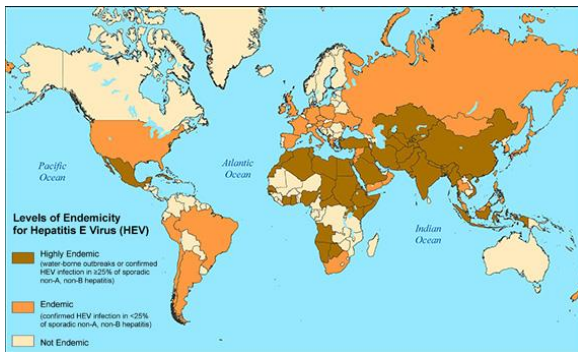


## Introduction

This brief is intended to highlight key elements of an effective response to an outbreak of hepatitis E virus (HEV) infection in refugee setting. It focuses on specific response actions, including the review of common risks associated with health, water, sanitation, and hygiene (WASH). The overall implementation of response actions and mode of operation should be context specific, as highlighted by the examples given from Dadaab (Ifo) Kenya and South Sudan.

## Hepatitis E Virus

Hepatitis E is an acute hepatic infection caused by the Hepatitis E Virus (HEV). It rarely develops into a chronic stage with eventual liver failure. The route of transmission is fecal-oral. The source of infection is usually contaminated drinking water or contaminated food. It is associated with contaminated water supply in countries/settings with poor sanitation. Hand washing and personal hygiene play a major role.



Source: CDC

It is highly endemic in the East and Horn of Africa, North Africa, MENA and wide parts of central and South-East Asia. About 70,000 deaths and 3.4 million cases are attributed to acute hepatitis E infections. Hepatitis E often co-exists with Hepatitis A, another water-borne hepatitis type.

## Risk Groups

- Pregnant women are most at risk of developing severe acute hepatitis and subsequent liver failure, especially during the third trimester of pregnancy.
- Adolescents and adults may develop symptomatic illness, but mostly without complications.
- Children often remain asymptomatic
- The case-fatality rate is usually below 1% in developed countries and between 1-4% in developing countries but as high as 10%-25% for pregnant women in the third trimester.

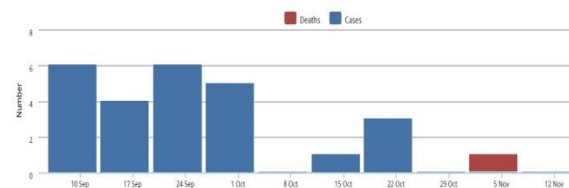
## Risk Factors

- Inadequate and unsafe drinking water
- Contaminated water sources, distribution and storage (infrastructure, household)
- Inadequate and/or inappropriate sanitation facilities
- Inadequate hygiene practices (hand-washing, food preparation and eating)
- Lack of basic hygiene items (soap)
- Lack of waste disposal and management
- Overcrowding and sub-optimal living/shelter conditions
- Personal and communal practices and risk behavior.

## Recent HEV Outbreaks in Refugee Settings

### 2012: Kenya, Dadaab, Ifo

- Week 36 Sep 10, cluster of 6 cases identified and confirmed
  - Outbreak Control Team activated, consisting of public health and WASH partners
  - Case definition developed
  - Measures to address sanitation and hygiene gaps identified
  - Active case findings especially among pregnant women at community and ANC level started
  - In subsequent 6 weeks 19 cases identified, severe illness among pregnant women only, 1 death
  - No new cases were reported after initial response and within 6 weeks (end of incubation period)
- Ifo epidemic curve: distribution of reported AJS cases by date of onset



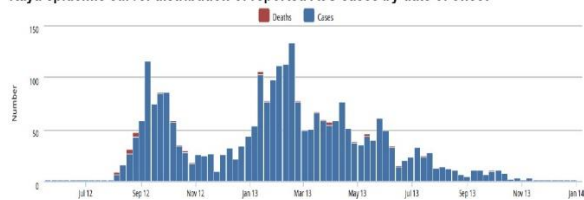
Source: UNHCR HIS Outbreak Report - HEV Outbreak curve: Ifo camp, Dadaab, 2012

