Confirmed Tuberculous Lesions in Non-Tuberculin-Reactor Cattle Slaughtered at Export Meat Plants in the Republic of Ireland, 1988 to 1999

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Introduction

This paper details the identification of confirmed lesions of tuberculosis in non-tuberculin reactor cattle slaughtered at export licensed meats plants in the Republic of Ireland over a twelve year period. These results are complementary to the ongoing national tuberculin testing programme and provide an additional monitor of bovine tuberculosis in the national herd.

Over the twelve year period, 1988 - 1999, the total number of cattle slaughtered annually has increased from 1.18 million in 1988 to 1.92 million in 1999. The cattle come from every county in the country and represent 20% to 25% of the 7.5 million national cattle population. The screening of such a large proportion of the national herd can provide a reliable estimate of the overall prevalence of the disease, as characterised by the presence of gross lesions at slaughter.

Data relating to the number of attested animals, i.e., animals presented for slaughter with an animal identity card, that disclose a confirmed lesion of tuberculosis, when expressed as a proportion of the total number of cattle slaughtered, provide a means of monitoring the year-to-year change in the prevalence of bovine tuberculosis at the national level. These data can then be analysed against the background of the annual tuberculin testing programme.

Objective

The objective of this paper is to collate and analyse the annual data relating to non-tuberculin-reactor cattle slaughtered at export meat plants that disclosed tuberculous lesions on meat inspection examination during the period, 1988 - 1999.

Methods

The veterinary meat hygiene and inspection procedures conducted at these export licenced meat plants were conducted in accordance with European Union practice. These procedures are not specifically designed to identify all cases of tuberculosis.

In every case in which a suspected lesion of tuberculosis was disclosed in (i) attested cattle, i.e. cattle from clear herds which were accompanied by an animal identity card when presented for slaughter, or (ii) non-reactor cattle slaughtered under permit from herds which were currently under movement restriction due to tuberculosis and which were accompanied by a movement permit when presented

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for slaughter, the lesion(s) was/were submitted to the Department of Agriculture, Food and Rural Development's Central Veterinary Research Laboratory, for evaluation, based upon the use of approved histopathological and/or microbiological procedures. A small proportion of the non-reactor animals were submitted for slaughter on permit because they had lost their identity cards or in recent years were from brucellosis restricted herds.

Results

The numbers of attested cattle and cattle slaughtered under permit that had confirmed tuberculous lesions disclosed at slaughter in export licensed meat plants during the period, 1988 to 1999 inclusive, together with the total number of animals slaughtered, excluding tuberculin reactors, are shown in Table 1.

Table 1. The number of (i) attested cattle or (ii) cattle slaughtered under movement permit that had confirmed tuberculous lesions at slaughter, together with the total number of cattle slaughtered and the confirmed tuberculous lesion rate, during the period 1988 to 1999, inclusive.

Year	No. of cattle with lesions	Category of animals showing lesions		Total No. slaughtered*	Lesion Rate (% of kill)	
		Identity Card	Movement Permit		Card	All
1988	1,722	1,253 (72)**	469 (28)	1,181,102*	0.106	0.146
1989	1,864	1,248 (67)	616 (33)	1,156,408	0.108	0.161
1990	1,927	1,405 (73)	522 (27)	1,316,986	0.107	0.146
1991	2,290	1,747 (71)	543 (29)	1,461,362	0.120	0.157
1992	2,309	1,727 (75)	582 (25)	1,469,490	0.118	0.157
1993	2,626	2,018 (77)	608 (23)	1,386,745	0.146	0.189
1994	2,563	1,963 (77)	600 (23)	1,238,989	0.158	0.207
1995	2,664	2,044 (77)	620 (23)	1,319,023	0.155	0.202
1996	2,480	1,894 (76)	586 (24)	1,478,228	0.128	0.168
1997	2,414	1,875 (78)	539 (22)	1,533,664	0.122	0.157
1998	2,952	2,241 (76)	711 (24)	1,653,350	0.136	0.179
1999	3,399	2,593 (76)	806 (24)	1,924,792	0.135	0.177

* Source: Department of Agriculture, Food and Rural Development
** ( ) percent of total no. of cattle with confirmed lesions

These figures show no change in the annual lesion rate for attested cattle between 1988 and 1990 during a period of intensive testing which included two tests per herd per year. In 1991, there was a delay in the commencement of the testing programme and from that year onwards the aim was to test every herd once per year. For the first five years (1988 to 1992) there was little difference in the overall lesion rate. In 1993 there was a 17% increase in this rate, with a further 9% increase in 1994. The figure remained the same for 1995, then dropped by 17% in 1996 and by a further 7% in 1997, returning to the figure of the first five years. There was a 12% increase in 1998, this reflected the substantial increase in tuberculin test reactors identified during the year. The figure remained the same in 1999.

The lesion disclosure data presented here, for the years 1991 to 1997, follow the same pattern of a rise and fall in the lesion disclosure rate as did tuberculin test reactors described in the 20 year period, 1970 to 1990 (Byrne, 1992). These earlier data indicated a cyclical pattern to lesion disclosure in test reactor animals which, as the current data indicate, is still the case.

The proportion of cows exhibiting tuberculous lesions was 60 - 70% greater than might have been anticipated on the basis of the number of cows slaughtered. Steers and heifers on the other hand had a 10 - 20% lower ratio of lesions to their numbers slaughtered (Table 2).

