17. Supply and inspection of food of animal origin

In disaster or emergency situations the provision of an adequate supply of food of high quality for human consumption may be difficult to ensure.

Veterinary officers in charge of the inspection of food of animal origin should be equipped with a kit including: inspection knives, ph-meter, thermometer, plastic gloves, etc. Such kits are now in use by the Italian Army Veterinary Corps.

In principle, the normal veterinary meat hygiene regulations should be regarded as valid in emergency situations.

Animals should be slaughtered in a clean environment and every effort should be made to prevent the entry of other animals, particularly dogs.

The importance of starting slaughtering as soon as possible in order to prevent the purchase of animals by dishonest dealers at lower than market prices must be stressed.

An alternative system could be the purchase of livestock in the affected area by national or regional authorities and their maintenance in quarantine for the emergency period or until they can be slaughtered.

The precise measures to be adopted will depend upon the specific disaster situation. In chemical pollution, for example, measures should concentrate first on preventing the animal carcases being used for human consumption. The second objective should be to prevent the slaughter of affected animals until such time as the level

of radioactivity has dropped so as not to constitute any hazard to human health.

The animals should be subjected to clinical inspection before slaughter. Only those animals which appear to be clinically sound should be slaughtered and this should be carried out within the disaster area.

Slaughtering may be implemented in different ways:

i. using slaughterhouses that are still functioning;
ii. using the slaughterhouse units of the nearest unaffected zones;
iii. using mobile slaughtering units installed on trucks, especially for injured animals impossible to move;
iv. setting up a suitable area for butchering in the open and under makeshift conditions.

After slaughtering, it may be difficult to sell all the meat at the site affected by the disaster. In most cases the demand for meat will be low and no markets will be available. The problem of ensuring that meat and by-products reach the market in the best possible state of freshness is the next priority.

Because of the frequency of disruption of electricity supplies, refrigeration and freezing, the most common methods of storage normally used, are very seldom available at the time and place of a disaster. Even if they are available, their limited capacity becomes overloaded as a result of the abnormal increase in the number of animals slaughtered. The traditional methods of meat preservation such

as drying, smoking, salting and curing have the advantage of low-cost technology but in these cases the limiting factor may be time.

One of the methods which might be applied in the case of a disaster is the spraying of dressed carcases with special anti-microbial solutions. The anti-microbial solution is a mixture of acetic acid (2.0%), lactic acid (1.0%), citric acid (0.25%) and ascorbic acid (0.1%) made up to 100% with water. About 250 ml of spray are needed for a beef quarter and about 300 ml for a dressed mutton carcase. The meat should be sprayed while still hot and in the place where it will be stored. This method prolongs the shelf-life of the meat for a few days depending on the temperature and the humidity of the air in the storage room.

Very little can be done with animal by-products. During emergency slaughtering, however, hides and skins should be salted and stored in any available facilities before transporting them to the nearest market or tannery. All other by-products should be burned or buried.

The strict control of food of animal origin is necessary to prevent outbreaks of human diseases such as enteritis. The need to cook meat and boil milk before consumption must be widely publicized within the community.

Furthermore, all supplies which arrive in the stricken area should be controlled in order to avoid pollution, contamination, organoleptic adulteration, etc. Thus, all food kept in stores should be inspected and fitness for human consumption should be based on appearance, physical characteristics, taste and odour. If judged to be

unfit for human consumption a decision should be made as to whether the food is suitable as animal feed or whether it should be safely disposed of either by burial or incineration.

The setting up of a mass catering service could be the best solution to overcome these problems.

18. Destruction of carcases and other materials of animal origin

In most disasters a certain number of animals die and their carcases have to be disposed of. There might also be parts of animals stored in unserviceable commercial or domestic refrigerators which need to be dealt with.

Carcase recovery may require the same equipment as that necessary for the recovery of human bodies, but of course the latter has priority.

Dealing with this problem is a task of the first emergency phase. The justification for a quick collection and destruction of animal carcases can be summarized as follows:

i. the general belief that unburied carcases and particularly their smell carry epidemics (the miasma theory) can cause anxiety among uninformed people;

ii. such carcases and parts of animals represent a source of food for noxious animals such as rodents and packs of dogs;

iii. it may be necessary to provide certification of disposal in order to obtain financial compensation;

iv. it may be useful to verify the causes of death.

