

## D6.3 Initial assessment of member states surveillance systems and needs assessments

### UNITED FOR SURVEILLANCE IN EUROPE

JOIN THE MISSION TO BE BETTER PREPARED FOR FUTURE CROSS-BORDER HEALTH THREATS



Representing 24 countries in Europe, UNITED4Surveillance gathers expertise in public health, clinical microbiology, epidemiology and data-science to support the strengthening of integrated surveillance systems for infectious disease prevention and control on national and European level

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## 1. Executive summary

One of the major lessons learnt from the COVID-19 pandemic is that structural improvements of surveillance and monitoring strategies are needed to guarantee prompt detection and identification of cross-border health concerns, therefore allowing quick and effective interventions. Therefore, the UNITED4Surveillance scope will be to define a roadmap for future implementation in each MS and pilot the most promising strategies for an integrated surveillance system at the European level. For this, several gaps need to be tackled for improving preparedness to future emerging health threats. These needs and gaps analysis have been performed earlier within UNITED4Surveillance for the WPs concerning “outbreak detection”, “hospital surveillance” and “One Health”. This deliverable report provides an integrated assessment of common challenges and needs across these surveillance pillars.

The main challenge from a technical point of view is that, since there is a strong need for inter-disciplinary approaches where data from different sources is integrated, there is a strong need for the development of robust data infrastructures to collate and process data streams increasing in number, size and frequency, in particular in the context of genomic data. This requires digitalization and standardization across the whole chain of data-providers. Setting-up such infrastructures requires a modern vision on data-handling and storage (incl. cloud-based), state-of-the-art automated analysis algorithms, and application of commonly agreed data standards. This all requires leadership with a joint vision including all stakeholders and strategy working towards this goal, including requirements such as mandate for data centralization and a steady funding source. Although clearly technical aspects regarding improved digitalisation, upgrading of ICT systems, etc. are important needs raised over the different surveillance pillars, the legal problems stand out regarding their impact on slowing down (or even be counter-productive to) the improvement of surveillance systems in the broad sense. We strongly advice a supra-national network of legal professionals with specialization in public health in order to reach more common understanding and interpretation of the GDPR in relation to infectious disease surveillance and control. Another over-arching key need is strong central leadership with a clear vision on the changes needed in order to realize strong integrated trans-disciplinary surveillance system. Without that there is a strong risk of parallel and diverging initiatives.

## 2. Description of task

The main goal of Joint Action UNITED4Surveillance is to support European Union (EU) Member States (MS) in strengthening national integrated surveillance systems and scaling-up to EU level and to improve national surveillance systems by integrating different sources of electronic health data and digital registers/databases, thereby enhancing EU/European Economic Area (EEA) surveillance system. One of the stages of achieving this is to assess the current state of different surveillance systems, and identifying needs and gaps. Within the technical WP2 “Outbreak detection”, WP3 “Hospital Surveillance” and WP4 “One Health” a detailed assessment was made which cumulated in 3 separate deliverables.

This deliverable integrates the gaps and needs analysis over these WPs and describes overarching commonalities in these needs and gaps. In addition, suggestions to achieve improvements are made.



## 3. Description of work & main achievements

### 3.1 Background of the task

One of the major lessons learnt from the COVID-19 pandemic is that structural improvements of surveillance and monitoring strategies are needed to guarantee prompt detection and identification of cross-border health concerns, therefore allowing quick and effective interventions. The implementation of an EU-wide surveillance system depends on the alignment of the readiness level of all countries as current obstacles include interoperability between national systems, integration of epidemiological data at the national level and lack of full digitalisation of health records. Given the complex differences between MSs, it was deemed unfeasible to design and implement a new integrated surveillance system in only three years. Therefore, the UNITED4Surveillance scope will be to define a roadmap for future implementation in each MS and pilot the most promising strategies for an integrated surveillance system at the European level. For this, several gaps need to be tackled for improving preparedness to future emerging health threats. The gaps and needs identified in the separate WPs (WP2 “Outbreak detection”, WP3 “Hospital Surveillance” and WP4 “One Health”) form the basis of specific pilots in these WPs. Ultimately the results of the pilots will provide the basis for the roadmap towards improved surveillance systems.

