

EXTERNAL SCIENTIFIC REPORT



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Animal Population Data Flows at country level: domestic pigs and poultry

SIGMA Consortium

Abstract

The Framework Working Contract (FWC) number OC/EFSA/ALPHA/2018/01 between the European Food Safety Authority (EFSA, the contracting authority), and the SIGMA consortium (the contractor), is in force from 23 May 2018 until 22 November 2021. The subject matter of the FWC is the provision of technical support to improve and automatize the collection and reporting to EFSA by the European Union (EU) Member States of data on animal disease outbreaks and surveillance (SIGMA). Among other tasks, EFSA requested the preparation of two External Reports on Country Data Flows: one on Animal Population and a second on Laboratory data. The present report describes the data flows in place in contributing countries for the management and updated of national animal (pig or poultry) population databases.

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Key words: SIGMA data collection, livestock, animal population, domestic pigs, poultry

Question number: EFSA-Q-2022-00224

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Summary

The European Food Safety Authority (EFSA) has been receiving requests for support by the European Commission (EC) in the analysis of certain animal disease outbreaks and related risk factors (i.e. African swine fever, ASF; lumpy skin disease, LSD; avian influenza, AI). These types of epidemiological analysis require the availability of high resolution and up to date data about the susceptible animal population and the results of surveillance and control activities, such as laboratory testing or vaccination actions, carried out by the European Union (EU) Member States (MSs).

In the remit of the Framework Working Contract (FWC) number OC/EFSA/ALPHA/2018/01, the SIGMA Consortium has been appointed by EFSA to study and define the possible data collection flows from MSs to EFSA, considering all possible difficulties and related technical solutions to minimise the workload of the data providers (MSs and pre-accession countries), ensuring, at the same time, the level of data quality needed for risk assessment studies.

The main objective of the service, therefore, was to provide EFSA with all necessary technical support in developing and implementing an automated data collection and reporting system on:

- susceptible livestock,
- animal testing to detect animal diseases (LSD, AI, ASF).

To properly achieve this objective a “bottom-up” approach was chosen, starting from the collection of all available information about the organization of data flows at national level.

Four types of questionnaires were prepared by the SIGMA Consortium (regarding pig and poultry population data, ASF and AI surveillance data) and submitted to the EU MSs and 4 IPA countries, including questions about the institutions generating or collecting the basic data, the level of details of collected data, the existing data repositories at local or national levels, the existing data exchanges between Institutions and technical means used.

Overall, 50 filled questionnaires were received from 21 countries (17 EU MS and 4 IPA countries). Concerning the data flows on animal (pig and poultry) populations, 14 EU MS and the 4 IPA countries provided information about population data: 12 EU MS and 4 IPA countries for pig populations, 8 EU MS for poultry populations.

All countries have an operational central database, collecting data for the whole territory, with the sole exception of Germany. Central animal population databases are generally directly managed by Public Institutions, but at least in three countries (Finland, Greece, Romania), the technical routine management of the database and related system is made by private companies. In all countries where a central animal population database has been established, the data are stored in relational databases of various operating systems and languages (Microsoft SQL, Oracle PostgreSQL, MySQL, Db2).

In some countries data is notified by the farmer to the local competent authority through paper forms, emailing standard files or even by phone. In these cases, the local authorities take care of updating the data of the central database through dedicated applications, web forms or the activation of web services from local to central applications. In other countries, farmers or delegated persons (often veterinarians) may directly registered the data into the central or local databases.

Concerning the completeness of establishment registration at national level, different criteria can be applied for the registration of non-commercial (also defined as “backyard”, for “own-consumption”, or “hobby” herds) pig herds. Concerning poultry population data, usually a bird numerical threshold is considered.

The great majority of countries collects data on geographic coordinates for each establishment.

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1. Introduction

1.1. Background and Terms of Reference as provided by the requestor

This contract was awarded by EFSA to:

Contractor:

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Partner 4:

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Partner 5:

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collectively 'the contractor',

Contract title: Technical support to improve and automatize data collection and reporting on animal disease outbreaks and surveillance (SIGMA)

Contract number: OC/EFSA/ALPHA/2018/01

1.1.1. Background

The European Food Safety Authority (EFSA) has been receiving requests for support by the European Commission (EC) in the analysis of certain animal disease outbreaks and related risk factors (i.e. African swine fever, ASF; lumpy skin disease, LSD; avian influenza, AI). These types of epidemiological analysis require the availability of high resolution and up to date data about the susceptible animal population, e.g. number and spatial distribution of establishments breeding susceptible hosts, and the results of surveillance and control activities, such as laboratory testing or vaccination actions, carried out by the European Union (EU) Member States (MSs).

In the remit of the Framework Working Contract (FWC) number OC/EFSA/ALPHA/2018/01, the SIGMA Consortium has been appointed by EFSA to study and define the possible data collection flows from MSs to EFSA, considering all possible difficulties and relative technical solutions to minimise the workload of the data providers (MSs), ensuring, at the same time, the level of data quality needed for risk assessment studies.

The main objective of the service, therefore, was to provide EFSA with all necessary technical support in developing and implementing an automated data collection and reporting system on:

- susceptible livestock,
- animal testing to detect animal diseases (LSD, AI, ASF).

To properly achieve this objective a “bottom-up” approach was chosen, starting from the collection of all available information about the organization of data flows at national level.

This report summarises the main relevant findings about the organization of national databases and data flows obtained through the submission of specific questionnaires to contributing EU Member States (MS) and four EU candidate countries (Instrument for Pre-accession Assistance - IPA countries). The present report describes the data flows in place in contributing countries for the management and updated of national animal (pig or poultry) population databases.

1.1.2. Terms of reference

In the context of the FWC, the Order Form number 13 (OF13), signed on the 6th of May 2021, foresaw the preparation of two External Reports on Country Data Flows: one on Animal Population and a second on Laboratory data.

So far, the data flows on population and laboratory data have not been published but submitted to EFSA as Internal Reports. The aim is to publish two external reports, i.e. one on animal population data flows and one on laboratory data flows, including for both all the available data flows.

Each report should be a collection and a re-elaboration of the information provided to EFSA with the Internal Reports related to OF 03 and 04. In detail the Consortium shall:

- i) revise all internal reports to make them consistent and harmonised (the quality has improved over time and the first reports may require some complementation);
- ii) liaise with the data providers, should some information be missing;
- iii) give a final overall assessment and overview at European level of the similarities and diversities across the EU countries in terms of IT architectural solutions for the generation and management of the animal health data;
- iv) assess the feasibility of a full automation of the data submission (from push to pull, machine-to-machine solutions, etc.)

- v) liaise with the contributing countries to seek for *nulla osta* for the publication of the information included in the report on behalf of EFSA.

2. Methodologies

Considering the “bottom-up” approach chosen by the SIGMA project, the first step was the collection of all available information about the organization of data flows at national level.

For this purpose, EFSA produced a comprehensive overview of the competent authorities in the framework of the animal health and welfare, describing the ownership of the data domains and all the competent authorities in each MS involved in the generation, collection and storing of data on animal diseases. The data are retrieved by means of an online survey. The results are elaborated in the format of Country Cards on Data sources on animal diseases and published in a public website¹.

In addition to this preliminary picture of the national Institutions involved in the collection of data on animal diseases, more specific information on the organization of the data flows in each country should be gathered. For this objective, the following questionnaires were prepared:

- For African swine fever:
 - Questionnaire regarding the technical description of the data repositories and the related data flows of pig population data;
 - Questionnaire regarding the technical description of the data repositories and the related data flows of ASF surveillance in pigs and wild boars.
- For Avian Influenza:
 - Questionnaire regarding the technical description of the data repositories and the related data flows of poultry population data;
 - Questionnaire regarding the technical description of the data repositories and the related data flows of avian influenza surveillance.

The questionnaires include questions about the institutions generating or collecting the basic data, the level of details of collected data, the existing data repositories at local or national levels, the existing data exchanges between Institutions and technical means used. The possibility of data exchange with EFSA is also explored.

The questionnaires were submitted to the EU MS, directly through the Consortium partners and through the EFSA Scientific Network for Risk Assessment (RA) in Animal Health and Welfare (AHAW). Also four IPA countries, namely Montenegro, Serbia, North Macedonia and Kosovo were involved. The dissemination of the questionnaires was also supported by the EFSA ENCO unit through the Focal Points (FPs).

¹ <https://www.efsa.europa.eu/en/search?s=Data+sources+on+animal+diseases%3A+Country+Card>

3. Results

Overall, 24 filled questionnaires were received from 18 countries (14 EU MS and 4 IPA countries) (**Table 1**).

Table 1: Filled questionnaires received back from the EU MS and IPA countries

Country	Pig population	Poultry population
Austria	X	X
Bulgaria	X	
Cyprus	X	
Czechia	X	X
Estonia	X	X
Finland	X	
France		X
Germany		X
Greece	X	X
Italy	X	X
Latvia	X	
Romania	X	
Slovakia	X	
Spain	X	X
Kosovo	X	
Montenegro	X	
North Macedonia	X	
Serbia	X	
Total	16	8

Concerning the data flows on animal (pig and poultry) populations, 14 EU MS and the 4 IPA countries provided information about population data: 12 EU MS and 4 IPA countries for pig populations, 8 EU MS for poultry populations (**Table 1**).

3.1. Structure of national animal population database

One important aspect, especially for possible future data exchanges with EFSA, is the presence of a **central national database in the countries**, collecting the data for the whole country in a harmonised manner. Looking at the answers provided by the EU MS and IPA countries listed in Table 1, the establishment of a central database is strictly linked to the structure of the Competent Authority in each country. According to the replies to the questionnaires all countries have an operational central database, collecting data for the whole territory, with the sole exception of Germany, for which the following situation is reported for poultry population data: *"All farmers and private owners of poultry have to report the details to the local district veterinary office. No central database exists. Individual databases in currently 401 districts"*. However, data can be accessed through a specific computer application ("BALVI iP")² developed by a private Company. The absence of a central database in Germany reflects the organization of the State. Germany is a Federal State with 16 Länder. The Federal Government is responsible for policy and federal legislation. The Länder are responsible for official controls to comply with the legislation in the relevant areas. At national level, the Federal Ministry of Food and Agriculture (BMEL) has almost exclusive competence for food and feed safety, animal health and animal welfare. Its remit encompasses higher federal authorities, public institutions and federal research institutions, including in particular the Federal Office of Consumer Protection and Food Safety (BVL), the Federal Institute for Risk Assessment (BfR), the Federal Agency for Agriculture and Food (BLE), and the Friedrich Loeffler Institut (FLI).

Central animal population databases are generally managed by Public Institutions, but at least in three countries (Finland, Greece, Romania), the technical routine management of the database and related system is made by private companies.

In all countries where a central animal population database has been established, the data are stored in relational databases of various operating systems and languages (Microsoft SQL, Oracle PostgreSQL, MySQL, Db2).

Concerning the possibility of activating an unsupervised automatic data exchange with EFSA, theoretically the optimal situation would be the presence of a single central national database, directly managed by the competent authority (or a Public Institution under direct supervision of the competent authority), developed following technologies easily allowing the data transfer through web services or similar solutions.

However, even in the case of federal organizations, without the establishment of a central database, data exchange flows can be activated with all data sources. In fact, considering the type of data requested by EFSA, which can be considered a snapshot at a certain date of active establishments, production units and the number of animals kept, no risks of data overlap³ among the various regional databases will occur.

Considering the operating systems generally in place for the management of the national databases, no major technical problems are expected for establishing any kind of automatized exchange of data with EFSA.

More obstacles to external data exchange with EFSA may derive from the management of database by private companies, especially when the service contracts do not allow a certain flexibility in the services requested to the contractors.

² <https://www.balvi.de/de/>

³ On the contrary, when animal movement data are requested, the possibility of animal exit from one Region and entry into another should be considered.

3.2. Data Flows

The collection and notification of basic data on animal population to the local offices of the competent authority may vary a lot in each country. In some countries data can be notified by the farmer to the local competent authority through paper forms, emailing standard files or even by phone. In this situation the update of data stored in the central database is made by the local authorities through dedicated applications, web forms or the activation of web services from local to central applications (**Table 2**).

In some countries, farmers or delegated persons (often veterinarians) may directly registered the data into the central or local databases.

From the data quality point of view, it could be advisable that data is entered into the system directly by the primary responsible of the data (farmer or delegated person), in order to avoid delays or misalignments between what declared by the farmer and the data recorded into the system. However, albeit the responsibility of data correctness is mainly on farmer for the EU legislation, duties and task of each single "actor" of the system are defined in details by national rules, which may vary greatly from one country to another. At least in Austria, Bulgaria, Estonia, France, Italy, Latvia, Romania and Slovakia, the farmers (or the delegated persons) have the possibility to directly enter data into the central database.

Table 2: Type of data flows for updating the central animal population databases.

Country	Pig population	Poultry population
EU Member States		
Austria	Dedicated application	Dedicated application
Bulgaria	Dedicated application	
Cyprus	Web forms	
Czechia	Web forms / Web services	Web forms / Web services
Estonia	Web forms	Web forms
Finland	Web forms, paper, phone	
France		Web forms
Germany		Paper forms, e-mail, letters*
Greece	Dedicated application	Dedicated application
Italy	Web forms / Web services	Web forms / Web services
Latvia	Paper / Web forms	
Romania	Dedicated application	
Slovakia	Papers, mail, dedicated programme, Web services	
Spain	Web forms, dedicated application	Web forms, dedicated application
IPA countries		
Kosovo	Dedicated application / Excel files	
Montenegro	Web forms / Web services	
North Macedonia	Web forms / Web services	
Serbia	Web forms	

* In the case of Germany it refers to the data flows for updating the local databases.

More in details, when the contents of registered data at national level are considered, two main aspects should be taken into consideration for their possible effects on the quality of risk assessments for animal diseases, and in particular for ASF and AI:

- The completeness of establishment registration.
- The availability of geographical coordinates for each establishment

The completeness of establishment registration at national level is relevant, and in particular the inclusion of non-commercial establishments into the central database must be evaluated for their potential role in the disease diffusion. In the case of pig population data, the main aspect is related to the registration of non-commercial (also defined as “backyard”, for “own-consumption”, or “hobby” herds) pig herds. Various definition can be used for this category of establishment⁴ in the countries, although often they are defined as herds with a limited number of animals (number can vary from 1 to 3 or more according to the national legislation), usually kept for own consumption (and therefore the breeding animals are often excluded by this definition).

According to the replies at the questionnaires all countries include in their national databases this type of herds, albeit the level of completeness of this registration may be partial in several countries.

Concerning poultry population data, usually a numerical threshold is considered for those flocks that must be recorded in the central database on a mandatory basis: for example, more than 250 birds for France and Italy, or more than 100 birds for Czechia.

It is noteworthy that, at the time of questionnaire filling, in Greece the data stored at the central database for poultry population concerned only laying hens establishments. The software application for the registration of the other categories of poultry farms was under development. At that time data on these types of farms were available at central level only on Microsoft Excel files.

Another relevant aspect is represented by the availability of geographical coordinates for each establishment registered in the central database. The great majority of countries collects this kind of information for each establishment. According to the replies at the questionnaires at least the following countries record geo-coordinates at central level: Austria, Bulgaria, Cyprus, Estonia, Finland, Germany, Italy, Latvia, Romania (only for commercial farms), Slovakia, Spain, North Macedonia and Serbia.

4. Conclusions

With the exception of Germany all the other countries replying to the questionnaires have a **national animal population database in place at central level**, collecting and storing data for the whole country.

In principle, this organization should facilitate the establishment of external data sharing with EFSA. In addition, the fact that in all countries the data are stored in relational databases (with the exception of Greece for data on poultry other than laying hens), although based on various operating systems and languages, should allow the implementation of web services or other technical solutions for non-supervised automatic data transfer.

