

The integrated management system for *Salmonella* control plan in Italy

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The national *Salmonella* control Plan

In 2003, the European Union set for Member States the objectives of reducing the prevalence of *Salmonella* on the basis of specific control programs approved by the Commission (Commission Regulation (EC) No. 2160/2003). In Italy, a National *Salmonella* control Plan (PNCS) aimed at controlling relevant *Salmonella* serovars in *Gallus gallus* breeding flocks, laying hens and broilers as well as in fattening and breeding turkey flocks is issued every year in accordance with EU provisions [1, 2]. The Plan is prepared by the Italian Ministry of Health in collaboration with the National Reference Laboratory for *Salmonella* and the National Reference Centre for veterinary epidemiology and risk analysis (COVEPI).

The following serovars are considered as relevant for public health: *S. Enteritidis*, *S. Infantis*, *S. Hadar*, *S. Typhimurium* and *S. Virchow* for breeding flocks of *Gallus gallus*; *S. Enteritidis* and *S. Typhimurium* (including the monophasic variant) for the other categories of poultry foreseen by the Plan.

The Plan is mandatory for poultry farms with commercial purposes (not for own consumption) and for all farms with a capacity of more than 250 animals. The epidemiological unit is the flock, defined as "all poultry of the same health status of the same breeding cycle, with the same date of placement kept on the same premises or in the same enclosure and constituting a single epidemiological unit". This aspect is crucial because the flock is the unit of reference for the evaluation of the reduction target of *Salmonella* prevalence.

According to the Plan, sampling activities must be performed both by public health authorities and food business operators (FBOs) and are aimed at identifying flocks positive for *Salmonella* spp. In case of identification of serovars relevant to public health, sanitary measures are applied in order to control the infection and avoid the dissemination of salmonellae in food products.

Organization of the information flow

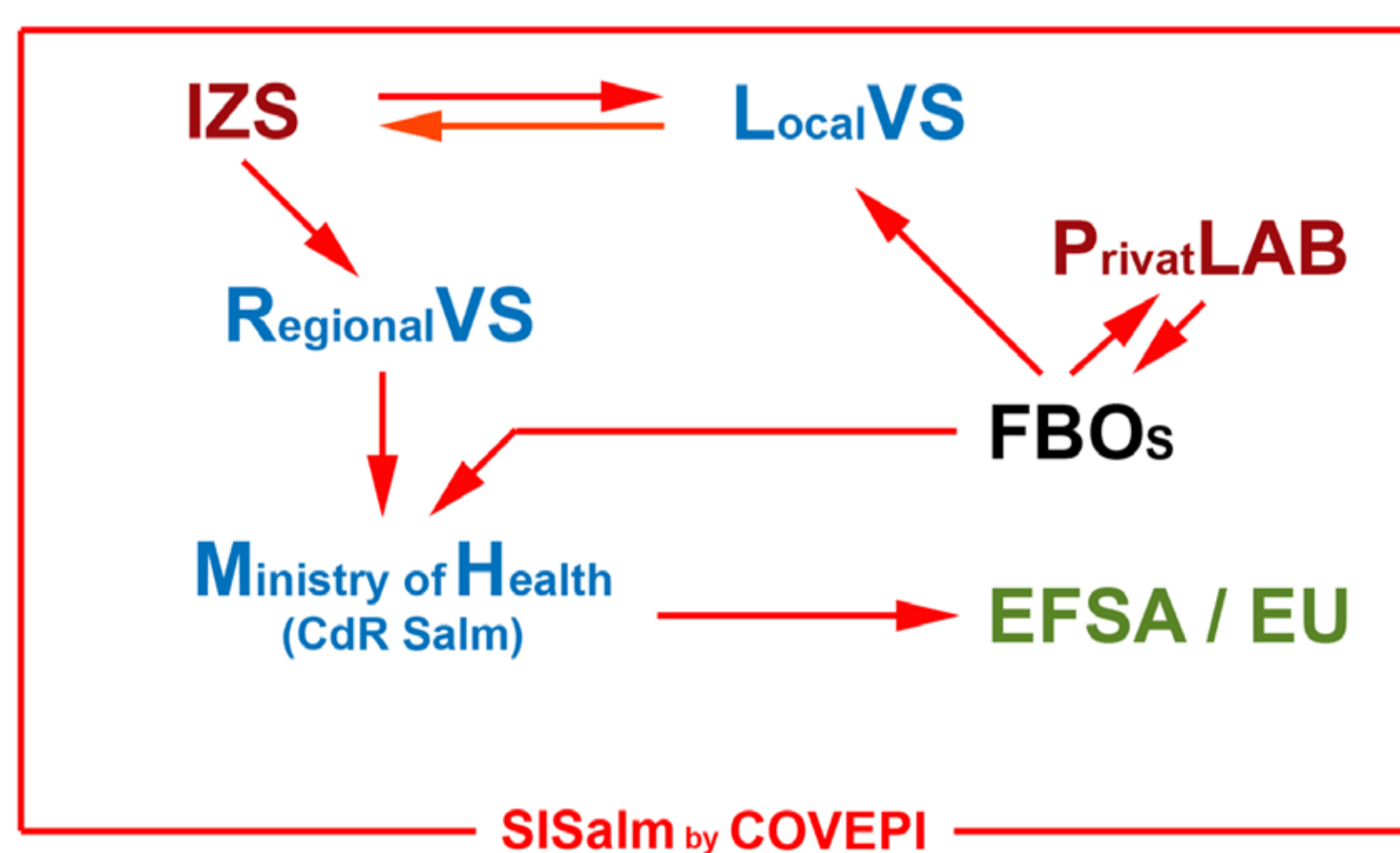
As regards data on official sampling, SISalm is fed by the regional veterinary services (RVS) and by the veterinary service of the local health units (LHU) (also through the official laboratories), who can access the system also for consulting detailed data of their territorial competence on both FBO and their activities.