The main aim and activities of technical WPs are the following:

- WP2 “Outbreak detection” aim is to support outbreak detection and pandemic preparedness by improving real time surveillance for a timelier coordinated response. By improving national surveillance systems, the goal is to strengthen overall surveillance in Europe. WP2 „Outbreak detection“ WP is structured in:
  - Task 1 „Improving Laboratory-Based Reporting“ with the following subtasks:
    - Subtask 1 “Needs and gap analysis & relation to national policies” intended for description of the participating countries’ laboratory surveillance system, including technical, legal, organizational and financial aspects, national policies and challenges with respect to reporting.
    - Subtask 2 “Data standards” intended for development a logical, i.e. theoretical, data model for genotyping/subtyping, covering the range of possible reporting forms and corresponding use cases from molecular detection (PCR) and complete genome sequence to individual allele sequences, as well as relevant classifications based on that.
    - Subtask 3-6 “Pilots of solutions in the MS”.
  - Task 2 „Outbreak & Signal Detection“ with the following subtasks“:
    - Subtask 1 “Review of outbreak detection activities” intended using the survey to Identify gaps and needs in detecting outbreaks from routine surveillance data, define common terminology for different aspects of surveillance data and outbreak detection, specify common use cases for outbreak detection.
    - Subtask 2 “Benchmarking of outbreak detection methods” intended for development an evaluation framework that allows a fair and useful comparison of outbreak detection methods for different use cases, including the use of several appropriate performance metrics. Evaluation of outbreak detection methods on a diverse set of datasets either through data sharing or federated evaluation.

- Subtask 3 “Tool development” intended for development of tools for outbreak detection and evaluation.
- Subtask 4 “Piloting and training” intended for deployment of the developed tools in order to identify the most relevant outbreak detection methods for the local situation of the piloting systems, regular use and evaluation of the outbreak detection methods, reviewing results, experiences and tools to summarize in teaching materials and provide training for interested member states.
- WP3 “Hospital Surveillance” aim is to build a foundation for timely, comparable, and representative surveillance of severe infections leading to hospitalization in each MS. The goal of WP3 is three-fold: to assess, and with time, to overcome legal and technical barriers, to improve the representativeness and timeliness of surveillance, using only electronic reporting in Member States relying on sentinel-based approach, to integrate clinical information on hospitalised patients (syndrome) with microbiological data in Member States with nationwide digitalised surveillance systems. This is structured in:
  - Task 1 “Establishing or improving sentinel-based electronic surveillance of serious infectious diseases or syndromes from hospitals in the participating Member States”.
  - Task 2 “Integrating clinical information on hospitalised patients with microbiological data (typing and microbial resistance) in Member States using nation-wide register based public health surveillance.
- WP4 “One Health” aim is to support EU MS and JA partner countries in developing One Health surveillance structures with integration of data/signals from the human, animal, and environmental domains to enhance i) the capability of detecting (re)emerging pathogens with zoonotic potential and performing public health risk assessments, ii) source identification of outbreaks, and iii) research into targeting interventions. According to this scheme, the work of this WP is organized over 3 tasks focusing on foodborne disease, zoonotic influenza, and vector-borne disease. All tasks will contain the following subtasks:
  - Subtask 1 “Goal description and stakeholder analysis”.
  - Subtask 2 “Systems mapping of current and desired situation”.
  - Subtask 3 “Piloting promising approaches”.

In order to effectively improve surveillance systems, it is important to understand commonalities in the needs and hurdles that are encountered in improving these systems. Tackling these common issues in an integrative manner is more effective than doing this within separate WPs since similar solutions may apply to different surveillance activities/systems.

### 3.2 Description of the work carried out

The deliverables regarding current state assessments and the identification of needs and hurdles regarding laboratory-based reporting / outbreak detection, hospital surveillance, and One Health were analyzed in order to infer commonalities. It involved the following deliverables:

- D2.1. Review/ Inventory of existing (i) laboratory surveillance systems and (ii) outbreak detection systems or methods of participating countries, including needs and gaps, and description of planned pilots.
- D3.1. Report on the member states survey and description of piloting plans.

- D4.1. Inventarisation of goals, stakeholders and One Health systems in member states.

For more detailed information we refer to these separate deliverables.

Here we provide summaries of the needs and gaps analysis of the separate WPs and a synthesis of common needs and gaps structured in 3 main categories: i) technical, ii) policy and organization, and iii) legal.

