TABLE II
TREATMENT CHART EXAMPLE

Agent	Prednisone: 5 mg oral tablets
	Give *1-2 mg/kg* every morning for *3* days
	Give *0.75-1.5 mg/kg* every morning for *3* days
	Give *0.5-1 mg/kg* every morning for *3* days
	Give *1-2 mg/kg* every other morning for *10* days
	Give *0.75-1.5 mg/kg* every other morning for *10* days
	Give *0.5-1 mg/kg* every other morning for *10* days
	Give *0.25-0.75 mg/kg* every other morning for *10* days
	etc.
and continue to reduce until the minimal controlling dose is reached.	

For owner convenience, the chart is generally made out in numbers of tablets rather than doses as described.

amount of alternate morning short-acting glucocorticoid necessary to control clinical signs.

Prednisone and prednisolone are suitable short-acting "steroids." The duration of action of dexamethazone is too long to make it a suitable drug for alternate day therapy on a long term basis. Methyl prednisolone acetate is also very unsuitable for this purpose.

The Management — Owner understanding of the treatment regime is of utmost importance to the success of therapy. Sufficient, meaningful instructions will not fit on the label of a pharmacy bottle. A separate sheet of paper (Table II) or calendar may be necessary to convey full instructions for the successful management of this disease. Owners should always be cautioned regarding the harmful effects of glucocorticoids if not used as directed and warned of the side effects, most evident during the initial phases of therapy. If the level of glucocorticoid cannot be reduced to less than 1 mg/kg on alternate days without a recurrence of signs, the diagnosis should be reconsidered. Dogs receiving long term corticosteroid therapy must be presented on a regular basis for examination.

Concomitant Therapies — The use of antiseborrheic shampoos with moisturizers has proven to be helpful in relieving secondary seborrhea.

Appropriate antibiotic therapy may be instituted if the accompanying pyoderma is severe.

COMMENT

The views expressed in this paper are entirely my own, acquired through years of experience in treating "itchy" dogs. There are many other approaches to diagnosis and management that can also be used successfully.

REFERENCES

1. MULLER GH, KIRK RW, SCOTT DW. Small animal dermatology. 3rd ed. W.B. Saunders Co., 1983.
2. SCOTT DW. Immunologic skin disorders in the dog and cat. Vet Clin North Am 1978; 8: 641.

The Modern Role of Meat Inspection and Food Hygiene

T. E. FELTMATE

As part of the general theme "Veterinary Diagnosis and Disease Control: Current Status and Trends", the following presentation will emphasize the contribution that the Meat Hygiene program can offer toward disease control in Canadian livestock. In so doing, the history and mandate of the Meat Hygiene program will be briefly reviewed as will some of its present activities. While activities related to food safety form an important part of these activities, I will restrict my discussion to those relating to veterinary disease control. Following this, swine condemnation data will be used to illustrate the value of data collected at slaughter in the development of disease control strategies.

The Meat Hygiene program was established in 1907 with the main objective of maintaining our export markets, in particular with the U.K. and the U.S.A. The system was in fact established at their request. As time passed, the scope of the program was enlarged and the mandate broadened. Subsequent to the meat scandals that took place in Ontario in the 50's and in Quebec in the 60's and 70's, the program was expanded to include establishments that never have, and never will, export meat products. The objectives had therefore expanded to include improved consumer protection. These newly added plants are using the federal meat inspection stamp to increase consumer confidence regarding the safety and wholesomeness of their meats and meat products. Still more recently, the meat hygiene program has been used as a

Meat Hygiene Division, Food Production and Inspection Branch, Agriculture Canada, Ottawa, Ontario K1A 0Y9.

tool in some of the eradication and control programs administered by the Animal Health Division of the Food Production and Inspection Branch. A good example of this is the bovine tuberculosis control program in which routine field testing has basically been put aside to concentrate on the detection of lesions at the slaughterhouse level. More than 90% of infected herds detected in the past two years resulted from abattoir submitted lesions. This latest inclusion of disease detection and control elements into the Meat Hygiene program is an important trend which will be discussed in depth later.

