



Water-Related Diseases

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وَجَعَلْنَا مِنَ الْمَاءِ كُلَّ شَيْءٍ حَيٍّ

{30} الأنبياء

We made from water
Every living thing

Prophets {30}



"I have little need to remind you that water has become one of our major national concerns."

Ezra Taft Benson, U.S. Secretary of Agriculture

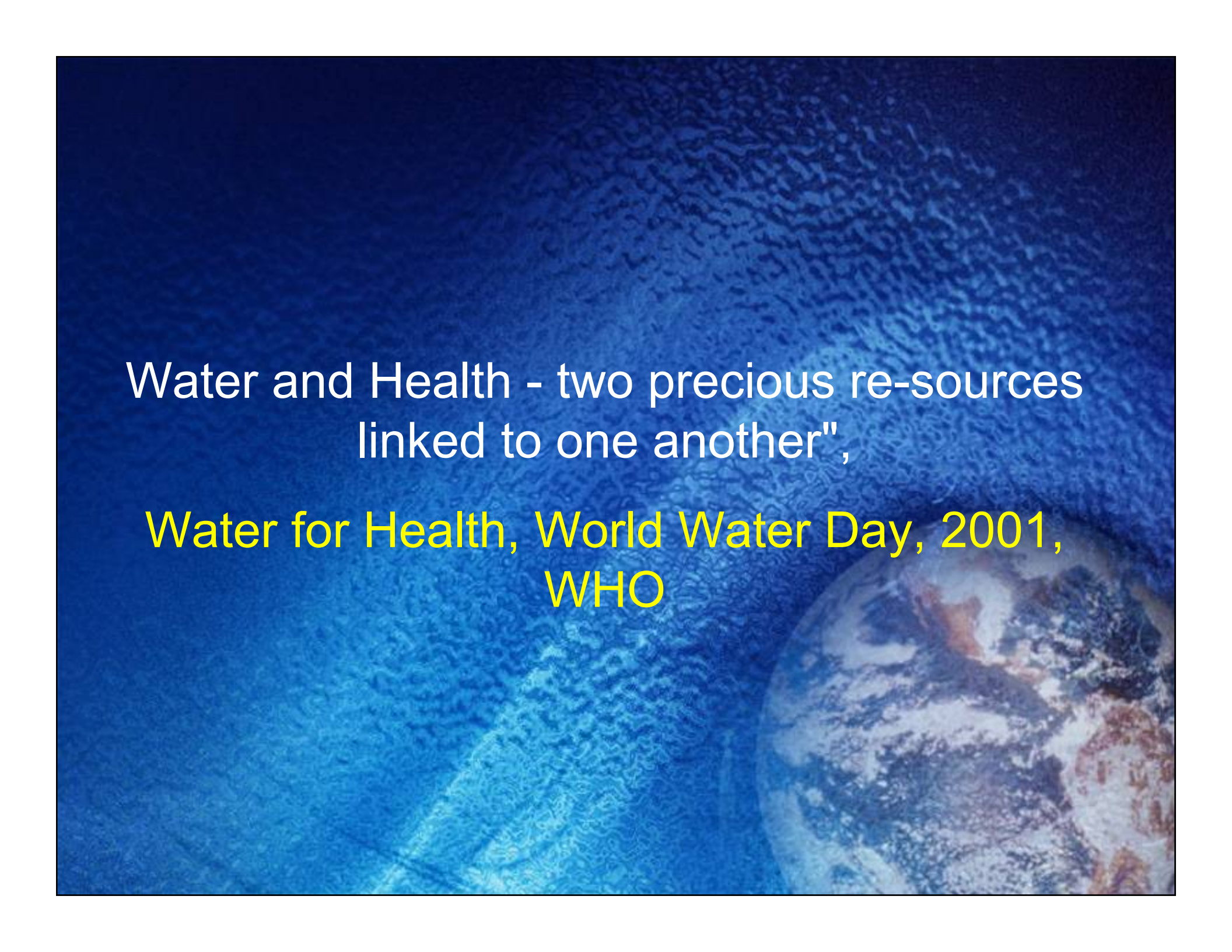
"Anyone who can solve the problems of water will be worthy of two Nobel prizes - one for peace and one for science."

John F. Kennedy

"Water is a very good servant, but it is a cruel master."

Roberts, Sir Charles George Douglas,

"Adrift in America", 1891

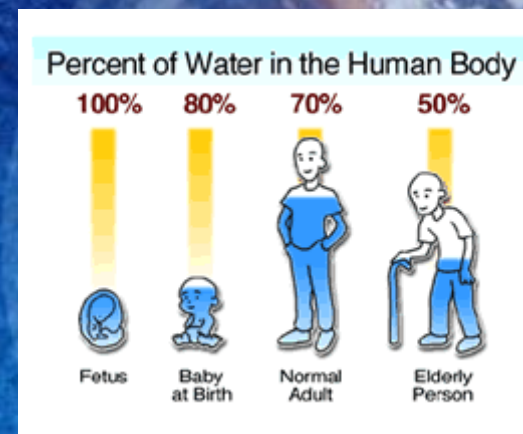
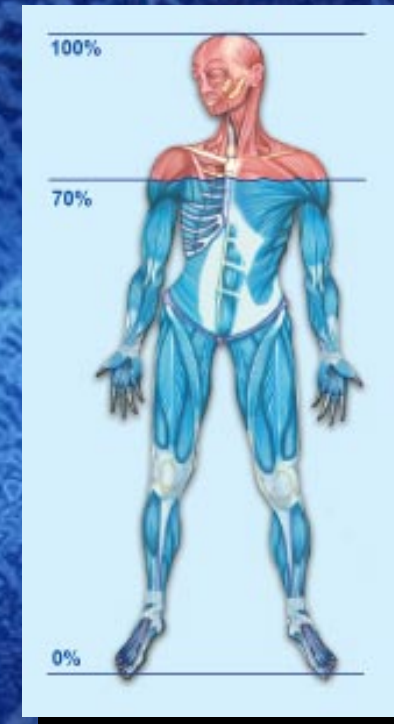


Water and Health - two precious re-sources
linked to one another",

Water for Health, World Water Day, 2001,
WHO

Basic Facts

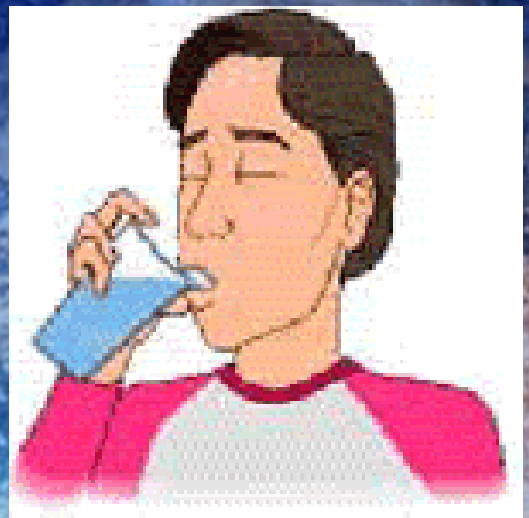
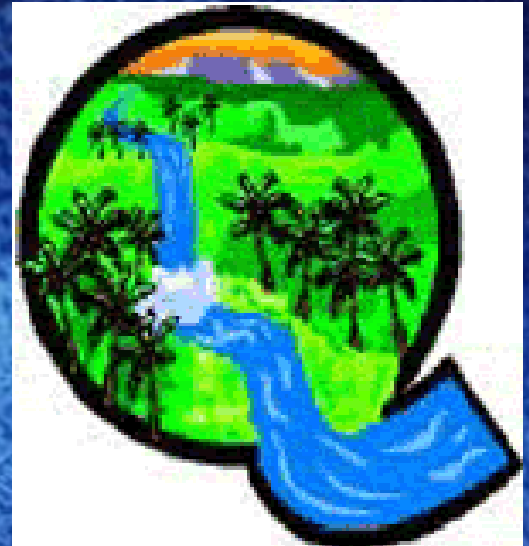
- The human body contains about **70 %** water.
- Water is critical in regulating all body organs and temperature as well as dissolving solids and moving nutrients throughout the body.
- Just a **5%** drop in body water will cause up to a **30%** loss of energy in the average person.



•1 billion people do not have access to safe drinking water.

• 2.9 billion people do not have adequate sanitation facilities.