Data on industry sampling derives directly from the FBO: once logged in through appropriate credentials, the FBO can feed the system, view and download data only of his own farms according to the registration saved in the National Animal Identification, Registration & Traceability (AIRT) system [3] (Figure 3). Industry sampling is an integral part of the controls: where the FBOs are required to apply the relevant legislation, the competent authorities have the obligation to ensure its conformity [4]. This principle is valid for all FBO and for all the stages of production, from the farm to the sale of food to the consumer, in line with European policy "from farm to fork" [5]. Moreover, all the results of the sampling activities carried out by the veterinary services and by the FBO are used by the EC to evaluate whether the reduction target is met.

The samples collected by the veterinary services are tested by laboratories of public health institutes (IZS). Both public and private laboratories (the latter are allowed to analyse samples taken by FBO) are accredited by a national accreditation body (Accredia) according to EN/ISO 17025: 2005 rule, as required by Regulation (EC) n. 2160/2003.

The National Reference Laboratory (NRL) for *Salmonella*, performs the analysis on official confirmatory samples that are collected by veterinary services in exceptional circumstances. Moreover, it organises proficiency tests for the laboratories performing analysis in the framework of the Plan.

Figure 3. Actors and Information flows.



SISalm

SISalm is a web application for management of data derived from the National *Salmonella* control Plans, in agreement with the community legislation and to satisfy the demand of the veterinary services, the local and central public health authorities and of the FBOs as well.

It was developed by COVEPI, using the Java Enterprise Edition (Java EE) platform and is available on the portal of Veterinary information systems of the Italian Ministry of Health (www.vetinfo.sanita.it). The use of SISalm became mandatory in 2009 for the collection of data on official sampling and since 2012, also for data on FBO sampling for all the poultry categories considered by the Plan.

The left side of the portal is public and does NOT require authentication for access. You can view the annual plan, the activities and performance per region and period compared to both the official and own-check sampling. Statistics are also available in excel format (Figure 1).

In SISalm restricted part, data can be entered using on line forms (Figure 2) or uploading XML files and can be queried summarizing and grouping data by sampling period, farms, flocks sampled, samples and results. Each report can be downloaded by the users in relation to their own territorial competence. It is also possible to download in Microsoft Excel format all details of the data entered according to the specific user role. Moreover, the system produces reports with statistics on the trend of the sampling plan, showing for example how many samples are collected in a given region and time period compared to those expected, how many positive results and which *Salmonella* serovars have been isolated. All reports are available in Excel format (Table 1).

Figure 1. Zoonoses free part in National Veterinary portal (www.vetinfo.sanita.it).

