

Automated chest-radiography as a triage for Xpert testing in resource-constrained settings: a prospective study of diagnostic accuracy and costs

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Table S1 shows the cost estimates for the GeneXpert MTB/RIF (Xpert) test. A depreciation period of 5 years is assumed and the average costs per cartridge are calculated based on a usage of 5 years. The cost for one Xpert test is \$13.06. The costs for automated chest radiography (ACR) are summarized in Table S2. A depreciation period of 10 years is assumed and the average cost for one ACR is calculated to be \$1.46.

The performance of the CAD4TB v3.07 software, human readers and Xpert test, in terms of area under the receiver operator characteristic curve (A_z), using sputum culture reference is shown in Fig S1. The software has $A_z = 0.79$ and the human readers have $A_z = 0.76$, $A_z = 0.81$ and $A_z = 0.77$, respectively. The sensitivity/specificity of the Xpert test is plotted for reference. Pairwise comparison with bootstrap estimation of the performance of the human readers with the computer software was performed, considering $p < 0.05$ significant. The performance of all human readers compared to CAD4TB was not significantly different ($p = 0.91$, $p = 0.11$, $p = 0.70$, respectively).

Table S1. Cost estimates GeneXpert MTB/RIF¹

Row	Category	Item	Cost, number of days, tests or cartridges	Source
A	Equipment	GeneXpert IV module	US\$ 17 500.00	Ref ^{S1}
B		Shipping	US\$ 1 000.00	Ref ^{S1}
C		Power supply unit	US\$ 1 200.00	Ref ^{S1}
D		Printer	US\$ 200.00	Ref ^{S1}
E	Maintenance	Calibration kit after 1 st year	US\$ 450.00	Ref ^{S1}
F		Annual warranty after 2 nd year	US\$ 2 900.00	Ref ^{S1}
G	Consumables	Cost per cartridge	US\$ 9.98	Ref ^{S1}
H		Shipment per cartridge	US\$ 1.20	Ref ^{S1}
I	Productivity	Number of working days per year	250	Ref ^{S1,S3}
J		Average number of test per instrument per day (year 1)	8	Ref ^{S1,S3}
K		Average number of test per instrument per day (year 2 and beyond)	15	Ref ^{S1,S3}
L		Number of cartridges (year 1)	2 000	I*J
M		Number of cartridges (year 2 and beyond)	3 750	I * K
N	Human resources	Annual salary for technician*	US\$ 5 500.00	Ref ^{S2,S3}
O		Training and monitoring	US\$ 1 000.00	Assumed
P	Investment costs: year 1		US\$ 19 900.00	A + B + C + D
Q	Running costs: year 1		US\$ 22 810.00	E + (G+H)*L + N + O
R	Running costs: year 2		US\$ 44 825.00	F + (G+H)*M + N + O
S	Depreciation period in years		5	Assumed
T	Average cartridge cost first 5 years		US\$ 13.06	(P + Q + (S-1)*R)/(L+(S-1)*M)

* Based on 2 hours work needed per day

Table S2. Cost estimates automated chest radiography (ACR)

Row	Category	Item	Cost, number of days or tests	Source
A	Equipment	Direct digital X-ray	US\$ 232 452.50	Ref ^{S2}
B		PACS	US\$ 10 626.40	Ref ^{S2}
C		Shipment	US\$ 3 320.75	Ref ^{S2}
D		CAD4TB software	US\$ 13 283.00	Ref ^{S2}
E		Training & TA	US\$ 3 320.75	Ref ^{S2}
F	Running costs	Annual maintenance cost	US\$ 11 290.55	Ref ^{S2}
G		Annual maintenance and upgrade CAD4TB	US\$ 2 656.60	Ref ^{S2}
H		Computer memory	US\$ 415.09	Ref ^{S2}
I		Power supply	US\$ 3 984.90	Ref ^{S2}
J	Productivity	Number of working days per year	250	Ref ^{S1-S3}
K		Average number of ACR per day	200	Assumed
L		Number of ACR per year	50 000	J*K
M	Human resources	Annual salary for technician	US\$ 27 500.00	Ref ^{S2,S3}
N		Training and monitoring	US\$ 1 000.00	Assumed
O	Investment costs		US\$ 263 003.40	A + B + C + D + E
P	Yearly running costs		US\$ 46 847.14	F + G + H + I + M + N
Q	Depreciation period in years		10	Ref ^{S2}
R	Average ACR cost first 10 years		US\$ 1.46	(O/Q + P) / L

