A One Health Multi-sectoral National Strategy for Brucellosis Prevention and Control in Kenya

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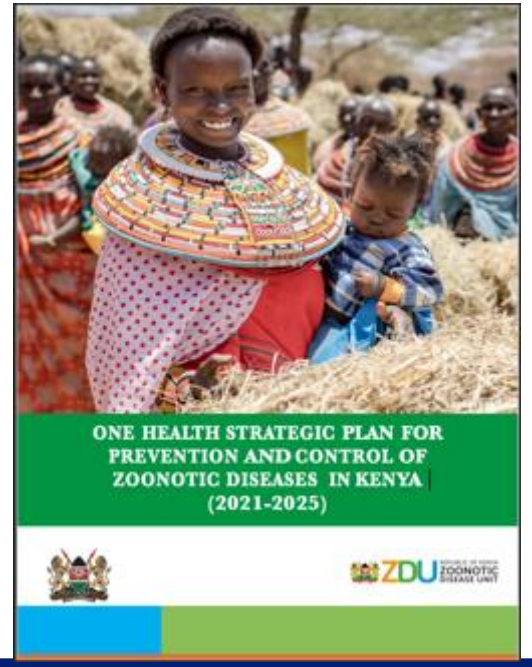
Background

Score**	Indicators - Zoonotic Disease*		
	P.4.1 Surveillance systems in place for priority zoonotic diseases/pathogens	P.4.2 Veterinary or Animal Health Workforce	P.4.3 Mechanisms for responding to infectious zoonoses and potential zoonoses are established and functional
No Capacity - 1	No zoonotic surveillance systems exist	Country has no animal health workforce capacity capable of conducting one health activities.	No mechanism in place
Limited Capacity - 2	Country has determined zoonotic diseases of greatest national public health concern but does not have animal zoonotic surveillance systems in place	Country has animal health workforce capacity within the national public health system.	National policy, strategy or plan for the response to zoonotic events is in place
Developed Capacity - 3	Zoonotic surveillance systems in place for 1-4 zoonotic diseases/ pathogens of greatest public health concern	Animal health workforce capacity within the national public health system and less than half of sub-national levels.	A mechanism for coordinated response to outbreaks of zoonotic diseases by human, animal and wildlife sectors is established
Demonstrated Capacity - 4	Zoonotic surveillance systems in place for five or more zoonotic diseases/ pathogens of greatest public health concern	Animal health workforce capacity within the national public health system and more than half of sub-national levels.	Timely[4] and systematic information exchange between animal/wildlife surveillance units, human health surveillance units and other relevant sectors in response to potential zoonotic risks and urgent zoonotic events
Sustainable Capacity - 5	Zoonotic surveillance systems in place for five or more zoonotic diseases/ pathogens of greatest public health concern with system in place for continuous improvement	Animal health workforce capacity within the national public health system and at all sub-national levels. This includes a plan for animal health workforce continuing education	Timely[5] (as defined by national standards) response to more than 80% of zoonotic events of potential national and international concern



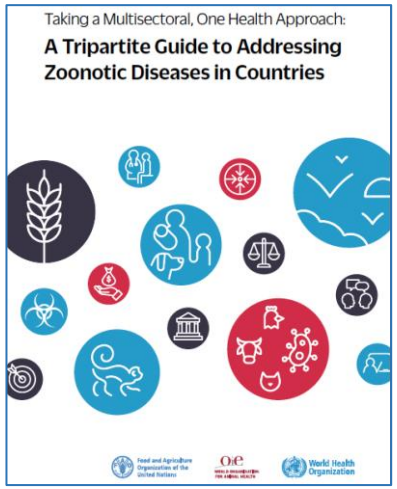
JEE recommendation

- Development of national control strategies for 2 priority zoonotic diseases: Brucellosis and Anthrax.
- **OHSP :** Strengthen surveillance, prevention and control of priority zoonotic Diseases (PZD)

Why Brucellosis - a PZD?

