

Zoonotic Tuberculosis in Malaysia

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Animal Production Systems

Diverse Ruminant Sector

Comprises intensive commercial dairy farms, feedlot beef systems, and semi-intensive beef cattle.

Susceptible Population Size (2023)

Dairy: **12,025** | Beef Cattle: **37,596** | Buffaloes: **13,271**

Production Interface

Semi-intensive operations and pasture grazing create critical potential livestock-wildlife contact zones.

Biosecurity Standards

Enforced **myGAP** certification to enhance herd immunity. 3-Phase Screening Program for 1-year Disease Free Certificate.

Malaysian Good Agricultural Practice (3 Phase Screening Programme)

Phase 1 - Active surveillance and baseline screening

Phase 2 - Confirmation of diagnostic and containment screening

Phase 3 - Past eradication monitoring and freedom certification



Epidemiological Status & Target

NATIONAL HERD TARGET

< 0.1%

Zonally Phased Elimination

The national strategy mandates reducing herd prevalence below 0.1% across designated zones to achieve progressive nationwide TB-free certification.

Sporadic & Notifiable Status

Strict Legal Mandate: Bovine Tuberculosis (zTB) is a Notifiable Disease under Section 31 of the Animals Act 1953 (Amended 2013). Mandatory reporting within 24 hours.

Pathogen Complex: Driven by *Mycobacterium bovis* (MtbC), affecting multi-species ruminant populations.

Geographic Distribution & Trends

Localised Clusters: Concentrated in states with large-scale commercial dairy operations (e.g., Selangor). **Positivity:** < 1–2% in screened livestock.

High-Risk Borders: Critical transit gateways along the northern borders (Perlis, Kedah, Kelantan).

Density Hotspots: Intensive dairy and cattle breeding clusters in Perak and Johor.

Disease Impact & Containment

Mandatory 'Stamping-Out' Policy: Enforces the immediate culling of any animal testing positive to prevent transmission.

Overall Impact: Remains strictly contained at very low levels nationwide due to fast regulatory intervention.

Prevention and Control Strategy

1. SURVEILLANCE ACTIVITIES

PRE-INCURSION

•Active Surveillance

Caudal Fold Test (CFT)

Primary skin screening in dairy farms and transit points.

Gamma Interferon (IFN- γ)

Blood cellular assay for early & hidden infection detection.

•Passive Surveillance

Suspect Case Reporting

Flagged by livestock owners, clinicians & abattoir workers.

Abattoir Inspections

Ante/Post-mortem screening for TB granulomatous lesions.

Key Surveillance Targets & Requirements:

- **Commercial Dairy Farms:** Mandatory scheduled routine screening and Disease Free Herd Certification.
- **Import & Transit Gateways:** Strict border quarantine, physical isolation, and international clearance protocols.
- **Laboratory Assays:** Rapid PCR and bacterial culture confirmation for all suspect lesions flagged during slaughter.

2. CONTAINMENT & CORDON

UPON DETECTION

Restrict Movement

Immediate farm lockdown & quarantine perimeter hold order.

Reactor Culling

Humane depopulation to prevent horizontal herd transmission.

Abattoir Traceback

Lesion tag tracking directly back to source farm of origin.

Decontamination

Disinfection of pens, troughs & machinery.
According to APTVM 22(d) :
1/2010 Disinfection

3. PREVENTION & RAPID RESPONSE

RECOVERY STAGE

Disease Free Status

Maintain consecutive negative status across zones.

Double Fencing

Mandated infrastructure barriers in high-risk spatial belts.

Pre-Purchase Screening

Mandatory test clearances prior to herd restocking.

Milk Pasteurization

Compulsory heat treatment (62°C for 30 min) under quarantine.

Disease Index Management (MADIC)

Index Stage	Color	Case Definition & Protocol Status	Standard Actions Required
Suspected	Grey	Initial field complaint, clinical signs, or positive CFT screening test	EpiS 01 report within 24h, farm quarantine, confirmatory CCT testing
Active	Red	Confirmed positive by CCT, PCR, or bacteriological culture	Activate Red index in MADIC; immediate notification to District Health (PKD)
Control	Yellow	Active implementation of culling and sanitary measures	Humane culling, carcass condemnation, farm disinfection, EpiS 06 submission
Recovered	Green	All cattle >6 weeks pass 2 consecutive CCT tests 3 months apart	Quarantine lifted; restricted livestock movement allowed under supervision
TB-Free Herd	White	Passed follow-up test 3 months post-Green status with no recurrence	Free status certified; mandatory annual surveillance screening to maintain

Diagnostic Protocols & Testing

▼ Primary Screening Tests

Caudal Fold Tuberculin (CFT) Test

Field screening via intradermal injection of Bovine PPD at the tail fold (caudal fold) in animals >6 weeks old. Read at 72 hours; palpable swelling, induration, or hardness triggers suspect status.

Gamma-Interferon (γ -IFN) Assay

Laboratory-based whole-blood assay (Bovigam® in heparin tubes) assessing cell-mediated immunity (CMI). Enables rapid early detection before advanced skin test responsiveness.

✓ Confirmatory Diagnostic Tests

Comparative Cervical Test (CCT)

Official field confirmation comparing intradermal Avian and Bovine PPD on mid-cervical skin. Caliper differential (>4mm positive, 1–4mm doubtful) eliminates environmental non-specific sensitization.

Real-Time PCR (qPCR)

Direct species-specific molecular amplification detecting pathogenic *Mycobacterium bovis* and *Mycobacterium tuberculosis* Complex (MtbC) DNA from suspicious lung lesions, liver, and lymph nodes.

