MANAGEMENT OF ANIMAL DISEASE EMERGENCIES

C.C.J.M. van der Meijs
Chief Veterinary Officer, P.O. Box 20401, 2500 EK Den Haag, The Netherlands

Original: English

Summary: Adequate management of animal disease emergencies is important for the entire world, as it will prevent affected countries from incurring huge economic losses and will reduce the risk of disease spread to uninfected countries. In this paper I describe the importance of the various tasks included in the management of animal disease emergencies. These tasks include the management of preparation for animal disease emergencies, veterinary activities, organisational structure, funding, human resources, information, time, and evaluation and follow-up.

Results of a questionnaire, which was sent to the OIE Member Countries, indicate that good preparation is generally accepted as the most important task for the management of animal disease emergencies. Good preparation consists of making available up-to-date emergency plans and the accompanying working documents. However, performing periodic practical exercises also seems to be important; countries that use both emergency plans and practical exercises have in general experienced (or expect) fewer problems during animal disease emergencies. In addition, the existence of a good and easily accessible animal identification and registration system seems to be a very powerful tool. If the above issues have been addressed well, a lot of valuable time can be saved during emergencies, and the effectiveness of the implemented measures will be increased. The responding countries also considered it very important that primary outbreaks are detected as soon as possible.

One problem in interpreting the results of this questionnaire on the management of animal disease emergencies is the lack of unambiguous definitions of activities concerning preparation, such as model emergency plan, working protocols, practical exercises and veterinary activities. The establishment of clear definitions and the developments of standards could be an important task for the OIE in this respect.

1. INTRODUCTION

The weekly OIE disease information periodicals (6) show that a considerable number of Member Countries are dealing with emergencies of one or more of the animal diseases on List A. Because of the growing international trade in animals and animal products, as promoted by the GATT agreement, and growing passenger traffic between countries, disease-free Member Countries are at risk of contracting disease from infected regions. Consequently, proper management of animal disease emergencies is for the benefit of all countries. In affected countries adequate management will prevent the occurrence of a severe epizootics, or, even worse, transition to an enzootically infected region. Thus, it will prevent great economic damage caused by production losses, control expenditures, and trade restrictions with the accompanying market disruption (2, 3). It is obvious, however, that disease-free countries will also benefit from adequate disease management because it reduces the probability of introducing the disease from infected regions, and thus reduces the transmission of pathogenic agents between countries.

Having concluded that adequate management of animal disease emergencies is crucial, it is necessary to determine which aspects of this management are important. Often attention is focused on the veterinary aspects of managing animal disease emergencies, such as restrictions on animal movements, depopulation of infected herds, or vaccination. It is obvious that these aspects are very important because they teach us how to use our knowledge of diseases and how they spreads to prevent disease transmission. However, whether we are able to implement veterinary measures effectively depends heavily on a number of factors, such as the structure of the organisation in which the various activities take place, the availability of funding and personnel, and the management of information. In this report I will deal with various factors that are important in the management of disease emergencies. First, I will present an outline of

---

1 General Agreement on Tariffs and Trade
the most important aspects of the management of animal disease emergencies. Secondly, I will show the results of a questionnaire on this subject that was sent to all the OIE Member Countries. Finally, I will discuss the results of the questionnaire in the perspective of the goals of disease management and the possible role for the OIE.

2. TASKS IN THE MANAGEMENT OF ANIMAL DISEASE EMERGENCIES

Management of animal disease emergencies consists of a broad range of different tasks. These tasks include the management of:

- preparation for animal disease emergencies,
- veterinary activities,
- organisational,
- funding,
- human resources,
- information,
- time, and
- evaluation and follow-up.