The **main limitation** to the possibility of implementing new data flows with EFSA is represented by the management of animal population recording systems by private companies, especially when the service contracts do not allow enough flexibility in the services requested to the contractors. This situation is present at least in three countries (Finland, Greece, Romania) among those replying to the

⁴ EFSA AHAW Panel (EFSA Panel on Animal Health and Welfare), Nielsen SS, Alvarez J, Bicoût DJ, Calistri P, Canali E, Drewe JA, Garin-Bastuji B, Gonzales Rojas JL, Herskin M, Miranda Chueca MA, Michel V, Padalino B, Pasquali P, Roberts HC, Sihvonen LH, Spoolder H, Stahl K, Velarde A, Viltrop A, Winckler C, Blome S, More S, Gervelmeyer A, Antoniou S-E and Gortazar Schmidt C, 2021. Scientific Opinion on the African swine fever and outdoor farming of pigs. EFSA Journal 2021;19(6):6639, 113 pp. <https://doi.org/10.2903/j.efsa.2021.6639>

questionnaires. However, the real constraints due to this aspect must be explored on a country-by-country basis, taking into account the specific conditions of each service contract undersigned by the national competent authorities and the private companies.

In relation to the **data completeness**, it appears that the great majority of information required by EFSA is available in the national databases. Even the geo-coordinates (latitude and longitude) of establishments are widely available, although no details are provided about the level of accuracy and the presence for all farm categories.

A more heterogeneous situation is observable about the availability of **data on “own-consumption”** establishment. A recent Scientific Opinion on pig outdoor farming showed how different are the definitions in place in the EU MS in relation to “own-consumption” pig farms. Also criteria used for defining this type of husbandry are quite different, especially in terms of type and number of animals kept. The situation is clearer for poultry farms, especially for *Gallus gallus* species, for which numerical thresholds are set to define those farms to be recorded and included in the national database.

It is important to remind that the data to be provided to EFSA by the countries, and for which the possibility of establishing an automatic protocol is considered here, can be extracted from the national databases with limited modifications to the original structure and values: the transformation into the EFSA’s data model format can be subsequently performed, after proper configuration, by the SIGMA-EST web mapping tool. Further improvements are needed, but the way to a fully automated process has been drawn.

Appendix A – National population dataflows

A.1. Austria

A.1.1. Pig population (IZSAM)

A.1.1.1. Results

The description of the authorities responsible for data collection and management of animal diseases in Austria has been already provided in a published EFSA report¹. For the sake of clarity, the organization of the main authorities is reported here (**Figure 1**).

Austria (Österreich, AT)

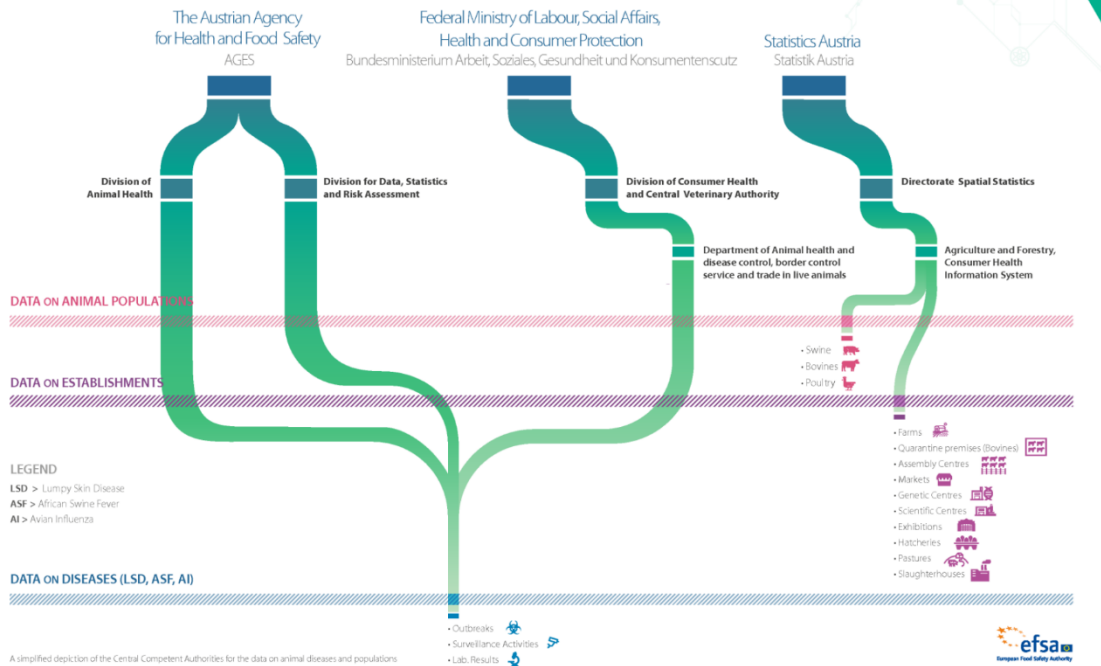


Figure 1: A simplified depiction of the central competent authorities for the data on animal diseases and animal populations in Austria (source: EFSA, 2019).

Regarding the collection and management of the data on animal population and the establishments where live animals are kept, Statistics Austria, an independent federal institution, is involved on behalf of the Austrian Ministry of Social Affairs, Health, Care and Consumer Protection. It maintains the Veterinary Information System (VIS), where all the official veterinary information and animal population data are consolidated.

Domestic pig population data have to be collected on a yearly basis. The data is collected using the electronic database VIS, to which authorized persons have access via portal network (uniform framework for access to official web applications). The non-aggregated VIS data are stored in a computer centre using a relational Db2 database. The VIS is available via a website and supports automated data exchange via VIS web access (<https://portal.statistik.at>). Additionally, csv-exports can be provided through SFTP. All competent authorities have access to VIS and are able to select the relevant data.

The data are not reported to EuroStat or FAO so far and EFSA has no direct access at the moment. Data can be provided via files (e.g. xlsx, csv, xml) and no specific discussion on this topic has been initiated until now.

In **Figure 2** a conceptual description of the Domestic Pig population data flows is provided.

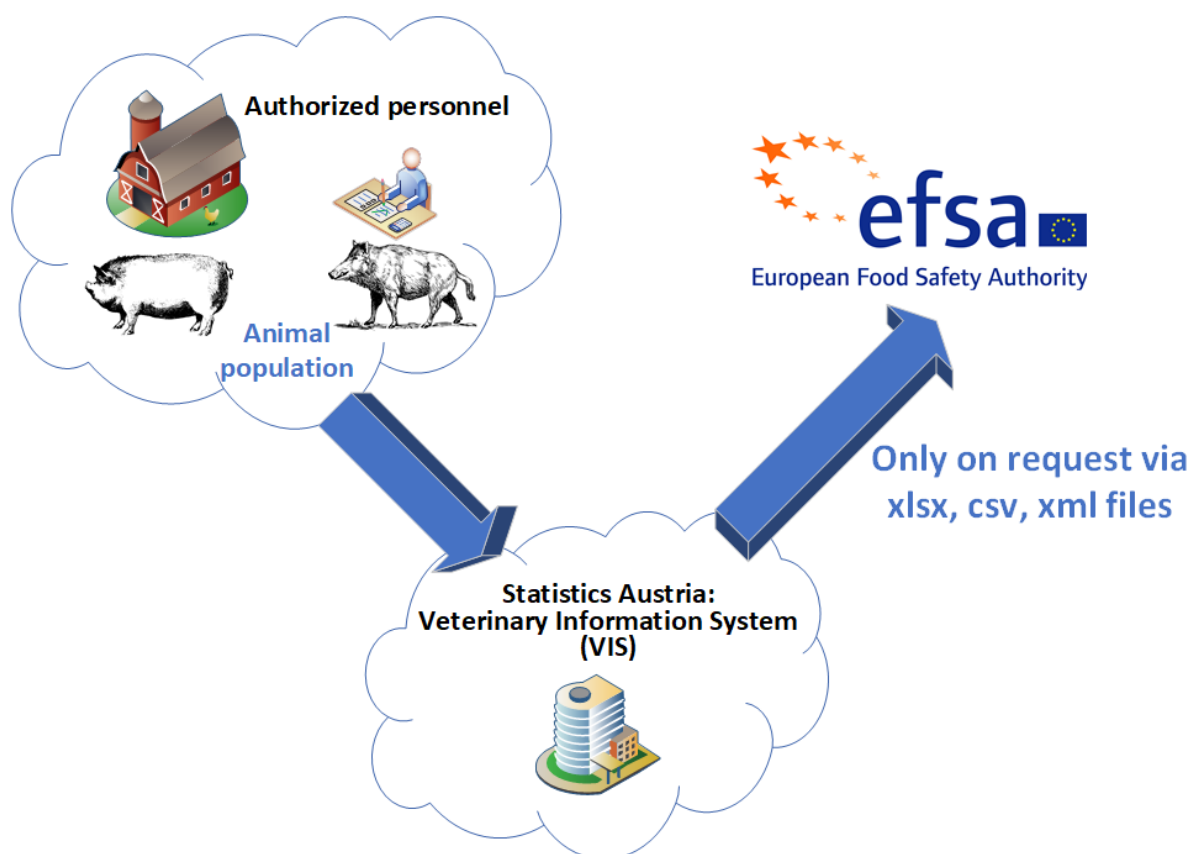


Figure 2: Conceptual description of the Domestic Pig population data flows.

A.1.1.2. Conclusive remarks

Data is collected centrally, despite the fact, that the federal states are responsible for animal health control.

The veterinary information system (VIS), which is maintained by Statistics Austria, is also the storage point for information pig populations and holdings (apart from being the storage point for sample data). All relevant competent authorities have got access to this system.

Currently there is no exchange of data or transmission of data to EFSA. However, the custom-built database provides extensive options for exporting data.

A.1.2. Poultry (FLI)

A.1.2.1. Summary

The Austrian Ministry of Labour, Social Affairs, Health and Consumer Protection (Division of Consumer Health and Central Veterinary Authority) is responsible for data related to animal diseases and animal population in Austria. Regarding the collection and management of data on animal population and the establishments, where live animals are kept, Statistics Austria, an independent federal institution, is mainly involved on behalf of the Austrian Ministry of Labour, Social Affairs, Health and Consumer Protection. Statistics Austria further maintains the Veterinary Information System (VIS) of Austria, where all the official

veterinary information is consolidated. In Austria veterinary authorities work with two databases in the poultry sector: 1. VIS is the national database, where all poultry holdings (commercial and non-commercial) have to be registered. Access is only provided to the competent authorities. 2. PHD (PoultryHealthData) is provided by a private association (Poultry Health Service) that also has an official function by running the official registry for laying hens. Access to this database is very restricted but broader than VIS, as also private veterinarians that are registered as responsible for certain farms have access to these farms' data. Official Veterinary Services use this database on a day-to-day basis within the National Salmonella Control Programmes. Certain data (e.g. sampling within the programme) are provided to VIS using a data interface and are transferred automatically, via VIS webservice <https://portal.statistik.at>. Members of the Poultry Health Service have web-access to the PHD via <https://secure.qgv.at>. A hotline-service is in place for non-members. The basic data, e.g. from a municipality or district level, are not aggregated on a higher level and not reported to EuroStat. Data on poultry population is provided to EFSA within the zoonosis data collection. Aggregated data on poultry population is prepared in an xml-file and uploaded to the Data Collection Framework (DCF) of EFSA. No direct access is granted to EFSA. Austria is transmitting data on AI to EFSA in July 2019 for the first time according to the "Guidelines for reporting 2019 avian influenza data in accordance with SSD2 data model". No specific discussion have been undertaken until now, whether the data exchange can be initiated by EFSA or if it has to be initiated by the Member State.

A.2. Bulgaria

A.2.1. Pig population (IZSAM)

A.2.1.1. Results

The description of the authorities responsible for data collection and management of animal diseases in Bulgaria has been already provided in a published EFSA report¹. For the sake of clarity, the organization of the main authorities is reported here (**Figure 1**).

Bulgaria (България, BG)

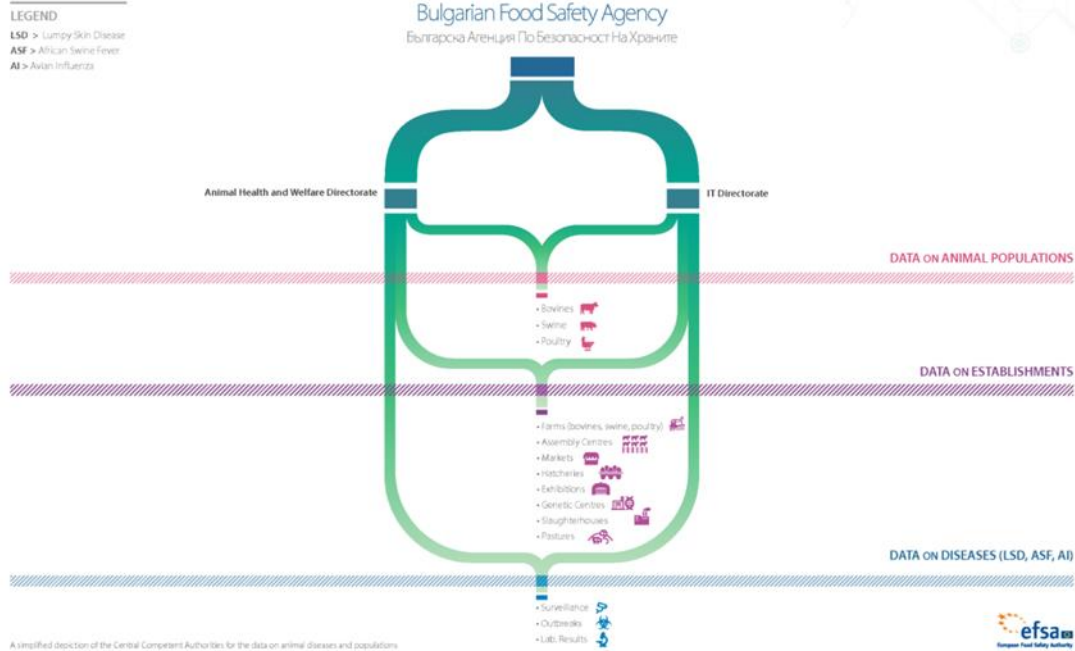


Figure 1: A simplified depiction of the central competent authorities for the data on animal diseases and animal populations in Bulgaria (source: EFSA, 2019).

Farmers are requested to maintain a record with the number of animals. Any changes of the number of animals has to be recorded within 7 days to the national Identification and Registration Database, which is part of the Veterinary Information System (VetIS). Microsoft Excel or other computer software are used for the register on commercial farm premises. The data are usually collected and recorded into the VetIS database by private veterinarians (registered veterinarians). In the case of non-commercial farms (back yards, where it is allowed to keep no more than 3 fattening pigs) the records are kept on paper format. The data is reported to the Headquarter (HQ) of Bulgarian Food Safety Agency (BFSA) via the VetIS and can be analysed at individual farm level, as well as at village, municipality and region levels.

The data is physically stored at a computer centre/data processing centre. The computer centre uses a relational database (Oracle) for the central administrative levels. Via a website and a VPN address it is possible to access the data via secured login. All data is automatically exchanged via a webservice.

The aggregated population data is provided to Eurostat via the Ministry of Agriculture, Forestry and Fisheries (MAFF). EFSA could have direct access via the webservice and VPN address if it is granted. It is not clarified, whether the data exchange can be initiated by EFSA or if it has to be initiated by the Member State.

In **Figure 2** a conceptual description of the Domestic Pig population data flows is provided.

