

2. WASH and Public Health

Disease outbreaks can spread very rapidly in refugee settings leading to high morbidity and mortality rates. The susceptibility of the refugee population to disease is greatly increased by a number of factors including overcrowding, fatigue, poor nutritional status, insanitary conditions and a lack of access to basic needs. WASH interventions are essential for preventing and controlling disease transmission.

INTRODUCTION	64
The importance of WASH interventions in disease prevention and control	64
WASH interventions as part of a comprehensive public health approach	64
COMMON WASH RELATED DISEASES IN REFUGEE SETTINGS	65
Water-borne diseases in refugee settings	65
Water-washed diseases in refugee settings	68
Water-based diseases in refugee settings	68
Diseases spread by mosquitoes	68
Diseases spread by flies	68
Diseases spread by lice	68
Diseases spread by biting flies	68
Diseases spread by ticks, mites, triatomine bugs and fleas	70
EPIDEMIC PREPAREDNESS AND RESPONSE IN REFUGEE SETTINGS	70
WASH related epidemic preparedness	70
The importance of epidemic surveillance and early detection	72
WASH prioritised disease outbreak response activities	72
Outbreak response coordination arrangements	72
WASH participation in the Outbreak Control Team (OCT)	74
Confirming the outbreak	74
Outbreak investigation	74
Responding to the outbreak	74
After the outbreak	74
LIST OF FIGURES	
Figure 3-1 The F-Diagram	65
Figure 3-2 Impacts on Diarrhoeal Morbidity	66

Introduction

The importance of WASH interventions in disease prevention and control

1. Disease outbreaks are defined as the occurrence of cases of a disease with a frequency that is clearly in excess of what is normally expected in a given population, therefore, demanding emergency control measures. Diseases with rapid transmission and high mortality rates are of concern in particularly diarrhoeal diseases, enteric fevers, respiratory infections and malaria.
2. The susceptibility of the refugee population to disease is greatly increased by a number of factors including overcrowding, fatigue, poor nutrition, insanitary conditions and a lack of access to basic needs such as food, shelter, safe water, sanitation and disease vector control measures. The most at risk from disease are typically infants, the elderly and the chronically ill.
3. Experience has shown that the risk of WASH related diseases can be greatly minimised through the immediate provision of basic WASH interventions including: the provision of adequate quantity of sufficient quality; the safe containment of excreta; the provision of hygiene related non-food items in particular clean water storage containers and soap; the promotion of basic hygienic practices in particular handwashing with soap at critical times; and the efficient control of disease vectors in particular the reduction of vector breeding sites, clean up

campaigns and the safe management of domestic wastes. Summaries of each of the most important WASH related diseases that are relevant to refugee settings, along with their prevention and control strategies, can be [found in the annex](#).

WASH interventions as part of a comprehensive public health approach

4. UNHCR and WASH actors should ensure that all WASH interventions are fully integrated into the larger public health strategy with the overall aim of improving the health status of the refugee population. The WASH and Medical focal points should aim to meet regularly (at least once every two weeks) to share health incidence rates and conduct joint planning. Short-term water, excreta management, solid waste management, hygiene promotion and disease vector control interventions should be geographically targeted based on current health clinic morbidity and mortality data in collaboration with the Health section's case management activities.
5. Many WASH diseases exhibit seasonal peaks at certain times of the year that correspond to seasonal conditions e.g. peaks of diarrhoea or malaria during the time of year when fly and mosquito populations peak. Medium and longer term WASH interventions should be planned based on a comprehensive analysis of seasonal morbidity and mortality data if it is available.

A description of how WASH interventions are addressing public health prevention, control and

preparedness - including an analysis of the up to date disease morbidity and mortality rates and historical analysis, should be updated in the site WASH plan/strategy. The site WASH plan/strategy should also clearly describe the current WASH coordination arrangements with the Health service providers including any updates from bi-monthly WASH and Health planning meetings.