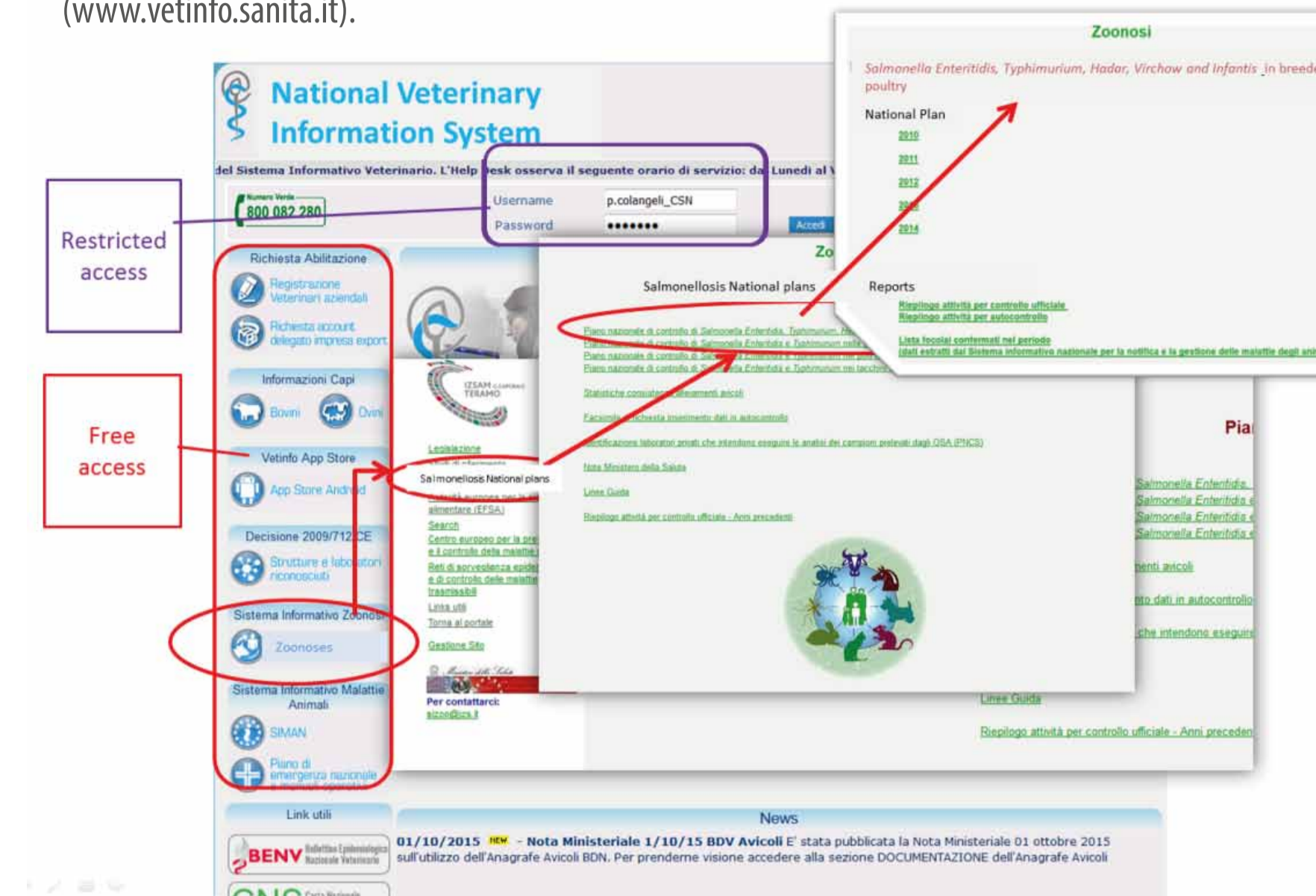


Figure 2. Form to insert sampling activity data.



Table 1. Reports with statistics on official control activities carried out by the Local Competent Authorities on breeding flocks of *Gallus gallus* in 2014.

Region	Flocks to be tested	Flocks tested at holding	Flocks positive for <i>Salmonella</i>	Flocks positive by serovars					
				<i>S. Enteritidis</i>	<i>S. Typhimurium</i>	<i>S. Hadar</i>	<i>S. Virchow</i>	<i>S. Infantis</i>	Others
Abruzzo	159	56							
Basilicata	15	34							
Calabria	0	0							
Campania	7	6	1						1
Emilia Romagna	202	202	1						1
Friuli Venezia Giulia	24	48							
Lazio	4	8	1						1
Liguria	0	0							
Lombardia	243	317	5						2 3
Marche	9	4							
Molise	59	57	2						2
Piemonte	139	201							
Puglia	7	7							
Sardegna	3	5							
Sicilia	0	0							
Toscana	0	0							
Trentino - Alto Adige (Tn)	9	19							
Umbria	58	79	1						1
Valle D'Aosta	0	0							
Veneto	261	210	2						2
TOTAL ITALY	1199	1253	13						3 10

