Kementerian Kesihatan
Malaysia

GUIDELINES FOR THE DIAGNOSIS, MANAGEMENT, PREVENTION AND CONTROL OF BRUCELLOSIS IN MALAYSIA

1st EDITION

DISEASE CONTROL DIVISION
DEPARTMENT OF PUBLIC HEALTH
MINISTRY OF HEALTH MALAYSIA
2012

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STATEMENT OF INTENT

This guideline is meant to be a guide for clinical and public health practice, based on the best available evidence at the time of the development. Adherence to this guideline may not necessarily guarantee the best outcome in every case. Every health care provider is responsible for the management of his/ her patient based on the clinical picture presented by the patient and the management options available locally.

This guideline was prepared and published by

Disease Control Division
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FOREWORD

Brucellosis continues to be a major public and animal health problem in many regions of the world, particularly where livestock is a major source of food and income. The increasing incidence in human Brucellosis has resulted in increasing public awareness. Prevention and control of Brucellosis needs supportive action from various sectors, including health care, food safety as well as the veterinary services. These include the control and eradication of Brucellosis program in animals, the importance of Good Animal Husbandry Practices and proper food handling.

I would like to commend the Zoonosis Sector for bringing together a multidisciplinary group of professionals in developing this guideline which will serve as a guiding tool in creating awareness and assisting healthcare personnel in the diagnosis, management, prevention and control of human Brucellosis in Malaysia.

I also encourage constructive comments and feedback from the implementers at all levels to further improve this guideline in order to control this disease in the most effective, coordinated and organized manner.

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2012

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1. INTRODUCTION

Brucellosis continues to be a major public and animal health problem in many regions of the world, particularly where livestock is a major source of food and income. Expansion of animal industries and urbanization, and the lack of hygienic measures in animal husbandry and in food handling, as well as consumers' preference for fresh dairy goods which may be contaminated, partly account for Brucellosis remaining a public health hazard.

Human cases continue to occur following traditional use of raw milk products and following close contact with infected animals. Brucellosis cases had been reported in Malaysia involving people who consumed unpasteurized goat's and camel's milk, thus creating a public health concern. Therefore, this guideline is drawn to provide information on the disease, diagnostic criteria, management, prevention and control of Brucellosis in Malaysia.

The aims of this guideline include:

- To increase awareness among the healthcare personnel and relevant stakeholders on the importance of Brucellosis.
- To identify sources of transmission (e.g., an infected animal or a contaminated dairy product) and to stop further transmission.
- To guide in diagnostic procedures in order to obtain early diagnosis so that prompt and appropriate management of prevention and control can be taken at the earliest possible stage to reduce morbidity and mortality.

2. EPIDEMIOLOGY

Brucellosis is a zoonotic bacterial disease. The bacteria multiply in the reproductive organs and mammary glands of infected animals. Infected animals are most contagious during parturition or abortion. There are several different *Brucella* species and the following are of public health importance:

- *Brucella melitensis*, affecting primarily goats, sheep and camels.
- *Brucella abortus*, affecting primarily cattle, other bovidae, and cervidae.
- *Brucella suis,* affecting primarily swine.
- *B. canis* affecting dogs.

Humans acquire the disease through direct contact with infected aborted material from animals, consumption of contaminated animal products, or by inhaling airborne agents. Brucellosis is also known as "undulant fever", "Mediterranean fever" or "Malta fever". Human Brucellosis can be a very debilitating disease. It can be sub-clinical or chronic, especially if not recognized early and treated promptly. The case fatality rate is generally low.

As Brucellosis is not required to be notified under the Prevention and Control of Infectious Diseases Act 1988 in Malaysia, the available country data is based on the Report of Morbidity and Mortality for Ministry of Health Hospitals (Table 1).

Table 1: Brucellosis Cases admitted to Ministry Of Health Hospitals, Malaysia from Year 2004 to 2008

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
Cases	1	3	1	2	3	1	4	3	1

Source:
Report of Morbidity and Mortality for Patients For The Year 2004 to 2008, Health Management Information System, Medical Care Subsystem, Health Informatics Centre, Planning and Development Division, Ministry of Health, Malaysia.

3. MODES OF TRANSMISSION

Brucellosis is transmitted to humans through contact with blood, body tissues, or body fluids of infected animals. The modes of transmission include:

i) Ingestion or consumption of unpasteurized milk and dairy products.
ii) Direct contact with infected animals or their secretions through skin cuts/abrasions or conjunctival splashes,
iii) Inhalation of contaminated aerosols (air-borne infection especially in laboratory, abattoir and farm workers).

3.1 Transmission of Brucellosis to humans

3.1.1 Food-borne transmission

This is usually the main mode of transmission of brucellosis. Ingestion of unpasteurized milk or dairy products is the main source of infection for most populations. Persons who eat cheese made from unpasteurized milk contaminated with Brucella are also at risk of becoming ill with Brucellosis. Meat products are less frequently associated with infection, mainly because they are not usually eaten raw.

Note:

- Regulation 82 (4) of the Food Regulations 1985 prescribed standards for 'Milk, raw milk or fresh milk' include milk that may have been cooled but shall not have been subjected to heat, irradiation, or any other physical treatment.

- Regulation 85 of the Food Regulations 1985, prescribed standards for 'Pasteurized milk' as milk that has been efficiently heat-treated by either one of two methods:-

i) Holding Method – whereby milk is heated to a temperature of 63-65 degree C for 30 minutes, and then rapidly cooled to 4 degrees C,

ii) High Temperature Short Time Method – whereby milk is heated to 73 degrees C for 15 seconds and rapidly cooled to 4 degrees C.

- In both methods the cooled milk must be maintained in 4 degrees C with protection from contamination.

- Regulation 87 of the Food Regulations 1985, prescribed standards for Ultra high temperature milk or U.H.T. milk as milk which has been subjected treatment by being retained at a temperature of not less than 135 C for at least two seconds to render it commercially sterile and immediately aseptically packed in sterile containers.

3.1.2 Occupational exposure

Certain types of occupation are commonly associated with a high risk of infection with Brucellosis such as farmers, farm labourers, stockman, inseminators, veterinarians, meat inspectors and those involved in the processing of animal products. Laboratory workers involved in culturing *Brucella* are also at risk. The families of farmers may also be at risk as domestic exposure may be inseparable from occupational exposure when animals are kept in close proximity to human dwellings.

4. CLINICAL MANIFESTATIONS

The incubation period is highly variable, usually from 5 to 60 days; 1 – 2 months is common. However, the incubation period may occasionally be up to 5 months.

