PILOTING ULTRAPORTABLE CXR AND CAD

ACHIEVEMENTS AND CHALLENGES IN PAKISTAN

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BACKGROUND

DOPASI FOUNDATION

ABOUT US

A vibrant nonprofit, working in health and related social sectors, committed to bringing about a visible and sustainable improvement in the quality of life of the underprivileged communities through effective implementation of integrated solutions

ABOUT THE INTERVENTION

Dopasi pioneered the CXR through mobile x-ray devices and CAD equipped with AI in Pakistan in March 2020 in the country. The goal of the initiative was to intensify tuberculosis case detection in marginalized and key-at-risk coalminers in highly warranted areas of Pakistan, through an intensified active case-finding approach. The target population was screened in the camp settings near the coal mining sites where there was no health facility nearby.

ABOUT THE DEVICE

X-air is a super compact digital X-ray machine and is relatively easy to use and handle with inbuilt AI software to guide diagnoses. The overarching aim is to aid diagnosis. With this edge-cutting technology, DOPASI is able to achieve a good image quality with less radiation dose and in ensuring the provision of diagnosis in most hard-to-reach areas. Dopasi was the pioneer in deploying this state-of-the-art equipment for TB screening anywhere across the globe!

PROGRAM PLANNING

Step I

Receipt of Fuji – Xair from Fujifilm Global through their local office

Step II

Stakeholder’s orientation and advocacy sessions

Step III

PNRA Approval

Step IV

Community Engagement and sensitization

Step V

Screening Camps

SITE SELECTION

The intervention was designed for the screening of an unaddressed key population of coal miners in major coal mining districts of Pakistan. The target population including coal miners, and the associated mining communities were screened in the camp settings near the coal mining sites. Due to no electricity in the area, the device was charged using a Solar Power rechargeable battery that in turn was used to charge the Xair device. Mining communities were screened at campsites with no health facilities nearby and where even the routine transportation vehicles can not reach.

TRAININGS

Detailed Review of the Operational Manual

The operational manual describing details on how to operate the device and cautions to be observed when operating it, was thoroughly reviewed.

