Water, Sanitation &Hygiene Related Diseases

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4. What standards and guidelines do you use in WASH
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6. WASH Management Program
7. Community Directed Intervention

Session objectives

- **Describe the key elements of WASH and the integrated approach**
- **List and explain the priority WASH interventions to protect public health in emergencies**
- **Identify the key standards and indicators applicable to WASH Programmes**

What is WASH?

- **Hygiène promotion**
- **Water supply**
- **Excreta disposal**
- **Solid-waste management**
- **Drainage (wastewater disposal)**
- **Vector control**



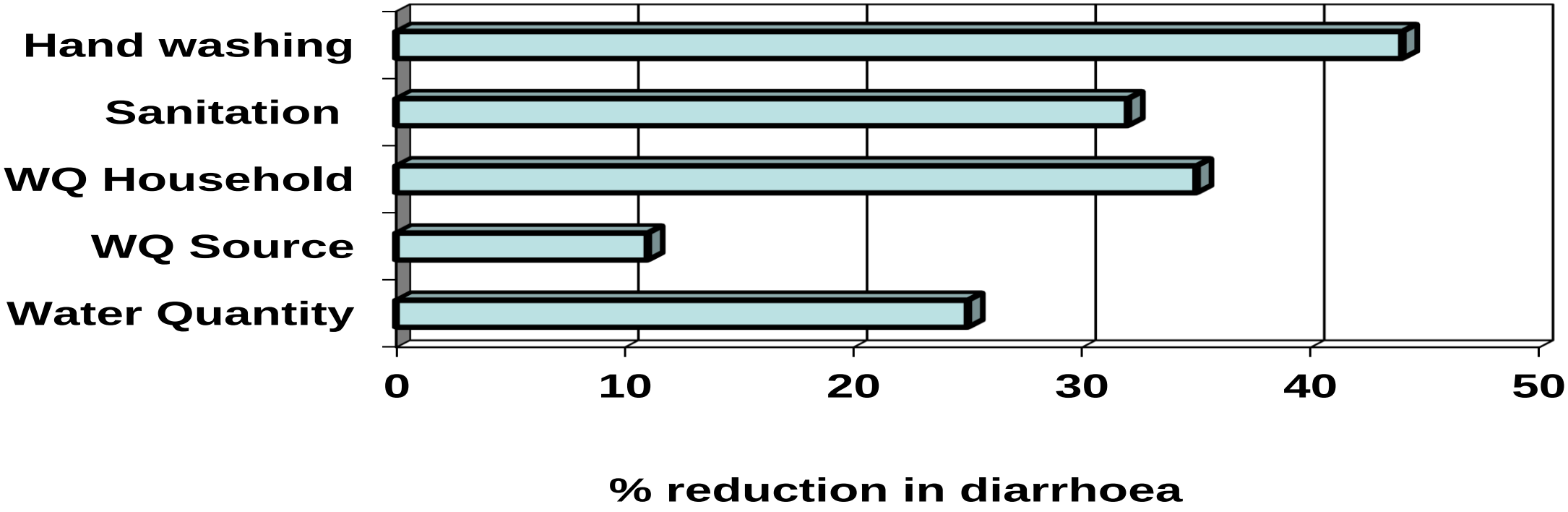
Relevance of water, sanitation and hygiene to health

- **Physical health**
- **Safety and security**
- **Psychosocial health**
- **Livestock and livelihoods**
- **Conflict reduction**

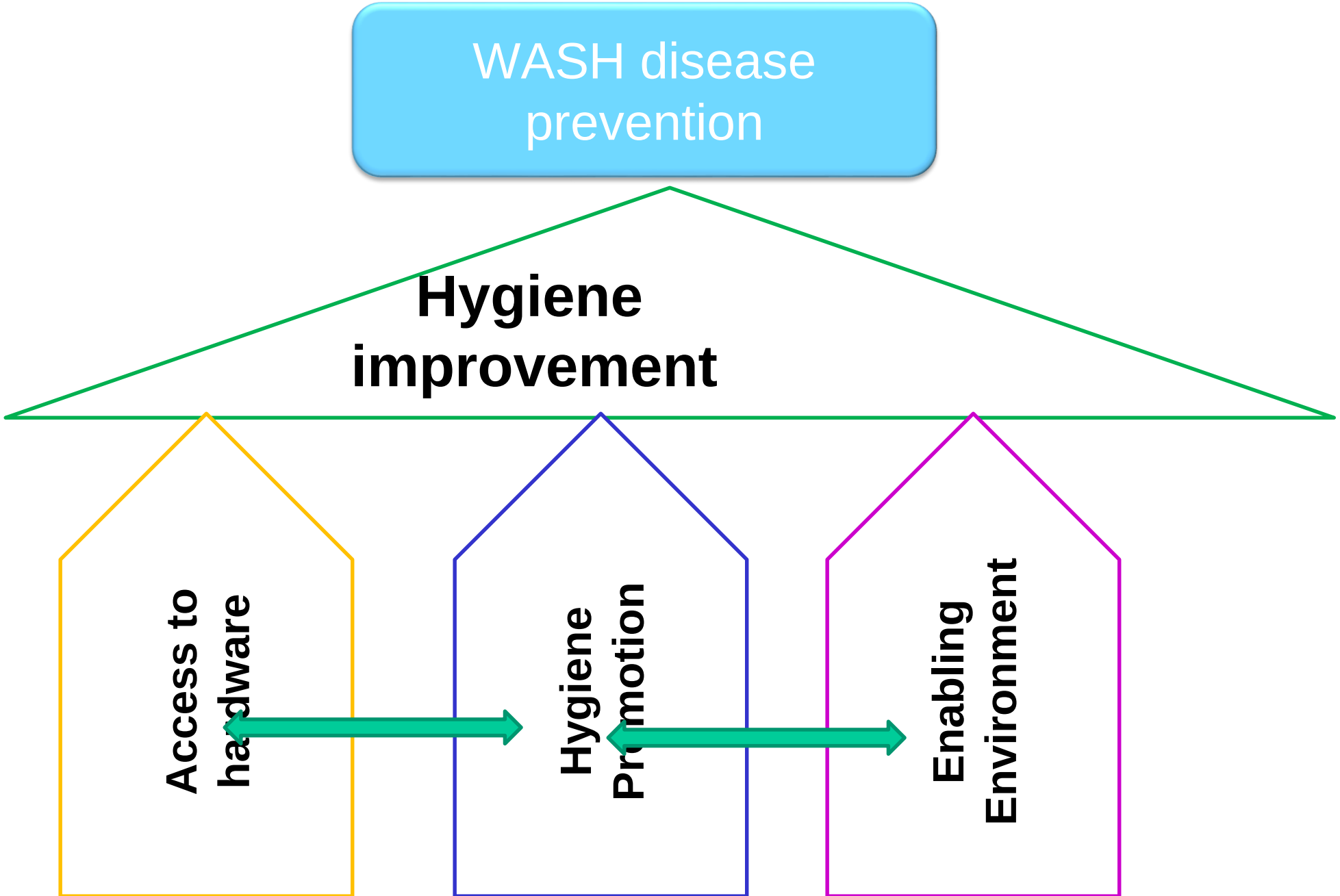


WASH and diarrhoea prevention

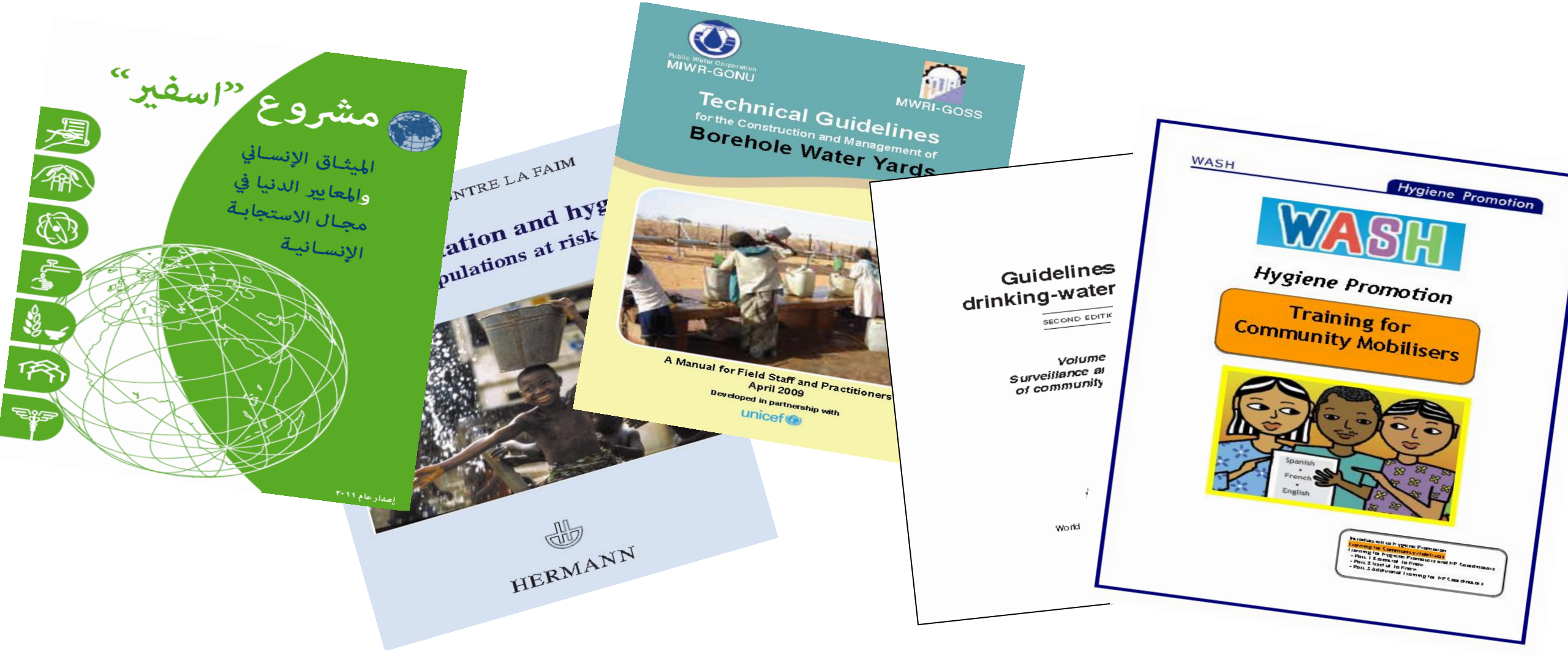
Water, sanitation, and hygiene interventions to reduce diarrhoea in less developed countries: a systematic review and meta-analysis, Fewtrell et al (2005)



Hygiene Improvement Framework



What standards and guidelines do you use in WASH in emergencies?