### 2012-2014: South Sudan, Unity, Upper Nile refugee camps

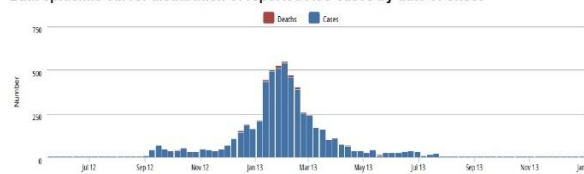
- HEV is endemic in Sudan where the refugees in Unity and Upper Nile originated from.
- The deaths of two pregnant women and one child reported in the first week of July 2012 from Jamam refugee camp, Maban are considered the index cases.
- Hepatitis E virus (HEV) was confirmed among a subset of cases in all four camps in collaboration with CDC, MoH and WHO.

- First epidemic threshold was reported from Kaya camp, Maban in August 2012.
- The first epidemic peak was reached in Jammam in Sep 2012 following rains and flooding.
- In December 2012 when services and capacities were reduced, a second massive increase occurred, peaking in February 2013 with over 500 cases in Batil alone.
- Attack rates ranged, but went as high as 15%, CFR ranged between 2-3%.
- WASH and health outbreak response team developed priority interventions around improvements to water and sanitation infrastructure, hygiene promotion and case detection.
- While outbreak response efforts in Batil paid off, in Kaya, Doro and Gendrasa (Upper Nile) and Yida (Unity) containment efforts were slow to show impact

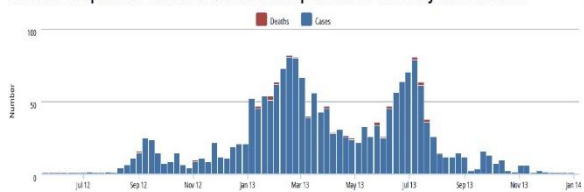
Kaya epidemic curve: distribution of reported AJS cases by date of onset



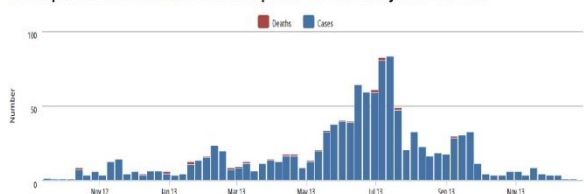
Batil epidemic curve: distribution of reported AJS cases by date of onset



Gendrasa epidemic curve: distribution of reported AJS cases by date of onset



Doro epidemic curve: distribution of reported AJS cases by date of onset



Yida epidemic curve: distribution of reported AJS cases by date of onset



## Outbreak Response

### Multi-sector Coordination Response Planning

An integrated and well-synchronized coordination between public health and WASH is necessary for an effective response. The coordination should include surveillance, clinical, laboratory, WASH, education and community components. Functional available resources, logistics and skilled personnel are essential. This enables harmonization of prevention activities, services delivery, monitoring, and supervision.

An initial assessment must be carried out, looking in particular at the:

- Affected population (demographic, geographic, socio-economic, socio-ethnic etc),
- Knowledge and Practices (could be dedicated KAP survey)
- Infrastructure (shelter, WASH, health, schools, markets etc),
- Services (WASH, health, education etc)
- Economic situation (trade, farming, producing, etc)
- and factors such as population movements/ interactions (with host communities)

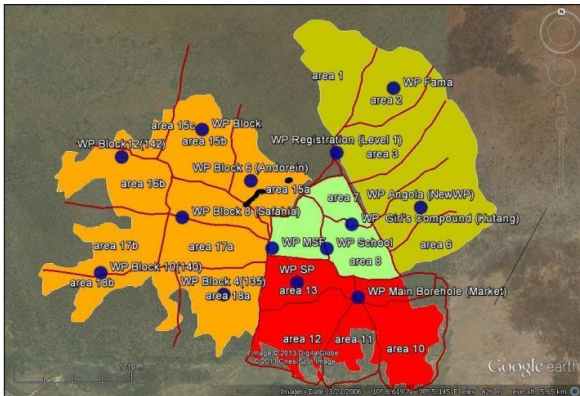
Furthermore, in-depth community consultations will help to understand underlying factors and involve the community from the start.

