



The Role of Clinical Microbiologist in Dx Foodborne Infections

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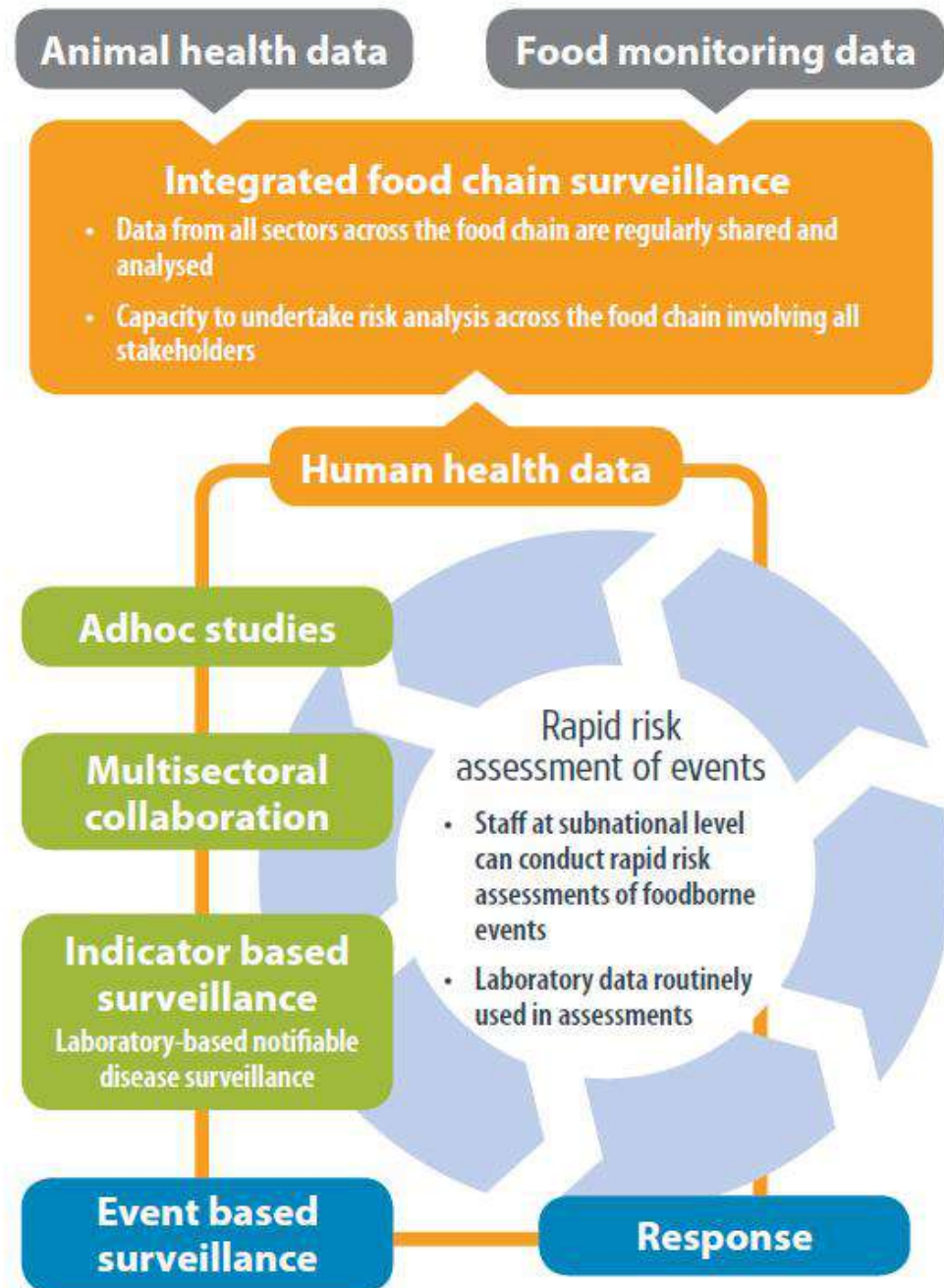
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Subyek

- Pendahuluan
- Foodborne Infections
- Foodborne Microbiology
- Outbreak Management



Components of
a fully developed
surveillance and
response system for
foodborne disease