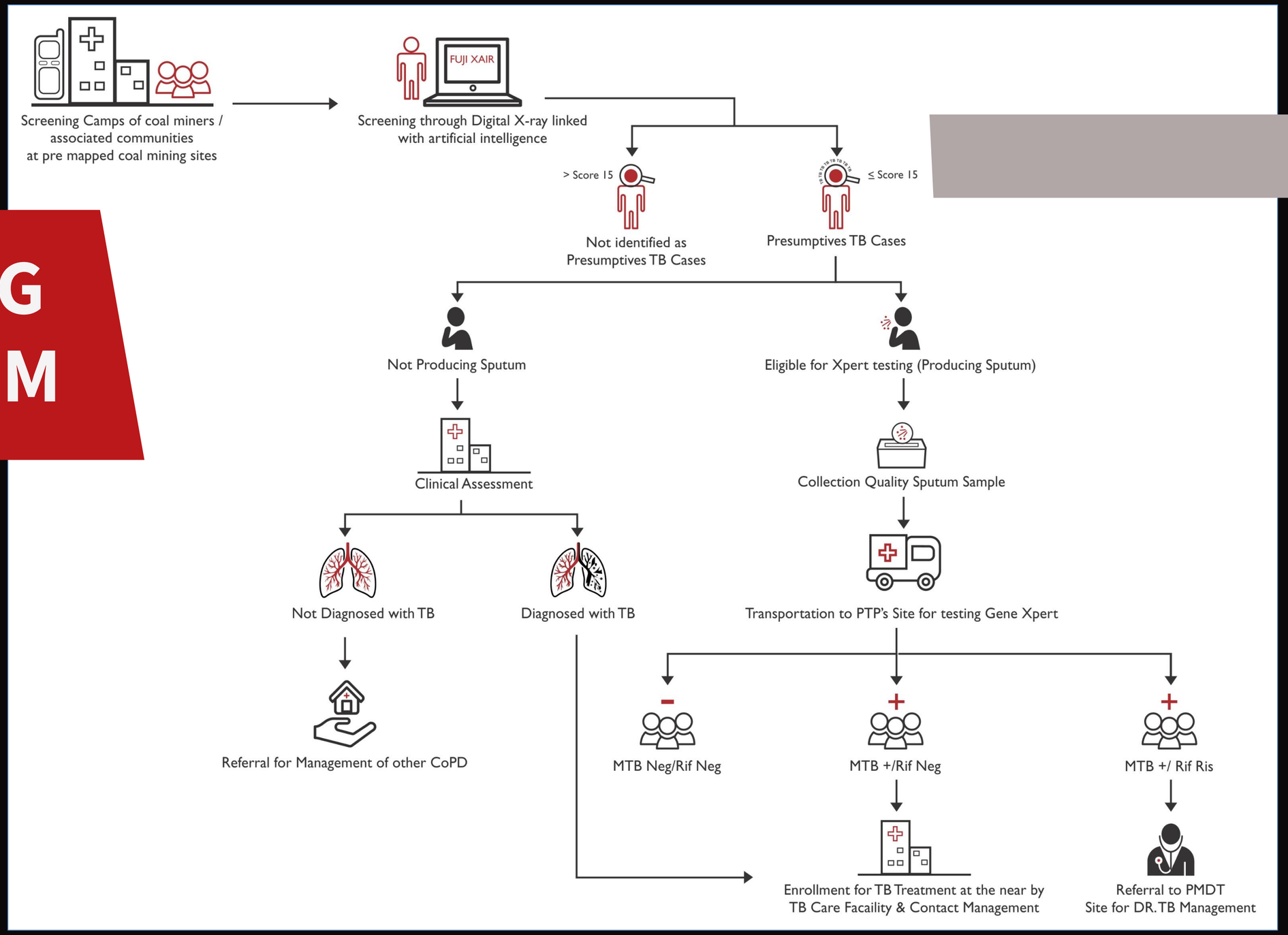
Training of Master Trainer

A trained team from Fuji Film Pakistan visited Dopasi Head Office and trained a well-qualified and technically sound team of master trainers of Dopasi.

Capacity-building of the Relevant Staff

The trained master trainers further trained the relevant field staff.

SCREENING ALGORITHM



THRESHOLD SCORE

The operational threshold is score 15+ given by the manufacturer for this version

A robust data from the implementation being collected complemented the NTP presumptive TB records

The threshold is maintained to give time for data generation from ongoing screening activities in the field

