

# Bluetongue control using vaccines: the experience of Emilia Romagna, Italy

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## Summary

In 2003, thirty municipalities of the provinces of Parma, Reggio Emilia and Modena in the Emilia Romagna region of Italy, bordering the region of Tuscany, were included in the national bluetongue (BT) vaccination programme, using monovalent live-attenuated type 2 vaccine. The purpose of the study was to evaluate the organisation of a vaccination programme designed by the Regional Veterinary Service and the relative cost of the campaign, as a large number of animals were involved. To better evaluate the real cost of the campaign, costs sustained by the Reggio Emilia Local Sanitary Unit were specifically analysed. BT vaccination of all domestic ruminants is a very expensive operation (€9.20 per vaccinated animal). Consequently, to evaluate the need for a vaccination campaign in a new area, the risk of disease spread, as well as the cost of the operation, should be considered.

## Keywords

Bluetongue – Cost – Emilia Romagna – Italy – Vaccination – Vaccine.

## Introduction

A national vaccination programme against bluetongue (BT) commenced in 2001 and involved several regions of Italy. The third annual vaccination campaign has now been completed. The objectives were to protect sheep and goats from clinical illness and to create an immune population of domestic ruminants to stop further circulation of BT virus (BTV). Vaccination of at least 80% of the susceptible population was considered necessary. The region of Emilia Romagna became involved in the national vaccination programme in 2003: thirty municipalities in three provinces (Parma, Reggio Emilia and Modena) bordering the region of Tuscany were included, using monovalent BTV-2 live-attenuated vaccine. These prophylactic measures were designed to create a barrier to the possible spread of BTV to northern Italy, currently still free from infection. The results of the regional vaccination campaign are presented in Table I. By the end of the campaign (1 January-30 April 2003), over 95% of susceptible

animals (about 40 000 cattle and 8 000 sheep and goats) had been vaccinated. The Local Health Units involved devoted most of their available resources to this activity.

The Regional Veterinary Service led the study which was to evaluate the organisation of the vaccination programme and to determine the costs of the campaign, taking into account the large number of animals involved. To better evaluate the expense of such a vaccination campaign, the costs sustained by the Reggio Emilia Local Sanitary Unit (RELSU) are analysed specifically.

## Results

### Territory

Figure 1 shows the region of Emilia Romagna and highlights the eight municipalities of the Reggio Emilia Province in which vaccination was compulsory. The area is mountainous and has a low

Table I  
Animals vaccinated in Emilia Romagna by the end of the bluetongue vaccination campaign, 30 April 2003

Species	Province	Farms	Animals	No. of vaccinated animals	Percentage of vaccinated animals
Cattle	Modena	379	9 383	8 991	95.8%
Sheep and goats	Modena	44	1 455	1 412	97.0%
Cattle	Reggio Emilia	455	16 812	16 170	96.2%
Sheep and goats	Reggio Emilia	63	3 358	2 884	85.9%
Cattle	Parma	589	14 471	13 982	96.6%
Sheep and goats	Parma	98	2 949	2 620	88.8%
Total	Cattle	1 423	40 666	39 143	96.3%
Total	Sheep and goats	205	7 762	6 916	89.1%
Total		1 628	48 428	46 059	95.1%

