



## Equine Infectious Anemia:

Lessons learned from the six year application of the National Italian Surveillance Programme

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# What feedback after five years from the implementation of the Italian National Surveillance Programme (NSP) for Equine Infectious Anemia (EIA)

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# Recent regulatory acts

- **ORDINANZA 14 novembre 2006**  
*Disposizioni urgenti in materia di sorveglianza dell'anemia infettiva degli equidi.*
- **O.M. 18 dicembre 2007,**  
*Piano di sorveglianza nazionale per l'anemia infettiva degli equidi*
- **ORDINANZA 8 agosto 2010**  
*Piano di sorveglianza nazionale per l'anemia infettiva degli equidi (nuove schede)*

# The aims of the NSP

- To control the entire population of equids > 6 months of age once/year (previously aged > 3 months)
- To monitor EIA spread in Italy
- Minimize the risk of AIE spread through the adoption of biosecurity measures
- To trace regional Clusters
- To adjust the intensity of surveillance by region, based on the epidemiological evidences

Degree of risk



decreasing intensity of  
surveillance

# Note

- Since sept. 2010 all the regions of Italy reduced the intensity of surveillance for EIA but...
- ....regions at higher risk
  - Abruzzo
  - Molise
  - Lazio
  - Umbria

# Equids population in ITALY

- The National Registry of equids (BDE) will be ready in 2013 (!?)

**Individual registry still not available**

- Today the National Registry of holdings counts about 250.000 equids (census)
- The true population estimates  
about 400.000 equids

# Results 2007-2011

- Trend of observed prevalence by Region
  - **Equids (samples) tested by species**
    - Horse
    - Mule
    - Donkey
  - **Hodlings controlled**
- Epidemiologic Evidence and critical points of surveillance

# Results 2007-2011

## definitions

- **EIA Positive equid (case)**

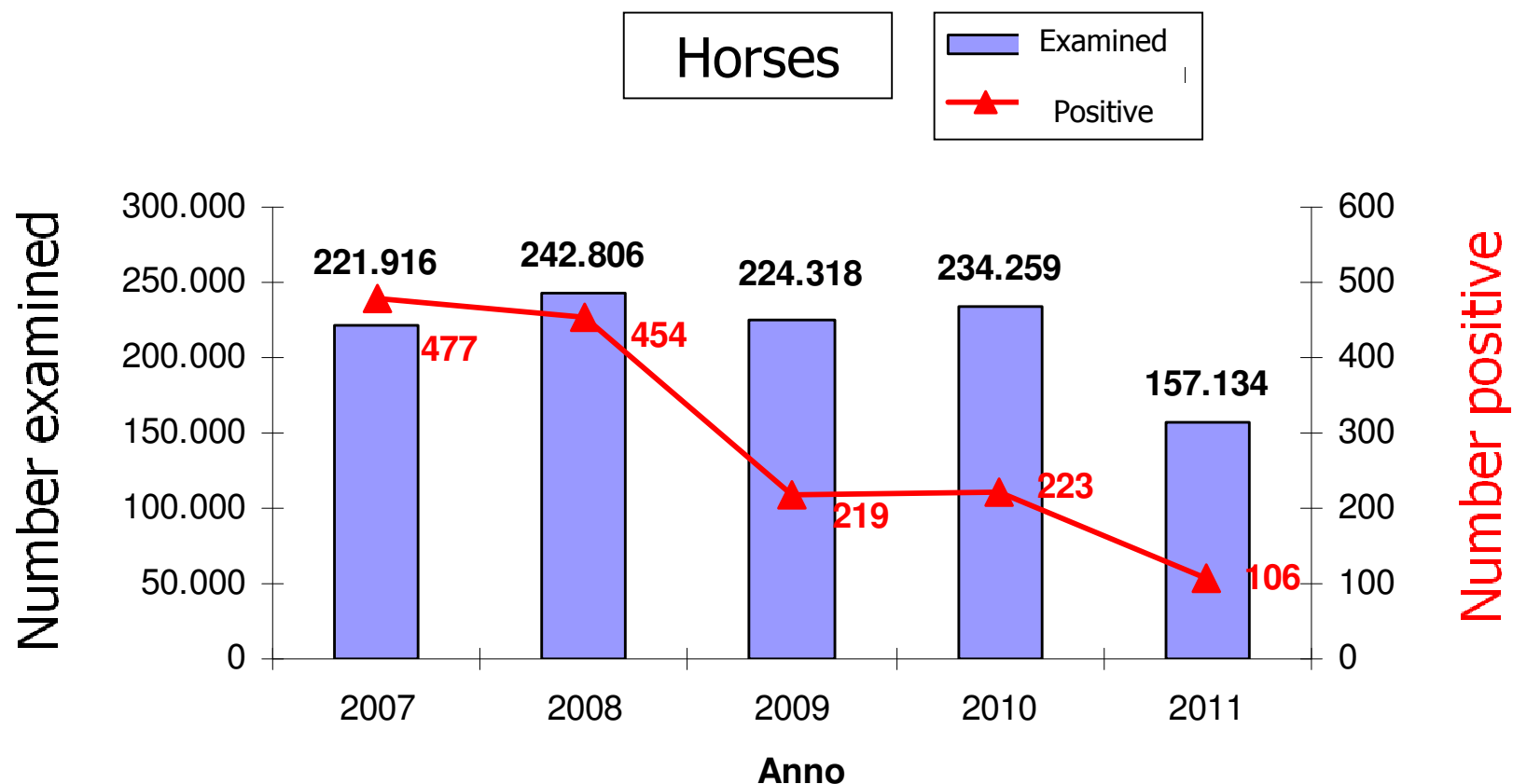
Sample tested positive at screening (ELISA-AGID) and confirmed by CRAIE (AGID)

- **EIA Outbreak**

Holding where, at least, one positive equid is found

# Results 2007-2011

## EIA-ITALY: samples examined/positive



**2007-2011: 1.080.433 examined – 1.479 positive**



# Horses

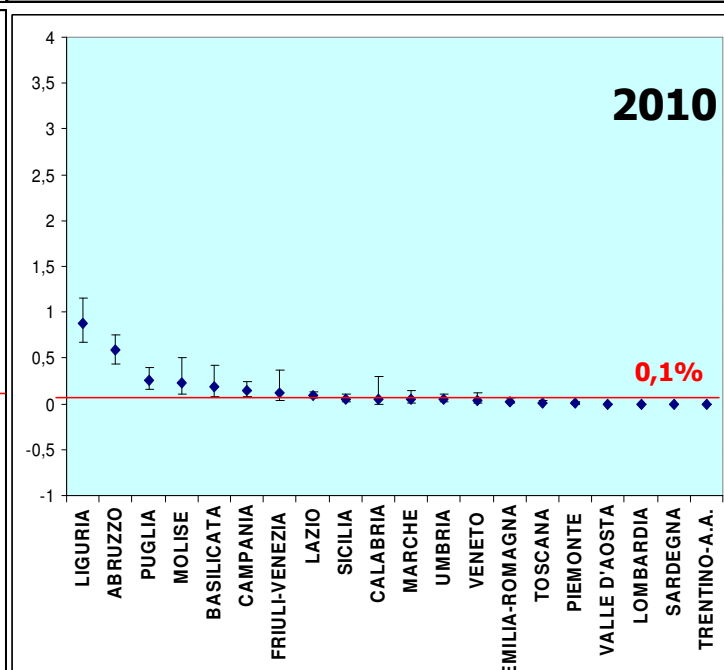
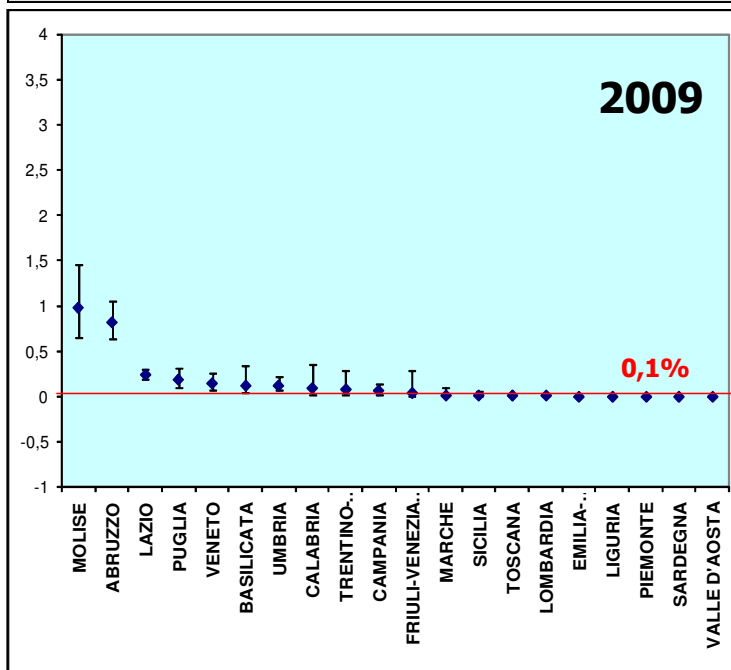
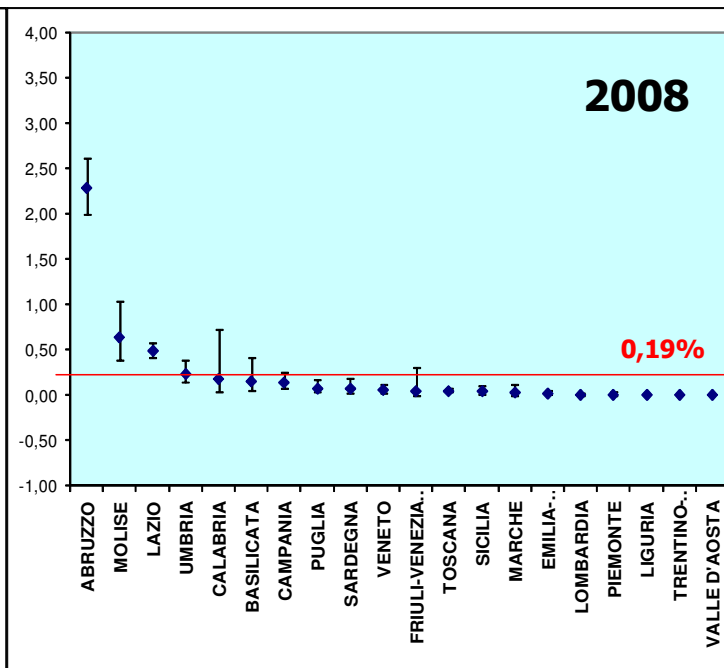
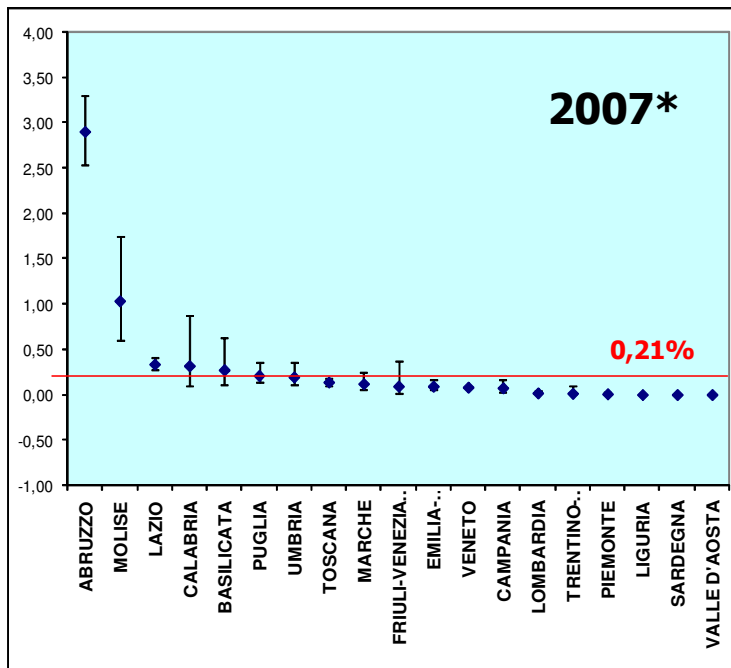
## EIA