4.1 Clinical features

A systemic bacterial disease with acute or insidious onset, characterized by;

- continued, intermittent, or irregular fever of variable duration
- headache
- profuse sweating
- weakness
- generalized aching
- arthralgia (joint pains)

Acute disease may last from days to weeks but chronic infections lasting months or more may occur if an acute infection is not adequately treated.

Chronic symptoms include:

- Chronic fatigue syndrome (which includes fatigue, depression, generalized body ache, weight loss).
- Involvement of the liver and spleen, including abscesses.
- Osteoarticular complications (which occur in 20 to 60% of cases, most commonly sacroiliitis).
- Genitourinary involvement (which occurs in 2 to 20% of cases, in particular orchitis and epididymitis).
- Involvement of the lymphoreticular, skeletal (arthritis and osteomyelitis), cardiac (endocarditis), and nervous systems.

The case-fatality rate of untreated Brucellosis is low, with rare deaths due to endocarditis and neurobrucellosis, mainly caused by *B. melitensis.* Subclinical infections may be asymptomatic and detected by high levels of antibody.

5. CASE CLASSIFICATION

Brucellosis should be suspected in patients who have fever and history of consuming raw/unpasteurized milk or occupation associated with a high risk of infection with Brucellosis.

5.1 Clinical

a) An illness characterized by **acute or insidious onset of fever** AND one or more of the following symptoms: night sweats, fatigue, anorexia, myalgia, weight loss, headache, arthralgia, arthritis/spondylitis, meningitis, or focal organ involvement (endocarditis, orchitis / epididymitis, hepatomegaly, splenomegaly).

WITH

b) History of exposure to probable sources of infection.

5.2 Probable

a) A clinically compatible illness

WITH

b) Presumptive laboratory evidence of *Brucella* infection by positive IgM or IgGtitre.

WITH

c) Epidemiological link to a confirmed Brucellosis case.

5.3 Confirmed

A clinically compatible illness with definitive laboratory evidence of *Brucella* infection from **either one** of the following methods:

i) Isolation of *Brucella* species from clinical samples.

ii) Evidence of a fourfold or greater rise in *Brucella* antibody titre between acute- and convalescent-phase serum specimens obtained two or more weeks apart.

iii) Blood sample positive by PCR.

Table 2: Case Definition Summary for Brucellosis

Classification	Clinical	Probable	Confirmed
Acute or insidious onset of fever AND one or more of the following symptoms: night sweats, fatigue, anorexia, myalgia, weight loss, headache, arthralgia, arthritis/spondylitis, meningitis, or focal organ involvement	+	+	+
Consumption of unpasteurized milk/dairy products or in close occupational contact with livestock in the last 6 months	+	+	+
Epidemiological link to a confirmed Brucellosis case		+	+
Brucella serology		+ IgM or IgG	+ 4-fold rise in titre
Isolation of *Brucella* in blood /tissue			+
PCR for *Brucella* DNA in blood samples			+

6. LABORATORY DIAGNOSIS

A confident diagnosis is often difficult unless *Brucella* species is isolated from the patient's clinical samples. A strong clinical suspicion and patient's history of exposure to animals or consumption of raw dairy products often help in the diagnosis of infection.

The key diagnostic tests for Brucellosis are the isolation of the bacteria from the clinical specimen and serological test. The clinician should alert the clinical laboratory personnel when a diagnosis of Brucellosis is being considered so that the laboratory staff can take the necessary safety precautions.

Note:

- Laboratory request forms should be marked as **"TRO Brucellosis"** in red ink.

6.1 Cultures

Blood and bone marrow cultures are positive in 70% and 92% of Brucellosis patients respectively. Conventional culture method requires a long incubation time (6 weeks) and its yield is variable (40-90% in acute cases versus 15-20% in chronic, focal and complicated cases). Automated blood culture systems give higher yields than conventional culture method (majority recovered within 1 week). Isolator lysis-centrifugation culture system can also expedite the recovery of *Brucella* from blood. Bone marrow cultures result in 15-20% higher yields than peripheral blood cultures. Blood culture may be positive in the absence of positive serology but this is rare.

From blood culture bottles, subculturing can be made on Sheep Blood Agar (SBA) and Chocolate Blood Agar (CBA). It may also grow on Buffered Charcoal Yeast Extract agar (BCYE) used for isolation of *Legionella* species. Because *Brucella*

species require CO_2 for growth, the plates should be incubated at 35°C in CO_2 Growth may be seen after 24-48 hours, sometimes after 5-7 days. Colonies can present as either “smooth” or “rough” form depending on the nature of their lipopolysaccharides (LPS).

Figure 1: Colony appearance: *Brucella* grows slowly, even on rich media to give pinpoint, translucent colonies with a smooth surface.

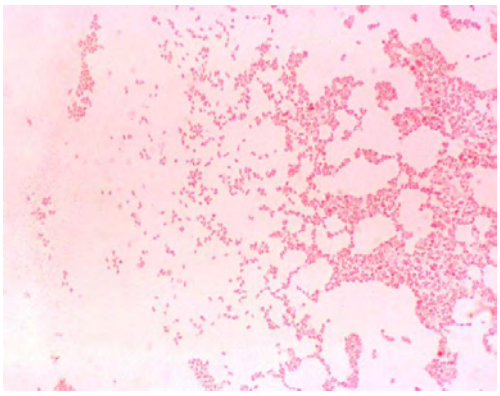

Figure 2: A gram-stain of *Brucella* showing the coccobacillary shape and Gram-negative staining. *Brucella spp.*are Gram-negative, aerobic, non-motile coccobacilli.

Source: CDC/ Courtesy of Larry Stauffer, Oregon State Public Health Laboratory, Public Health Image Library #1902

6.2 Serology

Serology is also helpful for the diagnosis of Brucellosis. In a low prevalence area, detection of acute Brucellosis can be done by detecting either IgG or IgM, since the presence of any of them is a significant marker of infection. Standard serological tests for the diagnosis of Brucellosis include the standard agglutination test (SAT), Coombs test and enzyme-linked immuno-assays (ELISA). Despite a high sensitivity ranging from 65% to 95%, these methods have a number of limitations. Interpretation is particularly difficult for this organism for several reasons including cross-reaction with *Yersinia enterocolitica*, *E.coli 0:157, Stenotrophomonasmaltophilia*, *Toxoplasma*, *Salmonella Typhi, Epstein-Barr* virus and *Francisella tularaemia*.

Serological tests also have a low sensitivity for early diagnosis of a possible relapse and are not useful for patient follow-up as serum titres decline slowly. In patients with chronic disease who have a long period of evolution of the disease, the immune response can be reduced giving false-negative results in standard agglutination assays. In some individuals, *Brucella*-specific IgG and in some cases IgM, can persist for years, despite treatment and cure.