Common WASH related diseases in refugee settings

Water-borne diseases in refugee settings

6. Waterborne diseases are caused by the ingestion of water contaminated by human or animal faeces or urine containing pathogenic bacteria, viruses, protozoans and spirochaete. Important water borne diseases in refugee settings include Watery Diarrhea, Cholera, Shigellosis, Typhoid and Hepatitis A and E. Transmission of water borne diseases follows the faecal-oral route and occurs when the pathogen is consumed in contaminated water or food. Diarrhoeal diseases have been responsible for up to 40% of deaths in refugee populations in the emergency phase. Diarrhoeal diseases are spread via the faecal oral route, depicted in the F-Diagram (see right).
7. The F-Diagram shows how pathogens in faeces from a person infected with the disease reach a new host. These pathogens are ingested either through

contaminated water, poorly cooked or raw foods or directly from the hands. Human faeces from carriers of the disease are the principal source of pathogens for all of the diarrhoeal diseases with epidemic potential, making human faeces the greatest potential environmental hazard confronting refugees. While faeces from infected humans represent the greatest risk of epidemic diseases in emergencies it should be borne in mind that animal faeces contains pathogenic organisms that can cause disease in humans. To the extent possible animal and human water points should be separated.

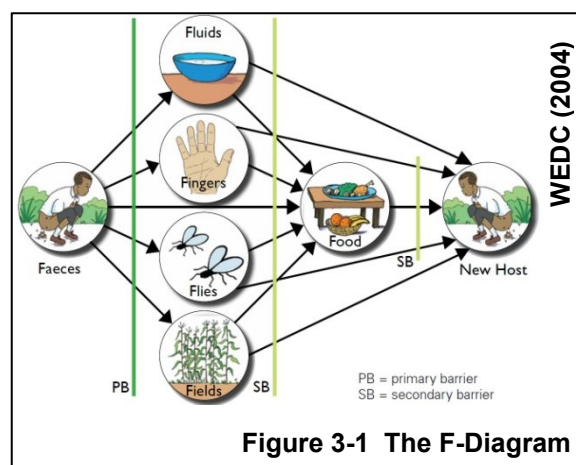


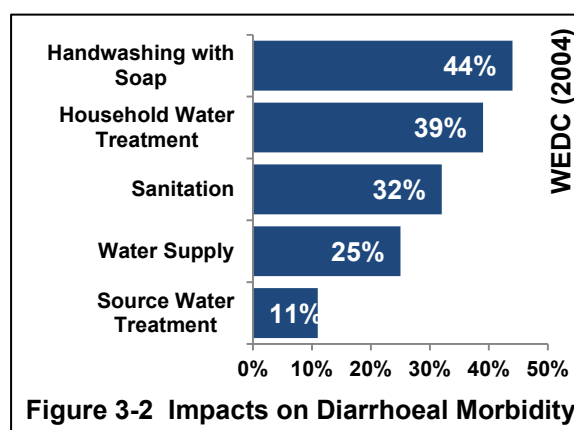
Figure 3-1 The F-Diagram

8. Strategies for reducing the transmission of diarrhoeal diseases are based on interrupting the pathways in the F-Diagram, which include..
 - ◆ Preventing faecal contamination at the water source through prevention of open defecation, increasing latrine coverage, enforcing of minimum safe distances and undertaking sanitary upgrades to water sources. Prevention of open defecation and clean-up campaigns are an essential

- requirement to prevention of disease transmission by flies.
- ◆ Preventing contamination of water during transport and storage. It is thus critical that refugee populations have sufficient water containers to safely collect and store water and that water supplies are treated have residual chlorine levels that allow water to be continuously protected up to the point of consumption. Water must be irradiated to at least 10mJ/cm² if there is evidence of chlorine-resistant protozoans in particular *Cryptosporidium*, *Giardia lamblia*, or *Entamoeba histolytica* cysts.
- ◆ Educating the public on modes of transmission and protection in particular handwashing with soap (or with any rubbing agent such as ash) at critical times has been shown to be extremely effective in reducing the incidence of diarrhoea. Most of the studies available have been carried out in non-emergency settings and reductions in incidence of up to 40% have been achieved by this simple change in behaviour.
- ◆ Educating the public on the importance of proper food hygiene practices including thoroughly cooking food just before eating, washing fruits or vegetables that are eaten raw thoroughly with safe water, protecting food sources and utensils from flies, safe storage and reheating of cooked foods.
- ◆ Improved solid waste management can have the potential of reducing the numbers of fly breeding sites

and should result in a lower density of vectors. All latrines should be clean and fly-proof and their use should be encouraged.