The outcome of initial assessment and coordination must be translated into an **integrated outbreak response plan**. Such plan should incorporate and emphasize on community participation, health and hygiene promotion, WASH services and supplies, epidemiology, surveillance and laboratory, case management and coordination.

### Surveillance and Outbreak Reporting

The **Outbreak Response Coordinator** should ensure that timely collection and reporting of epidemiologic data is initiated at (1) confirmation of an index case in non-endemic settings, or (2) surpassing the outbreak threshold (1.5 x number of baseline cases of previous 3 weeks) in endemic settings. Line-listing and weekly outbreak reporting should be initiated as soon as the outbreak is declared. The Ministry of Health and UNHCR HIS Outbreak Report tools should be used ([twine.unhcr.org](http://twine.unhcr.org)). The UNHCR public health officer has to ensure completeness of data and timely reporting and feedback to partners. Weekly outbreak updates as produced in South Sudan are an ideal way of sharing information (see references below).

Mapping of cases against the location of WASH infrastructure, residential areas and key services will help identify potential sources and inform a targeted response.



Epidemic map (new cases), week 49/13 to week 03/14, Yida camp

Key indicators:

- New cases and Cumulative total cases
- New deaths and Cumulative total deaths
- Attack Rate (Nr. of cumulative cases / population (at mid-point))
- Case Fatality Rate (Nr. of cumulative deaths / nr. of cumulative cases)

### Case Definition

UNHCR and its partners will use the case definition developed by the Ministry of Health. In the absence of a national case definition, the generic WHO case definition should be adapted to the context. Any hepatitis case definition must consist of a clinical and biochemical component. Clinical distinction from other types of hepatitis is impossible. Laboratory diagnosis is required.

### Clinical diagnosis

Any person with discrete onset of an acute illness with signs or symptoms commonly known as acute jaundice syndrome:

- Acute jaundice
- Abdominal pain and tenderness (right upper quadrant)
- Enlarged, tender liver
- Loss of appetite
- Nausea and vomiting
- Fatigue
- Fever

### Laboratory Diagnosis

- Elevated serum aminotransferase levels >2.5 times the upper limit of normal
- or IgM and/or IgG positive
- or HEV RNA positive

In outbreak situations, only a number of initial cases need to be laboratory confirmed. All further clinical cases of acute jaundice syndrome (AJS) that can be linked epidemiologically to the index (initial) case(s) are to be considered as outbreak-relevant cases.

### Case Detection

Early case detection particularly among pregnant women is important to reduce the risk of development of severe clinical manifestation or complications. As the incubation period is relatively wide with 14-60 days, a classical outbreak response approach with contact tracing is ineffective. Community-based surveillance, active case finding and follow-up of pregnant women is more effective. The community-based workforce (CBWF) must be trained on clinical signs of AJS. Clinical examination during ANC visits have also shown to be effective. Screening for yellow discoloration among women and children at nutrition centers or food distributions may also prove effective.

### Control and Prevention

Community participation is a prerequisite in prevention and control activities. The community is essential in sharing knowledge about the disease, risk factors, mode of transmission, signs and symptoms of the infection, and basic measures to prevent transmission. Service delivery and control efforts must be geared towards community-based programming and promote community buy-in/ownership. Community participation is supported by public health professionals and by community-based workforce (CBWF) to ensure effectiveness and comprehensiveness. However, at the level of the community peer-to-peer, family support or collective approaches ensure getting the messages across.

### Water quantity and quality

Availability of potable water should be increased to the minimum UNHCR standard of 20 liters per person per day to ensure that covering ALL basic needs such as personal hygiene, washing of cloths and household items, drinking and, depending on the context, watering of animals are ensured.

Free residual chlorine (FRC) levels should be increased to a maximum of 0.8-1.0 mg/l at tap stands. It is important to involve the community and explain the reason and the expected change in taste, because they may reject to using the water and instead retreat to using untreated unsafe water. FRC levels decrease over time, particularly during household storage. Regular monitoring of water availability and quality at the household level is essential. The objective is to maintain levels of 0.5 mg/l FRC.