When the necessary facilities and equipment are available, appropriate methods should be chosen in accordance with various environmental factors such as:

i. kind of disaster;
ii. quantity and size of the materials to be destroyed;
iii. type of soil;
iv. availability of facilities and supplies (excavators, fuel);

There are several ways in which animal carcases or parts of them may be safely disposed of. Examples of burial and cremation are given in Annex 3. Incineration may be practised if sufficient fuel or firewood is available.

If burning is not possible, either because of a lack of fuel or because of large number of animals to be disposed of, carcases might be buried in remote places after they have been covered with quicklime. As soil contamination can remain for a long time under these circumstances, such burial places should be clearly identifiable, registered and properly protected, people and animals being kept away from the sites by fences or by other means. No cultivation or drawing of drinking water should be allowed in these areas. Burial should be deep enough to prevent carnivorous animals digging up the carcases and the sites should be located on dry ground so that the spread of microorganisms by way of ground water is

minimized.

In countries bordering the ocean, the safest and the most simple, although perhaps not the most economical way of disposal, could be the dumping of carcases into the sea at a safe distance offshore.

In many countries relevant legal regulations exist at least in regard to the disposal of refuse from ships, and these regulations can be applied also in the disposal of animal carcases in disaster situations. Is is very important in such cases that disposal is carried out by the government, or at least under the supervision of the government, and not simply entrusted to a private agency.

Rendering is the most desirable method if safe transportation in waterproof vehicles to the place of rendering is possible. Where the circumstances require it, carcases should be sprayed with a disinfectant solution and with an insect and vermin repellent prior to loading. Usually, however, the capacity of rendering equipment and installation will be adequate only for normal use and not for the abnormal quantities arising as a result of disasters.

19. Decontaminantion and pest control

Veterinary services should also be equipped to deal with the following:

i. disinfection of slaughterhouses, stores, camps, etc.;

ii. eliminating noxious animals and vectors from premises;

iii. rodent control;

iv. waste disposal.

For such activities, veterinary services should work in close collaboration with the medical services and other agencies such as military forces which are often well equipped to deal with such operations.

Disasters do not generate new vector-borne diseases, but they may increase the number of vectors and consequently the risks of spread of vector-borne diseases. The main predisposing factors can be summarized as follows:

i. modification of the environment;

ii. interruption of routine control programmes and sanitary services such as garbage collection and disposal;

iii. overcrowding and poor sanitation;

iv. movement of populations from one region to another which provides the conditions under which people can come into contact with arthropods and become infected with diseases such as malaria, typhus, leishmaniasis, viral encephalitides, etc.

Houseflies, lice, ticks, mosquitoes, fleas and other arthropods can multiply rapidly in modified environments and under insanitary and crowded conditions.

Vector control programmes should take into account the latest

information collected before the disaster on the situation of vectors and related diseases in the affected and adjacent areas.

Knowledge of the biology and ecology of pest organisms is required in order to forecast and identify the possible problems created by the new situation.

Knowledge of various procedures and of the pesticides available should also be to hand because the non-selective application of pesticides by routine methods, based on a single technique or chemical, could lead to unsatisfactory results.

Vector control should be organized in different phases as follows:

i. immediately after the disaster, control activities must achieve the objective of eliminating by physical or chemical means pests that infest people and their personal belongings, ;

ii. in the second phase, the work should be aimed at sanitation of the environment through the proper disposal of garbage and other measures.

All pesticides in current use are in some degree toxic to man. Persons preparing pesticides or applying sprays or powders should be carefully trained concerning the toxic risks involved.

Problems caused by rodents could become more acute after a disaster, especially in urban areas. In fact, rat and mouse populations suddenly deprived of their habitats and nesting places start moving at random, searching for new protective habitats. Rats

are nocturnal animals but in a modified environment they can change their behaviour under the pressures arising from the need to explore new areas in order to find living places, food and water.

The spread of rodent populations increases the chance of human populations coming into contact with pathogens present in the rodents' urine and wastes. Furthermore, in closed spaces and when molested, if there is no possibility of escape, rats may become aggressive showing atypical behaviour and frequently biting man.

Rodent control programmes should involve such measures as:

i. preparation of a master map indicating the priority areas where rodent control is required, e.g. hospitals, foodstores, etc.;
ii. reduction of the rat population with rodenticides;
iii. extension and intensification of the collection and removal of garbage;
iv. enforcement of proper storage and sanitary disposal methods in order to deprive rats of food.

The public should be made aware of the true significance of such animals as scorpions, spiders and snakes. The fear of these species, many of which are harmless, may create anxiety and panic.