6.3 PCR

PCR is only useful for acute but not chronic Brucellosis since bacteraemia is present mainly in the acute stages of infection. Only cases with history of risks factors

associated with Brucellosis should be sent for PCR. Sample for PCR is whole blood in EDTA.

6.4 Sending of samples

6.4.1 Clinical sample

i) Culture

a. All major state hospitals should be able to do culture and sensitivities for clinical samples on *Brucella* sp. using BSL 2 facility with Level 3 practices.

b. For blood culture, inoculate into the BacT/Alert or BACTEC (aerobic and anaerobic bottle) (10 mL each bottle for adults or 3 mL each bottle for children).

c. All *Brucella* isolates from hospital must be sent to Institute for Medical Research (IMR) for identification to species level and DNA fingerprinting.

ii) Serology

a. Send 3-5 mL serum samples.

iii) PCR

a. Only for acute Brucellosis cases.

b. Blood samples to be taken in 5 mL EDTA bottle.

Note:

- Clinical samples of cases from hospitals (inpatient or outpatient) should be sent to IMR. Important: Test will only be carried out if the sample is accompanied with IMR Brucellosis Laboratory Request Form (IMR/IDRC/BACT/BRUCE/01) **(Annex 1a)** to avoid inappropriate requests for laboratory testing and delay in processing.

- Community samples (from health clinics or field/ outbreak investigation) should be sent to the National Public Health Laboratory, Sungai Buloh (NPHL) for epidemiological link study and tracking the source of the outbreak. Samples sent to NPHL should be accompanied with Laboratory Request Form: MKAK-BPU-U01 (**Annex 1b)** with Clinical/ Provisional Diagnosis TRO Brucellosis to avoid inappropriate requests for laboratory testing and delay in processing.

6.3.2 Food sample

i) In cases where food products may be the cause of a Brucellosis outbreak, food samples should be taken and sent to NPHL for analysis.

ii) Sampling of suspect food is done using Regulation 5 of Food Act 1983 and Food Regulation 1985 for Microbiological Sampling under aseptic condition.

iii) The request for analysis should be made in FORM A as set out in the Third Schedule of Food Act 1983 and Food Regulations 1985.

iv) The minimum amount of food samples taken should be 250 mL for liquids or 250 g for solids.

v) The temperature of the food samples during transportation should be maintained between 0 ºC to 4.4 ºC and received at the laboratory within 24 hours from the time of sampling.

6.3.3 Animal sample

The District Health Offices should liaise with the respective District Veterinary Offices regarding sending of animal samples. Refer to Protokol Veterinar Malaysia Penyakit Brucella (PVM 141:2008) by Department of Veterinary Services (DVS) Malaysia.

7. NOTIFICATION

As Brucellosis is not notifiable under the Prevention and Control of Infectious Diseases Act 1988, notification is made by an administrative order. For the purpose of notification, all **probable** and **confirmed** cases must be notified to the nearest District Health Office **within 1 week** of the date of laboratory diagnosis.

- Notification of cases is done using Notification Form (Rev/ 2010) by filling in: “Others” and specify *Brucellosis* **(Annex 2).**

- All notified cases must be investigated using the Investigation Form **(Annex 3).**

The District Health Office must notify the District Veterinary Office of any suspected or confirmed case of Brucellosis for traceability purposes *(APTVM Daya Jejak).*

8. TREATMENT

Antibiotics should be started after blood investigations, and preferably when the serology test is positive or if the blood culture is positive for *Brucella*. A meta-analysis has shown that dual or triple regimens including an aminoglycoside (doxycycline-streptomycin/ gentamicin or doxycyline- rifampicin- streptomycin / gentamicin) significantly reduces treatment failure and relapse rates, and are currently recommended as first-line treatment regimens. Duration of treatment is 6 weeks for doxycycline and rifampicin, and 2 weeks for aminoglycoside therapy (daily intramuscular injections).

8.1 Adult regime:

a) Regime 1: IM Streptomycin 1 gm once daily for 21 days + Cap Doxycycline 100 mg twice daily for 6 weeks (if osteomyelitis, meningitis or infective endocarditis)

b) Regime 2: Cap Doxycycline 100 mg twice daily + Cap Rifampicin 600 mg once daily both for 6 weeks

Note:

- Patients require prolonged follow-up to monitor for further complications or relapse. Repeat LFT/FBC 1 to 2 days prior to the date to look for side effects of treatment.

- Cases must also be worked up for other causes of fever such as Dengue, Malaria, Leptospirosis, etc.

8.2 Paediatric Regime:

For children > 8 years: Regime is as per adult.

For children < 8 years:

a) Regime 1:

Trimethoprim-sulfamethoxazole (TMP/SMZ 8/40 mg/kg/day) twice daily for 6 weeks + IM Streptomycin (30 mg/kg/day) once daily for 3 weeks or IV/IM Gentamicin (5 mg/kg/day) once daily for 7 to 10 days.

b) Regime 2:

TMP/SMZ + Rifampicin (15 mg/kg/day orally) for 6 weeks, or Rifampicin + an aminoglycoside.

9. VACCINATION

Safe and effective vaccines for the prevention of human Brucellosis are not generally available.

10. OUTBREAK RESPONSE AND MANAGEMENT

10.1 Definition:

An outbreak is defined as **more than one probable or confirmed cases** of Brucellosis with an epidemiological link within sixty (60) days.

10.2 Conditions under which outbreaks may occur

Common-source epidemic/ outbreaks can occur as a result of the ingestion of unpasteurized milk or dairy products. Aerosol infections can occur, such as in laboratory and abattoir workers.

10.3 Outbreak management

- The District Health Office should investigate all clinical, probable and confirmed cases in an outbreak. However, for notification purposes, only **probable** and **confirmed** cases are notified **within 1 week** of the date of diagnosis.
    - All symptomatic cases should be assessed by a Physician or Family Medicine Specialist at health clinics for treatment.
    - People who are exposed but asymptomatic do not require treatment. They should be given health education and advised to seek treatment if symptoms develop.
- Identify common vehicle of infection.
    - If the source is found to be food products - stop production, distribution, sale and recall the incriminated food products immediately.
    - The public should be advised not to consume the incriminated food product. Instead it should be discarded.
- Laboratory samples must be taken, such as;

    i) Clinical samples from symptomatic cases.

    ii) Food samples suspected to be the cause of the outbreak. Refer to Standard Operating Procedures for Microbiological Food Sampling - UIP-AM-05-07.
- All outbreaks must be notified to the National Crisis Preparedness and Response Centre (CPRC) KKM by phone and text/*sms* to on-call surveillance at 013-6699700.
- Register outbreak in system eWabak(http://vekpro.moh.gov.my) in 24 hours.
- A final report must be produced after 1 month the outbreak ends and sent to CPRC, Disease Control Division or e-mail to cprc@moh.gov.my
- Punitive / legal action should be taken as per Food Act 1983 and Food Regulations 1985 or Prevention and Control of Infectious Diseases Act 1988

Refer **Annex 4** for flow chart of notification of cases/outbreak.