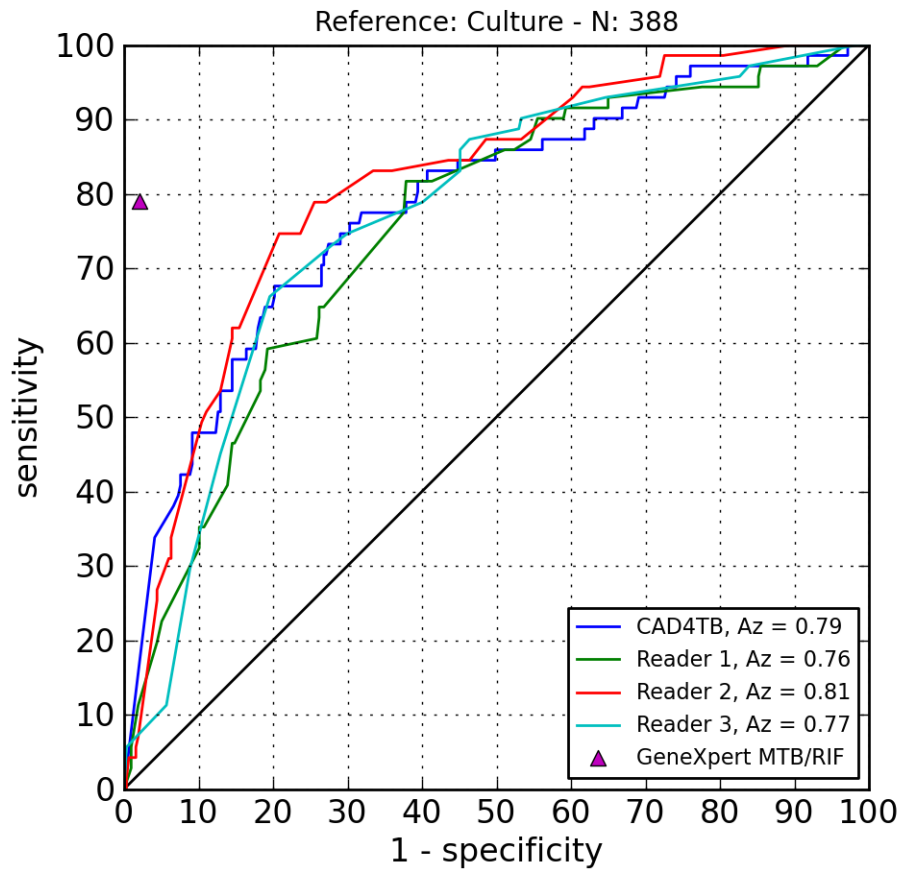


Figure S1. Receiver operating characteristic curves for CAD4TB and human readers. The purple triangle shows the performance of the Xpert test. Culture results are used as reference.

References

- S1 World Health Organization. Xpert MTB/RIF implementation manual. Available at: http://apps.who.int/iris/bitstream/10665/112469/1/9789241506700_eng.pdf?ua=1, Accessed June 2014.
- S2 CheckTB! Economics of TB Screening Simulation. Available at: http://checktb.com/index.php?option=com_wrapper&view=wrapper&Itemid=171&lang=en.
- S3 Theron G, Pooran A, Peter J, van Zyl-Smit R, Mishra HK, Meldau R, et al. Do adjunct TB tests, when combined with Xpert MTB/RIF, improve accuracy and the cost of diagnosis in a resource-poor setting? 2011;40:161–168.