Water supply standard 1: Access and water quantity

All people have safe and equitable access to a sufficient quantity of water for drinking, cooking and personal and domestic hygiene. Public water points are sufficiently close to households to enable use of the minimum water requirement.



Key actions (to be read in conjunction with the guidance notes)

- Identify appropriate water sources for the situation, taking into consideration the quantity and environmental impact on the sources (see guidance note 1).
- Prioritise and provide water to meet the requirements of the affected population (see guidance notes 2 and 4).

Key indicators (to be read in conjunction with the guidance notes)

- Average water use for drinking, cooking and personal hygiene in any household is at least 15 litres per person per day (see guidance notes 1–7).
- The maximum distance from any household to the nearest water point is 500 metres (see guidance notes 1, 2, 5 and 6).
- Queueing time at a water source is no more than 30 minutes (see guidance note 6).

Guidance notes

1. ***Water sources selection:*** The following factors should be considered in water source selection: availability, proximity and sustainability of sufficient

Key learning points

- **WASH should be considered in the broader context of public health and humanitarian response**
- **Integrating within the WASH sector and strong coordination with other sectors is important for full benefits to the affected population**
- **Standards and indicators need to be chosen and applied carefully, with respect to national standards, international standards, and the necessary adaptation to local context and needs**

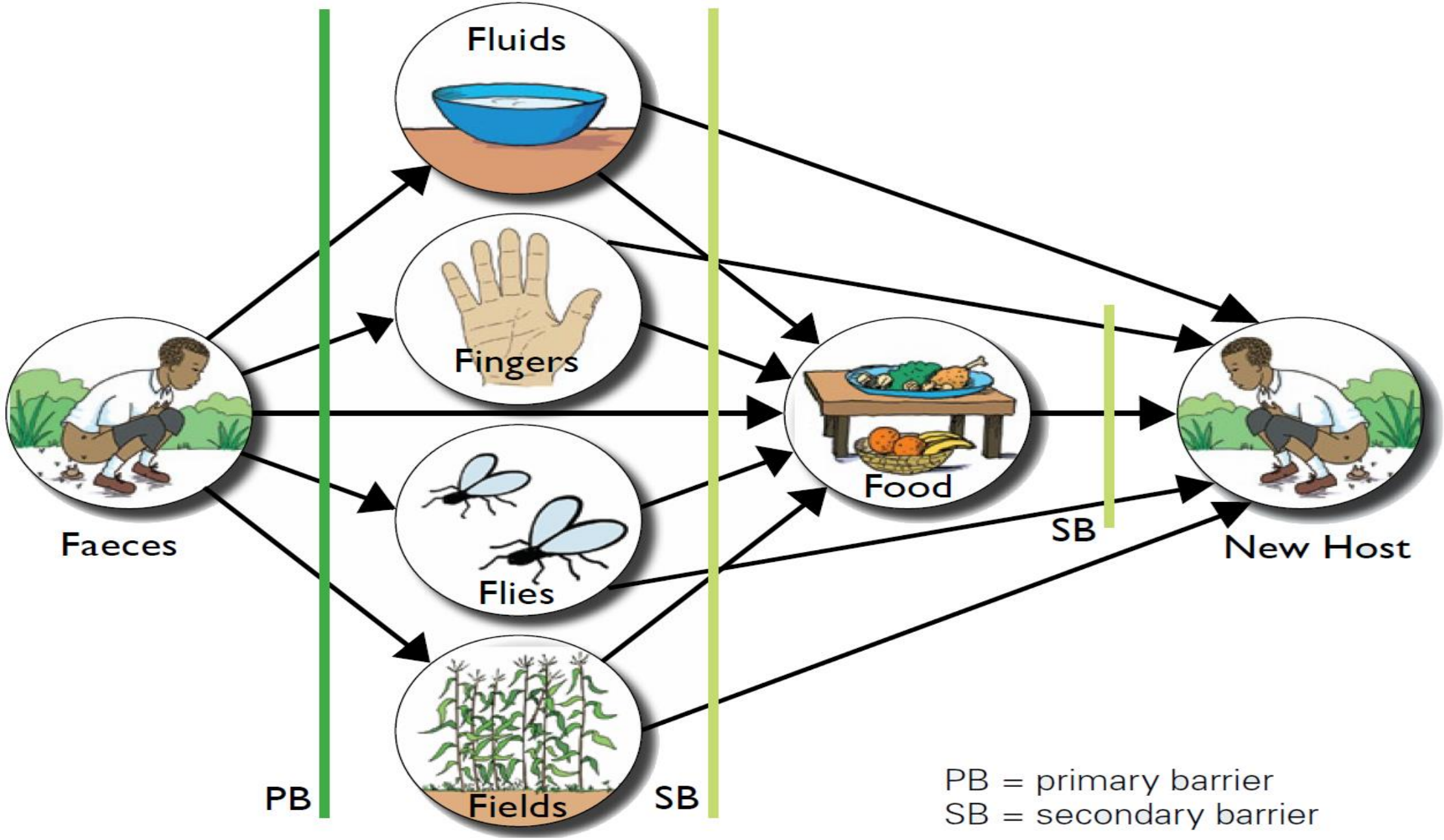
Importance of WASH to human health

- **The goal of water and sanitation projects throughout the world is to ensure health benefits to the lives of people by improving the supply of safe water and access to sanitation and adoption of good hygiene practices**
- **For all these diseases, there are three essential components involved in transmission from one person to another. These can be described as the epidemiologic triangle, shown in Figure 1.2. (Epidemiology is the study of the patterns of distribution and causes of disease in a population.) The three components, shown as the three corners of the triangle, are:**

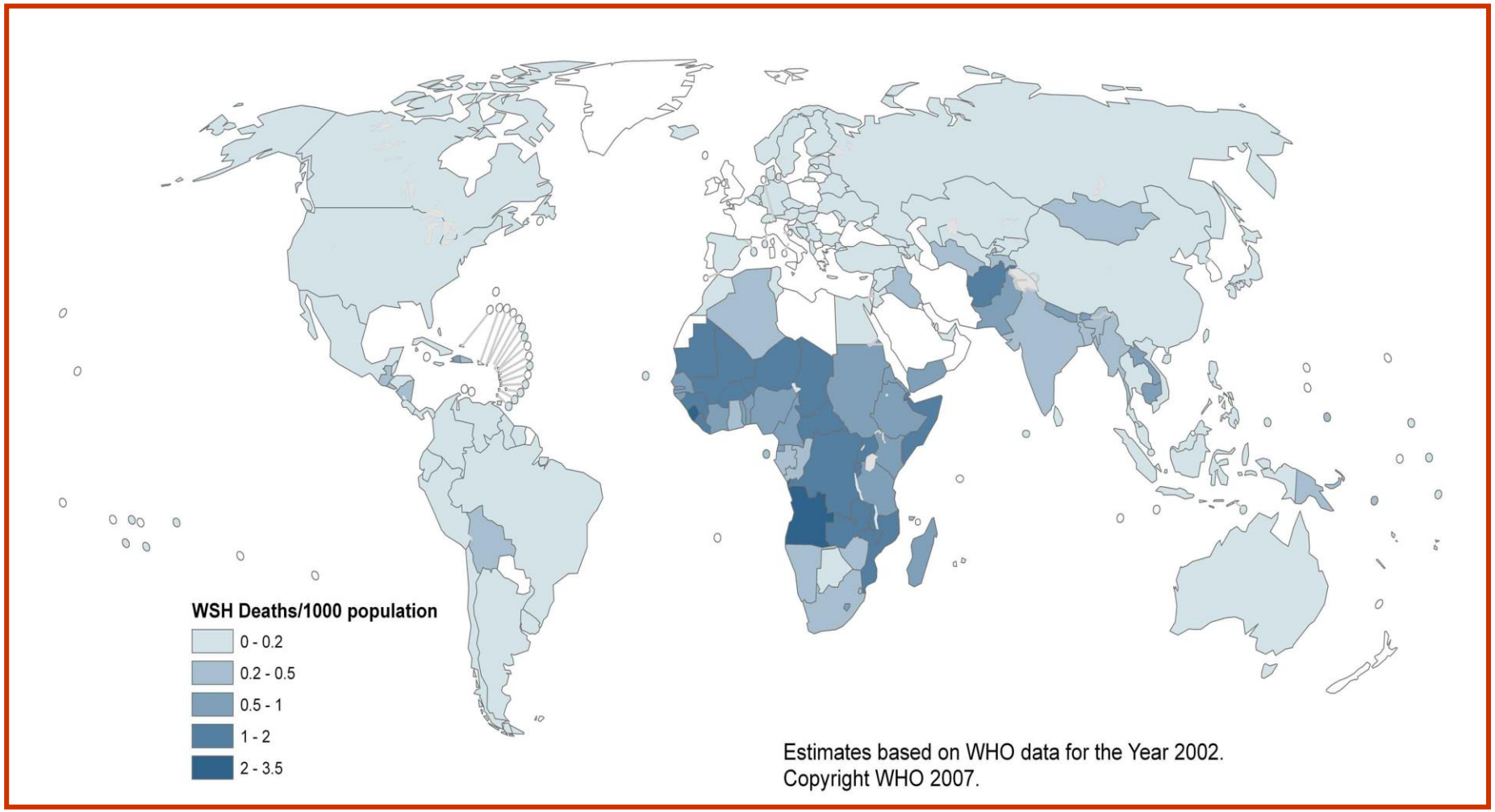
✓ **Agent: causes the disease**

✓ **Host: has the disease**

✓ **Environment: external factors that allow transmission of the disease**


Fluids
Fingers
Faeces
Food
Flies
SB
New Host
PB
Fields
SB
PB = primary barrier
SB = secondary barrier

WASH Death Rates



Introduction

- Drinking water is a major source of microbial pathogens in developing countries.
- Waterborne disease cause more than 2 million deaths and 4 billion cases of diarrhea annually.
- 9 out of 10 deaths are in children and virtually all of the deaths are in developing countries.