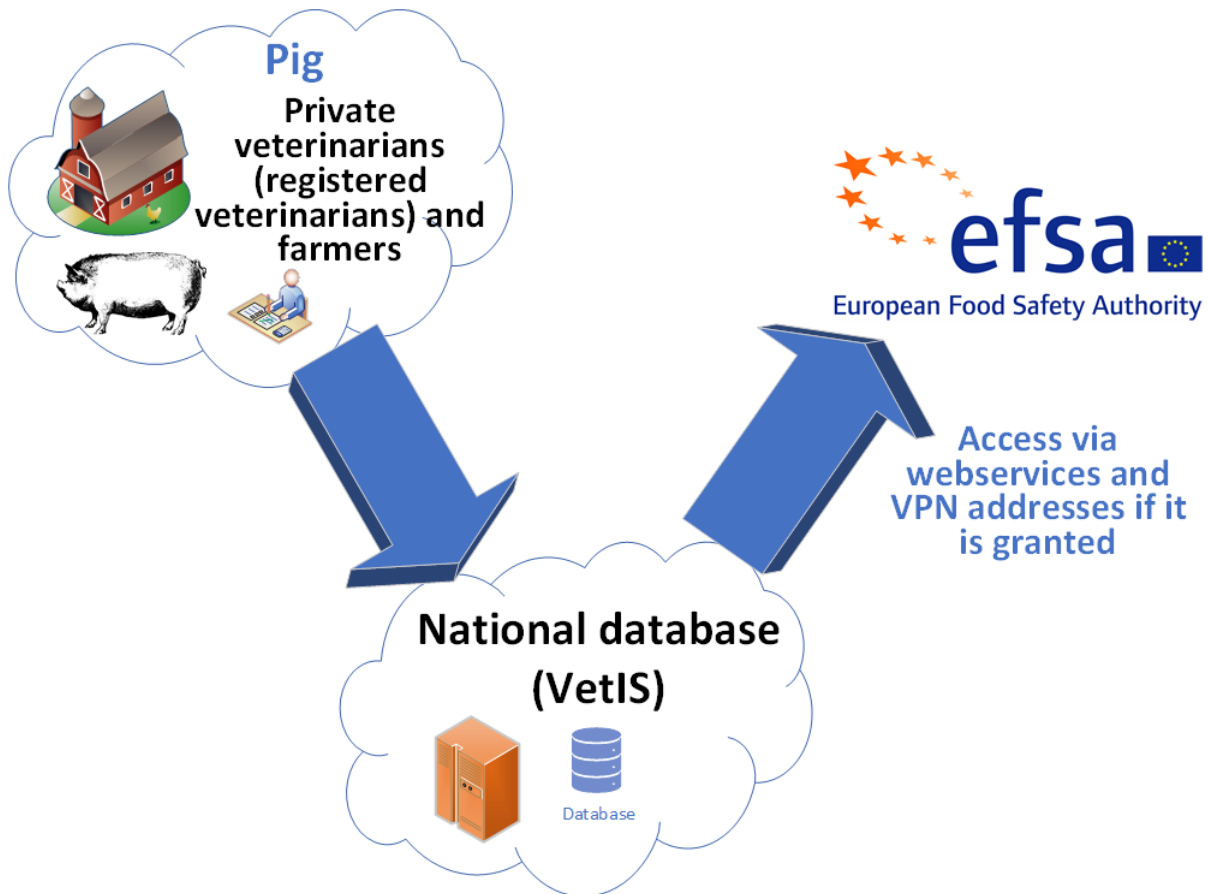


Figure 2: Conceptual description of the Domestic Pig population data flows.

A.2.1.2. Conclusive remarks

Data on pig populations from commercial holdings are collected electronically by veterinarians. Only for backyards (not keeping more than 3 fattening pigs), paper forms are used. The data is then stored in the national Identification and Registration Database, which is part of the Veterinary Information System (VetIS). VetIS is an Oracle database, managed by the headquarter of the Bulgarian Food Safety Agency. This database contains not only information pig population, but also about ASF surveillance, and offers extensive analytical options. Data exchange between the different levels is automated through a webservice. The database would be accessible for EFSA (if granted access).

A.3. Cyprus

A.3.1. Pig population (IZSAM)

A.3.1.1. Results

The description of the authorities responsible for data collection and management of animal diseases in Cyprus has been already provided in a published EFSA report¹. For the sake of clarity, the organization of the main authorities is reported here (**Figure 1**).

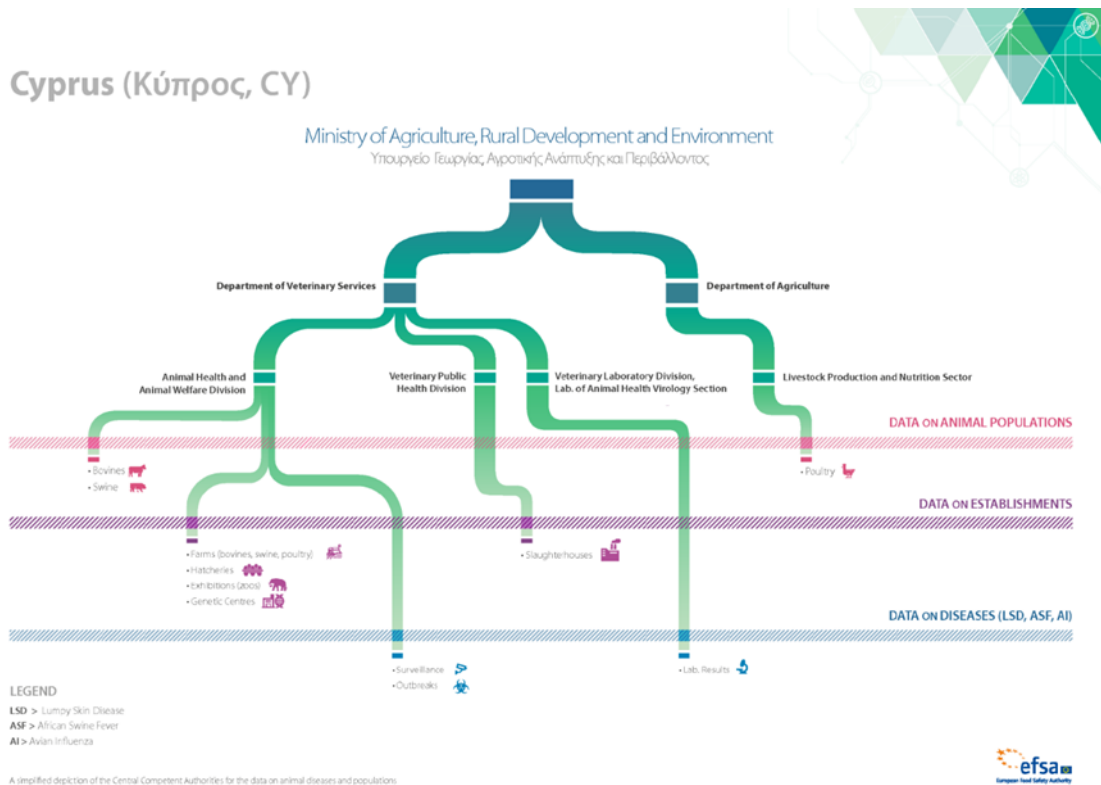


Figure 1: A simplified depiction of the central competent authorities for the data on animal diseases and animal populations in Cyprus (source: EFSA, 2019).

Data about the pig population are collected annually by the Veterinary Services (VS; Figure 1) based on farm operator's declarations. The data on animal movements to slaughterhouses are collected on daily basis. Each farm operator provides the VS with information about pig population using documents approved by the VS. These paper documents / forms are then collected by local veterinary officers in the context of on-the-spot inspections. The district level data is used on central level for the central database update.

The animal population data are stored in an electronic database (Oracle Database Server). Via a secure website it is possible to access the data. All data can be automatically exchanged between the different administrative levels.

Basic data is reported from district levels and then aggregated on central level. The data are reported to Cyprus Statistical Service and then the data are further reported to Eurostat by the Statistical Service.

In general, EFSA could have access to the aggregated data at central level after seeking permission from the VS. The data exchange can be initiated by EFSA.

In **Figure 2** a conceptual description of the Domestic Pig population data flows is provided.

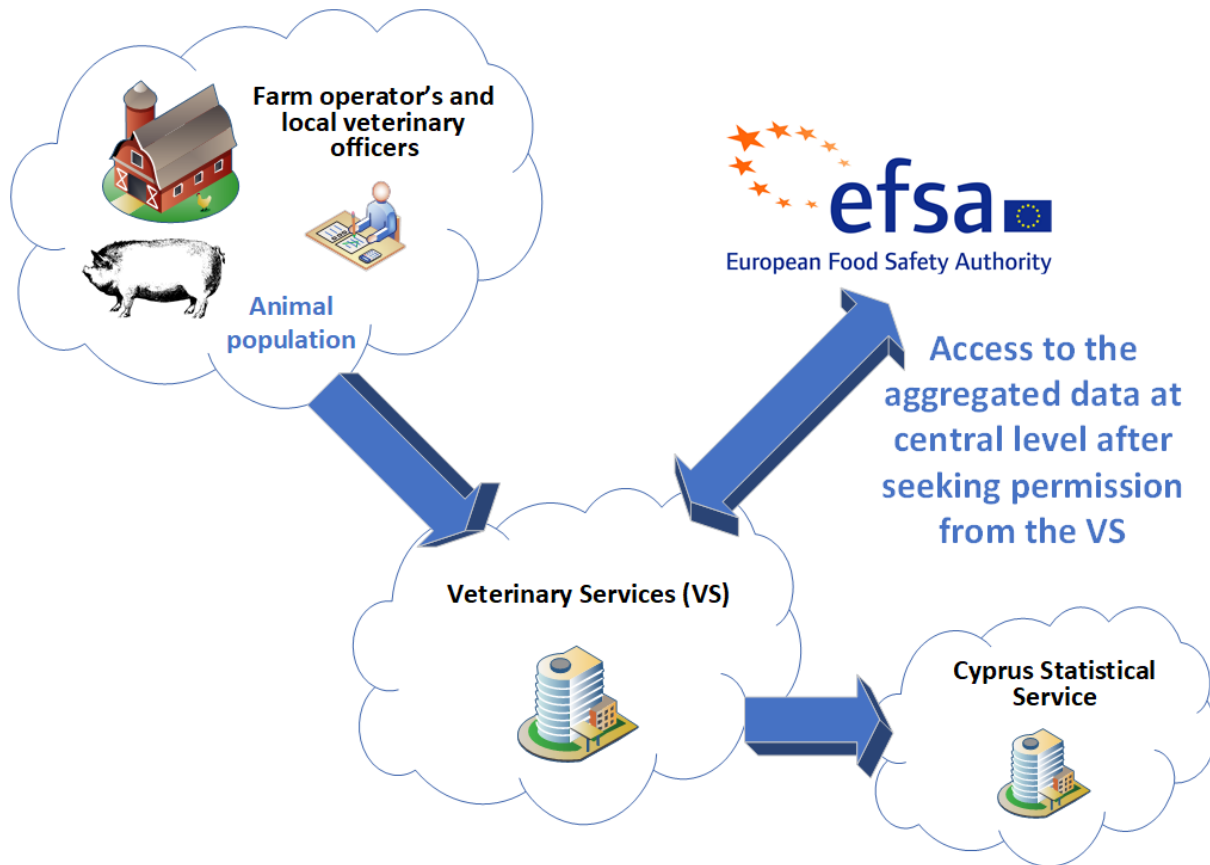


Figure 2: Conceptual description of the Domestic Pig population data flows.

A.3.1.2. Conclusive remarks

For the pig population data, a central database exists at the Veterinary Service in Cyprus. Data is collected via paper-forms from the holdings and then entered and aggregated into the database.

Data contains information on the number of animals on the holdings (annually collected) as well as information on movements of pigs to slaughterhouses (on daily basis). No information has been provided on movements between holdings.

The Oracle database with the aggregated data could be made available for EFSA.

A.4. Czechia

A.4.1. Pig population (IZSAM)

A.4.1.1. Results

The description of the authorities responsible for data collection and management of animal diseases in Czech Republic has been already provided in a published EFSA report¹. For the sake of clarity, the organization of the main authorities is reported here (**Figure 1**).

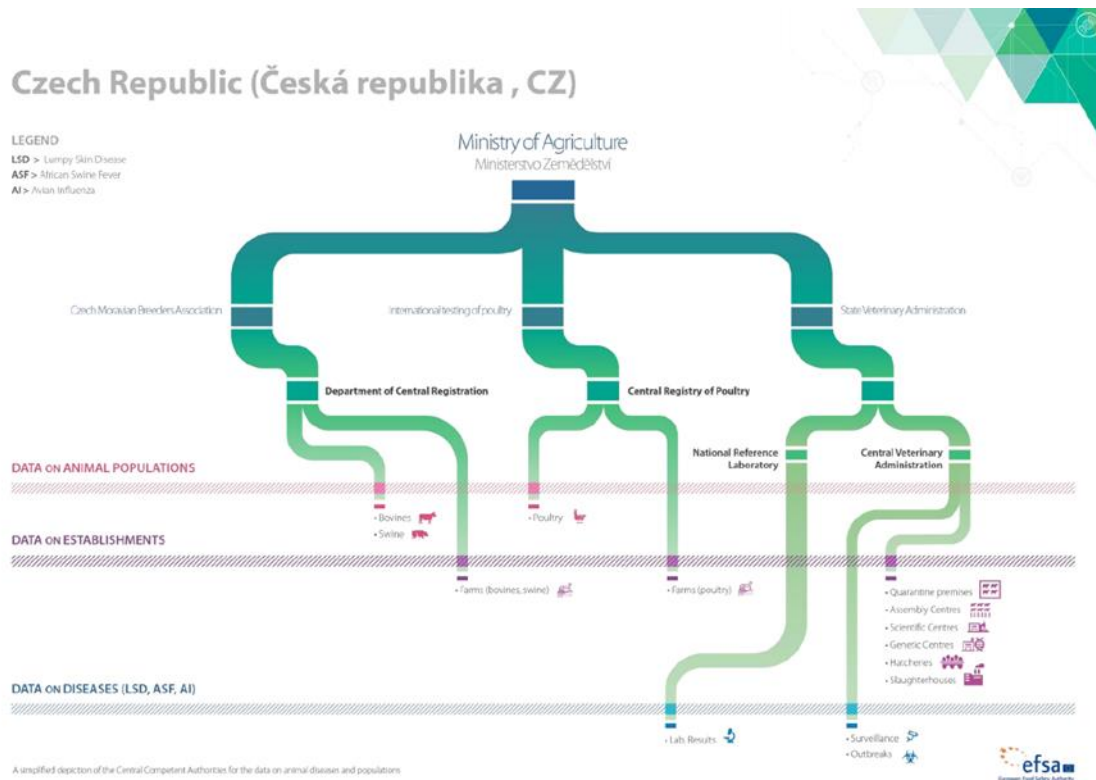


Figure 1: A simplified depiction of the central competent authorities for the data on animal diseases and animal populations in Czech Republic (source: EFSA, 2019).

Domestic pig owners (everyone, who keep pigs), not only farmers, are obliged to declare the poultry population data to the authorities. The pig owner can report the data in several ways, by e-mail or e-mail attachment, via a website (after authentication) or with any commercial programmes via web services. It is also possible to report the data by letter or FAX. After initial recording of the basic farm data, the data have to be updated on a monthly basis if any changes occur. The population data are collected at state level by the Czech-Moravian Society of Breeders (Českomoravská společnost chovatelů, a.s.; <https://www.cmsch.cz/>).

All data are physically stored in a relational database (Oracle platform) at a hosting centre, which is leased by the Ministry of Agriculture. The data can be accessed via a website or from any commercial programmes via public web services after authentication.

The Czech statistical office has all available data and exploits them for reporting to different national and international authorities.

EFSA can receive a file with aggregated data via the European Commission. Plenty of data from the poultry sector are publicly available. After specification of data requirements and proposed analyses by EFSA, it will be feasible to determine, if the data is publicly available.

In **Figure 2** a conceptual description of the Domestic Pig population data flows is provided.

