

A Survey of Carcass Condemnation at a Poultry Abattoir and its Application to Disease Management

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Abstract

During a five year period, slaughter records were maintained on flocks of broiler chickens sent to a federally-inspected abattoir in New Brunswick. These records, including data regarding condemnation of both carcasses and portions of broilers, were maintained at the level of the individual producer. Annual meetings and *ad hoc* consultations with producers, a veterinary poultry specialist, and support groups in the poultry industry (feed mills, breeders, etc.) were used to relay to the various interested parties, information relating to disease conditions.

Following the implementation of this system, condemnation rates dropped by one full percentage point during the first three years, with a slight increase observed during the last two years of the study. At the end of the survey, condemnation rates were 20% less than those of the national average.

Key words: Broiler diseases, slaughter inspection, condemnation data.

Introduction

The collection of data about disease and other conditions noted at slaughter has been recognized as one method of monitoring the disease status of a herd or flock (1, 2, 3, 4). Although considerable data are collected at federally-inspected abattoirs across Canada, the data are not collected in a fashion which permits analysis according to individual producers (2). Although systems which make use of this valuable information have been developed in other countries, most of these systems involve red meat species, particularly swine (5, 6). The following paper describes a system developed specifically to monitor disease in broiler chickens in Canada.

Résumé

Un relevé de la condamnation des carcasses, dans un abattoir de volailles, et son application à l'éradication des maladies

Cette étude s'étalait sur une période de cinq ans et elle consistait à accumuler des observations, lors de l'abattage de certains troupeaux de poulets de grill, dans un abattoir sous inspection fédérale, au Nouveau-Brunswick. Ces observations incluaient des données relatives à la condamnation de carcasses ou de certaines de leurs parties et se rapportaient à chacun des troupeaux impliqués. Des rencontres annuelles et des consultations *ad hoc* avec les propriétaires des troupeaux précités, un spécialiste en pathologie aviaire et des groupes de support de l'industrie avicole, à savoir: meuniers, aviculteurs et autres, servirent à communiquer aux intéressés les renseignements relatifs aux maladies diagnostiquées.

Au cours des trois années ultérieures à la mise en application de ce système, le taux de condamnations baissa de 1%; il accusa toutefois une légère hausse, au cours des deux dernières. À la fin de la cinquième année, il se révéla de 20% inférieur à la moyenne nationale.

Mots clés: maladies des poulets de grill, inspection lors de l'abattage, données relatives à la condamnation.

In Canada, approximately 300 million broilers are slaughtered annually. Data from Agriculture Canada (T. Feltmate, personal communication) indicate that an average of 2% of these broilers are condemned at the time of slaughter because of the presence of various diseases or conditions which render the carcasses unsuitable for human consumption.

The following project was undertaken with four objectives:

- a) to identify the major causes of condemnation of broiler carcasses and portions at one abattoir in New Brunswick;
- b) to analyze the production performance of individual producers in terms of rates of carcass condemna-

- c) to estimate the financial loss resulting from condemnations at the abattoir; and
- d) to determine the impact of establishing an effective communication system among veterinarians, poultry producers, and others involved in the poultry industry.

Materials and Methods

For the purposes of this project, the twelve month period between October of one year and September of the following year was defined as a statistical year. Data were collected over five such periods starting in October 1980 and ending in September 1985. Data regarding the slaughter and inspection of each lot of poultry were compiled on a daily basis. For each producer, monthly summaries indicating the total slaughter, the number of broilers found dead at arrival at the plant, the number of carcasses condemned (and the reason for the condemnation), and the number of portions condemned, were prepared. Weights for the condemned material, along with an estimation of the value of the condemned material, were provided. At the end of each statistical year, a final report was published. This report, which included graphical presentations, detailed production performance of individual poultry producers, and comparisons with previous statistical years, were presented and discussed at annual meetings with plant management and local poultry producers.