Classification of diseases related to water

- Water-borne Diseases
- Water-based Diseases
- Water-washed Diseases
- Water-related Diseases

Morbidity and mortality rates for selected water-, sanitation-, and hygiene-related diseases

Disease	Estimated morbidity (episodes per year)	Estimated mortality (deaths per year)	Cause/link			
			Unsanitary disposal of excreta	Unsafe drinking water	Poor hygiene	Water resources development[a]
Diarrheal diseases	1 billion	2.2 million	✔	✔	✔	
Intestinal helminths	1.5 billion	100,000	✔	✔	✔	
Schistosomiasis	200 million	200,000	✔			✔
Trachoma	150 million[b]	—	✔		✔	

[a] Water resources development refers to dams and farm irrigation schemes that have increased snail habitat, a vector for the schistosomiasis-causing parasites, and the likelihood of exposure with additional individuals working in irrigated fields where the snail breeds.

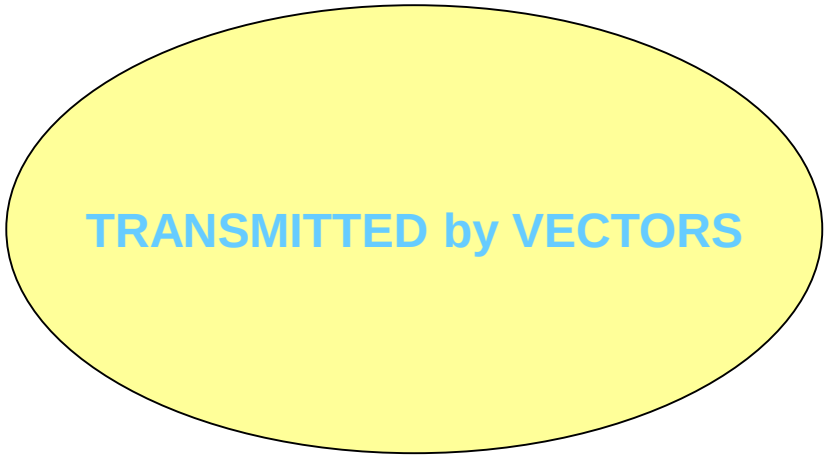
[b] This reflects the number of active cases. Approximately 6 million cases of preventable blindness are due to trachoma.

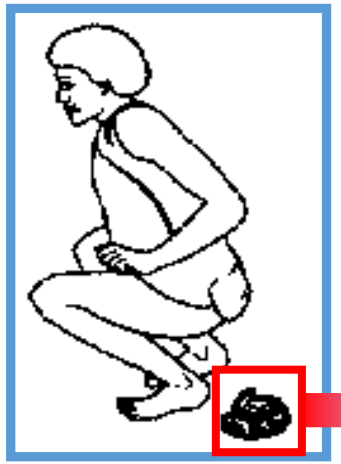
Adapted with permission from Ref. 8.

Diseases Related to Water & Excreta and Spreading Mechanism

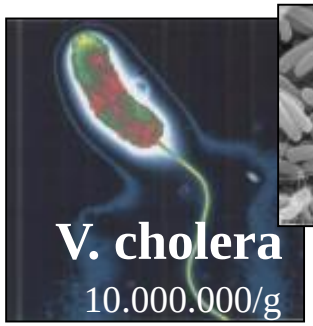
The most important are:-

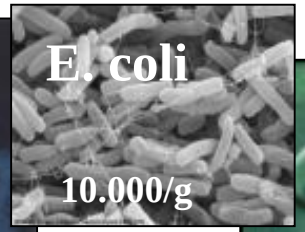






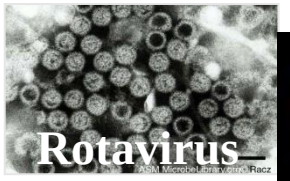
BACTERIA







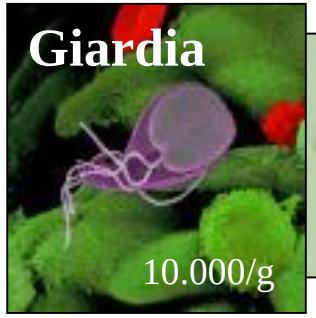
VIRUS

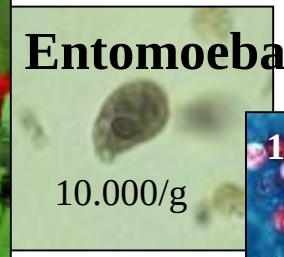


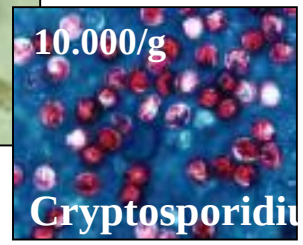




PROTOZOAN







- **Water-borne or water-washed diseases**

Transmission mechanisms

Cholera, shigellosis, diarrhoea, salmonellosis.

Typhoid, paratyphoid, etc.

Amoebic dysentery, giardiasis

Hepatitis A, poliomyelitis, rotavirus diarrhoea

FAECAL-ORAL

- *Water contamination*
- *Poor sanitation*
- *Poor personal hygiene*
- *Crop contamination*

DIARRHOEA DISEASES

- **Acute watery diarrhoea:**

  Watery stools without visible blood, vomit and fever. Dehydration

- Cholera

- **Bacillary Dysentery (shigellosis):**

  Acute bloody diarrhoea with fever, abdominal cramps and rectal pain. Complications include sepsis, rectal prolapse, haemolytic uraemic syndrome and seizures.

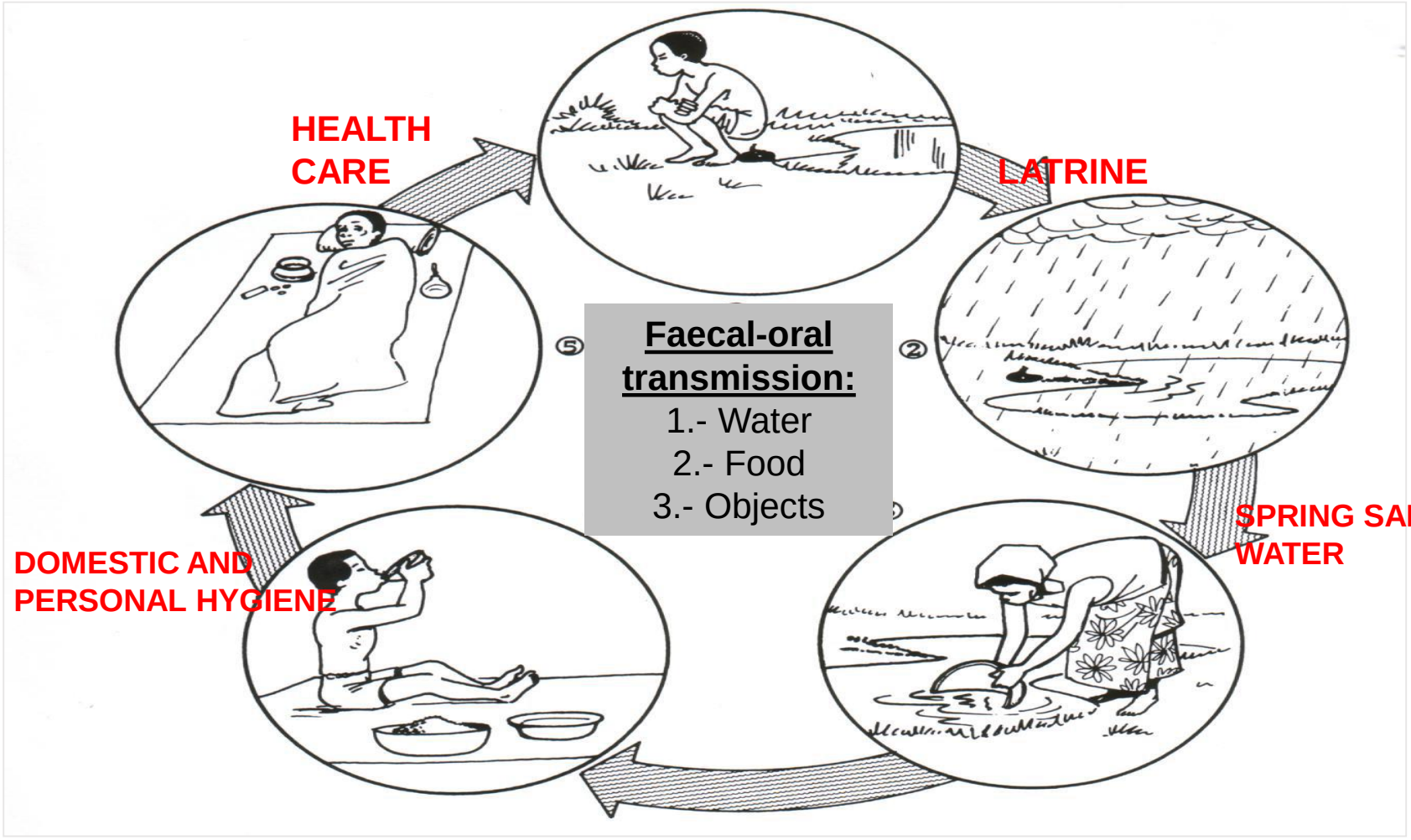
- **Giardiasis:**

  Watery stools, flatulence, greasy stools, stomach cramps, nausea, weight loss and dehydration.