What of present activities? Dr. Van Dreumel in his presentation entitled "Postmortem Diagnosis" described a postmortem system which examines a few thousand carcasses and tissue submissions per year. What is being described in this presentation is a chain of postmortem facilities which examines some 330 million animals per year (see Table I). When comparing the depth of examination and the quality of the results, it is a little like comparing service at a restaurant in the Hyatt Regency to service at McDonald's. It must be stressed, that just as McDonald's prepares each and everyone of its millions of hamburgers served per year, we also examine each and every animal that is delivered to the slaughterhouse. On each animal a diagnosis must be made — in most cases the diagnosis is usually NORMAL, e.g. FIT FOR HUMAN CONSUMPTION. However in a significant number of carcasses, we may identify and remove from the food chain a portion of all of

TABLE I

SLAUGHTER STATISTICS FOR THE FISCAL YEAR 1983-1984

Species	Number Slaughtered
Red Meat	
Swine	13,166,762
Cattle	3,233,725
Calves	465,049
Others	439,981
Poultry	
Chickens and Fowl	290,763,731
Turkeys	16,030,478
Others	6,574,952
Total	330,674,678

TABLE II

SELECTED SAMPLE ANALYSES PERFORMED AS PART OF THE MEAT HYGIENE PROGRAM DURING FISCAL YEAR 1983-1984

Analysis	Number of Samples
Antibiotics/Growth Promotants	7,700
Pesticides/Heavy Metals	3,000
Trichinosis	45,000
Bacteriology	2,300
Tuberculosis Confirmation	800
Pathology Examination	800

a carcass affected with some pathological and/or aesthetic defect. In the past, this identification followed a purely organoleptic appraisal of the carcass and its parts. This too has changed over the years to include several additional examinations (see Table II). In the last fiscal year 7700 samples were analysed for antibiotics and growth promotants, 3000 samples were analysed for pesticides and heavy metals, over 45,000 pork tissues were examined for trichinosis, while 2300 samples were inspected for the presence of bacteria, the majority being *Salmonella* or *Campylobacter* examinations. During this same period over 800 samples were submitted to determine the etiology of lesions resembling tuberculosis in cattle plus an equal number of samples were submitted for pathological examination to confirm a tentative diagnosis, e.g. tumour identification. Of these tests, only the trichinoscopic examination of pork tissue and the screening for bacterial growth inhibitors using the STOP test are currently carried out at the plant level. We rely heavily on the various laboratories of the Animal Pathology Division, the Laboratory Services Division as well as other private laboratories to provide the diagnostic service. At present, I do not envisage an increase in the use of in-plant chemical or bacterial analyses due to the expensive equipment involved and the technological expertise required. There have been, however, some developments which may result in other tests being attempted. Recent advances in the development of ELISA tests and monoclonal antibody production have permitted other countries to incorporate certain of these screening tests into their meat hygiene systems, e.g. trichinosis detection using the ELISA system. Armed with a multitude of antigens and the equipment needed, it may be that the routine screening of animals for the presence of various antibodies (or antigen) may be a capability in the plants. Probe technology, including the use of robotics, have recently advanced to permit the trial use of probes in selected plants in Canada. These probes, used in the grading process, employ light reflection technology or electrical measurement bridges for the automated determination of the fat:lean ratios of carcasses at slaughter. These same techniques may be adapted to examine carcasses for certain pathological conditions where there are alterations in the colour or electrical conductivity of the affected tissues, e.g. PSE pork. We are also examining the potential use of ultrasonic techniques to detect abscesses in pork tissue not easily examined during normal postmortem examination. Slowly we are realizing that the use of analog input from potentiometers, colorimeters, voltmeters, etc. may be incorporated into the present system of meat inspection to assist in the identification of carcass abnormalities. The screening procedures which may result must be consistent with our need for an assembly line approach to carcass examination, e.g. easily automated, requiring minimal interpretation of results. At present, many of these tests are highly sensitive but with low specificity, and therefore their usefulness is mainly as a screening rather than definitive test. This will probably change with further application and refinement of the tests.

While the routine organoleptic evaluation of carcasses is no longer considered totally sufficient to ensure food safety, the simple examination of carcasses at slaughter for the presence of visible pathology has a potential which has yet to be tapped. This potential lies in the timely distribution of the nonmortal disease status of livestock slaughtered in Canada.

In recent years, various provincial ministries, producer groups and veterinary bodies have recognized the importance of collecting timely and accurate postmortem data from animals slaughtered in Canada. The need for and benefits realized from this data invariably derive from its use in directing and evaluating preventive medicine programs designed to reduce the economic burden of disease in our livestock. Such systems have been in effect for over ten years in some countries, e.g. Denmark and Sweden, where both the potential and realized benefits from these systems have been reported.

