PANDEM-2: an EU-funded project on pandemic preparedness and response

5.1.2e

NFP Webinar
April 22nd 2021

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 883285

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PANDEM-2
PANDEMIC PREPAREDNESS AND RESPONSE

Overview of the PANDEM-2 Project

- Project will develop **IT solutions** for efficient **EU-wide pandemic preparedness and response**
- Goal is to enable EU countries to **better prepare** for **future pandemics** and **improve response** when pandemics occur through **innovations in technology, training and cross-border collaboration**
- **Two year** project, **19 partners**, **13 EU countries**
  - Public health agencies: RKI, FoHM, RIVM, INSA, NIPH, THL
  - First responders: OeRK, ItRC, INEM
- **Budget €9.75M** in Disaster Resilient Societies thematic area of Security work programme

PANDEM-2's core objectives (1/2)

- Collate **pandemic-related data from multiple sources** (global, EU, national, regional, local, online) **into a coherent pandemic-management database**
- Provide **single dashboard using state of the art visual analytics tool** where data can be queried, analysed and interpreted to support decision-making by planners and policy makers.
- Develop **new modelling tools to better manage pandemic-related resources**, e.g. hospital beds, ventilators, PPE and vaccines, nationally and across borders

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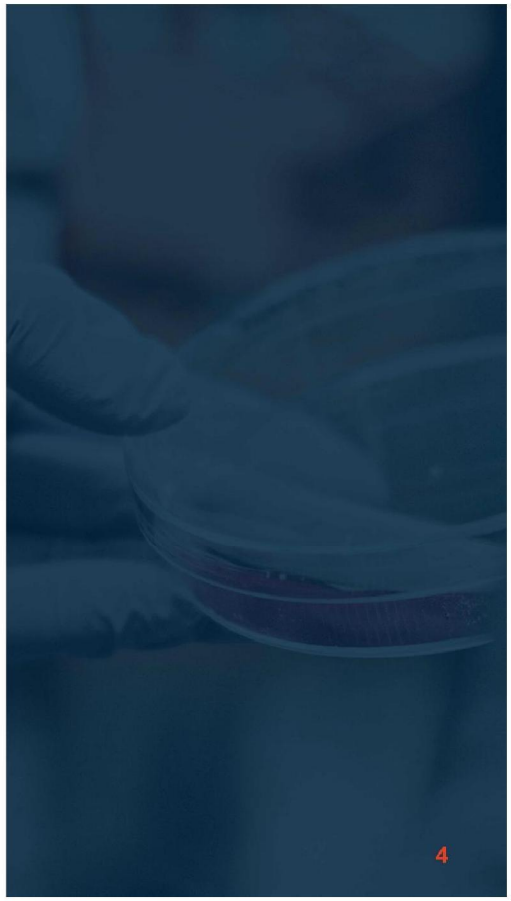
PANDEM-2's core objectives (2/2)

- Develop **communication tools and strategies to support real time exchange of information, opinion and advice** between public health agencies, health care providers, first responders and communities affected by a pandemic
- Develop a **training and simulation component** to be used by agencies for tabletop exercises to strengthen preparedness capacity for cross border pandemic response through large-scale demonstrators
- Deliver **long term value** in the areas of pandemic preparedness and response **beyond the lifetime of the project**



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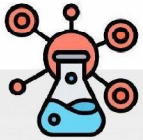
PANDEM-2 foundation

Project will incorporate lessons being learnt during the current COVID-19 pandemic



PANDEM-2 is based on the gaps and research priorities identified by the phase I project

