

Background

TB is a major public health problem in Ghana. it is estimated that ...

One person falls ill with TB every 12 minutes!

Only one (12,674) out of every four people (44,000) developing TB were put on treatment in 2020!

The National TB Programme (NTP) has the responsibility of coordinating TB care and treatment services. Until 2013, the NTP recommended only symptoms screening i.e. passive case finding for TB diagnosis, after which the next step was using either sputum smear or sputum smear LED microscopy for confirmation. 59% of TB patients did not report signs or symptoms of TB at the screening highlighting

- the need to undertake more actions to find the undiagnosed ('missed') people with TB and
- revise the screening and diagnostic algorithms to create a more sensitive process.

In 2015, the screening strategy was revised to active TB case finding which included a second screening test with a chest X-ray after symptoms screening. At this time, <20 GeneXpert (PCR) machines were available for TB confirmatory test across the country.

In 2019, GeneXpert became the initial diagnostic test for people with signs and symptoms of TB, replacing microscopy.

A research priority was set in the TB Strategic Plan of evaluating the 'impact of the introduction of digital X-ray in terms of increased yield of diagnosis (linked to the anticipated implementation of the ORIO project)

Intervention

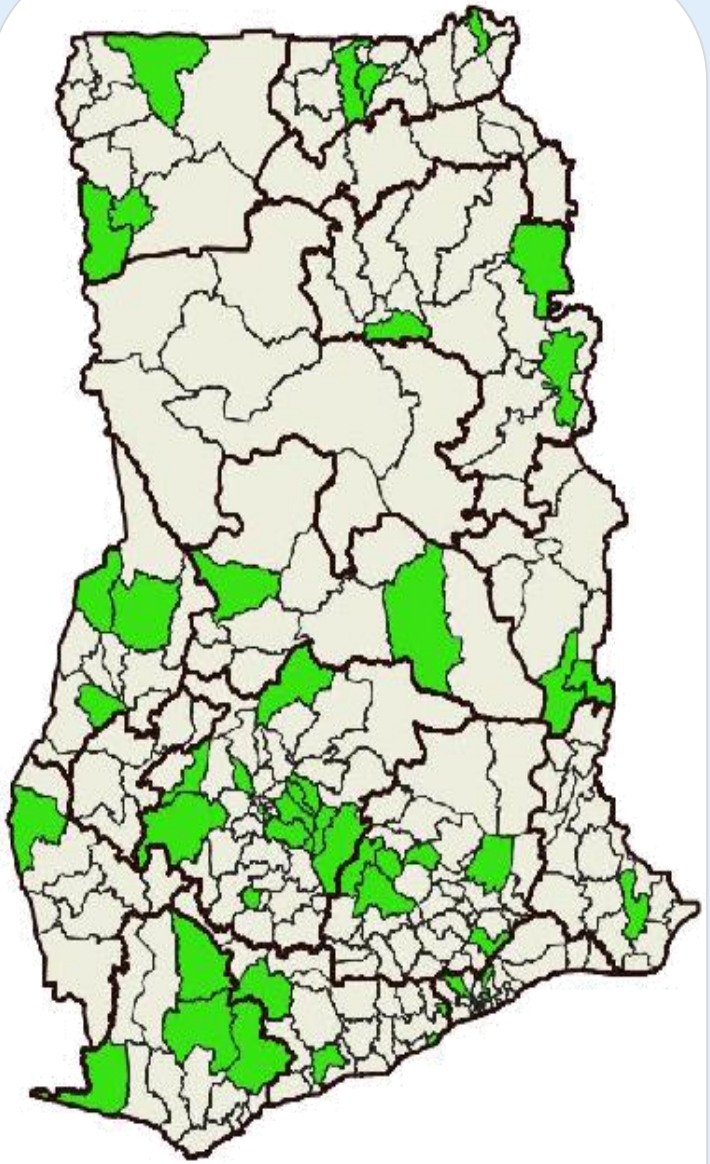
ORIO is a part grant-part loan facility won by the government of Ghana to improve TB case-finding nation-wide

From February 2016, the **ORIO** project was implemented having 3 main objectives;

- Detect more TB cases using digital X-ray machines
- Improve quality of TB care and healthare in general
- Research how to optimize using the X-ray machines

Infrastructure:
 52 multipurpose digital X-ray systems with CAD 48 in hospitals across the country
 2 in specially outfitted vans,
 2 portable X-ray systems in transport cases.
 16 radiological viewing stations.