Other functionalities

SISalm manages the list of the private laboratories authorized for the analysis of the FBO samples (Figure 4). It is a dynamic and constantly updated list as SISalm interfaces both with the database of Accredia, to confirm the requirements satisfaction during time, and with the National Reference Laboratory for *Salmonella*, which periodically organizes proficiency tests, in order to verify the ability of the laboratories to isolate *Salmonella* spp.

Figure 4.

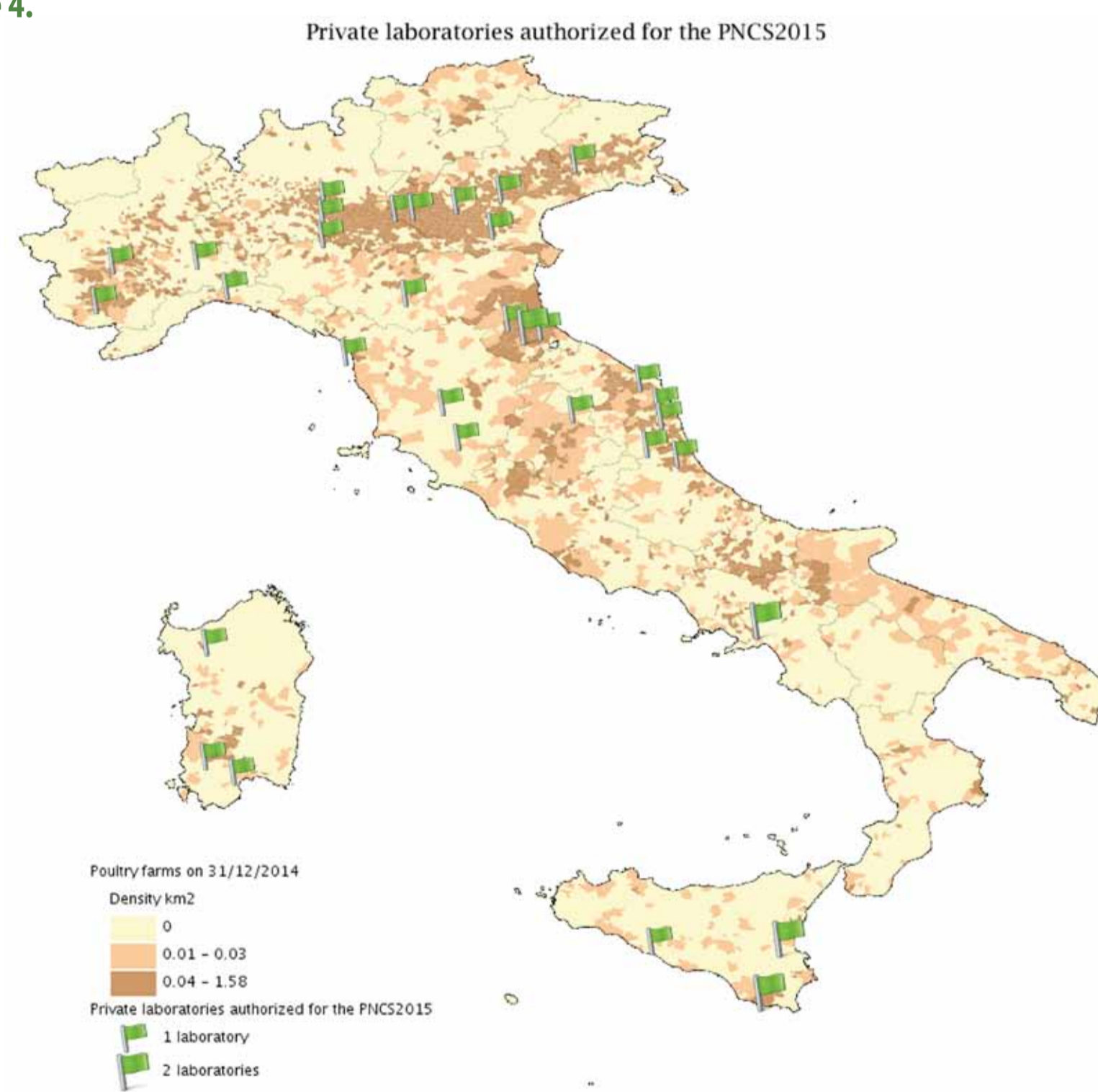


Figure 5. Pre-filled sampling model with information on the farm.

