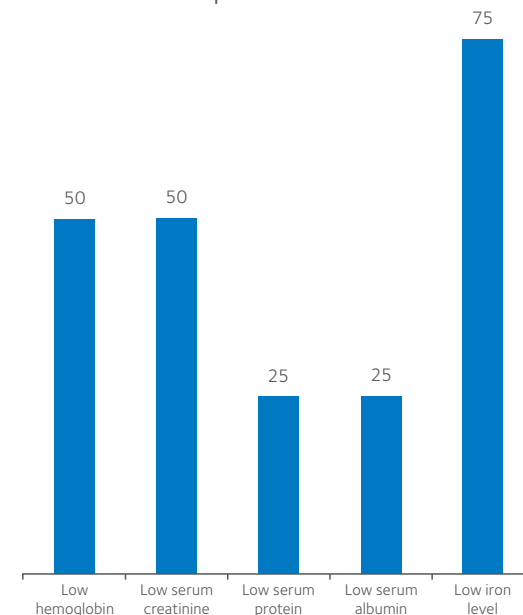
Undernutrition is not only related to the risk of acquired tuberculosis but also with patient recovery.



	Percentile Distribution				
	min	25%	median	75%	max
Body mass index (Kg/m2)	11,5	18,4	20,1	22,2	49,3

Host Characteristics

Abnormal laboratory test suggestive of undernutrition have been observed in 25 to 75% of our patients.



Proportion of Patients with Abnormal Results of Specific Laboratory Test

Close contacts of infectious TB cases, including household contacts, are at a higher risk of becoming infected with *Mycobacterium tuberculosis* and development of primary active tuberculosis.

Prolonged length of exposure to an infectious patient caused by health system-related factors, such as delay in diagnosis.

Exposure

Proximity Duration of contact

Delay in diagnosis is significant with regard to not only disease prognosis at the individual level but also transmission within the community and the reproductive rate of the TB epidemic.

Delay in tb diagnosis

1. Among the strategies for prevention and control of tuberculosis are included measures to promote the early diagnosis and the compliance with treatment.
2. The delay in the diagnosis has a critical role in the control of tuberculosis and constitutes threats for the community and worsens the prognosis for the improvement in the patient's clinical status

Patient and system delays should be considered.

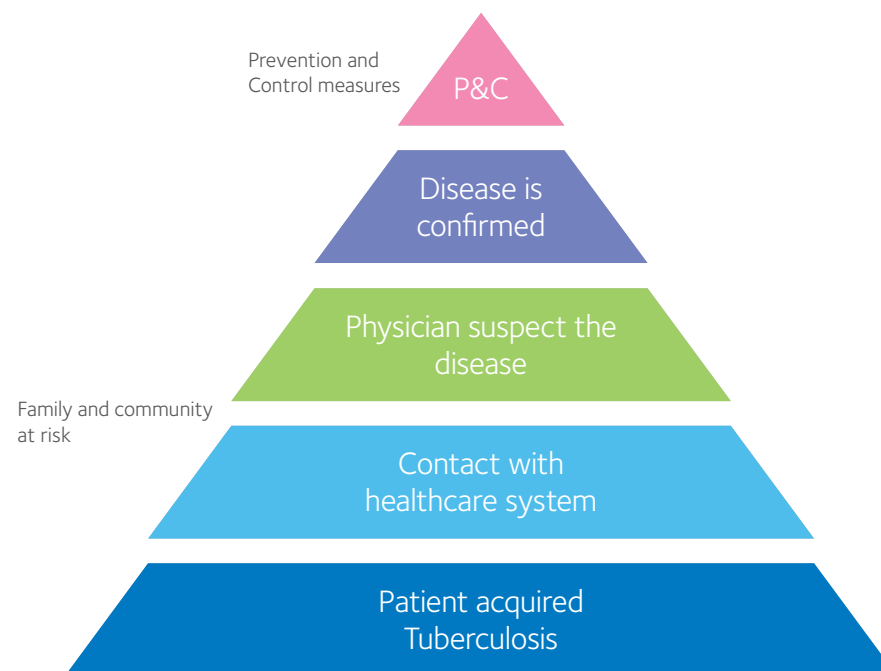
Patient delay:

Time between symptoms onset and first contact with the healthcare system, regardless the category or level of care provided by the facility (primary healthcare facility, hospital).