Throughout the year, producers were encouraged to visit the abattoir to observe the slaughter and inspection of their broilers. Diseases and other conditions noted at slaughter were discussed with the producers at that time. Although lines of communication were open prior to the onset of this project, a structured communication system was developed so that the veterinarian in charge of the abattoir could contact either the veterinary specialist, poultry producers, or other industry representatives when a given

TABLE I
A Listing of the Ten Most Frequently Reported Conditions Resulting in Broiler Carcass Condemnation During the Five Year Period, October 1980 to September 1985

1980/81	1981/82	1982/83	1983/84	1984/85
1. Contamination ^a	Marek's/Skin condition	Bruises ^a	Bruises ^a	Bruises ^a
2. Bruises ^a	Bruises ^a	Arthritis	Arthritis	Arthritis
3. Arthritis	Contamination ^a	Cyanosis/Moribund ^a	Cyanosis/Moribund ^a	Contamination ^a
4. Cyanosis/Moribund ^a	Cyanosis/Moribund ^a	Contamination ^a	Contamination ^a	Airsacculitis
5. Marek's/Skin condition	Arthritis	Septicemia	Dermatitis	Cyanosis/Moribund ^a
6. Emaciation	Septicemia	Mutilation ^a	Overscald ^a	Emaciation
7. Peritonitis	Emaciation	Emaciation	Emaciation	Mutilation ^a
8. Rickets	Abscess	Airsacculitis	Hepatitis	Cellulitis
9. Dermatitis	Peritonitis	Dermatitis	Airsacculitis	Imperfect bleeding ^a
10. Pendulous crop	Cellulitis	Overscald ^a	Septicemia	Pendulous crop

^aIndicates a nondisease condition associated with transportation or processing of poultry.

flock had an unusual disease problem. At the same time, the field veterinarian or individual producers were able to contact the veterinarian in charge of the abattoir to indicate the presence of a specific problem in a flock. This information prepared the veterinarian at the abattoir to perform special examinations of carcasses for particular conditions or to collect specimens for submission to a laboratory for further diagnosis.

To calculate the economic impact as a result of condemnation of portions, data regarding the three most commonly reported conditions were used. These conditions were contamination, for which the back may be removed and condemned, bruising, for which legs and wings are removed, and mutilation, also involving both wings and legs. It was previously determined that either three backs, three legs or six wings were required to equal one kilogram of condemned portions. These factors were used to estimate the weight of portions condemned. In order to assign a dollar value to this weight, it was first converted into an equivalent live weight. This was accomplished by dividing the weight of the portions by 0.89, a factor which represents the ratio of the dressed weight of broiler chickens to their live weight. The live weight equivalent was then multiplied by the current price for broilers. For our purposes this rate was set at \$1.15 per kilogram of live weight.

Student's t-test was used to analyze the data regarding the rate of birds found dead.

Results

During the five statistical years reported, there was a dramatic decrease in the rate of condemnation of whole carcasses, from a high of 2.18% in the first year to a low of 1.14% in the third year. The condemnation rate for the final year was 1.39%. During the same time, the condemnation rate for broilers slaughtered in Canada decreased only slightly from a high of 1.96% in the first year to its present level of 1.72% (Figure 1).

For the purpose of charging losses back to the producer, broiler condemnations are separated into two categories — disease and nondisease. "Disease conditions" are defined as those conditions which occur at the farm and therefore, any condemnations are charged directly to the producer, e.g. air sacculitis, Marek's disease, etc.

"Nondisease conditions", such as bruising, fractures, frostbite, etc., are conditions which may occur after the birds leave the barn and are charged to the packer or the transporting company.

The ten most frequently observed conditions in each of the five statistical years of the survey are given in Table I. Bruising, contamination, and cyanosis/moribund state accounted for 39.3% and 40.3% of condemnations, respectively, during the last two statistical years. During the same two years, four disease conditions were responsible for 32.7% and 34.8% of total condemnations; these conditions were arthritis (usually a sequel to valgus/varus deformity), air sacculitis (often leading to septicemia), emaciation (usually in conjunction with an unspecified disease), and dermatitis/cellulitis. During the early years of the project, Marek's disease represented a major cause for condemnation of whole carcasses. For example, in the second year of the project, 25% of all condemnations were due to Marek's disease, either in the classical form or with skin lesions associated with Marek's disease. In the last two years, condemnations for Marek's disease-related pathology amounted to only 1% and 3% respectively, of all condemnations (95% of these condemnations originated from two flocks).