Socioeconomic Impacts

- Livestock deaths, abortions, loss of productivity, nutritional insecurity,
  - Loss of revenue and cost of intervention



Public Health Burden

- Morbidity, Burden of Disease, Cost of treatment, AMR

Lack of Standardized Diagnostics

- Presumptive & confirmatory diagnostic algorithms for animals and humans

Human Treatment Guidelines

- Combination therapies : Standardized treatment regimens

Risk Mapping and Vaccine Uptake

- Cost effective targeted control

Multisectoral Developmental Process

Food and Agriculture Organization of the United Nations

One Health HORN Regional Network For The Horn of Africa

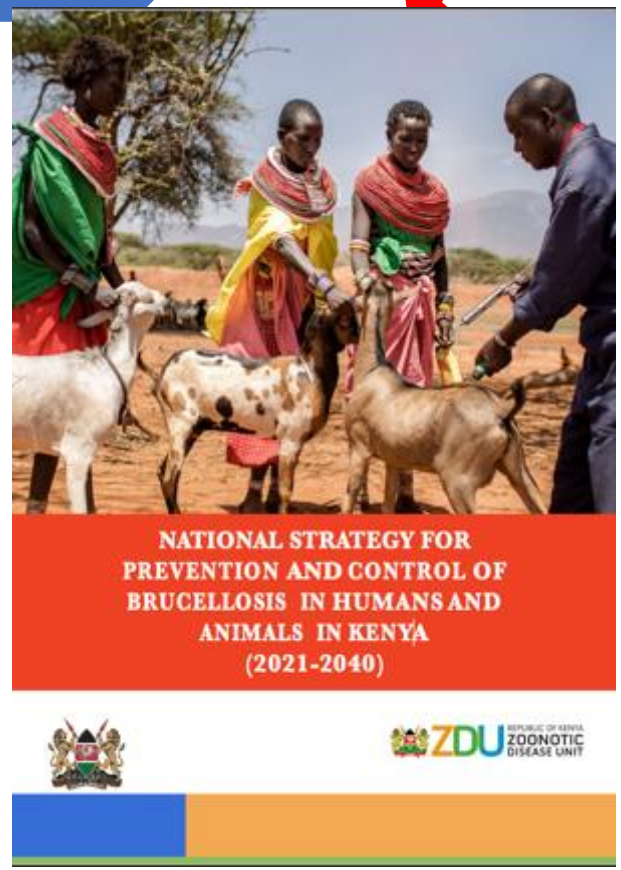
MARCH 2019
DEVELOPMENT
(CONSULTANTS)

MAY 2019
DRAFT 1 REVIEW
(NAIROBI)

JULY-AUGUST 2019
DRAFT 2
REVIEW
(NAKURU)

SEPTEMBER 2019
VALIDATION
(NAIROBI)

2017 –JEE
JANUARY 2019
TOR BY FAO



One Health Stakeholder Situational Analysis

Food and Agriculture Organization of the United Nations

One Health Regional Network For The Horn of Africa

INSTITUTIONAL CAPACITY

SURVEILLANCE

DIAGNOSIS & TREATMENT

LEGISLATION & POLICY

KNOWLEDGE /CONTROL

BIOSAFETY/BIOSECURITY

RESEARCH/ SKILLS

FINANCIAL CAPACITY

STRENGTHS

- One Health Coordinating office -ZDU
- CVL,RVIL,NPHL,KEMRI,ILRI,KALRO
- WHO,FAO,OIE,CDC,AUIBAR,ACDC
- Vaccines availability
- Joint Surveillance- KLWSS, IDSR
- Biocontainment facilities – BSL2/3
- Budgetary allocation –sectoral/county
- SME- Epidemiologists/Lab/sociologists
- Joint outbreak response

WEAKNESSES

- Poor knowledge of disease
- Poor coordination and communication
- Lack of OH legal framework/policy
- Lack of databases or publications
- Low vaccination coverage (stockpiles)
- Insufficient advocacy – IEC
- Misdiagnosis/treatment (AMR)
- No standard diagnosis or treatment

BRUCELLOSIS

OPPORTUNITIES

- List of PZD
- OH platforms –local/regional
- Research collaboration
- Media and mobile coverage
- Technical support –FAO,OIE,WHO
- IBLI
- Reference laboratories
- Curriculum development

THREATS

- Weak collaboration
- Data sharing and communication
- Lack of funding
- Lack of human vaccines
- Insecurity and poverty
- Sociocultural barriers

Strategic Framework

Vision: To have a nation that is free from **Brucellosis**

Mission: To safeguard human health by improving safety of animal source products and enhance livestock productivity through an integrated one health approach

Goal: To prevent, control and eliminate **Brucellosis** in the country through an integrated one health intervention strategy

General Objective: To reduce the burden and socio-economic impact caused by **Brucellosis** by **95%** in human and animal populations in Kenya by **2040**

Strategic Objectives

- To harmonize appropriate legal /policy framework & institutional arrangement in the implementation of the **Brucellosis** control strategy

- To institutionalize **Brucellosis** testing among the febrile human cases (AFI) in public and private health facilities