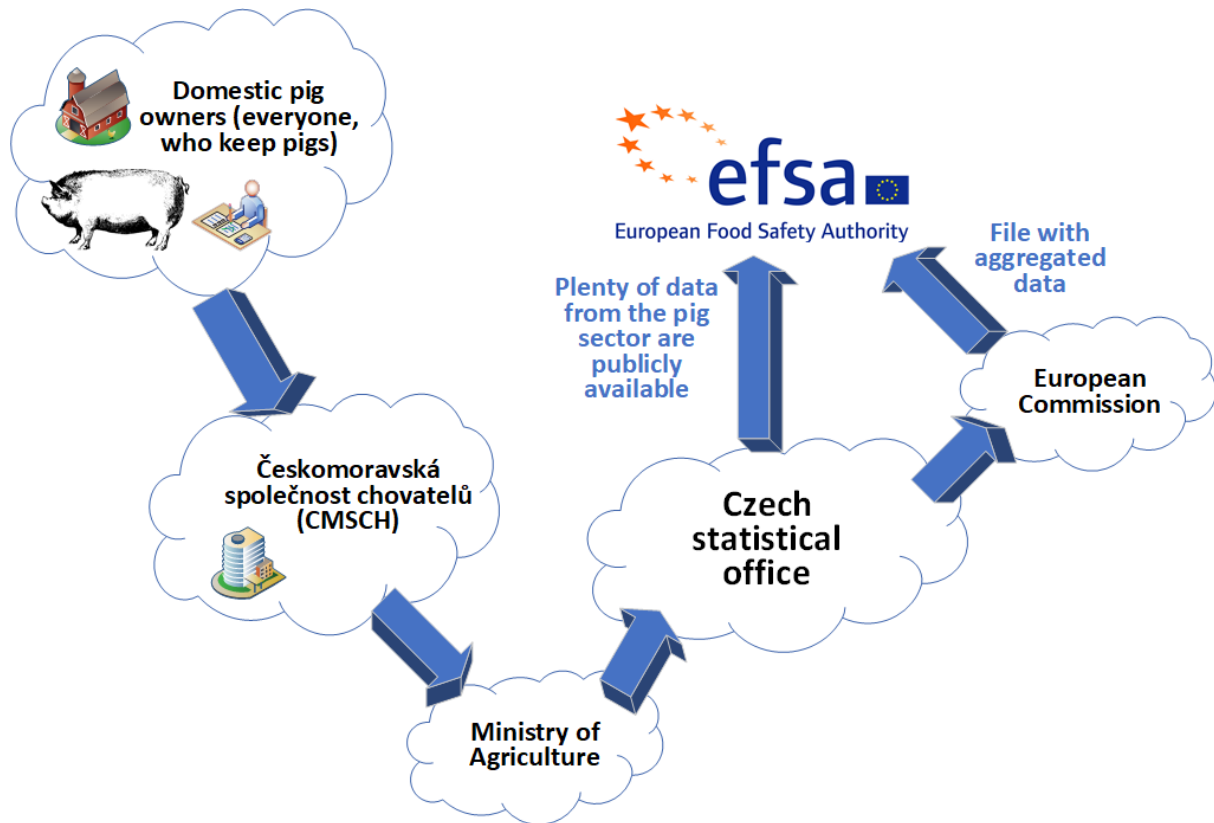


Figure 2: Conceptual description of the Domestic Pig population data flows.

A.4.1.2. Conclusive remarks

Information about pig population is stored in a relational database (Oracle platform) at a hosting centre, which is leased by the Ministry of Agriculture. The data can be accessed via a website or from any commercial programmes via public web services after authentication. Data contains information from all commercial pig holders, but also of private owners that keep pigs. Changes in the pig population have to be notified to the authorities monthly. These notifications can be done using several ways (letter, fax, E-mail, webservice). Data stored in the central database, can be accessed via a website or from any commercial programmes via public web services after authentication. Aggregated data will be available to EFSA via the European Commission.

A.4.2. Poultry population (IZSAM)

A.4.2.1. Results

The description of the authorities responsible for data collection and management of animal diseases in Czech Republic has been already provided in a published EFSA report¹. For the sake of clarity, the organization of the main authorities is reported here (**Figure 1**).

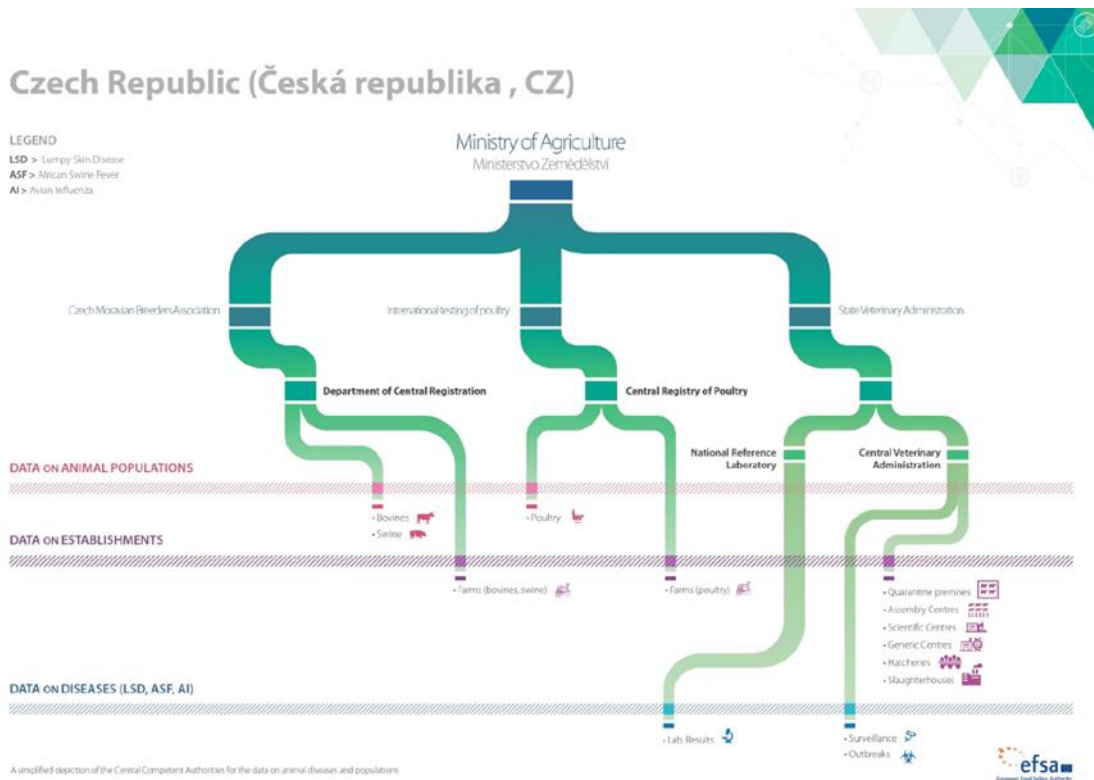


Figure 1: A simplified depiction of the central competent authorities for the data on animal diseases and animal populations in Czech Republic (source: EFSA, 2019).

Poultry owners (everyone, who keeps poultry over 100 birds), not only farmers, are obliged to declare the poultry population data to the authorities. The poultry owner can report the data in several ways, by E-mail or E-mail attachment, via a website (after authentication) or with any commercial programmes via web services. It is also possible to report the data by letter or FAX. After initial recording of the basic farm data, the data have to be updated on a monthly basis if any changes occur. The population data are collected at state level by the Czech-Moravian Society of Breeders (Českomoravská společnost chovatelů, a.s.; <https://www.cmsch.cz/>).

All data are physically stored in a relational database (Oracle platform) at a hosting centre, which is leased by the Ministry of Agriculture. The data can be accessed via a website or from any commercial programmes via public web services after authentication.

The Czech statistical office has all available data and exploits them for reporting to different national and international authorities.

EFSA can receive a file with aggregated data via the European Commission. Plenty of data from the poultry sector are publicly available. After specification of data requirements and proposed analyses by EFSA, it will be feasible to determine, if the data is publicly available.

In **Figure 2** a conceptual description of the Poultry population data flows is provided.

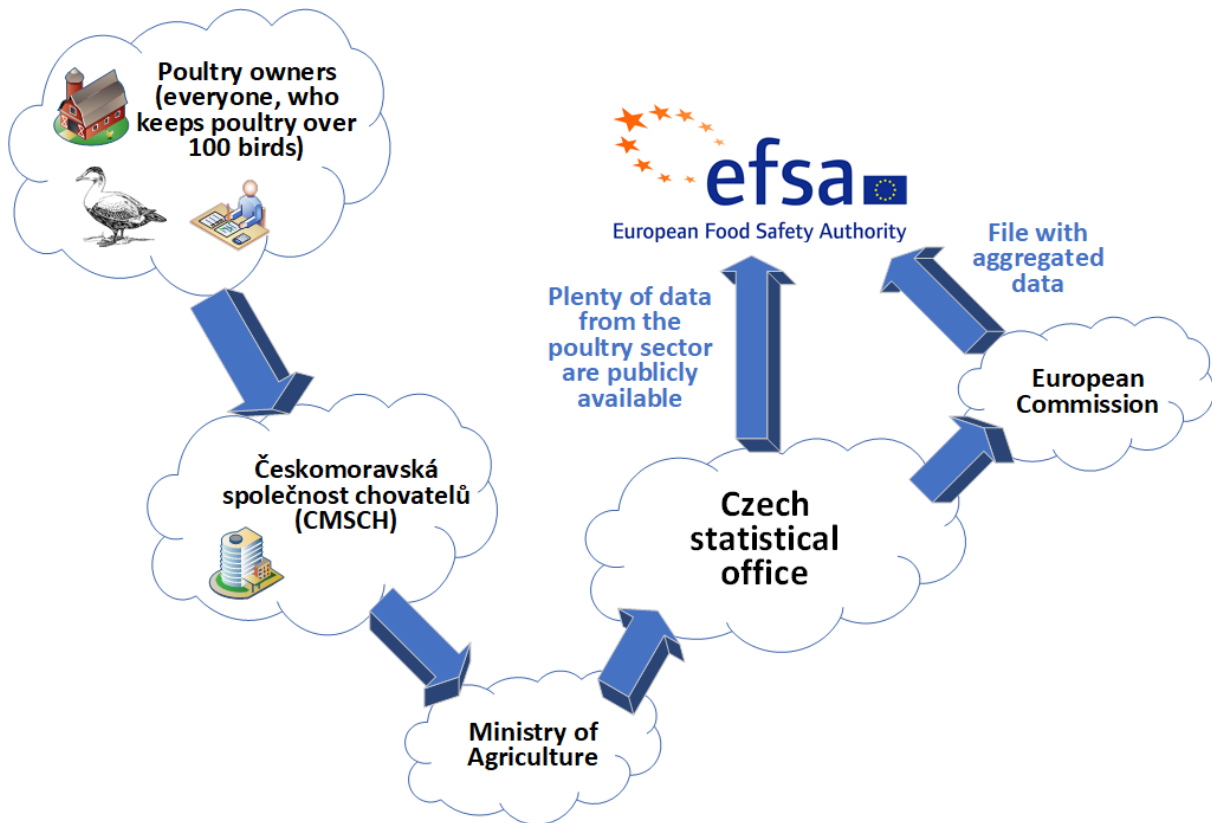


Figure 2: Conceptual description of the Poultry population data flows.

A.4.2.2. Conclusive remarks

Information about poultry population is stored in a relational database (Oracle platform) at a hosting centre, which is leased by the Ministry of Agriculture. The data can be accessed via a website or from any commercial programmes via public web services after authentication. Data contains information from all commercial holdings, but also private owners that keep more than 100 birds. Changes in the poultry population have to be notified to the authorities monthly. These notifications can be done using several ways (letter, fax, E-mail, webservice) Data stored in the central database, can be accessed via a website or from any commercial programmes via public web services after authentication. Aggregated data will be available to EFSA via the European Commission.

A.5. Estonia

A.5.1. Pig population (FLI)

A.5.1.1. Summary

Farmers are collecting the basic data about the pig population because they are obliged to report the keeping of pigs in a farm and the number of pigs in a farm to the Estonian Agricultural Registers and Information Board (ARIB). This data is stored at state (central) level and physically saved on computer server at the ARIB in a Relational database (Oracle). Since 01.07.2019, the farmer has to provide information 4 times per year (quarterly) by himself through a webservice. Only ARIB staff can access the data with a computer program named "LOOMREG" (Animal Register). The data is transferred via a webservice to the Veterinary and Food Board (VFB). This VFB register is integrated within the ARIB database via the "X-road service". The data is not aggregated on another level because there are no NUTS codes in database, but aggregated data can be generated from address data. Statistics Estonia transmits the data on live animals to Eurostat. Previously, Statistics of Estonia collected pig statistics by weight categories themselves, but from 31.12.2019, data are collected only by ARIB and transmitted to Statistics Estonia once a year. Note: At the legislative level, this change about data collection has already been made. EFSA can access the data at the moment by file sharing or from Eurostat. In the future EFSA could get these data through some kind of data transmission service. The exchange of data has been so far initiated by EFSA and Estonia has been agreeing with it.

A.5.2. Poultry population (FLI)

A.5.2.1. Summary

The Estonian Agricultural Registers and Information Board (ARIB) collects data through a webservice about the poultry establishments.

The data is collected before the starting of business activities in establishments, within 7 days after change of activity and at the end of business activities in the establishment.

There is no information on the exact number of birds, but there is data on what species are kept and the potential number of bird places per establishment.

This data is stored at state (central) level and physically saved on computer server at the ARIB in a Relational database (Oracle).

Only ARIB staff can access the data with a computer programme named "LOOMREG" (Animal Register). The data on establishment information is transferred from ARIB to the Veterinary and Food Board (VFB) via a webservice. This VFB register is linked with the ARIB database via the "X-road service" (backbone of e-Estonia; <https://e-estonia.com/solutions/interoperability-services/x-road/>).

The data is not aggregated on another level because there are no NUTS codes in database, but aggregated data can be generated from address data.

The number of laying hens are obtained from farmers during the survey, which is organized by Statistics Estonia. In 2020, 2023, 2026 there will be bigger surveys, when they will also collect more specific data about poultry species, numbers etc.

At the moment, EFSA can access the data by file sharing or from Eurostat. In the future EFSA could get these data through some kind of data transmission service.

The exchange of data has been so far initiated by EFSA and Estonia has been agreeing with it.

A.6. France

A.6.1. Poultry population (IZSAM)

A.6.1.1. Results

The description of the authorities responsible for data collection and management of animal diseases in France has been already provided in a published EFSA report¹. For the sake of clarity, the organization of the main authorities is reported here (**Figure 1**).

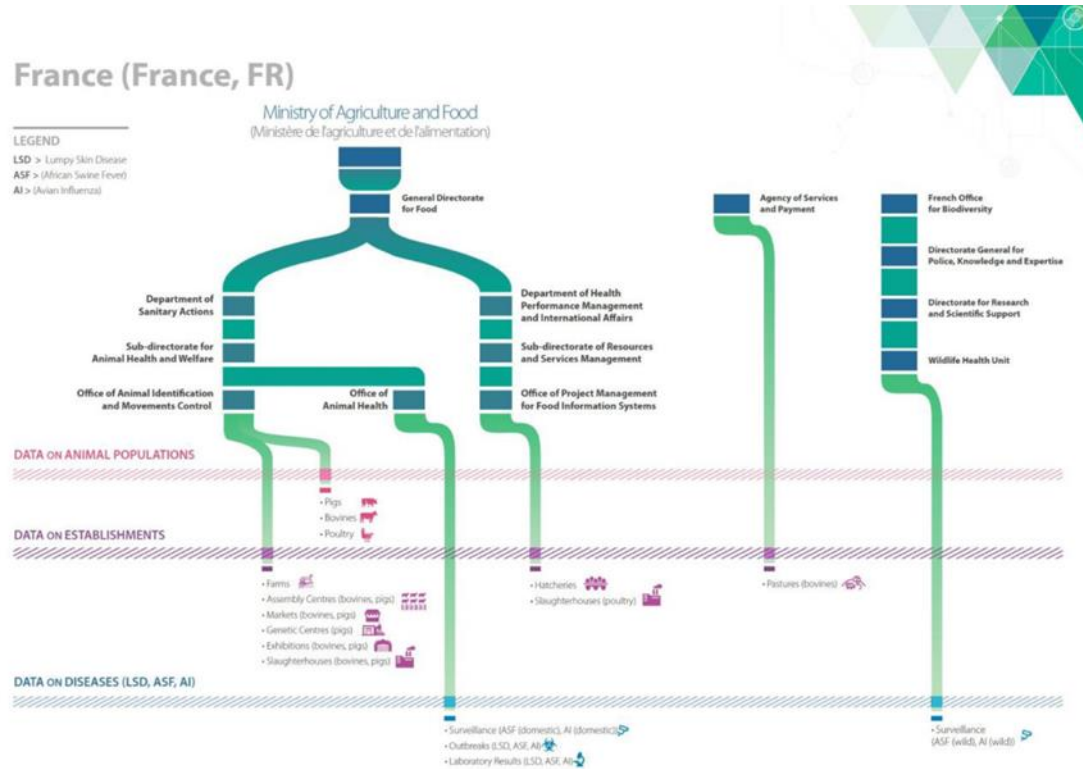


Figure 1: A simplified depiction of the central competent authorities for the data on animal diseases and animal populations in France (source: EFSA, 2021).

The current situation concerning basic data about poultry population in France is particularly complex and undergoing profound changes. The farms/breeding establishments with more than 250 animals are declared to the official departmental establishments of breeding (établissement départemental d'élevage, EDE). The information is transmitted to the national identification database (base de données nationale d'identification, BDNI) and made available to the departmental directorates for population protection (directions départementales de la protection des populations, DDPP). Smaller commercial farms must register directly to the DDPP, who will register them in Résytal, a database managed by the Ministry of Agriculture and Food (Figure 1).