11. SURVEILLANCE

11.1 Active surveillance in an outbreak

Data should be collected and line listing of cases kept including case classification (clinical/ probable/ confirmed), age, sex, occupation, exposure history (place, date, conditions of exposure to dairy products or animal contact), signs and symptoms, treatment, status, etc.

11.2 Laboratory based surveillance

Isolation followed by typing is essential for surveillance as it provides information about the *Brucella* species common in our country. Therefore, all positive isolates of *Brucella* sp. should be sent to IMR for fingerprinting.

11.3 Food safety surveillance

Monitoring of milk for sale at the farm should be done at regular intervals to ensure milk is safe for consumption. Milk processing plant/ outlets at the farm should be registered with Ministry of Health under the Food Safety Information System (FoSIM) Domestic. The premises should comply with hygiene requirements of the Food Act 1983 and Food Regulations 1985. Operators should also comply with the labelling provision to ensure trace back of the food products is done efficiently should recall become necessary in the event of contamination.

12. PREVENTION OF HUMAN BRUCELLOSIS

As the ultimate source of human Brucellosis is direct or indirect exposure to infected animals or their products, prevention must be based on elimination of such contact. In Malaysia, test and cull with compensation of positive animals had severely reduce the incidence. The technical, economic and social difficulties involved in eradicating Brucellosis in animal have affected the speed of eradicating the disease in our country. Therefore, health education is the most effective preventive measure to reduce the risk of infection, and should be done with close collaboration with stakeholders. Examples of a public health advisory and poster is found in **Annexes 5** and **6,** respectively.

12.1 Prevention of food-borne Brucellosis

Educate the public to avoid raw dairy foods. Health education messages include:

- Do not consume raw untreated dairy products such as milk, cheese, or ice cream.
- Dairy products for human consumption should be heat treated such as pasteurization or ultra heat treatment (UHT).
- Meat should be thoroughly cooked.
- Individuals who are unwell/ having fever after consumption of raw/ fresh dairy product need to seek immediate treatment.

12.2 Prevention of occupational exposure to Brucellosis – animal handlers

People with high risk occupational exposure include farmers, farm labourers, stockman, inseminators, veterinarians, meat inspectors, abattoir workers and those involved in the processing of animal products and laboratory workers.

High risk procedures include contact with animals suffering from or suspected of having Brucellosis, such as shearing, dipping, clinical examination, inspection, insemination, vaccination and treatment, and the disinfection and cleaning of contaminated premises. The risk of infection is greatest when dealing with aborting animals or those undergoing parturition and aborted materials.

i) All persons carrying out high-risk procedures at risk premises should wear adequate protective clothing or Personal Protective Equipment (PPE). The work clothes should be reserved for this purpose and retained on the premises. PPE include:
   - overall or coat
   - rubber or plastic apron
   - rubber gloves
   - boots
   - eye protection such as face shield, goggles
   - respirator such as mask, if the mode of transmission is airborne.

ii) Exercise care in handling and disposal of animal placenta, discharges and fetuses.

iii) Wash / shower with clean water immediately after exposure. As a minimum, the hands should be rinsed with an approved disinfectant.

iv) Any superficial injuries such as cuts or scratches should be treated with an antiseptic, and covered with a bandage or self-adhesive dressing.

v) Seek immediate medical treatment if develop symptoms within the incubation period.

vi) Disinfect contaminated areas and work clothes after use. Particular attention should be given to the disinfection of footwear to ensure that infection is not transferred outside the premises.

Note:

- Any staff that develops clinical disease should be treated promptly.

12.3 Prevention of occupational exposure to Brucellosis – laboratory workers

12.3.1 Risk Assessment

Brucellosis is one of the most frequently reported laboratory-associated bacterial infection. Specifically implicated procedures related to infection with pathogenic *Brucella* species in a laboratory setting include:-

i) Sniffing bacteriological cultures
ii) Direct skin contact
iii) Mouth pipetting
iv) Inoculations, and sprays into eyes, nose, and mouth
v) Manipulation of *Brucella* organisms on an open bench without use of the recommended practices.

12.3.2 Recommendations for Surveillance and Post-Exposure Prophylaxis (PEP) for Laboratory Exposure to *Brucella* isolates

i) Determine number of workers exposed to *Brucella* isolates and classify exposures into high- and low-risk. High-risk exposure refers to individuals who had handled cultures on the open bench, or were within 1.5 m (five feet) of such activities. Low-risk exposure refers to workers who were present in the laboratory at the time of manipulation on an open bench, but were further than 1.5 m away.

ii) Recommend PEP for workers with high-risk exposures to *Brucella* comprising Doxycycline 100mg twice daily and Rifampicin 600mg once daily for 3 weeks. PEP could be discussed with and offered to those with low-risk exposures.

iii) Obtain baseline serum samples from all workers as soon as possible after a potential *Brucella* exposure is recognized. Arrange for sequential serologic testing on all workers exposed to *Brucella* (e.g. at 2, 4, 6, and 24 weeks post exposure) using *Brucella* microagglutination test at IMR or NPHL.

iv) Arrange for regular (e.g. weekly) active surveillance for development of febrile illness or other signs and symptoms of Brucellosis among all workers exposed to *Brucella* isolates for 6 months following last exposure. Any staff that develops clinical disease should be treated promptly.

13. INTERSECTORAL COLLABORATION AND COOPERATION IN BRUCELLOSIS SURVEILLANCE

As Brucellosis is an important zoonosis, close and continued collaboration between health and veterinary staff should occur at all administrative levels for effective control or eradication efforts to be achieved. Surveillance data on human Brucellosis can be a sensitive indicator of the status of animal infection in the country or region. Human epidemics, whether food-borne or animal-contact related, may direct veterinary epidemiologist to foci of animal infections.

Multi-departmental representation at the National and State Committees on the Control of Zoonotic Diseases can ensure better communication of surveillance information. Similarly, at the district level, the District Health and Veterinary Officers should report Brucellosis cases in either human or animals to their counterparts. Joint epidemiological investigations should be carried out, especially of suspected outbreaks and individual human cases to determine the route of transmission and animal sources of infection.

Joint meetings of medical and veterinary associations are also a useful means of exchanging information on Brucellosis, as well as on other zoonoses. Personal contacts between physicians and veterinarians working in both the public and private sectors are strongly promoted, to ensure that both are made aware of the situation in their areas to ensure efficient collaboration.