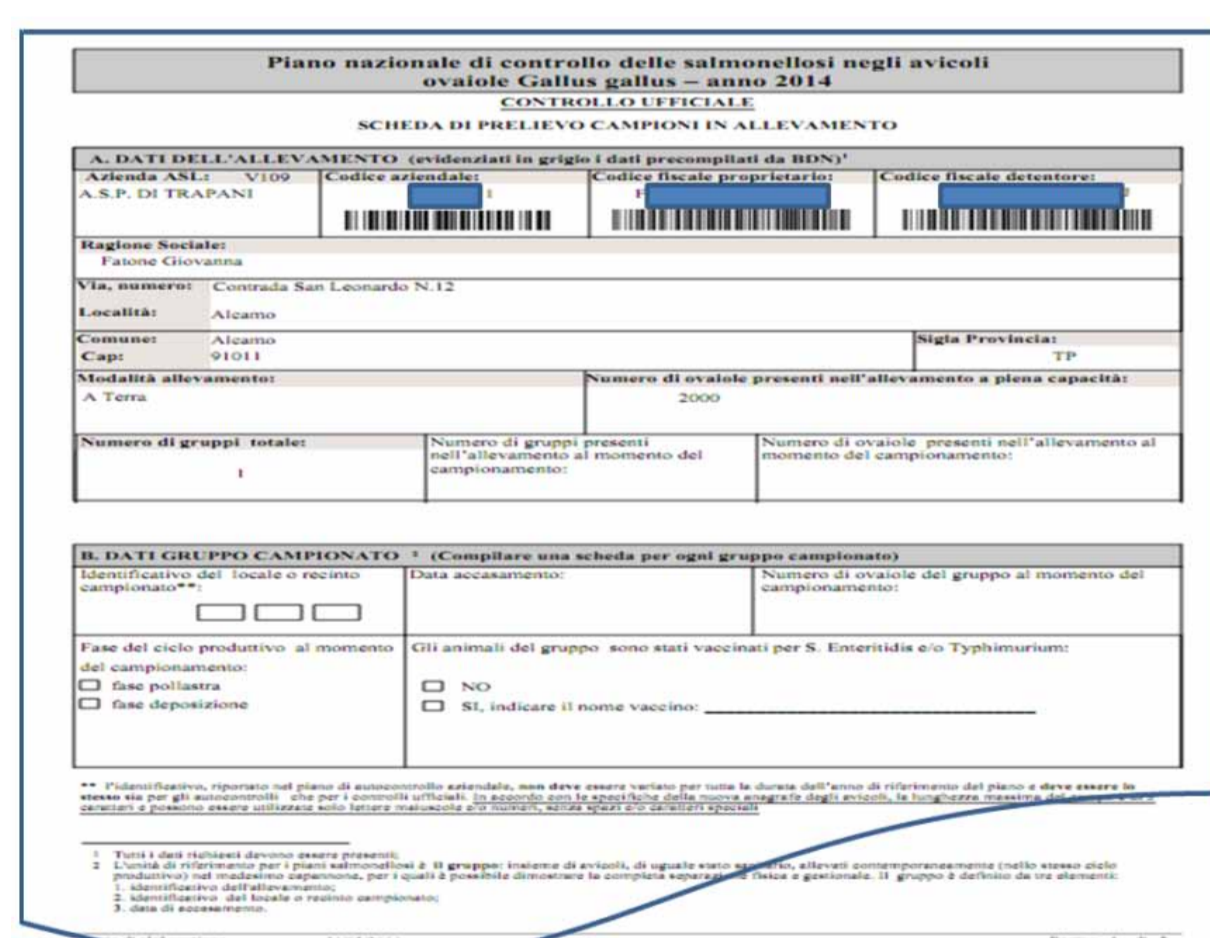
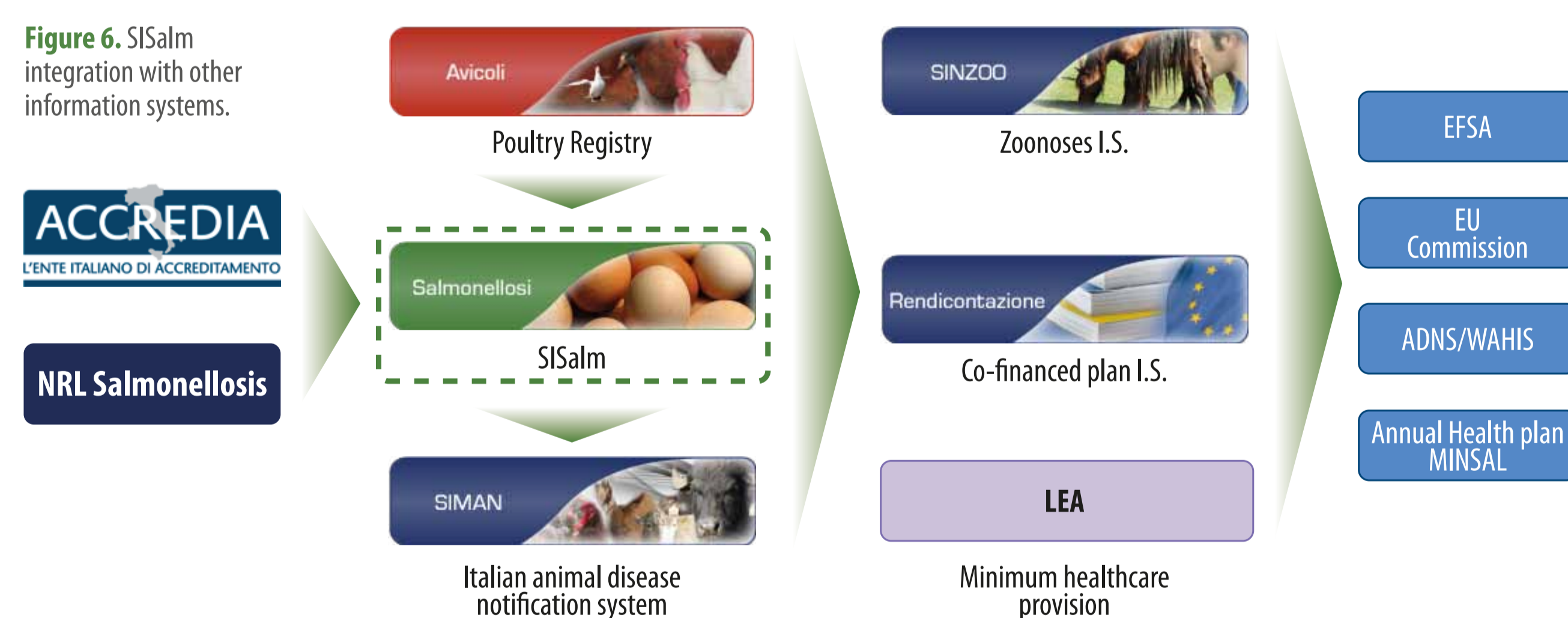