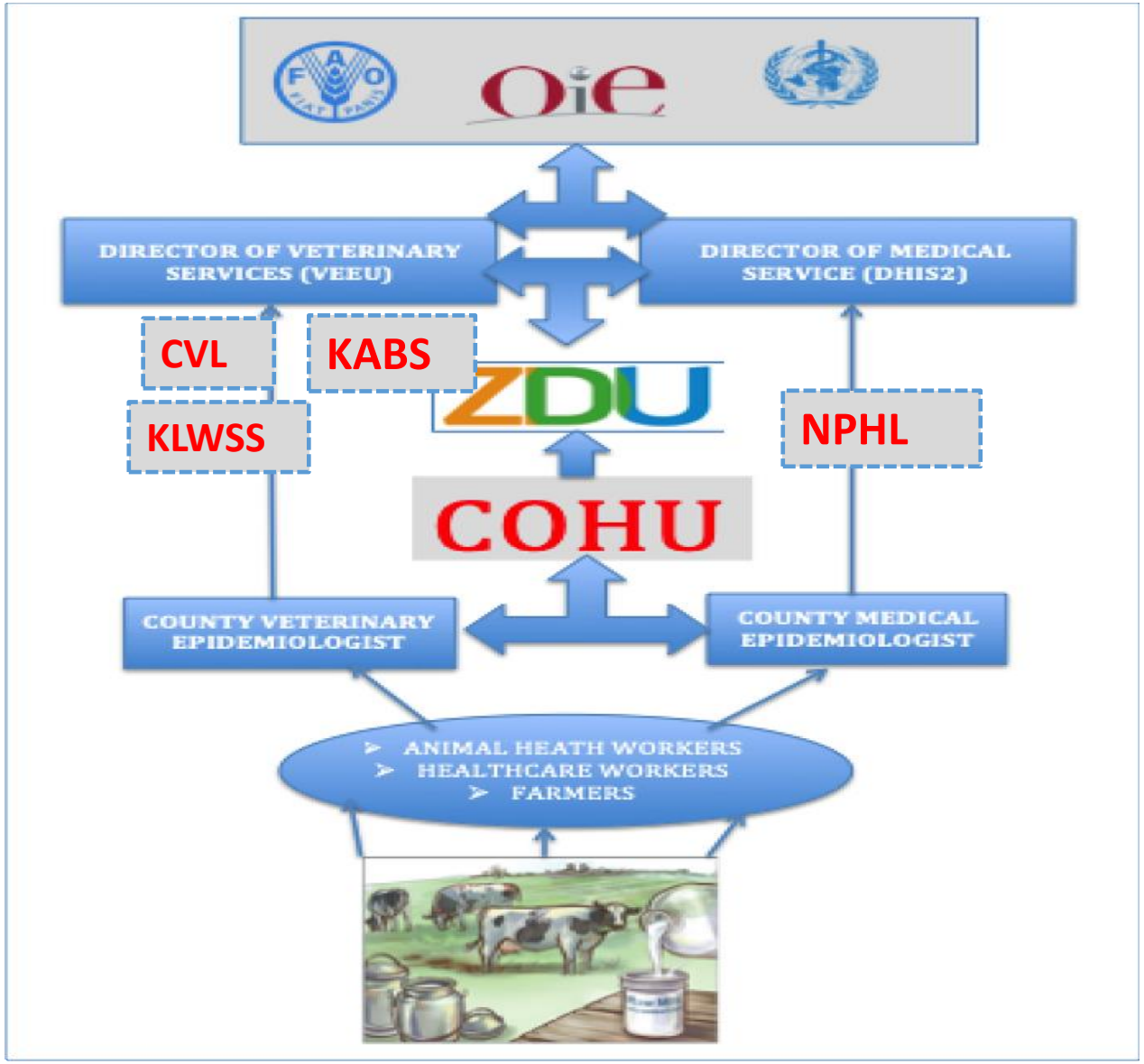
- To strengthen laboratory capacity for human and animal Brucellosis diagnosis at national and subnational level

- To enhance advocacy, communication and social mobilization for prevention and control of **Brucellosis**
- To advocate and mobilize resources for supporting the implementation of **Brucellosis** control strategy