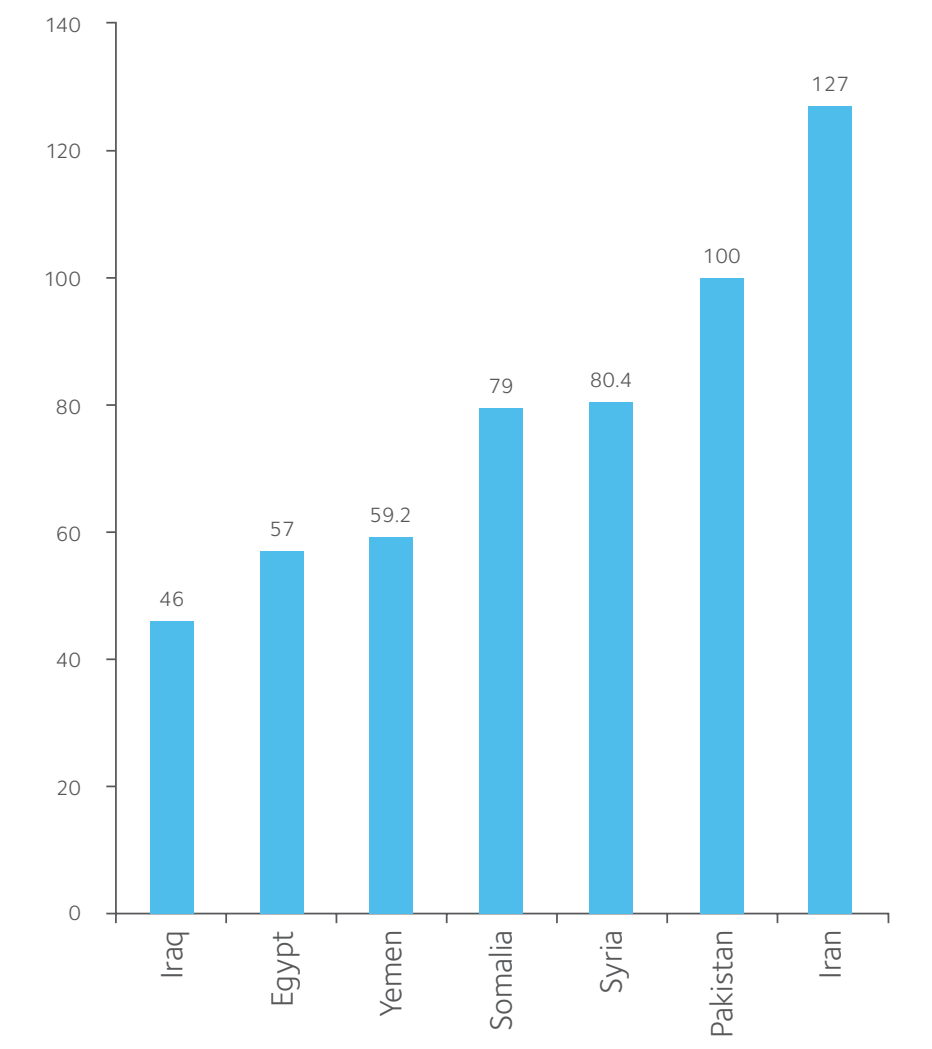
System delay:

System delay was considered the time between the first contact with the healthcare system and the diagnosis.