Overall, 66% of the granuloma-like tissue samples submitted for examination from non-tuberculous reactor cattle were confirmed as tuberculous (Table 2). A significantly higher proportion of suspect lesions were confirmed as tuberculous from animals submitted for slaughter on permit, compared to those submitted from attested cattle ($P < 0.00001$). However, the actual difference was small, at 72% and 65%, respectively. This was attributed to the difference in the rate of confirmed tuberculous lesions seen in steers and heifers presented for slaughter under permit, compared to that seen in attested steers and heifers. As the number of bulls slaughtered was small (1.5% of slaughterings), no inferences have been drawn from their data. Many of the bulls were young and were slaughtered for the specialist 'bull beef' trade.

Table 2. The number of suspect tissue samples which were submitted for laboratory examination from cattle with an identity card or a movement permit when slaughtered at export licensed meat plants and the number which were positive or negative for tuberculosis during the period 1988 to 1999, inclusive. Source: *Central Veterinary Research Laboratory.*

Animal	Identity Card		Permit		Overall Totals	
Class	Pos. (%)	Neg. (%)	Pos. (%)	Neg. (%)	Pos.(%)	Neg. (%)
Cows	7,178 (71)	2,943 (29)	2,399 (73)	879 (27)	9577 (71)	3,822 (29)
Heifers	3,499 (64)	1,932 (36)	1,097 (71)	447 (29)	4,596 (66)	2,379 (34)
Steers	11,070 (61)	6,985 (39)	3,628 (71)	1,480 (29)	14,698 (63)	8,465 (37)
Bulls	256 (61)	167 (39)	78 (56)	61 (44)	334 (59)	228 (41)
Totals	22,003 (65)*	12,027 (35)	7,202 (72)*	2,867 (28)	29,205 (66)	14,894 (34)

* $P<0.00001$

In attested animals, there were significantly higher rates of confirmation of lesions in cows compared a) to steers ($P < 0.00001$) and b) heifers ($P < 0.00001$). Such differences were not seen in animals presented for slaughter under permit.

Overall, lesions from cows and heifers had significantly higher confirmation rates than for steers ($P <0.00001$ and $P <0.001$, respectively).

The proportions and ratios of factory kill and lesions for each animal class, over the twelve year period, are shown in Table 3. The proportion of the different animal classes slaughtered varied during the period under review. The primary influences were international market changes, the removal of eligibility of Friesian cows for suckler cow grants in the mid 1990's and the reduction in, or absence of, a trade in live cattle in the latter years.

Table 3. The proportion and ratio of the factory kill and confirmed tuberculous lesions disclosed, by animal class, in non-reactor cattle slaughtered in export licensed meat plants from 1988 to 1999, inclusive.

	Cows	Heifers	Steers	Bulls
	% kill / % lesions	% kill / % lesions	% kill / % lesions	% kill / % lesions
1988	19 / 28	11 / 10	69 / 61	1 / 1
Ratio	*1.5*	*0.9*	*0.9*	*1.0*
1989	19 / 30	11 / 10	69 / 59	1 / 1
Ratio	*1.6*	*0.9*	*0.9*	*1.0*
1990	19 / 30	15.5 / 12	64.5 / 57	1 / 1
Ratio	*1.6*	*0.8*	*0.9*	*1.0*
1991	20 / 27	17 / 13	62 / 59	1 / 1
Ratio	*1.4*	*0.8*	*1.0*	*1.0*
1992	18 / 28	20 / 13	61 / 58	1 / 1
Ratio	*1.6*	*0.7*	*1.0*	*1.0*
1993	21.5 / 34	20.0 / 13	57.5 / 52	1 / 1
Ratio	*1.6*	*0.7*	*0.9*	*1.0*
1994	25 / 40	23.5 / 18	50 / 41	1.5 / 1
Ratio	*1.6*	*0.8*	*0.8*	*0.7*
1995	24 / 38	25 / 19	49 / 42	2 / 1
Ratio	*1.6*	*0.8*	*0.9*	*0.5*
1996	21.5 / 38	20.5 / 15.5	57 / 45	1 / 1.5
Ratio	*1.8*	*0.8*	*0.8*	*1.5*
1997	19.5 / 33	18.5 / 17	60 / 48	2 / 1.5
Ratio	*1.7*	*0.9*	*0.8*	*1.5*
1998	20 / 34	22 / 18	57 / 47	1 / 1
Ratio	*1.7*	*0.8*	*0.8*	*1.0*
1999	19.5 / 31	23 / 21	56 / 46	1.5 / 1.5
Ratio	*1.6*	*0.9*	*0.8*	*1.0*

Discussion

The additional monitoring of the national cattle population for evidence of tuberculosis in animals sent for slaughter supports the analysis of the outcome of the tuberculin testing programme.

The rate of identification of tuberculous lesions in cattle slaughtered in abattoirs in the Republic of Ireland from 1988 to 1999 demonstrates that there is a persistent low level of tuberculosis in the national cattle herd which the tuberculin testing programme has been unable to eliminate.

The fact that a higher proportion of the confirmed tuberculous lesions was consistently identified in animals presented for slaughter from herds under movement control, i.e. with a movement permit, than in those animals originating in attested herds, is reassuring in regard to the effectiveness of the annual national testing programme.

During the 12 year period a market developed for heavier heifers i.e., as older heifers; also, steers were brought to slaughter weight sooner i.e., as younger steers. This was likely to have affected the ratio of lesions to kill for these as the overall figures would indicate that the older the animal is the greater the risk of being disclosed at slaughter.

These data confirm that greater attention requires to be given to aspects of tuberculosis control, other than the testing programme alone, in order to finalise eradication of the disease from the national herd.

References

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