Janna Health Foundation

Active TB Screening with Portable CXR Equipment in Nomadic Communities of North East Nigeria

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Outline

- Background
- Program planning (training & product cost)
- Screening algorithm
- The Threshold score and operational set-up
- Ultra-portable X-ray system image quality
- Interoperability with health information systems
- Data storage and privacy
- Results
- Success stories and Scaling up
- Experience with the X-ray and CAD vendor
- Challenges
- Lessons learned
- What should be done differently next time

Background...1

- JHF was established: 2012.
- JHF focuses on TB Prevention & Care among KVPs in NE for >10 years:
  - Nomadic Pastoralists
  - Internally Displaced Persons (IDPs)
  - Refugees
- Have presence in 5 of the 6 States of the NEZ
  - HQ in Yola, Adamawa State
  - Project Officers & Offices in each of the 5 States
- JHF works with a pool of over 400 Volunteers; mostly youths from KVPs

Background...2

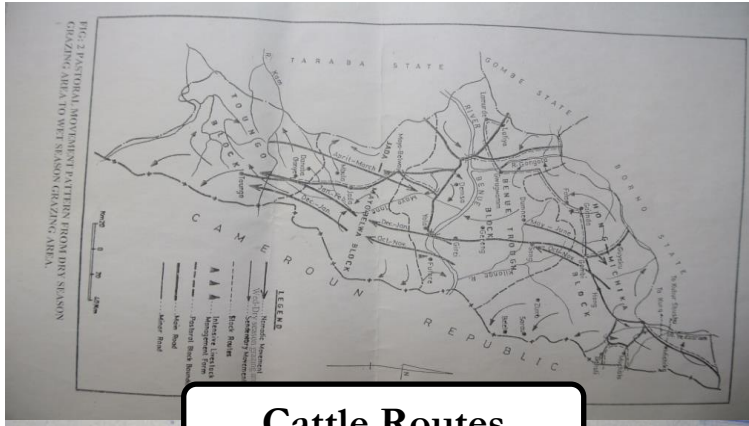
- Use of UP-XRs & CAD devices to aid TB diagnosis started in 2020;
  - JHF procured its MinXray Impact system with fully integrated qXR v3 (Qure.ai) for AI in 2022
- JHF started Nomadic Community Screening with UP-XRs & CAD in 2nd Qtr, '22
- Our targeted KVPs have little or no access to health services & are often distrustful of them
- Previous screening has been mostly symptom based.
- Results show huge burden of TB; up to 40% of TB cases may be among our targeted KVPs
- Poor access to X-ray machines & Radiologists in Adamawa State worsen the situation;
  - low #s of clinically diagnosed TB cases

Program planning…1

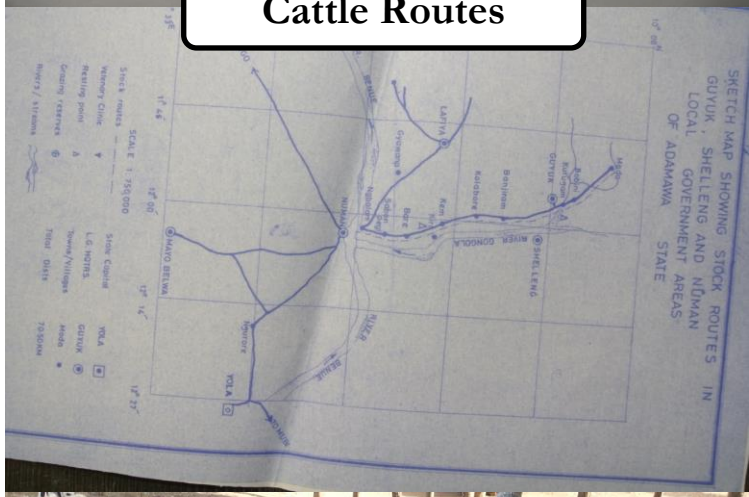
- No experience with Custom clearance;
  - Ethical approval grated at the State level
- JHF procured 1 MinXray Impact system with fully integrated qXR v3 (Qure.ai) for AI
- 3 Teams (Registration Officer, Data entry staff, Radiographer and a Coordination officer) were trained

Processes:

- Nomadic Communities Mapped, Community Leaders identified & engaged
- Advocacy Plan developed and implemented
- Community mobilization and Screening led by Nomads Focal Point and LGTBLS were conducted
- Active Screening commenced in Nomadic communities
- Presumptive TB cases were detected and managed
  - Sputum collection & Transportation
  - Result retrieval
  - Active linkage to TB Care
- Result sharing during strategic advocacy



Cattle Routes



Advocacy & Engagement

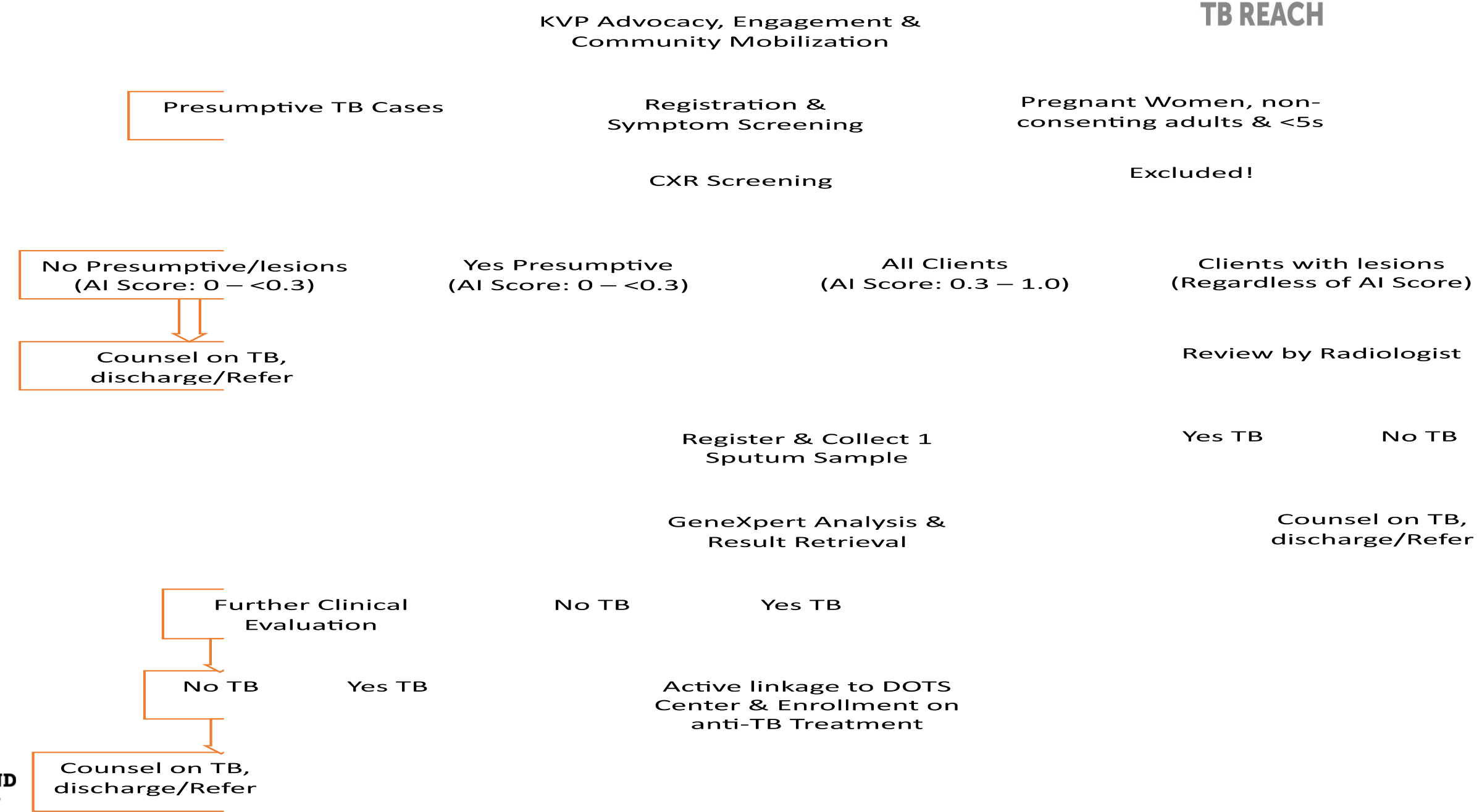
Program planning…2

Stop TB Partnership
TB REACH

- Our MinXray Impact system equipment is very portable, easy to set up & user friendly
- It is made up of;
  - The Generator, DR Panel, a computer (Lap Top) with a q-Track software installed
  - Completely wireless with 2 light tripods
  - Takes 3 minutes to set up
  - Could shoot up to 200 images/day depending on location
- No additional items procured locally
- Easy access to support from manufacturers;
  - Introduction of more variables
  - Highlighting symptoms of interest