Integrated Human-Animal Surveillance

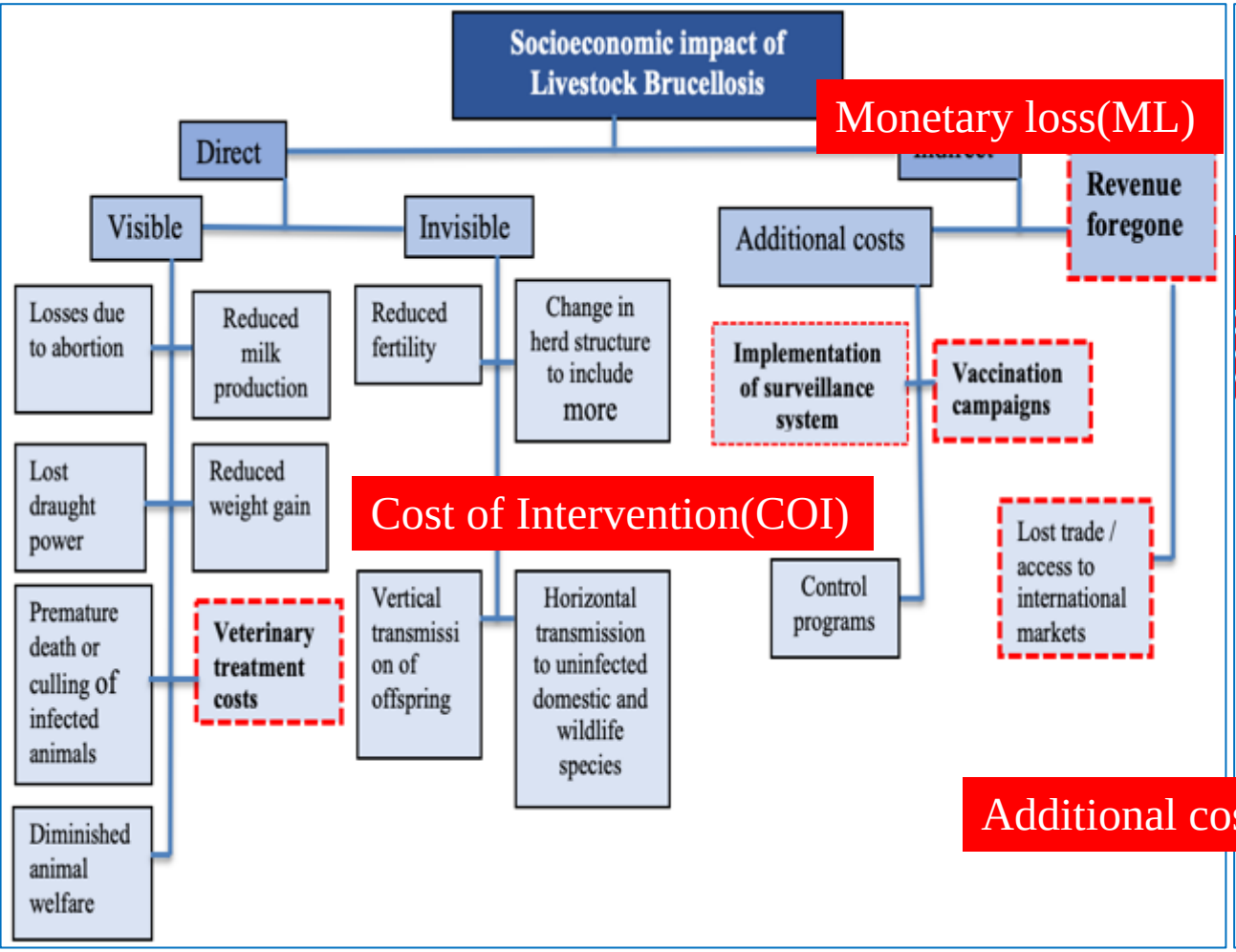
- **ZDU** a platform for joint coordination, surveillance, outbreak response protocols, data sharing and risk communication of disease information across all sectors (animal, health wildlife and environment)

- Syndromic Surveillance is a key element for management of prevention and control of Zoonotic diseases