### 2007-2010

#### Samples

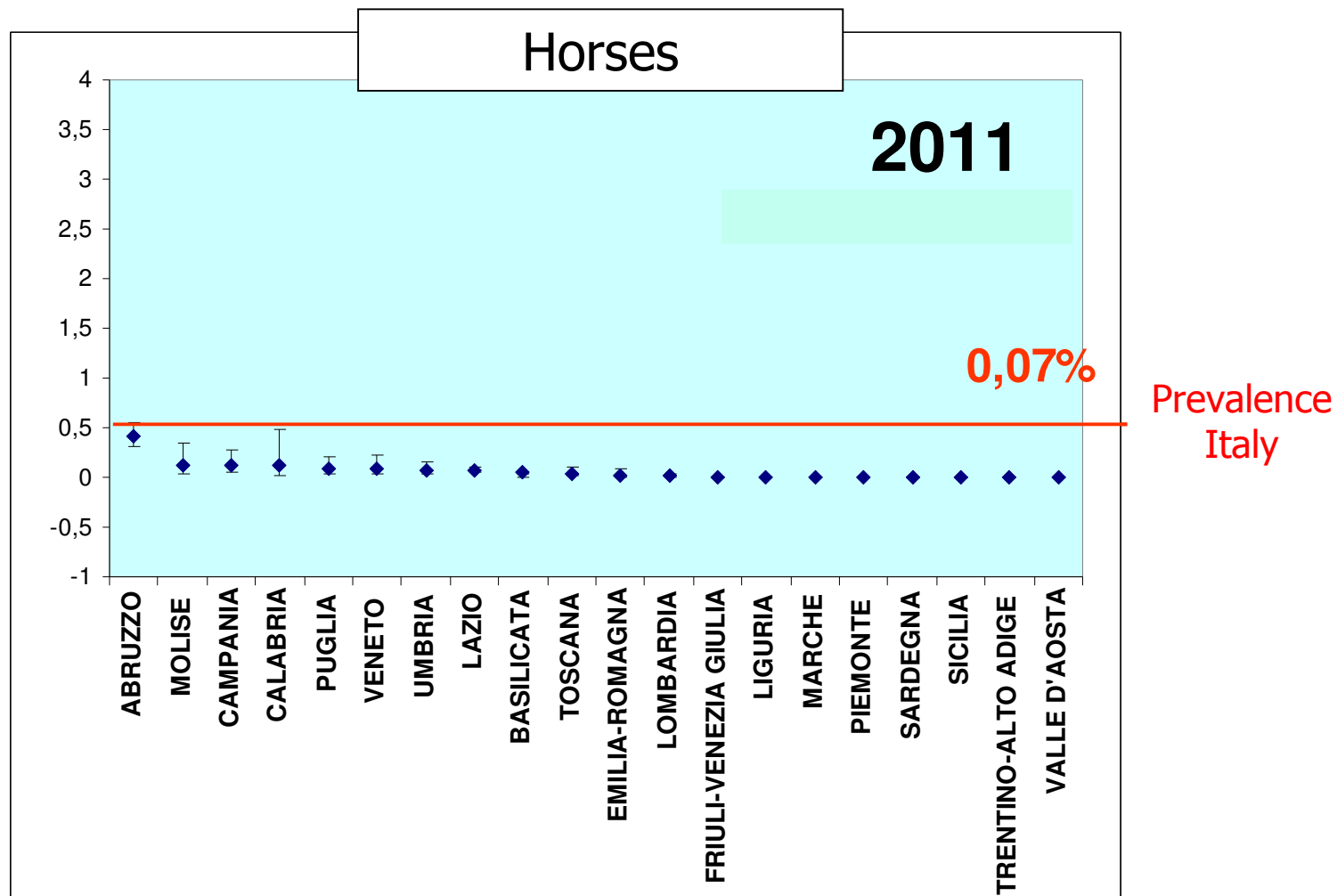
#### Annual prevalence by Region

Prevalence Italy



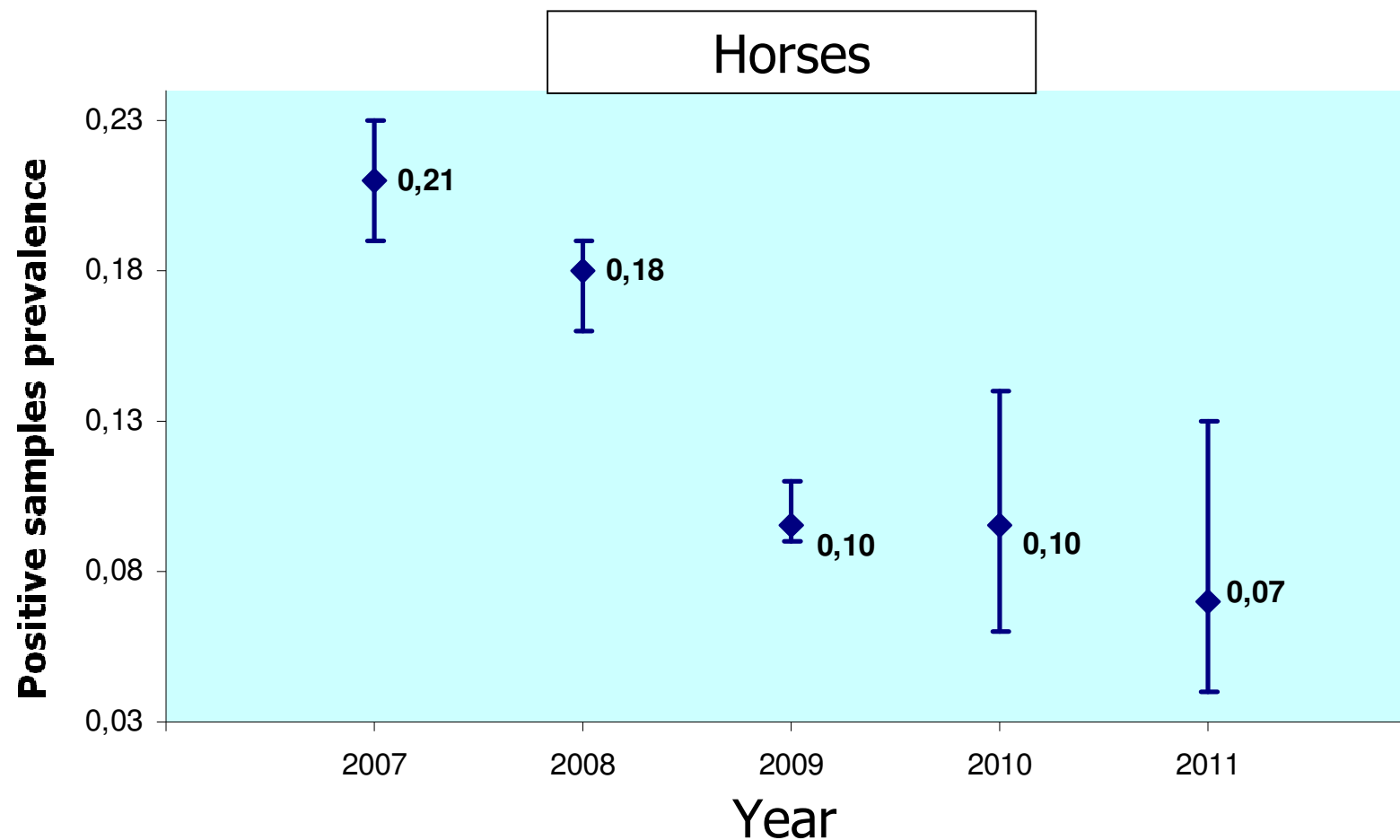
# Results 2011

EIA-ITALY: positive samples - prevalence (IC 95%)



# Results 2007-2011

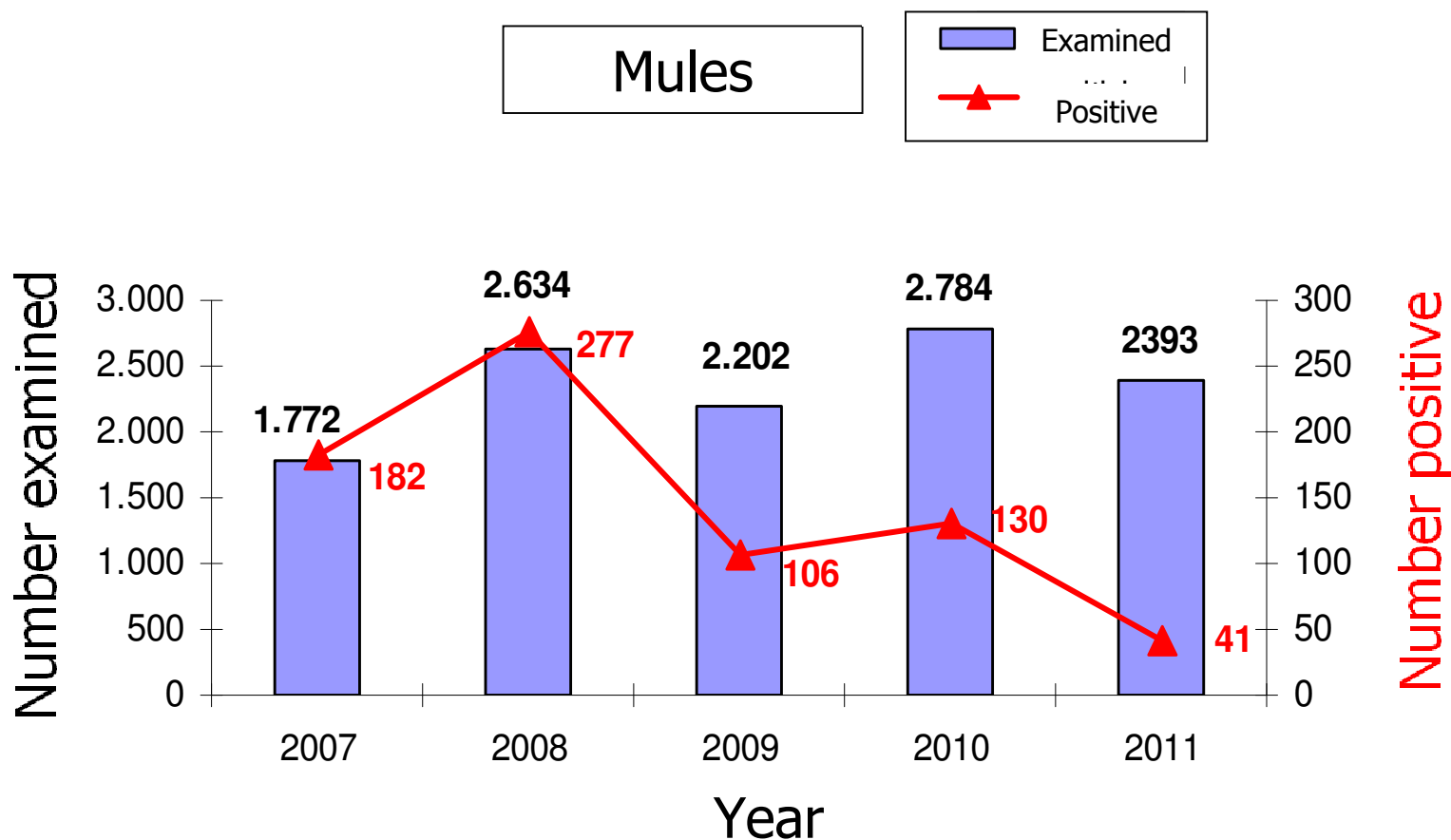
EIA-ITALY: trend of positive samples - prevalence (IC 95%)



