Trichinellosis:
A Study of a Human Population Potentially Exposed to Infection

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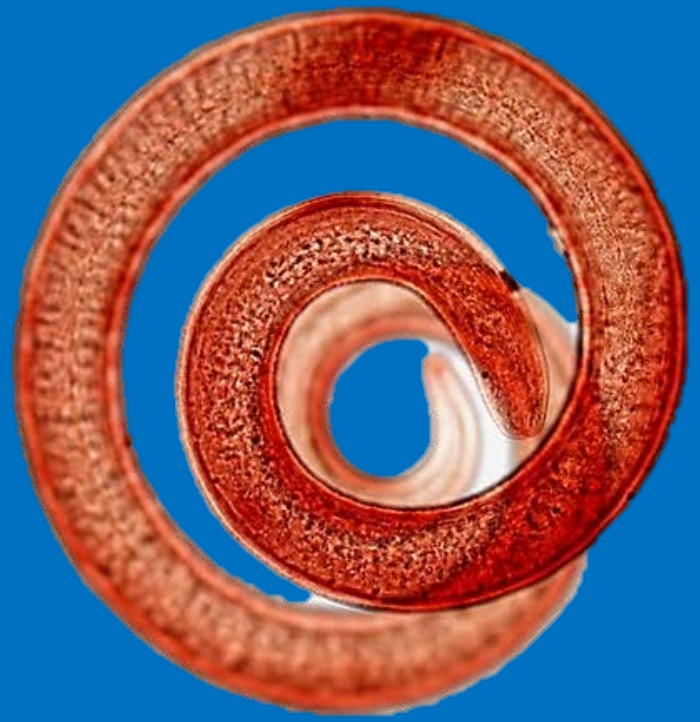
TRICHINELLOSIS

Foodborne parasitic zoonosis caused by nematodes of the genus *Trichinella*

Often transmitted through the consumption of :

- cured /smoked meat
- Undercooked meat
- Improperly frozen meat

containing infective larvae.



TRICHINELLA

The genus *Trichinella* includes 10 identified species

T. britovi
T. chanchalensis
T. murrelli
T. nativa
T. nelsoni
T. papuae
T. patagoniensis
T. pseudospiralis
T. spiralis
T. zimbabwensis

TRICHINELLA

Four of these — *T. britovi, T. nativa, T. pseudospiralis and T. spiralis* have been observed in Europe.

All infect mammals, with *T. spiralis* being particularly prevalent in domestic and wild pigs.