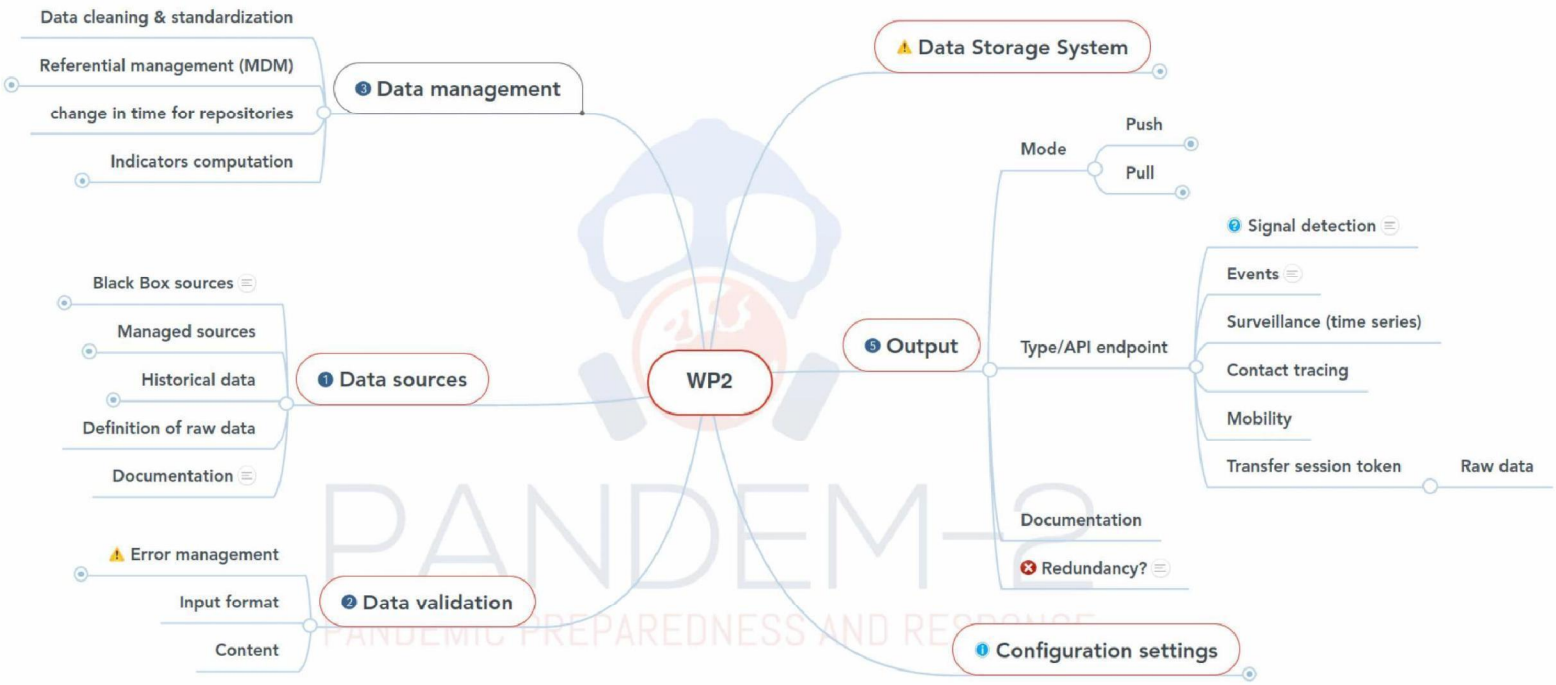
ECDC and WHO as members of the Advisory Board will help ensure EU investment builds on existing solutions

PANDEM-2 will also build upon the key insights and lessons learned in several previous and current EU-funded projects including iMOVE, EuroMOMO, SHARP, Healthy Gateways, PandHub, MOOD, NO FEAR, VEO and PHIRI

PANDEM-2 project structure

PANDEM-2: Surveillance (WP2): Objectives

Identification, description, selection of **surveillance systems and analytic tools** adapted to monitor pandemics (task 2.1)	• Report- List and attributes of identified sources and tools **Tools adaptation** (e.g. Epitweetr, signal detection)
Strengthening **participatory surveillance** systems (task 2.2)	• Adaptation of influenzanet network to **monitor pandemic among individuals not seeking medical assistance Include new events under surveillance**
Development of **novel text mining** to support community/participatory surveillance (task 2.3)	• Software for the **analysis of unstructured text data** from social media venues, for **signals detection** and to identify spread of disease • **Sentiment and emotion analysis**
Identification and mapping of laboratory data including Next Generation Sequencing (NGS) data (task 2.5)	• Review of literature: Sample type, preanalytical steps, NGS, **Bioinformatics analysis** • **Useful indicators** for early detection (NGS) and monitoring (WGS) • **Proof of concept: CORONAVIRUS** (Monitoring – virus)
Integration of **data sources** into a database and adaptation/development of **analytic tools** to generate indicators for pandemics monitoring to be used in **WP3** (task 2.4 and 2.6)	• **Software development** for data base creation Data management plan (metadata)