chi square for linear trends: 220,7;  $p=0,00000$

# Results 2007-2011

## EIA-ITALY: samples examined/positive



**2007-2011: 11.785 examined– 736 positive**

# Mules

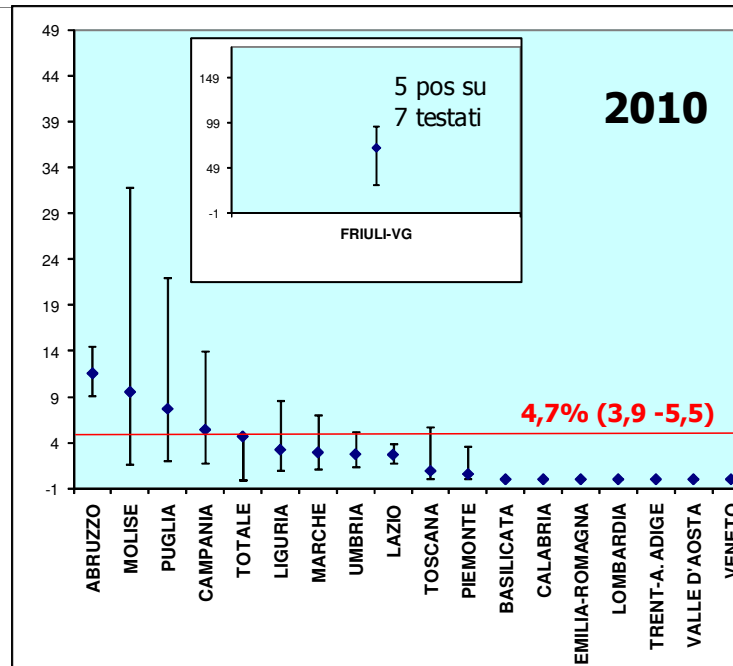
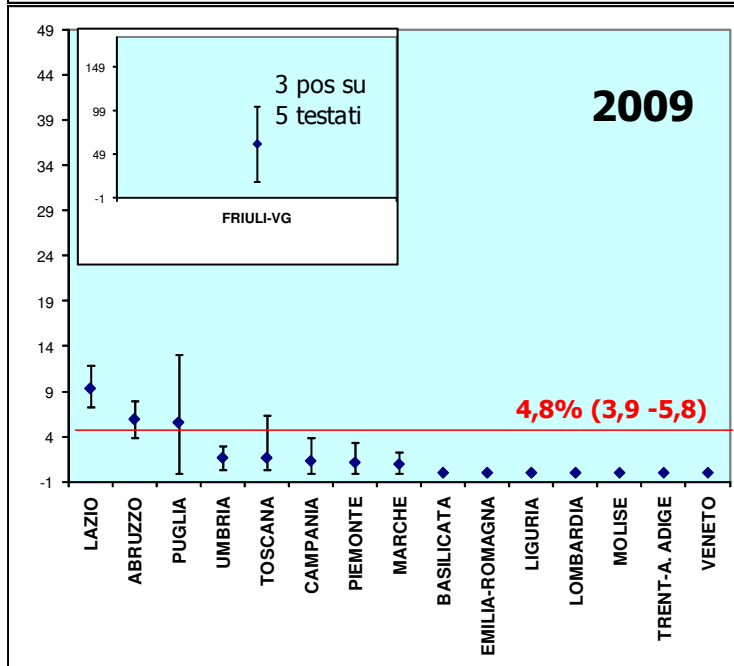
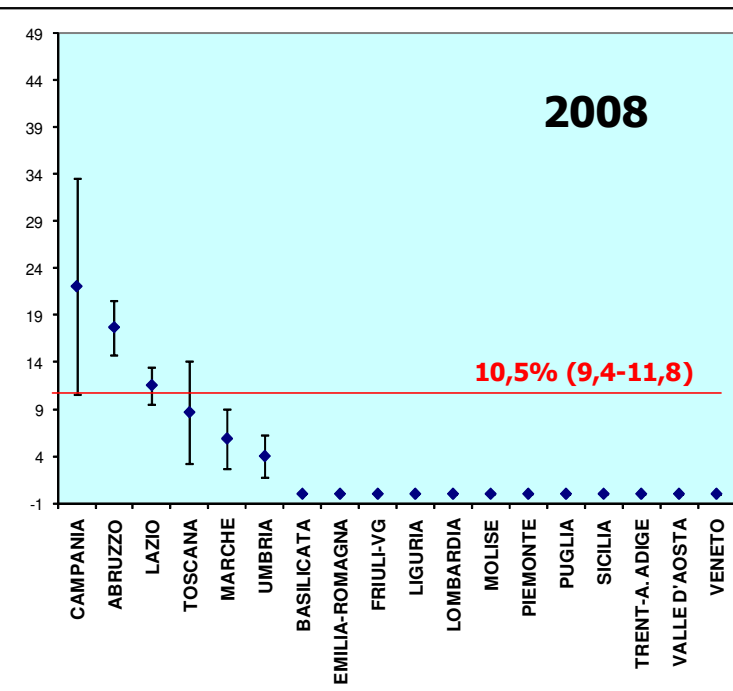
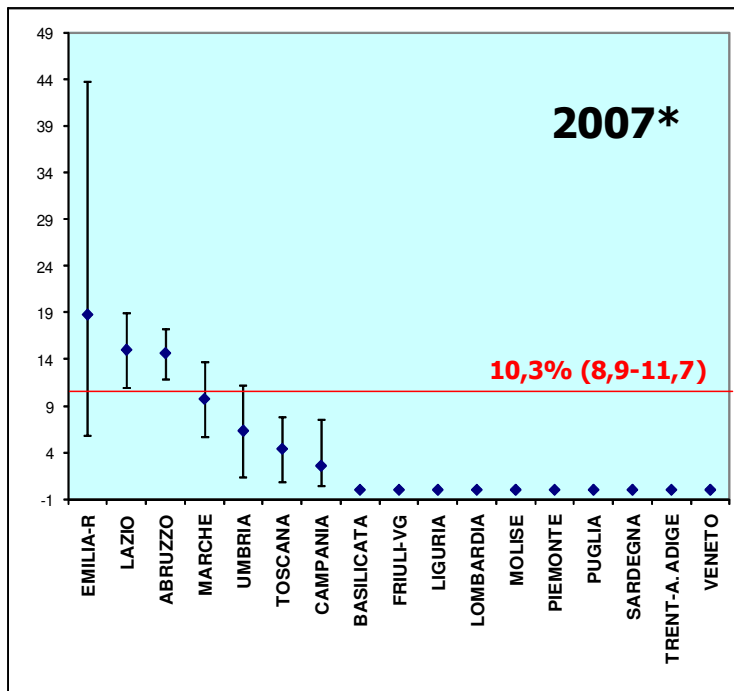
## EIA