•11,000 children die each day of water-related diseases



Classification of Water-Related Diseases

1. Physical Health Hazards

2. Chemical Health Hazards

3. Biological Health Hazards

4. Nutritional Health Hazards

Classification of Water-Related Diseases

1. Physical Health Hazards

2. Chemical Health Hazards

3. Biological Health Hazards

4. Nutritional Health Hazards

Classification of Water-Related Diseases

1. Physical Health Hazards

- Spinal Injury
- Drowning

Classification of Water-Related Diseases

1. Physical Health Hazards

2. Chemical Health Hazards

3. Biological Health Hazards

4. Nutritional Health Hazards

Classification of Water-Related Diseases

1. Physical Health Hazards

2. Chemical Health Hazards

3. Biological Health Hazards

4. Nutritional Health Hazards

Classification of Water-Related Diseases

2. Chemical Health Hazards

- Fluorosis
- Arsenicosis
- Lead Poisoning
- Methaemoglobinemia

Classification of Water-Related Diseases

1. Physical Health Hazards

2. Chemical Health Hazards

3. Biological Health Hazards

4. Nutritional Health Hazards

Classification of Water-Related Diseases

1. Physical Health Hazards

2. Chemical Health Hazards

3. Biological Health Hazards

4. Nutritional Health Hazards

Classification of Water-related Diseases

3. Biological Health Hazards

Water-Born
Diseases

Water-Washed
Diseases

Water-Based
Diseases

Water- Related
Insect-Vector
Diseases

Classification of Water-Related Diseases

1. Physical Health Hazards

2. Chemical Health Hazards

3. Biological Health Hazards

4. Nutritional Health Hazards

Classification of Water-Related Diseases

1. Physical Health Hazards

2. Chemical Health Hazards

3. Biological Health Hazards

4. Nutritional Health Hazards

Classification of Water-Related Diseases

4. Nutritional Health Hazards

- **Anaemia**
- **Malnutrition**

A close-up photograph of a chrome faucet with water dripping from it. The background is a blurred, bright blue and white, suggesting an indoor setting with overhead lights. The text is overlaid on a semi-transparent white box in the center of the image.

Description of Selected Water Born Diseases

1. Physical Health Hazards

Drowning

Defined as death by suffocation due to being immersed in water

•Causes:

•In children, a lapse in **adult supervision** is the single most important contributory cause for drowning.

•Lack of **swimming skills** in adults

•**Accidents** related to related to yacht, boat ...etc.

1. Physical health Hazards

Drowning

- **Scope of the Problem:**
 - Overall death rate : **8.4/100,000** population
 - Children aged 5 to 14 years, drowning is the **fourth** leading cause of death.
 - Adults aged 15-44 years, drowning is the 10th leading cause of death.

1. Physical health Hazards

Drowning

- **Prevention:**

- Education about **Swimming skills** & Hazards.
- Swimming in will **supervised** places.
- Inflatable **life jackets** for children and adults with low swimming skills.
- Adequate **rescue aids** on boats and ships, training of crew in rescue procedures.
- Learning **First Aid measures** for drowning.



1. Physical Health Hazards

Drowning



1. Physical Health Hazards

Spinal Injury



- **The most common cause** of spinal injuries in pools is from diving into the upslope of the pool bottom or into shallow water.
- Injuries range from damage to the vertebrae, ligaments and discs, to damage to the spinal cord itself.

1. Physical health Hazards

Spinal Injury

- **Scope of the Problem:**
 - **4-14%** of spinal cord injuries
 - Typically occur **high in the spine**. Those affected are commonly **young adult males**.
 - Cause **Quadriplegia** if occurs in cervical spine or **paraplegia** if occur in lumber spines.

1. Physical health Hazards

Spinal Injury

- **Prevention:**
 - **Education** about diving hazards and safe behaviour
 - **Supervision** by life guards
 - **Diving instruction**
 - Access to **emergency services** for rapid **first aid** and treatment

2. Chemical health Hazards

Fluorosis

•Causes:

- **Waters with high levels of fluoride** (above 1.5 mg/litre of water - the WHO guideline value for fluoride in water)

- **Areas where the sea has made geological deposits** :
Known fluoride belts on land include: one that stretches from Syria through Jordan, **Egypt**, Libya, Algeria, Sudan and Kenya, and another that stretches from Turkey through Iraq, Iran, Afghanistan, India, northern Thailand and China. There are similar belts in the Americas and Japan. In these areas fluorosis has been reported.

2. Chemical health Hazards

Fluorosis

- **Scope of the Problem:**
 - Affects millions of people all over the world, It is endemic in at least 25 countries across the globe
 - An estimated 30 million people suffer from chronic fluorosis in China alone.
 - Increase in areas depending on groundwater.
 - Cause staining and pitting of the teeth, and skeletal deformities in severe cases.



2. Chemical health Hazards

Fluorosis

- **Prevention:**

-De-fluoridation may be the only solution . Methods e.g.

- * use of bone charcoal
- * contact precipitation
- * use of Nalgonda or activated alumina

2. Chemical health Hazards

Arsenicosis

•Causes:

- **chronic intake of Water with high levels of Arsenic** (WHO's Guideline Value for arsenic in drinking water is 0.01 mg /liter.)
- **Natural arsenic contamination may occur in many countries .**
- **Chemical arsenic Contamination may also be due to industrial processes such as those involved in mining, metal refining .**

2. Chemical health Hazards

Arsenicosis

- **Scope of the Problem:**

- Approximately **1 in 100** people who drink water containing **0.05 mg arsenic per litre** or more for a long period may eventually die from **arsenic related cancers**.

Leads to

- * **skin problems**
- * **skin cancer,**
- * **cancers of the bladder, kidney and lung,**



2. Chemical health Hazards

Arsenicosis

- **Prevention:**

- **Provision of safe drinking (arsenic-free) water:**

- @ Deeper wells are often less likely to be contaminated

- @Use of arsenic removal systems in households

- @ Testing of water for levels of arsenic and informing users.

- **Health Promotion:**

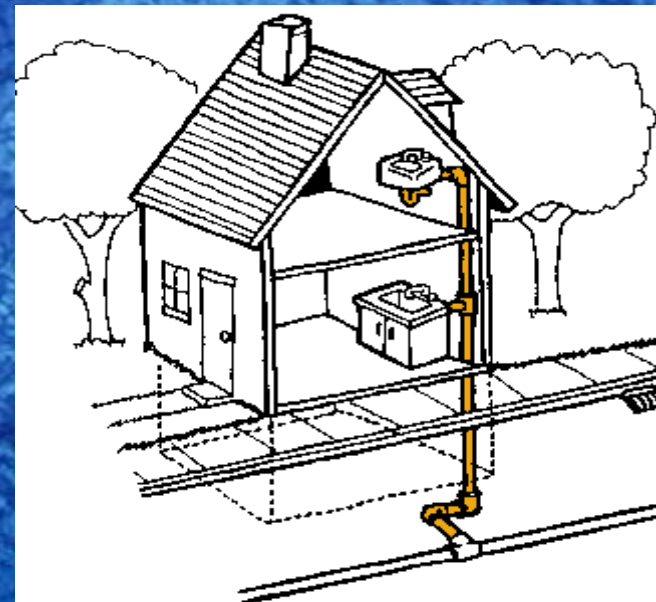
- @Monitoring for early signs of arsenicosis .

- @Health education regarding harmful effects of arsenicosis and how to avoid them.

2. Chemical health Hazards

Lead poisoning

- **Causes:**
- **The main source of lead in drinking water is (old) lead piping. (The WHO guideline for lead in drinking water is 0.1 mg/l).**



2. Chemical health Hazards

Lead poisoning

- **Scope of the Problem:**

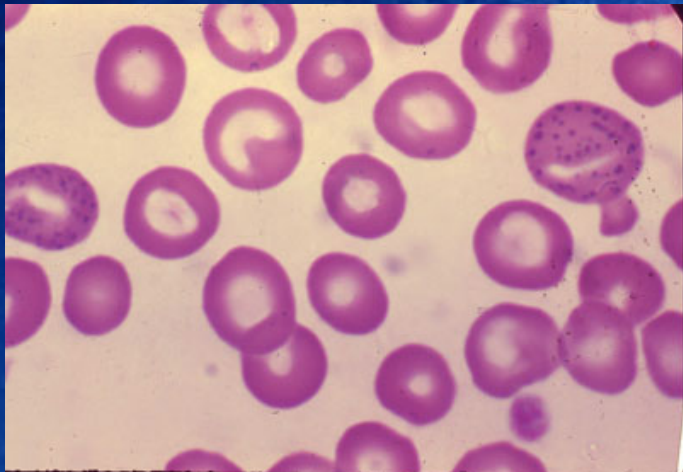
- The amount of lead that may dissolve in water depends on **acidity (pH)**, temperature, **water hardness** and standing time of the water.