Contaminated or dirty carrying or storage containers (buckets, jerry cans) continue being a source of re-contamination. Regular cleaning exercises at community and household levels should be encouraged and practiced. Chlorine solution (over 1 mg/100 ml FRC) or in the absence [clean] ashes or sand can be used.

Reducing the distances between water distribution points and households decreases the risk of contamination/ re-contamination further.

### Sanitation

Ideally, the UNHCR minimum standard for latrines of 1:20 should be in place (less than 50 meters from dwelling). However, in places where this has not been achieved, latrine construction should be accelerated as soon as possible. The aim is to eradicate open defecation by ensuring the community has adequate latrines. In all cases, family latrines are preferred.

Individual and shared family latrines are taken and maintained by each family/ families. The “owners” are responsible to ensure soap and water are always available, the latrine is cleaned daily, and repairs are reported and done. Communal latrines are maintained under some form of shared, rotational or incentivized responsibility. Daily monitoring by WASH staff, health workers or community managers and supervision at program and camp management levels are key for ensuring proper functioning, cleanliness, maintenance and safety.

Assessment of latrines gaps and proper monitoring of latrines filling rate is essential, therefore during a HEV outbreak needs to be undertaken or reinforced.

### Waste disposal

Poor management of solid waste propagates the risk for hepatitis E virus transmission. Mitigating measures must be put in place to reduce and prevent open waste disposal, open defecation and improve waste disposal options, resources and management. Effective waste disposal links to sanitation efforts, hygiene promotion, community-based approaches and service providers, not least health care providers.

### Public spaces and communal facilities

Market places, social centres, schools and any other public area are both high-transmission risk areas and response opportunities. Market places, restaurants, shops and other conveniences which store or handle food items can be a source of continued HEV transmission. Local authorities, community leaders, partners and the Ministry of Health should be involved in the inspection and quality control of these installations and services. Appropriate actions such as provision of WASH facilities (latrines, hand-washing and safe and adequate water) or closure if required should be instituted as necessary.

Persons involved in public and private services, such as teachers, policy, administration, store keepers and merchants should also be considered for carrying messages of good practice forward.

### Hygiene promotion and health education

It is important to demonstrate to the community the importance and impact of basic hygiene measures at communal, household and individual levels.

Regardless title or function, being a hygiene promoter, community health worker, community-based nutritionist, community leader, community member or a service provider, during a HEV outbreak EVERYONE becomes an outbreak advocate, EVERYONE gets involved. Integration of roles and responsibilities, including harmonization of awareness messages for HEV prevention and control among WASH and Health partners improves effectiveness and sustainability.

Recruitment of CBWF with active participation of the community leadership and continuous training and supervision ensure continuous commitment.

Traditional food sharing, personal sanitation and hygiene practices are among the most common behavioral risk factors. Soap distribution alone is not sufficient. Definition of appropriate methods for awareness messages and dissemination strategy targeting particular groups (based on the KAP surveys results) and at strategic assembly points (markets, schools, mosques, water collection points, cross roads between camps, during food and general NFIs distributions) is essential. Dissemination methods include massive awareness campaigns through megaphones, activities with children on hand-washing at schools and at camp levels (role plays, theatre), jerry cans clean-up campaigns, dissemination of IEC materials, households hygiene sessions, FGDs with targeted groups (women, elders, youth, children, sheiks). Opportunities to use social media, mobile technology, and social marketing approaches should be explored.

Hygiene practices should be reinforced through daily house-to-house monitoring by CBWF or peer groups can be established. Weekly soap distribution at all hand-washing stations and monthly soap distribution at household-level should be increased to at least 450 g/person/month.

The frequency of monitoring should be reviewed regularly as appropriate, but should be intense for the initial 6-8 weeks.

### WASH Monitoring

- UNHCR’s Health Information System TWINE provides tools for data collection, compilation, analysis and sharing on basic WASH indicators:
  - Water quantity
  - Water quality
  - Sanitation coverage
  - Hygiene practices

### Case Management

Treatment is symptomatic. There is no treatment regimen available against HEV infection. Supportive therapy should include nutrition support and rehydration.