### 2007-2010

#### Samples

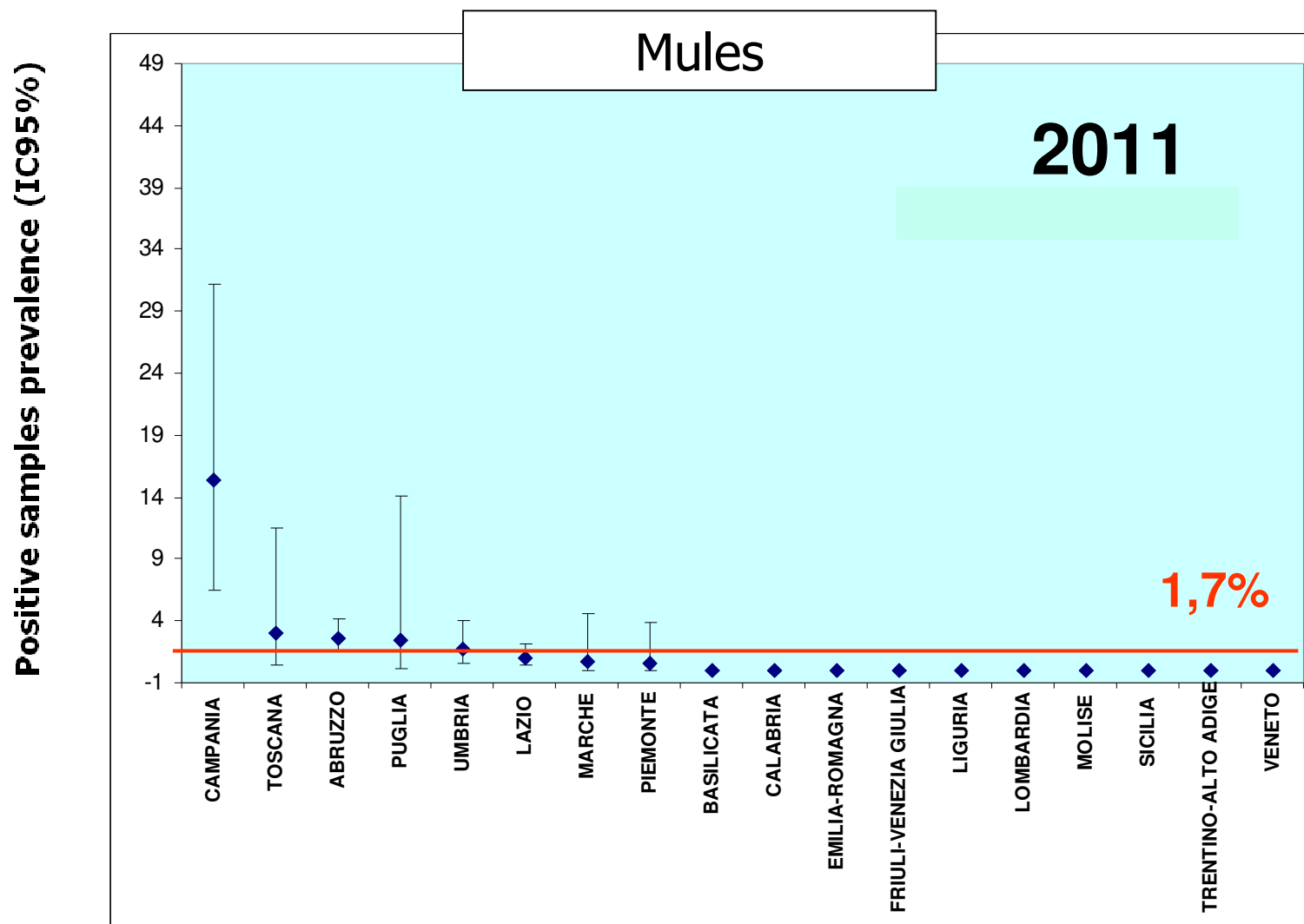
#### Annual prevalence by Region

— Prevalence Italy



# Results 2011

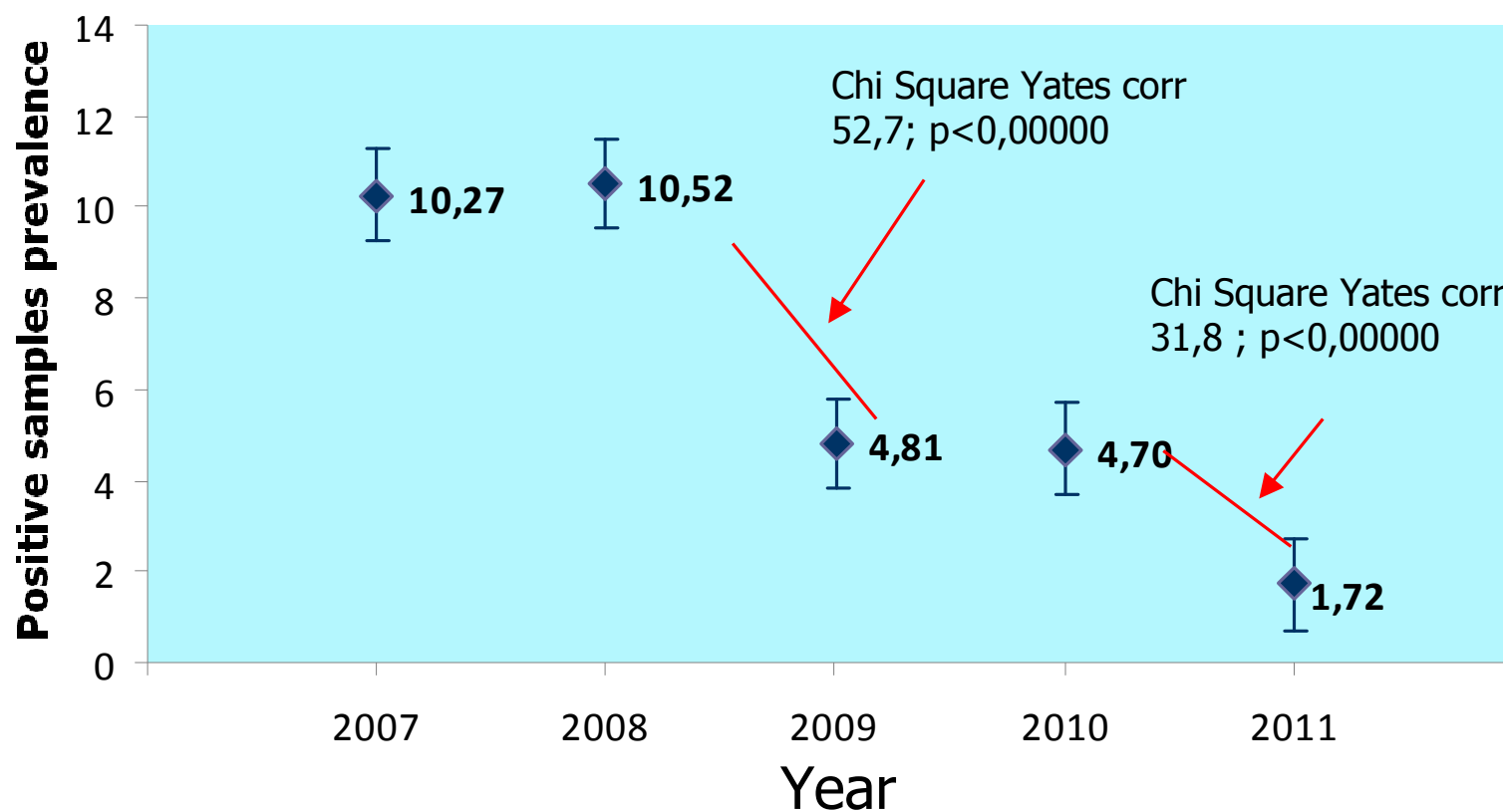
EIA-ITALY: positive samples - prevalence (IC 95%)



# Results 2007-2011

EIA-ITALY: trend of positive samples - prevalence (IC 95%)