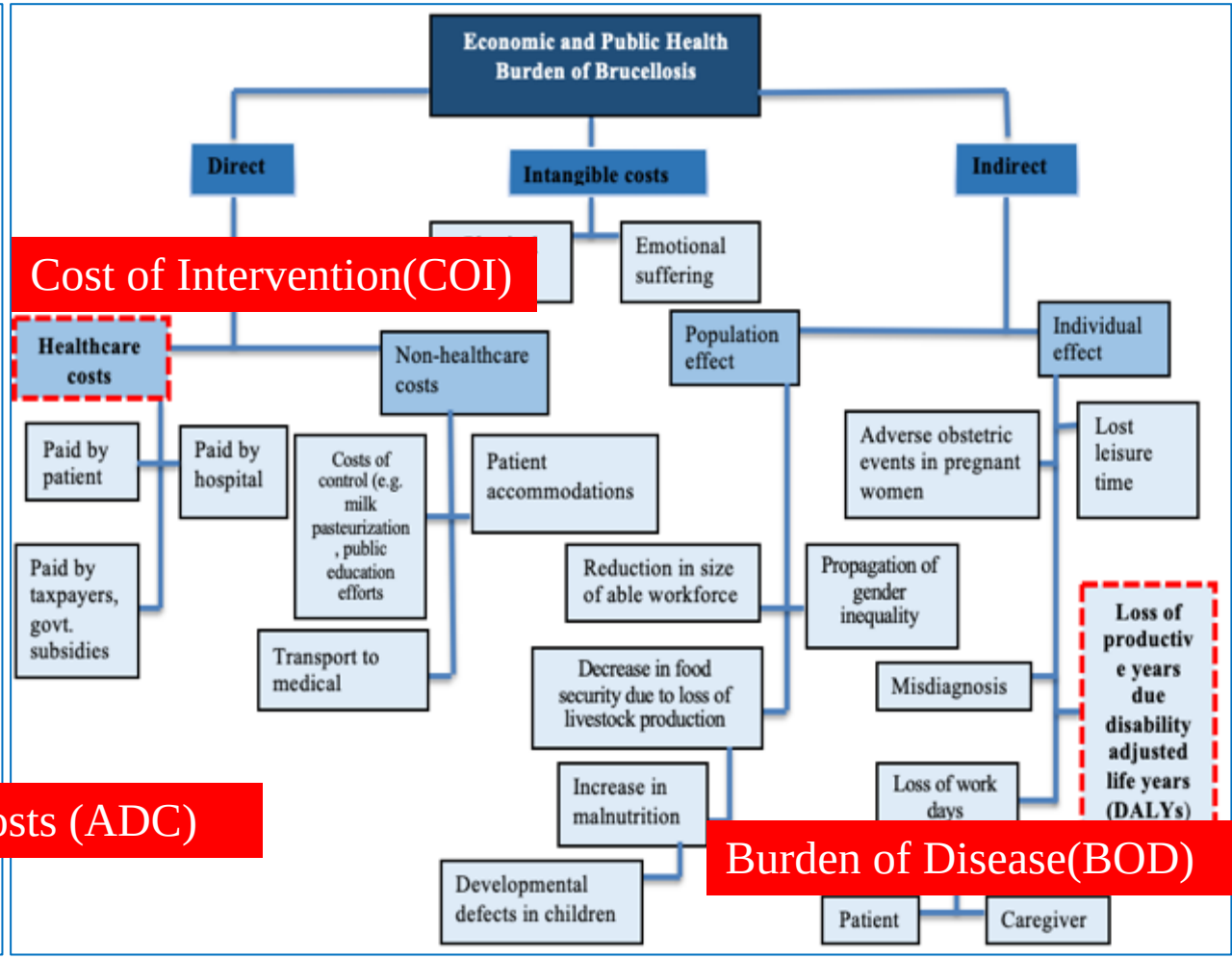


Socioeconomic Impacts and Public Health Burden

ANIMALS



HUMANS



Standardised Diagnostic Algorithms

PLOS | NEGLECTED TROPICAL DISEASES

HUMANS

de Glanville et al 2014

RESEARCH ARTICLE

Poor performance of the rapid test for human brucellosis in health facilities in Kenya

William A. de Glanville[1,2¤]*, Raquel Conde-Álvarez[3], Ignacio Moriyón[3], John Njeru[4,5], Ramón Díaz[3], Elizabeth A. J. Cook[1,2], Matilda Morin[6], Barend M. de C. Bronsvoort[7], Lian F. Thomas[1,2], Samuel Kariuki[4], Eric M. Fèvre[2,8]*

KEY FINDING: Disagreement of diagnostic performance between the FBAT and RBT, Coombs, SAT, LFA

SIGNIFICANCE: Overdiagnosis, Poor treatment and resultant AMR

POC and Surveillance Gold Standard = The Rose Bengal (RBT)

PLOS | NEGLECTED TROPICAL DISEASES

ANIMALS

Gusi et al 2017

RESEARCH ARTICLE

Comparative performance of lateral flow immunochromatography, iELISA and Rose Bengal tests for the diagnosis of cattle, sheep, goat and swine brucellosis

Amahyel M. Gusi[1], Wilson J. Bertu[1], M. Jesús de Miguel[2], Lucía Dieste-Pérez[2¤], Henk L. Smits[3], Reuben A. Ocholi[1], José M. Blasco[2], Ignacio Moriyón[4], Pilar M. Muñoz[2]*