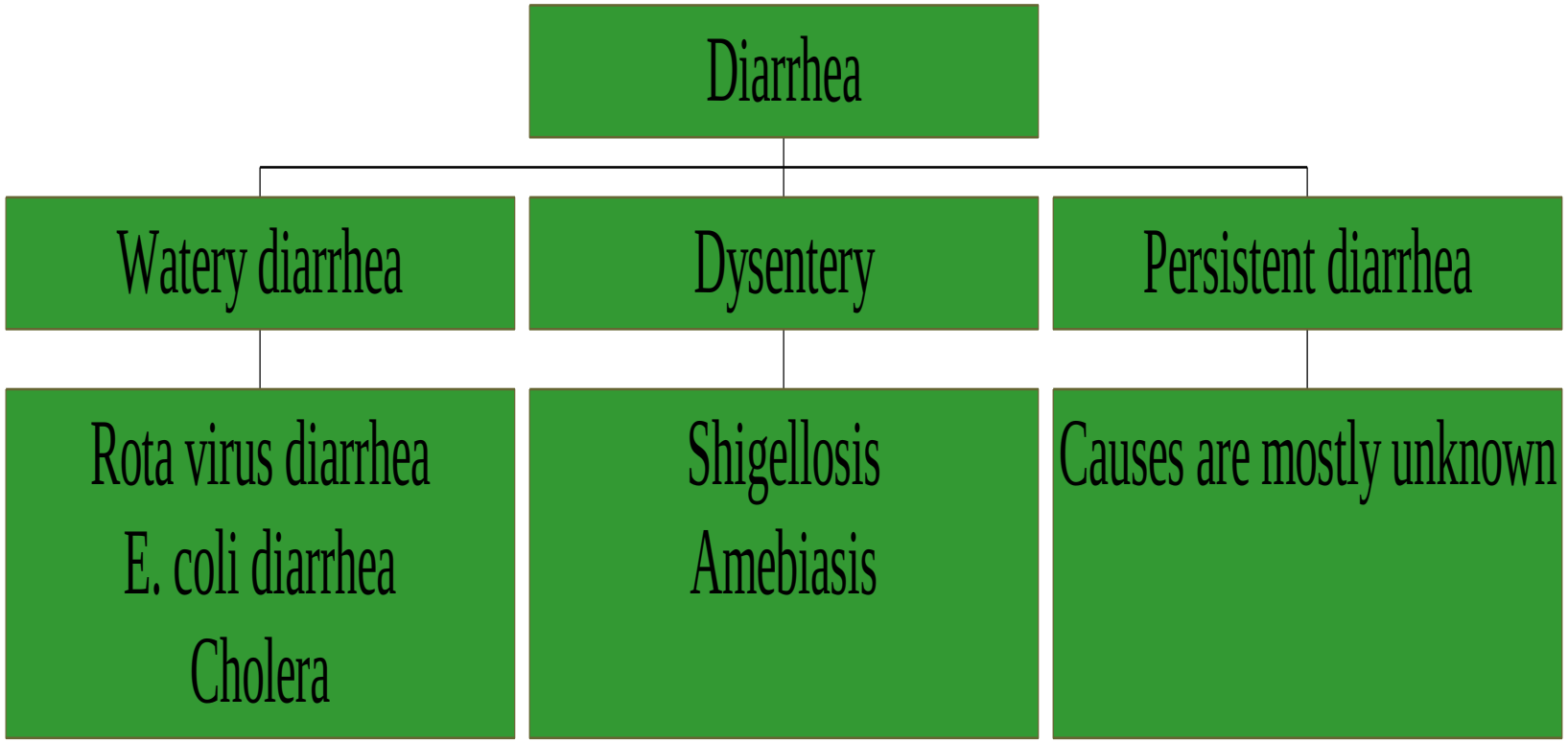
- **Amebiasis or Amebic Dysentery:**

  Bloody stools or loose stools, stomach pain, stomach cramping and fever.

DIARRHOEA DISEASES



TYPES OF DIARRHOEA



CHOLERA

- Caused by the Vibrio Cholerae (bacteria)
- Endemic or with epidemic potential (Africa,South America,Asia...)
- Watery diarrhoea classically rice-water stools, with or without vomiting, dehydration, shock
- **IMPORTANT!! faecal-oral route**

  -Faecal material and vomit mist be properly disinfected and disposed of

  -Adequate water supply

  -Clean water whenever food is being handled

  -Hand washing promotion

- Cause *outbreaks* with case-fatality rates

TYPHOID FEVER

- Caused by Salmonella Typhi (bacteria)
- Low grade fever, malaise and dry cough, abdominal discomfort, diarrhoea or constipation, altered mental status and multiples complications.
- **FAECAL-ORAL**
- - Waste water with human and animal faeces
- - Faeces contaminated food
- **PREVENTION**
- - Health education
- - Safe food and water, proper food handling
- - Adequate excreta disposal
- - Personal hygiene
- - Safe water collection points

KEY FACTORS FOR PREVENTING DIARRHOEA DISEASES

- Safe drinking water (Extraction, transport and storage)
- Controlled excreta disposal
- Safe food and proper food handling
- Hand washing with soap
- Breastfeeding
- Education

Seven steps to community planning for the prevention of diarrhoeal disease

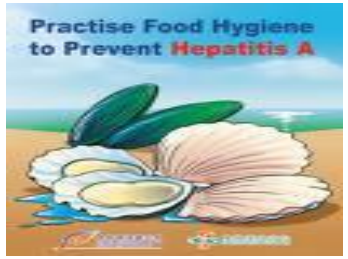
STEP	ACTIVITY	TOOL
1 Problem identification	1. Community stories 2. Health problems in our community	1. Unserialized posters 2. Nurse Tanaka
2 Problem analysis	1. Mapping water and sanitation in our community 2. Good and bad hygiene behaviours 3. Investigating community practices 4. How diseases spread	1. Community mapping 2. Three-pile sorting 3. Pocket chart 4. Transmission routes
3 Planning for solutions	1. Blocking the spread of disease 2. Selecting the barriers 3. Tasks of men and women in the community	1. Blocking the routes 2. Barriers chart 3. Gender role analysis
4 Selecting options	1. Choosing sanitation improvements 2. Choosing improved hygiene behaviours 3. Taking time for questions	1. Sanitation options 2. Three-pile sorting 3. Question box
5 Planning for new facilities and behaviour change	1. Planning for change 2. Planning who does what 3. Identifying what might go wrong	1. Planning posters 2. Planning posters 3. Problem box
6 Planning for monitoring and evaluation	1. Preparing to check our progress	1. Monitoring (checking) chart
7 Participatory evaluation	1. Checking our progress	1. Various tool options

HEPATITIS

- Virus A and E.(exist B ,C,Δ)
- *Clinical:* fever, tiredness, nauseas, digestive problems and later jaudince (yellow skin and mucous) with dark urine and whitish stools.
- Usually complete cure. No chronic, no carrier.

- **Attention the A and E transmission FAECAL-ORAL route**

- *Risk factors*



- Food and water contaminated
- Poor sanitation infrastructure
- Crowding
- Waste water with human and animal faeces

POLIOMYELITIS



- Virus polio virus (serotypes 1,2,3)
- In endemics areas epidemics usually affect children < 5 years of age. In non endemic areas where vaccination coverage is low, young adults are most commonly affected
- 90% a symptomatic
- 10% disease
  - *Non paralytic form*: fever, muscle pain,tiredness, headache, intestinal problems (nausea ,vomits ,diarrhoea), backache, non neurological involvement
  - *Paralytic form:* after the non specific signs,the patient develops rapid onset acute flaccid paralysis flaccid and meningeal symptoms .
- There is no cure. Prevention vaccination
- **FAECAL-ORAL**
- Point of contagious:Food and water contaminated by infected faeces, nose and mouth infected secretion.

- **Water washed or water scarce diseases**

Skin and eye infections.

Louse borne typhus or louse-borne relapsing fever.

Transmission mechanisms

- *Inadequate water*
- *Poor personal hygiene*

SKIN DISEASES

- **Scabies:**
- Sarcoptes scabiei hominis (parasite)
- Larvae dig tunnels in the external skin layers.
  - Rash, scab skin.
  - Wrinkles, between fingers, elbows, writs, penis, nipples.



- **Impetigo:**
- Streptococcus and staphylococcus

  Contagious superficial skin infection.
  - Blisters with pus-scab
  - Face, nasal cavity, mouth, neck, groin.



EYE DISEASES



- **Conjunctivitis:**
- Acute inflammation of the conjunctiva due to bacterial or viral infection.

  * Irritation, teardrop, secretion.

  * Contagious : contact with infected conjunctivitis secretions, hands and clothes contaminated, fly….



- **Trachoma:**
- Keratoconjunctivitis due to Chlamydia trachomatis

  * Progressive conjunctivitis and most common cause of blindness in endemic areas.

  * Contagious : contact with infected conjunctivitis secretions,hands and clothes contaminated,fly….

KEY FACTORS FOR PREVENTING WATER-WASHED AND WATER-SCARCE DISEASES

- Non contaminated water for hygiene
- Hand washing with soap
- Laundry with soap
- Fly vector control
- Louse vector control
- No crowding

- **Excreta-related helminths**
  (Parasite worms in human intestine)

Roundworm, hookworm, whipworm

Transmission mechanisms

Soil transmitted Helminths

- *Open defecation*
- *Ground contamination*

ASCARIDIASIS

- Nematodiasis due to Ascaris lumbricoides (Parasite)
- Clinical
  - ✓ *Phase of larva migration*: pulmonary and allergic signs (non productive cough, mild fever)
  - ✓ *Established infection:* non specifics digestive signs nausea, vomits, diarrhoea, intestinal irritation,
- TRANSMISSION: Faecal -Oral