Mules

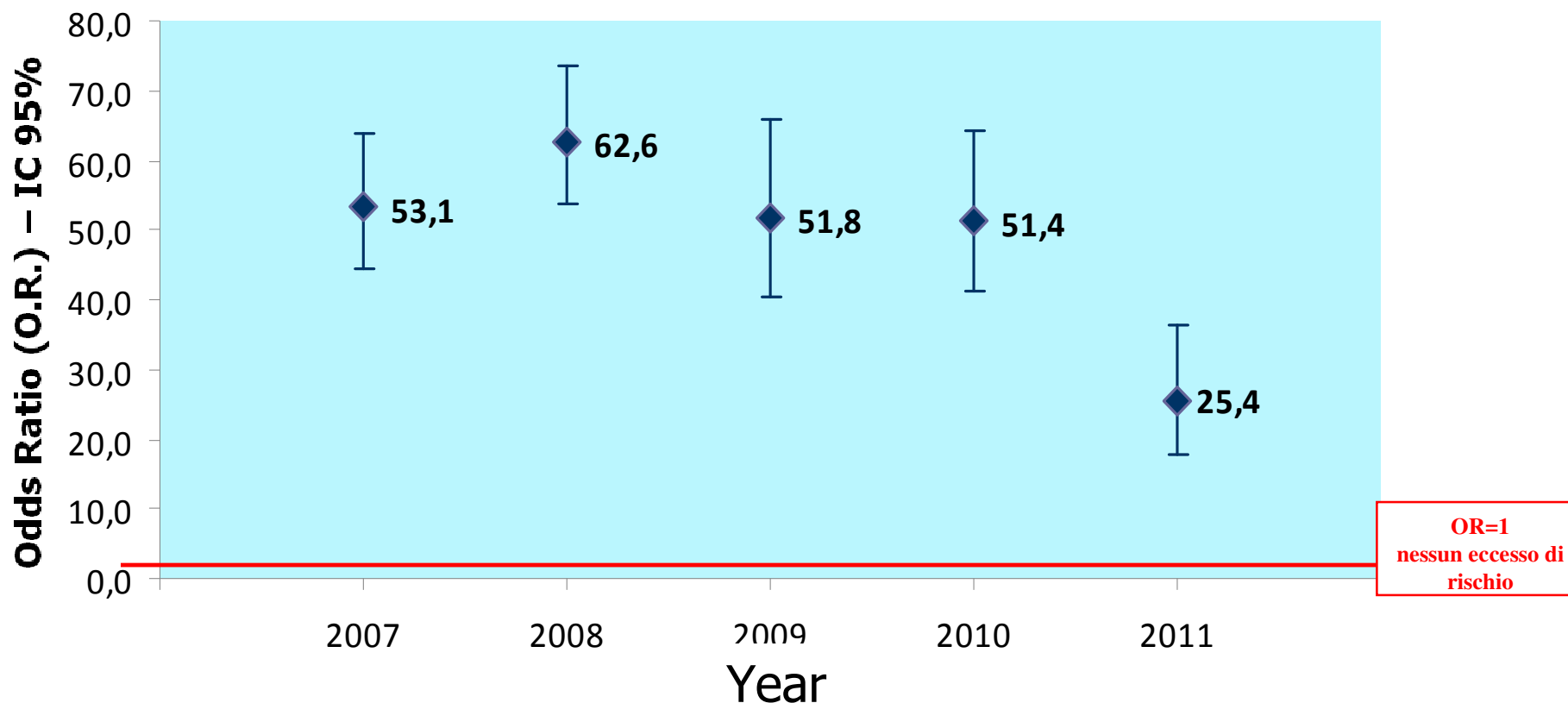


chi square for linear trends: 203,4 ; p=0,00000

# Results 2007-2011

## EIA-ITALY. Samples: the risk by species

ODDS RATIO: Mules VS HORSES

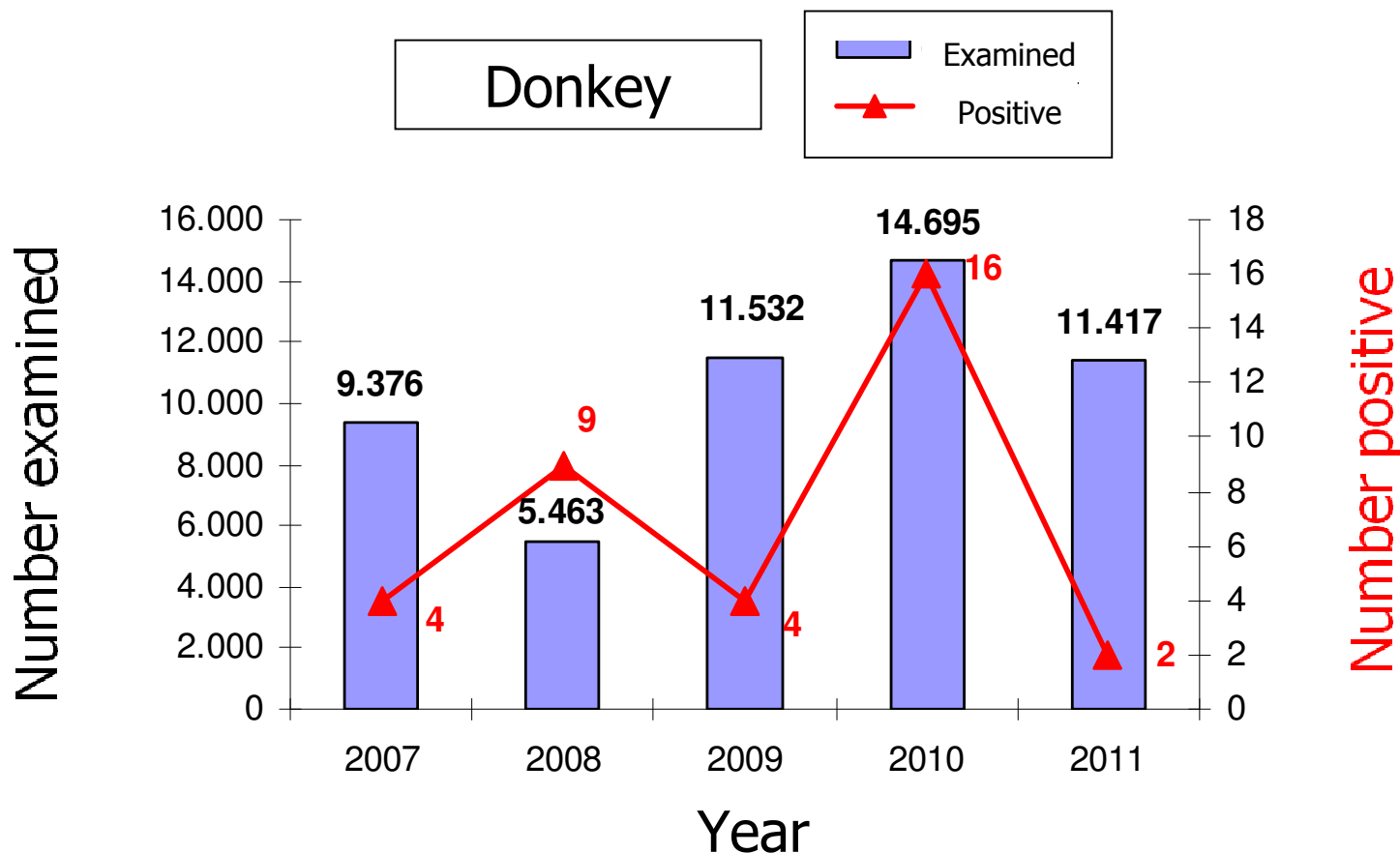


The Mules are 25-60 more at risk than Horses



# Results 2007-2011

## EIA-ITALY: samples examined/positive



**2007-2011: 52.483 examined – 35 positive**

# Results 2007-2011

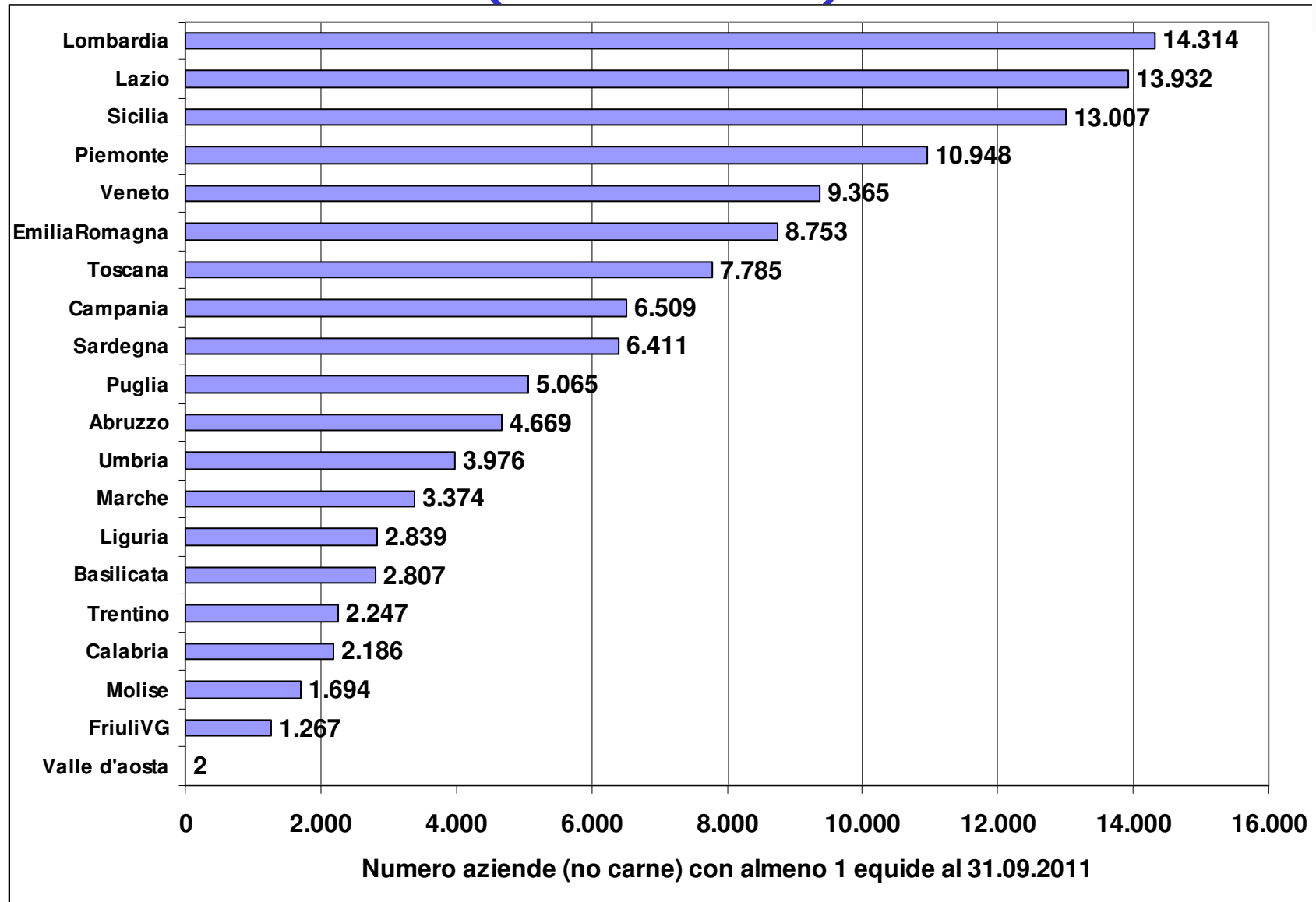
## Holdings with equids in Italy

- Holdings (meat production excluded) in BDN 2011-09-31 updated:

**121.150**

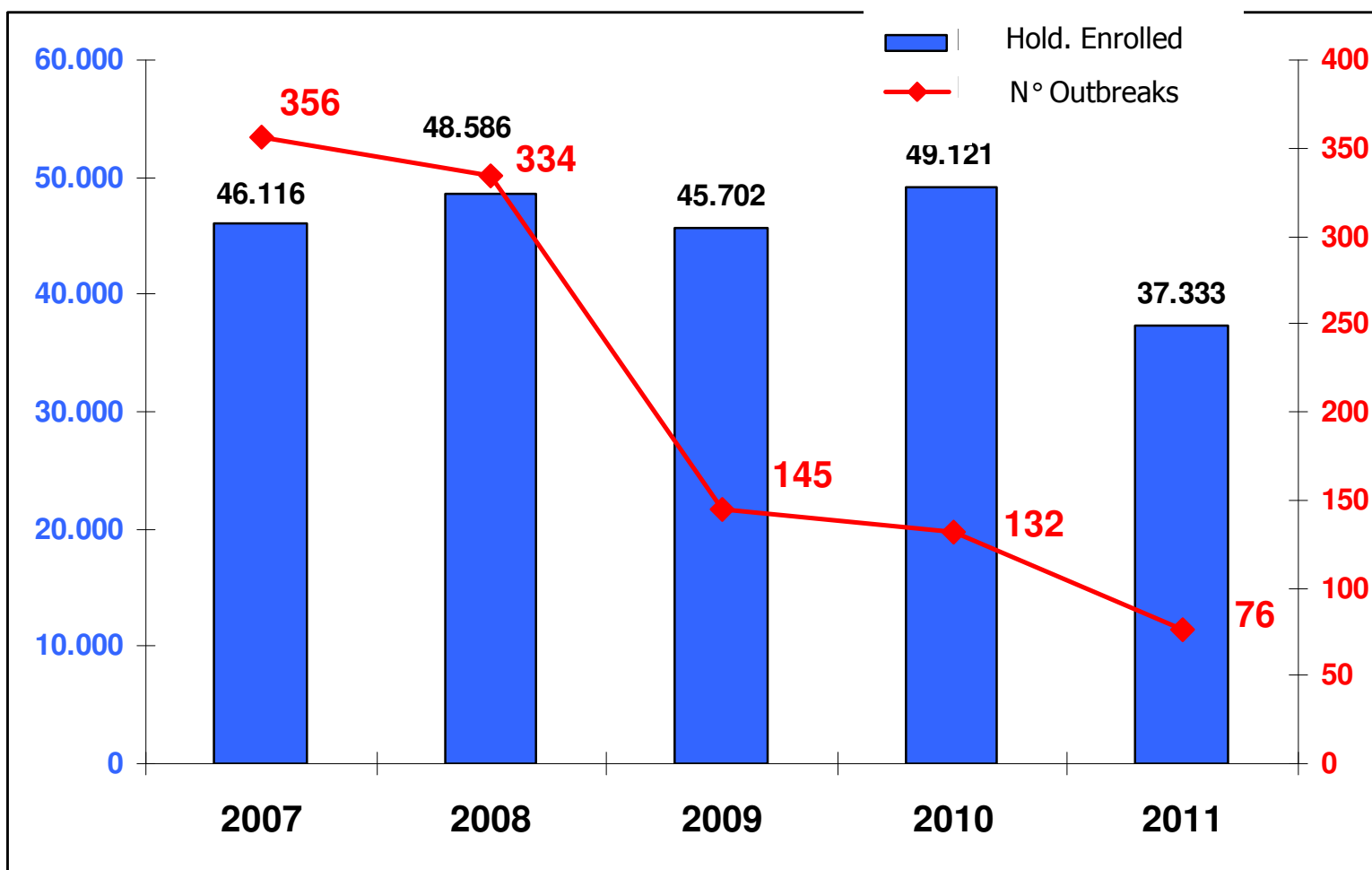
- Underestimated due to the different levels of registration compliance by region
- We used the 2011 count as the denominator for the analysis