Leads to

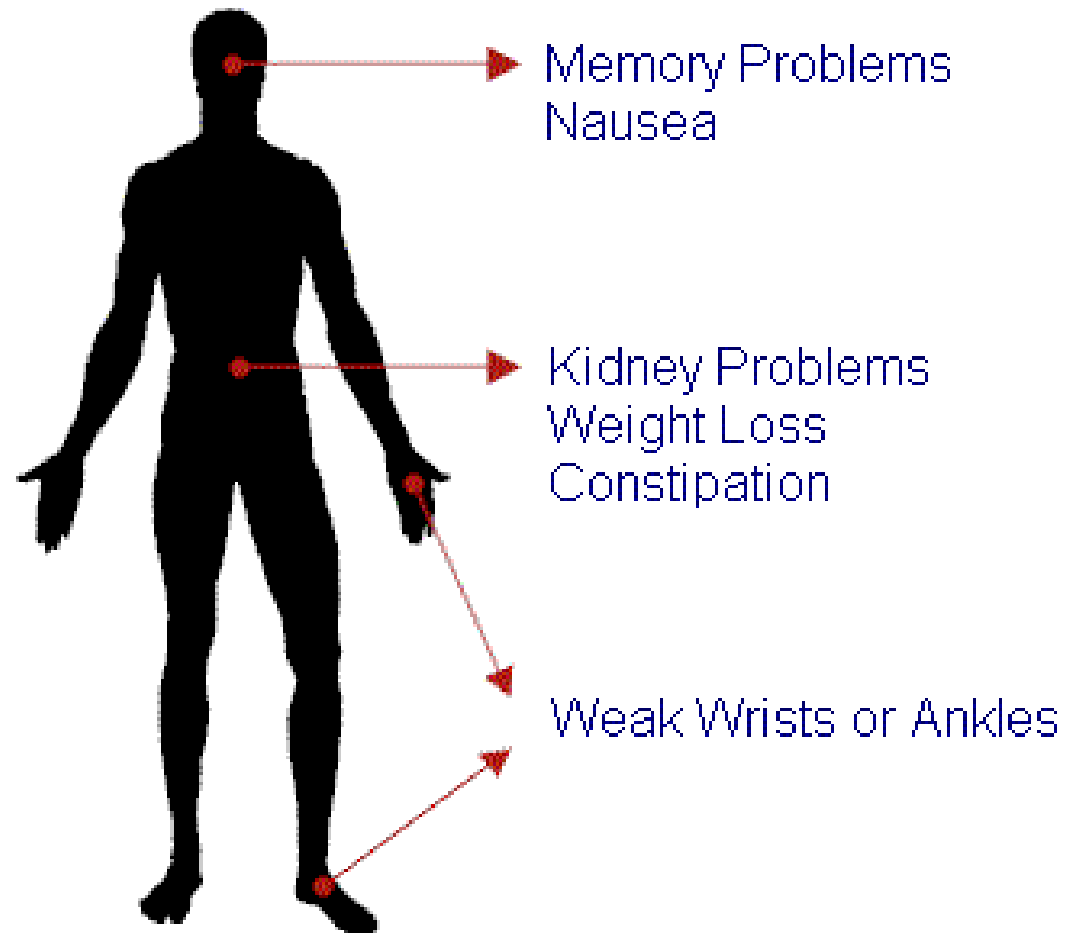
- >> **Neurological Insult,**
 - >> **blue line in gum,**
 - >> **Reproductive system & Kidney**
 - >> **Anaemia.**

2. Chemical health Hazards

Lead poisoning



Later Symptoms of Lead Poisoning



2. Chemical health Hazards

Lead poisoning

- **Prevention:**

- **Provision of safe drinking (lead-free) water:**

- @ Water treatment.

- @ Use of lead-free pipes

- **Health Promotion:**

- @ Screening of children for blood levels over acceptable limit and referral for medical care as necessary. .

2. Chemical health Hazards

Methaemoglobinemia

- Decreased ability of blood to carry vital oxygen around the body.
- High nitrate levels may be present in drinking-water due to the use of manure and fertilizers on agricultural land, but rare now in industrial countries.
- Levels greater than 50mg/litre are known to have been associated with methaemoglobinaemia in bottle fed infants.
- Controlling nitrate levels in drinking water sources to below around 50mg/litre is an effective preventive measure.

3. Biological Health Hazards

Water-Born Diseases



- cholera, typhoid,
- amoebic and bacillary dysentery
- diarrheal diseases

Water-Washed Diseases



- **scabies,**
- **trachoma**
- **flea, lice and tick-borne diseases.**

Water-Based Diseases



- Schistosomiasis
- Dracunculiasis

Water-Related Insect-Vector Diseases



- **filariasis, malaria,**
- **onchocerciasis,**
- **trypanosomiasis**
- **yellow fever**

3. Biological Health Hazards

Water-Borne Diseases



- cholera, typhoid,
- amoebic and bacillary dysentery
- diarrheal diseases

3. Biological Health Hazards

Diarrheal Diseases

- Caused by viruses, bacteria and protozoan.
- Loss of both water and electrolytes, >> dehydration .
- In developing countries, diarrhea is a **major killer**.
- In 1998, diarrhea killed **2.2 million** people, mostly were under **5 years** of age (WHO, 2000).
- Each year approximately **1-4 billion** cases of diarrhea worldwide.

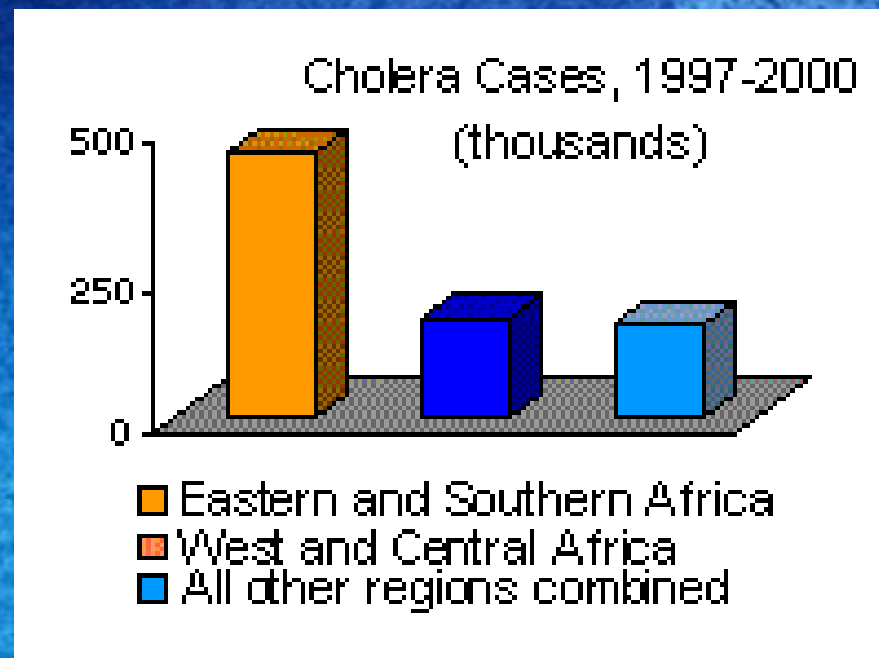
3. Biological health Hazards

cholera

- Cholera is an acute bacterial infection, causes severe diarrhea, that can quickly lead to acute dehydration and death.
- A world-wide problem that could be prevented by* providing access to safe drinking water, sanitation and good hygiene behavior (including food hygiene).
- **Year 2000**, **140,000** cases resulting in approximately 5000 deaths were officially notified to WHO.
- **In 2002**, over **120,000** cholera cases were reported worldwide.
- **Africa** accounted for **87%** of these cases.

3. Biological health Hazards

cholera



3. Biological health Hazards

Typhoid

- Typhoid fever is a bacterial infection (*Salmonella typhi*) (contaminated food or water).
- Infection occurs by drinking water contaminated by **sewage containing the bacteria**.
- Often occurs in **epidemics**
- **Symptoms :**
 - * Headaches, delirium.
 - * Nausea, vomiting, loss of appetite.
 - * Diarrhea or constipation.
 - * Rose-coloured spots on the chest.
 - * Enlarged spleen and liver.