KEY FINDING: Similar diagnostic performance seroprevalence by RBT and LFA on Fulani Cattle

SIGNIFICANCE: RBT is recommended for resource-limited laboratories- low cost and human diagnosis

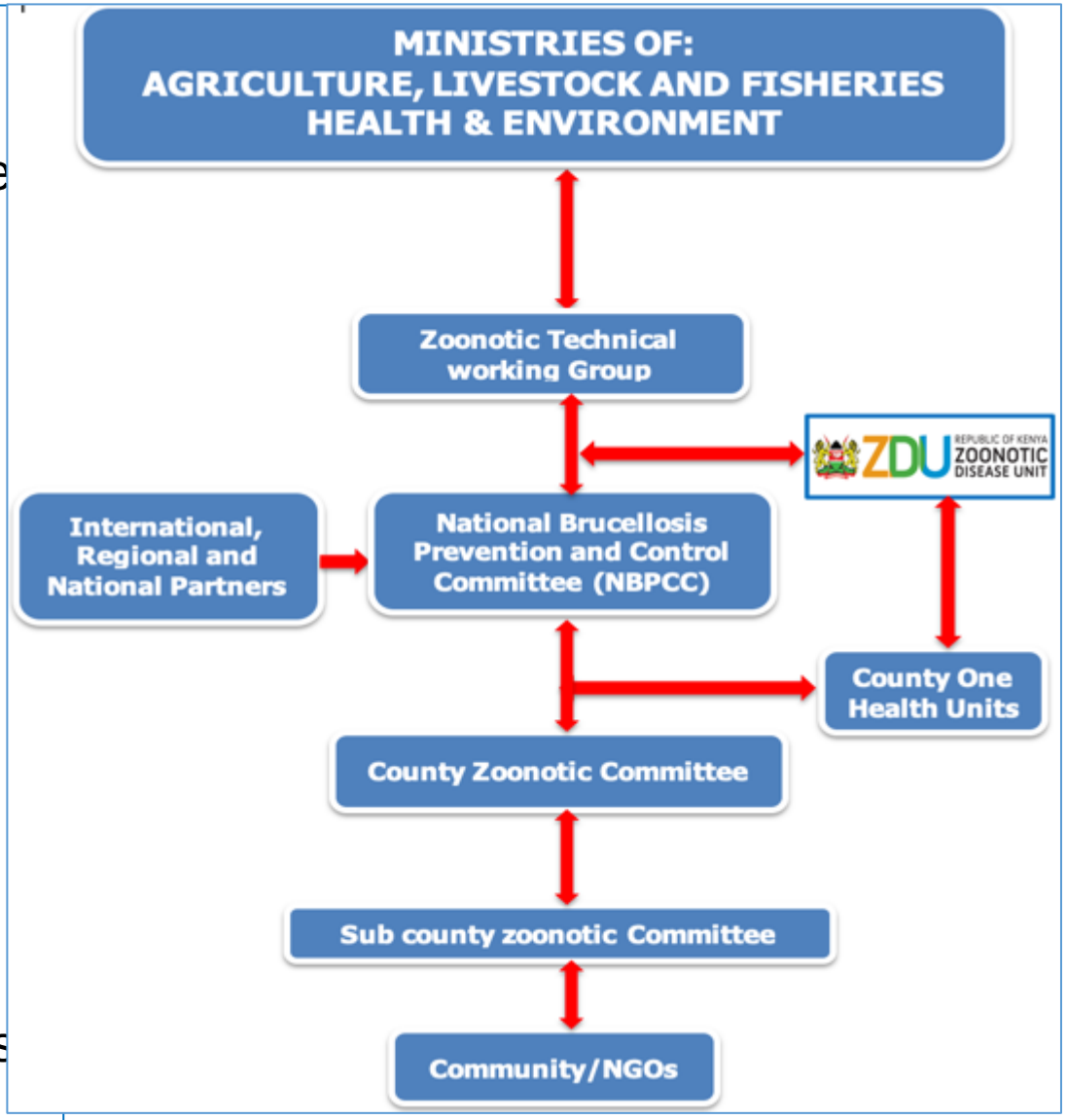
Treatment Guidelines for Human Brucellosis