Capacity building:
 759 different personnel trained

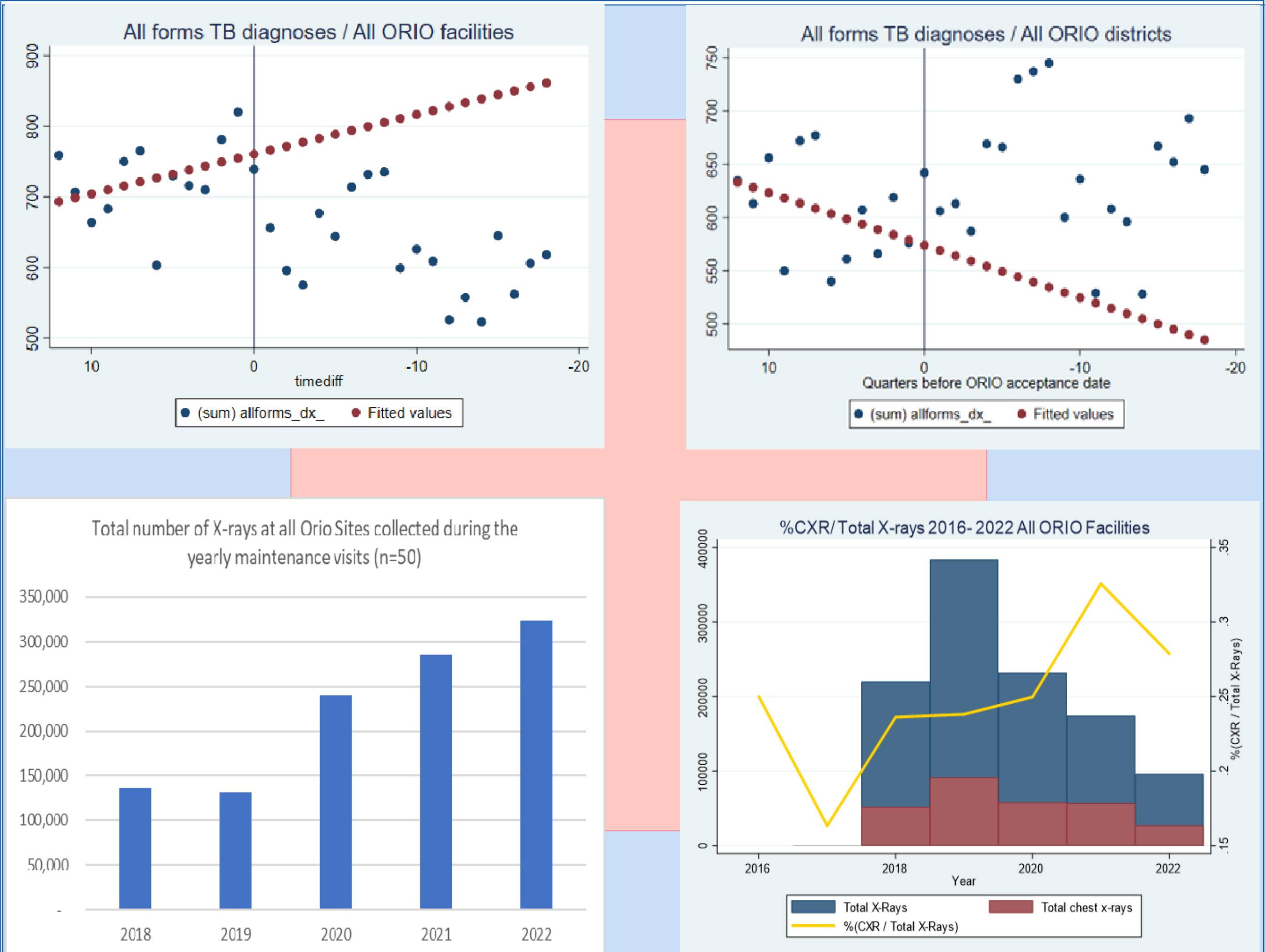


Green highlighted districts received an x-ray system from the ORIO project

Mixed methods approach of the evaluation:

Qualitative data	Quantitative data
Key informant interview 19 <ul style="list-style-type: none"> National Regional District Facility 	NTP data <ul style="list-style-type: none"> TB notifications Total X-rays Total Chest X-rays
Semi-structured interview <ul style="list-style-type: none"> Doctors (18) TB focal persons (18) Radiographers (21) Patients (30) 	Data from Delft imaging <ul style="list-style-type: none"> Total X-rays ORIO sites

Results



TB case finding: did not increase in the facilities equipped with chest x-ray machines when combining all but increased at the district level. Qualitative findings supports this, *"...of course, 100 percent, of course 100 percent. ... Someone is there, the person cannot produce the sputum...You bring them chest X-ray, then you watch. So, it has improved it, 100 percent"* Facility respondent
X-rays: In total, 1,104,233 X-rays were shared by facilities, among which 272,362 (24.7%) were chest X-rays.

* ...dotted lines (fitted values) in the two graphs above represent the baseline trend



Financial
 Removed both direct and indirect costs
"...we do not have to pay money to travel to other places or facilities to take an X-ray"

Impact on access:



Diagnostic
 General perception of increased TB diagnosis
"...First and foremost, the TB X-ray, anybody who is TB suspect is free...so the poor, this thing is theirs"



Geographic
 70% of participants lived near the X-ray facility
"We used to suffer to travel long distances to access X-ray service. But now we don't have to"

Infrastructure for teleradiology set up the potential to provide digital health services

Increased capacity in health facilities for the diagnosis of TB, lung-related diseases, and other conditions

Impact on health system:

Various training that built the capacity of 759 Healthcare workers e.g. Doctors, Nurses, ICT staff, facility engineers who provide X-ray related services

Funds generation: The machines were used for non-TB diagnostic purposes and generated internal revenue for facilities

Though under-utilized, the capacity to collate X-ray data real time at the national level was set up

Challenges

- Existing policy permits only Radiographers to operate machines
- No uniform TB screening algorithm was disseminated
- Shortage of Radiographers to man the machines
- Internet infrastructure was still under-developed.
- Staff transfers, poor handover process and loss of institutional memory

Conclusions

- Trends in TB notifications improved generally across districts but varied widely across facilities
- No clear steps taken to implement research in the project
- Increased screening and diagnostic options available in health facilities for the diagnosis of TB, lung-related diseases, and other conditions
- improved access to X-ray services