Whereas the rate of condemnation of whole carcasses decreased, the condemnation of portions tended to increase. Although part of this increase may have been due to changes in policy, i.e. permission to trim contaminated portions rather than condemn the whole bird, there was also an increase in condemnation of portions due to

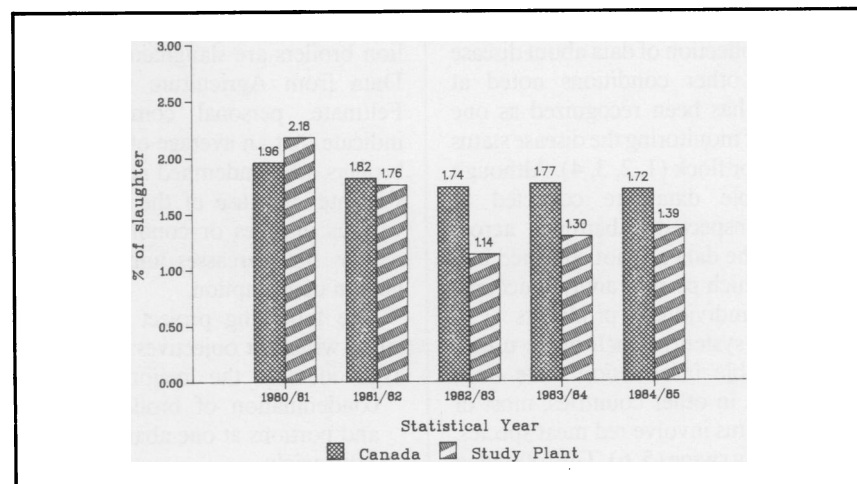


Figure 1. A comparison of the rate of condemnation for Canada versus that of the study plant during the five year period from October 1980 to September 1985.

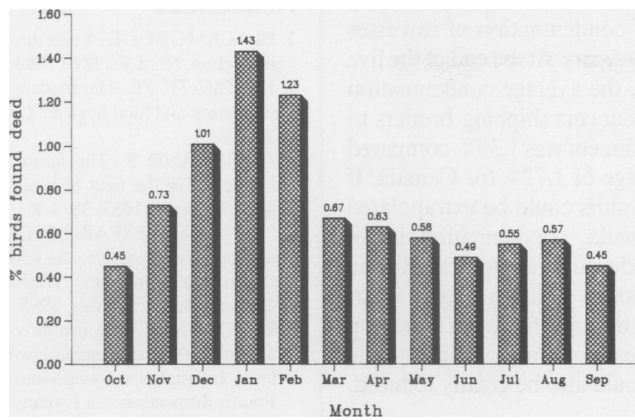


Figure 2. A monthly comparison of the rate at which broilers were found dead on arrival at the study plant.

conditions not affected by policy changes, e.g. bruising. Since the slaughter volume increased during the five years of the study, the appropriate statistic to examine is the rate of portion condemnation. However, to fully realize the impact of these losses on the poultry industry, the number of portions condemned (or weight thereof) was also examined.

In 1980/81, some 663,698 portions were condemned whereas in 1984/85, 1,077,327 portions were condemned. These figures are equivalent to the condemnation of one portion for every six birds slaughtered in the first statistical year and the condemnation of one portion for every three birds slaughtered in the last statistical year. The overall value of these portions doubled during the study, rising from \$176,475 in 1980/81 to \$381,372 at the end of the study. This represents a twofold increase in losses due to trimmed portions, rising from \$0.046 per bird slaughtered in 1980/81 to \$0.092 in 1984/85 (value is expressed in 1985 dollars). As described earlier, these figures represent only the three most frequently reported conditions, and therefore underestimate the total impact of portion condemnations to the industry.