2.1. Preparation for animal disease emergencies

During animal disease emergencies decisions usually have to be made under enormous time constraints (7). Furthermore, actions resulting from these decisions often have to begin in the shortest possible time to stop transmission of the infectious agent of concern. If we have thought in advance about the situations and problems that we may encounter during an animal disease emergency, valuable time can be saved. Furthermore, the quality of the decisions taken and the effectiveness of the subsequent actions are likely to increase because in disease-free periods we have more time to weigh the advantages and disadvantages of decisions. Preparation includes more than the collection of sufficient knowledge of the diseases and actions to be taken during the various situations that may be encountered. It is important that several operational aspects of animal disease control have been set down in emergency plans. Such emergency plans should contain guidelines for making decisions based on the situations that may arise by the disease in concern, describe the various tasks (veterinary and logistic) that have to be carried out during a crisis, and clearly show the distribution of responsibilities (who is to do what). However, an emergency plan is still only a desk model of the control of an animal disease emergency. It is important to carry out, as far as this is possible, practical exercises based on the emergency plan. Such an exercise will reveal the possible flaws in the plan and, even more important, it will train the people involved in disease combat in how to do their jobs. The latter aspect also implies that such training has to be repeated on a regular basis. Only in this way will personnel occupied in an animal disease crisis know what they should or should not do.

2.2. Veterinary activities

The veterinary activities during animal disease emergencies can be subdivided into a) activities to detect the first outbreak in an area that was previously free of the disease and b) activities to stop transmission of the pathogen of concern once it is present in the region. Detection of a new outbreak of any of the List A diseases is still mainly based on clinical diagnosis by the farmer and his veterinary practitioner. Consequently, it is important that they have been trained to recognise the appearance of the diseases. The awareness of these people can be increased by an international warning system (8) that forecasts whether a certain region is more or less at risk of introduction of pathogenic agents from surrounding countries. Furthermore, it is necessary that the interest of the individual farmer (especially in case of a suspicion that cannot be confirmed) is not in conflict with the interest of the entire animal industry in a country. The latter may arise for example when a farmer suffers serious loss of income after he notifies a suspicion of a List A disease that is not confirmed. As a result, the farmer may tend to delay diagnoses of notifiable diseases. Finally, we can try to diagnose outbreaks more quickly by designing better surveillance programmes and technical improvements, such as for example on-site tests.

Once the pathogen has been introduced in the country, veterinary measures have to stop further spread of the agent. This spread can be reduced by three mechanisms: 1) reducing the susceptibility of animals getting infected, 2) reducing the amount of agent emitted by animals and herds, and 3) minimising contacts between infected and susceptible herds. The first mechanism can be achieved by use of effective vaccines. Effective vaccines will also reduce the amount of agent emitted. However, this can also be achieved by fast detection (screening, tracing) and depopulation of infected herds (with accompanying decontamination of the animals) and pre-emptive slaughter. Detection must be facilitated by knowledge of the transmission routes of the pathogen,
knowledge of the contacts between herds, experienced personnel and adequate diagnostic tools. In general, herds have to be depopulated before they transmit the agent to, on average, more than one other herd (10). Minimising the contacts between infected and susceptible herds can be achieved by a ban on the movement of animals. Last but not least, the importance of hygienic measures at the farm gate should also be stressed in this respect. Such measures reduce the probability that the agent is transmitted during contact between an infected and noninfected herd.

2.3. Organisation

During a crisis, many things have to be organised quickly. Setting up a local crisis centre in the affected region is a great advantage. From here, it is easier to coordinate the necessary activities; the centre can serve as a base for personnel working in the region, and materials can be collected or distributed more efficiently. This crisis centre should have at its disposal working documents derived from the available emergency plans. Furthermore, it should have all necessary facilities and a sufficient number of adequately trained personnel. Clear and short lines of command between the political and administrative sector and the working sector in the crisis centre will promote the efficiency of decision making. As far as possible, decisions should be based on the emergency plans, and discussions about decisions should focus on the problems that were not foreseen. There should be scientific support providing the management team with the best veterinary insight. It is obvious that the availability of emergency plans, working protocols and a good legal framework greatly facilitate the organisation of a crisis.

Evidently, to prepare for animal disease emergencies it is necessary to have a competent Veterinary Service in disease-free periods. Strengthening the role of the Veterinary Services was also proposed by Astudillo at the 66th General Session of the International Committee of the OIE in 1998 (1). During disease-free periods the Veterinary Services can carry out activities, such as improving and updating the emergency plans and working documents, organising practical exercises, and improving the legal framework. A good basic operations unit is also necessary for the quick control of relatively small crises. The quality of the organisation could be evaluated by the quality control systems proposed by F. Gerster (4).

