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QUALITY OF BIOLOGICAL ANALYSIS IN EPIDEMIOLOGY AND HEALTH DECISIONS (AEEMA meeting of December 7th, 1989)

Quality of the results for the laboratory man

Fournier (D) & Lorant (JM)

The quality of the analysis results had been studied in the broadest acceptation within the frame of a Departmental Veterinary Laboratory. The first part of this paper presents the different components that influence the quality of the analytical production with a special development about quality control of reagents and a control of analysis execution. The second part deals with the quality of communication and presents all the data that an analysis result contains. The way the result is presented is important. Today communication and transmission tools are fast and can preserve confidentiality. The way the results are stored is also presented. Then the lecture goes on to the prices list which must be considered in order to preserve the future of the service. Then come the ways to keep quality level inside the laboratory and to get the trust of the users by showing them the quality. The quality book and the agreement and audit process are presented too.

Analysis results quality: from the user's point of view

Brunet (J) & Van de Wiele (A)

After giving the definition of quality and separating between the two kinds of laboratory users (individuals and institutions), the authors give the three important steps leading to the analysis result: the acceptance of the sample, the "analysis-service" (the measure of the biological parameter) and its communication to the user) and the result interpretation Then the needs of the individual user are presented (advices for sampling, presentation of the result, short delay, interpretation) as well as the one of the institutional user (lower costs). In these both situations, the expected specific quality of the assays are seen and studied with real situations. The authors give some propositions for a better satisfaction of the users: communication between users, diagnostic laboratories and national laboratories; the producers of diagnostic technology; standardization of the technology and organization of a quality policy within the laboratories; to organize external controls; to standardize the words used by the laboratories.

Sensitivity, specificity, predictive values: importance of analysis quality in epidemiology

André-Fontaine (G)

In this article, sensitivity and specificity of an assay are first defined in experimental conditions. Then positive and negative predictive values are presented as used in epidemiology. The way they evolve following the intrinsic values of the test is shown. Then it is explained how important is the quality of the technique used following the aim of qualifying an individual or a herd.

Test quality: the bovine tuberculosis example

Bénet (J-J)

The application of notions like sensitivity, specificity and positive and negative predictive value to bovine tuberculosis brings to light some inadequacy in the definition of standard methods being able to make comparison between the results of different authors, and then, to lead to the application of these notion on the field in a way in harmony with the needs of the health practician. For the cleansing of infected herds, the statistical concepts lead to accept the choices already done, *i.e.* to use additive

methods, especially epidemiology. In the use of screening for infected herds, the risk of missing positive animals is very low. The risk of false positive has to be evaluated with special epidemiological studies over the area. They are the only way to help efficiently to take health decision as individual data cannot be extrapolated to the herd level.

Sensitivity, specificity, predictive values: the example of classical swine fever serology ELISA test

Leforban (Y) & Vannier (P)

The qualities of serological tests must be evaluated in relation to the epidemiological situation of the disease they are performed to trace. An ELISA test devoted to the revelation of CSF antibodies had been developed. This test had been standardized with the seroneutralisation assay. Both have similar sensitivities and specificities. The choice of the threshold for the assays had been established in thinking first to sensitivity. This lead to a low specificity, mainly linked to cross-reactions between CSF virus and other Pestivirus (BVD and Border disease virus). With the absence of CSF outbreak in France and the existence of cross-reactions, the positive predictive value of the tests in nowadays close to 0, and the negative predictive value is close to 100%. Even with this very low positive predictive values, these serological tests are able to monitor the disease with good accuracy.

Bovine brucellosis. Quality of biological analysis. Adaptation of their use to the epidemiological situation

Garin-Bastuji (B)

The official measures once taken against bovine brucellosis have been set up following rules and techniques, which, for some of them, are now too far from their aims when the epidemiological situation of the disease in France is considered. The author analyses the qualities of every diagnostic methods used in France with the help of epidemiological data coming from French and foreign works. He then points out the consequences, in the fields of strategic usefulness of these assays when eradicating the disease, for the trade of animals and for the extinction of the outbreaks.

Importance of decision analysis in public health situation

Grenier (B)

Decision analysis may bring a high increase of information, especially in the case of Public Health problems often presented as cost-benefit ratio. This example is the choice of a prevention politics, in human medicine, for the risk of acute rheumatoid arthritis. Two ways of treating acute quinsy are proposed: either systematic treatment of every quinsy, or selective treatment of quinsy when sampling showed *Streptoccocus pyogenes*. Decision analysis is followed along a decision tree, down to the calculus of the unitary cost of the treatment which as a decision threshold could lead to the choice of the best treatment at the lower price among the whole population of children with acute quinsy and under an acute rheumatoid arthritis risk.

Quality of biological analysis in epidemiology and health decisions: enzootic bovine leucosis

Eloit (M), Perrin (B), Perrin (M), Fedida (M) & Toma (B)

The authors present a synthesis of the available information's on ELISA test performances when applied to pooled serum or milk samples when screening for enzootic bovine leukosis (E.B.L.). The major performances (specificity, sensitivity, detectability, predictive values) are described for different commercial reagents already available, and in different epidemiological situations. The result from these information is enough to draw consequences in a way to lead a campaign against E.B.L.

Quality of screening tests: application to health decisions

Bénet (J-J)

The decrease of the positive predictive value of screening for bovine tuberculosis linked to the decrease of its prevalence leads to the obligation to adapt the rules in health decision making from herd level to regional level. Field experience taught to the veterinary practitioner that they had to give an interpretation to the results of tuberculin tests practiced to screen for infected bovine herds. Besides the test, they have to look for reason why tuberculosis could enter the herd. This is like making a bet from these data on the tuberculosis could enter the herd. This is like making a bet from these data on the tuberculosis prevalence risk, either high, either non-existent, to be able to deduct the possible value of positive predictive value (enough on non-existent). At the local level, the technical solutions cannot bring the benefice of positive predictive value that could be enough to rehabilitate tests, because of biological (intrinsic value of the tests) and epidemiological (positive predictive value and prevalence) limits. The need for a deep charge in the strategy leads to think of a strategy of quality increase, with qualification of the herds, from the qualification of the region and the control of risk factors at the herd level and at the local level and with a control of this process. The screening of tuberculosis (thinking of incident detection) could be done at the slaughterhouse. The screening by tuberculin test could be done on a population sample thinking of qualification of the region.

PAPER OF EPIDEMIOLOGY

Methodology of description of feeding systems in bovine milk farms

Faye (B), Courcy (E) & Barnouin (J)

In most of the cases, studies in private farms do not allow to get exhaustive information for animal feeding, particularly individual quantities given or feed intake. We are able to get only fragmentation information's such as weekly food supply with the knowledge of the physical form, the way of feeding and of consumption. The "feeding profile" correspond to the time distribution of the main components from diet. Analysis by hierarchical ascending classification allowed to draw out clusters of feeding systems according to the similarity of the observed profiles, 61 and 64 farms were involved in a 2 years study (1979-1980). We have obtained respectively 11 and 8 clusters of farms. From one year to the next, criteria for cluster aggregation were not the same, but characterisation of the farming type is done by first dominant component in basal diet (maize, silage, grass silage, hay) or in complement feeding (concentrate, cake …) and second by secondary components (cabbages, beets, rapeseed …). Clustering analysis was here used as a pre-processing of the data. Later, the profiles obtained were compared to "sanitary profiles".