SUBJECT	RECOMMENDED THERAPY
Adults, **Children > 8 years**	Combination therapy to decrease the incidence of relapse: ▪ Oral doxycycline *(2-4 mg/kg per day, maximum 200 mg/day, in 2 divided doses)* or ▪ Oral Tetracycline *(30-40 mg/kg per day, maximum 2 g/day, in 4 divided doses)* -and- ▪ **Rifampin** *(15-20 mg/kg per day, maximum 600-900 mg/day, in 1 or 2 divided doses). Min 6wk* Combination therapy with (**TMP-SMZ**) can be used if tetracyclines are contraindicated.
Children < 8 years	▪ Oral TMP-SMZ *(trimethoprim, 10 mg/kg per day, maximum 480 mg/day; and sulfamethoxazole, 50 mg/kg per day, maximum2.4g/day)* divided in 2 doses for 4 to 6 weeks. Combination therapy: consider adding rifampin.
Pregnancy	Tetracyclines are contraindicated for pregnant patients
Complicated Cases (endocarditis, meningitis, osteomyelitis, etc.)	▪ **Streptomycin* or gentamicin** for the first 14 days of therapy in addition to a tetracycline for 6 weeks (or TMP-SMZ if tetracyclines are contraindicated). ▪ Rifampin can be used in combination with this regimen to decrease the rate of relapse. ▪ For life-threatening complications, such as meningitis or endocarditis, duration of therapy often is extended for 4 to 6 months. ▪ Case-fatality rate is< 1%. ▪ Surgical intervention should be considered in patients with complications such as deep tissue abscesses or hygromas

Pre-implementation Phase (operationalization)

- **Establishment of the National and Subnational taskforces**
  - National Brucellosis Prevention and Control Committe (NBPCC)
  - County and Subcounty Zoonoses Control Committee (CZCC/SCZCC)

- **Guidelines for operationalization of the strategy**
  - Human case diagnosis and management
  - Outbreak investigation using one health approach
  - Surveillance in humans, animals and wildlife
  - Vaccination in animals integrated with identification
  - Infection prevention and Control
  - Biosafety/Biosecurity : bio-containment,
  - Sample collection, processing and storage
  - Laboratory diagnosis
  - Compensation /Indemnity for test and slaughter cases
  - Risk communication



Implementation Phases – Roadmap

Food and Agriculture Organization of the United Nations

One Health HORN Regional Network For The Horn of Africa

PHASE	1 (2021-2023)	2 (2024-2032)	3 (2033-2037)	4 (2038-2040)
SITUATION	▪ Limited disease information ▪ Structured control plan developed	▪ Adequate disease information ▪ Control Plan implemented	▪ Brucellosis at low levels within susceptible livestock and human population	▪ No evidence of Brucellosis in Livestock ▪ No human cases
OUTCOME	Better understanding of the disease situation	Brucellosis prevalence/incidence rates in livestock and humans reduced by 50%	▪ Reduced impact of Brucellosis in livestock by 80% ▪ Reduced human incidence by 80%	▪ Reduced impact of Brucellosis in livestock by 95% & humans by 99% ▪ Zonal self declaration free from Brucellosis with/without vaccination
ACTIVITIES	▪ Conduct baseline KAP surveys and epidemiological investigations ▪ Develop control strategy ▪ National taskforce ▪ Risk mapping ▪ Cost benefit & Burden analysis	▪ Livestock vaccination coverage (80%) ▪ Diagnosis & treatment capacity building ▪ Facilitate transboundary multisectoral collaboration ▪ Sero-monitoring ▪ Artificial insemination	▪ Sustain vaccinations ▪ Risk map revision ▪ Lab and clinical QA ▪ TWG meetings ▪ AMR sensitivity testing ▪ Sentinel animal surveillance ▪ Advocacy and awareness ▪ Screening of genetic materials and AI	▪ Data provision for zonal self declaration of Brucellosis free status (OIE) ▪ Investigate and clear all suspected brucellosis cases by targeted vaccinations ▪ Control wildlife movement at human-wildlife-livestock interphase

▪ Surveillance, Monitoring and Evaluation
▪ Operational Research
▪ Lab and clinical capacity building

Declining levels of Human and Animal Brucellosis and Enhanced diagnostic capacity of national (CVL & NPH) labs