### 3.2.1 Summaries of needs and gaps analysis

#### 3.2.1.1 Improving Laboratory-based reporting

The survey was conducted between March – July, 2023. The survey was distributed to one selected country contact point of all 25 countries that were part of the consortium of UNITED4Surveillance at the time of circulation. The data provided by 23 countries was analyzed.

- The survey highlighted that about half the countries experience challenges with legal aspects around laboratory data sharing, ranging from some to a very large extent.
- Four countries (17%) currently do not assess the risk of identification of an individual based on lab surveillance data and half of the respondents (n=12; 52%) reported having limited or no legal expertise at the National Institute of Public Health level to assist with setup and maintenance of laboratory-based surveillance.
- There was substantial variation in the legal basis used for processing laboratory-based surveillance data between countries.
- More than half the countries experience difficulties to some or to a large extent in meeting training needs for laboratory-based surveillance (n=13; 57%).
- The number of organizational units at the NIPH involved in laboratory-based surveillance varied between countries, ranging from one to seven with a median of three units.
- In addition, fourteen (61%) countries listed specific measures taken to attract and retain talent in the area of laboratory-based surveillance.
- Although all countries used data standards, these varied widely between countries. Of the (international) data standards surveyed, more than half the countries (n=13; 57%) reported using other standards, including national ones, followed by the ICD reported by eleven countries (48%). The median number of data standards used in countries is two, with a range from one to six.
- The 23 respondent countries most often use paper-based reporting for the 21 pathogens surveyed (n=177), followed closely by machine-to-machine upload reported in 157 instances.
- Although it was shown that the majority of countries have stable funding to some extent to maintain laboratory-based surveillance at the national level, some countries are facing larger challenges with no or little stable funding in place. Another finding was that local laboratories in the majority of countries receive no or little compensation for infrastructures used for laboratory surveillance or for sending samples and/or data.

#### 3.2.1.2 Outbreak detection

The survey was conducted between April - May, 2023. The survey was distributed to one selected country contact point of all 25 countries that were part of the consortium of UNITED4Surveillance at the time of circulation. The data provided by 21 country was analyzed.

- The findings reveal a heterogenic landscape, with countries already using automated outbreak detection tools, not using any method of automated outbreak detection or being at different stages



of planning to implement chosen methods. While only three countries have tools in place, the implementation of tools is planned in 10 countries. The reported surveillance systems, which would be suitable for automated outbreak detection, include sufficient historic data, daily and case-based reporting and additional information on cases. This demonstrates the need, interest and potential in MS for automated outbreak detection tool and supports the overall aim of the activities.

- The existing tools predominantly consist of self-implemented scripts utilizing some established methods specifically tailored for the local context and system. Drawing from the survey results and the subsequent workshop on outbreak detection use cases (with the objectives to review existing outbreak detection systems and discuss gaps and needs, to identify relevant use cases for outbreak detection and to discuss next steps and the pilot phase) discussions, it is evident that collaborative efforts are crucial to navigating the complexities of implementing and refining automated outbreak detection tools for different systems across countries.
- Insights into the various forms of output data and how signals are presented, highlighted also the different preferences, priorities and the need for flexible outputs provided by the tool. Additionally, in most of the countries an assessment of feedback mechanism via communication means or reporting about outbreaks takes place, while there is not always a comprehensive and systematic way of evaluation methods in order to implement changes and improvement.
- Further, the survey and workshop discussion showed that the implementation of an automated outbreak detection activities in MS are not systematically embedded in surveillance systems and overall surveillance strategies and therefore lack adequate and sustainable funding, staff and expertise, making this activity vulnerable to deprioritization or discontinuation if challenges such as change of staff or increased workload arise.

### 3.2.1.3 Hospital surveillance

The survey was conducted between March - April, 2023. The survey was distributed to active WP3 "Hospital Surveillance" partners.

