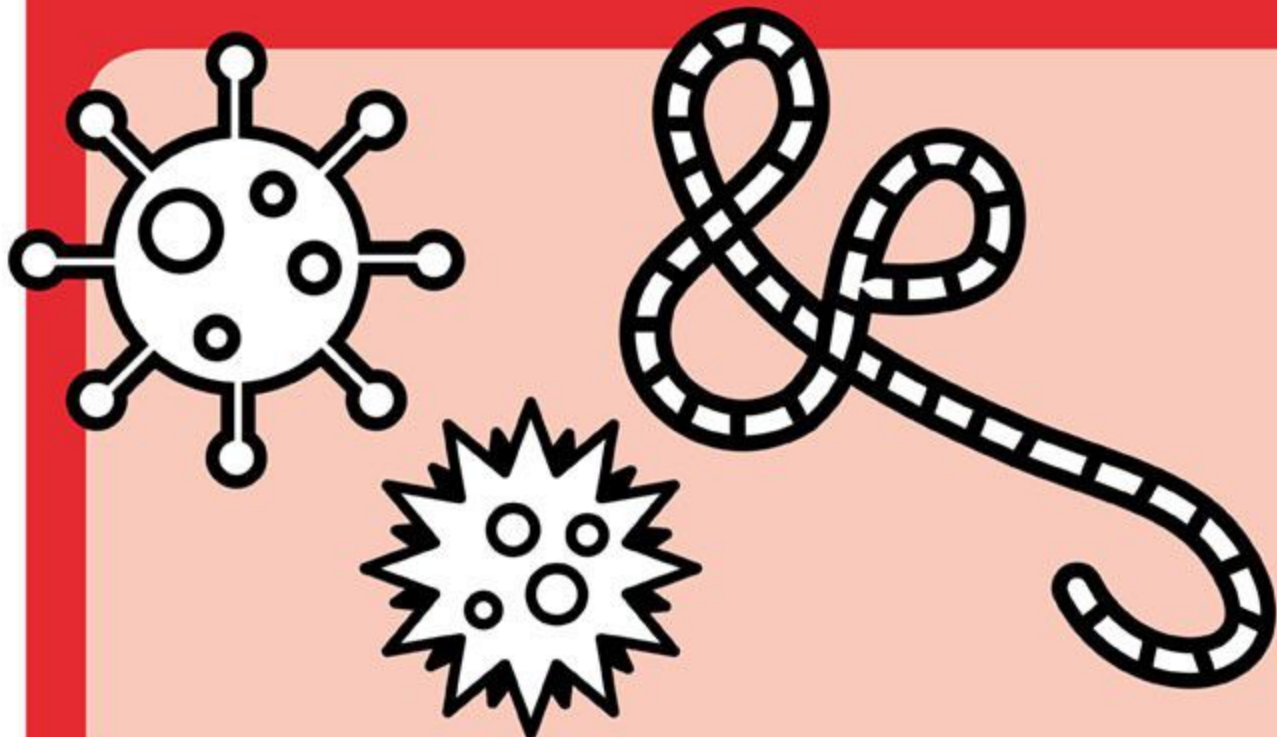


# Infectious diseases

A global crisis in need of new solutions



## Epidemic viruses

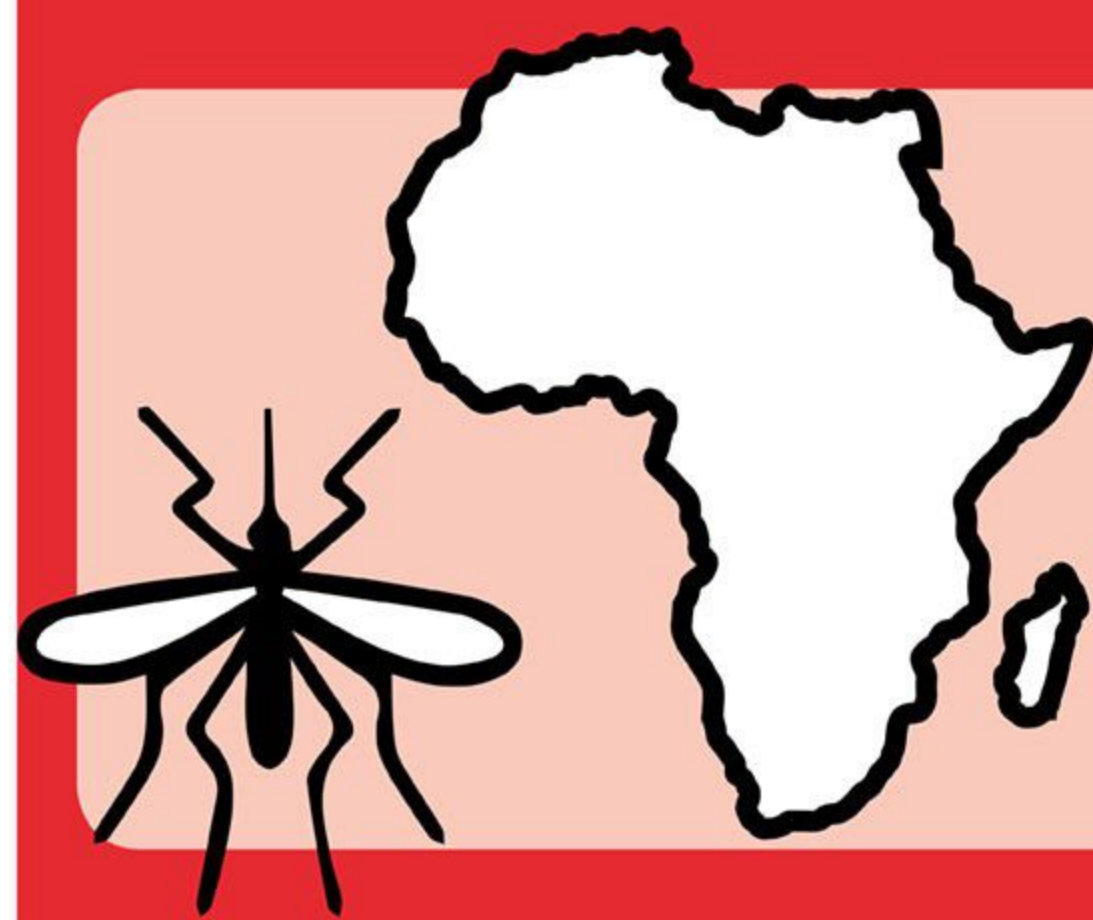
Influenza variants:  
H1N1, H5N1, H7N9  
ZIKA (2015/16)  
Ebola (2014-16)  
SARS-CoV-2 (2019/20)

## Antimicrobial resistances on the rise

EU: 25,000 deaths per year and 2.5m extra hospital days

