Surveillance of Infectious diseases in Europe: The role of ECDC

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2003 SARS
Epidemics still happen

• **SARS** in 2003 spread internationally with an alarming speed.


• In June 2009, WHO confirmed the **A(H1N1)** influenza epidemic as a global pandemic.

• **Ebola** outbreak in West Africa 2013-16.
• **Zika** virus disease epidemic.
• The **HIV** epidemic is still ongoing.
• **Measles** outbreaks have been ongoing in different European countries since 2016.
• **West Nile Virus** in 2018
• **Ebola** outbreak in DRC 2018 - ongoing
Major Emerging and Reemerging Infectious-Disease Outbreaks, Epidemics, and Pandemics, 2002 through 2015

Severe acute respiratory syndrome (SARS)
Started in China

Chikungunya Outbreaks

Zika virus
Yap Island, Federated States of Micronesia

Cholera
Zimbabwe

Cholera
Haiti

H1N1 influenza
Outbreak

Measles
Democratic Republic of Congo

Middle East respiratory syndrome (MERS)
Outbreaks


Figure I: The Global Risks Landscape 2018

Insight Report:
The Global Risks Report 2018
13th Edition
Drivers of disease outbreaks

21\textsuperscript{st} century disease trends

Changes present microbes and vectors with new opportunities:

- Globalisation of travel and trade
- Climate change
- Antimicrobial resistance
- Vaccine hesitancy and refusal
- Intentional use of biological agents (e.g. anthrax)

EU Member States

- 28 EU Member States
- 503 Million habitants
- 24 official languages
Public health in the EU

Member State competence:
• Organisation of healthcare
• Health prevention
• Public health emergencies

EU competence:
• Ensure a high level of human health protection
• Complement national public health policies
• Cross border health threats

Basis for EU legislation on communicable diseases
EU legislation on communicable diseases

Decision Cross-border health threats
- Epidemic surveillance for communicable diseases
- Early Warning & Response system
- Preparedness
- Coordination

Non-legally binding Legislation
- Use of antimicrobial agents in human medicine
- Patient safety, incl. healthcare-associated
- Council recommendations on seasonal influenza

Regulation establishing ECDC
- Mission
- Core functions
- Governance
ECDC - EU Decentralised Agencies

EU Agencies

- Technical, scientific or managerial tasks
- Pooling technical & scientific expertise
- Help the EU institutions making & implementing policies
- Own budget
- De-centralised, technical body for specific area slightly outside government sphere
- Providing EU institutions and countries with specialised knowledge
- With a certain degree of independence
- Own budget
Our mission

To **identify, assess and communicate** current and emerging threats to human health from **communicable diseases**;

In the case of other outbreaks of illness of unknown origin which may spread within or to the Community, the Centre shall act on its own initiative until the source of the outbreak is known.

**No risk management!**
Dissociation needed to preserve the precautionary principle and safeguard from conflicts of interests
• A decentralised EU Agency
• Established in 2005
• Budget 2018 EUR 58 M
• Staff: 280
Core functions of ECDC

- Disease surveillance
- Epidemic intelligence
- Risk assessment
- Scientific advice and guidance
- Preparedness and capacity strengthening
- Response support
- Training
- Communication
  - Eurosurveillance

Disease programmes:
- Antimicrobial resistance and healthcare-associated infections
- Emerging and vector-borne diseases
- Food- and waterborne diseases and zoonoses
- Influenza and other respiratory viruses
- Microbiology
- Tuberculosis
- HIV, sexually transmitted infections and viral hepatitis
- Vaccine-preventable diseases
The Preparedness Cycle

**Anticipation – Response – Recovery**

*A quality improvement cycle for Public Health Emergencies*

**Anticipate**
- Mapping, assessing and prioritising risks and vulnerabilities
- Conduct routine active surveillance
- Supporting strategic preparedness planning
- Strengthening cross-border and cross-sectoral collaboration
- Simulation exercises
- Capacity building

**Respond**
- Early warning and epidemic intelligence
- Rapid risk assessments
- *Ad hoc* technical guidance
- Field support

**Recover**
- After-event reviews (critical incident reviews)

**Buzz words:**
- “Generic”
- “Interoperability”
- “Cross-sectoral”
- “Multidiciplinary”
Surveillance: Disease and event monitoring

TESSy
Disease monitoring → Cases
- collect, analyse, interpret
- assess
- investigate

EWRS
Event monitoring → Events
- capture, filter, validate
- disseminate

Signal
Alert
Communicate
and control
### TESSy: The European surveillance system

**Data upload and access by Member States.**

- **Data upload** by Member States
- **Data access** by
  - Data users in Member States
  - National institutes
  - Disease experts
  - General public
  - Advisory Forum members
  - Management Board members
  - WHO
  - EMCDDA
  - EFSA
  - Others

