

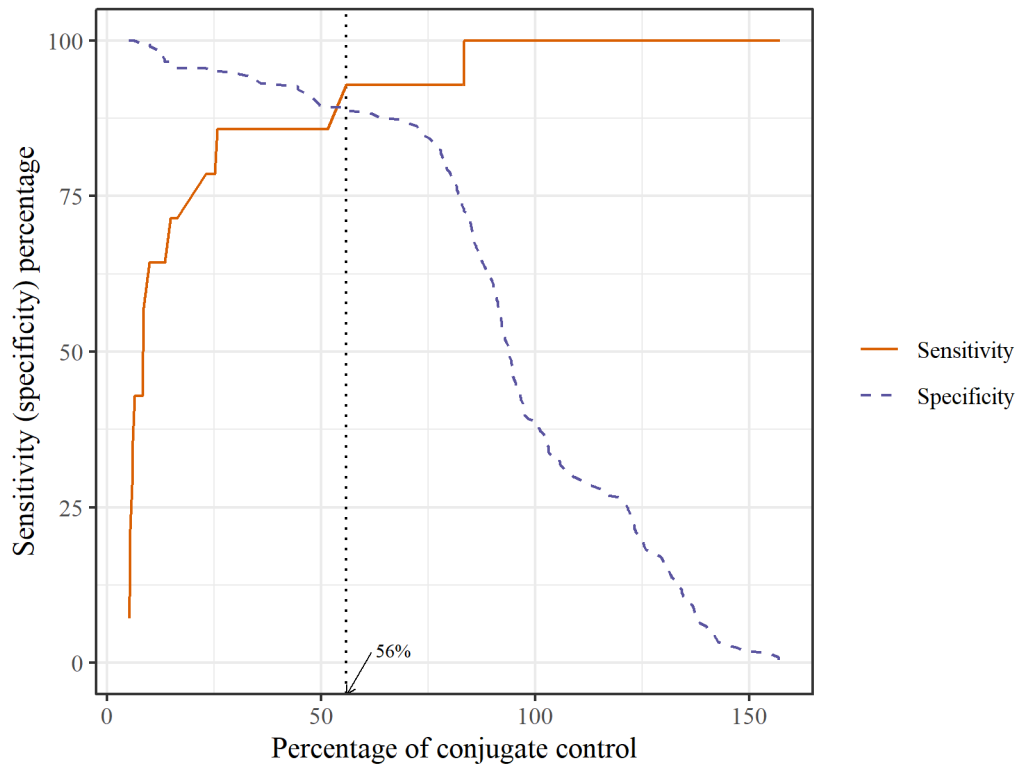
Full title: Performance characteristics and costs of serological tests for brucellosis in a pastoralist community of northern Tanzania.

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Supplementary materials



S1. Two-Graphs Receiving Operating Characteristics. The black dotted line indicates the threshold used as cut-off for classification. At this value, the sum of sensitivity and specificity is maximized.

S2. Pricing sources and details assumed for all component costs in cost estimation (currency: USD): Price assumes purchase in Tanzania Shillings (conversion rate to 1 \$ (USD) on 11/07/2019 from Central Bank of Tanzania at Spot Buying: 2,277.69 TZS), except for items purchased from APHA Scientific as the currency was the pound sterling (conversion rate to 1 £ (GBP) on 11/07/2019 from Central Bank of Tanzania at Spot Buying: 2,851.21 TZS); U/PS: units used per patient sample; U/QC: number of units for QC per batch (run); T/K: tests per kit; YL: 10 years of lifespan; MC/Y: maintenance cost per year in USD; PU/D: percentage use for method per day; RBT: the Rose Bengal test (both RBT 1:2 and RBT 1:8 protocols); cELISA: competitive enzyme-linked immunosorbent assay.

| Cost category | Item | Reference / manufacturer | Price | Details | | |
|---------------------------------|-------------------|---|--------|--|---|--|
| Reagents and consumables | | | | U/PS | U/QC | Other details |
| | Eurocell kit | 56/EME/1210/VER-01 | 7.03 | 1 | 2 | 100 T/K |
| | Fortress kit | FEBAMP-FEBRILE v3 | 14.05 | 1 | 2 | 100 T/K; controls included |
| | Arkray kit | 15SA402-05/3-05 | 13.17 | 1 | 2 | 100 T/K; controls included |
| | Amitech kit | Amitech Diagnostics Inc. | 13.17 | 1 | 2 | 100 T/K |
| | RBT antigen | APHA Scientific | 316.71 | 1 | 2 | 4,000 T/K |
| | cELISA kit | APHA Scientific | 264.13 | 1 | 2 | 400 T/K; controls included |
| | Eurocell controls | 56/EME/1210/VER-01 | 7.03 | 0 | 1 | 10 T/K |
| | Amitech controls | Amitech Diagnostics Inc. | 5.71 | 0 | 1 | 10 T/K |
| | RBT controls | APHA Scientific (RAB1003 and RAB 0701) | 65.09 | 0 | 1 | 4,000 T/K |
| | Gloves | Fisher Scientific | 3.29 | 2 | 2 | pack of 100 units |
| | Tips | ABS | 25.07 | 2 (except 4 for RBT 1:8 and 7 for cELISA) | 2 (except 7 for cELISA) | pack of 1,000 units of 1,000 µL without filter |
| | Stirrer | Local | 0.22 | 1 (except 0 for cELISA) | 1 (except 0 for cELISA) | pack of 100 toothpicks |
| | Saline | Local | 1.54 | 5 (except 2 for RBT 1:8, and 0 for RBT 1:2, Fortress and cELISA) | 1 (except 0 for RBT 1:2, Fortress and cELISA) | 1L of clinical grade saline; 1 unit = 0.05 ml |
| | Tile | Local | 1.01 | 0.001 | 0.001 | 1 unit = 1 x 0.5 ft tile |
| | Disposable gown | Fischer Scientific | 6.59 | 0.1 | 0.1 | pack of 25 units |
| Surface disinfectant wipes | Local | 7.50 | 0.1 | 0.1 | pack of 200 units | |