Foodborne diseases in the WHO Region



Foodborne diseases in the WHO Region of the Americas

Every year



Diarrhoeal diseases are responsible for **95%** of foodborne illnesses in the Region

Key causes of diarrhoeal diseases:



**FOODBORNE DISEASES ARE PREVENTABLE.
EVERYONE HAS A ROLE TO PLAY.**



Foodborne diseases in the WHO Western Pacific Region

Every year



Aflatoxin (caused by mould on grain) is main cause of foodborne disease deaths with **70%** of all cases worldwide in this Region



Region has highest death rate from foodborne **parasites**

As a result **>10 000** people develop liver cancer each year

**FOODBORNE DISEASES ARE PREVENTABLE.
EVERYONE HAS A ROLE TO PLAY.**

For more information: www.who.int/foodsafety

#SafeFood

Source: WHO Estimates of the Global Burden of Foodborne Diseases, 2015.

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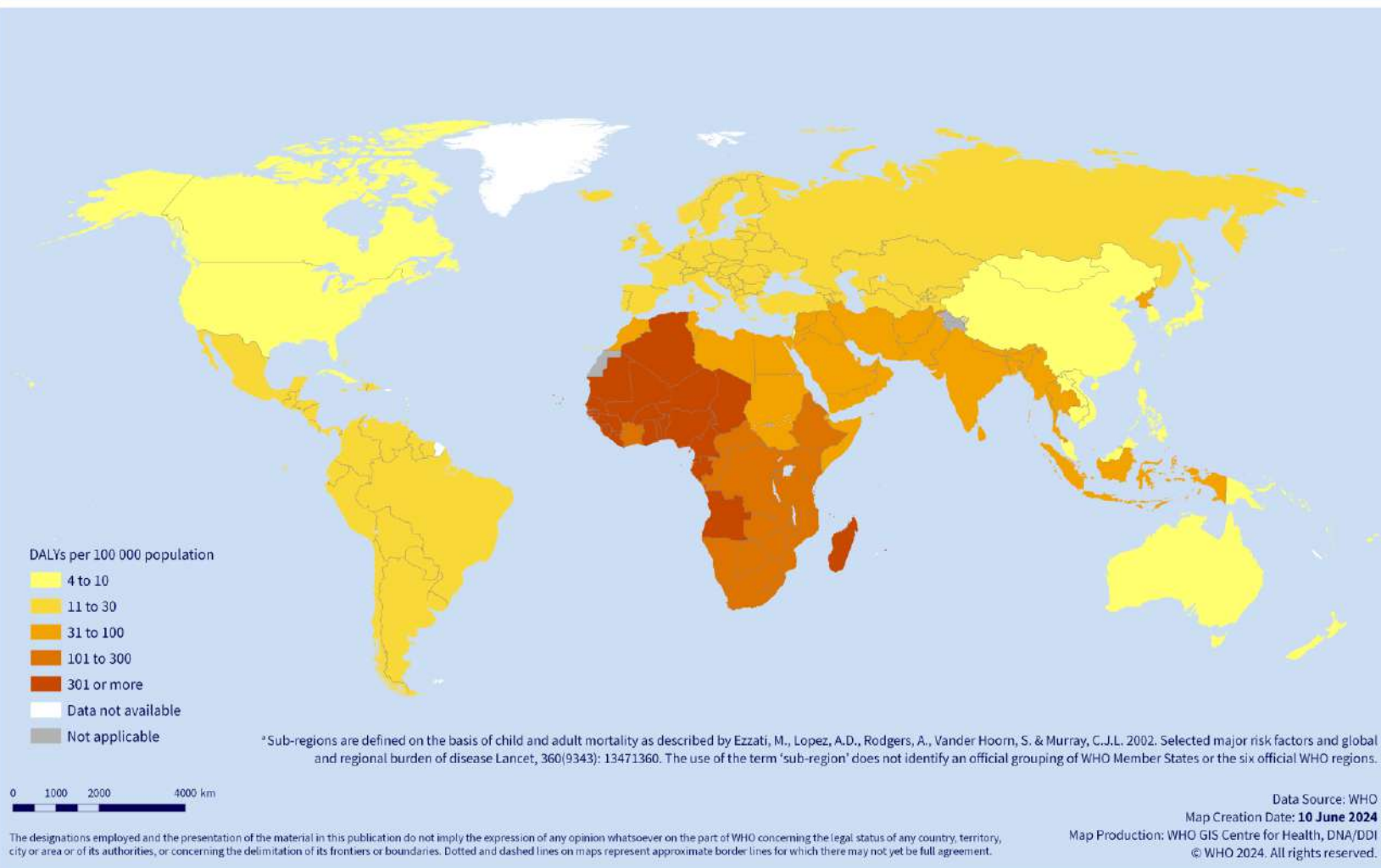
Source: WHO Estimates of the Global Burden of Foodborne Diseases, 2015.