2.4. Funding

Disease control actions cost a considerable amount of money. Money must be spent, in particular, to compensate farmers for their damages in order to maintain their commitment. Considering the importance of a rapid diagnosis, it is also important that money be made available to improve surveillance for List A diseases during disease-free periods. The issue of adequate financing for these purposes must be addressed. In this period systems also have to be developed for the administration of the money that will be spent during crises. Such systems are essential to be able to account for the expenditures during emergency periods.

2.5. Human resources

With respect to personnel, it is first of all necessary that the employees of the organisations that are responsible for disease control have good knowledge of the diseases and are trained in operational aspects. During disease-free periods such knowledge can be used to optimise emergency plans, working documents and surveillance systems. In crisis situations these people will help actively in the control of the disease and, if necessary, will train newly recruited and less qualified personnel on the job. Finally, it is necessary to make arrangements with other organisations regarding the quick availability of external personnel during big crises. The latter, obviously, requires good working instructions and a good evaluation of requirements for the various tasks.

2.6. Information

There are three aspects to the management of information during an animal disease emergency. The first is obtaining external information that is necessary for control of the disease. During crises, working protocols, designed in disease-free periods, should be available on how to obtain information on herds in the region (location, type and number of animals) and contacts between herds (especially animal movements) (9). Agreements have to be made in advance with the organisations that manage these databases to ensure that the information will be made available. Also, epidemiological information should be gathered and analysed to enable the evaluation and, if necessary, replacement of disease control measures. Secondly, information obtained by the various parts of the organisation must be available where it is needed within the organisation. The working documents derived from the emergency plans should deal with this issue. Thirdly, the information that goes to the outside world should be presented farmers, to the media and the public in order to provide a clear
picture of the means of control of the disease. This should prevent confusion and commotion caused by the spread of badly founded opinions or messages.

2.7. Time

During an epizootic decisions usually have to be taken under time pressure. The best solution to this problem is to make decisions as far as possible in advance, and record the decisions in emergency plans and working documents. Furthermore, decisions will usually be easier to make if good information is available (see section 2.6.). In addition, advance agreements on the availability of personnel and equipment during crises will be of great advantage. Finally, despite the importance of rapid actions, it is necessary to take time periodically to evaluate the actions that have been implemented.

2.8. Evaluation and follow-up

Each crisis generates new information that may be of use in future situations. This new information only becomes available if the approach taken is evaluated and the results are used to prepare for new crises. During disease-free periods, emergency plans should be adjusted according to changing situations or new information.

3. RESPONSES TO THE QUESTIONNAIRE

A questionnaire on management of animal disease emergencies with respect to the above-mentioned subjects was sent to all 151 OIE Member Countries. Eighty-nine of these questionnaires were completed and returned (Appendix 1). Five questionnaires have not been included in the results because of their late arrival. In the majority (81%) of the remaining 84 countries, one or more of the List A diseases had recently been detected (between 1993 and 1997). Of these, Newcastle disease (NCD) was reported most often (49%), followed by classical swine fever (hog cholera, CSF) (40%) and foot and mouth disease (FMD) (32%). NCD, however, was often not considered to be the most relevant recent outbreak. Of the countries that reported a recent outbreak of a List A disease, FMD was considered to be the most relevant (41%), followed by CSF (20%), and then NCD (16%). I will now summarise the answers to the questionnaire with respect to the various aspects of animal disease emergencies. A full description of the results of the questionnaire is available upon request (5).

3.1. Responses concerning the preparation for animal disease emergencies

The responsibility for the various aspects of controlling animal diseases during normal periods (i.e. not an emergency) lies in most countries (over 80% for each individual aspect) at the national level. Approximately 60% of the responding countries report the operational existence of information systems for identification and registration of animals, and movements of animals and animal products. Registration systems for cattle are predominant, followed by those for pigs and poultry.