The Meat Hygiene Division has identified the need for such a system in their recent Management Review and is presently considering major modifications to their data recording system in slaughter plants. Presently we collect data at two stages of slaughter, during antemortem inspection and during postmortem inspection. At antemortem inspection, the animals are examined for suitability for slaughter. Information is recorded when animals are detected which are sufficiently abnormal to require either condemnation without entry to the kill floor or marking and holding for slaughter at a predetermined time, under close veterinary supervision.

On the kill floor, 100% of all animals are inspected, the complexity of the inspection procedure varying with each species. When an animal is determined to have sufficient organoleptic abnormalities to warrant the condemnation or special handling of portions of the carcass, the inspector is required to record the defect observed. Daily records are kept on the kill floor which are summarized on a monthly form to be submitted to Ottawa for data capture. In the past, the information so collected was used for program assessment, training and to respond to various ad hoc requests from researchers, universities and private individuals.

Problems have been identified with this data. First of all, the accuracy of the data is questionable. The inspectors' duties are first to decide if a portion must be handled differently, then to dispose of the portion or carcass accordingly and finally to record the presence of the abnormality. Since food safety has historically been of primary importance, the data collection phase has been relegated to the position of a necessary evil. As line speeds have continually increased, the inspectors have simply tried to maintain a running mental tally of the number of portions affected waiting for a break in the action to transfer this tally onto a form at the inspection station. The potential for error in this type of system is therefore very great.

Consistency of diagnosis is certainly of concern. Animals affected with the same set of gross lesions may be condemned for different reasons at different plants. At the same time, the working definitions of certain conditions, e.g. pyemia, septicemia, may also differ dramatically between plants. This obviously makes comparisons of condemnation rates between plants extremely difficult.

The most important defect in the present system is the fact that data is collected on a per plant basis. There are no provisions for the recording of data on a per herd or per animal basis. It is this latter deficiency which most compromises the usefulness of the data presently collected.

With all the faults listed above, there is still value in the information derived from the present system. As mentioned previously, I will use swine slaughter data to demonstrate the usefulness of this data. In Table III, I have listed the five major reasons for condemnation of either portions or whole pork carcasses for the fiscal year 1982-83. It should be noted that these diseases are basically management responsive diseases which are easily diagnosed at slaughter. The five conditions listed account for over 75% of all carcasses condemned with a combined value of approximately $6.2 million. This value includes only the value of the carcasses condemned, when in fact the losses to the producer may be several times this value.

TABLE III
PORTION AND CARCASS CONDEMNATION STATISTICS FOR THE FIVE CONDITIONS ACCOUNTING FOR 75% OF ALL CONDEMNATIONS DURING FISCAL YEAR 1982-1983

Condition	Number Condemned
1. Ascariasis	450,000 portions
2. Adhesions	2.1 million portions
	9,552 carcasses
3. Abscesses	250,000 portions
	18,000 carcasses
4. Bruising	300,000 portions
	3,017 carcasses
5. Arthritis	116,000 portions
	18,633 carcasses

The first condition listed is Ascariasis, basically representing some 450,000 livers condemned due to the presence of white fibrotic areas consistent with the migration of larval Ascarids. Parasitism in swine has been calculated to have a significant effect on production costs. It has been suggested that feed efficiency may be reduced by as much as 25% in some cases. Dr. Magwood suggested in his report that losses as high as $1.75 for every hog marketed may result.

The section dealing with adhesions covers all losses due to acute, chronic and subclinical pneumonias. There are obvious producer losses associated with these diseases as a result of increased mortality and treatment costs, however the losses due to decreased growth rate and feed efficiency are also substantial. Again, Magwood has suggested an increase in production costs of just over $3.00 per hog as a result of this disease. For Ascariasis and pneumonias alone, this amounts to over $65 million per year in lost potential revenues to pork producers.

Abscesses are the chronic sequela to tail biting or pneumonia. Producer losses again include both increased mortality and increased production costs. Although no estimates are available, a recent report examining the effect of beef liver abscesses on production suggested that average daily gain in affected carcasses may be reduced by close to 12.5%. There are also substantial losses to the meat packer as a result of these abscesses being accidentally incised during routine dressing procedures. The resultant contamination of equipment and adjacent tissues means a considerable loss in time while the contaminated equipment is sterilized and contaminated tissue trimmed. One packer has suggested a loss of some $75.00 for each minute that the slaughter operation is halted.