- All systems, except one, were founded on some form of a national legislation, and eight systems out of the participating 15 operate under permanent basis. Most countries reported the need for improved or new legislation in the future.
- The majority of the systems EU MS's reported are pathogen specific surveillance systems and not generic. Approximately half of the surveillance systems cover only COVID-19, two systems cover mainly COVID-19, influenza, and RSV, and the remaining systems cover a plethora of infectious diseases, including COVID-19.
- Nearly all systems rely on case notifications from clinicians, in addition to other data sources. More than half of countries informed about using the International Classification of Diseases to classify the cases in their respected surveillance systems (ICD-10).
- The type of data was individual (case-based) in all Member States, and in all countries except one the data could be linked, at least in theory, to other data sources, using a social security number or other identification.
- Specific medical data in many countries are not accessible in electronic form, or electronic patient data may not be available in a structured and standardized format.
- Delays cause problems for surveillance, as hospital registers coding is mostly done on discharge, not on admission. That leads to a considerable delay in serious events leading to long hospitalisations.
- Legislation is an issue for all countries. For the COVID-19 pandemic new national legislation was enacted, allowing linking of different data source, but this legal basis is temporary.
- Different interpretations of the GDPR in MS.
- Lack of ICT and EHealth competence and resources make it difficult to digitalize surveillance and employ IT-specialists.

- Importance of reliable infectious disease surveillance is not prioritised by decision makers between the pandemics and therefore the resources are hard to obtain and there may not be a national plan for developing the surveillance further.
- For countries relying on clinical information, laboratory notifications of confirmed cases are a useful new data source.
- Data on all laboratory tests performed could be used to calculate the proportion of positive cases.
- Further typing of the microbe, test results of antimicrobial resistance, or genotyping information were identified for future use.
- Daily data on hospital outpatient visits and hospitalisations from hospital registers is valuable information for the surveillance of severe infections.
- In some countries hospital registers contain information on severity of the case, by including a marker for oxygen support or mechanical ventilation needed.
- More refined clinical information sources can be intensive care registers or registers containing prescribed medication.
- Electronic patient records can be used for detailed patient background information such as chronic diseases and conditions and medication history.

#### *3.2.1.4 Surveillance systems and need assessment: One Health*

Needs identified for One Health:

- Need for a cross-sectoral platform for data sharing, specifically sequence data. This would be a data platform where different stakeholders from the human, animal and environmental domain can share data (such as sequence data) with each other, possibly including some minimal metadata. Currently, most countries do not have such a system in place and data sharing occurs on an ad-hoc basis.
- More timely data and/or reporting sharing between the partners, preferably automated and fully digital. This will help to respond in time to public health threats of biological origin and more timely manage communicable diseases cases and outbreaks.
- Implementation of an early warning system to detect clusters of cases in the human or animal domain, or cross-sectoral clusters. Early identification and notification about communicable diseases cases and detection of the communicable diseases' clusters are crucial for the prevention, control and management of communicable diseases.
- Improved communication between sectors (i.e. human, veterinary, domain), and some countries also mentioned that communication with the general public should be improved
- The unclarity of legislation around data sharing between stakeholder, but also between sectors, was mentioned as a hurdle for the improvement for data sharing for surveillance.
- The uncertainties around funding of cross-sectoral data sharing were identified by some countries as a hurdle, specifically around the continuation of One Health surveillance projects after the funding from projects such as U4S stops.
- The need for strengthening core capacities (trainings related to food borne diseases outbreak management) of specialists working in different sectors (human and animal) that are working together using a One Health approach
- The need for review the legislation related to food borne diseases (incl. Salmonella) or vector borne diseases (incl. Tick-borne encephalitis) case and outbreak management, specifying (if necessary) activities and responsibilities, deadlines, information exchange procedures;

### 3.3 Integration of needs and gaps for improved surveillance systems.

This section describes commonalities on technical, policy-related and legal needs and gaps over the specific areas of laboratory-based reporting, outbreak detection, hospital surveillance and One Health.

#### 3.3.1. Technical gaps and needs

During the COVID-19 pandemic, we witnessed considerable improvement in surveillance to inform situational awareness through traditional and innovative methods. These advances consisted in tremendous scaling up of existing systems. This wealth of information must be appropriately and robustly handled, to present timely and relevant evidence. This includes the design of new methods to optimise the use of surveillance data (for example Wp2 outbreak detection methods). In addition, there is a strong need for inter-disciplinary approaches where data from different sources is integrated. This requires the development of robust data infrastructures to collate and process data streams increasing in number, size and frequency, in particular in the context of genomic data.