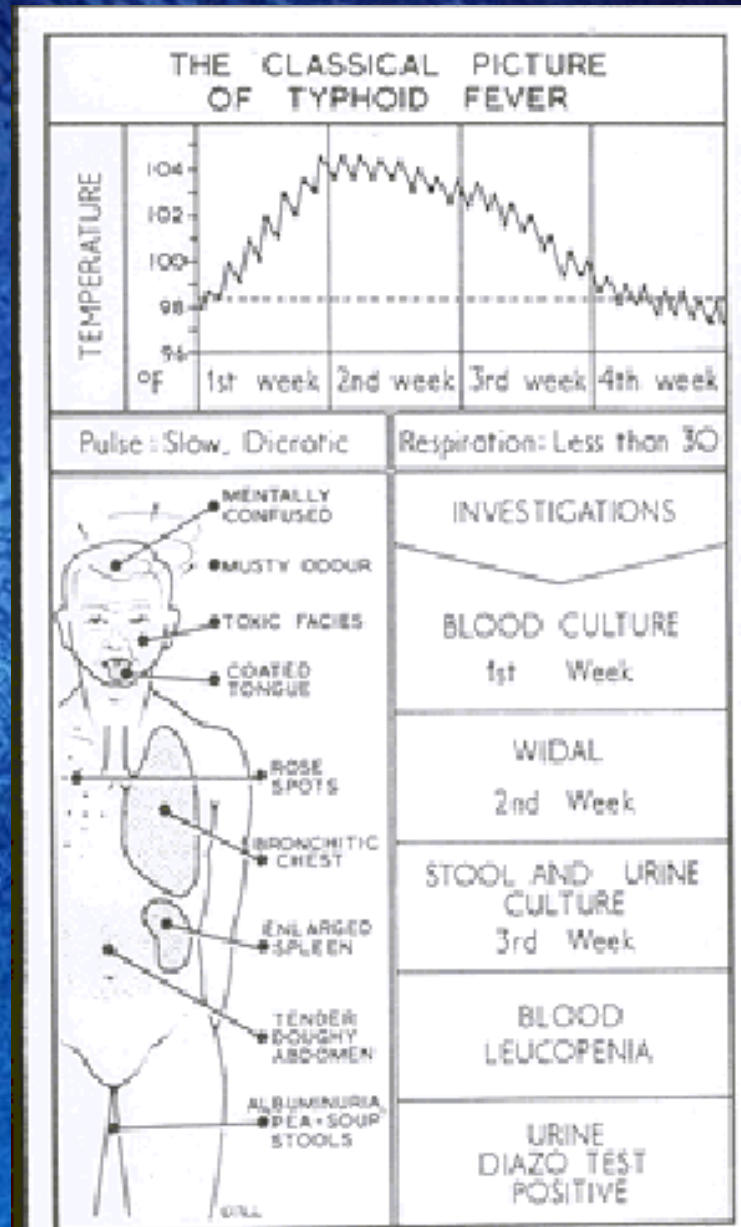
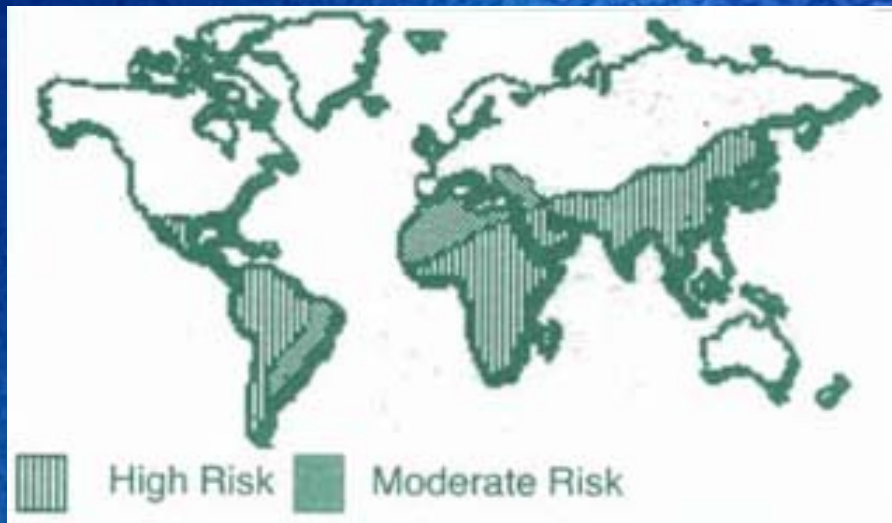
3. Biological health Hazards

Typhoid

- **Carriers** : continue to carry the bacteria. These people can be a source of infection for others.
- The annual incidence of typhoid is estimated to be about **12 - 17 million** cases worldwide.

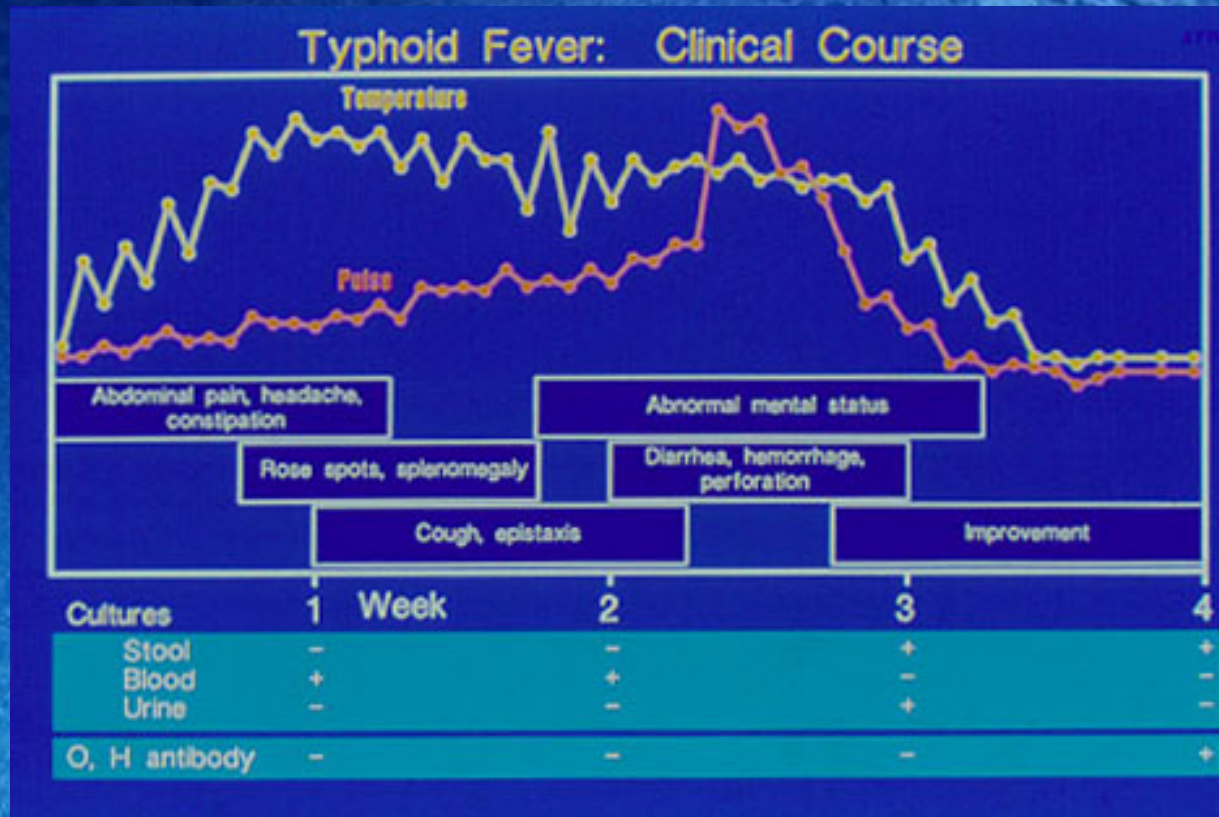
3. Biological health Hazards

Typhoid



3. Biological health Hazards

Typhoid



3. Biological health Hazards

Typhoid

Control measures :

- **Antibiotic** treatment
- **Health education** * personal hygiene, (hand-washing after toilet use and before food preparation;)
 - * safe water supply.
- Proper **sanitation** systems.
- Excluding disease **carriers** from food handling
- A **vaccine** is available, although it is not routinely recommended except for those who will have prolonged exposure to potentially contaminated food and water in high-risk areas.

3. Biological Health Hazards

Water-Born Diseases



- cholera, typhoid,
- amoebic and bacillary dysentery
- diarrheal diseases

Water-Washed Diseases



- **scabies,**
- **trachoma**
- **flea, lice and tick-born diseases.**

Water-Based Diseases



- Schistosomiasis
- Dracunculiasis

Water- Related Insect-Vector Diseases



- **filariasis, malaria,**
- **onchocerciasis,**
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- **yellow fever**

3. Biological Health Hazards

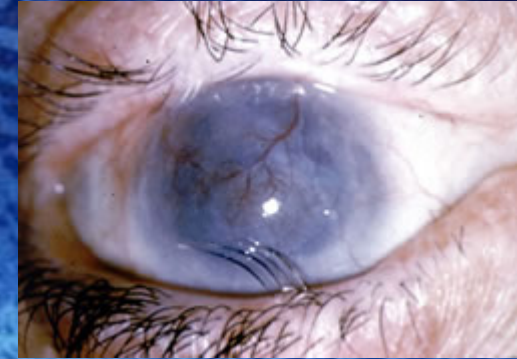
Water-Washed Diseases



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3. Biological health Hazards

Trachoma



- Trachoma is an eye infection caused by (*Chlamydia trachomatis*) spread mainly through poor hygiene caused by lack of adequate water supplies and unsafe environmental sanitation conditions.
- It is the world's leading cause of **preventable blindness** .
- cause scarring on the inside of the eyelid & may result in blindness after repeated re-infections .
- The World Health Organization (WHO) estimates that **6 million** worldwide are blind due to trachoma.

