

# **Importance of Sequence Sharing**

## **Case study – Food Safety**



# 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

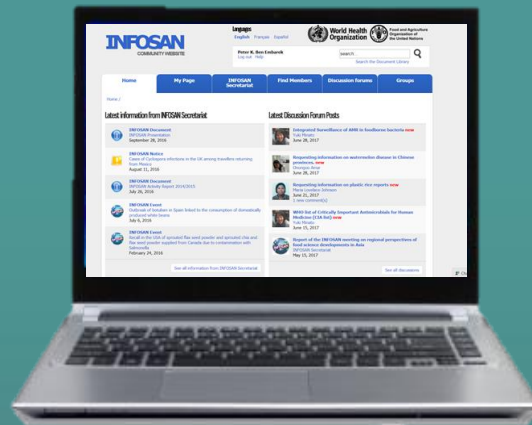
  
Children account for  
**1/3**  
of deaths from  
foodborne diseases

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



# International Food Safety Authorities Network

- Voluntary network of national food safety authorities (600+ members from 188 Member States) managed jointly by WHO/FAO
- Used for information sharing and response to food safety emergencies to reduce PH and trade impact



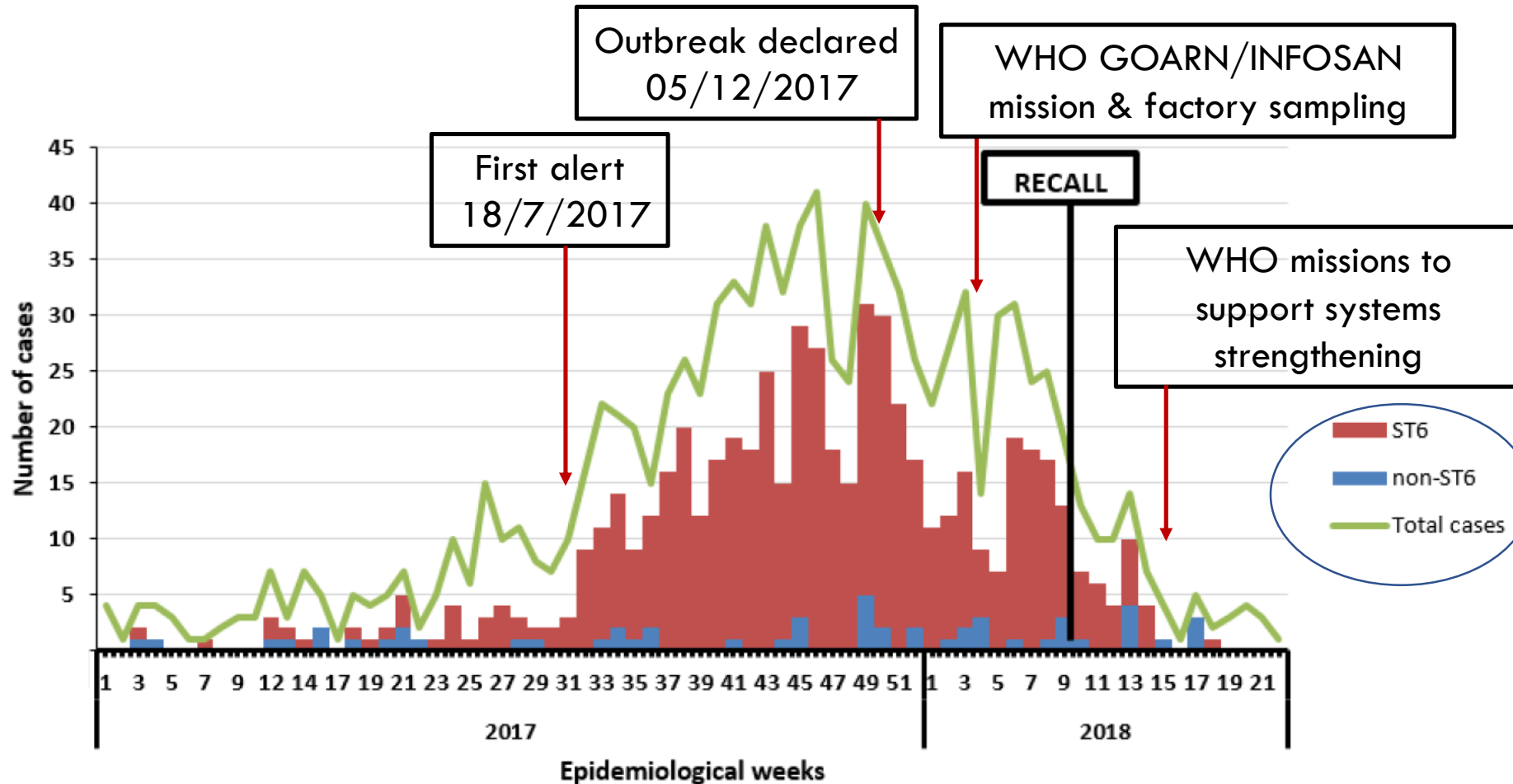
# Example

- Outbreak of Listeriosis in South Africa linked to internationally distributed ready-to-eat meat, 2017/2018
- Listeriosis is a serious disease (~30% of cases die) caused by consumption of contaminated ready to eat foods
- Invasive listeriosis: Due to the long incubation period (1-8 weeks), it is challenging to identify the particular food which was the cause of the infection



## Outbreak of Listeriosis in South Africa (SA)

Whole Genome Sequencing (WGS) enabled identifying the outbreak and the implicated food.