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Data sources
Traditional – non traditional surveillance

Surveillance - traditional sources
TESSY
Manual upload from countries
Influenza net
MOMO
Flunet
Bioscomsc (Ro, Effective Potential Growth)
Contact Tracing
GO.DATA – API
Contact Tracing Manual upload

Surveillance - non traditional sources
Early detection & monitoring (Human) (RSS) PROMED, Health Map, European Media Monitor, GPHIN, EIOS
Early detection & monitoring (Animal) (RSS) EMPRES-i FAO, VECTOR NET
Social Media
Integrate NUIG algorithms
Epitweetr – API
Reddit API
Signal detection

Data sources
Other sources

Other sources
Lab Surveillance and monitoring
Manual Upload
UC Luvain Black box source (NGS - WGS - RT - PCR)
TESSY lab data
Weather & climate
Weather monitoring (NOAA, NASA)
Disasters (relief web (OCHA))
Mobility
Flights (API)

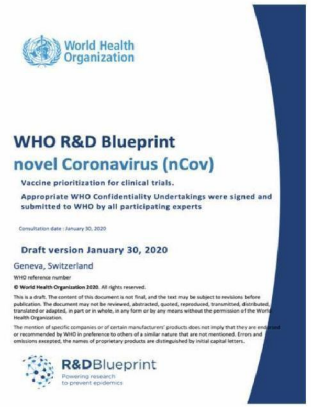
Other sources
System capacity
Staff (manual upload, Eurostat, TESSY)
Resources (manual upload, Euorstat, TESSY)
Countrameasures / communications
Social media interventions (manual, ECDC, epitweetr)
Non-pharma interventions (manual, ECDC, epitweetr)
Vaccines roll-outs (manual, ECDC, epitweetr)
Repository
Research (last publications & ongoing initiatives)
Training (Training material & exercises)
Policy (static content on Dashboards)

Prioritized Diseases

WHO R&D Blueprint

*prioritization reviewed in 2018

1) Crimean-Congo haemorrhagic fever,
2) Ebola virus and Marburg virus disease,
3) Lassa fever,
4) MERS and **SARS**,
5) Nipah and henipaviral diseases,
6) Rift Valley fever
7) **Zika virus** disease
8) **Disease X**



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MOOD H2020 project

1) Influenza (all virus types) for airborne pathogens;
2) Tick-borne encephalitis and Lyme borreliosis (endemic pathogens transmitted by endemic vectors);
3) West Nile and Usutu viruses (exotic pathogens transmitted by endemic vectors)
4) Chikungunya, dengue and **Zika viruses** (exotic pathogens transmitted by invasive mosquito)
5) Tularaemia and leptospirosis (neglected endemic pathogens with multiple transmission routes and reservoirs;
6) Antimicrobial resistant bacterial strains (complex, anthropogenic threat)
7) Unknown pathogens (**disease X**) as a challenge for any epidemic intelligence system. **COVID-19** as a case study.

Opportunities - Relevant collaborations (ECDC - WHO)

› **ECDC:**

- **Epidemic Intelligence team** (5.1.2e , 5.1.2e) → supporting in **filter and integrate multisource information (EI daily tasks) + integrate tool (Epitwiteer, signal detection, etc.)**
- **Surveillance Section** (5.1.2e , 5.1.2e) → **some PANDEM2 data/indicators integrated into the TESSY platform?** / Monitoring and evaluation framework for COVID-19 response activities in the EU/EEA and the UK (ECDC)
- **Emergency Preparedness and Response Section** (5.1.2e , 5.1.2e) → **WP6, training / WP4 pandemic planning**

› **WHO**

- **Epidemic Intelligence from Open Sources (EIOS)**: **One Health approach to early detection, verification, assessment and communication of public health threats using publicly available information**. ProMED, HealthMap and the Global Public Health Intelligence Network (GPHIN), and collaboration between WHO and the Joint Research Centre (JRC) of the European Commission (EC) → **data and code sharing, software development (build data federation)**

Opportunities - Relevant collaborations (research consortiums – H2020)