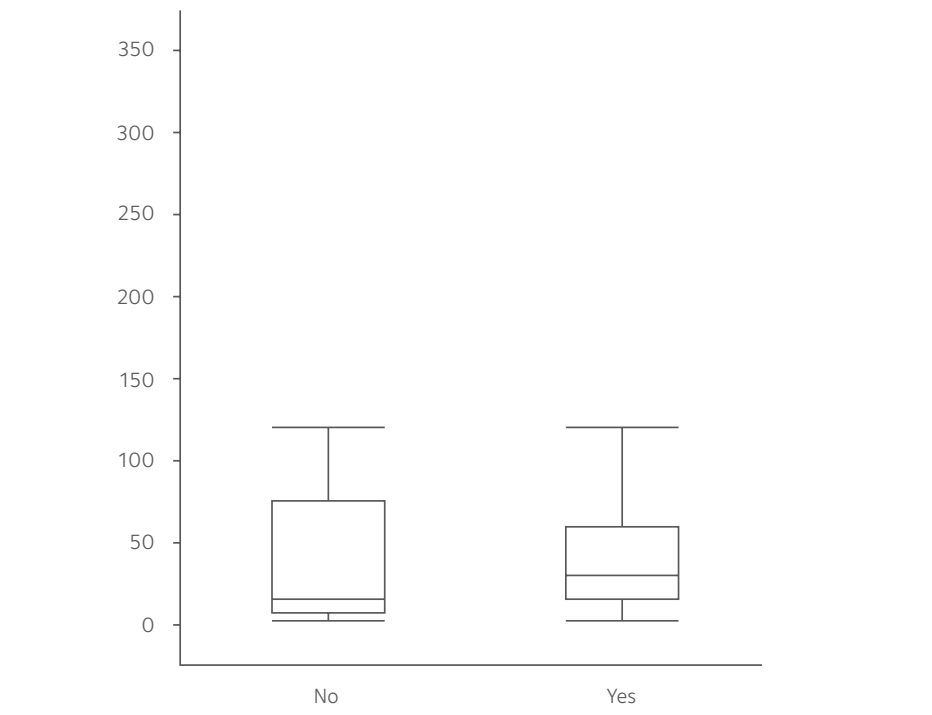
The delay in the diagnosis has a critical role in the control of tuberculosis and constitutes a threat for the community and worsens the prognosis for the improvement in the patient's clinical status.



According to a multinational study about diagnostic delays carried out in the Eastern Mediterranean Region (EMR) between 2003-2004, the mean duration of delay between the onset of symptoms until treatment with anti-tuberculosis drugs ranged from one month and a half to four months in the various countries.



The median total diagnostic delay in patients with pulmonary tuberculosis doubled the delay for non pulmonary localization. This fact is related with the risk of community transmission.



Percentile Distribution	Diagnostic Delay (Days) according Localization of Tuberculosis	
	Non Pulmonary	Pulmonary
Minimum	3	2
25%	7	15
Median	15	30
75%	75	60
Maximun	365	365
Source of data: patient files.		

Individuals with low socioeconomic status are exposed to several risk factors which increase their risk for TB.

People with lower SES have a higher likelihood of being exposed to crowded, less ventilated places and having limited safe cooking facilities.

“Migration, specifically from TB endemic countries, is considered the major influencing factor for TB spread.

Many laborers from endemic countries lack education and awareness about TB prevention.

Due to high rent costs they often live in unfavorable housing conditions, mainly crowded camps, i.e. nine persons living in one small room (27m³), that are poorly ventilated and dark, compounded by a lack of proper nutrition in their diet.

[Sayegh Suzan. Tuberculosis in Qatar: Current situation, assessment and trends from 2012-2015. American University of Beirut. Jul, 2015](#)

Some characteristics of our patients' population suggest the probability of transmission in the community setting.

Community risk for tb transmission

Risks

- Poor ventilation
- Male patients, aged 20-50
- From countries with high TB incidence
- Diabetes mellitus
- Malnutrition
- Diagnostic Delay
- Smoking
- Crowding

Challenges

- A better understanding of the epidemiology of tuberculosis.
- Evaluate public health impact of tuberculosis in hospital facilities.
- Review the management of TB patients according to sputum conversion time.
- Define the factors associated with diagnosis delay and the strategies to minimize its adverse impact in patients and communities.
- Understand the community risk of transmission and the public health action for its control.

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