

Brucellosis Prevention and Control in the Mediterranean and Middle East Region

D. Tabbaa*, **A. Seimenis****

* **Faculty of veterinary medicine, Hama University, Hama, Syrian Arab Republic.**

** **WHO/MZCC, Athens, Greece.**

Conclusion:

Brucellosis remains a major public health problem in the Mediterranean and Middle East region. There is a lack of reliable estimates of the frequency of disease, both in humans and livestock, which precludes the formulation of inter-sectorial control policies.

Brucella melitensis and *B. abortus* have been identified, in most countries in the Middle East, supporting the notion of widespread presence of *Brucella* spp. especially *B. melitensis* across the region. *B. melitensis* biovars 1, 2, 3 and *B. abortus* biovars 1, 2, 3, 4 and 9 were the most frequently isolated *Brucella* spp. in the majority of the Middle Eastern countries and recently, molecular work in Egypt has shown the presence of *B. suis* biovar 1 in milk and lymph node samples from cattle. Frequent isolation of *B. melitensis* from cattle in the Middle East raises questions on the role of cattle in disease maintenance and transmission, which needs further investigation.

Detection of the disease in animals is routinely running by direct visualization (Stamp's staining), Isolation and identification of the causative agent, Indirect measurement of either humoral (antibodies) or cell-mediated immune (CMI) responses. Polymerase Chain Reaction (PCR) assays (including real-time format) is a useful additional technique for direct detection of the organism.

Serological screening of the humoral immune response used to be tested by RBT and Complement fixation tests (CFT) in small ruminants and iELISA or, to a lesser degree, cELISA using various antigens, with a high content of smooth lipopolysaccharide. Native-hapten (NH) gel precipitation tests have been developed and tested to allow for differentiation of infected versus vaccinated sheep. Fluorescence Polarisation Assays (FPA) are an official test for the diagnosis of bovine brucellosis, CMI-based brucellin skin-test used in unvaccinated flocks. Another serological test used in animals is Time-resolved fluorescence energy transfer (TR-FRET).

Serological test in humans are RBT, Tube serum agglutination (SAT) with and without 2-mercaptoethanol, Coombs test, Brucellacapt, iELISA, cELISA, lateral flow immunochromatography FPA and Multiple Cross Displacement Amplification (MCDA).

The disease can be transmitted to humans via the consumption of unpasteurized milk and dairy products from infected animals, and through direct contact with afterbirth and aborted

materials. Cases are likely to arise from subpopulations directly exposed to ruminants or from the consumption of unpasteurized dairy products from infected ruminants, with some ruminant subpopulations in the region showing among the highest seroprevalence levels compared to other endemic regions. Animal movement between different countries in the region and the intense animal movement between the Horn of Africa and the Middle East for trading represent a challenge for the control and require more collaboration at the regional and international level.

Brucellosis is responsible for significant economic losses to livestock production due to abortions, reduced milk yield and infertility in addition to the public health burden. Prioritizing brucellosis control over other diseases should be based on estimating human health burden expressed as disability adjusted life years (DALYs) and measuring of monetary impact, i.e. economic losses due to human illness and decreased livestock productivity

To monitor the disease in the Mediterranean and Middle East region a good regional, inter-sectorial, comprehensive surveillance system should be established. OIE, FAO and WHO can authorised a collaborative laboratory in the region to run this system, and national veterinary and public health authorities can provide regularly necessary data. Therefore, a well-designed regional inter-sectorial surveillance and monitoring system can assess the real burden of the disease in humans and animals to plan a comprehensive and effective brucellosis control policies.

Control strategies can based on:

- Introduction of extensive and effective vaccination programs for susceptible livestock (bovine, sheep, goats and, where appropriate, buffaloes and camels) (S¹⁹ or RB²¹ for Cattle, Rev¹ for small ruminants).
- Good veterinary services contribution and regular laboratory support.
- Measures to control the contamination of food from animal origin for *Brucella sp.* and Expansion of milk pasteurization
- Detection and control of human cases.
- Agricultural Extension and Public Health Education.
- Recruiting different means of mass media for running persistent, extensive and structured public health education campaigns addressing for instance, milk boiling and avoidance of raw milk or fresh white cheese and unpasteurized ice cream consumption.
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Additional control strategies

- The test-and-slaughter strategy, which might gradually lead towards the elimination of infections and establishment of modern livestock farms
- The preservation of public health and alleviation of social and economic burdens

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