As a result of disaster situations, the human population might be compelled to flee from houses and to live under emergency shelters, often with domestic animals. Living under such conditions may be the cause of an increase of bites and stings of venomous animals in the case of both man and domestic animals. It is important, therefore,

that emergency settlements for man and domestic animals (tents, huts, stables) be prepared in open areas free of vegetation and stones. Snakes will leave the area if there is heavy trampling both from man and from animals.

In disaster-prone areas it is important that the health staff should be aware of the venomous animals present locally. Few people among the local population are knowledgeable in this respect. The public in these areas should be given as much information as possible.

The general requirements may be summarized as follows:

i. to have as much knowledge as possible of the venomous species present in the area;

ii. to have available adequate supplies of specific antisera;

iii. to control rodent populations;

iv. to prepare suitable camp sites for refugees in open areas, without vegetation, boulders or stones;

v. to carry out periodical treatments with insecticides in tents, huts, stables and similar accommodation;

iv. to educate the public with simple advice on the following:

   a. looking carefully where they put their feet;

   b. inspecting the soil before erecting a tent;

   c. not sleeping in direct contact with the soil;

   d. using a lamp during the night;

   e. raising stones and moving vegetation to allow animals to escape;

f. not panicking in the presence of an animal which is suspected of being venomous;

g. not putting clothes and shoes on the ground, especially during the night, and shaking them before wearing;

h. when bitten or stung by a venomous animal, killing it if possible and taking it to the sanitary staff for identification.

20. Educational aspects in disaster preparedness

When a disaster occurs an extensive mobilization of veterinarians and auxiliaries generally follows, but often such people are unprepared to face emergency situations and they may create a further problem.

There is a need to promote studies on subjects, especially in disaster-prone areas, relating of relief and rehabilitation and health.

Personnel in the health sector have a vital role to play in emergency planning and in disaster relief action. There is, therefore, a need for the provision of systematic post-graduate training for medical doctors, veterinarians, pharmacists and public health officers.

The Council of Europe has noted with concern that, broadly speaking, the level of education of health personnel in public health and in primary health care in disaster situations which is offered by schools or universities in Europe is inadequate. In coping with the

health problems arising in disasters, education and training should not be confined only to members of the traditional health professions, but should also involve engineers, chemists, etc.

The Fire Brigade and the Army play important roles in any actions resulting from acute disasters and more information on the training courses offered to their personnel in different countries would be useful.

All public health specialists should have an understanding of the problems related to disasters and the following categories of the veterinary profession should receive specialized training:

i. veterinarians working in an area with a high risk of natural or man-made disasters;
ii. those with a high probability of being called into a relief action such as veterinarians employed in the public health services and in the Army;
iii. those with special bilateral twinning arrangements with those working in high risk areas.

Teaching programmes should include:

i. general information on the possibility of emergency or disaster situations in a given area;
ii. general information on veterinary public health and animal health problems related to disaster situations;
iii. general information concerning responsibilities and tasks in relief operations;

iv. legislation.

These courses should be included in permanent or periodical programmes.

A second educational level should furnish specialized training to operative units or task forces set up to act in emergency situations both at national and at international levels. Their experiences in the field should be reported to legislative and administrative higher centres and should form the basis of contingency plans for action as well as of guidelines on the subject.

People living in areas at risk should also be trained with general and specific information on:

i. risks related to zoonoses and foodborne diseases;

ii. risks related to the environment;

iii. veterinary public health tasks;

iv. special information for farmers;

v. primary health care.

Because of the relative infrequency of major disasters in Europe there is the need to pool knowledge on a European basis and to create an evaluation team and a centralized epidemiological service system.

Annex 1

Chemical and industrial disasters

The Workshop stressed the potential danger to human and animal health from chemical and industrial disasters and outlined the procedures and organization required to deal with such occurrences.

The knowledge and experience gained during these experiences have largely increased the preparedness of the affected countries but it is essential that all industrialized countries be made aware of the dangers of such accidents and of the procedures required to prevent them and to deal with them if they should occur. This information must be made available also to developing countries, particularly those in which manufacturing and chemical industries are being or will be established.

Chemical accidents may affect human and animal health causing morbidity and mortality. It is sometimes difficult to relate illnesses caused by chemical accidents to the accident itself, and surveys and epidemiological monitoring lasting for many years after the event may be required.

Much more attention should be directed towards the planning and the establishment of chemical and industrial plants and complexes so that they are sited in those areas where they are likely to have a minimal effect on the environment and on both human and animal health.