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Annex 1a

IMR/IDRC/BACT/BRUCE/01

Brucellosis Laboratory Request Form
Bacteriology Unit,
Institute for Medical Research
Jalan Pahang, 50588 Kuala Lumpur

A. REQUESTOR INFORMATION

Hospital: _____ _____

Ward: _____

Date of Admission: ___/___/___

Name of Requesting Doctor: _____

Signature: _____

Tel No: _____

Fax No: _____

B. PATIENT'S INFORMATION

Name: _____

Address: _____

_____

_____

IC No: _____

R/N No: _____

Age: _____ Date of Birth: ___/___/___

Race: ☐ Malays ☐ Chinese ☐ Indian

☐ Others: _____

Sex: ☐ Male ☐ Female

Marital Status: ☐ Single ☐ Married

Nationality: ☐ Malaysian

☐ Non Malaysian: _____

Occupation: _____

C. CLINICAL SUMMARY

Diagnosis date: ___/___/___

Illness duration: _____days

Sign & Symptoms:

☐ Fever, duration: _____
☐ Recurring fever: present/absent
Days between attacks_____
☐ Night sweats
☐ Headache
☐ Weakness
☐ Generalized aching
☐ Arthralgia (joints pains)
☐ Loss of appetite
☐ Loss of weight
☐ Endocarditis
☐ Osteomyelitis
☐ Arthritis or Spondylitis
☐ Orchitis or epididymitis
☐ Meningitis
☐ Hepatomegaly/ splenomegaly
☐ Others: _____

D. EXPOSURE

☐ Drink unpasteurized milk
☐ Unpasteurized dairy products (soft cheese from raw milk, etc)
☐ Work with animals or animal products (veterinarian, abattoir, farmer, researcher, animal birthing, placenta (please circle)
☐ case or household member works or lives on farm or dairy
☐ Laboratory worker
☐ Contact with animals at home or elsewhere (cattle, cow, calf, dog, goat, sheep, and swine)

E. SPECIMEN INFORMATION

Type of specimen:

☐ Blood in EDTA for PCR
☐ Serum for serology
☐ Culture isolate for identification

Date Specimen Collection: ___/___/___

F. LABORATORY INFORMATION

Date specimen received: ___/___/____

Date test performed: ___/___/____

Result of test:

Verified by: _____

REQUESTOR INFORMATION	
Name :	
Post :	
Address :	
District :	State :
Tel. No. :	Fax No. :
Email :	

Lan No. (*for lab use*):	

MAKMAL KESIHATAN AWAM KEBANGSAAN
KEMENTERIAN KESIHATAN MALAYSIA
Lot 1853, Kg Melayu Sungai Buloh,
47000 Sungai Buloh, Selangor Darul Ehsan
Tel:03-61565109 Fax:03-61402249/61569654

LABORATORY REQUEST FORM

A. PATIENT'S INFORMATION

Name :	Age :	Date of Birth :
IC No :	Sex : ☐Male ☐Female	
Your Reference No. :	Marital Status: ☐Single ☐Married	
Address : District : Postcode : State :	Nationality : ☐Malaysian ☐Non Malaysian : *(Please state country of origin)*	
Tel. No :	Occupation :	

B. CLINICAL SUMMARY	**C. PURPOSE OF SAMPLING**
Sign and Symptoms :	☐Outbreaks / Cluster Cluster Code: ..... ☐Diagnostic ☐Surveillance Specimen Category : ☐Programme/Projects ☐Case ☐Others : ☐Contact
	D. FOR VACCINE PREVENTABLE DISEASE
Date of onset :	Immunisation status *(for the specified disease)*
Clinical/Provisional Diagnosis :	☐Yes Number of Doses : Date of last dose : ☐No

E. SPECIMEN INFORMATION

Type of Specimen	Date and Time of Collection	Date Specimen Received *(for lab use)*

F. TYPE OF TESTS

☐Bacterial identification : (culture ± sensitivity)
☐Viral Identification : Isoation / Antigen Detection / Nucleic acid
☐Serology (Specify) :
☐Others (Specify) :

G. RESULTS *(for laboratory use only)* :

Verified By : .....
Date :

NB : Please send request form in duplicate

Annex 2a

"JADUAL
(Peraturan 2)
Borang
(Peraturan 2)
AKTA PENCEGAHAN DAN PENGAWALAN PENYAKIT BERJANGKIT 1988
PERATURAN-PERATURAN PENCEGAHAN DAN PENGAWALAN PENYAKIT BERJANGKIT (BORANG NOTIS (PINDAAN) 2011

Borang Notis: Rev/2010
No. Siri:

NOTIFIKASI PENYAKIT BERJANGKIT YANG PERLU DILAPORKAN

(Seksyen 10, Akta Pencegahan Dan Pengawalan Penyakit Berjangkit 1988)

A. MAKLUMAT PESAKIT

1. Nama Penuh (HURUF BESAR):

Nama Pengiring (Ibu/Bapa/Penjaga):
(Jika belum mempunyai Kad Pengenalan diri)

2. No. Kad Pengenalan Diri / Dokumen Perjalanan ☐ Sendiri ☐ Pengiring
(Untuk Bukan Warganegara)

No. Daftar Hospital / Klinik Nama Wad:_____ Tarikh Masuk Wad: / /

3. Kewarganegaraan:
Warganegara:
☐ Ya Keturunan:
Sukuketurunan:
(Bagi O/Asli, Pribumi Sabah/Sarawak)
☐ Tidak Negara Asal:
Status Kedatangan: ☐ Izin ☐ Tanpa Izin ☐ Penduduk Tetap