While bruising is not usually indicative of an underlying disease process, it is important when considering the humane handling of livestock both in transit to the plant and while in the plant awaiting slaughter. The roughly 3,000 carcasses condemned due to bruising usually represent crippled or downer animals sent for slaughter. Here, improvements in the recording of the underlying cause for the crippling rather than simple recording of the effects of the condition would certainly improve the disease statistics produced.

The condition responsible for the most carcasses being condemned is arthritis. Chronic losses due to weight loss, poor condition and reduced feed efficiency can be substantial. Very often, more than one joint is involved in affected swine resulting in the severe restriction in mobility of these animals. Plant losses are also experienced as affected joints must be removed resulting in reduced value of the trimmed hams and the increased manpower needs to remove the affected tissues.

The above information is useful to demonstrate disease prevalence and trends and to estimate associated production losses on a national scale. However, it does nothing to assist the individual producer in assessing or improving the disease status at the herd level. The various European systems referred to earlier incorporate data collection at the individual animal or individual herd level. Reports have been published discussing how data from these systems have been used in swine disease control. I have excerpted five examples from these reports to illustrate how they may be applied in the Canadian scene.

1. *Formulation/Assessment of Preventive Medicine Programs*

Under the Danish system, when particular herds are identified as having disease prevalence outside of national norms, producers are notified immediately along with a recommendation that veterinary assistance be sought to rectify the problem. The old maxim, "What you don't know can't hurt you" does not hold true in preventive medicine programs. Until producers know the full extent of disease in their herds, the setting up of an effective, comprehensive disease control strategy remains extremely difficult.

2. *Monitoring the Results of Disease Treatments or Interventions*

As more producers collect individual animal historical data, it is possible to compare residual lesions seen at slaughter in groups of hogs exposed to different treatment regimes. By examining the residual pathology as well as carcass attributes, the treatment with the greatest production potential may be defined. At the same time, the possibility that no treatment may be equally effective may be examined.

3. *Assessment of Trends*

The routine within herd and/or between herd comparison of disease status over time would certainly permit the detection of changes in disease prevalence over that same time frame. Usually, these trends reflect some alteration in the management of the herd. An excellent example occurred in Quebec shortly after Haemophilus pneumonia made its effect known in that province. Inspectors were noticing a significant increase in the number of abscesses in the hams of market hogs. This resulted in the loss of a large number of hams suitable for further processing as well as considerable losses to the producer due to the increase in the weight of pork tissue being demerited. After investigations revealed that vaccination against Haemophilus pneumonia was the underlying cause of the abscesses, alterations in vaccination procedures were proposed to relieve the situation.

4. *Assessment of Herd Performance*

The comparison of disease prevalence between herds or between one herd and an average for the region would permit the producer to recognize if his herd's performance is comparable to others in the same area. Again, turning to Quebec, a recent report suggested that herds operating under the Minimal Disease Herd plan experienced much higher productivity at lower cost than others in Quebec (see Table IV). If we consider the savings in the cost of medication alone (between $5 and $10 per hog marketed) we may suggest that the potential savings to Quebec producers could range from 20 to 50 million dollars. The comparison of residual disease pathology in Minimal Disease Herds in Quebec to other herds not on the plan may reveal which diseases are responsible for the reduced productivity in these other herds.

TABLE IV
REPORTED PRODUCTION STATISTICS OF SWINE PRODUCERS OPERATING UNDER THE MINIMUM DISEASE HERD PROGRAM IN QUEBEC

- Market weight (225 lb) at 165 days
- Mortality 0.5 - 1.5%
- 20 Piglets per sow per year
- Medication costs less than $1 per hog (Quebec average $5 - $10 per hog)

5. *Early Awareness of Disease (especially sub-clinical)*

In studies performed in Denmark involving herds where individual animal histories were recorded, it was possible to see lesions of enzootic pneumonia in hogs without recorded clinical signs prior to slaughter. Approximately 8% of clinically normal pigs exhibited such lesions. The value of finding evidence of subclinical disease is such that the producer would be able to alter his management or treatment regimes to attempt to reduce this disease prevalence. A recent report by Dr. Wilson and others described an epizootic of bovine tuberculosis in cattle which was not evident in the bovine population. Lesions detected at slaughter gave the first indication that this sub-clinical infection was smouldering in the bovine population.