3. Biological Health Hazards

Scabies

- Scabies is a contagious skin infection that spreads rapidly in conditions associated with **bad personal hygiene, poor water-supply, sanitation**.
- The principal sign is a **pimple-like rash, itching, scratching, sores** that may become infected by bacteria.
- There are about **300 million** cases of scabies in the world each year.

3. Biological health Hazards

scabies

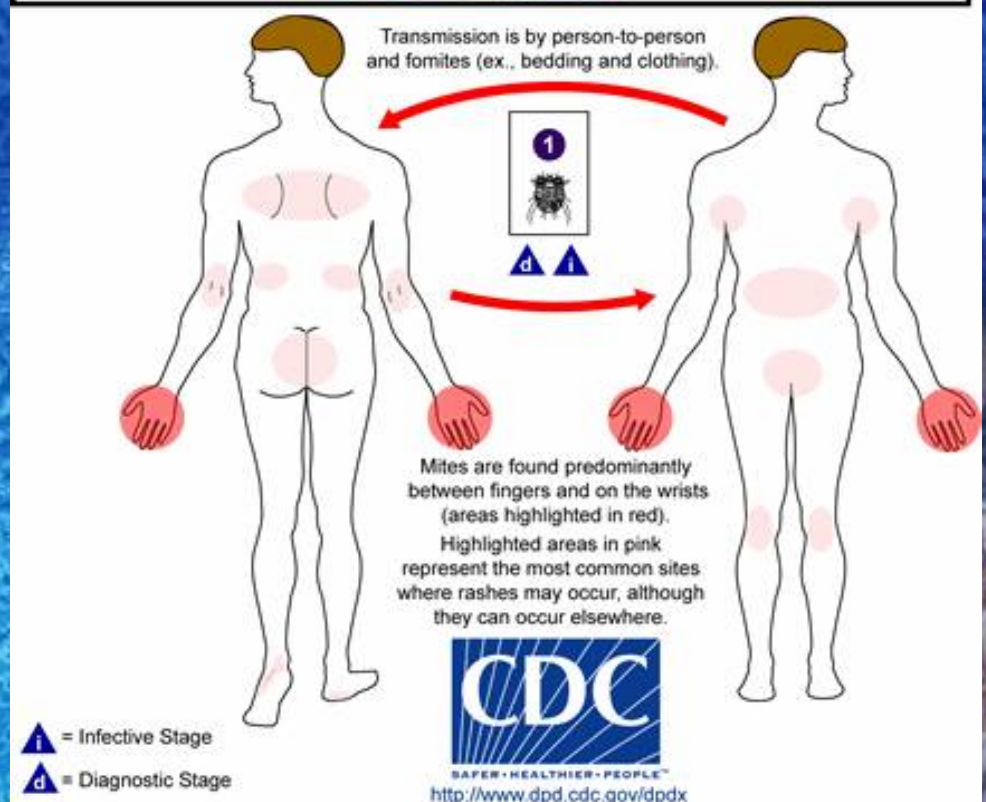
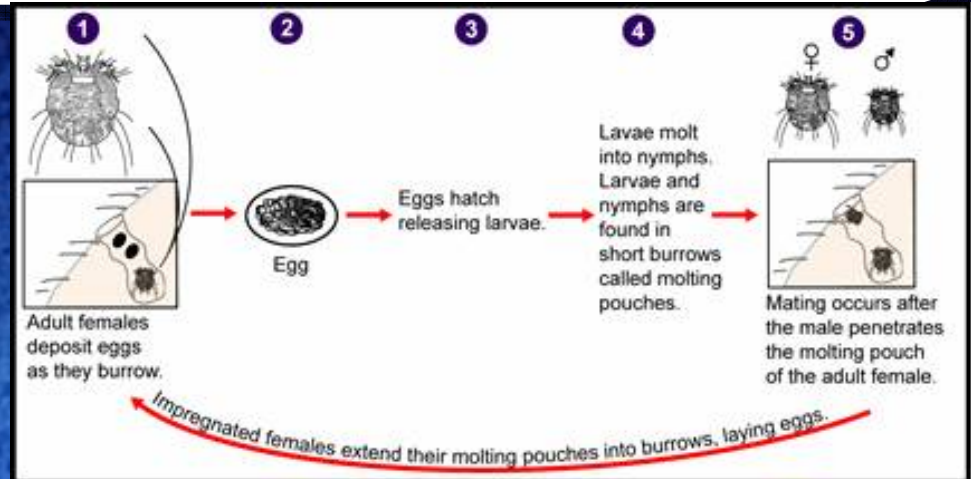
Itching

Scratching

**Sores,
Infection**

3. Biological health Hazards

scabies



3. Biological health Hazards

scabies

- Controlled by:
- Improved personal hygiene,
- Treatment of patients with acaricide,
- Sterilization of Bedding, mattresses, sheets and clothes .

3. Biological Health Hazards

Water-Born Diseases



- cholera, typhoid,
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- diarrheal diseases

Water-Washed Diseases



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3. Biological Health Hazards

Water-Based Diseases



- **Schistosomiasis**
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3. Biological health Hazards

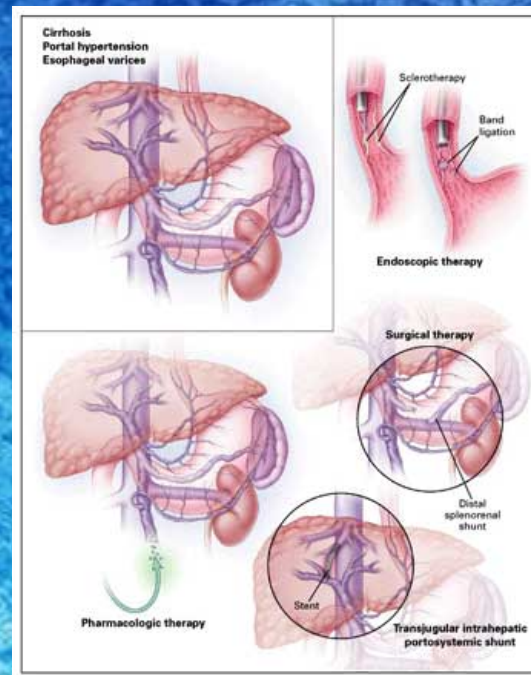
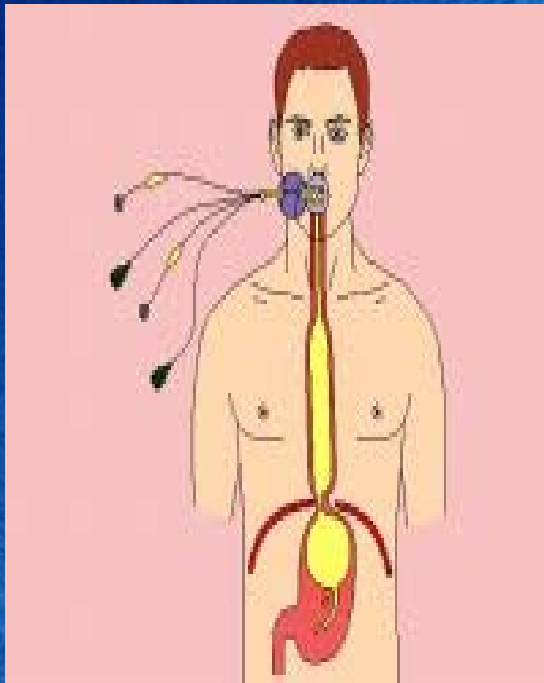
Schistosomiasis

- **Schistosomiasis is the second most important parasitic infection after malaria (public health and economic impact).**
- **Caused by :Schistosoma haematobium, S. japonicum, and S. mansoni.**
- **Free-swimming larvae penetrate human skin.**
- **The larvae develop in fresh-water snails.**