The information on movements (installation and/or removal of a poultry flock) is not stored in the Résytal database. Farmers either declare directly movements to the DDPP, filling in a web form (<https://www.mesdemarches.agriculture.gouv.fr/demarches/exploitation-agricole/obtenir-un-droit-une-autorisation/article/poules-coqs-dindes-et-dindons-mise>), or by data entry in two further databases: "ATMAvicole" (<http://www.atm-avicole.fr>) and "BDAvicole" (<https://www.bdavicole.fr/index.xhtml>). It is planned that the collection of movements will be entrusted in 2023 to a single operator, who will transmit the information to the Résytal database, which will make the data available to DDPP. In addition, it is possible to register the changes of poultry stock by letter. Owners and/or keepers of commercial poultry

flocks can declare the installation and removal of a poultry flock by postal letter addressed to the DDPP of the department where the poultry is located. The form is also available on the public website.

Data are collected continuously. Owners have to declare the change in their flock at maximum 7 days after installation/removal of the poultry.

Data are stored in relational databases at the computer centre/data processing centre and by cloud providers. After a personal identification, the data can be accessed via the mentioned two websites.

Data exchange between the administrative levels or with the private/commercial contractors are different for every system. From the professional websites, the data can be exported manually in csv or xls format. Each DDPP agent consults the information when needed and data is not continuously transferred. Data are not reported to Eurostat or FAO.

For poultry population data there is currently no data exchange with EFSA. Therefore, it cannot be stated whether a possible data exchange can be initiated by EFSA or if it has to be initiated by the Member State.

In **Figure 2** a conceptual description of the Poultry population data flows is provided.

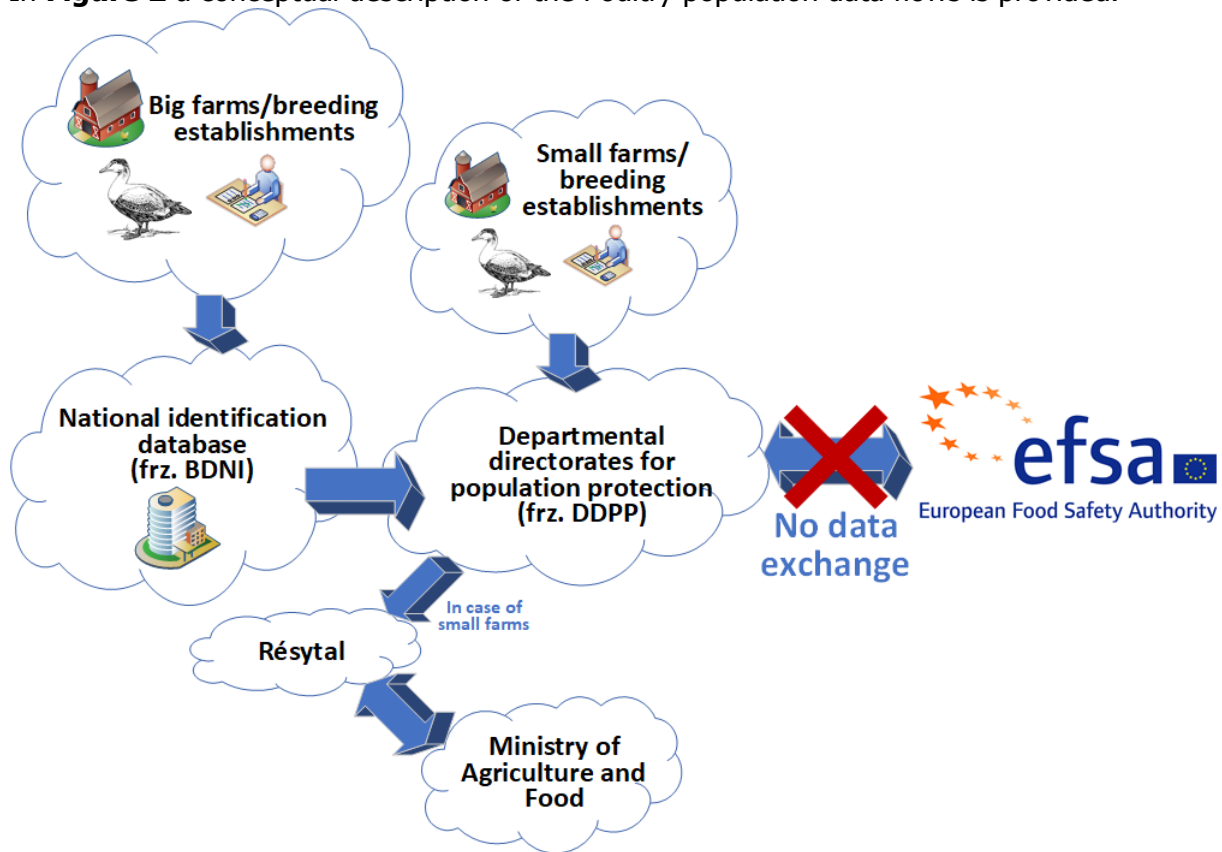


Figure 2: Conceptual description of the Poultry population data flows.

A.6.1.2. Conclusive remarks

The situation regarding the poultry population data in France is complex at the moment, and there are changes to be expected in the near future.

Currently, there are several options to report changed in the poultry flock sizes and there are several databases in place, depending on the size of the flock and the registration necessary. This concerns the registration of the holdings as well as the movements of poultry animals on and off the holdings.

Furthermore, database exist at the level of the ministry (mainly for large commercial holdings) and some at departmental level (smaller commercial holdings and movements of poultry animals).

Currently, there is no exchange of data amongst these databases or to other organisation (e.g., EFSA). Changes in the process of reporting movements of poultry are expected in 2023.

A.7. Germany

A.7.1. Poultry population (IZSAM)

A.7.1.1. Results

Germany is a Federal State with 16 Länder. The Federal Government is responsible for policy and federal legislation. The Länder are responsible for official controls to comply with the legislation in the relevant areas. At national level, the Federal Ministry of Food and Agriculture (BMEL) has almost exclusive competence for food and feed safety, animal health and animal welfare. Its remit encompasses higher federal authorities, public institutions and federal research institutions, including in particular the Federal Office of Consumer Protection and Food Safety (BVL), the Federal Institute for Risk Assessment (BfR), the Federal Agency for Agriculture and Food (BLE), and the Friedrich Loeffler Institut (FLI).

All poultry farmers, regardless of the number of birds held, have to declare their farms to the district veterinary office, by the start of operation at the latest, and notify the kind and number of birds being farmed. In the case of new establishments or change of the facilities, the maximum capacity of each of the stables has to be notified or updated, respectively.

Each farm is codified with a 12-digit registration number to each holding, which is made up of the official municipality code (eight digits) and a four-digit holding number.

Data are collected at local level without use of country-level standardised forms, and using different means, such as paper forms, e-mail, letters, etc.

The local authorities use a data base system known as "Balvi-IP" to register the poultry holdings. Balvi-IP is a specialised software system operated nationwide, designed specifically for the needs of official controls on food and animal health and regularly adapted to new legal requirements. Balvi-IP is a windows-based application with a local accessible database at the level of the district veterinary office. Balvi-IP is produced by a private company.

Currently 401 local poultry databases are in place. No central database exists, although a list of registered holdings is normally available at Länder level (often without the details of the number of birds).

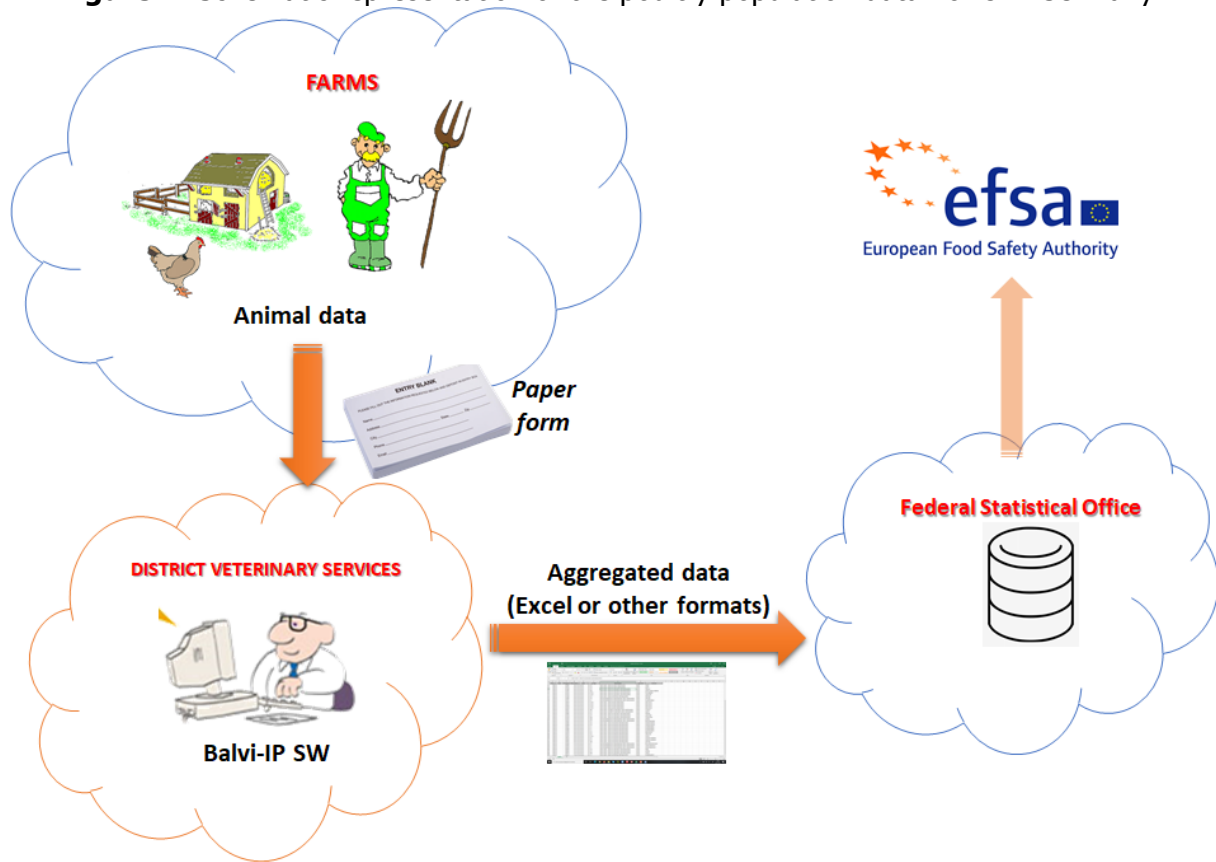
The district veterinary offices report aggregated data on poultry population to the hierarchical upper levels. Only in case of an outbreak, detailed non-aggregated data of all poultry farms of affected districts can be submitted for risk assessments, via the Federal States authorities, to FLI (implemented in federal law), mostly per e-mail of Excel-files.

Annually aggregated data (number of commercial poultry and commercial farms per district) are reported to the Federal Statistical Office for statistical purposes, using standardized form sent by email.

A schematic representation of the data flows related to the poultry population data collection and management is reported in **Figure 1**.

Page Break

Figure 1. Schematic representation of the poultry population data flows in Germany.



A.7.1.2. Conclusive remarks

The major technical obstacle that actually hampers the submission of good quality, detailed poultry population data to EFSA (or any other EU Authorities) is represented by the presence of not-interconnected 401 local databases. The local databases are not accessible with web services or other direct link and a country-wide data collection network is missing.

Therefore, actually only country-wide aggregated data are available from the Federal Statistical Office.

In addition, even if the same software application (Balvi-IP) and basic dataset is used at local level, the utilization of various and different forms by Federal States to collect data at district level determines a large heterogeneity regarding the additional data registered for each establishment.

A.8. Greece

A.8.1. Pig population (FLI)

A.8.1.1. Summary

The collection of the basic data about the pig population is performed by the veterinarians of the regional units all over Greece. However, it was written, that data about domestic pigs are not yet collected.

The data regarding the annual census of each holding are collected digitally through a dedicated web based digital service, which has been developed by Collectives S.A., or paper-based through the veterinary service of regions and regional units.

For this, the animal keeper fills in a special notification form.

The basic data are collected anytime there is a change in the animals' population of the establishment, or a new establishment is registered. Moreover, the population is collected yearly through the application.

The basic data are reported to the regional unit administrative level. The data are physically stored centrally in the application database at the Ministry of Agriculture data Center in Athens. The format of the saved basic data is a relational database (MySQL), which was developed by Collectives S.A.

The basic data are accessed through the computer program (application) developed by Collectives S.A.

The basic data are not exchanged between the administrative levels, as there is a central database.

The basic data are reported to the veterinary services of regions and regional units. There are regional units with more than one local vet offices, which act as aggregating contact points for several municipality units.

The data are not reported to EuroStat.

EFSA can access the basic data or the aggregated data through a web service. This web service is not available, but can be developed in cooperation with EFSA.

The data exchange has to be initiated by the Member State.

A.8.2. Poultry population (FLI)

A.8.2.1. Summary

The collection of the basic data about the poultry population is performed by the veterinarians of the regional units all over Greece.

In the case of laying hens the basic data are collected and reported digitally through a dedicated Computer Program (Application). The application has been developed by Collectives S.A. (Greece). For the remainder of poultry, the basic population data are collected and reported through Microsoft Excel files. A Computer Program has already been developed and is currently under testing. Following the deployment of the application all the poultry basic population data will be collected and reported through Computer Programs.

The basic data are collected anytime there is a change in the laying hens' population of the establishment, or a new establishment is registered. Moreover, the population is collected yearly through the application.

The basic data are reported to the Regional Unit administrative level.

The basic data for the laying hens are physically stored centrally in the application database at the Ministry of Agriculture data center in Athens. The basic data for the rest of the poultry population are physically stored (excel files) in the file server centrally in Athens.

The format of the saved basic data for the laying hens is a relational database (MySQL). The system has been developed by Collectives S.A. (Greece). The format of the saved basic data for the remainder of the poultry population is saved (excel files) in the file server.

The basic data for the laying hens are accessed through the computer program (application) developed by Collectives S.A.. The basic data for the rest of the poultry population are accessed through the file server stored excel files.

For the laying hens there is a central database, so there is no manual exchange between the levels. For the rest of the poultry population, the basic data are exchanged manually by excel files through emails on a yearly basis.

The basic data are aggregated to the NUTS3 level. The data are not reported to Eurostat.

EFSA can access the basic data or the aggregated data through a web service only for the data in the central database (laying hens). This web service is not available but can be developed in cooperation with EFSA.

The data exchange has to be initiated by the Member State.

A.9. Italy

A.9.1. Pig population (FLI)

A.9.1.1. Summary

In Italy, according to the Italian legislation on animal identification and registration, the animal keeper (farmer) has the responsibility to register the data about pig animals kept in the national database. For this task the farmer can delegate the farmer association, private authorised veterinarians or the local veterinary services.

The basic data are collected, reported and can be accessed at <https://www.vetinfo.it> and in case, regional/local databases are in place (not in all regions); the national database is updated through the web service at https://ws.izs.it/j6_bdn/. There are no possibilities considered to update the national database through analogic ways.

The introduction/removal of groups of animals must be registered in the national database within 7 days of the event.

The basic data are reported directly to the national database (RDMS: Oracle PostgreSQL), which is located at the IZSAM in Teramo, this is appointed by the Ministry of Health as National Service Center for animal I&R. In case a region has a regional database in place, the data are registered simultaneously in the national and regional database through web services, in order to avoid any misalignment.

The data can be spatially aggregated to all possible levels (minimum detail=X,Y coordinates) and are made available through an on-line reporting system to the various levels of veterinary services, according to geographical competency, Veterinary Institutes, and other Public Administrations.

Data related to establishments are reported to the National Statistical Agency (ISTAT) every six months.

Currently the national database offers standard web services. According to SIGMA project solutions, it will be possible to develop ad hoc web services or other technologies.

EFSA can access this information once the web services will be jointly defined by EFSA and IZSAM and made available on-line.

A.9.2. Poultry population

The analysis of the answers provided in the questionnaire are ongoing.