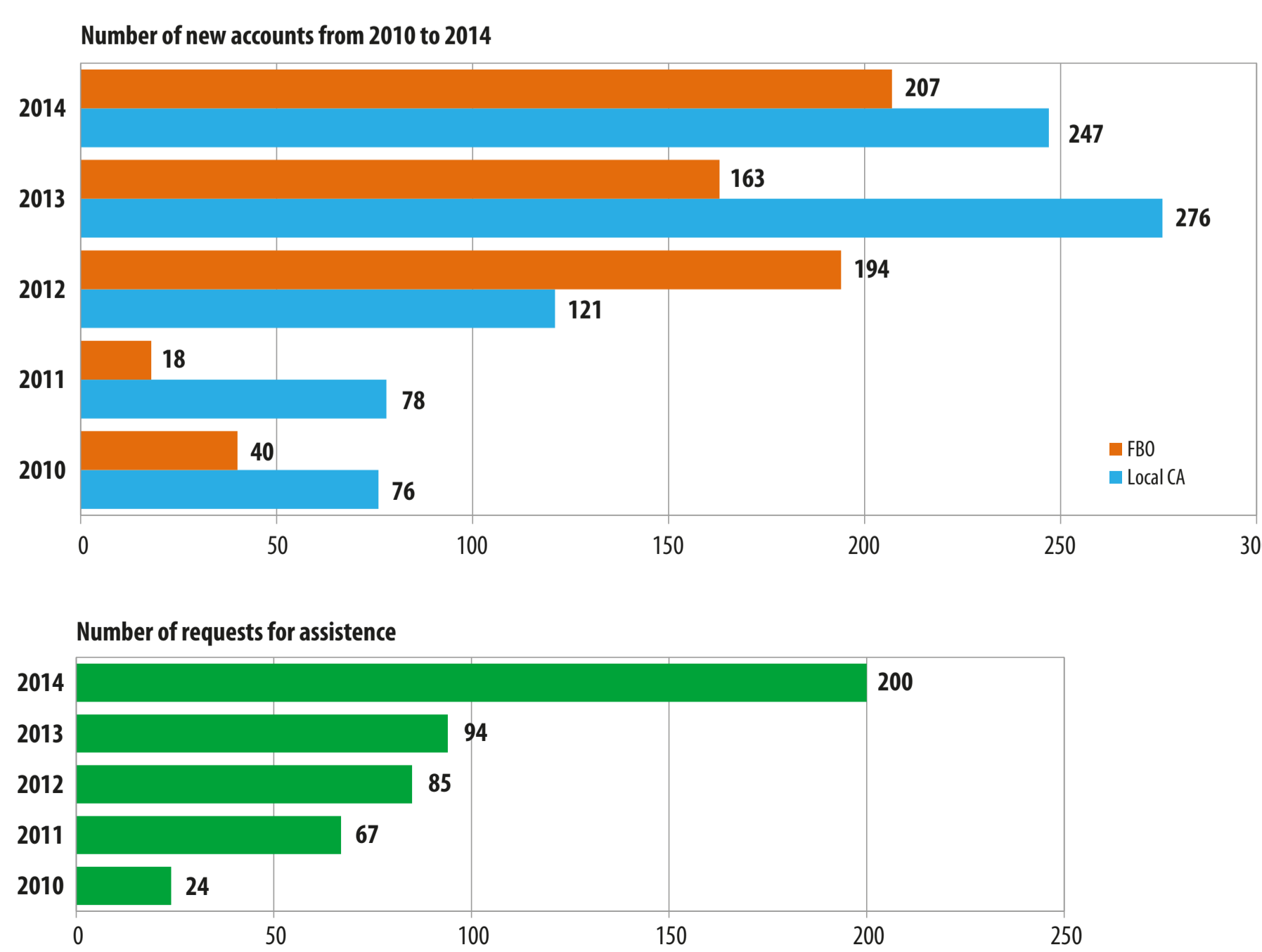
Figure 6. SISalm integration with other information systems.



