This is the first of a series of two articles on Flood related health risks.

Heavy rain falls resulted in flooding and landslides across nine districts in Sri Lanka, recently. This has affected nearly 288 307 people causing 86 deaths. Nearly 10 774 people are displaced. However the epidemiological situation remains stable with no major infectious disease outbreaks. Due to the treatment received number of skin diseases and acute respiratory infections has reduced. Despite this status the health authorities continue to conduct enhanced disease surveillance activities.

Health risks posed by flooding

Generally, a disaster situation like flooding and landslides provides a platform on which many communicable diseases can easily spread and cause disease outbreaks. Mainly water borne diseases as well as vector borne diseases cause huge public health impact. Apart from that, overcrowding can increase the spread of diseases like measles and Nisseria meningitides meningitis. In selected situations, dead bodies can provide sources of diseases. However, they do not carry a higher risk than living beings in producing disease outbreaks. Apart from usual communicable disease spread, drowning, injuries, trauma, hypothermia etc are other health risks posed by flooding and landslides.

Water borne diseases

Among the water borne diseases, Typhoid fever, Cholera, Leptospirosis and hepatitis A are common infectious diseases which can spread easily due to congestion of a huge crowd in an environment which is compromised with lack of clean water supply and proper sanitation. The nutritional status of the displaced population, the amount of immunity to vaccine preventable diseases like measles and the access to health care services also contributes to the risk of communicable disease spread. However, the risk of spread of infection is low unless there is significant water source compromisation and/or significant population displacement. As evidence for this, out of 14 massive floods occurred globally between 1970 and 1994, only in Sudan in 1980, a diarrhoeal epidemic was reported as the flood was complicated by population displacement.

If the drinking water sources get contaminated, this provides a portal via which pathogens can spread. However even this happens, the risk of disease spread can be minimized if the possibility of water contamination is recognized early and provision of clean water is made a priority.

Not only through contaminated water ingestion, infections can also spread by surface contact with polluted water causing wound infections, dermatitis, conjunctivitis and ear, nose and throat infections. However, these diseases do not tend to cause outbreaks. But an important infectious disease which is spread by contact of water on skin or mucus membranes and which
tend to produce outbreaks is Leptospirosis. The risk of Lepto-
spirosis spread increases with increased vector (rodent) popu-
lution due to environmental changes brought about by the dis-
aster situation. Close proximity between human and rodents
due to shared high ground also make the victims more vulner-
able.

Vector borne diseases
Vector borne diseases like Dengue, Dengue haemorrhagic
fever, Malaria, Yellow fever can cause outbreaks in disasters
like flooding. Relationship between flooding and increased risk
of vector borne diseases is indirect. Flooding increase the
number and range of vector habitats.

Flooding initially washout mosquito breeding sites. But once
the overflowed water recedes, it produce stagnant water col-
lections and increase mosquito breeding sites. Heavy rainfall it
self can also produce the same effect. Usually there is a lag
period of 6-8 weeks after flooding where a Malaria epidemic
starts.

During a flood, not only the affected individuals but also emer-
gency workers face the risk of getting vector borne diseases.
Other risk factors such as changes in human behavior like tem-
porary pause in disease control activities, overcrowding, in-
creased exposure to mosquitoes while sleeping outside and
changes in the vector habitats which promotes mosquito
breeding like landslides, deforestation, river damming contrib-
utes to the increased risk of vector borne disease spread.

Risks posed by dead bodies
Corpses rarely produce sources of acute infections than survi-
vors because most of the pathogenic organisms do not survive
long in the human bodies after death except HIV which can
last up to 6 days. Therefore, evidence to support the fact that
dead bodies are a source of disease epidemics is lacking.
However, special precautions are required in cases like Chol-
era and haemorrhagic fevers as corpses create a health risk
there.