The most frequently used method for preparation for an emergency situation is by means of an emergency plan. Over 80% of the responding countries use this instrument. Periodical exercises were considered to be important by 51% of respondents. Most exporting countries use both an emergency plan and periodic practical training. Training and instruction were also mentioned quite often as being important for the preparation for animal disease emergencies. The questionnaire also revealed that, in general, countries that perform periodic practical exercises in addition to having an emergency plan have encountered (or expect to encounter if they did not experience a recent outbreak) significantly fewer problems during animal disease emergencies than countries that prepare themselves by emergency plan only.

3.2. Responses on veterinary actions

Almost 80% of the responding countries reported that animal movements were restricted during an actual outbreak. However, when NCD was reported as the most relevant recent outbreak, restriction of animal movements, although considered, was often not implemented. It is also considered important to eliminate the infectivity of contaminated animals either by burial (52%), burning (30%), or rendering (20%). Whether vaccination is implemented during an animal disease emergency depends largely on the disease of concern. Vaccination is often implemented in the case of FMD (65%) or NCD (56%), but its use in the case of CSF is uncommon (a single response only). Pre-emptive depopulation of herds that were at risk of contracting the disease had been implemented by 44% of the responding countries. The implementation of this measure also depended largely on the disease of concern. In most cases it was deliberately excluded for FMD, and never deliberately excluded for CSF.
3.3. Responses on the organisation for animal disease emergencies

With respect to the organisation for the control of animal disease emergencies, the most important measure was considered to be the use of an emergency plan (63%). The second most important organisational measure was considered to be adequate supervision and enforcement of the plan (39%); the establishment of a national crisis centre was also mentioned quite often (38%). As risk factors for the organisation of emergencies, the respondents report most often opposition from individual entities or trade or industry organisations. An insufficient legal framework and insufficient political support were also considered to be serious obstacles.

3.4. Responses on the funding of animal health emergencies

With respect to financial management, compensation for slaughtered animals and financing the control organisation were both considered to be important. An insufficient budget was considered to be a major cause of failure.

3.5. Responses on the management of human resources

With respect to the management of human resources the respondents reported, in approximately equal frequency, the most important measures to be recruiting internal personnel, engagement of external personnel, and instruction of personnel. As the most important cause of failure for the management of human resources the respondents mentioned insufficient financial means, insufficient numbers of qualified personnel, and logistic problems (how to get people to the right place at the right time).

3.6. Responses on information management

The responses to the questionnaire revealed that the respondents consider information about animal movements, either acquired by ad hoc registration or by the use of existing systems, to be most important. However, the ad hoc identification of endangered or affected entities (premises) was considered to be equally important for information management, as well as documentation of measures and actions taken for disease control. The latter was reported most frequently, but not considered to be the most urgent measure. Risk factors that were often reported were insufficient insight into the extent and course of the disease and insufficient capacity to process all information. Furthermore, it is apparently not always easy to use existing information systems and to document financial aspects.

3.7. Responses on time management

Rapid diagnosis of disease and identification of contamination (infection) is crucial according to the majority of the responding countries. Countries that experienced outbreaks (as compared to countries that give the most likely reaction to a possible crisis) also consider fast implementation of measures to be important. Risk factors for adequate time management are the time between introduction of the agent and diagnosis of the first case, the time involved in executing the measures, the time between diagnosis and measures taken, and the time taken for deciding which measures should be implemented.

3.8. Evaluation and follow-up

78% of the respondents that reported recent outbreaks evaluated the control programme after the emergency. In almost 80% of these cases this resulted in adapting the plans in preparation for new emergencies with respect to one or more of the issues reported above. Information management was considered to be a particularly important issue.

4. DISCUSSION AND POSSIBLE ROLE OF THE OIE IN IMPROVING THE MANAGEMENT OF ANIMAL DISEASE EMERGENCIES

Almost 60% of responses to the questionnaire were very promising. Generally, the quality of the information in the received questionnaires was very high. Although validation has not taken place, the answers, especially to open questions, and the remarks on performed evaluations give no indication that situations have been presented as better or worse than reality. However, it is not evident that the heterogeneity of the OIE Member Countries is preserved in the responses. The existence of selective non response is suggested by the breakdown of the responses into the five regions.
of the OIE. For example, the percentage of responses from European countries is twice as high as that from Middle Eastern countries, with African, American and Asian countries in between. This may have influenced the outcome of the survey. However, there is no objective method to deal with this problem and therefore it is not considered further.