- It was observed that there is still a considerable lack of **digitalisation** in different areas of surveillance. As paper-based reporting affects timeliness of data sharing, efforts could be made to invest in further digitalization of reporting of other pathogens, as some countries have already mentioned to be ongoing or planned. **Cloud-based storage** of data is not currently used in any of the respondent countries. The reasons for this could be further explored and potential barriers addressed.
- There is a need to discuss about the replacement of the use of local codes with national and international classifications and terminologies. Binding EU/EEA working towards the use of common surveillance standards would aid interoperability
- There should be further investments in **infrastructure** (digital records and notifications, integrated genomic surveillance, surveillance of outbreaks and different surveillance tools and etc.). Molecular and genomic typing for surveillance not only remains to be rolled out to more diseases for which it adds European public health value, it also requires meaningful integration with epidemiological, veterinary and food as well as environmental data and careful calibration of the resulting public health response.
- The current surveillance systems have a significant gap in utilizing the laboratory detection data that is being collected, which could otherwise be used for more proactive and timely outbreak detection. Despite the ongoing collection of valuable laboratory data, the systems lack the integration of advanced outbreak detection algorithms, hindering its capacity to quickly identify and respond to emerging threats. It is important to move towards an objective-driven surveillance approach that integrates data collection with real-time outbreak detection algorithms to enhance early warning capabilities, improve response times, and facilitate targeted interventions for communicable diseases management.

#### 3.3.2. Policy and organizational related gaps and needs:

Above mentioned technical needs have a strong dependence on available resources.

- It is of importance to, besides ad-hoc budget built new infrastructure, obtain **steady funding** from national ministries in order to maintain a high-quality modern surveillance system.
- It should be increasingly realized that the public health infectious disease system spans wider the only the national Institute for Public Health and microbiological laboratories. Also, hospitals should increasingly be aware that they have an important role in public health and that sharing their data has mutual benefits. Similarly for partners in the One Health domain should acknowledge their shared

responsibility in controlling infectious diseases by sharing relevant data. This requires **building networks** where, besides technical solutions, **trust and a common vision** are vital for success.

Above mentioned points require national vision and leadership to ensure centralisation and sustainability of improved surveillance systems. This also requires investment in the whole chain of infectious disease surveillance and response, including medical laboratories, municipal health services, etc. Also, leadership should be employed to create joint commitment and perspective over disciplines (hospitals, One Health) in order to work towards trans-disciplinary integrated surveillance systems.

### **3.3.3. Legal related gaps and needs:**

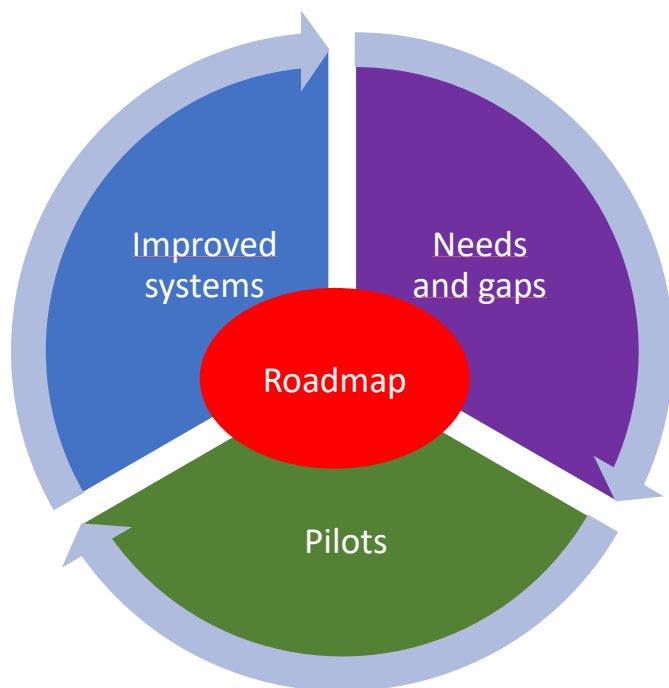
The GDPR (European Union, 2016) allows for national legislation to implement how personal data, including the special category of medical data, can be processed in the public interest, as is the case for surveillance of infectious diseases. Today's standard of prevention and control of infectious diseases requires that pseudonymized clinical microbiology laboratory data can legally be processed at the national level, by the national public health agency or equivalent, on the legal basis of a task carried out in the public interest (GDPR Art 6.1.e; (European Union, 2016). Although there is one GDPR law in the EU, there is wide variation among countries in the national interpretation and subsequent national law and procedures. Often this is based on an over-interpretation of what is *not* allowed. Since there can be **uncertainty on e.g. which legal basis can be used for surveillance**, the following actions could be considered to support EU/EEA countries in addressing their legal challenges.