- ◆ 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.
9. The effectiveness of WASH interventions in reducing diarrhoeal diseases can be seen in the figure below.



The diagram shows that the simple action of encouraging the population to wash their hands with soap at critical times is a very effective intervention and has the potential of reducing diarrhoeal disease morbidity by an average of 44%. On the other hand, providing treated water alone (without supporting hygiene promotion activities), or increasing the quantity of available water, has a much lower impact on diarrhoeal disease morbidity.



Water-washed diseases in refugee settings

10. Water-washed diseases of the skin and eyes are generally caused by poor personal and domestic hygiene. Transmission is reduced by increasing the availability and volume of water and providing soap in addition to facilities for bathing and laundering of bedding and clothes. Quality of water is relatively unimportant. Water-washed diseases in refugee settings include Conjunctivitis, Scabies, Trachoma and occasionally louse-borne Typhus and Relapsing Fever. Encouraging frequent handwashing with soap has also been shown to impact respiratory infections.

Water-based diseases in refugee settings

11. Water-based diseases caused by parasitic worms (helminths), which depend on aquatic intermediate hosts to complete their life cycles, are common in many parts of the developing world where refugees reside. Types include both penetrating skin: e.g. Schistosomiasis and ingested: e.g. Guinea Worm. While water-based diseases tend to cause chronic health problems, refugee sites should be rejected if there is a risk of long term exposure to water-based diseases. In long-term refugee settings, control of water based diseases may be considered through breeding site management, treatment of surface waters with molluscides, drinking water treatment and public education concerning the risks of consuming or bathing in contaminated waters.

Diseases spread by mosquitoes

12. Diseases spread from person-to-person via biting mosquitoes are of significant importance in many refugee settings e.g. Malaria Falciparum, Malaria Vivax, Malaria Malariae, Yellow Fever, Dengue / Dengue HF, Japanese Encephalitis, Filariasis. Refugee sites must be rejected if they are in areas close to water bodies, marshy areas or large mosquito breeding sites. Control is generally achieved through a combination of the elimination of breeding sites in particular standing water, the use of barriers and screens, residual spraying with insecticide, fogging with insecticide and the use of insecticide treated bednets.

Diseases spread by flies

13. Domestic flies are an important transmission route for diarrhoeal diseases and infectious eye diseases including Trachoma and Conjunctivitis. Control is typically through domestic waste clean-up campaigns, reduction of open defecation, improved toilet infrastructure and cleanliness, and improved domestic waste management.

Diseases spread by lice

14. Typhus, Relapsing Fever and Trench Fever transmission are carried out by lice in typically crowded and unhygienic conditions. Control is achieved through improved laundering and drying of clothing and bedding, delousing, residual spraying and use of insecticide treated bednets.