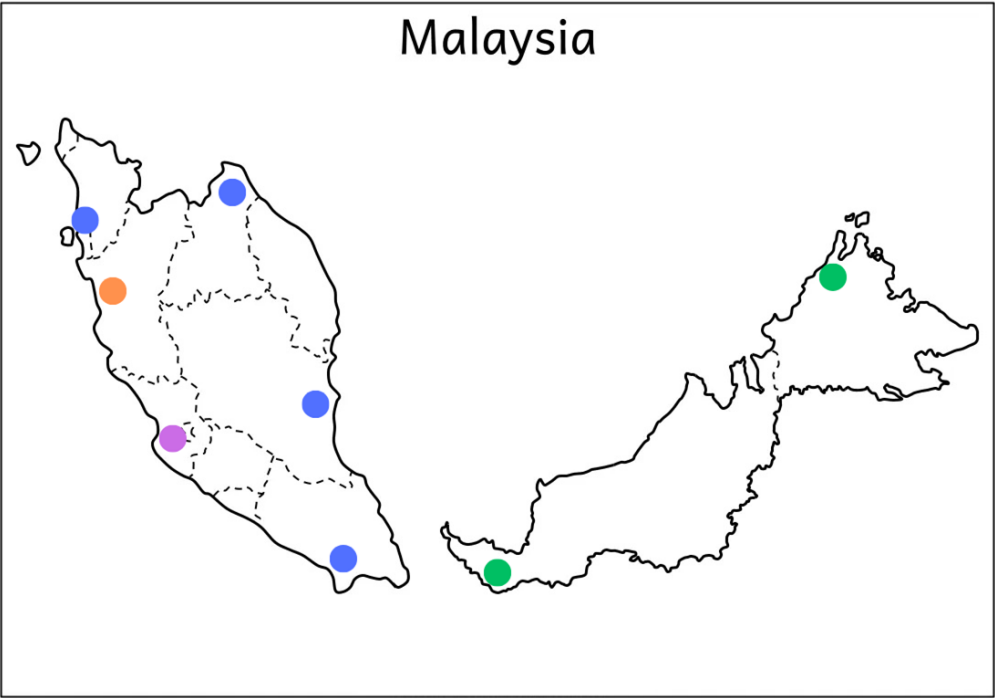
Bacterial Isolation

Gold-standard mycobacterial culture on selective media. Decontamination with hexadecylpyridinium-chloride detergent HPC 0.75% (WOAH Chapter 3.1.13)

DVS Veterinary Laboratory Network



mapOfficial DVS Laboratory Locations & Regional Coverage



- VRI Apex Reference Lab
- MVW Tengah / MKAV
- Veterinary Regional Lab
- State Labs (East M'sia)

starNational Reference Institutes

Veterinary Research Institute (VRI Ipoh): Apex reference lab for bacterial isolation, *M. bovis* culture, PCR, and histopathology.

Veterinary Public Health Laboratory (Sepang): National zoonotic food safety lab, dairy testing, and pasteurization audit.

Milk Quality Control Laboratory (Melaka): Specialized in milk quality, grading and biochemistry.

domainVeterinary Regional Laboratory & Coverage

MVW Utara Bukit Tengah (MVK Bukit Tengah)

Coverage: Perlis, Kedah, Pulau Pinang, and North Perak

MVW Timur Kota Bharu (MVK Kota Bharu)

Coverage: Kelantan and North Terengganu

MVW Tenggara Kuantan (MVK Kuantan)

Coverage: Pahang and South Terengganu

MVW Tengah / MKAV Sepang (MVK Petaling Jaya)

Coverage: South Perak, Selangor, N. Sembilan, Melaka, West Pahang, KL

MVW Selatan Johor Bahru (MVK Johor Bahru)

Coverage: Johor

publicEast Malaysia State Laboratories

SVDL Muara Tuang (Kuching): Regional diagnostic hub with sub-labs in Bintulu, Miri, and Limbang.

SVDL Kepyayan (Kota Kinabalu): State diagnostic laboratory supporting disease surveillance across Sabah.

One Health & Multi-Sector Action



Public Health Link

Immediate case notification to District Health Offices (PKD / MOH) for contact tracing, active screening of farm hands, abattoir workers, and high-risk human cohorts.



Abattoir Surveillance

Stringent ante- and post-mortem meat inspection by veterinary officers; systematic tissue sampling of suspicious caseous tubercles for rapid laboratory verification.



Border & Transit Control

Integrated border enforcement with MAQIS, Royal Malaysia Police (PDRM), and Customs to curb illegal, uninspected ruminant imports and interstate movement.

Challenges & Strategic Solutions

Domain	Operational Challenge	Strategic Mitigation Solution
Subclinical Infection	Chronic asymptomatic latency makes early field clinical detection difficult.	Routine annual herd CFT testing complemented by gamma-interferon assays.
Livestock Movement	Unregulated livestock transit and risks of cross-border animal introductions.	Mandatory ePermit/eVetPermit approvals, ear-tag tracking, and joint police roadblocks.
Biosecurity Adoption	Variable biosecurity adherence among decentralized smallholder farmers.	Enhanced compensation payouts, targeted extension services, and myGAP incentives.
Wildlife Reservoir	Potential transmission cycle in peri-domestic wildlife and feral animals.	Cross-agency surveillance with PERHILITAN and multi-host epidemiological research.

Future Plans & Strategic Roadmap



Questions?

Thank you for your time and attention.
Please feel free to reach out through any of the
channels if you have further inquiries.

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