Analysis of the answers to the questionnaire clearly shows the importance of being well prepared for animal disease emergencies. This is not only revealed by the answers to specific questions on preparation for animal disease emergencies (see section 3.1.), but also by answers to questions about the other tasks involved in managing animal disease emergencies that stress the importance of good preparation. For example, the availability of sufficient funds and qualified personnel during emergencies can best be organised during disease-free periods. The way information can be gathered and communicated is something that can also be most easily developed during disease-free periods. If animals and herds are identified and recorded and a movement registration system exists, it is far easier to identify suspect herds than if such a system has to be made ad hoc. The difficulties that many countries encountered when using existing animal (movement) information systems in disease control indicates that these systems must be improved. The OIE could describe the minimal requirements of such systems and further help to adapt them to specific local situations.

The importance of emergency plans for disease combat is widely accepted among the responding OIE Member Countries. However, the quality of the emergency plans cannot be ascertained from the responses to the questionnaire. The problem areas encountered during disease control suggest that these plans may often be quite inadequate. In those cases it is advisable to widen the scope of these emergency plans. They should not only include which measures have to be implemented in the ‘standard crisis situation’ and how these measures are implemented, but they should also deal with less obvious situations that may be encountered. This includes gathering information on the course of the disease to determine whether or not the situation is a ‘standard crisis situation’. If the course of the crisis does not follow expectations, the analysis of information should provide the critical points. The emergency plan, if necessary assisted by an advisory board, must solve these problems (or determine how they can be solved) quickly. Also the places where the decisions are to be taken must be clear. A detailed emergency plan will prevent loss of valuable time. Furthermore, specific actions that have to be taken can be described in working documents. It should be clear how actions are to be performed and who is to carry them out. It seems in particular the OIE could take the initiative to develop a general blueprint of an emergency plan, including the operational side of an outbreak.

The advantage of periodic practical exercises was clearly shown by the results of the questionnaire. Countries that perform such exercises experience (or expect) fewer problems during outbreaks. This is most likely caused by the fact that quite a number of potential problems were recognised during exercises and solutions found before an actual disease emergency took place. Promoting these exercises (with the available expertise and, if possible, financial means), is also a task for the OIE. The existing knowledge in this area should be collated and subsequently made available to other countries.

In this paper the rapporteur did not try to associate the actions that Member Countries take in the management of animal disease emergencies with their normal disease situation. This is because causal inferences cannot be drawn from such observed associations. For example, from the association between the presence of an FMD crisis and the use of vaccination as a control instrument, an uninformed person could conclude that vaccination is not a good measure to combat FMD (because it is not used in disease-free countries). However, this conclusion is obviously invalid, because vaccination is usually only implemented in regions seriously at risk from FMD outbreaks. In addition, it is unclear whether the Member Countries have the same definition of the various veterinary measures. It would evidently greatly help communication between countries if the OIE could take the initiative to propose unambiguous definitions for the various veterinary activities that take place during an animal disease emergency.

Another important result of the questionnaire is the finding that many Member Countries stress the importance of detecting an outbreak as soon as possible after introduction of the agent. Member Countries that experienced a recent outbreak of one of the List A diseases particularly stress this as the most important problem area. Consequently, considerable attention must be paid to this problem. We should encourage research that provides techniques that enable a reliable diagnosis to be made quickly. However, this alone would not be sufficient. It is also important that better surveillance systems be developed that use the currently available diagnostic techniques. Such systems should provide us with objective guidelines on how (how frequent, which test, which animals and how many) herds have to be tested in order not to exceed an acceptable period between infection and detection. Furthermore, we must ensure that the interests of individual farmers or organisations are not in conflict with their national interests. Finally, an international early warning system (8) would be a great help in this respect. This would allow countries to take specific preventive actions upon the threat of a List A disease.
5. CONCLUSIONS AND RECOMMENDATIONS

The most important task in the management of animal disease emergencies is preparation. Proper preparation includes not only the availability of up-to-date emergency plans and the accompanying working documents, but also periodic practical exercises and the existence of good animal (movement) information systems. This will save valuable time during emergencies and will increase the effectiveness of measures that are implemented. It is also very important that primary outbreaks be detected as soon as possible. Recommendations for the role of the OIE in the management of animal disease emergencies are derived from this paper and are for the organisation to:

- Initiate the development of standards for emergency plans and practical exercises,
- Help to optimise the international warning system and the surveillance for animal diseases,
- Propose unambiguous definitions of the various veterinary activities that take place during an animal disease emergency, and
- Describe the minimal requirements for identification and information systems and help to adapt them to specific local situations.