- It may be useful to conduct an assessment at EU level of what is actually allowed under the GDPR and e.g. what jurisprudence and European Data Protection Supervisor guidance exists. For instance, an impact assessment could be made on how the rights and freedoms of individuals could be infringed by national-level processing of limited (pseudonymized) personal data for the purpose of prevention and control of infectious diseases. In other words, what is the probability and impact of identification of an individual based on these data and for a different purpose than intended. In addition, it should be assessed how *not* processing these data, or processing only anonymized data at national level, could harm the public interest. Special focus should be on 'special categories' of personal data like sexual preference, vaccination status, country of origin etc. which for some infectious diseases are crucial to know in order to advise of the most effective interventions.
- Similarly, this applies for potential economic impact on food and veterinary partners when sharing pseudonymized personal data. Finally, there is strong need for assessing for creating clarity on the sharing of surveillance data in public repositories (applies especially for genomic data).
- These gaps could be addressed by organizing trainings for legal professionals specifically on the legal aspects of public health, including the sharing of personal data and the special categories needed for public health (health data, sexual preference, genetic information). In its most accessible form, this could be a freely accessible tutorial, e.g. on the ECDC Virtual Academy, complemented by more in-depth training courses. Similar training for epidemiologists and microbiologists to understand the legal basis of surveillance might be useful as well.

Finally, it should also be remarked that the European Court of Justice, in its judgment of 26 April 2023 for case T-557/20 (Single Resolution Board vs European Data Protection Supervisor), may question that what is today considered pseudonymised personal data, such as laboratory-based surveillance data including only an identifier but no directly identifiable data, may in some cases be considered anonymous data, and as such not fall under the GDPR altogether. This important development should also be followed up closely.

### 3.4 Piloting plans

Above identified gaps and need will largely be explored in pilots conducted in different countries for the different surveillance activities. This will result in a roadmap on how to best tackle the existing needs and gaps.



### 3.4.1. Pilot plans for Laboratory-based surveillance

Country	Subject
Finland	Describe a STEC data model and study how it can be integrated in the national surveillance in Finland and modify existing laboratory surveillance tools to meet the requirements of the STEC data model.
Denmark	Integrate microbial properties and molecular level information in the existing Danish Microbiology Database (MiBa) in a standardized way. This includes the development of an upgraded data transfer protocol.
Netherlands	Newly developed generic open-source implementation of the logical data model, also including application programming interface and reference data for agreed on model pathogens.
Norway	Development of data management protocol for diagnostic test data on STEC in the MSIS-lab database and explore data transfer protocols for integrated surveillance with the genotypic data in the national reference laboratory database.

### 3.4.2 Pilot plans for automated outbreak detection

Country	Subject
Denmark	Group A streptococci
Finland	Campylobacteriosis, salmonellosis
Hungary	Foodborne/airborne diseases
Ireland	Salmonellosis, campylobacteriosis, shigellosis, cryptosporidiosis, VTEC/STEC, giardiasis
Malta	Salmonellosis
The Netherlands	VTEC/STEC
Poland	Salmonellosis
Slovenia	Salmonellosis, campylobacteriosis. Norovirus infection, rotavirus infection
Latvia	Acute gastrointestinal infections (Salmonellosis, rotavirus Gastroenteritis, Noravirus gastroenteritis, Yersiniosis, Campylobacteriosis, Shigellosis, STEC/VTEC); Varicella

### 3.4.3. Pilot plans for hospital surveillance

Country	Subject or aim
Finland	Link National Infectious Disease register with the Hospital Care register and study how severe hospitalised Influenza, RSV, and Covid-19 cases can be found and how the linkage can be done technically.
Italy	Link clinical data from Intensive Care Units network and microbiological data from the network of Antimicrobial Resistance laboratories.
Latvia	Develop a sentinel computerized reporting system between two hospitals, reference laboratory and the CDPC.
Malta	Develop a Patient Dashboard for use in the main state hospital, allowing systematic inputting of symptoms data by clinicians and automated electronic reporting.
Netherlands	With the help of a stakeholder analysis define the minimal requirements and aim for a robust and sustainable sentinel surveillance system.
Norway	Design a concept for development, implementation, and maintenance of a scalable, secure, and robust nation-wide register-based surveillance system.
Poland	Link electrical vaccination data and certain data from patient files to the EpiBaza (that contains notifications from laboratories and clinicians).
Slovenia	Take first steps to develop a digitalized SARI surveillance system, by identifying the core data items needed and respective coding for them, mapping the availability of relevant data etc.