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Median foodborne disability-adjusted life years per 100 000 population for non-typhoidal *Salmonella enterica*, by sub-region^a, 2010



Foodborne diseases in the WHO Region






Foodborne diseases in the WHO South-East Asia Region

Every year

 **>150 million** people fall ill } **>175 000** die

 including **60 million** children <5 fall ill } **50 000** die

Diarrhoeal diseases are responsible for majority of deaths. Key causes:

-  Norovirus
-  Non-typhoidal *Salmonella*
-  Pathogenic *E. coli*



Region has **>1/2** the people globally who are infected and die from **typhoid fever or hepatitis A**

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Source: WHO Estimates of the Global Burden of Foodborne Diseases, 2015.

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Foodborne diseases in the WHO Eastern Mediterranean Region

Every year

 **>100 million** people fall ill } **37 000** die

including  **32 million** children <5 fall ill

Diarrhoeal diseases are responsible for **70% of the burden of foodborne diseases**

-  *E. coli*
-  Norovirus
-  *Campylobacter*
-  Non-typhoidal *Salmonella*

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Source: WHO Estimates of the Global Burden of Foodborne Diseases, 2015.

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Foodborne diseases in the WHO Region



The burden of foodborne diseases is substantial

Every year foodborne diseases cause:

almost
in 10
people to fall ill

33 million
healthy life years lost

Foodborne diseases can be deadly, especially in children <5

420 000
deaths

Children account for
1/3
of deaths from
foodborne diseases

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Source: WHO Estimates of the Global Burden of Foodborne Diseases, 2015.

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Diarrhoeal diseases are the most common illnesses resulting from unsafe food

Diarrhoeal diseases are responsible for:



1/2
global burden of
foodborne diseases
caused by 31 hazards

Key global causes of diarrhoeal diseases:

- Norovirus
- Campylobacter
- E. coli
- Non-typhoidal Salmonella

550m
people falling ill
230 000
deaths

including
220m
children <5 falling ill
96 000
of whom die

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EVERYONE HAS A ROLE TO PLAY.**

For more information: www.who.int/foodsafety

#SafeFood

Source: WHO Estimates of the Global Burden of Foodborne Diseases, 2015.

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Foodborne diseases in the WHO Region



Foodborne diseases in the WHO European Region

Every year

23 million
people fall ill



5 000
people die

Diarrhoeal diseases
are responsible for
most foodborne
illnesses



Norovirus infection =
almost 15 million cases



Campylobacter =
nearly 5 million cases

FOODBORNE DISEASES ARE PREVENTABLE.
EVERYONE HAS A ROLE TO PLAY.

For more information: www.who.int/foodsafety

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Source: WHO Estimates of the Global Burden of Foodborne Diseases, 2015.

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Foodborne diseases in the WHO African Region

Every year



>91 million
people fall ill



137 000
people die

representing
1/3 of the global death
toll for foodborne diseases

Diarrhoeal diseases are
responsible for **70%** of the burden
of foodborne diseases



Non-typhoidal *Salmonella*



Foodborne cholera



E. coli



Chemical hazards (cyanide
and aflatoxin) cause **more**
than 3000 deaths annually

Paralysis (Konzo) caused by
cyanide in cassava, is unique
to the African Region, resulting in
death in **1 in 5** people affected

FOODBORNE DISEASES ARE PREVENTABLE.
EVERYONE HAS A ROLE TO PLAY.

For more information: www.who.int/foodsafety

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Source: WHO Estimates of the Global Burden of Foodborne Diseases, 2015.