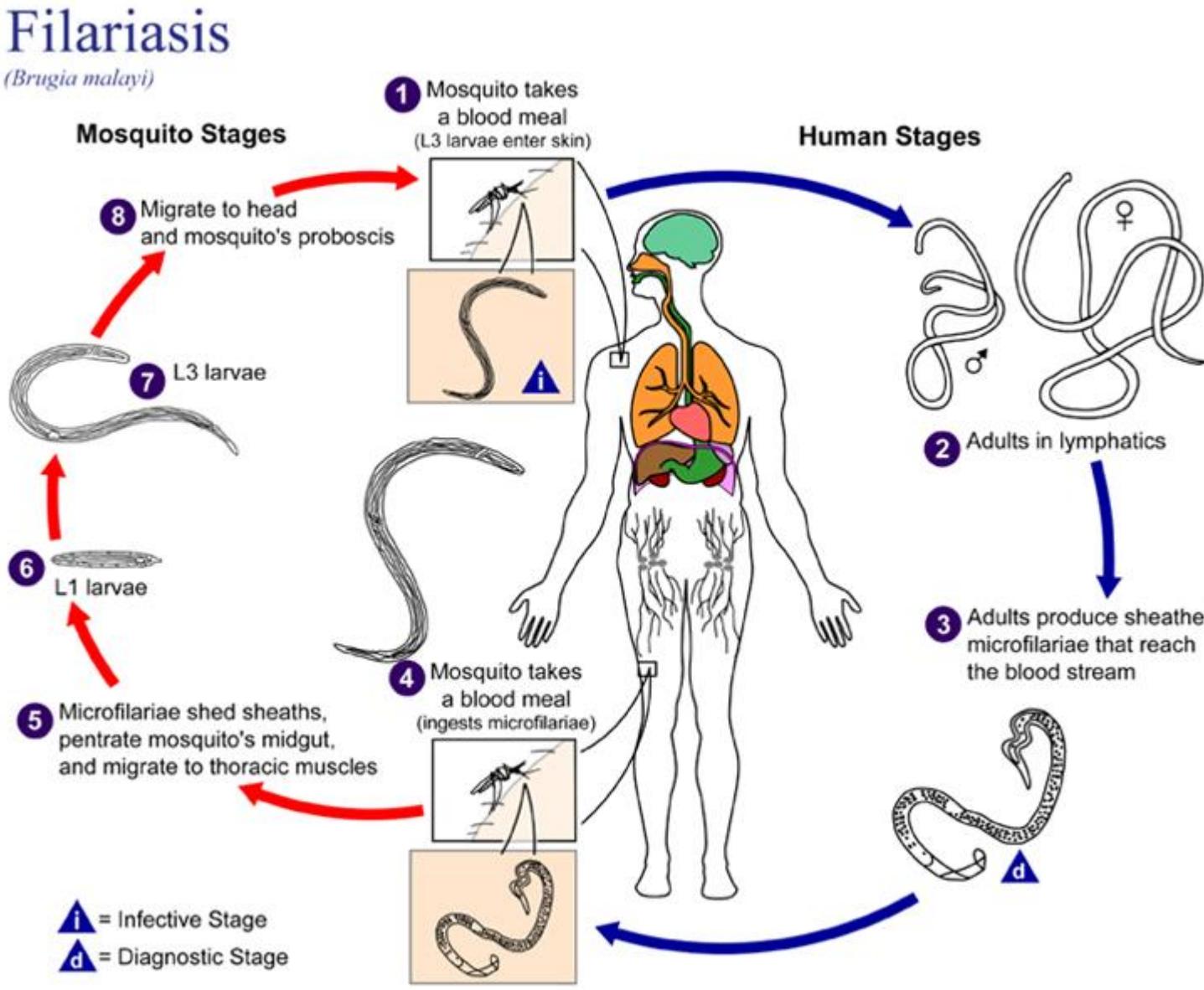


Lymphatic Filaria









KEY FACTORS FOR PREVENTING HELMINTHS

- Controlled excreta disposal
- Hand washing with soap
- Non contaminated food

Water-based diseases

Schistosomiasis, Guinea worm (Dracunculosis), clonorchiasis .

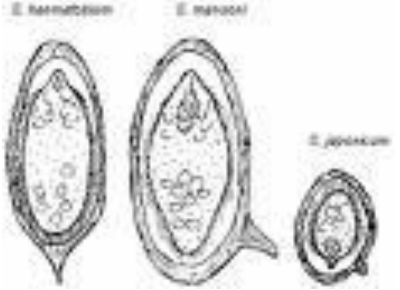
Transmission mechanisms

Long stay in infected waters

- *Water contamination*

SHISTOSOMIASES





- Infections by *Schistosoma haematobium*, *S. mansoni* are frequently, by *S. japonicum* y *S. intercalatum* *lowness*.(Parásitos)

- Clinical:
  - Each species give rise to specific clinical form,it depends the parasite load
  - ✓*Shistosomiases urinary* *S. haematobium* signs : haematuria, frequent and painful micturation evolution to fibrosis urethral.
  - ✓*Shistosomiases intestinal*: *S. mansoni* signs : bloody diarrhoea , abdominal pain, nauseas, vomit and it evolution liver fibrosis
- TRANSMISSION: By contact with the parasite when bathing or swimming in contaminated water.

KEY FACTORS FOR PREVENTING WATER-BASED DISEASES

- Safe drinking water supply
- Adequate drainage of stagnant waters

- **Water-related insect vectors**
- **Excreta-related insect vectors**

Transmission mechanisms

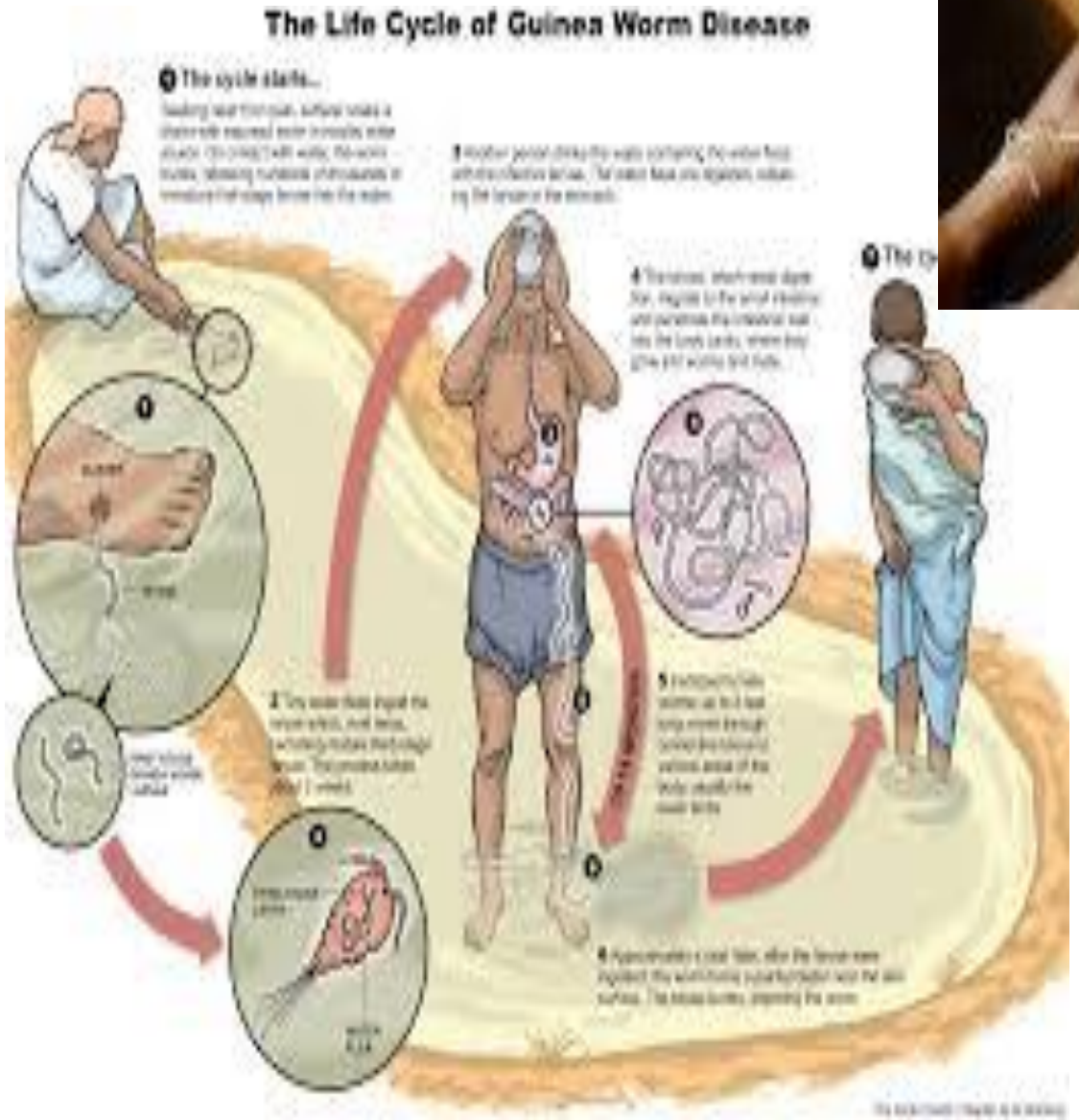
Malaria, dengue, sleeping sickness, filariasis, yellow fever.

Diarrhoea and dysentery

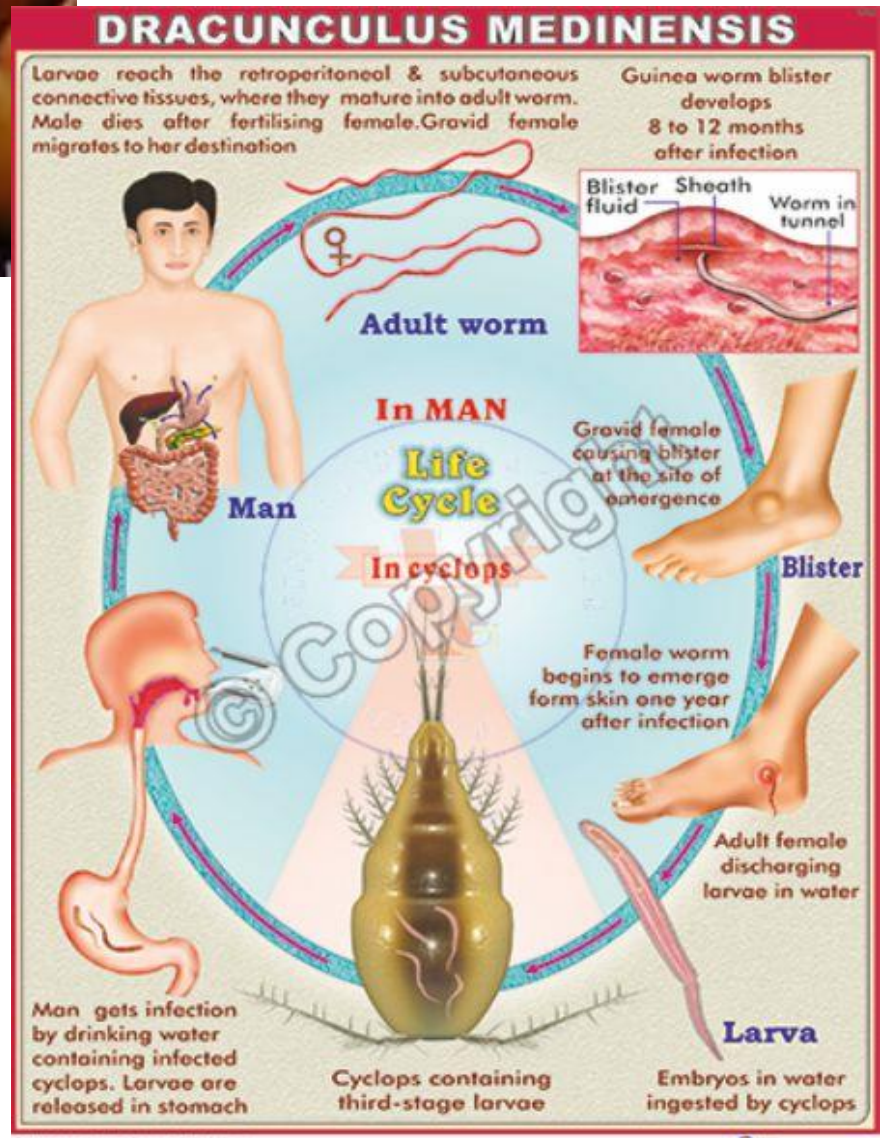
Bitting by mosquitoes, flies.
Transmited by flies, cockroaches