Meanwhile workers who handle dead bodies are exposed to
increased risk catching Tuberculosis, gastrointestinal infections
like Rota virus diarrhea, E.coli, typhoid/ paratyphoid fevers,
Salmonellosis, Shigellosis, Cholera, Hepatitis A and blood
borne infections like HIV, Hepatitis A and B due to several rea-
sons.

Residual air in the lungs can come out or fluid from the lungs
can spurt out through nose or mouth while handling dead bod-
ies. By this way Tuberculous bacilli can be aerosolized and
enter into a person. Dead bodies usually tend to leak faeces
and surviving individual’s clothes and other equipment can get
soiled and contaminated by them. Dead bodies in water
streams can also contaminate drinking water with faeces. This
leads to spread of gastrointestinal infections via faeco-oral
route. Among the various ways through which people can ac-
quire blood borne infections are non intact skin contacting with
blood or body fluids, exposure of the mucus membranes from
spurtling of blood or body fluids, needle stick injuries and inju-
ries from bone fragments.

Other health risks created by flooding
Not only spread of communicable diseases, there are also
other health risks posed by a situation of flooding. Affected
individuals as well as health care workers are equally prone for
them.

People are prone for injuries and trauma of any sort during a
disaster situation which can be physical, thermal, chemical or
electrical. They usually occur not in the immediate phase of the
disaster but specially when attempting removal of their loved
ones or objects after the disaster. Injuries also occur while cleaning up where risk is increased by unstable buildings, elec-
tric power cables etc.

However Tetanus is not common after injuries from flooding.
Therefore mass tetanus vaccination is not indicated usually.
But depending on their Tetanus vaccination history, people
with open wound are given Tetanus boosters.

Hypothermia is a possible sequale specially in small children. If
they have been trapped in flood waters for a prolonged period
or are exposed to rain, the risk of developing hypothermia in-
creases.

Physical disease outcomes are more apparent and easily
measurable after a disaster. However, mental health impact
posed by disasters like flooding does exist to a more or less
equal extend. Disaster situations carry a potential to cause
psychological derangement in its victims such as Post Trau-
matic Stress disorder, depression, irritability, sleeplessness,
suicidal ideation etc.

Sources
1. Flooding and communicable diseases fact sheet available at
2. Epidemics after natural disasters available at http://
   wwwnc.cdc.gov/eid/article/13/1/06-0779_article

Compiled by Dr. S.A.I.K. Sudasinghe of the Epidemiology
Unit
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**Note:** A = Cases reported during the current week. B = Cumulative cases for the year.

**Source:** Weekly Returns of Communicable Diseases (WRCD)

**Footnote:**
- A = Cases reported during the current week.
- B = Cumulative cases for the year.
- T = Timeliness refers to returns received on or before 20 May, 2016
- C = Completeness

**Table 1:** Selected notifiable diseases reported by Medical Officers of Health

**Source:** Weekly Returns of Communicable Diseases (WRCD)

**Footnote:**
- T = Timeliness refers to returns received on or before 20 May, 2016
- C = Completeness
Table 2: Vaccine-Preventable Diseases & AFP

<table>
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<th>Disease</th>
<th>Number of cases during current week in 2016</th>
<th>Number of cases during same week in 2015</th>
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Key to Table 1 & 2


Data Sources:


CRS** = Congenital Rubella Syndrome

AFP and all clinically confirmed Vaccine Preventable Diseases except Tuberculosis and Mumps should be investigated by the MOH.

Dengue Prevention and Control Health Messages

Look for plants such as bamboo, bohemia, rampe and banana in your surroundings and maintain them.

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Comments and contributions for publication in the WER Sri Lanka are welcome. However, the editor reserves the right to accept or reject items for publication. All correspondence should be mailed to The Editor, WER Sri Lanka, Epidemiological Unit, P.O. Box 1567, Colombo or sent by E-mail to chepid@sltnet.lk. Prior approval should be obtained from the Epidemiology Unit before publishing data in this publication.