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Foodborne diseases are a major global public health concern

Foodborne diseases are caused by types of:



Bacteria



Viruses



Parasites



Toxins



Chemicals

Some of these are a public health concern across all regions
Others are much more common in middle- and low-income countries



But in a **globalized world** they can
spread quickly along the food chain
and **across borders**

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Source: WHO Estimates of the Global Burden of Foodborne Diseases, 2015.

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Key foodborne diseases and hazards



Bacteria:

- **Listeria** can result in blood poisoning and meningitis, and is usually spread by consuming contaminated raw vegetables, ready-to-eat meals, processed meats, smoked fish or soft cheeses.
- **Brucella**, commonly from unpasteurized milk or cheese of infected goats or sheep, can cause fever, muscle pain or more severe arthritis, chronic fatigue, neurologic symptoms and depression.
- **Cholera** can be caused by consuming food contaminated with *Vibrio cholerae*. It causes watery diarrhoea that can be fatal within hours if left untreated.



Virus:

- **Hepatitis A** is a liver disease caused by the hepatitis A virus, transmitted through food contaminated by the faeces of an infected person. It causes jaundice, nausea, anorexia, fever, malaise and abdominal pain.



Parasites:

- **Toxoplasmosis**, caused by *Toxoplasma gondii*, spread through undercooked or raw meat and fresh produce, can result in impaired vision and neurological conditions.
- **Pork tapeworm** (*Taenia solium*) can cause cysts to develop in the brain (cysticercosis), which is the most frequent preventable cause of epilepsy worldwide.
- **Echinococcus tapeworms** can infect humans through food contaminated with dog or fox faeces. They can cause tumours to form in the liver, lungs and brain.
- **Chinese liver fluke** (*Clonorchis sinensis*) commonly contracted through raw and incorrectly processed or cooked fish, can cause bile duct inflammation and cancer.



Chemicals and toxins:

- **Aflatoxin** is a toxin produced by mould that grows on grain that has been stored inappropriately, and can cause liver cancer, one of the most deadly forms of cancer.
- **Cyanide** poisoning occurs when inappropriately processed cassava is consumed.

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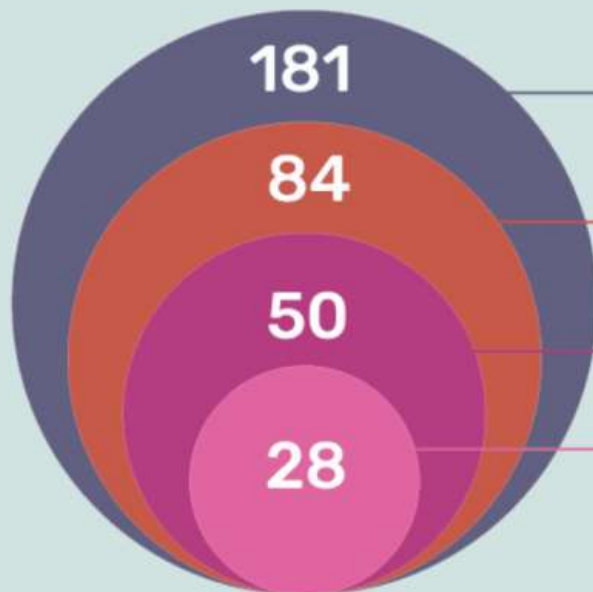
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Source: WHO Estimates of the Global Burden of Foodborne Diseases, 2015.



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OUTCOMES FOR INVESTIGATIONS OF POSSIBLE MULTISTATE OUTBREAKS, 2023



● **POSSIBLE MULTISTATE OUTBREAKS:**

Two or more people with a similar illness living in two more states

● **MULTISTATE OUTBREAKS:**

Two or more people with a similar illness that have evidence of a common source

● **SOLVED MULTISTATE OUTBREAKS:**

Outbreak for which a source was identified

● **MULTISTATE OUTBREAKS - Confirmed Sources:**

Solved outbreak with at least two types of data supporting the source (epidemiologic plus lab and/or traceback data)



IMPACT OF MULTISTATE OUTBREAKS



942
HOSPITALIZATIONS



3,153
ILLNESSES



12
DEATHS

2023



30172-A

84 MULTISTATE OUTBREAKS INVESTIGATED



2

CAMPYLOBACTER



15

E. Coli



54

SALMONELLA



13

LISTERIA

2023



202308 A

Arigatou
Gozaimasu

