AN INFORMATION SYSTEM FOR DECISION SUPPORT AND MANAGEMENT OF VETERINARY SERVICE ANIMAL HEALTH ACTIONS

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The need for an integrated multipurpose veterinary information system (IS), both for action and decision support, arose in Italy following the reorganization of the veterinary services on three functional levels: National, Regional and Local, within the National Health Service in 1978.

The specificity of functions of veterinary services has led to the creation of an organization with strong operational and organizational autonomy, in relation to other health service departments. Furthermore regions have organized their health services adopting various degrees of local decentralization leading to different levels of co-ordination and control functions that made it impossible to formulate a unique Regional IS model.

The animal health activities most demanding in terms of resources management needs and field work for Italian veterinary services are statewide prophylaxis campaigns against foot and mouth disease, bovine tuberculosis, leukosis and brucellosis and ovi-caprine brucellosis. In the Abruzzi Region, with a total bovine population of 120,000 distributed in 12,000 herds, these campaigns involve the control of as many as 700,000 animals and 60,000 herd visits/year. It was decided, therefore, to give priority to the implementation of a system for automatic prophylaxis campaigns data management.

It was decided, however, that the IS should be designed in such a way that it could be further developed to encompass all veterinary service activities that in Italy regard also food of animal chains inspection and control.

The system was implemented at the Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "G. Caporale" (IZS) in order to economize resources avoiding duplication of data entry given that: a) the Institute is the sole official laboratory in the Region and input data for the bovine brucellosis campaigns management are virtually the same produced as output by the serology laboratory; b) as far as herd information is concerned basic data for bovine brucellosis and tuberculosis campaigns are the same and cover about 90% of the information needed for foot and mouth disease prophylaxis.

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This choice was based also on the assumption that decision support IS must be generated, as far as possible, from routine veterinary activities and data must be collected and stored in computer only once, at the most peripheral level of activity.

INFORMATION SYSTEM FOR ACTION

It is the part of the IS dedicated to the routine organization of veterinary activities; it assumes herds as basic units of concern and does not record individual animal data unless a "problem" arises.

The system has been developed as a modular database subdivided into the following main archives/modules:

- **herd data**; it is the main archive containing the herd ID code and information concerning herds' ownership and location.

- **activity**; for each kind of activity there is one archive (ie, one archive per prophylaxis) describing herd status and activities performed. The link between activities and herd data is provided by the herd ID code.

- **health problems**; positive and doubtful cases identified in the course of each activity are stored in different archives according to the activity during which health problems have been identified. In this case also the link with herd data is guaranteed by the herd ID code.

- **service information**; containing general data needed for the running of the whole system.

The system has to respond to the daily information need of two main users: (a) Veterinary Services of the Local Health Units (LHU) as far as prophylaxis and vaccination campaigns are concerned; (b) Serology Laboratory of the IZS. Data management procedures for each user, therefore, are designed to run either jointly or separately. To this end the module for the brucellosis campaign data management, for instance, is designed in such a way that input can be carried out either directly by the LHU, through the current data forms, or by the Serology Laboratory output forms.

Besides providing information on single herd status and individual "problem" (positive, doubtful, etc) animals in relation to each activity, the system's routine output enables users to:

- know the total cattle and ovi-caprine populations, aggregated according to various administrative/geographical criteria (ie, locality, borough, LHU, Province, Region) and health status as well as the number of head per herd/flock. The total cattle population is vaccinated against foot and mouth disease and all sheep and goats are tested for brucellosis.

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- monitor prevalence, incidence and geographic distribution of bovine brucellosis and tuberculosis and ovi-caprine brucellosis within herds/flocks.

- know the time and number of re-testings needed to clear an infected herd/flock as well as the probability of re-infection.

- periodically perform automatic extractions of random samples from the whole bovine or ovi-caprine populations, in order to analyze: (a) efficacy and efficiency of prophylaxis campaigns and (b) more detailed information on the animal population structure (age, structure, sex ratio, breeds structure, etc). This information, together with individual data collected from positive or doubtful cases allow the recognition of possible risk factors for the pathologies studied.

- general analysis of cattle and sheep husbandry in various geographical/administrative locations within the Region.

As can be readily seen, the system allows for an almost infinite expansion in relation to further veterinary action implementation. It is indeed possible to integrate in the system as many new activity and related problem archives as the veterinary services wish to implement; on the other hand curbing of a given activity leaves the remaining part of the system unimpaired.

INFORMATION SYSTEM FOR DECISION SUPPORT

It is the part of the system which converts data into information (indicators) to support decision making.

The system implemented is able to generate a homogeneous set of key indicators for decision-making, activity planning and control statewide, in spite of the marked differences encountered in the organization of veterinary services in the various Regions.

It is oriented toward epidemiological surveillance and it is constituted by a set of procedures of transformation/analysis of data needed to convert information into actions and takes into account both the population's health status and capability of the veterinary services to cope with problems identified.

Such a system cannot be based only on data flows generated by the operational IS, but must be integrated with external flows as well; it has to be, therefore, flexible, expansible enough to allow both generation of the information needed to support decision making processes and connections with other external information systems.

To this end a number of compiled procedures have been developed for use with personal computers in a dBase III PLUS environment, running on MS/DOS operating system.

The choice of a system based on a database readily available on the market (ie, dBase, ORACLE, Informix, etc) instead of one based on a more traditional language for management of archives (ie, COBOL, PASCAL, BASIC, etc) not only requires a lower degree of user specialization, but allows further analysis and transfer of data to the main tools available on the market without the assistance of specialized personnel.

All data contained in the data bank of the IS can be exported to the main tools available (SPSS/PC+, Framework, Lotus, Statgraphics, etc), widening the spectrum of analyses and utilization of data. Moreover, it is quite easy, even for a non-expert user, to handle data, either interactively or by means of simple procedures, in order to generate further information. Both the *friendliness* of the system and portability of data allow (when needed) an expansibility of the level of sophistication of the analyses performed.

Finally the IZS together with some Italian Regions is testing a model of IS for the management of the veterinary services at local, regional and national levels. This system, using data gathered during the current activities of the services, is able to generate the indicators needed for monitoring and evaluating the whole veterinary service activity: animal health; food of animal origin production chain and environment control.

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