SISalm Support

A Help-Desk and a service telephone call centre (800 08 22 80) are available to support users and to solve, whenever possible, certain tasks, such as the activation of a new access. Figure 7 shows the number of accounts issued and the total number of requests for assistance from 2010 to 2014. Both have steadily increased over the years, due to the implementation of the compulsory registration of the FBO sampling. Another support is provided by e-mail (sizoo.support@izs.it) to help in technical, functional and epidemiological issues.

Figure 7. Number of active accounts and requests for assistance from 2010 to 2014.



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Conclusions

The new approach to the protection of human health against food-borne zoonoses, starting from the control at primary production stage, has been a real revolution in the context of the food chain. The National *Salmonella* control Plan is part of this framework, since the FBO play an active and pivotal role: while the number of official controls is limited to a percentage of the farms, 100% of the monitoring is ensured by the sampling carried out by the FBO, since the FBO of farms included in the program are obliged to report to SISalm all controls for each breeding cycle and each flock.

The integration of SISalm with other national information systems has improved the quality of data collection (for instance, it's not possible to entry data on the sampling activities if the flock is not recorded or if it has been closed in the AIRT System) and has allowed a comprehensive reporting with statistics on the sampling activities planned and carried out, on the laboratory results and on the outbreaks.

Moreover, this integration allows to fulfil the information debts towards the EC and the World Organisation for Animal Health (OIE) (Figure 6), thus avoiding reporting the same information with different timelines and different levels of aggregation. In this way, data is always uniform and unique because it originates from a single source. Through the use of SISalm, the information flow is unique and traces the entire process, from the sampling to the analytical results, both for official and industry sampling. Competent authorities always have at their disposal the updated information on farms and flocks, on FBO sampling, on the tested samples, on the analytical results, on the laboratories involved, etc. Data collected also allows the programming of activities, their periodic verification and risk analysis.