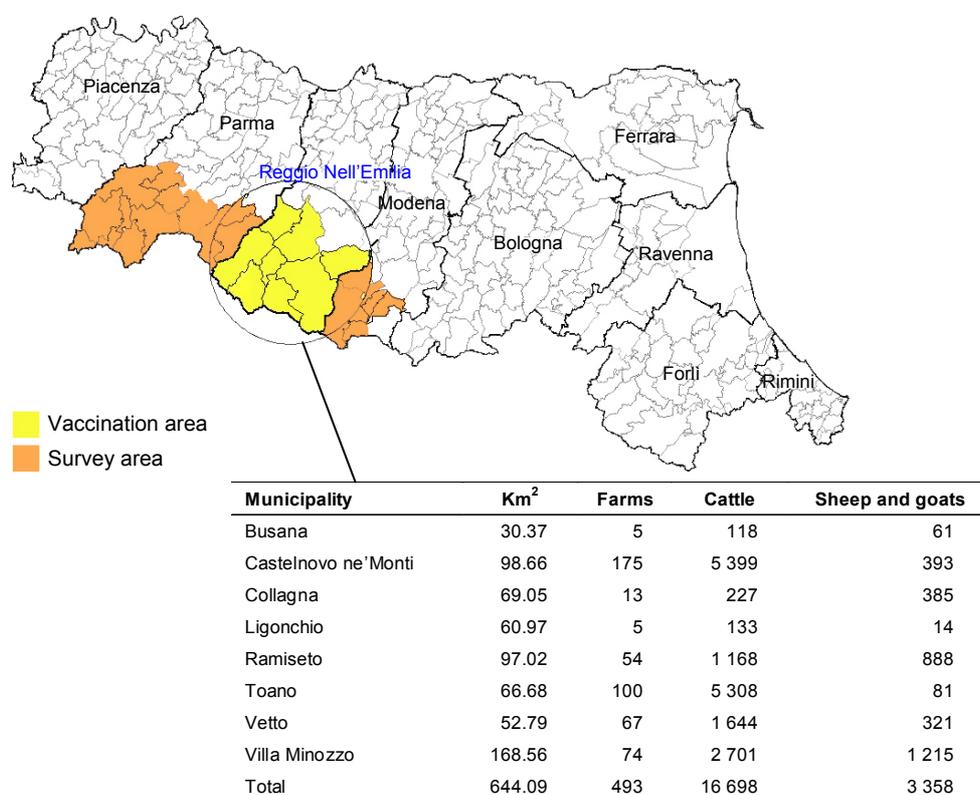


Figure 1  
Emilia Romagna councils (yellow) subjected to compulsory vaccination

animal density (0.8 farm/km<sup>2</sup>; 31.3 animals/km<sup>2</sup>). The results of the vaccination campaign in the eight municipalities are presented in Table II. By the end of the campaign, the percentage of susceptible animals vaccinated was over 80% (minimum level) in all municipalities; in seven of them coverage was over 90%.

### Vaccination costs

The costs of the vaccination campaign were analysed taking into consideration human resources (veterinarians, accountants, etc.), transport costs (kilometres), disposables and vaccine, as described in greater detail below.

## Human resources

The area of this study is under the authority of the Area Sud District, one of the three districts that form the RELSU. The RELSU decided to use available resources, organising the veterinary staff of the entire province without employing practitioners. Twenty-eight veterinarians (12 from Area Sud District and 16 from the other districts of the RELSU) were employed. To complete the entire vaccination programme, they worked 2 677 hours, of which 300 hours were spent organising the campaign (contacts with farmers, recording and reporting) and 2 377 hours were spent in the field. The agreement between farmers and veterinarians was fundamental to obtaining the necessary co-operation during the vaccination campaign. Media reports contributed to the increase of fear of vaccination amongst farmers. The announcement of negative effects on the reproductive system in cattle and in sheep represented a serious problem and a lot of time was spent convincing farmers of the need to vaccinate. Considering that a veterinarian costs €60.35 per hour, the RELSU sustained a total cost of €161 556. One accountant was employed for administrative and other activities, working 80 hours at €25.00 per hour, representing a total cost of €2 000. Thus, the total costs for staff were €163 556.

## Transport costs

Most of the farms were small (less than 50 animals) scattered in mountainous territory; veterinarians had to cover a total of about 21 300 km to reach all the farms. The cost was approximately €4 515.