- *Bite near water*
- *Breed in water*
- *Dirty environment*




The Life Cycle of Guinea Worm Disease



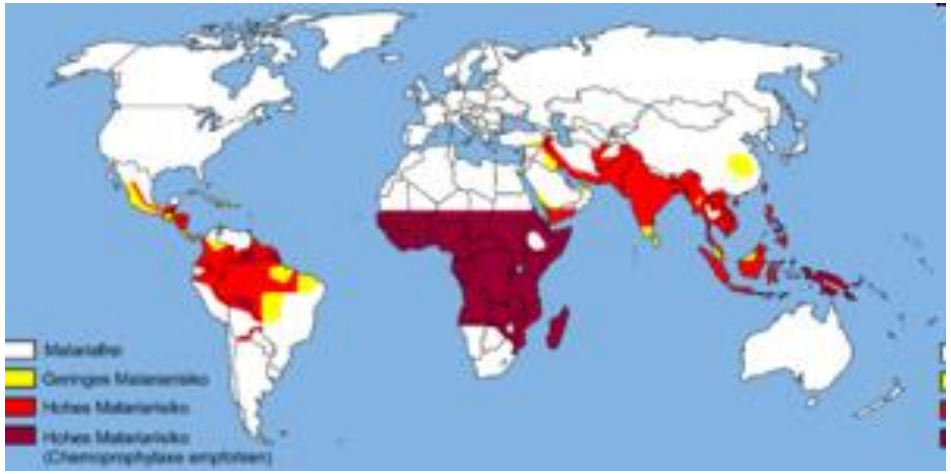

DRACUNCULUS MEDINENSIS
Larvae reach the retroperitoneal & subcutaneous connective tissues, where they mature into adult worm. Male dies after fertilising female.Gravid female migrates to her destination
Guinea worm blister develops 8 to 12 months after infection
Blister fluid
Sheath
Worm in tunnel
Adult worm
In MAN
Life Cycle
In cyclops
Man
Gravid female causing blister at the site of emergence
Blister
Female worm begins to emerge form skin one year after infection
Adult female discharging larvae in water
Larva
Embryos in water ingested by cyclops
Cyclops containing third-stage larvae
Man gets infection by drinking water containing infected cyclops. Larvae are released in stomach
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VECTORS RELATED TO DISEASES

- Mosquitoes
- Flies
- Louse (Typhus, Relapsing Fever)
- Fleas (Plague)
- Ticks

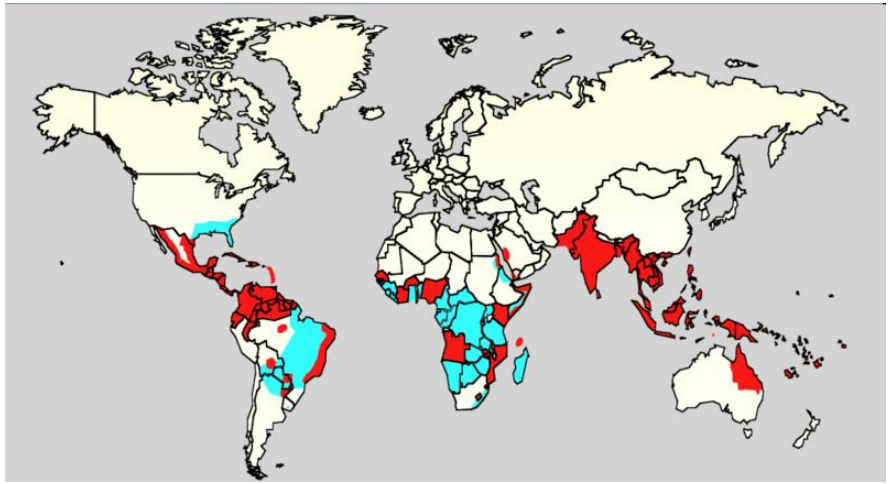
MALARIA

- Pathogen: Plasmodium falciparum, vivax and ovale (Parasite)
- Vector: Mosquito *Anopheles* female
- Clinical:
  - ✓ Painful muscles and joints,high fever with chills, headache, possybly diarrhoea and vomiting
- Stagnant waters are the breeding place.



DENGUE

- Pathogen: Virus (Flaviviridiae)
- Vector: *Aedes* aegypti
- Clinical:
  - ✓ High fever, headaches, pain in muscles and joints, red spots on skin. Classic dengue, hemorrhagic dengue .
- Larva growth in water containers (tyres, vases, barrels) or other natural places (lagoons, pools).



YELLOW FEVER

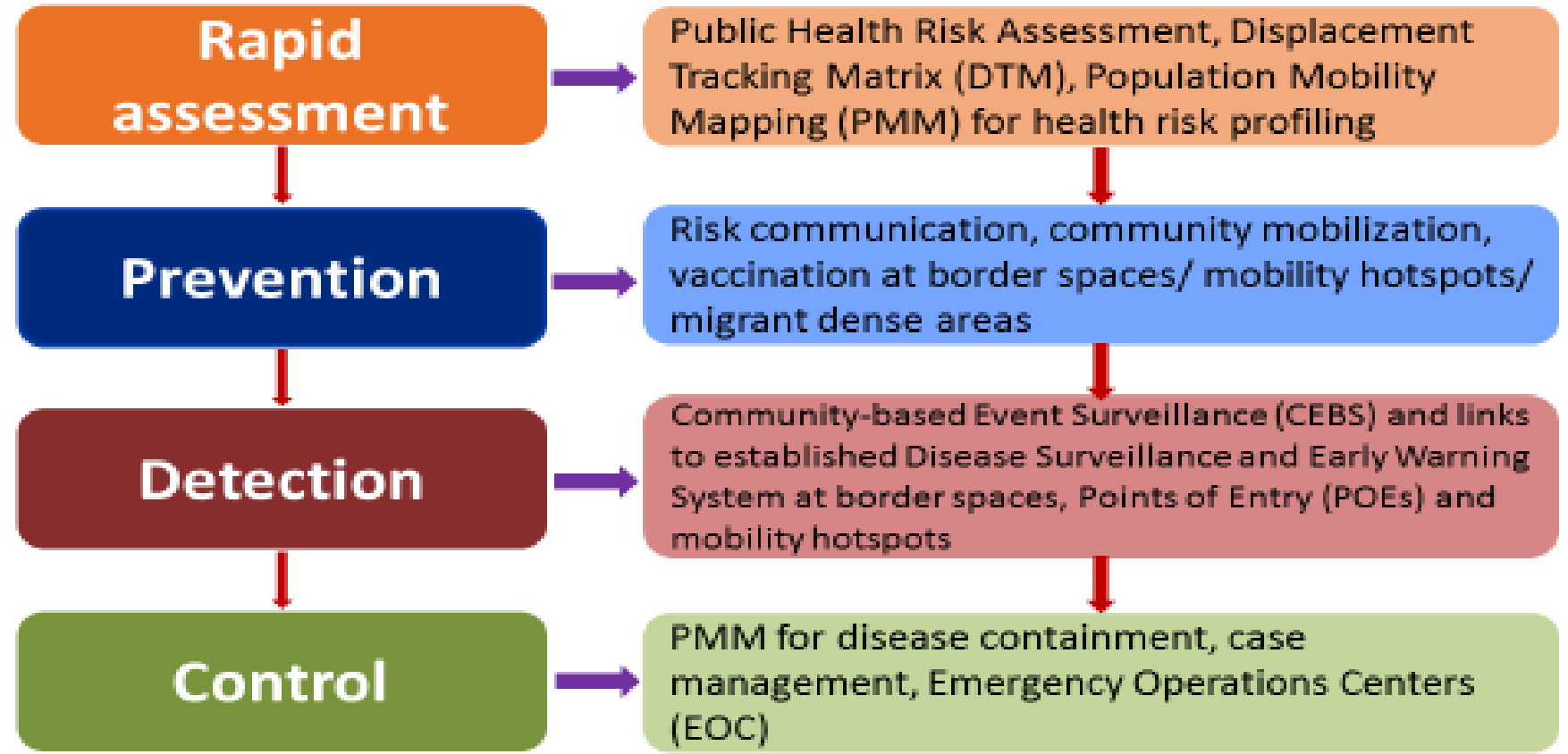
- Pathogen: Virus (Flaviviridiae)
- Vector: *Aedes* aegypti
- Clinical:
  - ✓Fever, headache, myalgia, nausea, red eyes, jaundice.
- Stagnant waters. Only bites during daylight.
- Vector Control