4. Jantina: ☐ Lelaki ☐ Perempuan

5. Tarikh Lahir: / /

6. Umur: ☐ Tahun ☐ Bulan ☐ Hari

7. Pekerjaan:_____
(Jika tidak bekerja, nyatakan status diri)

8. No. Telefon: ☐ Rumah ☐ Tel. Bimbit ☐ Pejabat -
(Untuk dihubungi)

9. Alamat Kediaman

10. Alamat Tempat Kerja / Belajar:

B. DIAGNOSIS PENYAKIT

☐ 1. Poliomyelitis
☐ 2. Viral Hepatitis A
☐ 3. Viral Hepatitis B
☐ 4. Viral Hepatitis C
☐ 5. Viral Hepatitis *(Others)*
☐ 6. AIDS
☐ 7. Chancroid
☐ 8. Cholera
☐ 9. Dengue Fever
☐ 10. Dengue Haemorrhagic Fever
☐ 11. Diphtheria
☐ 12. Dysentery
☐ 13. Ebola
☐ 14. Food Poisoning
☐ 15. Gonorrhoea
☐ 16. Hand, Food and Mouth Disease
☐ 17. Human Immunodeficiency Virus Infection
☐ 18. Influenza
☐ 19. Leprosy *(Multibacillary)*
☐ 20. Leprosy *(Paucibacillary)*
☐ 21. Leptospirosis
☐ 22. Malaria - *Vivax*
☐ 23. Malaria - *Falciparum*
☐ 24. Malaria - *Malariae*
☐ 25. Malaria - *Others*
☐ 26. Measles
☐ 27. Plague
☐ 28. Rabies
☐ 29. Relapsing Fever
☐ 30. Syphilis - *Congenital*
☐ 31. Syphilis - Acquired
☐ 32. Tetanus Neonatorum
☐ 33. Tetanus *(Others)*
☐ 34. Typhus - *Scrub*
☐ 35. Tuberculosis - *PTB Smear Positive*
☐ 36. Tuberculosis - *PTB Smear Negative*
☐ 37. Tuberculosis - *Extra Pulmonary*
☐ 38. Typhoid - *Salmonella typhi*
☐ 39. Typhoid - *Paratyphoid*
☐ 40. Viral Encephalitis - *Japanese*
☐ 41. Viral Encephalitis - *Nipah*
☐ 42. Viral Encephalitis - *(Others)*
☐ 43. Whooping Cough / Pertussis
☐ 44. Yellow Fever
☐ 45. Others: *please specify:* _____

Selain dari notifikasi bertulis, penyakit berikut perlu dinotifikasi melalui telefon dalam tempoh 24 jam iaitu:- Poliomielitis Akut, Kolera, Demam Denggi, Diptheria, Keracunan Makanan, Plague, Rabies dan Demam Kuning.

11. Cara Pengesanan Kes:
☐ Kes ☐ Kontak ☐ FOMEMA *
☐ Ujian Saringan _____

12. Status Pesakit:
☐ Hidup
☐ Mati - -

13. Tarikh Onset: - -

14. Ujian Makmal:
Nama Ujian: (i)_____
(ii)_____ (iii)_____
Tarikh Sampel Diambil: - -

15. Keputusan Ujian Makmal:
☐ Positif (_____)
☐ Negatif
☐ Belum Siap

16. Status Diagnosis:
☐ Sementara *(Provisional/Suspected)*
☐ Disahkan *(Confirmed)*
Tarikh Diagnosis - -

17. Maklumat Klinikal Yang Relevan:

18. Komen:

C. MAKLUMAT PEMBERITAHU

19. Nama Pengamal Perubatan:

20. Nama Hospital / Klinik dan Alamat:

21. Tarikh Pemberitahuan: - -

.....
Tandatangan
Pengamal Perubatan

Annex 2b

"SCHEDULE
(Regulation 2)
Form
(Regulation 2)
PREVENTION AND CONTROL OF INFECTIOUS DISEASES ACT 1988
PREVENTION AND CONTROL OF INFECTIOUS DISEASES (NOTICE FORM) (AMENDMENT) REGULATIONS 2011

Notification Form: Rev/2010
Serial No:

NOTIFICATION OF COMMUNICABLE DISEASES TO BE REPORTED

(Section 10, Prevention And Control Of Communicable Diseases Act, 1988)

A. PATIENT INFORMATION

1. Full Name (CAPITAL LETTER):

Accompany by(Mother/Father/Guardian):
(If under age/without Identity Card)

2. Identity Card Number / Travelling Document: ☐ Self ☐ Accompany by
(For Non Citizen)

Hospital/Clinic Reg. Number: Ward:_____ Date of Admission: / /

3. Citizenship:
Citizen
☐ Yes Race/Ethnic:
Sub Ethnic:
(For Aborigines, Native of Sabah/Sarawak)
☐ No Country of origin:
Status of Entry: ☐ Legal ☐ Illegal ☐ Permanent Resident

4. Gender: ☐ Male ☐ Female

5. Date of birth: / /

6. Age: ☐ Year ☐ Month ☐ Day

7. Occupation:_____
(If unemployed, please state self reference)

8. Telephone No.: ☐ Resident ☐ H.phone ☐ Office -
(Contact purposes)

9. Current Address:

10. Address of Employer/School/College/University:

B. DISEASE DIAGNOSIS

☐ 1. Poliomyelitis	☐ 16. Hand, Food and Mouth Disease	☐ 31. Syphilis - Acquired
☐ 2. Viral Hepatitis A	☐ 17. Human Immunodeficiency Virus Infection	☐ 32. Tetanus Neonatorum
☐ 3. Viral Hepatitis B	☐ 18. Influenza	☐ 33. Tetanus *(Others)*
☐ 4. Viral Hepatitis C	☐ 19. Leprosy *(Multibacillary)*	☐ 34. Typhus - *Scrub*
☐ 5. Viral Hepatitis *(Others)*	☐ 20. Leprosy *(Paucibacillary)*	☐ 35. Tuberculosis - *PTB Smear Positive*
☐ 6. AIDS	☐ 21. Leptospirosis	☐ 36. Tuberculosis - *PTB Smear Negative*
☐ 7. Chancroid	☐ 22. Malaria - *Vivax*	☐ 37. Tuberculosis - *Extra Pulmonary*
☐ 8. Cholera	☐ 23. Malaria - *Falciparum*	☐ 38. Typhoid - *Salmonella typhi*
☐ 9. Dengue Fever	☐ 24. Malaria - *Malariae*	☐ 39. Typhoid - *Paratyphoid*
☐ 10. Dengue Haemorrhagic Fever	☐ 25. Malaria - *Others*	☐ 40. Viral Encephalitis - *Japanese*
☐ 11. Diphtheria	☐ 26. Measles	☐ 41. Viral Encephalitis - *Nipah*
☐ 12. Dysentery	☐ 27. Plague	☐ 42. Viral Encephalitis - *(Others)*
☐ 13. Ebola	☐ 28. Rabies	☐ 43. Whooping Cough / Pertussis
☐ 14. Food Poisoning	☐ 29. Relapsing Fever	☐ 44. Yellow Fever
☐ 15. Gonorrhoea	☐ 30. Syphilis - *Congenital*	☐ 45. Others: *please specify:* _____

Besides by written notification, the following diseases must be notified by telephone within 24 hours, such as:- Acute Poliomyelitis, Cholera, Dengue, Diptheria, Ebola, Food Poisoning, Plague, Rabies and Yellow Fever.