## Disposable equipment and vaccine

Multi-dose syringes (€1 500), needles (one for each animal vaccinated, €1 000), tattooing forceps, disposable boots, gloves and overalls (about €2 500) cost approximately €5 000. Vaccine was supplied by the Reggio Emilia diagnostic laboratory of the Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna, which was supplied by the National Reference Centre for Exotic Diseases, Teramo, Italy (CESME: *Centro Studi Malattie Esotiche*) in Teramo. Considering European Union Decision 2002/545/CE that contributed €700 000 to Italy for the purchase of 6 500 000 doses of vaccine, we estimated the cost per dose of vaccine to be €0.11 (1).

Vaccination in the Reggio Emilia (19 054 animals) required about 19 500 doses (195 bottles 100 ml) of BTV-2 vaccine. Vaccination on farms was planned to ensure that the entire bottle of vaccine was used before the expiry date to avoid wastage.

By the end of the campaign, over 95% of the susceptible animals in the area had been vaccinated, as shown in Table II. A few abortions in cattle and sheep were reported (Table III), but BTV was never isolated from either the foetus or the placenta.

**Table II**  
Municipalities in the Reggio Emilia Province involved in the bluetongue vaccination campaign and vaccine coverage attained by the end of the campaign on 30 April 2003

Municipality	Vaccinated			
	Farms	Cattle	Sheep and goats	Ruminants
Busana	100.0%	91.5%	67.2%	83.2%
Castelnovo ne' Monti	100.0%	96.0%	89.8%	95.5%
Collagna	100.0%	96.0%	89.6%	92.0%
Ligonchio	100.0%	96.2%	71.4%	93.9%
Ramiseto	100.0%	98.3%	82.7%	91.5%
Toano	100.0%	98.5%	82.7%	98.2%
Vetto	98.5%	97.1%	89.4%	95.9%
Villa Minozzo	100.0%	95.2%	86.2%	92.4%
Total	99.8%	96.9%	85.9%	95.0%

**Table III**  
Abortions recorded in vaccinated cattle in the Reggio Emilia Province and the results of virological tests

Event	Days after vaccination	Virological test (PCR)
Abortion at 12th week of pregnancy	9	Negative
Abortion at 29th week of pregnancy	10	Negative
2 stillborn calves	3	Negative
Abortion at 21st week of pregnancy	18	Negative
Abortion at 20th week of pregnancy	2	Negative
Abortion at 25th week of pregnancy	19	Negative
Abortion	1	Negative
Abortion	1	Negative
Abortion	1	Negative
Abortion at 24th week of pregnancy	15	Negative

PCR polymerase chain reaction

Table IV summarises the costs sustained by the RELSU during the vaccination campaign in Reggio Emilia at approximately €9.20 per vaccinated animal.

## Conclusions

BT vaccination of all domestic ruminants is very expensive and informing and convincing farmers of the necessity of vaccination required a lot of time. Nevertheless, the vaccination programme was

completed with the co-operation of farmers and without requesting additional funding. It is important to note that farmers attributed abortions, stillbirths, neonatal mortality and weak and slow development amongst the newborn animals to BT vaccination.

**Table IV**  
Bluetongue vaccination campaign costs sustained by the Local Sanitary Unit of the Regio Emilia Province

Description	No.	Total hours	Unit cost	Total (euros)
Veterinarians	28	2 677	60.35	161 556.95
Accountant	1	80	25.00	2 000.00
Transport (km)	21 300		0.21	4 515.00
Disposable equipment (syringes, needles, etc.)				5 000.00
Vaccine (doses)	19 500		0.11	2 145.00
Total				175 216.95
Cost per vaccinated animal (19 054 animals)				9.20

After the risk period (August to November 2003), it would be useful to establish the most cost-effective outcomes of the campaign. An evaluation of the prevention of the spread of BT infection to the entire country and limiting the next vaccination campaign to regions at high risk must also be made.

## Reference

1. European Commission (2002). – Commission Decision 2002/545/EC of 5 July 2002 for the implementation of a bluetongue vaccination programme in Italy and the purchase of vaccine for this purpose (notified under document number C[2002] 2525). *Off. J.*, **L 177**, 23-24.