Preliminary data has shown some TB cases detected even below the 15

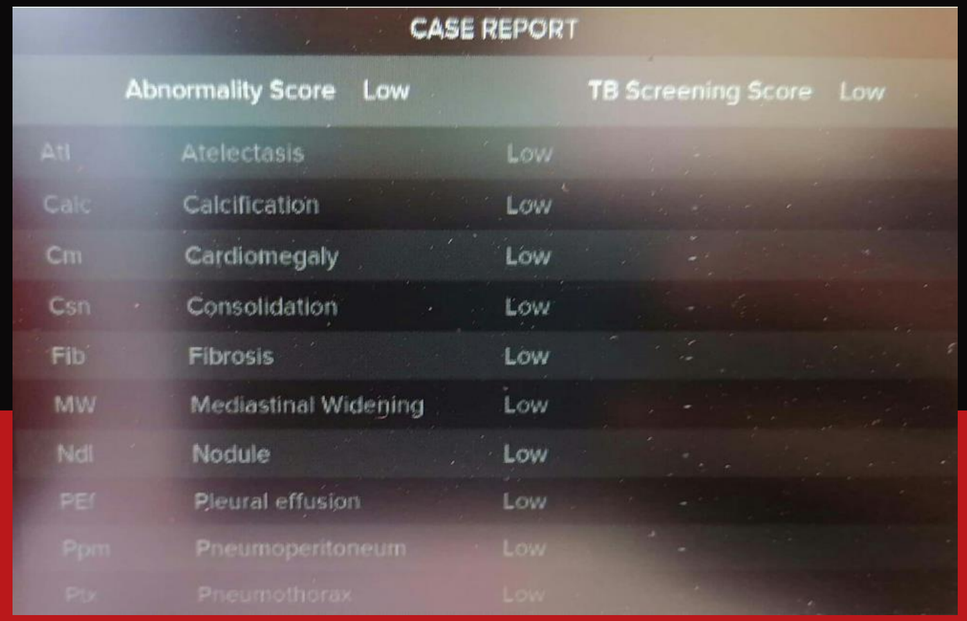
OPERATIONAL SETUP

Digital screening chest camps were conducted in the unreached and unaddressed areas identified for the unaddressed key population of coal miners in major coal mining districts of Pakistan. The target population including coal miners, and the associated mining communities were screened in the camp settings near the coal mining sites. Special protective gear along with the radiation dosimeter was used by the technicians and relevant staff.

Xair has been linked to a computer-aided reading software, Lunit INSIGHT, which uses an artificial intelligence algorithm trained to almost instantly recognize TB-related symptoms from CXRs taken using the digital X-ray device. With this technology, CXRs can be taken and read by the algorithm within minutes. The Xair is connected with Lunit INSIGHT through the internet and transmits X-rays on a real-time basis.

IMAGE QUALITY

A major concern was that handheld X-ray devices emit lower doses of radiation, which in theory compromises image quality, and subsequently could impair TB case detection yields. However, we detected no significant differences in TB abnormality scores using the AI software, nor in any of the steps along the TB care cascade during the intervention.