**Diseases**

- Anthrax
- Avian influenza in humans
- Botulism
- Brucellosis
- Campylobacteriosis
- Chikungunya
- Chlamydia infections
- Cholera
- Cryptosporidiosis
- Dengue
- Diphtheria
- Echinococcosis
- Giardiasis
- Gonococcal infections
- Hepatitis A
- Hepatitis B
- Hepatitis C
- HIV infection
- Infection with enterohaemorrhagic E. coli
- Infections with haemophilus influenzae group B
- Influenza – including influenza A(H1N1)
- Invasive meningococcal disease
- Invasive pneumococcal disease
- Legionnaires’ disease
- Leptospirosis
- Listeriosis
- Lyme neuroborreliosis
- Malaria
- Measles
- Mumps
- Pertussis
- Plague
- Poliomyelitis
- Q fever
- Rabies
- Rubella
- Salmonellosis
- Severe Acute Respiratory Syndrome (SARS)
- Shigellosis
- Smallpox
- Syphilis
- Tetanus
- Toxoplasmosis
- Transmissible spongiform encephalopathies
- Trichinosis
- Tuberculosis
- Tularaemia
- Variant Creutzfeldt–Jakob’s disease
- Viral haemorrhagic fevers
- West Nile virus infection
- Yersiniosis
- Zika

**Special health issues**

- Nosocomial infections
- Antimicrobial resistance
- Antimicrobial consumption

- 49 diseases
- Antimicrobial consumption, antimicrobial resistance and healthcare-associated infections
Process (= data flow)

**Collect, validate**

- EU/EEA Disease networks
  - Central database ("TESSy")
    - Web-based, protected
    - ~ 76 mio. records
    - Mostly annual uploads of case-based data

**Analyse, interpret**

- E.g. cases by
  - Country
  - Year
  - Age and gender
- Deviation from expected?
- Possible reasons?
- Public health implications?

**Disseminate**

- Surveillance Atlas for Infectious Diseases
  - Interactive
  - Basic overview per disease
  - Maps, charts, tables
  - Targets general professional public
- Annual epidemiological report
  - Short chapter per disease
  - Descriptive narrative
  - Targets general professional public
- Enhanced surveillance reports
  - One disease
  - Extensive data analysis (breadth rather than depth)
  - Mostly joint with other international agencies
  - Targets PH disease experts
- Scientific articles
  - One research question
  - In-depth analysis and discussion
  - Targets disease experts beyond PH

**Inform action**

- E.g. outbreak response
- E.g. targeted prevention
- E.g. new/revised policy
- E.g. further research

Data harmonisation through:

- Common case definitions
- Common variables
- Common reporting protocols
- EU/EEA external quality assurance (lab diagnosis, typing of pathogens)
Data for public health action

Annual Epidemiological Reports

Measles and rubella monitoring report

Surveillance ATLAS of Infectious diseases
Epidemic intelligence and Response

- Disease surveillance
- **Epidemic intelligence**
- Risk assessment
- Scientific advice and guidance
- Preparedness and capacity strengthening
- **Response support**
- Training
- Communication

Diagram:
- Indicator-based surveillance
- Event-based surveillance
- Signal
- Roundtable
  - Initial assessment
  - Not a threat
  - Investigation
  - Action plan
  - Enhanced support
  - Deployment
  - Situation report
  - Coordination

Process:
- Daily and weekly report
- Rapid Risk Assessment
- Internal response
- External request
  - Internal decision
Epidemic Intelligence activities at ECDC

- Number of emails/day (Active & Passive mailbox): ~ 100
- Number of webpages opened/day: ~ 1 000
- Number of articles screened/day: ~ 3 000
- Requests or comments from MS/day: 1-2

Social media
Epidemic Intelligence daily and weekly outputs

**Round Table Report**

**Communicable Disease Threat Report**
**Epi update**

**Rapid Risk Assessments**

**Annual threat report**

**Mass gathering**

**Support to travel medicine**

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**Critical events for preparedness**

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**Other outputs**

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Support to stakeholders

Examples of requests in 2018
• Malaria in Tripoli, Libya (European Commission)
• Plague in Madagascar (ECHO)
• Viral haemorrhagic fever in Africa (ECHO)
• Zika (Member State)
• Mass gathering FIFA 2018
EOC Response activities

Provide technical and logistics support to PHE teams and PHE activities as well as to ECDC teams deployed in the field

**PHE**
- 2017, Plague – Madagascar
- 2016, Zika – PHE level 1
- 2014, Ebola – PHE level 1&2
- 2013, H7N9 Flu – PHE level 1
- 2011, E-coli – PHE level 1
- 2009, H1N1 Flu – PHE level 1&2
- 2007, Tuberculosis – PHE level 1

**Missions**
- 2018, Ebola – DRC
- 2017, Plague – Madagascar
- 2016, Angola – Yellow fever
- 2015, Guinea – Ebola
- 2013, Madera – Dengue
- 2010, Haiti – Cholera
ECDC contribution to health security

Prevention
- Scientific research and guidance
- Health determinants
- Prevention guidance (AMR, VPD)
- Risk communication

Preparedness
- National risk assessments > preparedness priorities
- Preparedness plans
- Inter-operability of plans
- Intersectoral collaboration
- Training & Exercising
- Crisis management procedures
- COOP plans
- Evaluation

Early warning
- Epidemic Intelligence
- Risk Monitoring
- Rapid Alert
- Risk Assessment
- Public Communication

Surveillance
- EU Surveillance
- Support to Risk Management
- Outbreak Communication

Outbreak Response Assistance
- Outbreak investigation
- Mobilisation of networks
- Deployment of OAT

Recovery
- Guidance on rehabilitation/decontamination
- Crisis Mgt and Response Evaluation
- Lessons identified > After Action Review
- Update detection/response protocols

Anticipation | Response | Recovery
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Download the new ECDC Threat Reports App
Thank you!