A.10. Latvia

A.10.1. Pig population (IZSAM)

A.10.1.1. Results

The description of the authorities responsible for the data collection and management on animal diseases in Latvia has been already provided in a published EFSA report¹. For the sake of clarity here the organization of the main authorities is reported (**Figure 1**).

Latvia (Latvija, LV)

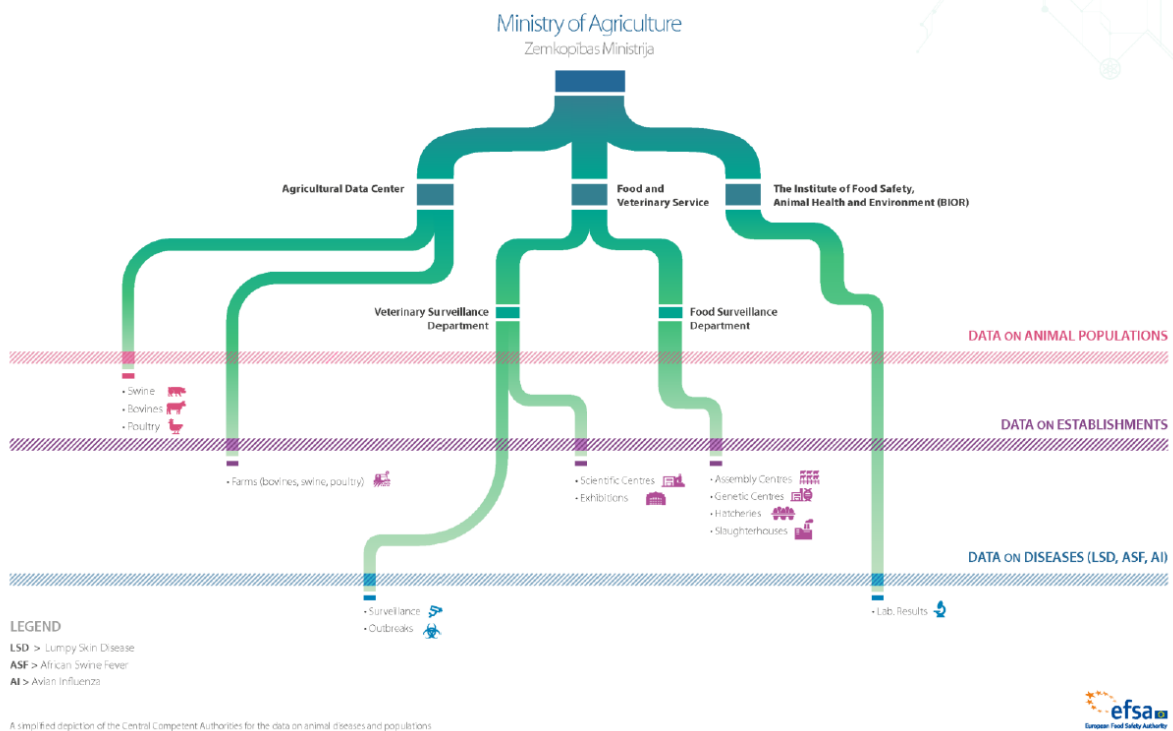


Figure 1: A simplified depiction of the central competent authorities for the data on animal diseases and animal populations in Latvia (source: EFSA, 2019).

In Latvia one central data base for all animal (cattle, pigs, sheep, goats, horses, wild animal, poultry, bees and dogs) is in place. Agricultural Data Centre (ADC) is the authority responsible for managing the livestock central database. ADC is a governmental institution under direct supervision of Ministry of Agriculture.

ADC collects data about pig farms, herd size and movements of animals. Data related pig breeding, selection and the herd book are collected by Pig breeding organization.

Pig population data (census of new born animals, movements in and out the farm, changes of ownership or other related data, etc.) must be notified by the farmer (owner or keeper).

Data can be collected digitally using computer program (via web service interface, or e-mail), or by paper forms.

In the first case, an Electronic Reporting System (Elektronisko ziņojumu ievades sistēmu – EZIS), which is a web based program developed by the ADC, must be used:

http://www ldc.gov.lv/lv/elektroniska_datu_ievade/par_ezis_iesniegumu/

For commercial farms (not for own consumption) the data are updated on monthly basis (data are submitted, electronically or on papers, by the 10th day of the month for the previous month). For own consumption pig herds, the data are updated twice a year: data are submitted, electronically or on papers, within a month after swine initial placement in holding or slaughter /fall and further once in six months by 31st January and 31st July.

Farmers can use paper forms to be sent by letter or fax. To record a herd a natural person or legal entity must submit to the ADC a duly filled "Herd Card". The herd is recorded in the database within 3 days from the receipt of the "Herd Card". A picture of the "Herd Cars" is following:

HOLDING CARD

Event:

Recording of and new HOLDING

Change of Keeper

Specification of location

Complete liquidation of HOLDING

Holding type:

Rearing place

Utilisation place or slaughterhouse

New number assigned by ADC

LV

Location

Street, house number, apartment NO./ house name

City/ settlement

Rural municipality

District

Geographical coordinates

X Longitude Y Latitude

Real estate cadastral number:
(to fill in)

ANIMAL KEEPER IN HOLDING (owner of animals means holders)

Keeper Recording number
or
 -
Keeper's personal code

Name, surname or name of undertaking

Mobile phone number Phone number

E-mail

Keeper signature and print name

Pay information (filled in by ADC employee):

ADC remarks

Each holding is recorded into the ADC IC (Agricultural Data Centre Information System), and a number LV#+6 digits (e.g., LV1123456) is assigned. The first digit code depends on the holding operation type (1- Rearing place; 2-Utilisation place or slaughterhouse; 3- Exhibition, competition; 4- Separate pastures; 5- Trading venue; 6-Recreation area; 7-Border post; 8-Quarantine site).

For the monthly update of the data the following form ("monthly swine movement summary form"), is used.

SWINE MONTHLY MOVEMENT SUMMARY

Herd No.: LV

Holding No.: LV

Owner: _____

Report on : / 2 0
month year

Reporting period	Born	Slaughtered in holding	Fallen	Alive at the end of the reporting period
Suckling pigs				
	Weaned pigs			
	Feeder swine			
	Rearing swine			
	Gilts			
	Sows			
	Boars			
	TOTAL			

Completed by: _____

/ 2 0
Date month year

<i>Signature</i>	<i>Print name</i>

ADC remarks:

NB!
 Swine arrival/ departure is to be reported in the Animal Status Declaration!

In case of own consumption herds, the following form is used.

SWINE OWN CONSUMPTION SUMMARY

Herd No.: LV Holding No.: LV

Owner: _____

Reporting period:
(mark "X" in appropriate boxes)

<input type="checkbox"/>	H1	2	0	<input type="text"/>	<input type="text"/>
<input type="checkbox"/>	H2	2	0	<input type="text"/>	<input type="text"/>

Or swine initial placement (or complete exclusion)

<input type="checkbox"/>	<input type="text"/>	2	0	<input type="text"/>	<input type="text"/>
	month		year		

Reporting period	Slaughtered in holding	Fallen	Alive at the end of the reporting period
Feeder swine			

Completed by: _____

<input type="text"/>	<input type="text"/>	2	0	<input type="text"/>	<input type="text"/>
Date	month		year	Signature	Print name

ADC remarks:

NB!

Swine arrival is to be reported in the Animal Status Declaration!

All data are stored in the central data base located at the ADC. Data are stored and administered using Microsoft SQL or using a computer program (EZIS) using a web service. All administrative institutions are connected with the central data base. However, if necessary, specific data can be automatically provided to Food and Veterinary Service or other Institutions.

For each herd information about Municipality and ZIP code are recorder. Also lat/lon geographic coordinates may be collected and registered.

ADC reports aggregated data to Central Statistical Bureau of Latvia, which reports all data about animal number to EuroStat. Animal statistics are reported also to offices of Ministry of Agriculture, which reports data to FAO.

Basic data or aggregated data can be accessed in an authorized computer program via web services. In case Latvia authorities agree to exchange data with EFSA, ADC can create a web service that will provide data exchange for basic or aggregated data.

In **Figure 2** a conceptual description of the pig population data flows is provided.

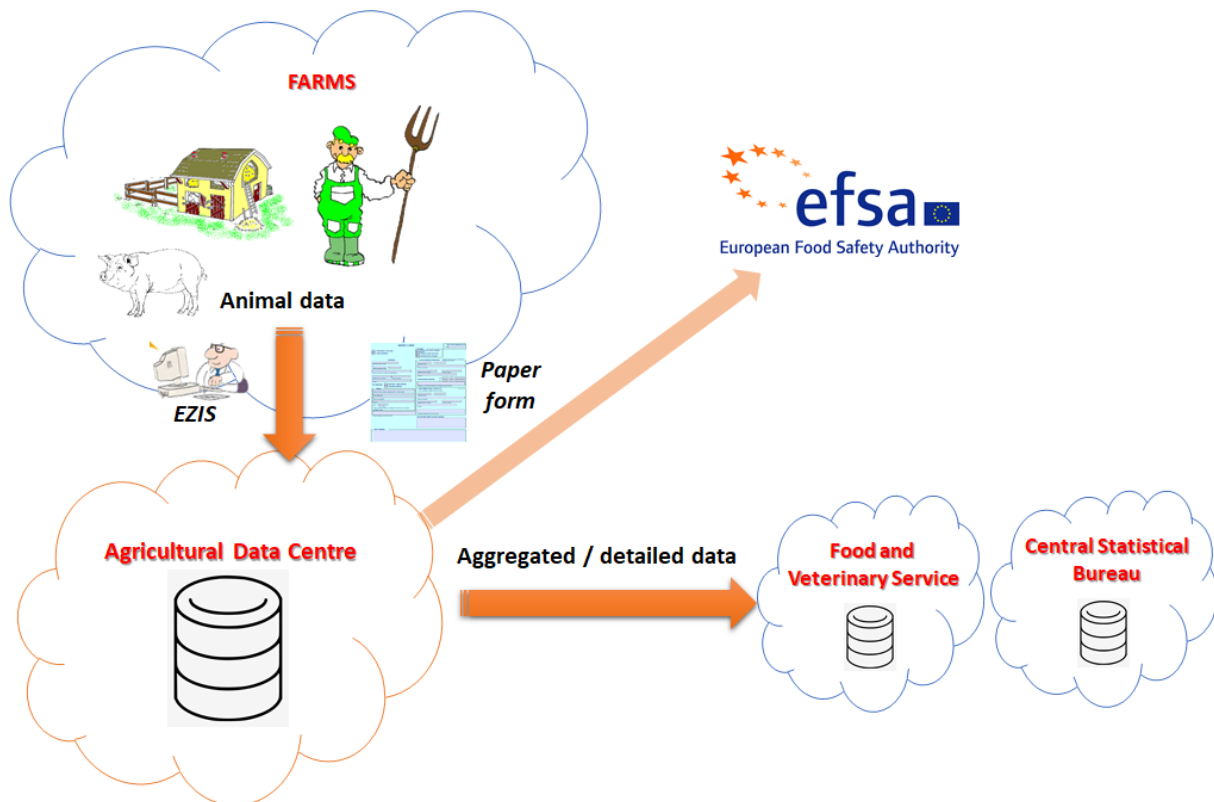


Figure 2: Conceptual description of the pig population data flows.

A.10.1.2. Conclusive remarks

The collection of livestock population data is well organised in Latvia and a single central authority (ADC) assures the management and consolidation of a unique national database. No major technical obstacles are identified for the submission of good quality, sample-based data to EFSA.

A.11. Romania

A.11.1. Pig population (IZSAM)

A.11.1.1. Results

Farmers of non-professional farms (backyard or own consumption pig herds) must notify any event concerning the production of pigs (new born animal, purchase or sale of animals, death or slaughter) to so called "empowered veterinarians", who are veterinarians appointed by the local veterinary services to visit, inspect and checks these type of farms.

The empowered veterinarians have the duty of recording all animal identification data into the National Database, to which they have access.

For commercial farms, the registration into the national database of the farm's data is made by a person designated by the farmer to operate in the database. The contact details of this

person are notified to the territorial competent authority and to the database associated operator.

Farmers notify all the updates regarding their own farm to the authorized and empowered veterinarian orally, in writing or by e-mail. Farmers must notify the events within 7 days.

Also, empowered veterinarians are required to keep a Register of Notifications at the medical office where the animal owners enter the event they wish to notify.

In addition to the continuous registration of events, an animal census is performed twice a year by the empowered and authorised veterinarians. During the census also the correct application of identification and registration rules are verified.

Concerning the level of detail of geographical localization of farms, geographical coordinates (latitude and longitudes), together with exact address are collected for commercial pig farms.

For backyard and own consumption farms latitude and longitude information is available only if they are the place of an outbreak. For backyard farms data on Municipality (LAU) is available.

The national database is under the competence of the National Sanitary Veterinary and Food Safety Authority (ANSVSA). From the technical point of view, the database is managed by a private IT company under a service contract with ANSVSA. The same company has developed the software and interfaces for data entry and retrieval.

In addition to the actors in charge of updating the data of the national database, as animals owners, private (empowered or authorised) veterinarians, slaughterhouses, etc.. also the Regional Veterinary Directorates (42 offices), Regional Veterinary Laboratories (county laboratories) and the Institute for Diagnosis and Animal Health (IDAH) have access to the national database.

Data extraction and retrieval may be obtained through specific statistical tools already developed by the company managing the national database. Other specific data extraction must be requested to the IT company.

The national livestock database is centralised and the data is stored in PostgreSQL relational databases.

Data stored in the national database can be accessed by:

- secured web application and access web form,
- web services API for APIA.

Following mutual agreement, basic/aggregated data can be transmitted to EFSA. It must be verified with the IT private company the possible costs for these additional work.

In **Figure 1** a conceptual description of the pig population data flows is provided.

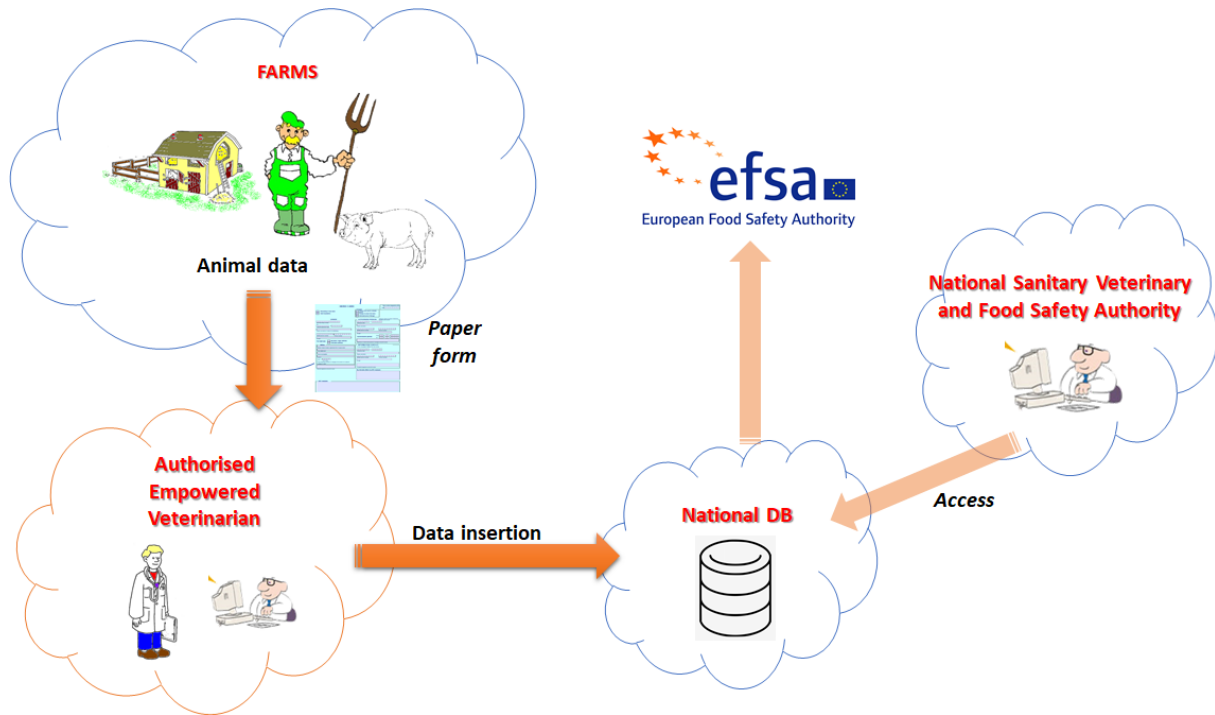


Figure 1: Conceptual description of the pig population data flows.