3. Biological health Hazards

Schistosomiasis

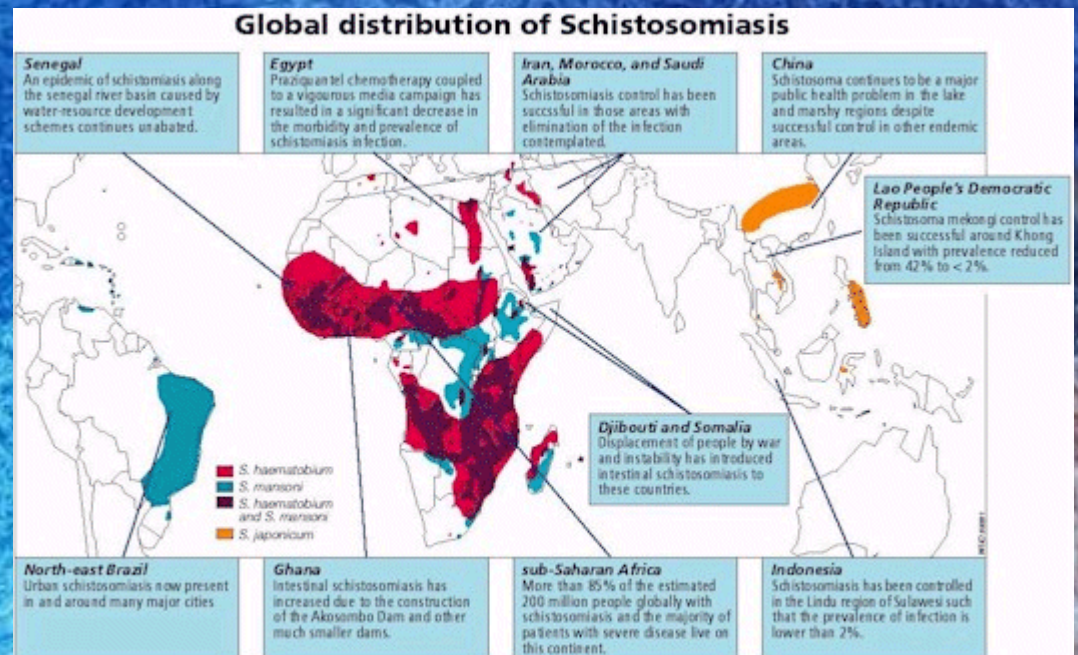
- In Egypt It is a **major cause** for **chronic liver disease, esophageal varices, ascitis, splenomegaly, and bladder cancer.**



3. Biological health Hazards

Schistosomiasis

At least 600 million people are at risk of infection and **200 million** are infected with schistosomiasis. Of these **20 million** have severe disease and **120 million** have symptoms.



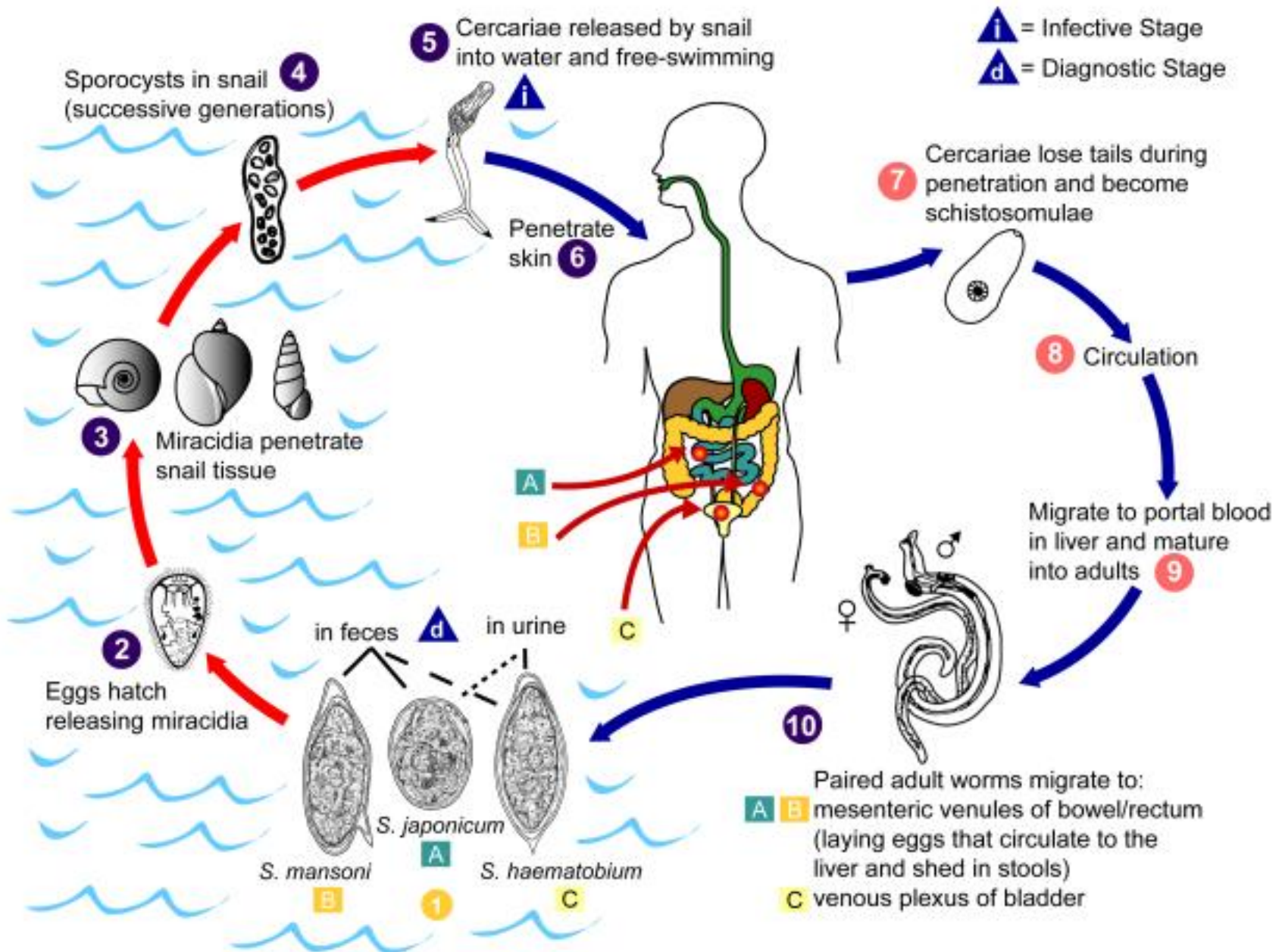
3. Biological health Hazards

Schistosomiasis

Figure 3. Priorities for schistosomiasis research



Schistosomiasis



3. Biological Health Hazards

Water-Born Diseases



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- diarrheal diseases

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3. Biological health Hazards

Water- Related Insect-Vector Diseases



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3. Biological health Hazards

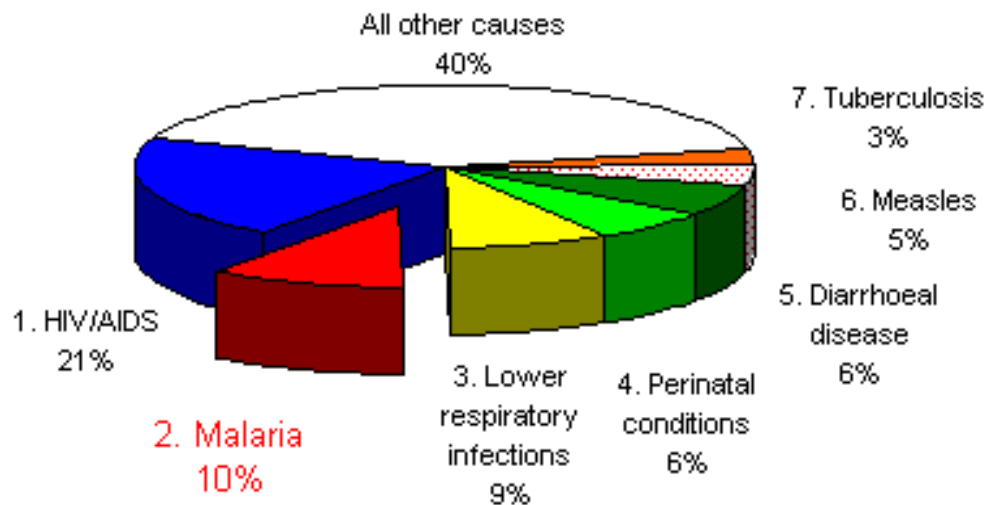
Malaria

- Malaria is the **world's most important** parasitic infectious disease.
- It is **transmitted by** mosquitoes which breed in fresh or occasionally brackish water.
- WHO estimates **300-500 million** cases of malaria, with over **one million deaths** each year.