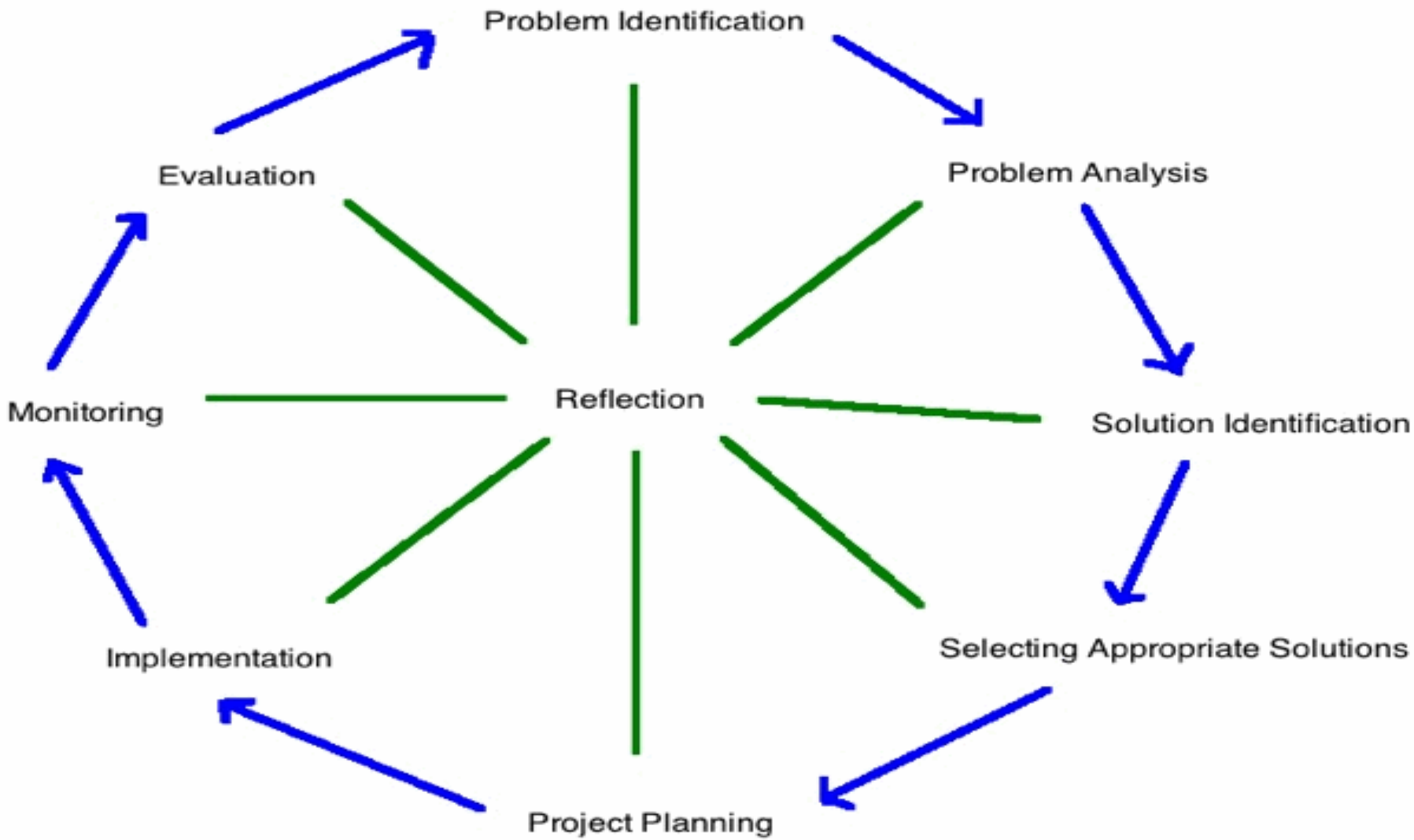


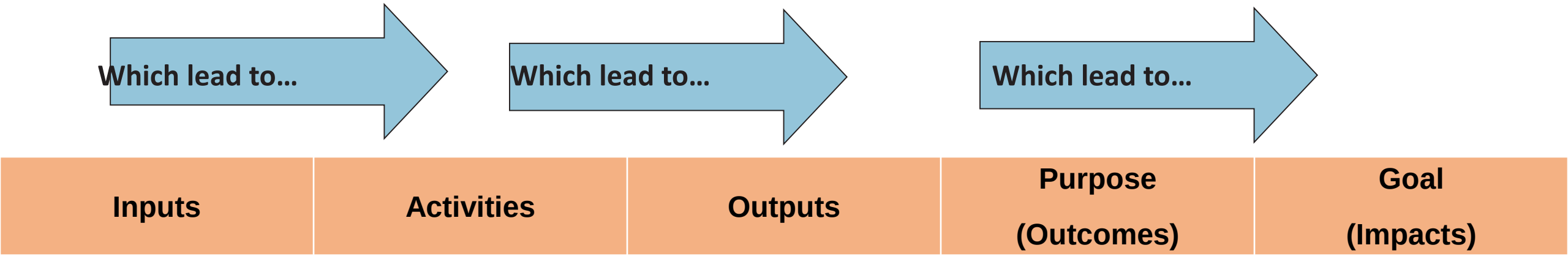
KEY FACTORS FOR PREVENTING WATER-RELATED INSECT VECTOR AND EXCRETA-RELATED INSECT VECTOR DISEASES

- Adequate drainage of stagnant water
- Disposal of waste water
- Excreta controlled disposal
- Safe storage of drinking water
- Vector control

Disease Surveillance, Early Warning and Response in Crisis Situations




Problem Identification
Problem Analysis
Solution Identification
Selecting Appropriate Solutions
Project Planning
Implementation
Monitoring
Evaluation
Reflection