# Number of Holdings by Region (BDN-2011)



# Results 2007-2011

## EIA-Italy: holdings enrolled and N° outbreaks



2007-2011: 1.043 Outbreaks

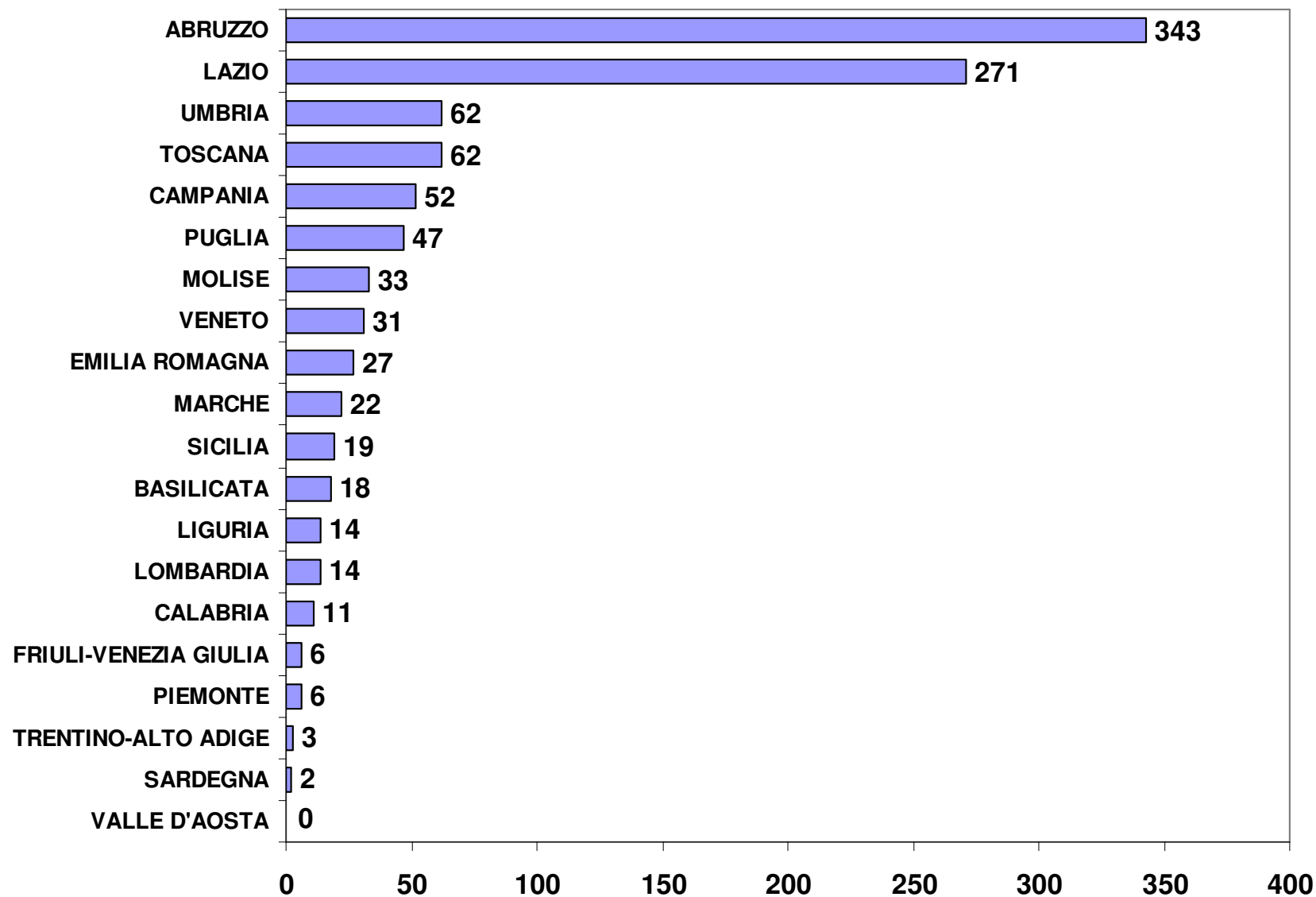
# Results 2007-2011

Cumulative frequencies 2007-2011: N° of outbreaks & incidence

| YEAR   | N° holdings enrolled NSP | % hold. enrolled VS BDN registered | N° outbreaks | Incidence % | IC95%              |
|--|--------------------------|------------------------------------|--------------|-------------|--------------------|
| 2007   | 46.116                   | 38,1%                              | 356          | 0,77        | 0,61 - 1           |
| 2008   | 48.586                   | 40,1%                              | 334          | 0,69        | 0,53 - 0,87        |
| 2009   | 45.702                   | 37,7%                              | 145          | 0,32        | 0,21 - 0,45        |
| 2010   | 49.121                   | 40,5%                              | 132          | 0,27        | 0,18 - 0,39        |
| 2011   | 37.333                   | 30,8%                              | 76           | 0,20        | 0,12 - 0,35        |
| <b>Cumulative hold. enrolled at least once 2007-2011</b> | <b>87.080</b>            | <b>71,8%</b>                       | <b>1.043</b> | <b>1,20</b> | <b>1,13 - 1,41</b> |

# Results 2007-2011

Cumulative frequencies 2007-2011: N° of outbreaks by Region

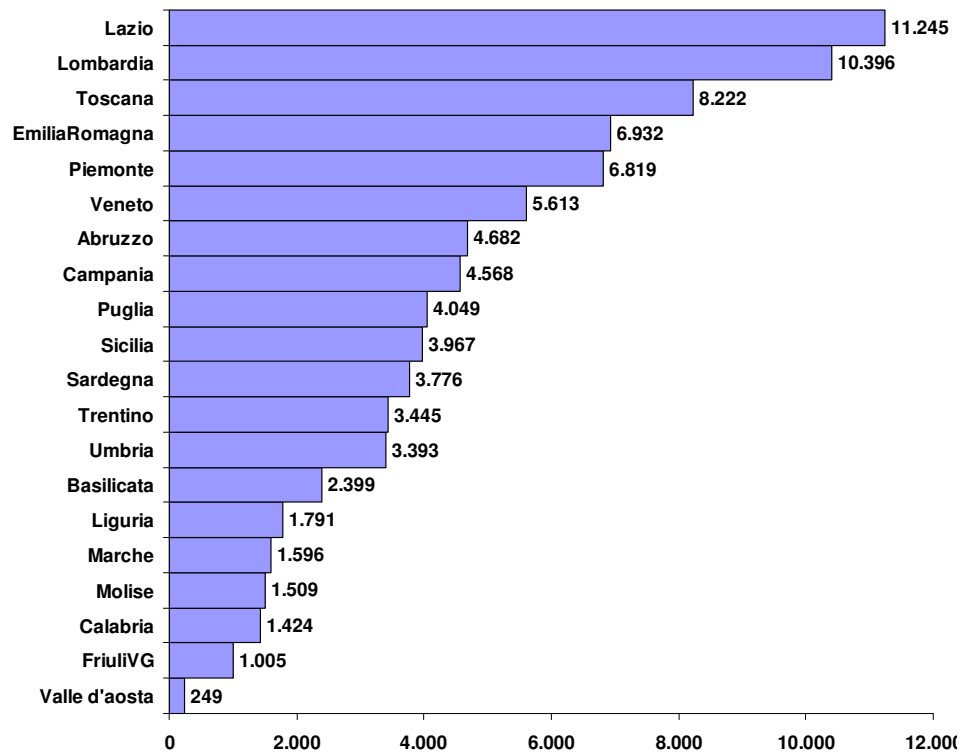


# Results 2007-2011

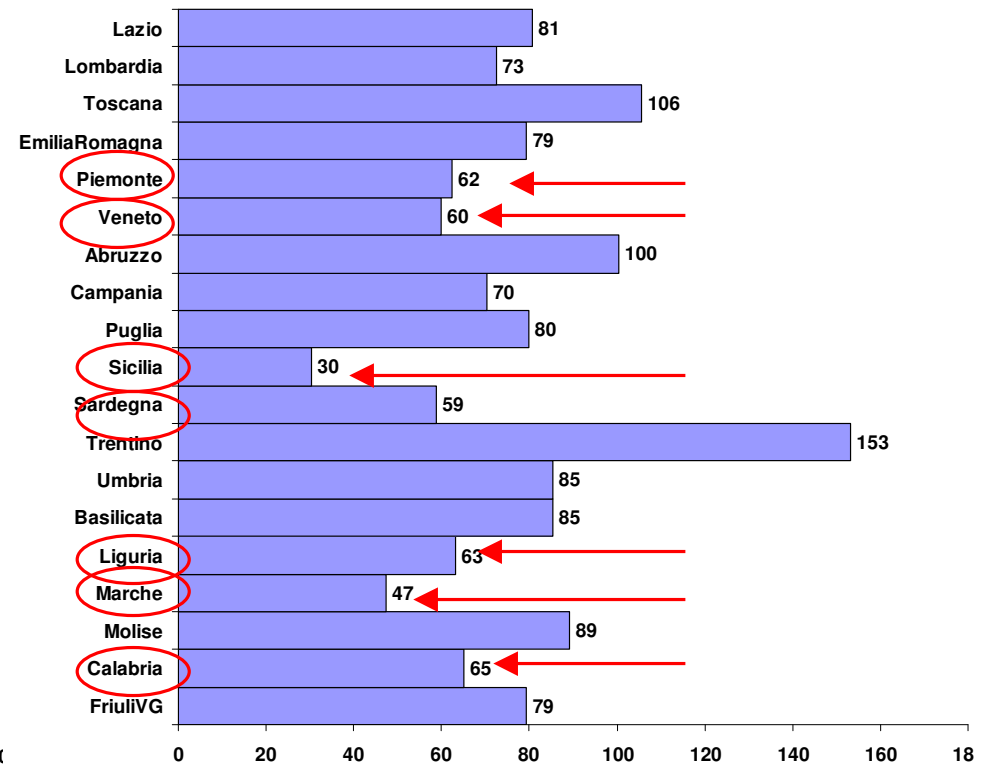
## EIA - Holdings enrolled at least once by region 'spotty' surveillance



Holdings enrolled  
Cumulative frequency



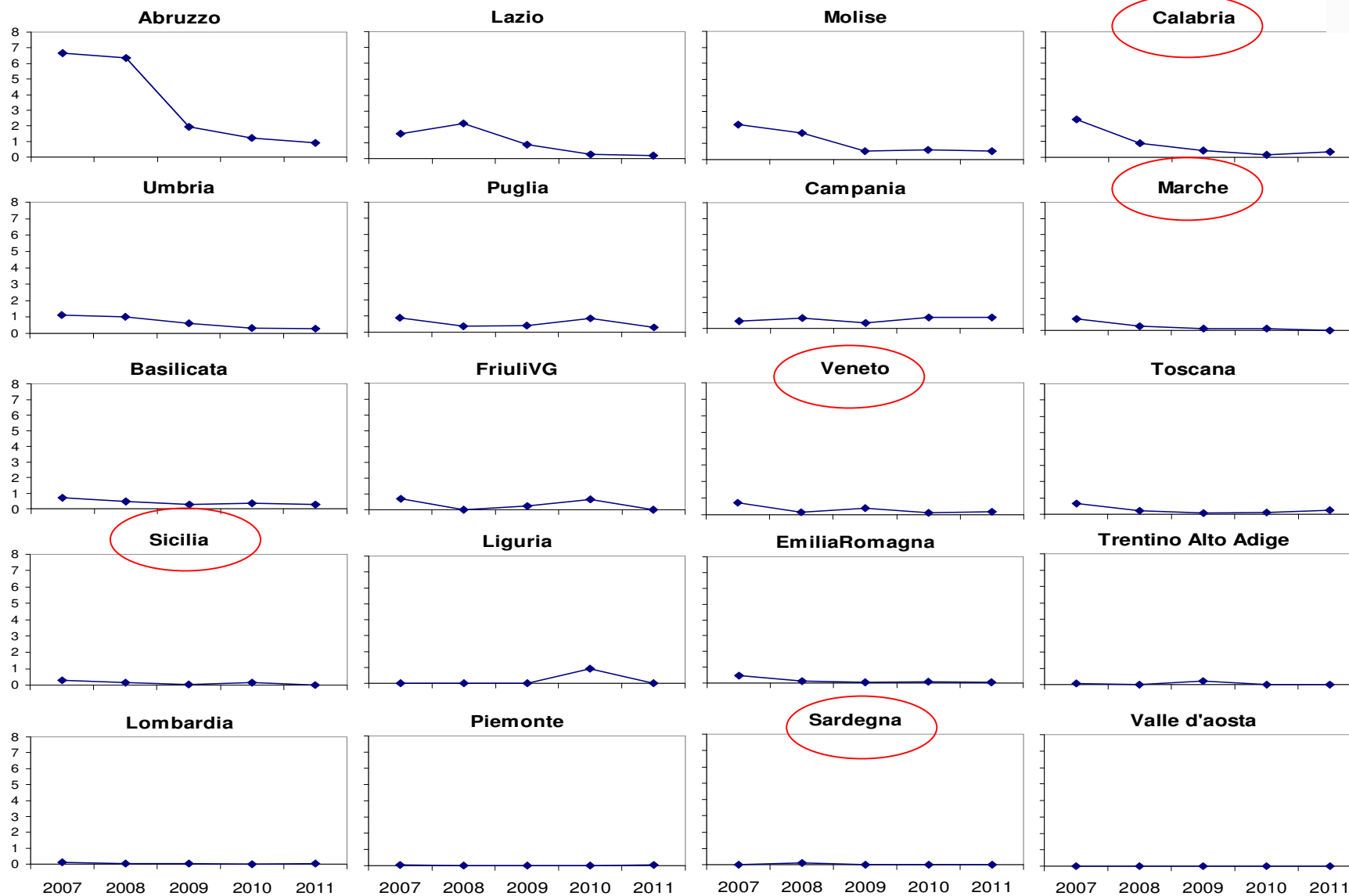
Cumulative proportion (%)  
Enrolled VS BDN-registered