In considering alterations to correct deficiencies in our present system and to develop a system which suits the needs of a National Disease Reporting System, certain recommendations must be considered. These include:

1) The system must be able to permit the immediate entry of data regarding detected abnormalities as soon as they are encountered. This will necessitate the use of automated data collection systems with computer assistance. One of the major reasons why we have not successfully implemented such a system previously is the cost of providing additional manpower for the data collection phase. It is hoped that recent innovations in computer assisted data input, including the potential for speech recognition systems, will overcome this manpower requirement.

2) While the ultimate unit of concern, as described below, is the herd, it is necessary that information be collected on individual animals. This is partly due to the present method of transporting animals to the slaughter plant and their handling at the plant

which prevents their slaughter as a lot consisting of one individual herd. More importantly, producers are increasingly maintaining records on individual animals at the farm level. The maintenance of slaughter data at the same level of concern will permit the evaluation of certain factors which may influence individual animal performance.

3) The system must permit the output of records according to herd or owner identification. It is only at this level that preventive medicine programs may be designed and evaluated. This permits the examination of within herd differences, e.g. trends through time and between herd comparisons, e.g. comparing individual herd statistics with other herds slaughtered at the same plant.

4) The distribution system must be such that all pertinent information is delivered, in a timely and useful manner, to those who require that information. It is certainly hoped that veterinarians represent the end user of this information, however, it must be stressed that under the present system, data collected on individual producers' animals must be considered the property of the producers. As such, they alone may dictate where the information may be sent. The distribution of summary statistics, e.g. weekly summaries from the plant, or region, would, within the confines of the Freedom of Information Act, be available to other interested parties, i.e. universities, research facilities, private industry, etc. Certainly, the issue of security will have to be addressed to ensure that the data as collected will not fall into the hands of other parties which may use the data to gain unfair advantage in the marketplace.

5) Finally, the issue of data accuracy and consistency must be resolved. With computer assisted data collection, it may be possible to identify inspectors, plants or regions condemning an inordinate number of portions or carcasses per unit of time. With follow-up investigations, the source of the variation may be identified and corrective procedures, if necessary, may be instituted.

What is presently being done in the Meat Hygiene Division to address these needs? Certainly, attempts are being carried out to correct the inconsistency of the present system through the development of modules defining the various conditions as concisely as possible leaving a minimum of choice in terms of nomenclature for the conditions noted. In developing the modules, we are attempting to answer the question: Given the time restraints and the lack of available diagnostic equipment, what name or term would best define a given set of lesions leading to the condemnation or special handling of that carcass?

A project is presently underway at the University of Guelph designed to develop a statistical algorithm which may be used to identify establishments with condemnation rates significantly different from the national norms.

A major research project by a DVSc student also at the University of Guelph will address the question of what the swine industry needs with respect to the recording of diseases or conditions seen at slaughter. A survey of swine practitioners and producers in Ontario has been planned to collect this information. Once the needs are defined, the student will then evaluate potential systems which would permit the collection and dissemination of the required data.

Finally, presentations are being made to various producer groups, veterinary associations and provincial ministries by members of the Meat Hygiene Division to indicate our commitment toward the development of this improved data collection system. Feedback from these groups will be used to define the needs and desires of each group to assist in developing a system which best meets the majority of their needs.

Diagnostic Procedures, Prognosis and Therapeutic Approaches of Chronic Respiratory Diseases in Horses

L. VIEL

The Disease Per se

Chronic respiratory diseases are responsible for approximately 20% of equine morbidity (1). The disease is by far one of the major problems encountered in equine veterinary practice. The degree of involvement ranges from the minor inconvenience of an initial exercise induced cough, to a mild, stable cough, progressing to complete disability with chronic and irreversible lung pathology.

The majority of pulmonary diseases affecting horses from birth to maturity may be categorized with respect to the animal's age. 1) In weanlings (less than one year of age) bacterial and probably viral agents account for most of the clinically recognized pneumonic syndromes (2). 2) In yearlings (two and three years old) entering the racetrack,

Department of Clinical Studies, Ontario Veterinary College, University of Guelph, Guelph, Ontario N1G 2W1.