

6. SURVEILLANCE AND OUTBREAK RESPONSE

The main objective of surveillance is to detect, in a timely manner, cases of CHIK in the Americas. Early detection will allow for proper response and characterization of the outbreak and identification of the viral strains circulating.

6A. Modes of Surveillance

Multiple modes of surveillance can be considered to determine if CHIK may have been introduced to an area, to track the disease once introduced, or to follow the disease once it has been established.

1. Preparedness phase

Reinforce existing febrile syndromic surveillance sentinel sites with the ability to detect CHIK cases. A percentage of patients presenting with fever and arthralgia or fever and arthritis, with no known etiology (e.g., malaria or dengue test negative), should be tested for CHIK at the national reference laboratory (See Section 4 for more details on proposed laboratory surveillance testing). To ensure adequate laboratory testing and surveillance capacity, laboratories should be aware of the laboratory network set up for testing and eventual distribution of supplies.

2. Response phase

Introduction

Once an autochthonous case of CHIK is detected, an in-depth epidemiologic investigation must be conducted to:

- track viral spread
- monitor for possible introduction into surrounding areas
- describe key epidemiologic and clinical features
- assess clinical severity and impact on society (days missed from work, school closures, etc.)
- identify risk factors for infection or severe disease
- identify circulating CHIKV lineages

These efforts will be the basis for developing effective control measures.

Active, passive, and laboratory surveillance should be used to calculate and monitor indicators such as: incidence, rate of spread, rate of hospitalization (per infections), proportion of severe disease, mortality ratios, and disability rates.

Sustained transmission

Once the virus has been identified throughout a country, scaling back of the level of testing and active surveillance can be considered (i.e., test only a fraction of suspect cases depending on laboratory capacity, severe or atypical cases, newborns, cases in new regions) to avoid unnecessary costs in resource-limited settings. However, ongoing surveillance should be continued to monitor changes in epidemiology and ecology of CHIKV transmission. Any changes in surveillance at the national level should be readily communicated to other surveillance partners and partners in prevention, such as vector control specialists, to ensure the quality and uniformity of the data collected.

6B. Case Detection

Clinicians should consider CHIK in the differential diagnosis for individuals who are presenting with fever and arthralgias that are not explained by another etiology or have an atypical presentation, e.g., an atypical dengue presentation with more severe joint pain or conjunctivitis. The index of suspicion should be heightened for a traveler or someone having contact with a traveler who has recently returned from an area with ongoing CHIKV infections (to obtain updated information on location of CHIK outbreaks visit

<http://www.who.int/csr/don/en/index.html> or

<http://wwwnc.cdc.gov/travel/default.aspx>).

Laboratory personnel should consider CHIK if there is a low proportion of samples that are seropositive for an etiology that has a similar clinical presentation, like dengue, or if there are a number of synovial fluid samples that are sterile on bacterial culture.

Public health authorities should be alerted to small clusters of disease (fever and arthralgia or arthritis) associated with a traveler returning from an endemic area or an increase in the number of hospital visits for fever and arthralgia or arthritis occurring in a localized area in a short time period.

6C. Case Definition

Suspect case: a patient with acute onset of fever > 38.5°C (101.3°F) and severe arthralgia or arthritis not explained by other medical conditions and residing or having visited epidemic or endemic areas within 2 weeks prior to the onset of symptoms.

Confirmed case: a suspect case with any of the following CHIK specific tests:

- Viral isolation
- Detection of viral RNA by RT-PCR
- Detection of IgM in a single serum sample (collected during acute or convalescent phase)
- Four-fold increase in CHIKV-specific antibody titers (samples collected at least 2-3 weeks apart)

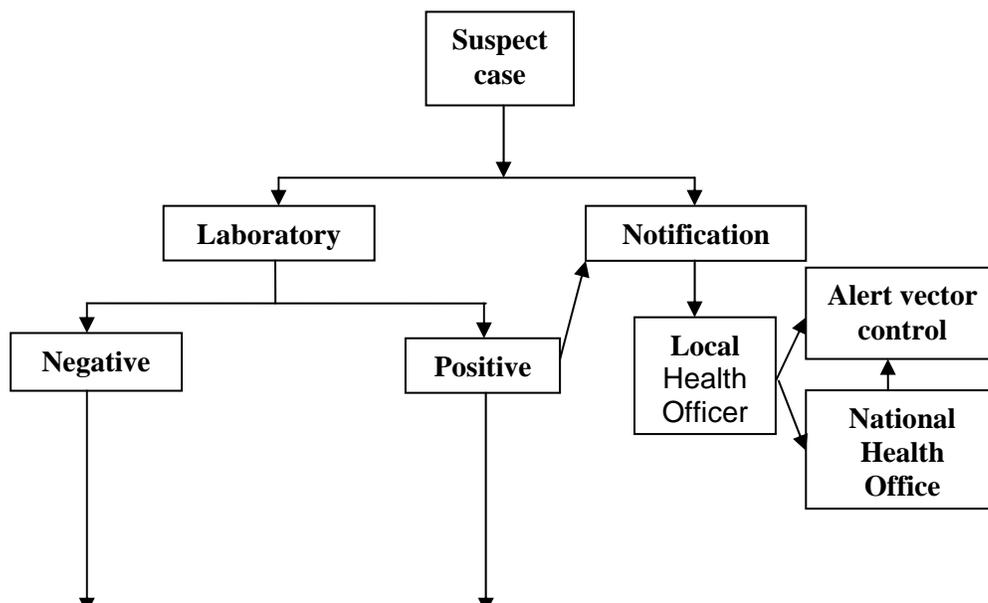
During an epidemic, all patients need not be subjected to confirmatory tests as above. An epidemiologic link can be sufficient.