USA: 23,000+ deaths per year and more than 2.0m illnesses

INDIA: 58,000+ babies died in one year; usually passed on from their mothers



## Poverty related diseases

Tuberculosis – 1.5m deaths per year

Malaria – 1m deaths per year

AIDS – 0.75m deaths per year

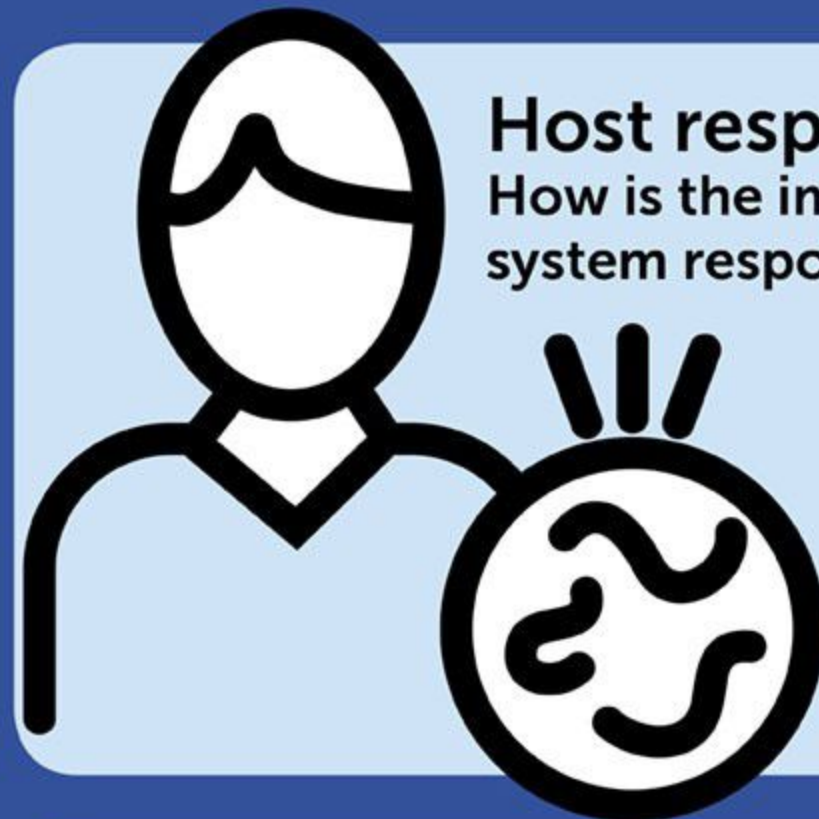
# How to prevent the next pandemic?