Persons with overt acute jaundice syndrome and worsening general conditions should report to the health facility. Severe stages such as acute hepatic failure, hepatic encephalopathy must be treated at referral hospital level.

National protocols should be used and where not available WHO guidance adapted.

Isolation wards should be set up in health facilities and universal precautions reinforced.

### Special Considerations for Pregnant Women

The severe progression of HEV infection during pregnancy may be related to several possible factors, such as differences in immune and hormonal factors occurring during pregnancy or genetic and environmental factors. Some studies and field experience show that use of herbal medicines to treat AJS is common during pregnancies, could contribute to mortality and need to be addressed. The mainstay in managing HEV during pregnancy largely remains prevention, increasing community awareness on harmful traditional medicines that can exacerbate liver infection, early detection of jaundice, close monitoring for complications and appropriate management.

During an epidemic, all pregnant women, their partners and families should receive a comprehensive awareness building session on Hepatitis E, its modes of transmission, signs and symptoms, danger signs, preventive measures, risk factors such as food and hygiene practices and the use of unsafe herbal medicines and the need for periodic follow up. When resources permit, serious consideration should be given to provide the pregnant woman with a new NFI kit (or hygiene kit) including additional soap.

Community health workers should make contact with all pregnant women at least on a weekly basis (more frequent the better) and screen for signs of jaundice (clinical and if possible simple urine testing for bile salts and pigments when possible). Pregnant women and their families should be advised to report immediately if any member of the family develops signs of AJS. Pregnant women in the family should be isolated if situation permits. If the pregnant woman has been found to be icteric, immediate admission into an in-patient facility is recommended. A baseline liver function test should be carried out. Weekly LFTs are to be continued in the facility and the woman can be discharged if her liver function shows signs of recovery and if she can be followed up on a weekly basis until her delivery and post-partum period. If the condition worsens, appropriate clinical management protocols should be readily available.

All pregnant women with icterus who are 37 weeks and over should be admitted in a comprehensive emergency obstetric care facility as a precautionary measure and followed up closely in the ward until delivery and 7 days post-partum. Caesarean section is indicated only for obstetric complications. A close vigil is required for HELLP syndrome and potential bleeding diathesis due to deranged liver function and need to be managed appropriately. It is recommended that all pregnant women with icterus at the time of delivery be monitored for 7 days post-partum in the hospital. Discharge should be considered only after 7 days if liver function shows signs of recovery.

### Feeding Practices

In the event of a maternal death or death of a lactating mother, especially of a child less than 6 months old, alternative feeding methods must be sought. In line with Infant and Young Child Feeding (IYCF) guidance a specific SOP should be developed. Wet nursing is the preferred choice of alternative feeding where appropriate and possible. The use of Breast Milk Substitutes should be limited and well-guided.

### References & Further Reading

- UNHCR Epidemic Preparedness and Response in Refugee Camp Settings: Guidance for Public Health Officers, 2011 <http://www.unhcr.org/4f707f509.html>
- UNHCR Standardised Health Information System Twine: Outbreak Reports <http://twine.unhcr.org> Tools > Disease Outbreak Reports (login required)
- WHO/UNICEF/FAO Communication for Behavioural Impact (COMBI): A Toolkit for Behavioural and Social Communication in Outbreak Response, 2012 [http://apps.who.int/iris/bitstream/10665/75170/1/WHO\\_HSE\\_GCR\\_2012.13\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/75170/1/WHO_HSE_GCR_2012.13_eng.pdf)
- WHO/UNICEF/FAO Communication for Behavioural Impact (COMBI) Toolkit: Field Workbook for COMBI Planning Steps in Outbreak Response, 2012 [http://apps.who.int/iris/bitstream/10665/75171/1/WHO\\_HSE\\_GCR\\_2012.14\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/75171/1/WHO_HSE_GCR_2012.14_eng.pdf)
- Example of UNHCR South Sudan HEV Weekly Epidemic Updates available upon request from PHS (email address below)