Val d'Aosta 2 registered – 249 enrolled within NSP

# Results 2007-2011

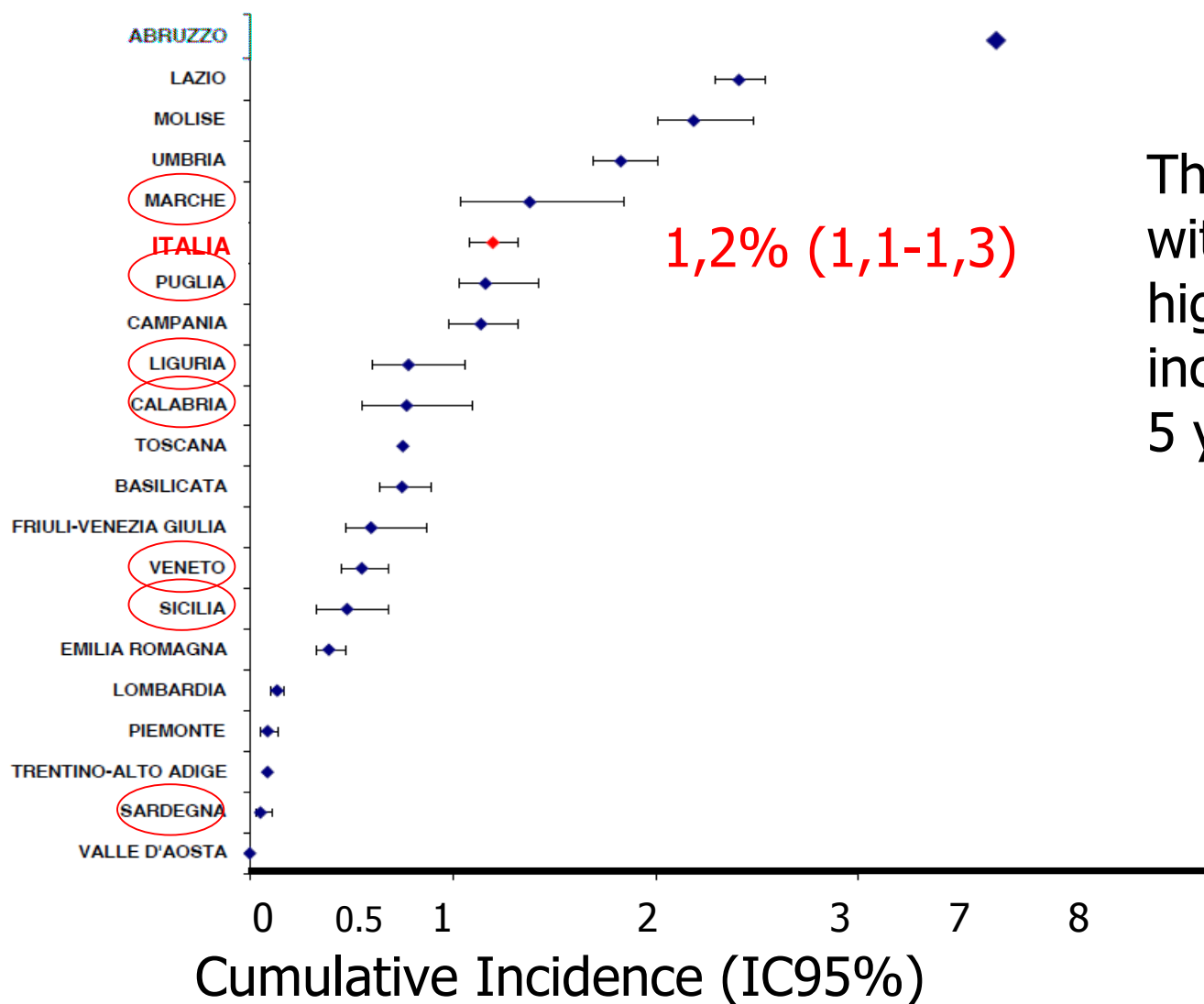
## EIA Crude Incidence of outbreaks by region





# Results

Outbreaks: cumulative incidence 2007-2011 by region

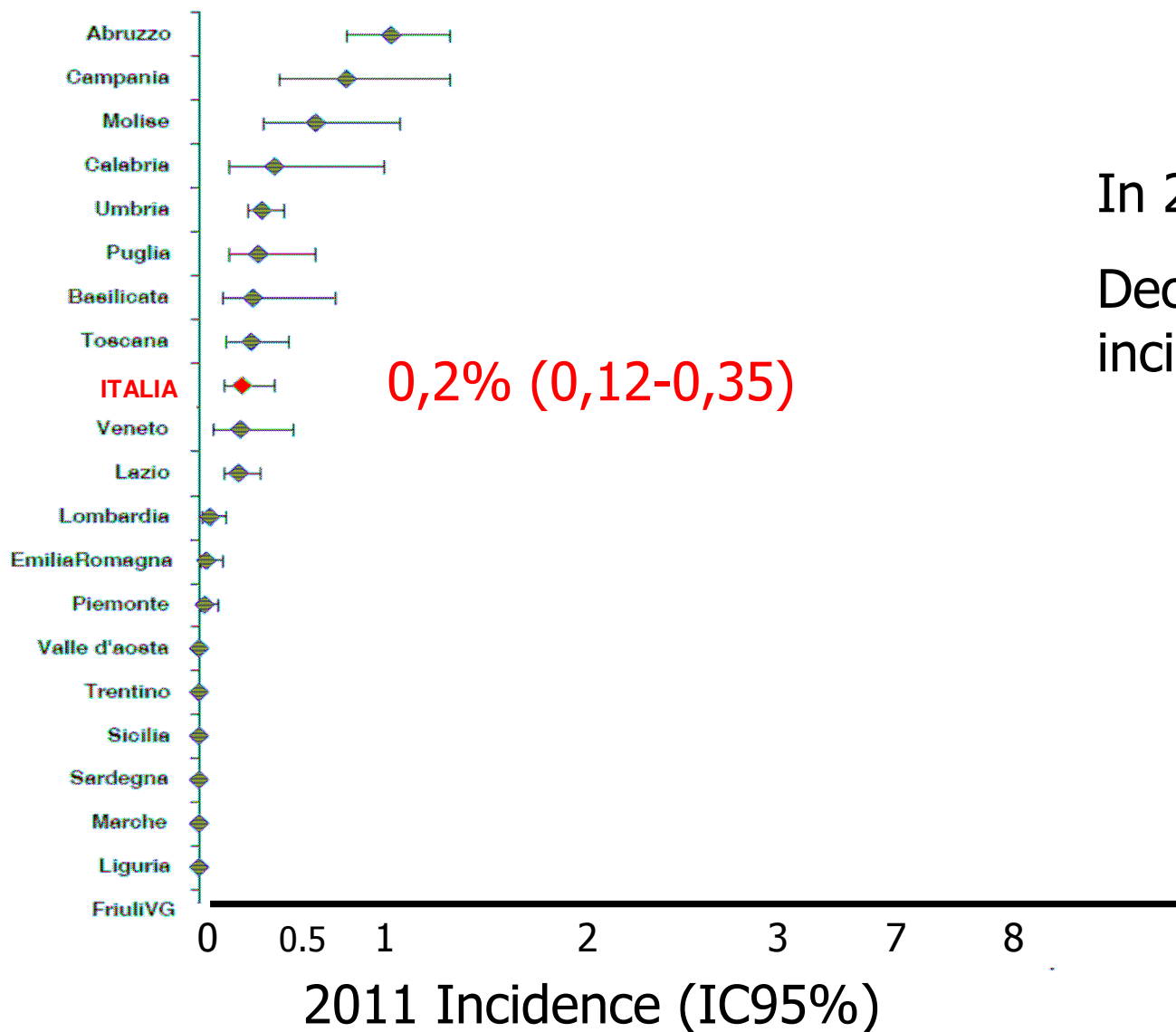


The regions with the higher incidence in 5 years

# Results 2011

## Outbreaks: 2011 incidence by region

| REGIONE        | INCIDENZA (%) |
|----------------|---------------|
| ABRUZZO        | 0,8           |
| CAMPANIA       | 0,6           |
| MOLISE         | 0,5           |
| CALABRIA       | 0,3           |
| UMBRIA         | 0,2           |
| PUGLIA         | 0,2           |
| BASILICATA     | 0,2           |
| TOSCANA        | 0,2           |
| ITALIA         | 0,2           |
| VENETO         | 0,1           |
| LAZIO          | 0,1           |
| LOMBARDIA      | 0,05          |
| EMILIA ROMAGNA | 0,05          |
| PIEMONTE       | 0,05          |
| VALLE D'AOSTA  | 0,05          |
| TRENTINO       | 0,05          |
| SICILIA        | 0,05          |
| SARDEGNA       | 0,05          |
| MARCHE         | 0,05          |
| LIGURIA        | 0,05          |
| FRIULI V.G.    | 0,05          |