- WGS: enabled focus on outbreak cases
- One case in Namibia: Sharing of strain/sequencing in SA → not part of the outbreak
- SA shared sequences → cases worldwide with history of SA travel could be discarded

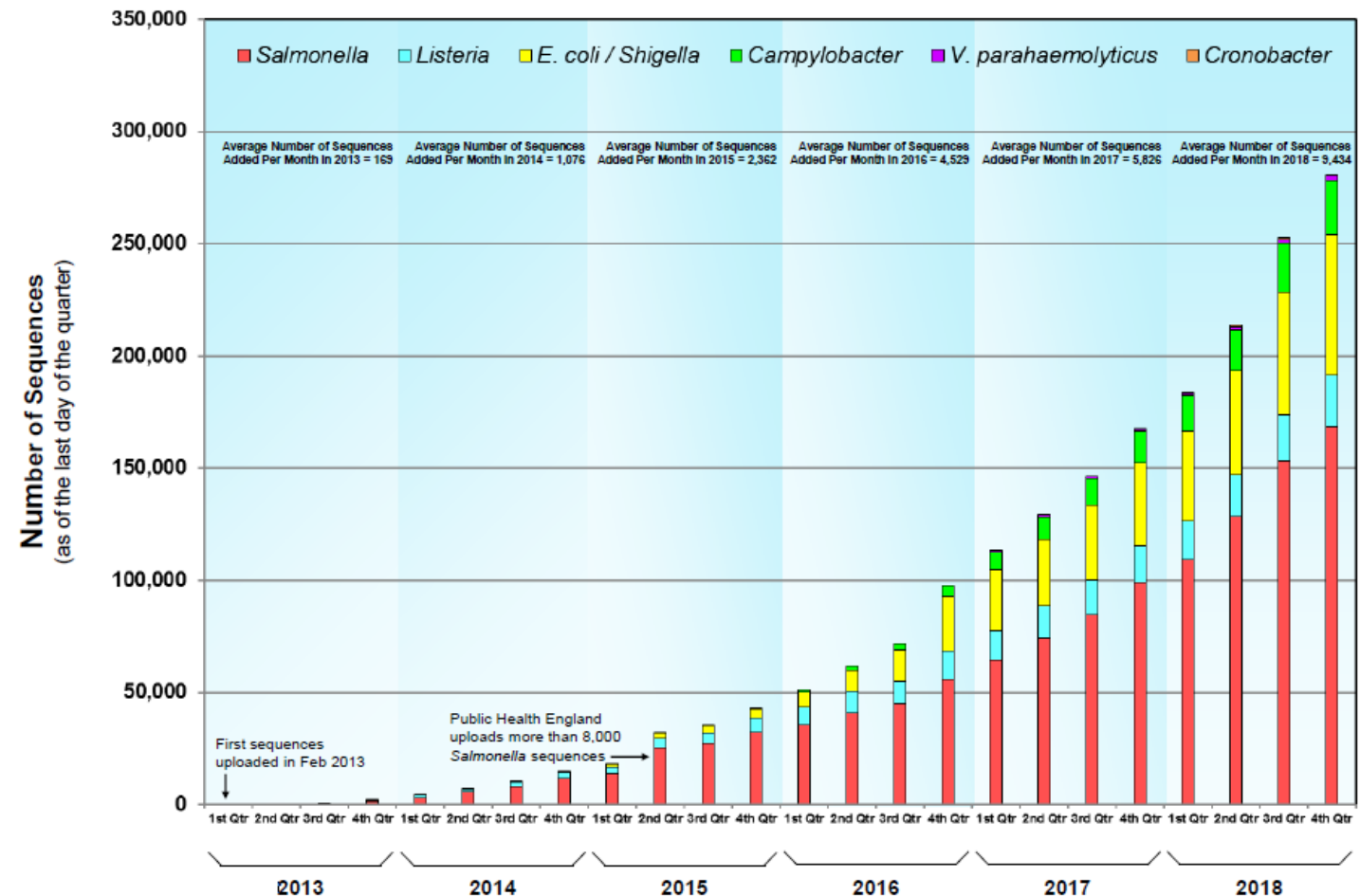
**2017-2018, 1060 cases , 216 deaths**

<http://www.nicd.ac.za>

# Use of WGS and sequence sharing worldwide

- 3 open databases exists already, mirroring each other (NCBI/EMBL-EBI/DDBJ)
- Ex. of open, near real time sharing: GenomeTrakr; Labs in the US and several other countries
- Contains 280 000 sequences
- >300 new sequences per day
- In Europe: 29/30 countries using WGS
- Use in Americas, Africa and Asia ↗

Total Number of Sequences in the GenomeTrakr Database





# WGS and open sharing: Timely sharing of foodborne disease pathogen sequences helps rapid outbreak investigation and surveillance

- Sharing of sequences:

WGS can provide strong pieces of evidence, linking contaminated food to human cases and detecting outbreaks much earlier and faster

- Timely sequencing & global cooperation:

During a food safety emergency involving WHO/INFOSAN, the Secretariat can facilitate the sequencing of samples upon request to potentially link cases to an on-going outbreak

- Rapid access to globally shared WGS information helps to manage increasingly complex international food safety events and link outbreaks and cases over time and geographic areas

Ex1) Salmonellosis in France (contaminated infant formula), 2005-2018 ← outbreaks linked to same factory

Ex2) Salmonellosis in Europe (contaminated infant formula), 2010-2019 ← outbreaks linked to same factory

Both events  
affected approx.  
100 countries  
worldwide