Photonic solutions for urgent questions in infection diagnostics



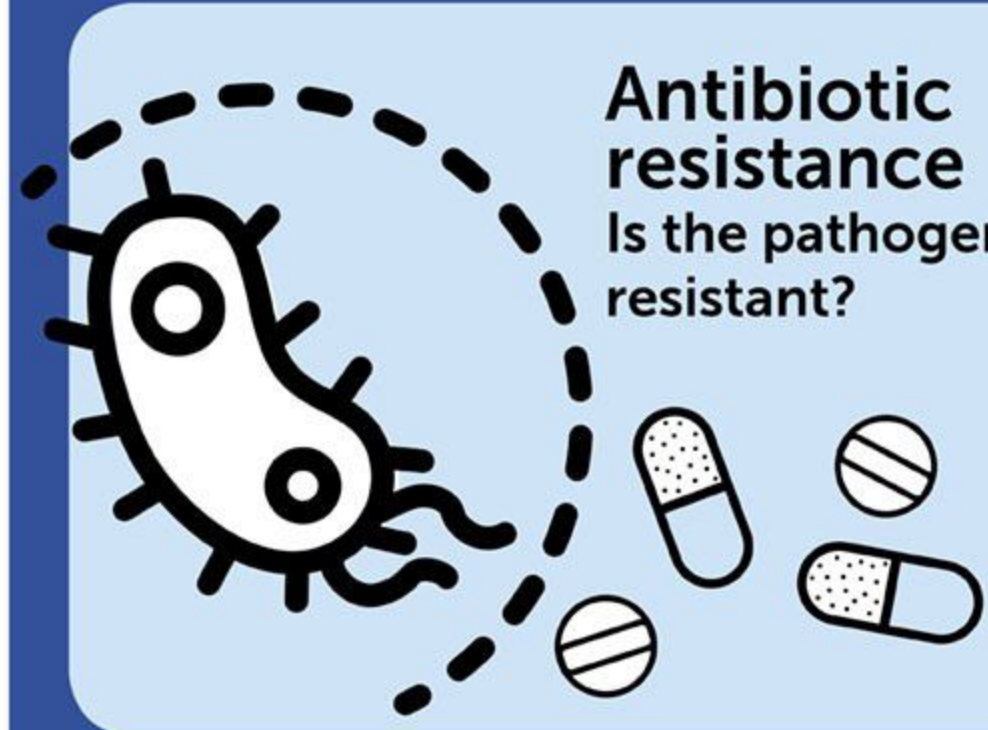
## Pathogen

Virus?  
Bacterium?  
Fungus?



## Host response

How is the immune system responding?



## Antibiotic resistance

Is the pathogen resistant?



## Best therapy

What is the optimal therapy?

Well-funded research in Photonics enables:

- Efficient & easy sample preparation
- Fast detection of pathogens
- Antibiotic sensitivity testing
- Early sepsis diagnosis
- Online monitoring of therapies

# Photonics in infection diagnostics

## Sample analytics

### Saliva/Swabs

- Spectroscopy
- Fluorescence-based methods

### Breathing gas

- FERS
- Chemiluminescence

### BAL

- Spectroscopy
- Fluorescence-based methods

### Blood

- Cytometry
- Spectroscopy

### Urine/Feces

- Spectroscopy
- Fluorescence-based methods