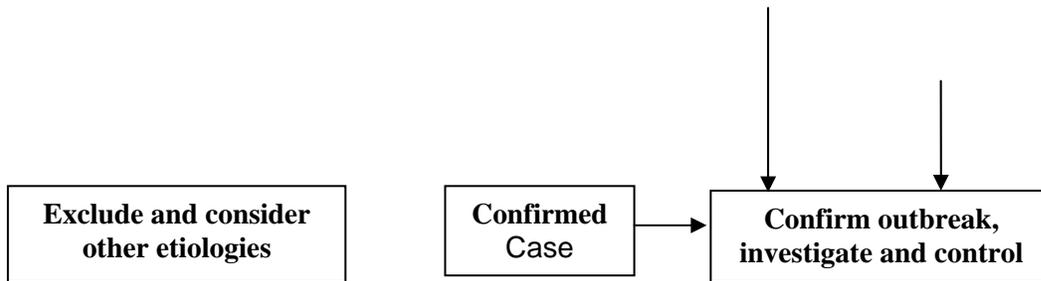
An evaluation of the sensitivity and specificity for clinical criteria for CHIKV infection was done during a large outbreak of the disease⁵⁴. The combination of fever and polyarthralgias had the best sensitivity and specificity at 84% and 89%, respectively, and allow for the correct classification 87% of individuals with serologically confirmed CHIKV infection.

6D. Case Reporting

CHIK is not a notifiable disease in most countries. However, depending on the epidemiologic situation, each country must determine independently when CHIK should be a disease of mandatory reporting. Occurrence of suspect cases could indicate a possible outbreak and therefore should be immediately reported to the nearest health authority in accordance with the IHR guidelines. Prior to the introduction of CHIK into an area, clinicians should report any suspect or confirmed travel-related cases to local public health officials who in turn should report to a regional level and then to a national level where information should be summarized and shared with stakeholders (Figure 3). In addition, other key partners, such as vector control management teams, should be notified.

Figure 3: Scheme for Notification of a Suspected Outbreak of CHIK





6E. Epidemiologic Reports

Ideally, epidemiologic reporting should be established at the national level with the support of local and regional public health officials. The types and number of epidemiologic reports will likely evolve during the course of the outbreak to reflect the types of surveillance that are performed in an area.

Following the introduction of CHIK into an area, a line list of suspect and laboratory confirmed cases should be kept and updated daily. Reporting should be coordinated at a national level with the establishment of a web-based line list, if at all possible, containing a few required variables and additional variables as needed. A standardized case report form, including demographic, epidemiologic and laboratory information, should be developed quickly and shared with key partners to help facilitate the collection of information (See Annex D for an example). At a national level, there should be clearly defined cutoffs in terms of presenting and closing the data on a daily basis. In addition to case count by location and timing, reporting on disease severity (hospitalization, mortality), number of hospital beds occupied per day, trends in cases based on syndromic surveillance can be considered as ways to present the data. The national level

data should be communicated back to the collecting districts, as well as to the press and other public health and partner agencies in control efforts (see Section 8 for more detail). Once a country has identified autochthonous transmission within its borders, they should activate their emergency operations center (sala de situacion) to serve as a source for rapid communication and decision making.

6F. International Health Regulations and Border Measures

International Health Regulations (IHR)

A single imported case (i.e., traveler) of CHIKV into the Americas would not necessarily constitute a public health emergency of international concern (PHEIC) under the International Health Regulations⁵⁵; although this case should be thoroughly investigated to minimize risk of CHIK introduction into the country. However, suspicion of autochthonous CHIKV transmission in the Americas will meet PHEIC criteria and should be reported per IHR (see Appendix E for an example). Such an event would have a serious public health impact because of its potential to cause an epidemic with high attack rates among an immunologically naïve population, and because vectors are sufficiently abundant to potentially support permanent establishment of the virus and year-round transmission. The event would also be unusual for the Americas since it would declare the appearance of previously absent pathogen and would signal a significant risk of international spread given the amount of travel between countries within the Americas. Although CHIKV does not have a high mortality rate, it has high morbidity rates associated with persistent arthralgias that can

lead to disability and productivity reductions. CHIKV establishment in a Member Country could also affect key national income sources, such as tourism. For example, Réunion Island observed a 60% decline in tourism after their CHIKV outbreak⁵⁶.