| | | | | | | |
|----------------------------------|----------------------------------|--------------------|----------|---|-------------|---------------------------------------|
| | Hand towel roll | Local | 7.50 | 0.2 | 0.2 | 6 rolls of 100 m; 1 unit = 1 m length |
| | Permanent marker | Local | 6.59 | 0.01 | 0.01 | pack of 12 units |
| | Paper A4 | Local | 4.39 | 1 | 1 | pack of 500 units |
| Equipment | | | | YL | MC/Y | PU/D |
| | Refrigerator | Westpoint | 285.38 | 10 | 30 | 5 |
| | Thermometer | Invitrogen | 15.00 | 10 | 1 | 1 |
| | Computer with printer | Dell | 439.04 | 10 | 50 | 2 |
| | Pipette 20-200 | Fischer Scientific | 150.00 | 5 | 5 | 10 |
| | Pipette 10-100 | Fischer Scientific | 150.00 | 5 | 5 | 0 (except 10 for cELISA) |
| | Pipette 100-1000 | Fischer Scientific | 150.00 | 5 | 5 | 0 (except 10 for cELISA) |
| | ELISA reader ⁵ | BenQ | 79.03 | 15 | 15 | 30 |
| Personnel | Annual salary | n/a | 3,951.37 | plus 20% of administration costs | | |
| Facility (price per year) | Rent | n/a | 5,000.00 | n/a | | |
| | Building maintenance | n/a | 250.00 | n/a | | |
| | Gas and heating | n/a | 0.00 | n/a | | |
| | Water | n/a | 110.00 | n/a | | |
| | Electricity | n/a | 110.00 | n/a | | |
| | Internet and telephone | n/a | 50.00 | n/a | | |
| | Other costs | n/a | 50.00 | n/a | | |
| Quality control | Annual proficiency testing panel | n/a | 100.00 | n/a | | |
| | Annual audit | n/a | 350.00 | With 10 methods being audited each year | | |

S3: Values and distributions assumed for the probabilistic sensitivity analysis. Average time required to run a batch of (ATRB) Eurocell, Fortress, Arkray and Amitech: 60 minutes; ATRB RBT(1:2): 30 minutes; ATRB RBT(1:8): 35 minutes; ATRB cELISA: 120 minutes; Laboratory average working hours per day, days per year, weeks per year, runs per week, and tests per year: 8, 312, 52, 6, 1560; RBT: the Rose Bengal test (both RBT 1:2 and RBT 1:8 protocols); cELISA: competitive enzyme-linked immunosorbent assay.

| Parameter | Value / distribution | Units |
|--|-----------------------------|--------------|
| Average time required to run a batch of (ATRB) | Uniform (50,70) | Minutes |
| ATRB RBT (1:2) | Uniform (25,35) | Minutes |
| ATRB RBT (1:8) | ATRB RBT (1:2) + 5 | Minutes |
| ATRB cELISA | Uniform (110,130) | Minutes |
| Laboratory average working hours per day | Uniform (6,10) | Hours |
| Laboratory average working days per week | Uniform (5,7) | Days |
| Laboratory average working weeks per year | Fixed (52) | Weeks |
| Testing schedule (number of runs per week) | Uniform (5,7) | N/A |
| Annual salary | Gamma (7902,2) | USD |
| Rent / year | Gamma (1250,0.25) | USD |
| Building maintenance / year | Gamma (62.5,0.25) | USD |
| Water / year | Gamma (110,1) | USD |
| Electricity / year | Gamma (110,1) | USD |
| Internet and telephone / year | Gamma (25,0.5) | USD |
| Other costs / year | Gamma (25,0.5) | USD |
| Annual proficiency testing panel | Gamma (50,0.5) | USD |
| Annual audit | Gamma (175,0.5) | Units |

S4. Pairwise comparison of sensitivity (top / right; blue cells) and specificity (bottom / left; red cells) estimates from each combination of index tests (n=218). All pairwise metrics were tested by differences between proportions. RBT - the Rose Bengal test (both RBT 1:2 and RBT 1:8 protocols); cELISA - competitive enzyme-linked immunosorbent assay. The statistical significance of the test of pairwise differences are shown as follows: * p-value < 0.05; ** p-value < 0.01; *** p-value < 0.001.

| | | Test | | | | | | |
|------|----------|---------|---------|---------|--------|----------|----------|--------|
| | | RBT 1:2 | RBT 1:8 | Amitech | Arkray | Eurocell | Fortress | cELISA |
| Test | RBT 1:2 | | | * | | | * | |
| | RBT 1:8 | | | | | | * | |
| | Amitech | *** | *** | | | | | ** |
| | Arkray | *** | *** | | | | | |
| | Eurocell | *** | *** | ** | * | | | * |
| | Fortress | *** | *** | | * | *** | | ** |
| | cELISA | ** | *** | *** | *** | *** | *** | |

 Sensitivity  Specificity

S5. Index and reference test results for each sample. RBT - the Rose Bengal test (both RBT 1:2 and RBT 1:8 protocols); cELISA - competitive enzyme-linked immunosorbent assay.