### 3.4.4. Pilot plans for One Health

Country	Subject
Austria	<p><b>Francisella tularensis</b> - Test ticks, mosquitos and deer flies for <i>F. tularensis</i> in areas with high human incidence</p> <p><b>Avian and swine influenza</b> – setting up a cross-sectional swine influenza surveillance system by sharing and analyzing samples across sectors, also from commercial, veterinary stakeholders. For avian influenza, persons in contact with poultry farms infected with high-pathogenic avian influenza will be tested. Furthermore, wildlife in these areas will be samples and tested.</p>
Belgium	<p><b>Salmonella</b>: setting up cross-sectoral databases for surveillance, develop early warning systems, improve communication, develop common questionnaires, environmental sampling and clarifying roles..</p> <p><b>Avian influenza</b>: conduct longitudinal self-sampling of at risk workers, such as in poultry farms or bird rehabilitation centres, including a questionnaire, to assess asymptomatic and symptomatic infection rates with avian influenza.</p>

Denmark	<b>Avian and swine influenza:</b> exploring feasibility of active surveillance of persons exposed to avian (AIV) or swine influenza virus (swIAV) (i.e. testing of persons occupationally exposed to AIV-infected poultry and swine presenting with respiratory symptoms consistent with swIAV)
Italy	<b>STEC:</b> Expand the current surveillance system with sequences from laboratories from two regions, and education of management of STEC infections
Lithuania	<b>Salmonella</b> – improve cross-sectoral data sharing through digitalization, as well as publicity tools, and strengthen core capacities for specialist with regard to outbreak investigation <b>TBEV</b> – similar to <i>Salmonella</i>
Norway	<b>Swine influenza:</b> enhance the virological surveillance in swine (e.g. testing of new sampling methods, increased sampling intensity, compare influenza viruses in humans and pigs using whole genome sequencing, harmonization laboratory methods) in Norway and assess the vaccine coverage in swine workers and veterinarian
Netherlands	<b>Salmonella:</b> Expanding surveillance with additional commercial and non-commercial non-human partners through sharing of sequence data and/or isolates, as well as facilitating automated data sharing
Spain	<b>West Nile virus:</b> incorporating data from different partners and improve communication with the public

### 3.5. Conclusions

Although clearly technical aspects regarding improved digitalisation, upgrading of ICT systems, etc. are important needs raised over the different surveillance pillars, the legal problems stand out regarding their impact on slowing down (or even be counter-productive to) the improvement of surveillance systems in the broad sense. We strongly advice a supra-national network of legal professionals with specialization in public health in order to reach more common understanding and interpretation of the GDPR in relation to infectious disease surveillance and control. Another over-arching key need is strong central leadership with a clear vision on the changes needed in order to realize strong integrated trans-disciplinary surveillance system. Without that there is a strong risk of parallel and diverging initiatives.

### 3.6 Data management

This is not relevant for this deliverable.

## 4. Deviations from the work plan

The preparation of the D6.3 was delayed due to the coinciding with the submission of the reports D2.1, D3.1 and D4.1. With approval from HaDEA the deadline was shifted with one month.



## 5. Performance of the partners

Technical WPs leaders provided their comments and suggestions to the deliverable.

## 6. References / Selected sources of information

1. UNITED4Surveillance D2.1 Review/ Inventory of Existing (i) Laboratory Surveillance Systems and (ii) Outbreak Detection Systems or Methods of Participating Countries.
2. UNITED4Surveillance D3.1 Report on the member states survey and description of piloting plans.
3. UNITED4Surveillance D4.1 Inventarisation of goals, stakeholders and One Health surveillance systems in member states.

Public health surveillance is the ongoing systematic collection, analysis, and interpretation of data, closely integrated with the timely dissemination of these data to those responsible for preventing and controlling disease and injury ([Thacker and Berkelman 1988](#)). Public health surveillance is a tool to estimate the health status and behavior of the populations served by ministries of health, ministries of finance, and donors. Because surveillance can directly measure what is going on in the population, it is useful both for measuring the need for interventions and for directly measuring the effects of interventions. The purpose of surveillance is to empower decision makers to lead and manage more effectively by providing timely, useful evidence.