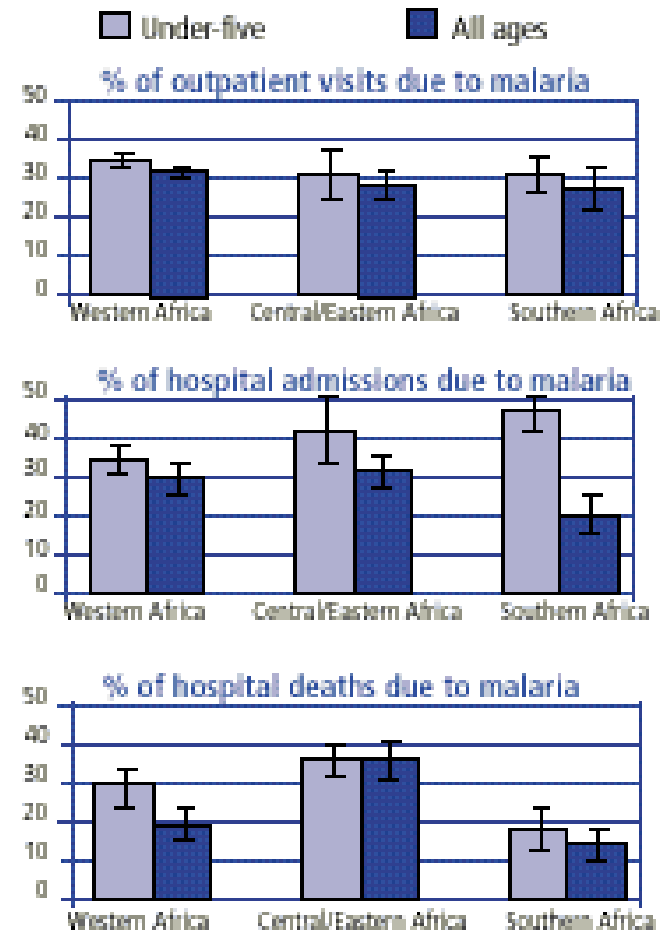
3. Biological health Hazards

Malaria

Burden of Disease Profile
African WHO Region



Malaria burden on health facilities



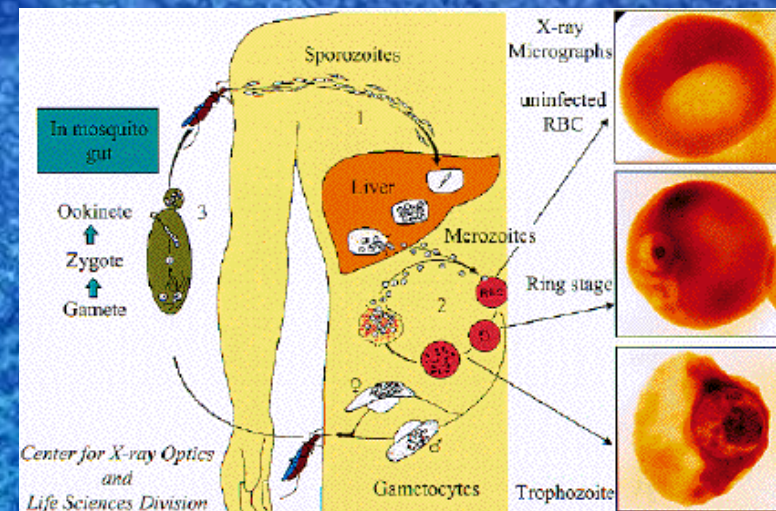
Source: AFRO routine Health Information System data. Averages 1998–2001. Error bars give the standard errors.

Figure 1.5

3. Biological health Hazards

Malaria

- ⊗ **Cold stage \cong 1 hr**
 - **Headache/shiver/rapid weak pulse**
- ⊗ **Hot stage 6hrs**
 - **Intense headache/nausea/thirst /distress**
- ⊗ **Sweating stage 4hrs**
 - **Profuse sweating**
 - **Sleep!**



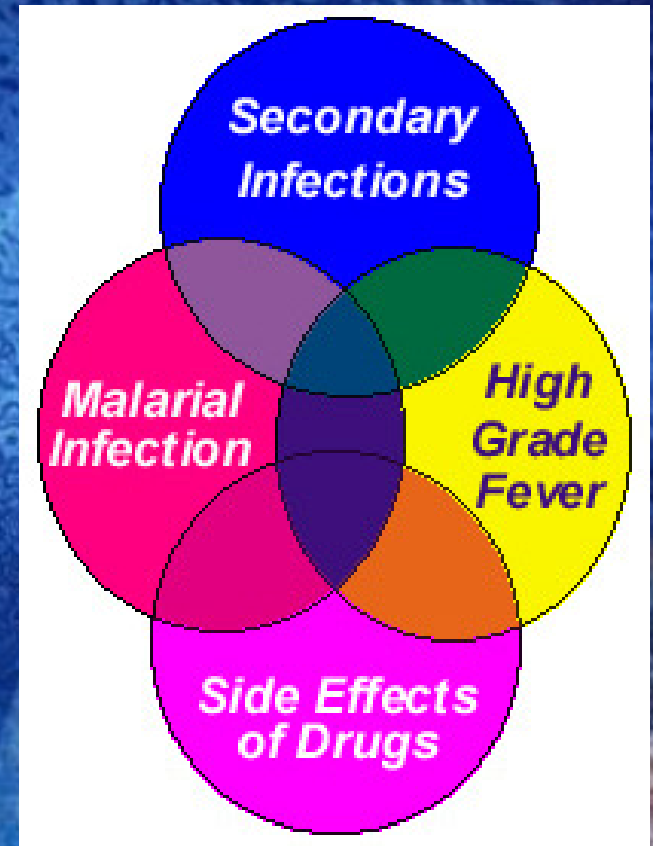
3. Biological health Hazards

Malaria

While most of the the clinical manifestations of malaria are caused by the malarial infection per se, **high grade fever** as well as the **side effects of anti malarial therapy** can also contribute to the clinical manifestations.

All these may act in unison, further confusing the picture.

In some cases, **secondary infections like pneumonia or urinary tract infection** can add to the woes.



4. Nutritional health Hazards

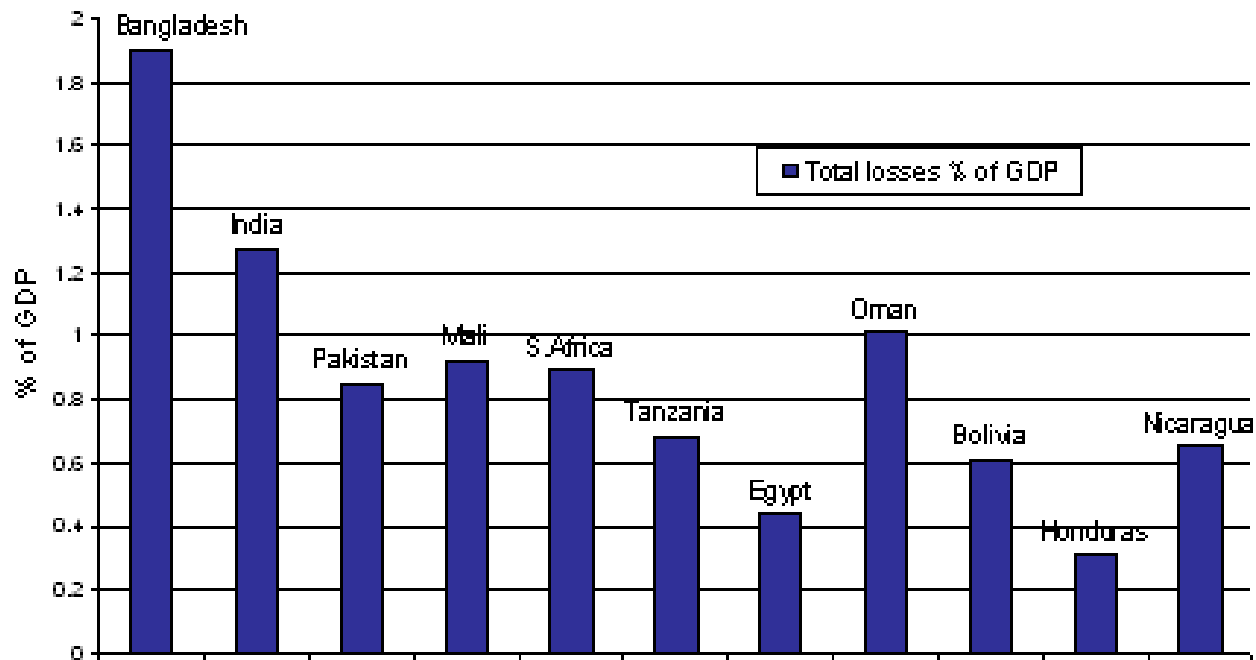
Anaemia

- The most important water-related causes of anaemia are:
 - Malnutrition
 - water-borne or water-related infections e.g : malaria (haemolytic anemia) , schistosomiasis (by chronic blood loss—> fe deficiency).
- Anaemia may contribute to up to 20% of maternal deaths.
- about 2 billion people suffer from anaemia.