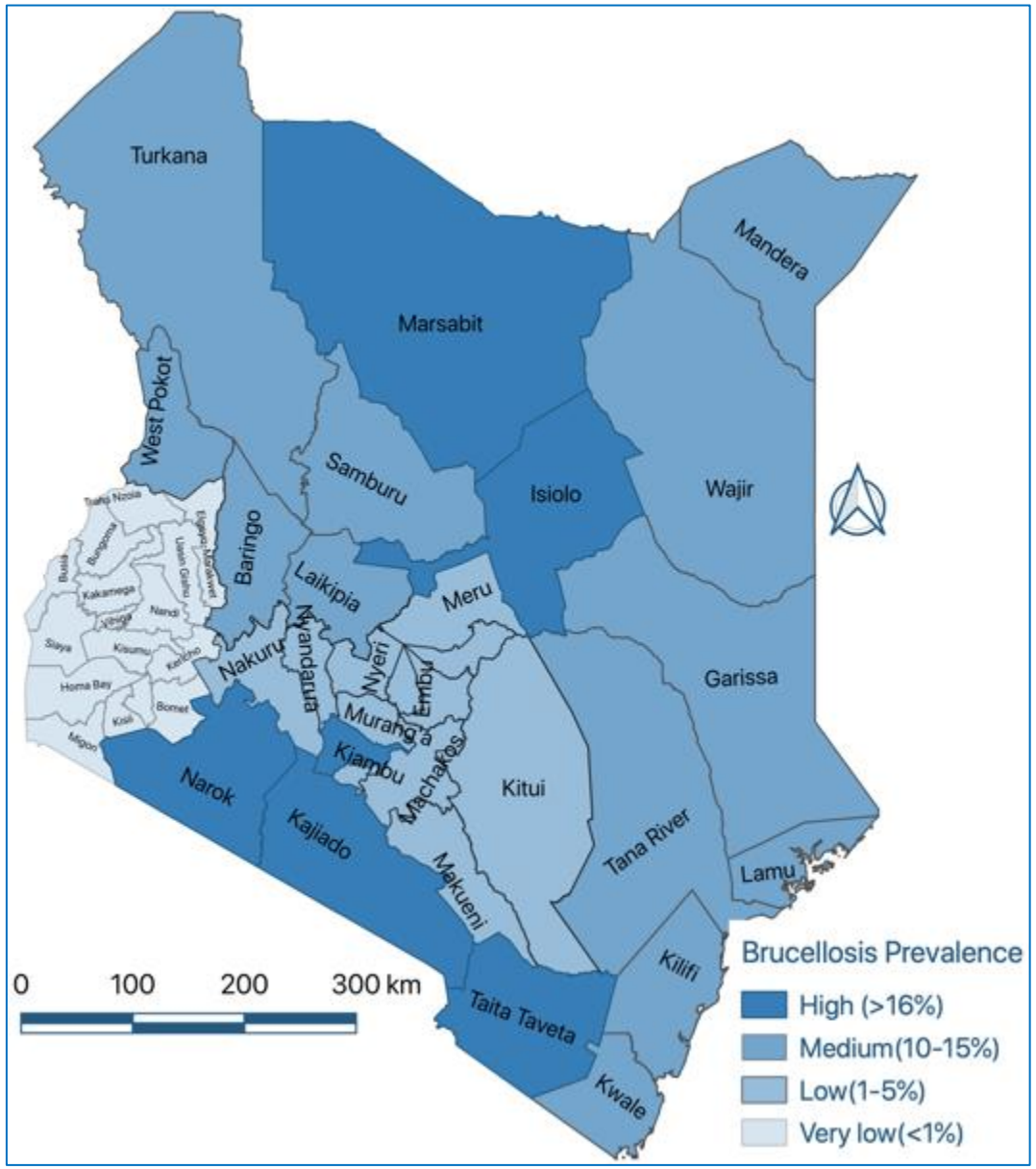
Strategic Activities

- **Harmonize appropriate legal and policy frameworks**
  - Development and institutionalization of a **one health policy** for joint preparedness, surveillance and response plans
  - Operationalize the County Health Units (COHU) at subnational level

- **Strengthen laboratory capacity for human and animal Brucellosis diagnosis**
  - Through training of field and lab personnel to support brucellosis surveillance
  - Equip laboratories for brucellosis diagnosis and establish targeted testing schemes at farm level

- **Promote and coordinate research and innovation in brucellosis Control**
  - Development and validation of rapid field and laboratory confirmatory tests that are cost effective.
  - Epidemiological Risk mapping
  - Disease burden analysis (DALYS) and Socio- economic modelling for vaccine uptake

Zonal Risk Based Approach



Achievements and Next Steps

- **Launch of the National Brucellosis Strategy – (October 2021)**
  - Development of Guidelines on:
    - Joint outbreak investigation, Risk communication, Human case management and vaccination approaches

- **Applied and Operational research for implementation (ongoing)**
  - Risk factor analysis
  - Spatiotemporal modelling
  - Vaccine uptake studies
  - Diagnostic algorithms

- **One Health Policy development (2022)**
  - Harmonization of Human and animal health joint protocols and strengthening of collaborations at the subnational level (**COHU**)

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ILRI INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

CGIAR

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