END TB

Screening algorithm



Threshold score selection & Equipment Set up

- A threshold of 0.5 was pre-determined in line with general findings from similar studies
- However, our experience revealed clients with lung field lesions in the AI score range of 0.3 to 0.5
  - We decided on a cut-off point from 0.3
- Protective Apron is used by the Generator Operator
  - All other persons including Team members stay behind
    - At least 2 meters distance
- Excellent Image Quality

END TB

Interoperability with health information systems

- CXR has a key role in the diagnosis of TB (NTBLCP guidelines)
  - In this intervention, the difference is the position of CXR in the algorithm
- Diagnosed TB cases are enrolled using NTBLCP R&R tools
- TB cases enrolled are reflected in the National HIS
- Data generated is stored in the cloud and accessed through the Qure.ai qTrack software
- Issues around data storage in cloud are relevant

Screening Nomadic Communities with portable X-Ray Equipment

Screening Nomadic Communities with portable X-Ray Equipment

Results

From July to December, 2022

- A total of 66 screening events, 60 communities
- Total people screened (15+):
  5,397
  - 2,739 (51%) were Females
  - 3,722 (69%) Age group 25 – 64
- Presumptive TB tested by Xpert:
  1,119
  - Bac+ detected: 85 (7.5%)
    - Females: 36 (42%)
  - AI @ 0.5 detected 89% and @ 0.3 identified 95%
  - Cough 2 weeks detected 40% and any cough 62%

Success Stories & Scaling up

- Success stories include:
  - Provision of access to TB services for KVP
  - Diagnosis of TB among people with no symptoms
  - Reduces TAT for diagnosis of clinical TB
  - Improved TB Case Notification (especially clinically Diagnosed Cases)
  - Reduction in sputum testing requirement
- Intervention is being scaled up already
  - Started with screening all age groups in Nomadic Communities in 1 State; now screening in 3 States
  - Support TB screening during:
    - World TB Day
    - Special Medical outreaches for Government
    - Nigeria Medical Association Week
  - Presently targeting malnourished children in Nutrition HFs across 3 States

Experience with the X-ray and CAD vendor(s)

- Product is user friendly, convenient, portable, easy to transport & set up in the most remote communities
- Our target communities are excited about the screening; 100% acceptance
- Vendors provide support whenever necessary:
  - Occasional issues with upload of images
  - Introduction of key symptoms into qTrack
  - Provision of power back-up for MinXray Computer

Lessons learned

- CXR/AI eased access of remote hard-to-reach communities to TB services:
  - Can go closer into hard to reach areas than larger van-based systems
  - Shortens time taken to diagnose Clinical TB
- CXR/AI screening led to a reduction in Case detection gap
  - Especially for clinically diagnosed TB cases
- No need for electricity during screening
- Symptom screening misses many people with Bac+ TB; use of this equipment reduces numbers of TB cases missed
- CXR/AI reduced testing requirements; saves costs
- Employing AI to read CXR can improve triaging when human readers are not available

Challenges & Recommendations

- Laptop battery life (4 hours)
- Limited access to radiologist
- Inability to use equipment on <5s & pregnant women
- NTP algorithm yet to be updated

- Battery back-up for Lap Top obtained
- Establish linkage with HFs where Radiologists are available
- Manufacturers should look into this
- NTPs should consider revising their algorythm

What would you do differently next time?

- Have a strong & well trained screening Team; frequent changes complicate things
- Invest more in community engagement and mobilization;
  - Key to successful screening
- Quality assurance is important;
  - Access to radiologists to review images is important
- Proper handling of equipment to avoid damaging;
  - Especially during set up
- Unstable power supply could affect the equipment;
  - Use surge controllers during charging
- Radiation safety is important;
  - More protective aprons are required

Acknowledgements

- Ministries of Health, Adamawa, Gombe & Taraba States
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- NTBLCP, Nigeria
- Stop TB Partnership, Geneva
  - TB REACH
  - Challenge Facility for Civil Society


Thank You!