- **PHIRI** is the implementation of the **research infrastructure on population health information** to facilitate and generate the best available evidence for research on **health and well-being of populations as impacted by COVID-19**. → i) Metadata templates: Pandemic related data, ii) Building a federated infrastructure for data sharing at EU level, iii) COVID-19 impact use case, iv) training material

- **MOOD project :** aims to develop **innovative tools and services for the early detection, assessment, and monitoring** of current and future infectious disease threats across Europe in the context of continuous global, environmental, and climatic change. → i) Building disease profiles, ii) data standarization and Integration, iii) pandemic managers engagement - feedback on utility

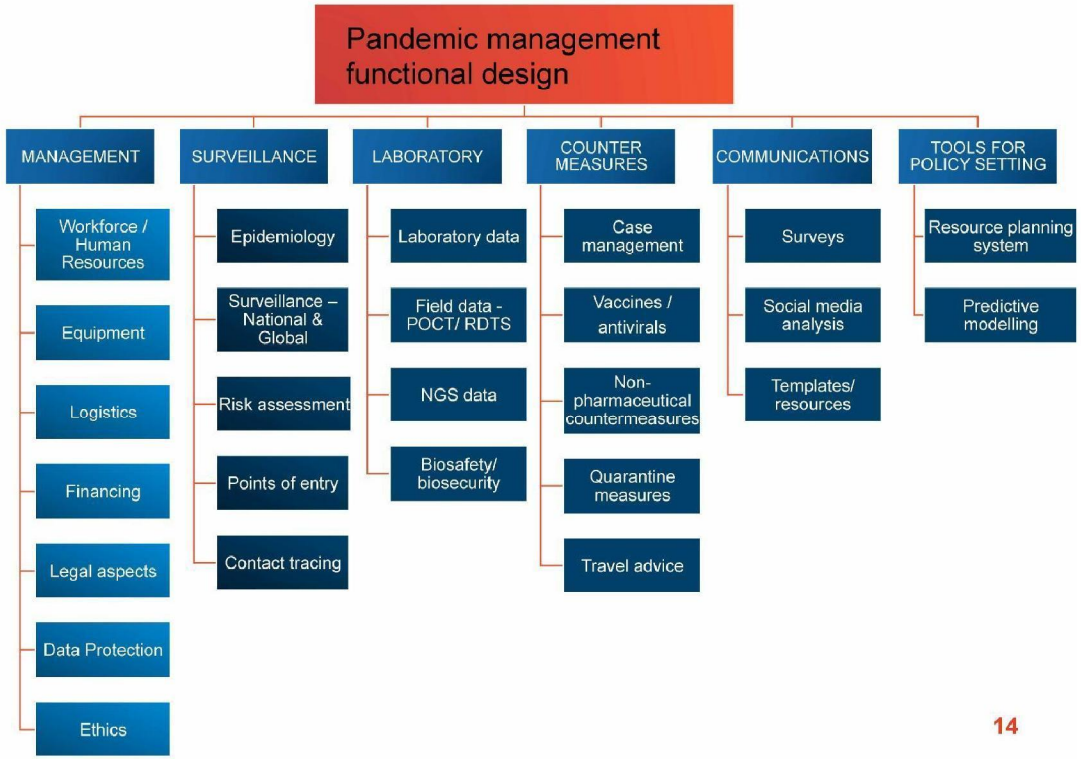
- **Versatile Emerging infectious disease Observatory (VEO)** early warning, risk assessment and monitoring of emerging infectious diseases (EIDs) and antimicrobial resistance (AMR).

- **European COVID-19 Data Platform** (facilitates data sharing and analysis in order to accelerate coronavirus research)

PANDEM-2: Situational awareness (WP3) - Dashboard
Decision support tool for pandemic preparedness, response and recovery

Flexible architecture
- Focus on use by public health agency in member states

Emphasis on
- Situational awareness
  - Surveillance
  - Contact tracing
- Scenarios Modelling
  - Resource planning (workforce and material)
  - Surge capacity
- Interventions and countermeasures
  - NPI – stay at home orders, quarantine, travel ban, border closures
  - Vaccines, PPF, diagnostics



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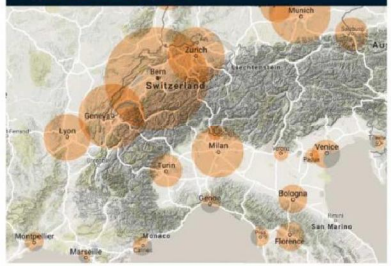
PANDEMIC EVENT - DASHBOARD