Member Countries should ensure that they thoroughly investigate any suspect CHIK case detected without a travel epidemiologic link to another country and rule out indigenous CHIKV transmission. PAHO recommends that Member Countries should consider reporting of CHIK be made mandatory to enable and promote a timely response.

Border Measures

Border closure for suspected CHIKV cases would be counterproductive, is not recommended by the World Health Organization, and is inconsistent with the IHR which emphasize detection and containment at the new source of transmission rather than control at borders of entry. The costs associated with port of entry screening for CHIK outweigh the benefits. It is insufficiently sensitive and specific and too expensive to be a tool for the prevention of CHIKV introduction and spread. The anticipated prevalence among travelers coming from areas of the world with CHIKV activity is low, symptoms are non-specific, and screening would yield a low positive predictive value. The reported experience of entry screening for CHIKV in Taiwan validates this point. During 2006, more than 11.7 million passengers arrived in Taiwan. Of these passengers, 6,084 were identified as having fever using thermal infrared imaging

cameras; laboratory testing of passengers detected 44 cases of dengue fever, 13 cases of shigellosis, 1 case of malaria, 1 case of paratyphoid fever, and 1 case of CHIK (JW Hsieh, Centers for Disease Control, Ministry of Health, Taiwan, *personal communication, 2007*).

Even disregarding the issue of cost and complexity of implementation, port of entry screening activities are unlikely to prevent or delay the importation of CHIKV. There is no evidence to support requiring flight health declarations by pilot or ship captain, asking passengers to complete screening questionnaires, taking temperature measurements and other entry screening modalities for the purposes of preventing CHIKV introduction and spread into the Americas. Member Countries should use their scarce public health resources on activities more likely to achieve intended results, including implementing sustainable vector control efforts, enhancing clinical surveillance for CHIKV disease, public education, and considering assisting affected Member Countries. For similar reasons, exit screening is not recommended if Member Countries in the Americas confront CHIKV outbreaks within their borders.

Some jurisdictions outside the Americas have instituted mosquito abatement activities at international airports and spraying adulticides in the passenger cabins of arriving international flights as part of efforts aimed at preventing dengue importation. However, virus-infected mosquitoes arriving in passenger aircraft are not considered as significant sources of most arboviral importations. For arboviruses with a human-mosquito-human transmission cycle, the most important source of viral importation is the viremic traveler. In a region

like the Americas, where competent vectors are already present in the majority of countries, mosquito abatement and vector surveillance efforts predominantly focused on international airports and seaports, with the purpose of preventing CHIKV importation, can be implemented by national authorities but are not suggested by PAHO. The exception would be if cases were being detected close to an international airport or seaport, or if suspected cases worked in or around these ports of entry. Routine vector control efforts consistent with IHR Article 22, which calls for eliminating vectors at facilities used by travelers at points of entry, should be implemented, but are not intended as a principal means of preventing CHIKV importation.

Similarly, in the presence of CHIKV cases and local virus transmission, there is no need to place any restrictions on baggage, cargo, containers, goods and/or postal parcels beyond usual practices to avoid unnecessary interference with international traffic in the absence of any identified public health benefit. However, it is advisable to establish communications between public health authorities and conveyance operators (sea and air, cargo and passenger) and other port-based organizations in case there is a need to implement a CHIKV communication campaign.

Countries may elect to distribute Travel Health Alert Notices (THANs) to international travelers if there is concern that CHIKV transmission is likely or if ongoing transmission has been detected. This information would offer guidance to travelers on how to reduce their risk of contracting CHIKV, to take steps aimed at reducing the likelihood that they would be bitten by mosquitoes, or to seek

early diagnosis if they develop signs and symptoms compatible with CHIK fever. These messages could be relayed through online reservation systems, travelers' health clinics, travelers' health Web sites and posting at international ports when outbreaks are occurring.

It will be important to monitor air travel patterns between countries where CHIKV is circulating and every country or region in the Americas in order to identify areas most at risk to virus introduction. In a preliminary analysis that was limited by using only direct flight data, scheduled commercial flight data has shown that countries importing CHIKV had 23 times more total scheduled passenger seats than non-importing countries originating from countries with CHIKV activity (CDC, *unpublished*). Subsequent analyses using passenger-specific data, which includes travel connections and actual passenger volume, could provide more accurate information on which to base a risk assessment of CHIKV importation.

Summary of Surveillance and Outbreak Response Section

- Epidemiological surveillance is key to timely detection of cases and appropriate and rapid response with active participation from all stakeholders.
- CHIK surveillance should be built upon existing dengue surveillance (highlighting differences in clinical presentation).
- If autochthonous transmission of CHIK is identified, it must be reported immediately as a public health emergency of international concern (PHEIC) under the International Health Regulations.