A.11.1.2. Conclusive remarks

The collection of livestock population data is organised through the “authorised” and “empowered” veterinarians, who register the data directly into the national database. Regional Veterinary Directorates (42 offices), Regional Veterinary Laboratories (county laboratories) and the Institute for Diagnosis and Animal Health (IDAH) have access to the national database, but it is not fully clear the sharing level of these data with the ANSVSA at central level.

The management of the national database by an external private company could represent a possible technical obstacle for the submission of good quality, sample-based data to EFSA.

A.12. Slovakia

A.12.1. Pig population (IZSAM)

A.12.1.1. Results

The description of the authorities responsible for the data collection and management on animal diseases in Slovakia has been already provided in a published EFSA report¹. For the sake of clarity here the organization of the main authorities is reported (**Figure 1**).

Slovakia (Slovensko, SK)

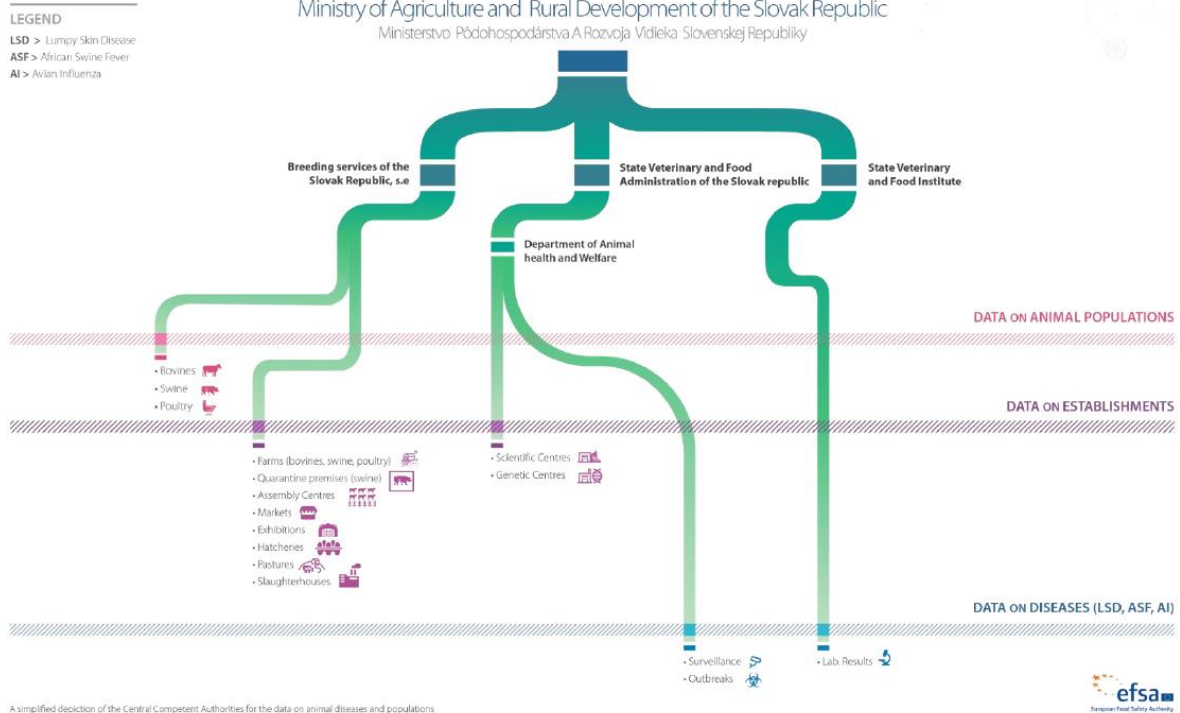


Figure 1: A simplified depiction of the central competent authorities for the data on animal diseases and animal populations in Latvia (source: EFSA, 2019).

The national livestock register (Centrálna Evidencia Hospodárskych Zvierat – CEHZ - <https://www.cehz.sk>), including pigs, is managed by the Breeding services of the Slovak Republic (BSS, <http://www.pssr.sk/index.php/en/organization/>), where the central database is stored. BSS is a state enterprise.

Farmers are responsible for directly updating the data recorded in the national register.

Farmers can update the data stored in the national livestock register using various alternatives: (1) by e-mail, providing xml files as attachments, (2) through a website (www.cehz.sk), where after login, farmers can insert an xml file, or (3) or using API.

A computer program (called "WinregOŠ" for pigs, <https://www.winreg.sk/>) can also be used by farmers to maintain the animal register updated.

WinregOŠ is a software application characterized by the following options:

- keep an individual register of pigs in electronic form and update it (insertion, correction, deletion of its records),
- viewing the individual register according to various time and other defined criteria,
- printing of an individual register according to time and other defined criteria,
- create monthly reports in electronic and printed form from the individual register to the central database of livestock records (CEHZ),
- generate correction reports automatically based on corrections in the individual pig register,
- back-generate reports for previous periods,

- create various statistical and summary reports from an individual register according to various defined criteria,
- connection with CEHZ in electronic (internet - farmer's access) and in print (report report) form,
- keep an individual register of pigs for several holdings on one workstation.

Farmers can update the CEHZ also using forms, by letters, which are generated by WinregOŠ. Therefore, through the various alternatives described above, the data on CEHZ are updated on daily basis, both for herds and individual pigs kept.

In relation to farm's localization data, exact geographical coordinates (lat/lon) are recorded for the great majority of establishments, although not for all. In all cases the indication of Municipalities (LAU level) is always reported.

Automatized data exchanges by web services are in place between the national livestock register and the veterinary services of the State Veterinary and Food Administration (SVFA), to synchronise all information related livestock animals. In addition, State Veterinary and Food Institute (SVFI) is synchronised with the information system of the SVFA.

The synchronisation between CEHZ and the veterinary information system is made every two weeks. With the same frequency the data stored in the SVFI is synchronised with those recorded in the veterinary information system at SVFA. Therefore, a maximum delay of 4 weeks can affect the data recorded in the SVFI.

The database of the CEHZ is based on Oracle. The database of the SVFI is based on Microsoft SQL.

National register is accessible through website (username and password requested): www.cehz.sk.

An automatic access, through web services or similar technical solutions, could be provided to EFSA for data exchange, if agreed by the competent Slovak authorities. Detailed data at farm level can be provided.

In **Figure 2** a conceptual description of the pig population data flows is provided.

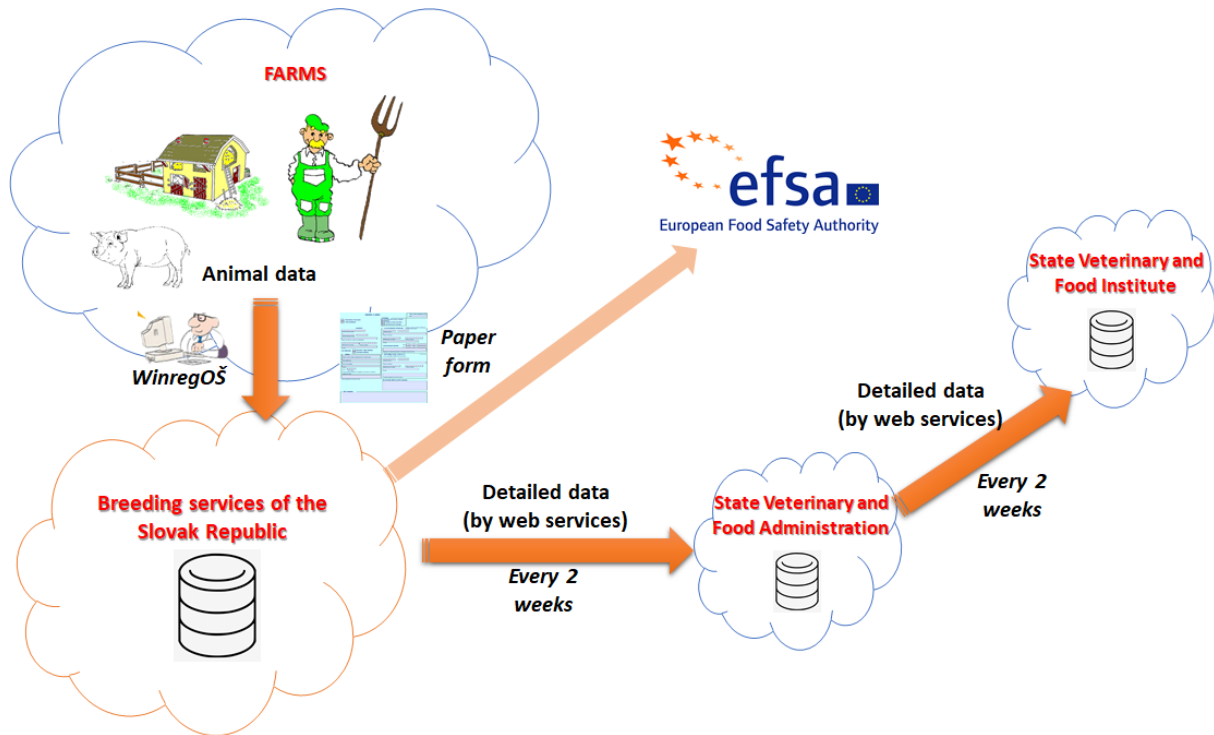


Figure 2: Conceptual description of the pig population data flows.

A.12.1.2. Conclusive remarks

The collection of livestock population data is well organised in Slovakia and a single central authority (ADC) assures the management and consolidation of a unique national database. No major technical obstacles are identified for the submission of good quality, sample-based data to EFSA.

A.13. Spain

A.13.1. Pig population

The analysis of the answers provided in the questionnaire are ongoing.

A.13.2. Poultry population (FLI)

A.13.2.1. Summary

In Spain, the Agricultural County Offices collect the basic data regarding poultry population from the farmers and then reports these data to the competent authority of the Autonomous Community (NUTS2) digitally; this is covered in the national legislation. The data is recorded and administered in different relational databases, which are working with different systems (Microsoft SQL, Oracle PostgreSQL, MySQL and others).

The basic data at the level of municipality are stored independently, but they can be provided aggregated on a higher level (country, autonomous community –NUTS 2- or province -NUTS 3-) under request.

The Spanish Ministry of Agriculture, Fisheries and Food has its own integrated management system with a dedicated distribution channel. The inventory of animals is declared once a year and the other data are automatically updated in the central database when the competent authority enters the information. The data is physically stored in a data processing centre under the Ministry of Agriculture, Fisheries and Food.

The data is accessible to competent authorities, laboratories, law enforcement and other authorised bodies at <https://programasnet.magrama.es/sitran/>. A per user registration is required.

A different department in the Ministry of Agriculture, Fisheries and Food provides the data reported to EuroStat.

EFSA can access this information by web service and the data exchange can be initiated by EFSA.

A.14. Kosovo

A.14.1. Pig population (IZSAM)

A.14.1.1. Results

The description of the authorities responsible for the data collection and management on animal populations and animal diseases in Kosovo has been provided in an EFSA report¹. Here the organization chart of the main authorities is provided (**Figure 1**).

Kosovo*

LEGEND

LSD > Lumpy Skin Disease
 ASF > African Swine Fever
 AI > Avian Influenza

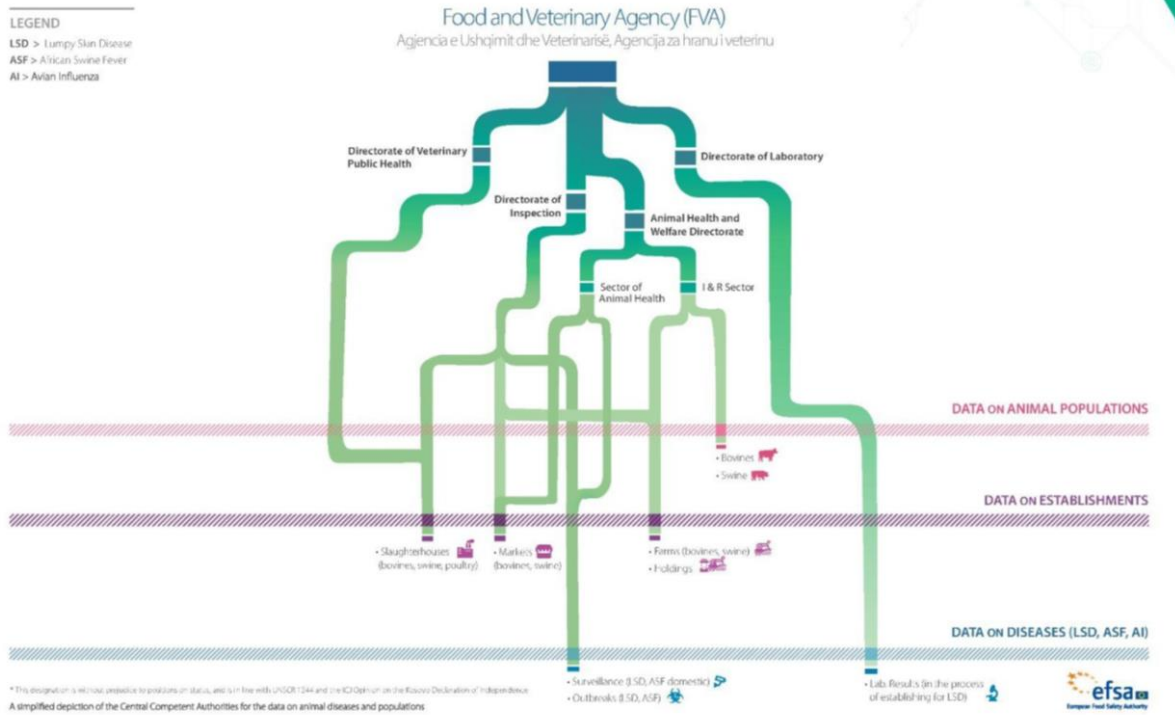


Figure 1: A simplified depiction of the central competent authorities for the data on animal diseases and animal populations in Kosovo (source: EFSA, 2020).

In Kosovo the Food and Veterinary Agency (FVA; <https://auvk.rks-gov.net/>) is responsible for collection and management of production animal data. There are two directorates of the FVA that deal with the data on animal populations and the establishments where live animals are kept. The Animal Health and Welfare Directorate is responsible for data on bovine and swine populations, and for the data on farms, holdings and markets. The Directorate of Inspection which has 6 regional offices is responsible for data collection on production animals and establishments such as farms, holdings, markets and slaughterhouses (EFSA, 2020).

There is one central database for production animals in Kosovo - KFVA (Animal Register) located at FVA sector of Identification and Registration (IR). The data on animals on farm are collected by the field veterinarians (contracted private veterinarians) during the farm visits.

¹ EFSA (European Food Safety Authority), 2020. Data sources on animal diseases: Country Card of Kosovo. EFSA Supporting publication 2020:EN-1840. 10 pp. DOI: <https://doi.org/10.2903/sp.efsa.2020.EN-1840>

The animal data are reported by the field veterinarian to the Animal Register database. The database can be accessed over the internet and data insert directly into the database (<http://84.22.58.106/ir>).

As a second option the field veterinarian may enter the data into an Excel file that is then sent to the Animal Register by e-mail. The basic data on pigs are updated every time when the field veterinarian visits the farm and that takes place in most of the cases once a week. Basic data registered in the Animal Register are: the farm identification number, type of the farm, localization of the farm including geo coordinates and number of pigs in the farm by animal categories.

The data are stored at the computer centre of the IR sector of the FVA in a relational database (Microsoft SQL). The database can be accessed over the internet with password permission. The data sharing with EFSA could be done by sharing the files.

A.14.1.2. Conclusive remarks

The collection of pig population data is well organised in Kosovo and a single central authority (FVA) assures the management and consolidation of a unique national database. No major technical obstacles are identified for the submission of data to EFSA.

A.15. Montenegro

A.15.1. Pig population (IZSAM)

A.15.1.1. Results

The description of the authorities responsible for the data collection and management on animal diseases in Montenegro has been already provided in a published EFSA report¹. For the sake of clarity here the organization of the main authorities is reported (Figure 1).