Diseases spread by biting flies

15. Biting flies (e.g. tsetse flies, sand flies and blackflies) are the main

Box: Relationships between communicable diseases and WASH interventions

	Water quality	Excreta management	Personal hygiene	Domestic hygiene	Food hygiene	Waste management	Disease vector control
<p>DIARRHOEAS AND DYSENTERIES: Transmission via faecal-oral routes. Diseases include Cholera, Shigellosis and Salmonellosis.</p>	X	X	X	X	X	X	X
<p>ENTERIC FEVERS: Transmission via faecal-oral routes. Diseases include Typhoid, Poliomyelitis and Hepatitis A.</p>	X	X	X	X	X	X	X
<p>WATER-WASHED: Infections of the skin which may be significantly reduced by improvements in domestic and personal hygiene. Quality of water is relatively unimportant. Diseases include infectious skin diseases, infectious eye diseases and louse-borne typhus and relapsing fever.</p>		X	X	X		X	X
<p>WATER-BASED: Transmission in which a pathogen spends a part of its life cycle in an aquatic animal (e.g. snail). Diseases due to infection by parasitic worms (helminthes) which depend on aquatic hosts to complete their life cycles. Examples include both a) PENETRATING SKIN: e.g. Schistosomiasis and b) INGESTED: e.g. Guinea worm.</p>	X	X			X		X
<p>MOSQUITOES Transmission by mosquitoes which typically breed in water. Control is typically through elimination of standing water, residual spraying with insecticides and use of treated bednets. Diseases include Malaria (Malariae, Falciparum and Vivax), Yellow Fever, Dengue / Dengue HF and Japanese Encephalitis.</p>							X
<p>LICE Transmission is by lice which are typically problematic in crowded and unhygienic conditions. Control is typically through improved laundering and drying of clothing and bedding, delousing, residual spraying and use of treated bednets. Diseases include Typhus, Relapsing Fever and Trench Fever</p>			X				X
<p>FLIES Domestic flies are an important transmission route for diarrhoeal diseases and infectious eye diseases including Trachoma and Conjunctivitis. Control is typically through a combination of vector control interventions including domestic waste clean-up campaigns, reduction of open defecation, improved toilet infrastructure and cleanliness and improved waste management.</p>		X	X	X	X	X	X
<p>BITING FLIES Biting flies (e.g. tsetse flies, sand flies and blackflies) are the main transmission factor in epidemics of Gambian Sleeping Sickness, Sandfly Fever, Cutaneous Leishmaniasis, Visceral Leishmaniasis, River Blindness.</p>							X
<p>TICKS, MITES AND FLEAS Ticks, mites, triatomine bugs and fleas are often responsible for localized outbreaks of diseases including Crimean-Congo HF, Typhus, Chagas Disease, Murine Typhus and Plague. Control is typically through improved domestic hygiene, residual spraying and use of treated bednets.</p>			X	X			X

For more information, refer to *Environmental Health Engineering in the Tropics* (Cairncross and Feacham, 1993) and *Disease Prevention through Vector Control: Guidelines for Relief Organisations* (Thomson, 1995)

transmission factor in epidemics of Gambian Sleeping Sickness, Sandfly Fever, Cutaneous Leishmaniasis, Visceral Leishmaniasis and Onchocerciasis (River Blindness). Control interventions should be based on local protocols and practices.

Diseases spread by ticks, mites, triatomine bugs and fleas

16. Ticks, mites, triatomine bugs and fleas are often responsible for localized outbreaks of diseases including Crimean-Congo HF, Typhus, Chagas Disease, Murine Typhus and Plague. Control is typically through improved domestic hygiene, residual spraying and use of insecticide treated bednets.

More information concerning disease vector control interventions in refugee settings can be found in [Chapter 6](#).

Epidemic preparedness and response in refugee settings

WASH related epidemic preparedness

17. Every refugee setting should have its own epidemic preparedness plan to respond to potential outbreak risks. The plan should be adapted to respective national plans and the UNHCR global Epidemic preparedness and response guidelines. The UNHCR Country Public Health Officer in coordination with health actors is responsible for developing the country specific plans for refugee camps/settlements. Disease-specific management plans should include only the most common/probable diseases according to disease prevalence and history of epidemics in the

area. It is recommended that to keep plans practical they should be limited to maximum of the most likely diseases of epidemic importance. The plans should be updated on a yearly basis and must clearly describe the key outbreak preparedness, prevention and response activities including..

- ◆ WHO (e.g. Health Team, Hygiene Promoters, WASH Operation and Maintenance Team, Camp Management, Education, other sectors, camp committees and local government authorities) will do WHAT (e.g. outbreak investigation, outbreak information campaigns, distribution of WASH NFIs, increase chlorine residuals), WHERE, WHEN and HOW?
- ◆ HOW will daily and weekly outbreak response coordination be carried out? WHO will lead? WHO will attend? WHERE will coordination take place?
- ◆ HOW will the outbreak investigation phase take place? WHO will be involved? HOW will information be shared?
- ◆ WHAT is the communication strategy for delivering health/hygiene messages to the refugee population?
- ◆ WHAT is the communication strategy to retain the confidence and trust of the refugee population?
- ◆ WHAT are the key approved health/hygiene outbreak related messages? Are these messages translated and ready for communicating to the refugee population? HOW will



- ◆ these messages be passed to the refugee population? Are standby arrangements in place?
- ◆ WHAT are the main health/hygiene outbreak related communication activities in addition to disseminated messages? Have the activities been field piloted and are they ready for implementation.
- ◆ WHERE will any isolation facilities be established if required? WHAT will be the role of the WASH team?
- ◆ WHAT are the WASH and Health stockpiling, personnel and equipment stand-by arrangements?