Moreover, the establishment of chemical plants in countries or areas which are subject to cyclical natural disasters should be

avoided because of the serious risks posed.

The Workshop stressed the need to develop an epidemiological approach to chemical disasters, i.e., an evaluation of their distribution and of risk factors. Furthermore, knowledge of the chemical characteristics of the substances involved and of their bioaccumulation and persistence patterns should allow reliable predictions to be made about pollution trends in a given area.

The veterinary task should be to prevent harm to the animals in the area, to take care of poisoned animals and to prevent dangers to human health caused by the presence of residues in food of animal origin.

The first action of the veterinarian should comprise gathering knowledge on the nature of the chemicals involved in the chemical pollution and details of modality and time of exposure to the agent concerned.

Next, the veterinarian should make an anamnesis and a clinical examination of those animals exhibiting intoxication. On dead or slaughtered animals, a post-mortem examination and chemical analysis of tissues should be made in order to decide upon the disposal of the meat, milk or eggs, either for human consumption or destruction.

In some cases, carcases of dead animals can be processed into animal feed, or into fertilizer for agricultural use, but if this is not possible they should be destroyed.

The most difficult task for a veterinarian is to decide the destiny of the surviving animals; three possibilities may be considered:

i. to cure animals to obtain a rapid recovery;

ii. to leave the animal without any specific therapy;

iii. to slaughter all the surviving animals in the affected area.

Livestock may be left alive on condition that their tissues do not contain any residues of the chemical responsible for the poisoning, or if it proves to be economically feasible to keep genetically selected animals alive, as long as they can maintain their productive potential.

The possible role of animal sentinels in monitoring chemical risks was discussed since observation of unexpected phenomena, e.g. mortality or infertility in either domestic or wild populations could give an early warning and constitute an alarm system.

The observations collected in the field might reveal previously underestimated or unrecognized effects of chemicals and could call for more sophisticated laboratory examinations. However, ready access to laboratory facilities may not always be available.

So far, organized systems for animal sentinels are still in a phase of initial development, but fish populations have been widely used to monitor water pollution. In future, further information might be collected from farm animal populations reared in proximity to nuclear or high risk chemical plants.

Work involving animal sentinels should be performed by means of a constant epidemiological surveillance of the selected populations, including the sampling and analysis of biological materials, appropriately chosen as markers.

A system of animal sentinels requires also:

i. a constant control on exposed populations as a whole and comparison with appropriately chosen unexposed groups, used as controls;

ii. a quick communication system between the different services interested in emergency intervention (i.e. human and animal health, environmental hygiene, etc.).

Animal populations can be also sampled after a pollution accident and the data obtained can be used in order to furnish information on the spatial and temporal patterns of the distribution of the chemical distribution in the environment.

Annex 2

Civic groups and others which could assist in relief actions*

i. Community councils. Local ordinances are often important to local programmes; council endorsement is always important.

ii. Community administrators. Active administrative support encourages community residents to action and makes local resources available to community programmes.

iii. Local medical and veterinary services. The personnel of these services are not only participants in community programmes, but serve at the same time as educators and promoters.

iv. Local health committees and community health workers. This group is most important for community motivation and education in the course of their work.

v. Local religious bodies guide both the attitudes and the actions of people in many countries. Their advocacy of health programmes is essential. They can often provide such invaluable facilities as meeting halls, audiovisual equipment, and communication networks kavailable to community projects.

vi. Local civ groups dedicated to community betterment bring together civic leaders and have resources in the form of personnel and funds that can be extremely helpful in community projetcs.

vii. Local school and adult educational groups. Located within the communities, they reach entire families, have facilities and resources for group meetings, attract the respected educated people in their communities, and can play an invaluable part in health programmes.

viii. Local practitioners of traditional medicine, birth attendants, and midwives. Often respected by large segments of their communities, they should be involved in health programmes and actively participate whenever possible.

ix. Local police or local military units. Often anxious to participate actively in community service, these groups must be informed of, and involved in, all programmes within their communities.

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* K. Bögel (1984) Contingency plans for veterinary public health in disaster situations.