Acknowledgements

The author acknowledges the help of Dr J.A. Stegeman (Institute for Animal Science and Health, ID-DLO, Lelystad), Dr D. Schumer, Dr J.A. Smak and Dr J. van Wijk (Department of Veterinary, Food and Environmental Affairs, Ministry of Agriculture, Nature management and Fisheries, Den Haag) and Dr A. Gaaff (Terp Advies, Amersfoort) in preparing this paper.

REFERENCES

## List of OIE Member Countries that completed the questionnaire

<table>
<thead>
<tr>
<th>Albania</th>
<th>Ghana</th>
<th>Portugal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria</td>
<td>Greece</td>
<td>Qatar</td>
</tr>
<tr>
<td>Andorra</td>
<td>Guinea</td>
<td>Romania</td>
</tr>
<tr>
<td>Argentina</td>
<td>Hungary</td>
<td>Russia</td>
</tr>
<tr>
<td>Armenia</td>
<td>Iceland</td>
<td>Senegal</td>
</tr>
<tr>
<td>Australia</td>
<td>India</td>
<td>Singapore</td>
</tr>
<tr>
<td>Austria</td>
<td>Ireland</td>
<td>Slovakia</td>
</tr>
<tr>
<td>Belgium</td>
<td>Italy</td>
<td>South Africa</td>
</tr>
<tr>
<td>Benin</td>
<td>Kazakhstan</td>
<td>Spain</td>
</tr>
<tr>
<td>Bhutan</td>
<td>Korea (Rep. of)</td>
<td>Sudan</td>
</tr>
<tr>
<td>Bolivia</td>
<td>Kuwait</td>
<td>Swaziland</td>
</tr>
<tr>
<td>Brazil</td>
<td>Latvia</td>
<td>Sweden</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>Lithuania</td>
<td>Switzerland</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>Luxembourg</td>
<td>Syria</td>
</tr>
<tr>
<td>Canada</td>
<td>Malaysia</td>
<td>Taipei China</td>
</tr>
<tr>
<td>Chad</td>
<td>Malta</td>
<td>Tanzania</td>
</tr>
<tr>
<td>Chile</td>
<td>Mauritius</td>
<td>Thailand</td>
</tr>
<tr>
<td>Colombia</td>
<td>Moldavia</td>
<td>Togo</td>
</tr>
<tr>
<td>Comoros</td>
<td>Morocco</td>
<td>Trinidad and Tobago</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>Myanmar</td>
<td>Tunisia</td>
</tr>
<tr>
<td>Croatia</td>
<td>Namibia</td>
<td>Ukraine</td>
</tr>
<tr>
<td>Cyprus</td>
<td>Nepal</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>Czech (Rep.)</td>
<td>Netherlands</td>
<td>Uruguay</td>
</tr>
<tr>
<td>Denmark</td>
<td>New Caledonia</td>
<td>Uzbekistan</td>
</tr>
<tr>
<td>Egypt</td>
<td>New Zealand</td>
<td>Vanuatu</td>
</tr>
<tr>
<td>Estonia</td>
<td>Oman</td>
<td>Venezuela</td>
</tr>
<tr>
<td>Finland</td>
<td>Pakistan</td>
<td>Yugoslavia</td>
</tr>
<tr>
<td>Former Yug. Rep. of Macedonia</td>
<td>Paraguay</td>
<td>Zambia</td>
</tr>
<tr>
<td>France</td>
<td>Peru</td>
<td>Zimbabwe</td>
</tr>
<tr>
<td>Germany</td>
<td>Poland</td>
<td></td>
</tr>
</tbody>
</table>