NAME OF PATHOGEN: COUNTRY:

DATE OF FIRST CASE INTERNATIONALLY: DATE OF FIRST CASE IN COUNTRY:

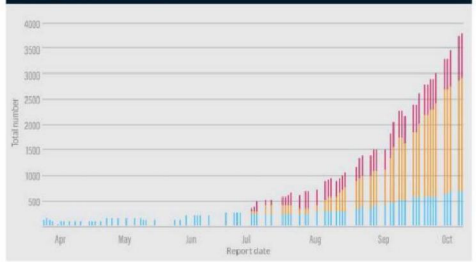
PROJECTED SPREAD



RESOURCE PLAN

SIT REP

TREND FORECAST



CASES AND KPIs

Cases who have died	Cases currently hospitalised	Cases with less than 2 contacts	Cases refusing to be transferred to a treatment unit
2	1	25	1

New cases in the previous 2 days among known contacts	Cases with pending lab results	Cases not identified through contacts
0 / 0	3	16

New cases in the previous 2 days in known transmission chains
0 / 7

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PANDEM-2: Pandemic planning (WP4) – led by 5.1.2e 5.1.2e , 5.1.2e , NUIG

- Predictive Modelling - *an integrated library of disease transmission prediction models with spatial and age cohort dimensions to model the progression of an outbreak in different locations and under different conditions*
- Resource Planning System - *simulation tool that can be used for capacity analysis and identification of resource coverage deficiencies in the context of a pandemic*
- Toolkit with guidelines, protocols and resources on biosafety and biosecurity for first responders, clinical staff and laboratory personnel during cross-border responses

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PANDEM-2: Communications (WP6) – led by [redacted]

- Current gaps:
  - Getting **accurate real time** information and advice to the right people at the right time during a pandemic is a critical challenge
  - **Skilled communication** is essential to maintain public support and trust during a pandemic esp when policy changes are necessary
  - Current practice for assessing **public opinion and sentiment** relies on **surveys of representative samples** of the population
  - Opportunity to assess the use case of COVID-19 for pandemic communications by analysing **social media data** eg Epitweetr, Reddit
  - Need to invest in **two-way communication** with the public to assess support for pandemic interventions

- PANDEM-2 is:
  - Developing **communication tools and strategies** to **support real time exchange of information, opinion and advice** between public health agencies, health care providers, first responders and communities affected by a pandemic building on COVID-19 and adapting solutions from other sectors eg crisis management, aviation
  - Developing **novel concepts and technologies** for **two-way communications** with the public
  - Developing **training material** for **stakeholders** on **effective pandemic communication**

PANDEM-2: Training & Simulation (WP6) – led by 5.1.2e

- **PANDEM-2 Goal:** strengthen cross-border, inter-organisation communication and shared response to serious cross-border threats to health.

- **Establish an EU-wide, cross-sectoral network of key pandemic stakeholders**
  - Develop a networking group to ensure results of PANDEM-2 project are widely used with high impact

- **Training protocols, design and evaluation of simulation exercises**
  - Creation and demonstration of three scenarios based on real pandemic events from peacetime planning to response to post-pandemic recovery in real world setting of Public Health Emergency Operation Centre
  - Testing and evaluation of PANDEM-2 dashboard and tools

- **Operational strategy development**
  - Working with DGs SANTE, HOME and ECHO, ECDC, WHO & stakeholder partners to determine practical implementation of PANDEM-2 outputs

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ECDC members of the PANDEM-2 Advisory Board

5.1.2e

5.1.2e

The PANDEM-2 Team

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National Institute for Public Health and the Environment Ministry of Health, Welfare and Sport | C.C.I.C.C. Carr Communications International Communications Consultants | THL National Institute for Health and Welfare | INSB | Robert Koch Institut

Radboudumc | Clarisoft | Österreichisches Rotes Kreuz Aus Liebe zum Menschen. | Epiconcept Group | INEM

Trilateral Research | ISI ISI Foundation & ISI Global Science Foundation | Croce Rossa Italiana | Instituto Nacional de Saúde | PANDEM-2 Pandemic Preparedness and Response

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PANDEM-2 team

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