Copies of the outbreak response plans for each major disease must be included in the site WASH plan/strategy.

The importance of epidemic surveillance and early detection

18. Early detection, reporting and response are vital to limit the spread of outbreaks and epidemics. Routine surveillance and reporting of bloody diarrhoea, watery diarrhoea, suspected cholera, lower respiratory tract infection, measles and meningitis must be carried out in all refugee settings. The reduction of disease incidence rates should be routinely reviewed to ensure that the WASH or disease vector control interventions are having an impact.

WASH prioritised disease outbreak response activities

19. Disease outbreaks remain a high risk in refugee populations not only in the emergency phase but also in the post-emergency and protracted phases. Outbreaks can spread very rapidly and can lead to high

morbidity and mortality rates so the WASH Coordinator and the UNHCR Public Health Officer must ensure that there is an agreed plan in place for responding to each of the major diseases with epidemic potential in emergency situations. These plans should be agreed with all sectors and actors and communicated with the camp population.

Outbreak response coordination arrangements

20. A disease specific task force should be established in all cases of suspected or confirmed disease outbreak. The task force is ideally led by the Ministry of Health, or alternatively by the UNHCR Public Health Officer and should include representatives of local authorities, UNHCR, WASH and Health actors, health educators and community leaders. The Task Force (or Outbreak Control Team) will start the investigation of an outbreak alert and make quick a decision as to whether assistance from external experts should be requested. National outbreak investigation teams exist and are on standby in certain countries. Depending on the suspected disease, a wide range of specialists may be required including epidemiologists, microbiologists, clinicians, veterinarians, vector control and water and sanitation engineers. Those experts are primarily found in MoH, WHO and sometimes in research institutes. In all cases, it is mandatory that disease outbreak reports in all refugee camp settings are reported on the UNHCR Twine website (<http://twine.unhcr.org/>).



WASH participation in the Outbreak Control Team (OCT)

21. The full participation and presence of representatives from the WASH programme is essential in any outbreak response. It is likely that the WASH programme will play a very large and active role in controlling and reducing the transmission of the outbreak within the refugee setting. All WASH activities must be closely coordinated and planned with Health actors.

Confirming the outbreak

22. The lead health organisation should confirm the outbreak situation. Specimens for confirmation of diagnosis should be sent for testing.

Outbreak investigation

23. The Health section will typically lead the outbreak investigation stage. The WASH Coordinator may be required to assist in the process of helping formulate a hypothesis for the source of the disease pathogens or likely routes of transmission. The WASH Coordinator may also be required to take part in any epidemiological studies to clarify modes of transmission and identify risk factors or at risk-groups within the refugee population.

Responding to the outbreak

24. A dedicated and targeted WASH response to the outbreak should begin immediately even if the Health section has not completed an analysis to confirm sources of the pathogen, modes of transmission, and identification of risk factors and at risk-groups. Control measures should be

relevant for the specific disease outbreak and are likely to include:

- ◆ Immediate dissemination of key relevant hygiene messages and re-distribution of essential WASH non-food items (in particular soap and clean water containers).
- ◆ Increasing chlorine residual levels of all water sources.
- ◆ Addition of additional water treatment steps (multi-barrier approach).
- ◆ Increasing the quantity of available water.
- ◆ Increasing the number and condition of toilet facilities including improving cleaning and sterilisation arrangements.
- ◆ Immediate clean-up of any excreta and pathogenic or hazardous wastes within the refugee setting.
- ◆ Immediate identification and control of high-risk disease vector populations.
- ◆ Support to WASH interventions in treatment facilities (e.g. Cholera Treatment Centres), health facilities and schools.

After the outbreak

25. A WASH evaluation report should be prepared following every outbreak in a refugee setting. The reports should include an evaluation of the cause of the outbreak, the effectiveness of the preparedness arrangements, the effectiveness of the coordination, and the appropriateness, timeliness, and effectiveness of the WASH response. If required, WASH preparedness activities and protocols should be revised to ensure any weaknesses identified are rectified for the future.