The other major source of lost productivity was reflected in the number of birds found dead on arrival at the abattoir. Although the rate of birds found dead decreased over the period of the study, these statistics were similar to rates of condemnation, in that there was an initial reduction in the rate of birds found dead during the first three years followed by a slight increase in this rate during the fourth and fifth years. Figure 2 illustrates the average monthly rate of birds found dead during

The dramatic drop in rate of condemnation observed during the first three years followed by slight increases during the last two years of the study may be the result of an initial enthusiasm experienced by the participants which gave way to complacency as the pro-the study. As might be expected, the rate of birds found dead tended to be higher during the winter months (December, January and February). The average rate of birds found dead for this period was 1.22%, a value that is significantly different ($p < 0.05$) from the 0.57% average rate of birds found dead, experienced for the rest of the year.

Discussion

Reductions in the rates of condemnation for both disease and nondisease conditions, as well as a reduction in the number of birds found dead on arrival at the plant, were noted during the study. It is my opinion that the dramatic drop in these rates was a direct result of the establishment of effective lines of communication among the participants. Although it is recognized that the mere identification of the prevalence of disease does not result in a reduction in rates of condemnation, this information can be used to determine those conditions that should be addressed to generate the greatest profit at the least cost to the producer. A prime example would be the reduction in Marek's disease condemnations during the study. An examination of management practices by the veterinary poultry specialist revealed minor modifications that were required to improve the effectiveness of the vaccination program. These modifications resulted in the elimination of a disease which previously accounted for 25% of condemnation.

gram matured. This observation indicated that new methods to maintain the enthusiasm of all parties involved were needed. One such method would be the development of interest in the reduction in the number of portions condemned. Although the major emphasis was placed on condemnations of whole carcasses at the onset of the project, figures from the last two years indicated that more effort is required to reduce wastage due to damage to portions. The development of specific targets for each producer would certainly assist in this area.

Many of the carcasses condemned for disease conditions were emaciated or much lighter in weight than normal birds. Many of the birds had evidence of longstanding disease, conditions which should have been obvious in the living animal. These birds should have been culled and not shipped to the plant. When broilers are condemned, their weight is calculated by multiplying the number condemned by the average weight of the live birds on entry to the plant. Therefore, the producer is charged for birds of a given weight when, in fact, the majority of these birds may be half this weight. Further loss is incurred as a result of the space these birds occupy and the feed they consume on the farm. Continued effort is required to encourage producers to reduce these losses by routinely culling sick or disabled broilers.

Further work to examine the relationship between disease and productivity is required. Many disease conditions are influenced by management of the flock, e.g. valgus-varus deformity, air sacculitis (7, 8). An examination of rates of condemnation for valgus-varus deformity during the last statistical year revealed rates ranging from 0.05% to 0.40%, an eightfold difference among producers. There is an excellent opportunity to examine the different management methods used by these producers to identify factors that may be associated with this condition. For each producer, it is necessary to determine the point at which reduction in rates of condemnation cannot occur without a concurrent loss in productivity.

Concern regarding the humane handling of poultry demands a closer examination of the rate of birds found dead on arrival at the plant. Because individual producers' losses ranged between 0.37% and 1.22% during the last fiscal year, various factors must be examined to determine whether improvements in transportation or

handling of the broilers might reduce these losses. With a threefold difference between rates of birds found dead in January versus June, continued effort is required to design transportation methods better suited to our winter climate.

Although losses due to condemnation of carcasses as a result of nondisease conditions decreased, there was a corresponding increase in the number of portions condemned for the same reasons. This finding indicated that there was a reduction in the severity of the conditions, e.g. bruising, without a corresponding reduction in the number of birds affected. Although this reduction in severity was profitable to the industry, there continues to be a major requirement to reduce losses in general.

Following the implementation of a disease reporting system at an establishment in New Brunswick, a reduction in condemnation of whole carcass condemnation for both disease and non-disease conditions was noted. The initial impact of this system was a

reduction of more than one percent in the rate of condemnation of carcasses within three years. At the end of the five year study, the average condemnation rate for producers shipping broilers to this establishment was 1.39%, compared to an average of 1.72% for Canada. If the same results could be extrapolated across Canada, condemnation losses could be reduced by approximately one million broiler chickens each year. Similarly, the severe losses resulting from the death of birds in transit to the abattoirs could also be greatly reduced.

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