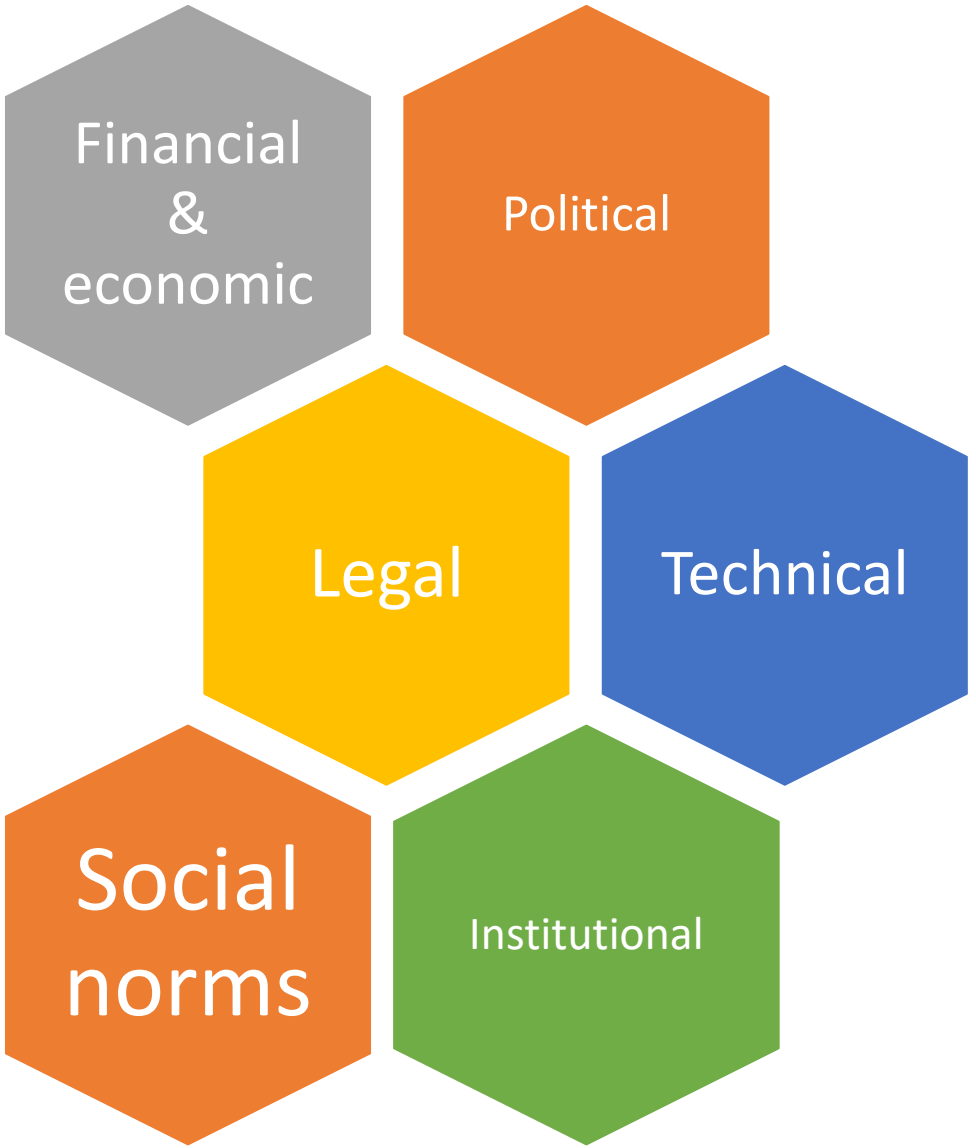
Monitoring

Evaluation

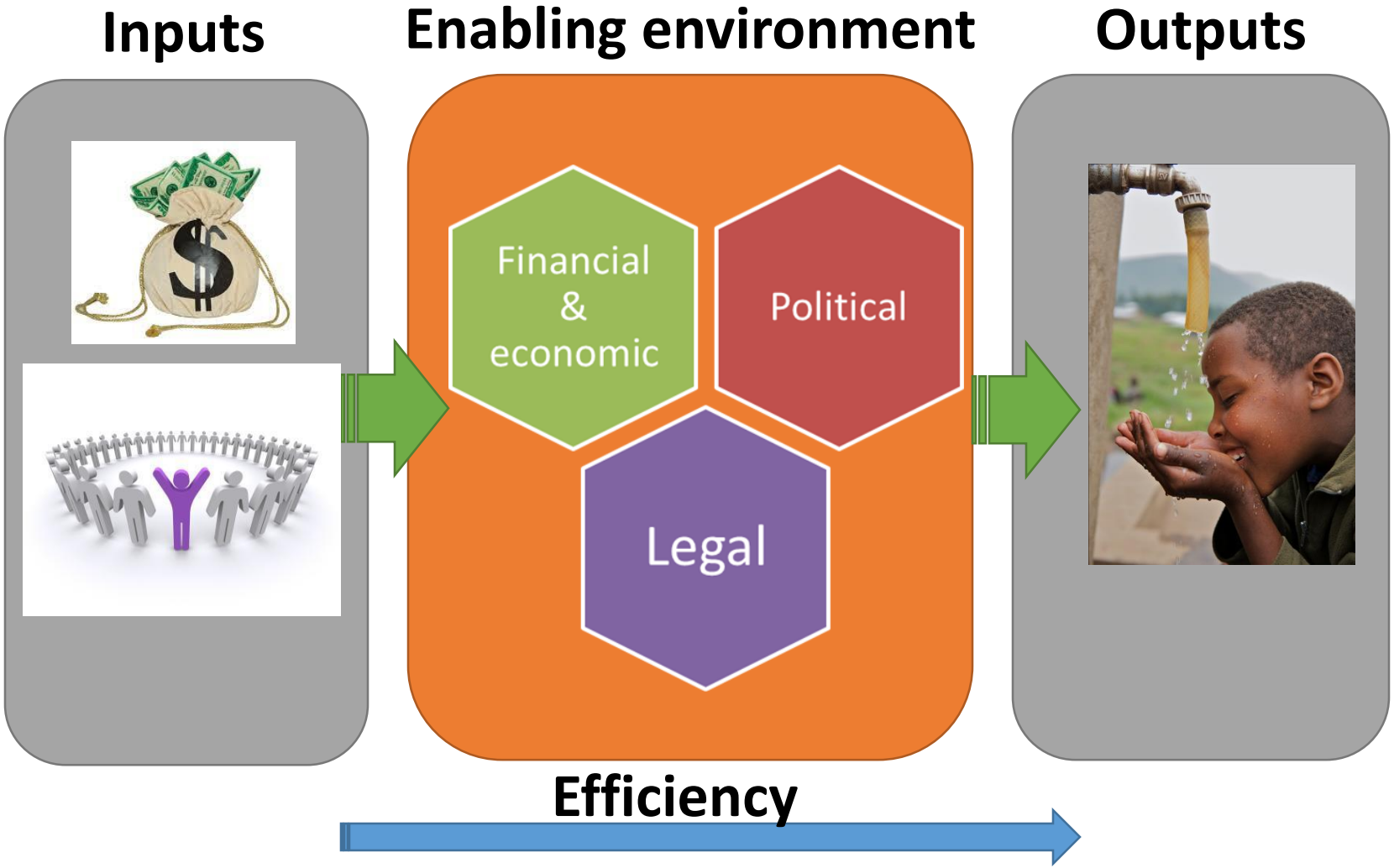
SMART Indicators

Properties	Definition
Specific	Reflect things the project intends to change, avoiding measures that are largely subject to external influences
Measurable And Unambiguous	Precisely defined: measurement and interpretation is unambiguous Provide objective data, independent of who is collecting it Comparable across groups & projects allowing changes to be compared
Attainable and sensitive	Achievable by the project and therefore sensitive to changes the project wishes to make
Relevant and easy to collect	It must be feasible to collect data on the chosen indicators within a reasonable time & cost. Indicators should be relevant to the project
Time bound	Indicators should describe by when a certain change is expected

“Enabling Environment”



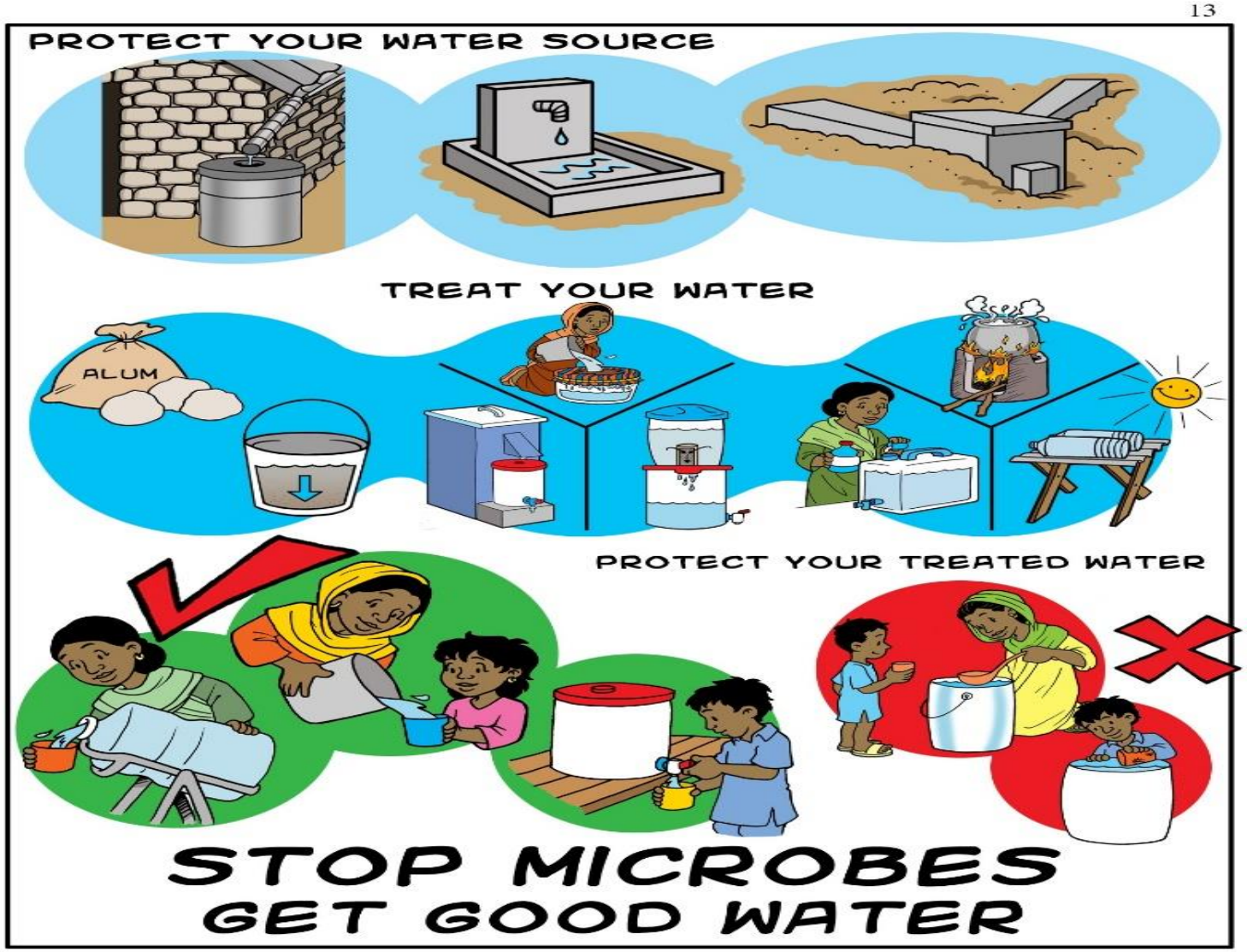
Inputs to outputs



Ultimate Goals

- To supply sufficient safe water
- To supply the means for an adequate excreta disposal and other types of waste
- To implement hygiene measures
- To train people regarding hygiene and the proper use of water

Community Directed Intervention



CDI Definition

An approach where communities themselves direct the planning and implementation of intervention delivery

Examples:

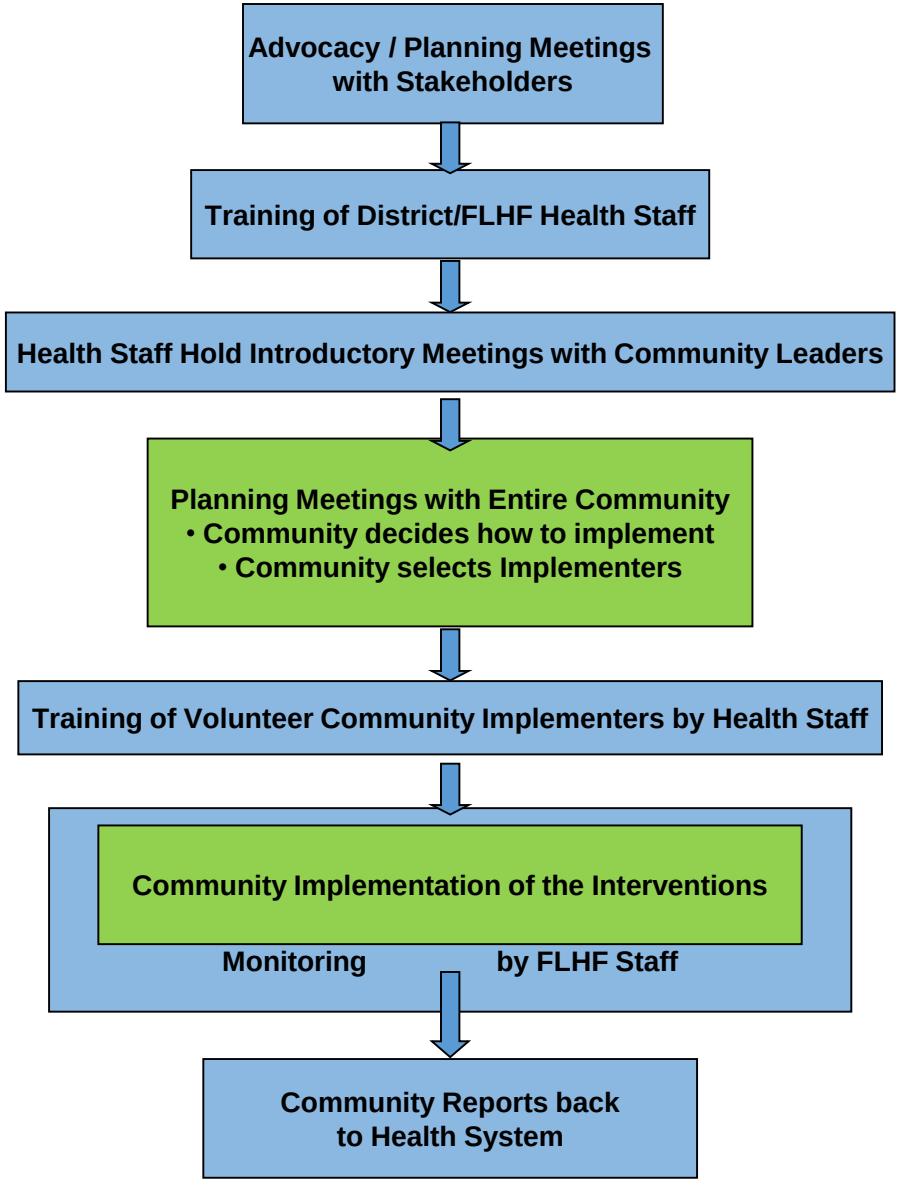
- African Program for Onchocerciasis.
- Community Directed Treatment with Ivermectin.







Main steps in the CDI Process



Future directions for control :-

- Encourage knowledge network.
- Mobilize and train volunteers for more effective preparedness, response and prevention.
- Increased capacity building lead to faster vulnerability reduction.



- Mobilizing stakeholder participation of self group, women’s groups, youth groups.

- Knowledge management: documentation and dissemination of good practices.






Thank You!