Annex 3

Disposal of carcases (pigs)[1]

i. Where disposal is to be burial:

a. select the site carefully to avoid contamination from drainage;
b. heavy machinery should be directed to the site and a pit at least 3 metres deep and 2.5 metres wide should be excavated. Allow 2.0 metres for five adult pigs. Carcases must be slashed open to prevent rising.

ii. Where disposal is to be by cremation:

a. A main channel should be excavated in the direction of the prevailing wind on the selected site at least 0.5 metres deep and 0.5 metres wide;
b. Cut a draught channel across the main channel at intervals of 2.0 metres, each such channel being 0.5 metres in width and projecting 1.0 metre on either side of the main channel;
c. Place some large logs or heavy timber parallel to and 1.0 metres each side of the main channel. Across these logs lay a framework of timber and other combustible material such as coal, old tyres, etc.

iii. Burning a carcase

a. Two trenches should be dug in the form of a cross each being 2 m long and 40 cm wide, the depth increasing from a few centimetres at the ends to 40 cm deep in the meddle;
b. The earth is piled into four heaps in the angles and two iron bars placed on them so that they lie across one of the trenches;
c. Strong wooden posts are placed across the bars on which a fire of straw and wood, well soaked in waste oil, is made;
d. The carcase is then placed on the heap of fuel and can also be sprayed with waste oil or kerosene.
e. Wood can be placed on the carcase until it is completely burnt.

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[1] From: Plan for African Swine Fever Eradication in Australia. EDSC, 1975

Annex 4

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Annex 5

List of working papers

1. Scope and purpose of the course
A. Mantovani

2. Contingency plans for veterinary public health in disaster situations.
K. Bögel

3. Lignes directrices pour l'action vétérinaire en cas de catastrophe naturelle.
A. Mantovani

4. A short account of the veterinary problems met from November 29 to December 9, 1980, in the area of Alta Irpinia affected by the earthquake.
A. Mantovani

5. Biting and poisoning animals in disaster situations.
E. Pozio

6. Study cases.
L. Henriet

7. Notes about the use of animals for monitoring human health risks in emergencies.
Al. Mantovani

8. Preparedness in facing health problems from natural disaster emergency situations.
A. Mantovani

9. Contingency plans for accidents and emergencies involving the release of potentially toxic chemicals. Activities from the WHO Regional Office for Europe.
A. Gilad & V. Silano

10. Problems and measures connected with zoonoses and with non-zoonotic communicable diseases of animals. List of transparencies.
A. Mantovani

11. Section concerning veterinary activities prepared together with two annexes: (1) Informations; (2) Veterinary primary health aspects of disaster preparedness (Trieste, 15-20 October 1984)
A. Mantovani

12. Meat technology in a disaster situation.
A. Pisula

13. National report of Cyprus.
K. Polydorou

14. The use of military veterinary services during national disasters.
M. Albano, R. Archilei & A. Conni

15. Study cases.
A. Ferrari

16. Control methods of vectors and pests of public health importance.
C. Majori

17. Commensal rodent control.
P.C. Turillazzu, C. Majori & C.C. Mola

18. Contribution.
B.M. Williams

19. Food and shelter for animals.
S. Borrello

20. Impact of chemical accidents and emergencies on animal health and as possible remedial measures.
A. Macri

21. Study cases.
B. Chomel & C. Perrotin

22. Experiences of care of animals.
A. Zanangeli

23. The 1980 earthquake in southern Italy. Rescue of trapped victims and mortality.
M. De Bruycker, D. Greco, I. Annino, M.A. Stazi, N. De Ruggiero, M. Triassi, Y.P. De Kettenis & M. Lechat

24. Control of stray dogs in the areas of Alta Irpinia struck by November 1980 earthquake.
C. Fantini

25. Veterinary public health in disaster situations in Belgium.
S. Geerts

26. Problems associated with canine populations.
K. Polydorou

27. Prevention of and response to chemical accidents and emergencies: specificities in relation to other disaster situations.
V. Silano

28. Environmental impact of chemical accidents and emergencies with specific reference to food chain contamination.
G. Zapponi

29. The role of WHO in emergency relief.
S.W.A. Gunn

30. Meat hygiene aspects in disaster situations.
J. Wegener

31. Veterinary public health in Portugal.
A. Martins Mèndes

32. Information, surveillance and evaluation.
D. Greco

33. Role of the societies for the protection of animals and of volunteers associations in case of natural disaster in the area of veterinary sciences.
G. Rombaldi

34. Disasters related with flooding.
C. Del Real

35. Principles for the preparation of veterinary public health task groups in disaster situations.
V. Caporale

36. Disposal of carcases in disaster situations.
J. Wegener

37. Radio-amateurs contribution in disaster situations.
G.C. Mola

38. Problems of the refugee camps.
A. Paganini

39. Pharmacological and immunoprophylaxis procedures and their logistics.
R. Lorenzini