11. Case detection classification:
☐ Case ☐ Contact ☐ FOMEMA
☐ Screening Test _____

12. Status of patient:
☐ Live/alive
☐ Died - -

13. Date of Onset: - -

14. Laboratory investigation:
Investigation: (i)_____
(ii)_____ (iii)_____
Date of specimen taken: - -

15. Laboratory investigation result:
☐ Positive (_____)
☐ Negative
☐ Pending

16. Diagnosis Status:
☐ Provisional/Suspected
☐ Confirmed
Date of Diagnosis - -

17. Relevant Clinical Information:

18. Comment:

C. NOTIFIER

19. Name of Medical Practitioner:

20. Name and address of Hospital/Clinic:

21. Date of Notification: - -

.....
Signature of Medical Practitioner

Annex 3
KKM/BKP/ZOONOSIS/BRUCELLOSIS/1/2011

BAHAGIAN KAWALAN PENYAKIT
KEMENTERIAN KESIHATAN MALAYSIA
BORANG SIASATAN KES BRUCELLOSIS

Daerah :
Negeri :
Tarikh Siasatan :

A. DATA DEMOGRAFI

1. Nama :_____
2. Umur :_____
3. Jantina :□Lelaki □Perempuan
4. No. ID (S/B,K/P,Passport):_____
5. Etnik :_____
6. Kewarganegaraan:_____
7. No. Tel :_____
8. Alamat Rumah :_____
   _____
9. Pekerjaan :_____
10. AlamatTempatKerja/ Sekolah* :_____
    _____

*jika berkenaan

B. RIWAYAT KLINIKAL

11. Tarikh onset :_____
12. Tarikh masuk wad* :_____ Hospital:_____RN:_____
13. Simptom & gejala klinikal:(Tandakan yang berkaitan)

Simptom:

□ Demam
□ Berpeluh
□ *Malaise*
□ Sakit kepala
□ *arthralgia/ joint pain*
□ sakit badan/otot
□ Muntah
□ *Diarrhea*
□ Berat badan menurun
□ Anorexia
□ Lain-lain, nyatakan:_____

Gejala Klinikal:

□
□
□
Lain-lain, nyatakan:_____

14. Adakah kes ini berkaitan dengan wabak ? □ Ya □ Tidak □ Tidak diketahui
15. Ujian Diagnostik makmal:

Nama Ujian	Tarikh Persampelan	Nama Makmal	Keputusan	Catatan
Culture				
PCR				
ELISA				
SAT				
Coomb's test				

16. Adakah pesakit dirawat dengan antibiotik ? □ Ya □ Tidak

17. Status Pesakit: □ Sedang dirawat □ Sembuh □ Mati

Tarikh Keluar wad*:_____
Tarikh mati* :_____
*jika berkenaan

C. FAKTOR RISIKO

18. Adakah jangkitan ini berkaitan dengan pekerjaan ? □ Ya □ Tidak
Jika ya, nyatakan kaitan pendedahan bidang pekerjaan:_____
_____

19. Adakah jangkitan ini berkaitan dengan pengambilan makanan/ minuman tenusu contohnya susu/ makanan tenusu yang tidak di*pasteurize*?
□ Ya □ Tidak
Jenis makanan :_____
Alamat pengilang/ penjual :_____
_____

20. Adalah jangkitan ini berkaitan hubungan langsung (*direct contact*) dengan haiwan?

□ Ya □ Tidak

Jika ya, nyatakan jenis haiwan dan kaitan bagaimana pesakit mendapat jangkitan daripada :
Haiwan :_____
Tempat :_____

23. Lain-lain maklumat yang berkaitan dengan risiko jangkitan, nyatakan:

24. Adakah anda mengenali sesiapa yang mempunyai simptom yang serupa ?

□ Ya □ Tidak □ Tidak diketahui

Jika ya, senaraikan:

Nama	Hubungan	No. Tel	Catatan

(Guna lampiran yang lain sekiranya ruangan tidak cukup)

D. KOMEN/ TINDAKAN SUSULAN

Komen Pegawai Penyiasat:

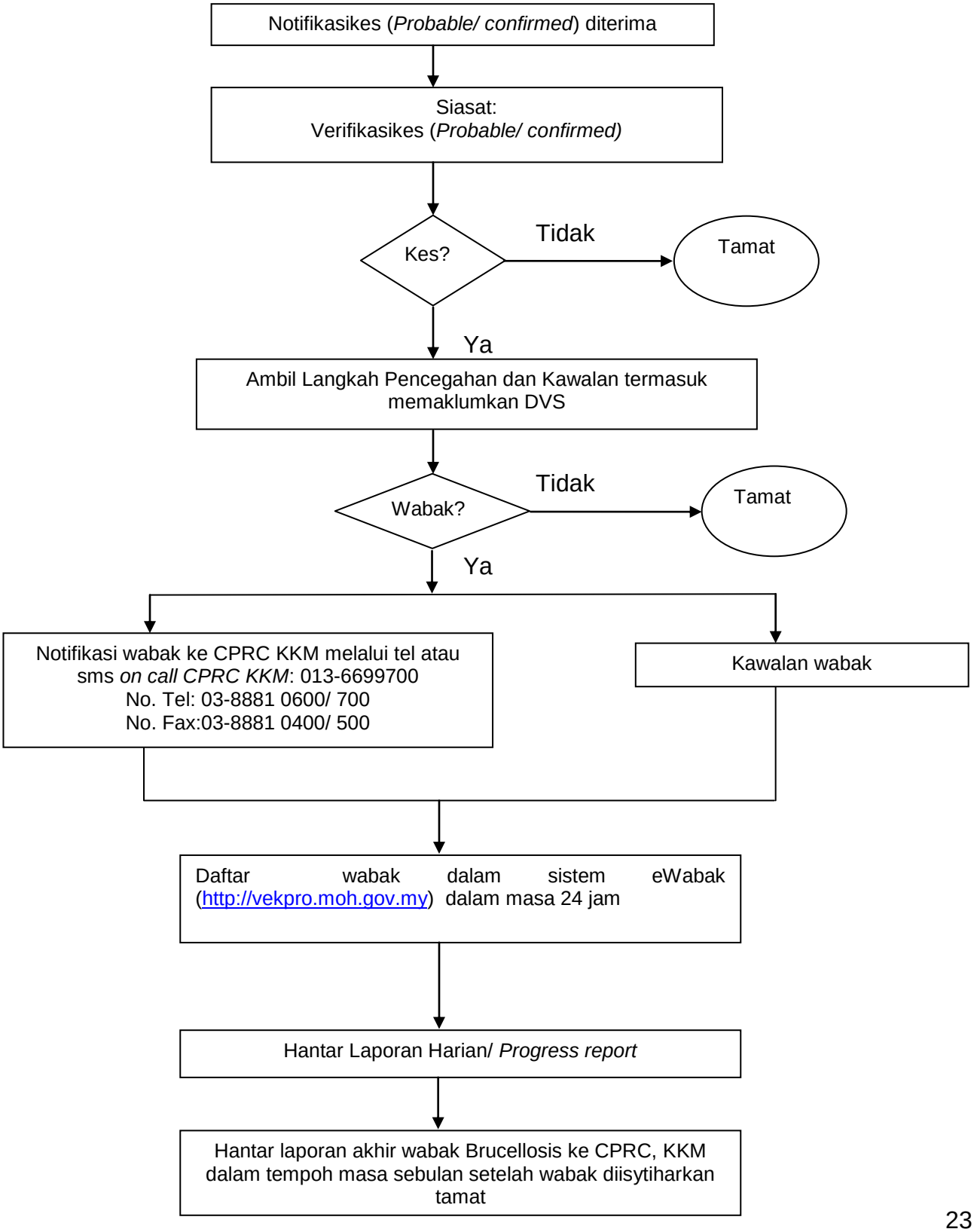
Tandatangan & cop :
Nama penyiasat :_____
Jawatan :_____
No. Tel :(Pej) _____
(HP) _____
Tarikh :_____