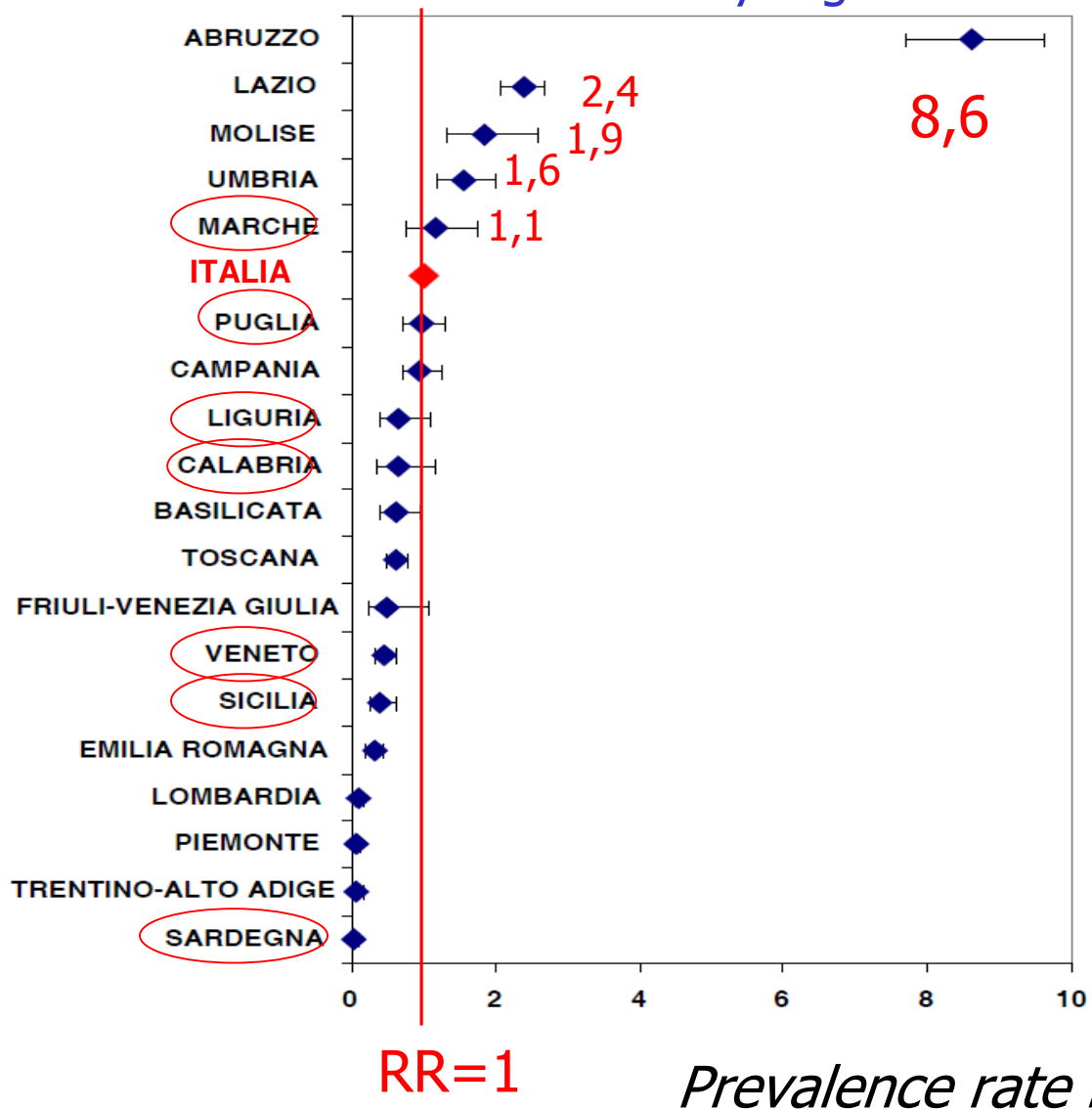


In 2011

Decreasing  
incidence

# Results 2007-2011

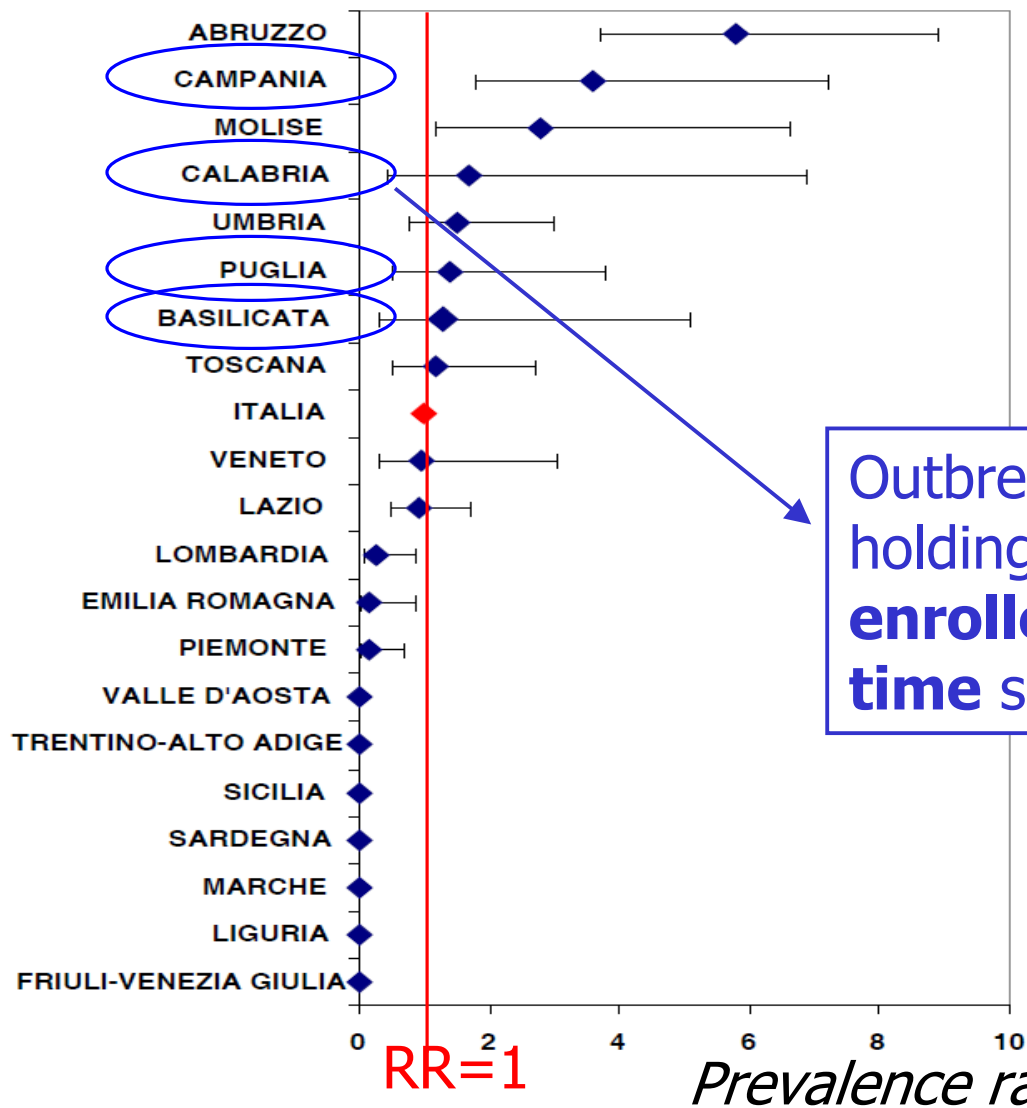
The EIA Risk by region



The regions at higher risk in 5 years

# Risultati 2011

## The EIA Risk by region



The regions at higher risk in 2011

Outbreaks found in holdings (and equids) enrolled for the first time since 2007

**Anemia Infettiva degli Equidi  
Aziende con almeno un equide  
positivo confermato in Italia  
nel periodo 01-01-2011 - 31-12-2011**



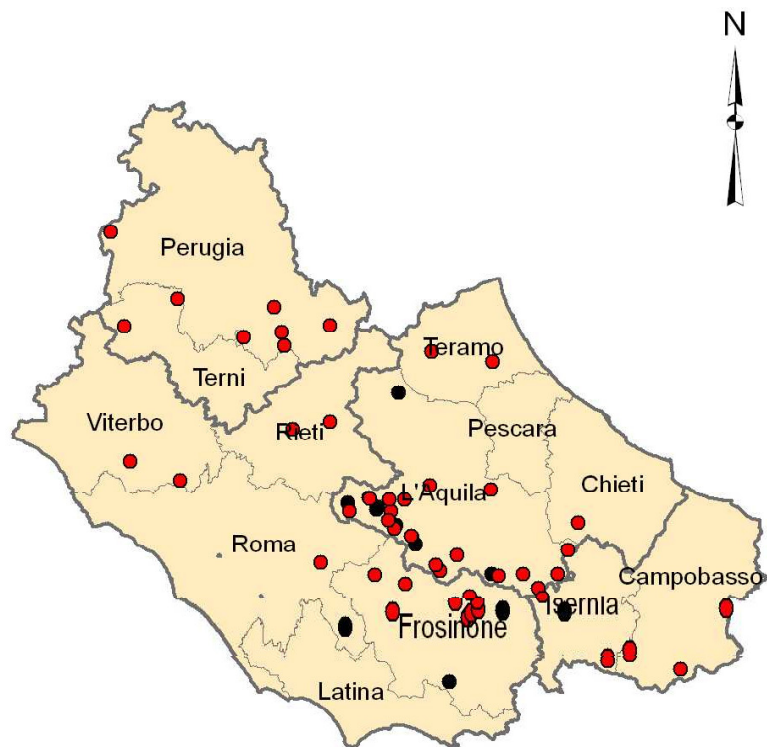
- Aziende con prima positività nel 2011
- Aziende positive nel 2011 già positive negli anni precedenti

0 65 130 260 Kilometers

**2011**

Tracking of positive  
holdings confirmed by  
CRAIE in 2011

**Anemia Infettiva degli Equidi  
Aziende con almeno un equide  
positivo confermato in Italia centrale  
nel periodo 01-01-2011 - 31-12-2011**



- Aziende con prima positività nel 2011
- Aziende positive nel 2011 già positive negli anni precedenti

0 25 50 100 Kilometers

2011



The Main Cluster 2011  
in Central Italy

# The feedback after 5 years- 1

2007-2011

- Italy: the trends are favourable – control measures efficacy
  - Significant decrease
    - ✓ positive equids (cases)
    - ✓ outbreaks
- Racing Horses population (thoroughbred and standardbred) are free from EIA (only sporadic cases)
- Mules are at major risk
  - **reservoir!?**
  - delay/lack of efficacy/ misapplication of control measures
  - Marginal areas – problematic management of surveillance and outbreak?

# The feedback after 5 years - 2

- Main stable cluster in Central Italy
  - Draft horses and mules working in areas at risk
  - Animals kept free range for long periods during the Year (poor biosecurity measures)
  - Outbreaks – frequent “relapse”
  - Local persistence of sources of infection and risk factors (also realated to menagement) for EIA spread?
- Annual regional clusters
  - Outbreaks due to (uncontrolled) equid movement from the main cluster



# The feedback after 5 years - 3

- Intensity of surveillance
  - In Italy the surveillance was very extensive
  - Estimation of EIA prevalence, incidence and degree of spread along with their uncertainty
  - ..but the intensity of surveillance was spotty through the country
  - The new cases & outbreaks in 2011-2012 were found in central and southern Italy in equids enrolled for the first time

“Hidden population” : how much undiscovered EIA infection??

# Uncertainty-limits

- Risk of spread, introduction of EIA from areas at higher risk and from areas where intensity of surveillance is still low
- Uncertainty due to the incomplete implementation of BDE – problems for denominators estimates and inference
- Risk factors: only since 2011 the data flow from the Country on the whole was fulfilled with the information relative to the equids age, intended use and with the information regarding the holdings

# Reccomendations

ITALY 2011:

- Positive samples (equids) prevalence  $< 0,1\%$
- Outbreak incidence  $0,2\%$  (0,12-0,35)
- There are the conditions for a futher deaccrease in the intensity of surveillanc in the regions where the compliance to surveillanc is adequate and the incidence is low
- Need to ensure adequate intensity of surveillanc in the other regions
- Controls focused on categories at major risk: draft horses ...and mules
- Controls on Movement of equids