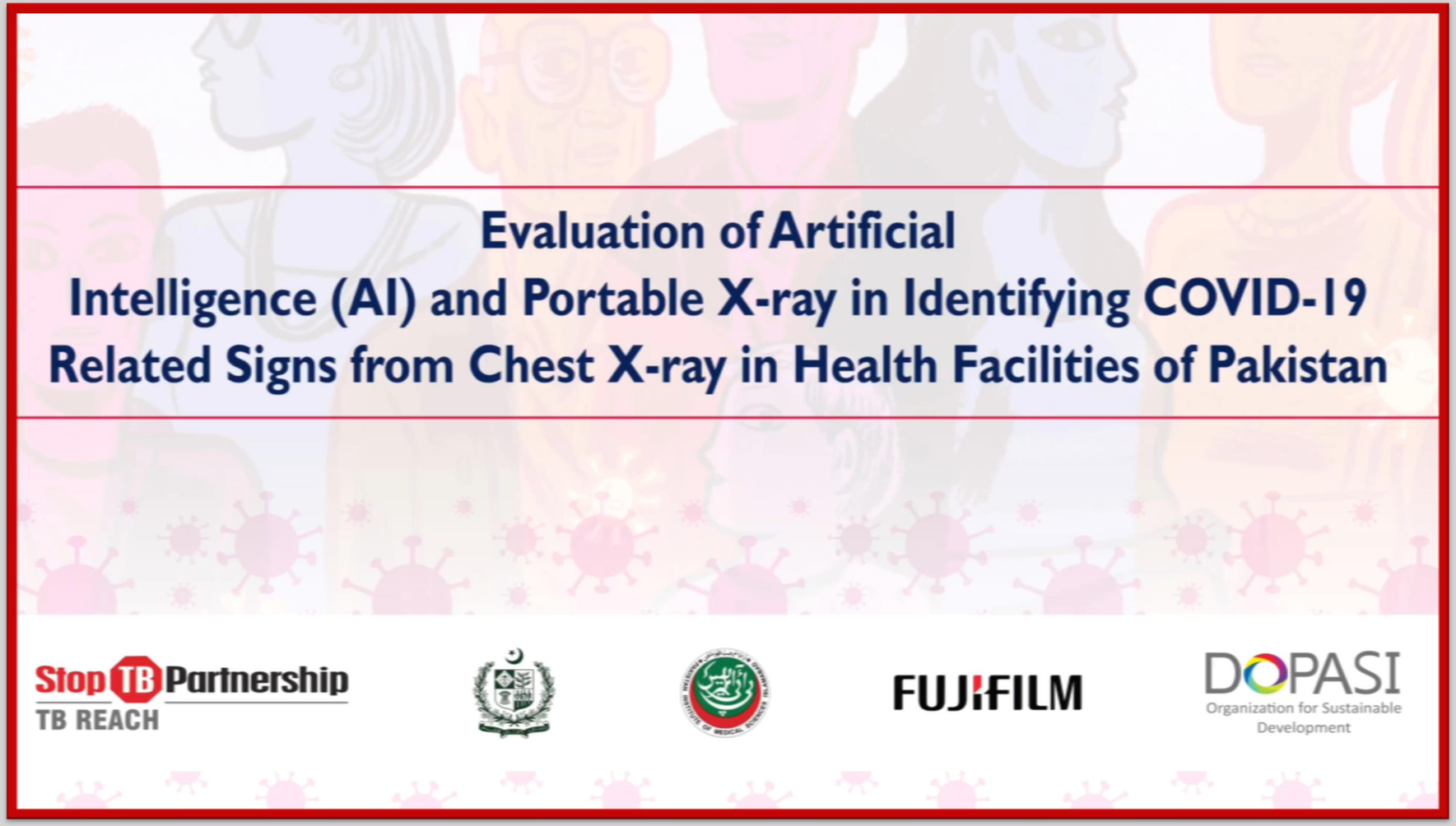


TESTIMONIALS FROM THE EXPERTS IN PAKISTAN

INTEROPERABILITY WITH HEALTH INFORMATION SYSTEMS

All information of presumptive and diagnosed TB patients was registered, shared and notified in the provincial and National TB Control program, hence entire information of people diagnosed and being enrolled on treatment was notified in the HIS

RESULTS TILL DATE



We targeted at screening a total of 14,000 coal miners and associated mining communities for TB using the Fujifilm Xair, Till date a total of around 14,004 coal miners and associated community members, have been screened and have been able to identify 110 B +ve TB Cases in extremely hard to reach areas with limited access to electricity.

Also conducted a COVID – 19 screening study intervention through Xair. A total of 1,509 individuals were screened with Xair followed by RT PCR at a governmental health facility.

SUCCESS STORY

SCALE UP

- Dopasi intends to significantly upscale and intensify Tuberculosis case detection for which it has already applied for Japan's Grant Assistance for Grassroots Human Security Projects through the Embassy of Japan in Pakistan
- Publishing results of the studies conducted
- Planning to use Xray for contact screening at households of TB Patients
- Screening in refugee camps
- Using AI for progress monitoring in DR TB Patients

CHALLENGES

- Initially the battery time was less
- In summers during the high temperature, we had to arrange a cooling fan in field camps as the device use to heat up in temperature ranging to 50 Degree Celsius
- We had to travel with 2 laptops and a couple of stands
- For changing battery of DR Panel, it had to be dismantled
- In mass screening camps the moment screening went beyond 200 differing issues were faced
- The local support from Fujifilm Pakistan was required who were of great help

KEY ACHIEVEMENTS

- Enabled screening in hard-to-reach areas
- Access to care for key at-risk populations
- Due to the low radiation confirmed by the Pakistan Nuclear and radiology authority we were exempted from the requirement the of the lead wall or lead room
- Need for doctors and radiologists was reduced
- Saving in cost of diagnosis – less no of Xpert cartridges were used as compared to screening to conventional methods like symptomatic screening
- Very well appreciated at all levels

DOPASI
FOUNDATION

THANK YOU