Komen PPKP Kanan / Pegawai Kesihatan Daerah

Tandatangan & cop :
Nama Pegawai :_____
Jawatan :_____
No. Tel :(Pej) _____
(HP) _____
Tarikh :_____

Annex 4

CARTA ALIR PENGENDALIAN NOTIFIKASI KES/ WABAK BRUCELLOSIS



Annex 5

NASIHAT KESIHATAN

AWASI PENYAKIT BRUCELLOSIS

Penyakit Brucellosis

Brucellosis adalah penyakit berjangkit yang disebabkan oleh bakteria dari jenis Brucella. Bakteria ini menjangkiti haiwan seperti kambing, biri-biri, lembu, kerbau, babi serta unta.

Cara Jangkitan

Apabila haiwan tersebut dijangkiti oleh kuman Brucella, susu haiwan ini akan turut mengandungi kuman tersebut. Cara biasa jangkitan berlaku adalah dengan meminum susu mentah yang mengandungi kuman itu. Bakteria ini juga boleh berjangkit kepada manusia yang berurusan dengan haiwan tersebut melalui sentuhan dengan haiwan yang terjangkit.

Tanda dan Gejala

Jangkitan Brucellosis pada manusia mempunyai tanda-tanda demam selesema termasuk demam, berpeluh, sakit kepala, sakit belakang dan lemah fizikal. Brucellosis juga boleh mengakibatkan tanda-tanda jangkitan kronik termasuk demam yang berulang, sakit sendi dan keletihan.

Jangkitan teruk boleh menyebabkan komplikasi pada sistem saraf atau lapisan selaput jantung dan sebahagiannya boleh mengakibatkan kemandulan.

Nasihat kepada orang awam

1. Hanya minum atau beli susu segar *(fresh milk)* yang mempunyai label ‘susu pasteur’[a] atau ‘susu suhu ultra tinggi / susu UHT’[b].

2. **SEGERA** dapatkan rawatan jika mengalami tanda dan gejala penyakit ini dan ada atau pernah makan/minum hasil tenusu atau terdedah kepada haiwan yang berpenyakit.

Nota kaki:

a) Susu pasteur bermakna susu yang telah dirawat pada suhu yang tinggi mengikut salah satu kaedah pempasteuran berikut;

- Kaedah *Holding*: Suhu susu dinaikkan kepada 63^{o}-65^{o}C dan dikekalkan selama 30 minit dan disejukkan secepat mungkin kepada suhu 3^{o}- 4^{o} C sebelum dipek dan disimpan.
- Kaedah Suhu Tinggi Masa Singkat: Suhu susu dinaikkan kepada tidak kurang daripada 73^{o}C dan dikekalkan selama 15 saat dan disejukkan secepat mungkin kepada suhu 3-4^{o}C sebelum dipek dan disimpan.

Pempasteuran adalah pemprosesan yang biasa dilakukan untuk “susu segar”. Susu Pasteur hendaklah sentiasa disimpan pada suhu 3-4^{o} C.

b) Susu suhu ultra tinggi atau susu UHT Adalah susu yang telah dirawat pada suhu tidak kurang daripada 135^{o}C sekurang-kurangnya selama 2 saat, dan seterusnya dipek secara aseptic kedalam bekas yang steril.

AWAS! Penyakit BRUCELLOSIS

Penyakit Brucellosis

Brucellosis adalah penyakit berjangkit yang disebabkan oleh bakteria dari jenis Brucella. Bakteria ini pada kebiasaannya menular di kalangan haiwan seperti kambing, biri-biri, lembu, khinzir dan anjing.

Cara Jangkitan

- Apabila haiwan dijangkiti oleh kuman Brucella, cecair badan haiwan termasuk susu haiwan ini akan turut mengandungi kuman tersebut.
- Cara biasa jangkitan berlaku adalah dengan meminum susu mentah yang tercemar dengan kuman Brucella.
- Manusia juga boleh dijangkiti melalui sentuhan dengan darah, tisu dan cecair badan haiwan yang sudah dijangkiti bakteria tersebut.

Tanda dan Gejala

Jangkitan Brucellosis pada manusia menampilkan tanda-tanda seakan-akan selesema termasuk demam, berpeluh, sakit kepala, sakit belakang dan lemah fizikal. Brucellosis juga boleh mengakibatkan tanda-tanda jangkitan kronik termasuk demam yang berulang, sakit sendi dan keletihan.

Jangkitan teruk boleh menyebabkan komplikasi pada sistem saraf atau lapisan selaput jantung dan juga berkemungkinan mengakibatkan keguguran/kemandulan.

Pencegahan

1. Bagi mereka yang mempunyai ternakan, pastikan haiwan tersebut menjalani saringan oleh Jabatan Perkhidmatan Veterinar (DVS) bagi memastikan ia bebas dari penyakit Brucellosis.
2. Pastikan menggunakan peralatan perlindungan diri seperti sarung tangan bila mengendali haiwan ternakan.
3. Hanya minum atau beli susu segar *(fresh milk)* yang mempunyai label 'susu pasteur' atau 'susu suhu ultra tinggi/susu U.H.T.

SEGERA dapatkan rawatan jika mengalami tanda dan gejala penyakit ini dan ada atau pernah makan/minum hasil tenusu atau terdedah kepada haiwan yang berpenyakit.

"UTAMAKAN KESIHATAN, BERTINDAKLAH DENGAN SEGERA"

Diterbitkan oleh:
Bahagian Pendidikan Kesihatan dengan kerjasama Bahagian Kawalan Penyakit,
Kementerian Kesihatan Malaysia
www.infosihat.gov.my - www.myhealth.gov.my
BM/15,000/2011