4. Nutritional health Hazards

Anaemia

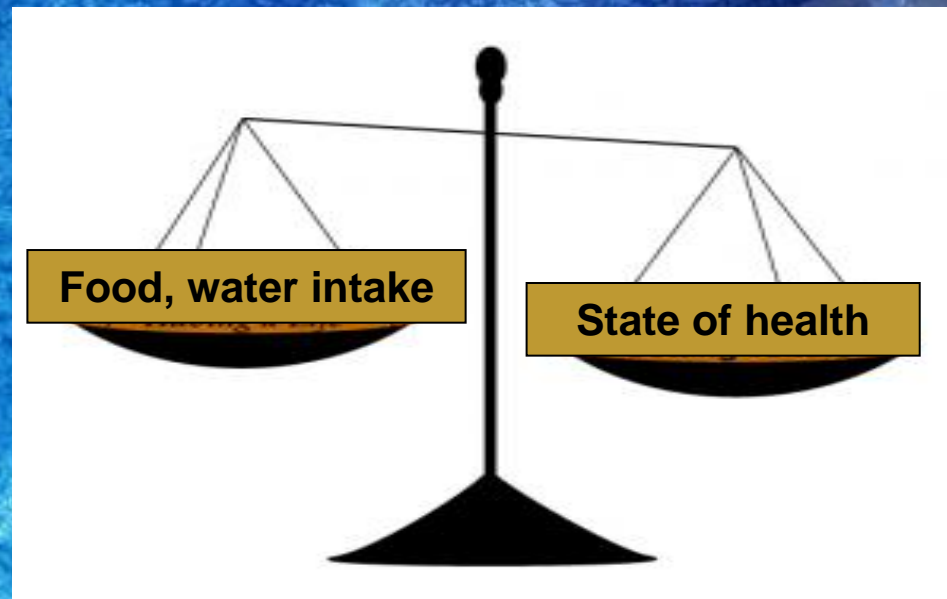
Estimates of economic costs of anemia (cognitive + productivity) as % of GDP



4. Nutritional Health Hazards

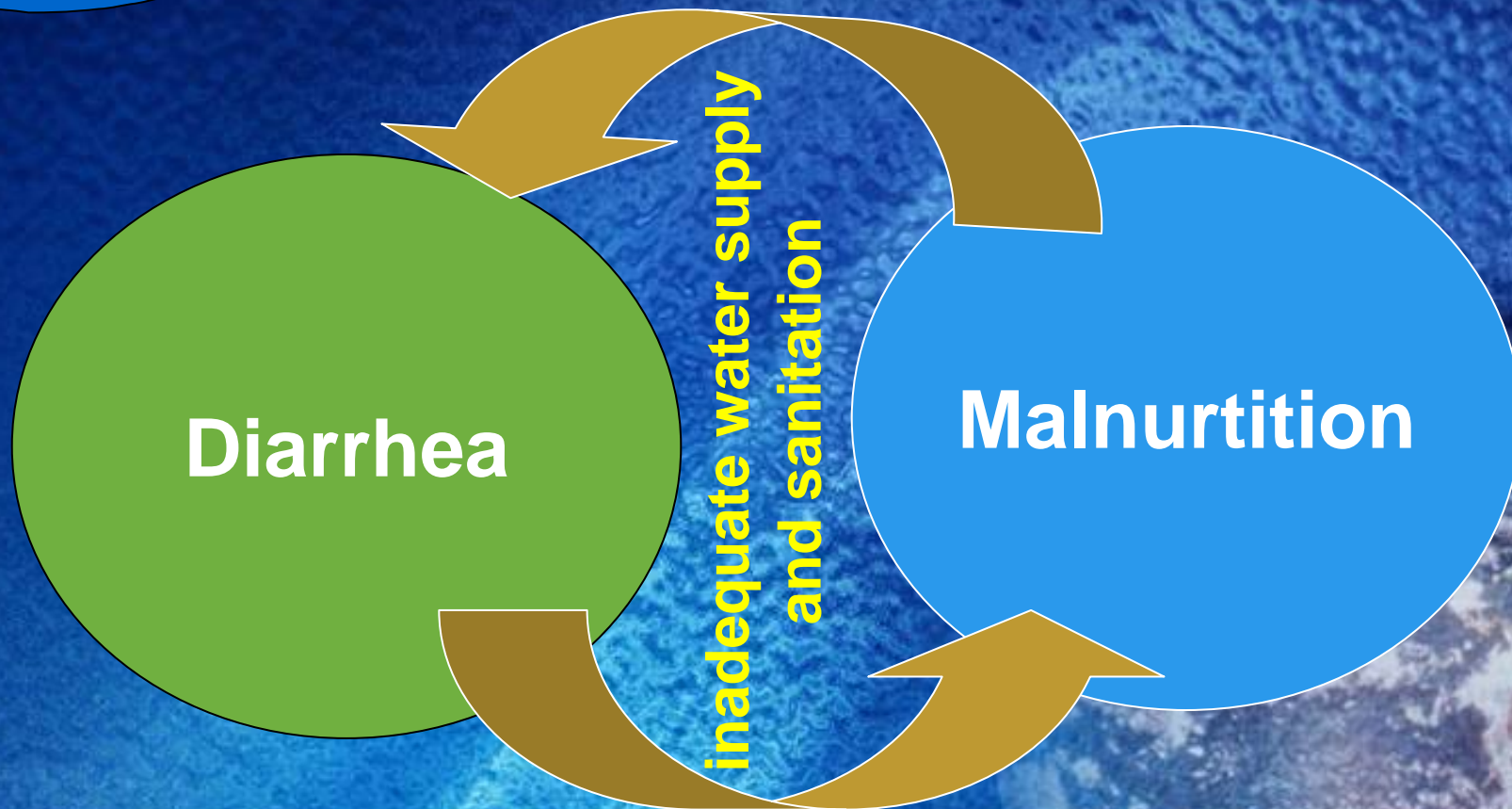
Malnutrition

- Due loss of food, water balance with the overall state of health leading to the inability to use nutrients properly to maintain health



4. Nutritional Health Hazards

Malnutrition



4. Nutritional Health Hazards

Malnutrition

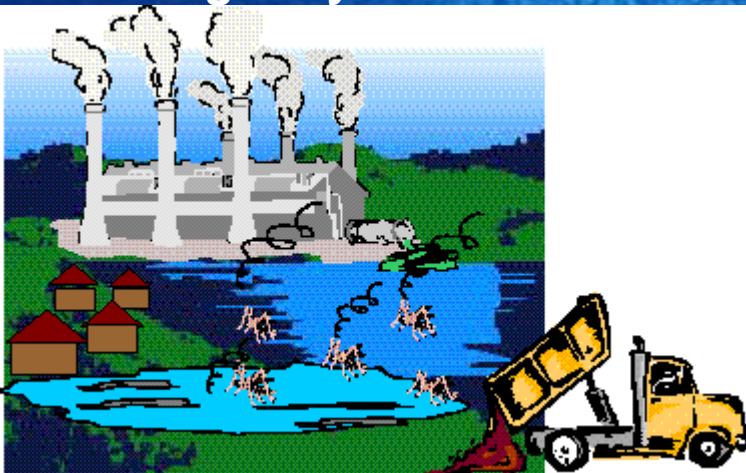
- The most important water-related causes of malnutrition are:
 - diarrheal diseases.
 - water-borne infections.
 - lack of nutrients e.g inorganic chemicals(flouride, copper, iodine..etc)
 - water-related habits.
- Malnutrition increases the risk of disease and early death.
- malnutrition affects **one in three people** in the world.
- **Protein-energy malnutrition** plays a major role in half of all under-five deaths each year in developing countries.

Control of Water-Related Diseases

Safe Water

- For
- Drinking
- Washing
- recreational use
e.g swimming
- Must Be safe :**

Chemically, physically, & biologically



Control of water-related Pathways

e.g

- Snails in Schistosomiasis.
- Mosquitos in Malaria
- Safe water transmission
e.g safe pipes, safe containers

Control of Human-Related Cause

e.g

- Health Education
- Health promotion
- Early detection & treatment

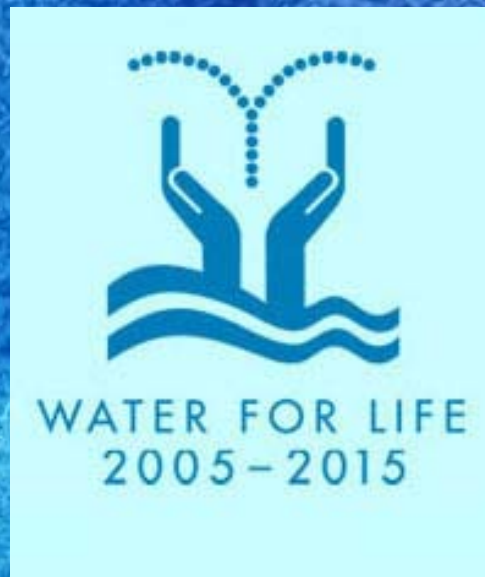


Control of Water-Related Diseases




The WHO and UNICEF promote three key hygiene behaviors as having the greatest potential health impact -

- Hand washing
- Safe disposal of faeces.
- Safe water handling and storage.

- The United Nations General Assembly, in December 2003, proclaimed the years 2005 to 2015 as the International Decade for Action **'Water for Life'**.



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 Official WWD07 Brochure now available for download	 New Events added to WWD Events Calendar	 WWD Official Video #1 now online
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World Water Day: 22nd March 2007 Coping With Water Scarcity



[Click HERE to view full slideshow](#)

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[WORLD WATER DAY 2007 Brochure](#)

<http://www.unwater.org/wwd07/flashindex.html>

g with Water Scarcity
Water website]

2007
world water day