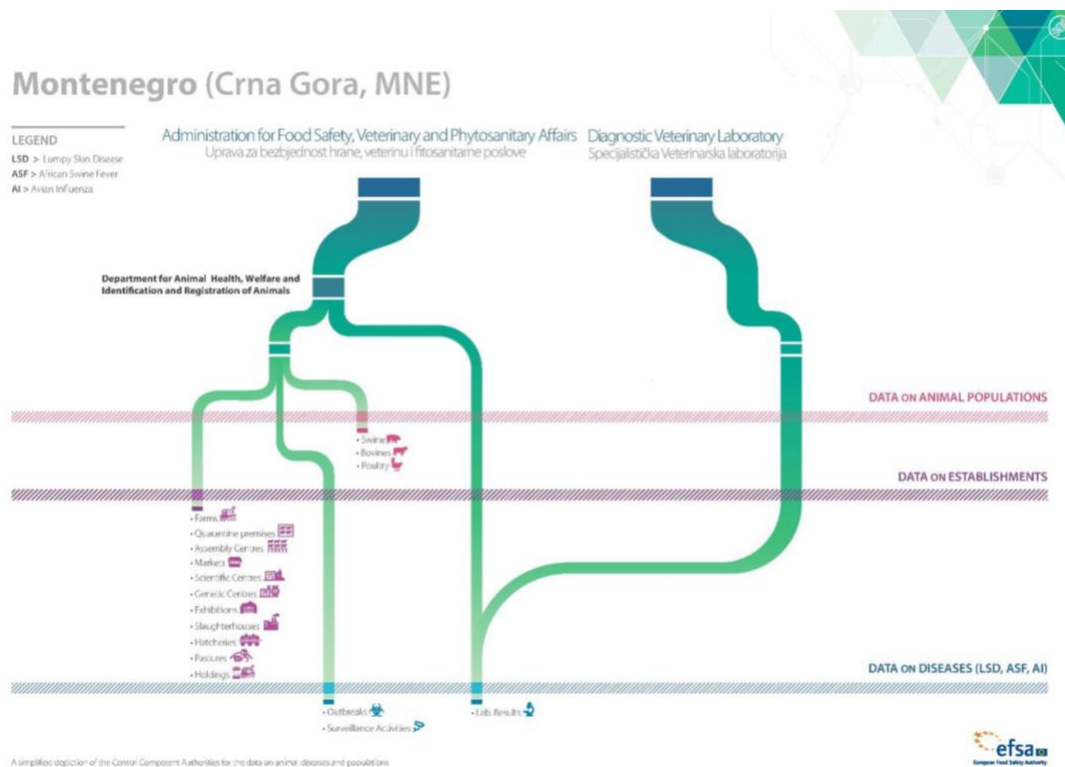


Figure 1: A simplified depiction of the central competent authorities for the data on animal diseases and animal populations in Montenegro. (source: EFSA, 2020).

The Administration for Food Safety, Veterinary and Phytosanitary Affairs and the Diagnostic Veterinary Laboratory, located in Podgorica are the two central sources of data related to animal diseases and animal populations in Montenegro (Figure 1, Tables 1 – 3). The Department for Animal Health, Welfare and Identification and Registration of Animals, within the Administration for Food Safety, Veterinary and Phytosanitary Affairs, is specifically in charge of the data on bovine, swine, and poultry populations and the establishments where live animals are kept.

In Montenegro different regional and local authorities are also participating in the collection and management of the data at primary level in order to make them available to the central authorities.

There is one central national database for registration of animal population in place. The pigs and pig holdings (commercial and non-commercial) are subject of official identification and registration at individual level. Geographical localization of the pig holding only exists at the municipal level, the GEO on latitude and longitude of the individual holdings are not recorded. The basic data on pig population is collected on different administrative levels by the registered (contracted/private) veterinarians at local levels and further recorded into the Central database. The data is gathered during the routine veterinary inspections at holdings, via notification by the owner in case of changes of the number of pigs and regular annual censuses every 6 months. Additionally, identification and registration checks and update of data on animal population in the Central database is carried out within the implementation of different animal health control programmes (for instance: Programme of Mandatory Animal Health

Protection Measures for 2020, Subprogram 12. Classical Swine Fever, Item 12.1. requiring ad laid down animal inspection of domestic pigs in all pig keeping holdings.

The basic data is automatically recorded and stored in the data processing centre/ national database system. The national database system used is Oracle Database 11g Release 11.2.0.1.0 - 64bit Production. The system and the basic data respectively could be accessed via the website of the system (using public internet).

The Statistical Office of Montenegro is responsible institution for providing and reporting data to Eurostat.

Montenegro expresses its readiness to report/exchange the data on pig population to EFSA, upon request.

A.15.1.2. Conclusive remarks

The collection of livestock population data is organised via using a central database and no major technical obstacles are identified for the submission of good quality, animal population-based data to EFSA.

A.16. North Macedonia

A.16.1. Pig population (IZSAM)

A.16.1.1. Results

The description of the authorities responsible for the data collection and management on animal diseases in North Macedonia has been already provided in a published EFSA report¹. For the sake of clarity here the organization of the main authorities is reported (Figure 1).

North Macedonia (Северна Македонија, MK)

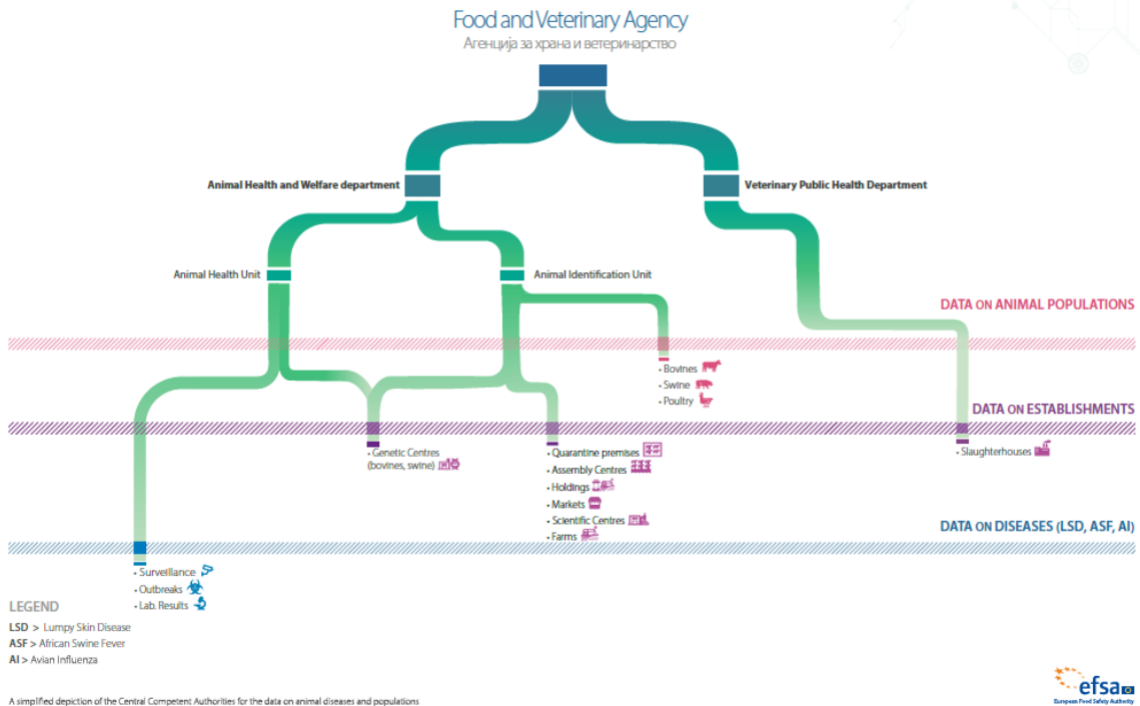


Figure 1: A simplified depiction of the central competent authorities for the data on animal diseases and animal populations in North Macedonia.

The Food and Veterinary Agency (FVA), located in Skopje is the central source of data related to animal diseases and animal populations in North Macedonia (Figure 1). Within this Agency the Animal Identification Unit and Animal Health Unit are those responsible for the data on diseases (LSD, ASF, AI) such as those for outbreaks, for laboratory results and for the surveillance activities as well as registration and identification of animals and animal holdings. The Veterinary Public Health Department in the Food and Veterinary Agency is responsible for the collection of the data for slaughterhouses.

In North Macedonia different regional and local authorities are also participating in the collection and management of the data at the primary level in order to make them available to the central authorities.

With regard to the data on pig population the basic data is collected by the Department for animal health and welfare, at the FVA. Data on pig population is recorded in the central database, maintained by the FVA - ISFVA (information system of the FVA).

The basic data for pig population is collected by the contracted veterinarians (at local levels) and recorded to the ISFVA. Census is performed annually each year in February and all data are entered in the central data base – ISFVA). Hard copies of the pig population data at local level are also kept by the local offices of the contracted veterinarians. Contracted veterinarians are responsible for entering the data in the central data base – ISFVA directly.

The animal owners are obliged to report number of pig animals during the annual census in February. The total number of pigs in the farm is divided into the different categories (piglets up to 20 kg; fattening pigs; gilts; sows; boars). The animal owners are obligated to record all changes on the holding (births, deaths, purchase, selling) within 7 days from the date of the event in the farm register (paper register), but there is no such obligation for the database. Pigs have to be identified with an ear tag or tattoo on the left side of the body, before the animal leaves the holding. Identification of the pigs used is an individual mark, in case of holdings keeping <100 pigs (from all categories); individual or group mark (consist the reg. number of the holding) in case of holdings keeping > 100 pigs (from all categories); tattoo (reg. number of the holding).

In 2018, the FVA upgraded the system and opened the possibility to enter the data about location of the holdings, by entering the geographical coordinates of farms. All holdings have information for Latitude and Longitude which lead to the very precise location of the farm. According current legislation in North Macedonia, until 2019 keepers who had only one pig for their own use, had no obligation to identify the animal. But due to the unfavourable epidemiological situation in the neighbour countries in 2018 with regard to ASF, an additional census of pig farms was carried out in November 2019, in order to obtain a real picture of a number of animals in the country. The census also includes holdings with one pig that have not been included in the system before. For the time being the FVA census will continue to include backyard holdings.

The basic data at state level, at computer centre/data processing centre system using Relational database (Oracle PostgreSQL).

The database can be accessed via web application developed by a private contractor.

The basic data is exchanged between the administrative levels automatically through the central database, as specific reports are developed by private contractor maintaining the database.

The FVA can aggregated data on both NUTS3 and NUTS level of region, municipalities and villages.

The FVA sends reports on annual basis to EuroStat, depending on the nature of the request. EFSA could access the basic data and aggregated data via the web service. So far, it has not been clarified whether the data exchange can be initiated by EFSA or if it has to be initiated by the Member State.

A.16.1.2. Conclusive remarks

The FVA has maintained and recorded the data on pig population at a central database (ISFVA) as the data could be clear aggregated to different local levels, which consequently could provide the submission of good quality of animal population data to EFSA.

EFSA could access the basic data and aggregated data via the web service, however, it has not been still clarified whether the data exchange can be initiated by EFSA or if it has to be initiated by the Member State.

A.17. Serbia

A.17.1. Pig population (IZSAM)

A.17.1.1. Results

The description of the authorities responsible for the data collection and management on animal populations and diseases in Serbia has been provided in an EFSA report¹. Here the organization chart of the main authorities is provided (**Figure 1**).

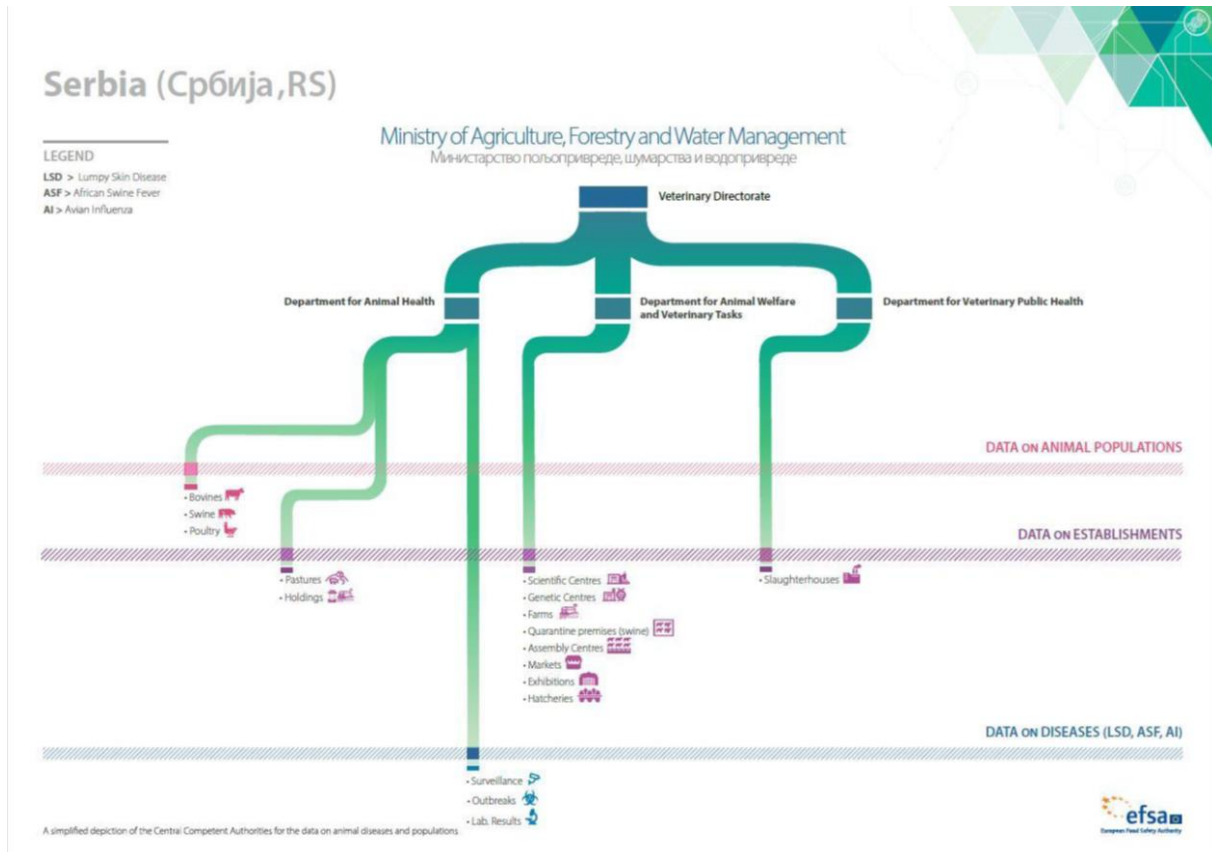


Figure 1: A simplified depiction of the central competent authorities for the data on animal diseases and animal populations in Serbia (source: EFSA, 2020).

In Serbia the Veterinary Directorate of the Ministry of Agriculture, Forestry and Water Management is the central source of data related to animal populations (Figure 1). In particular, the Veterinary Directorate oversees the data on animal populations, the establishments where live animals are kept. Different regional and local authorities are also participating in the collection and management of the data at the primary level in order to make them available to the central authorities. (EFSA, 2020).

There is one central database (relational database) for production animals in Serbia (Animal Register) located at VA. The data on animals on farm are collected by the private veterinary practitioners during the farm visits using specific paper forms. The basic data are usually collected at least quarterly. In the areas of high disease risk the data have to be updated monthly.

The animal data are entered by the field veterinarian to the Animal Register database. The database can be accessed over the internet and data inserted directly into the database.

¹ EFSA (European Food Safety Authority), 2020. Data sources on animal diseases: Country Card of Serbia. First published: 28 April 2020 DOI: <https://doi.org/10.2903/sp.efsa.2020.EN-1851>

Basic data registered in the Animal Register are: ID of holdings; Individual ID of breeding pigs; number of pigs in the holding by animal categories (sows, fatteners etc.); type of the farm, location of the holding including geo-coordinates. Owners' information include the name, settlement, municipality, district and address.

A.17.1.2. Conclusive remarks

The collection of pig population data is well organised in Serbia and a single central authority (VA) assures the management and consolidation of a unique national database. No major technical obstacles are identified for the submission of data to EFSA. The data exchange should be initiated by EFSA.