T. britovi

T. chanchalensis

T. murrelli

T. nativa

T. nelsoni

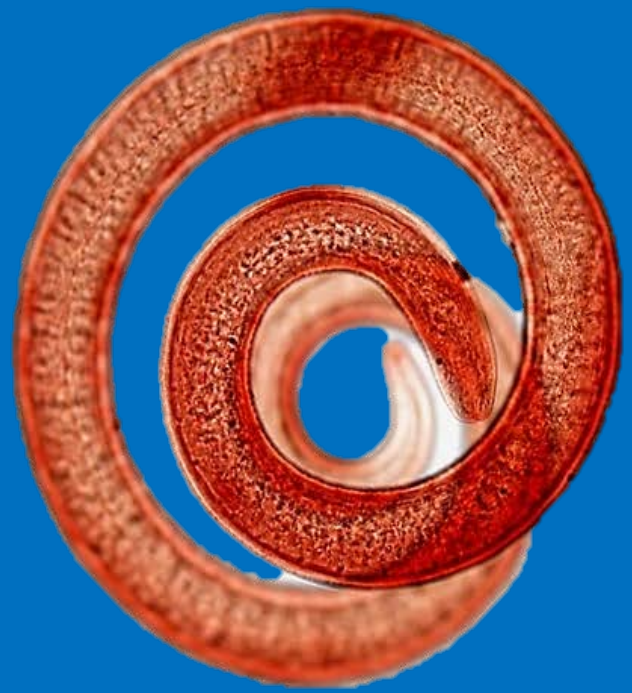
T. papuae

T. patagoniensis

T. pseudospiralis

T. spiralis

T. zimbabwensis



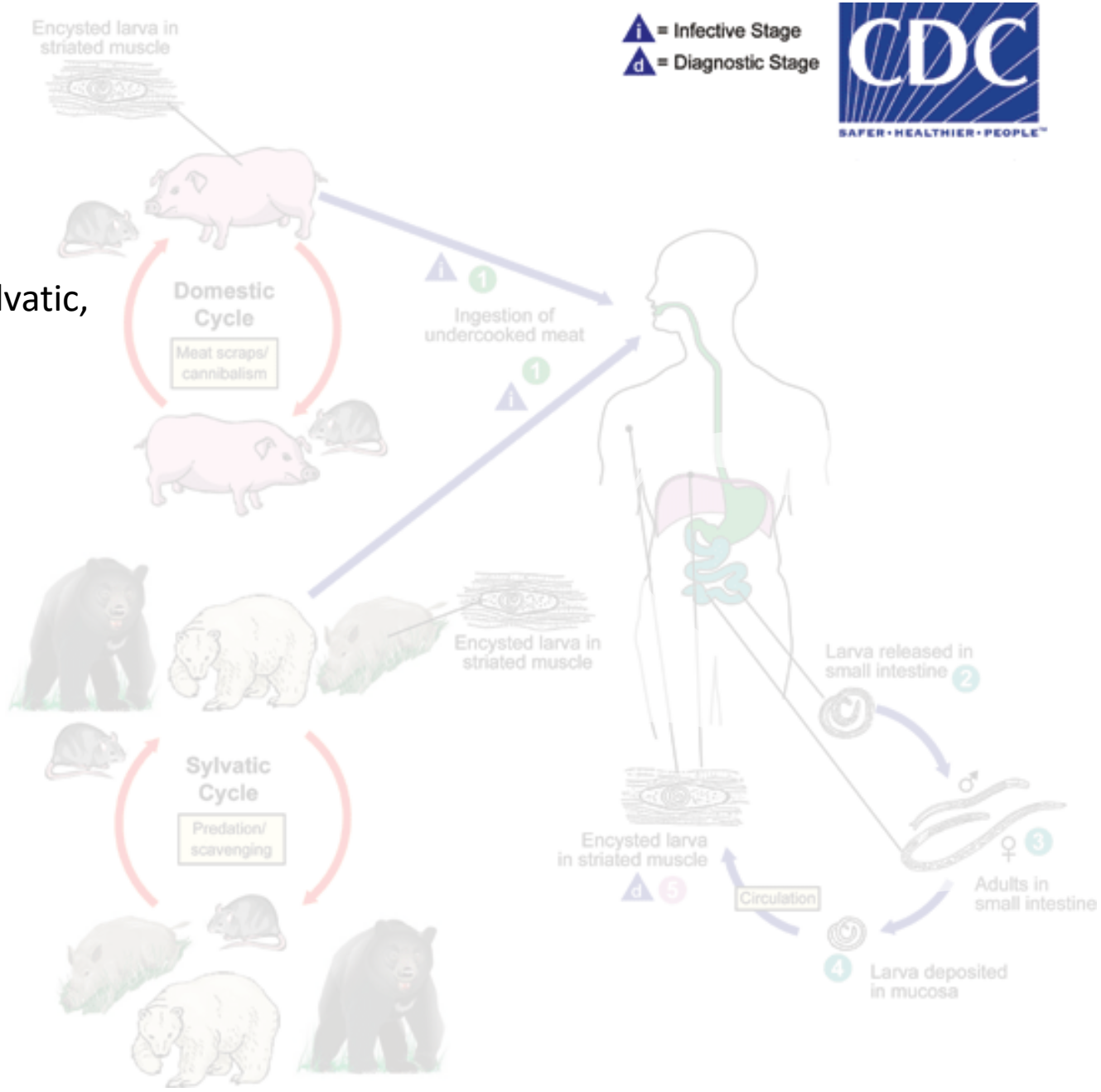
LIFE CICLE

There are two life cycles of *Trichinella*—domestic and sylvatic, both of which occur in a single host.

1) Ingestion of undercooked meat infected with *Trichinella* larvae.

(2 - 3) In the stomach, the larvae are released from the cysts and enter the small intestine, where they develop and reproduce.

(3-4) Newborn larvae migrate to striated muscles, where they encyst. These cysts can remain viable for months or years and eventually calcify.



Diagnosis

- **Clinical Symptoms :**

- intestinal phase- nausea, vomiting and diarrhoea .
- muscular phase- fever, myalgia, facial oedema, conjunctivitis, and eosinophilia.

- **Patient history** (namely the consumption of undercooked meat).

Diagnosis – Confirmation:

- Muscle biopsy ,microscopy and molecular biology.
- Serological tests.

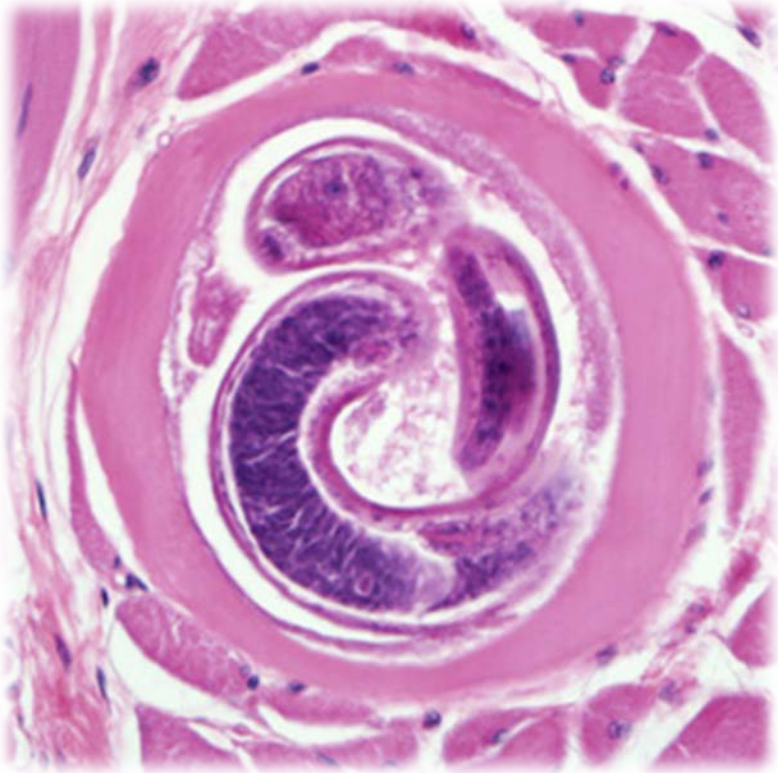


Image: Encysted *Trichinella sp.* larvae in muscle tissue (CDC)

Epidemiology - Europe

- Trichinellosis is present in wildlife in 66 countries and is a major concern in terms of food safety.

- In countries with well-developed veterinary systems, the occurrence of human cases associated with pork consumption has decreased significantly.

- However, cases related to the consumption of game meat are becoming a greater concern.

Epidemiology - Europe

- In 2023, 76 human cases were reported in 11 European Union countries.
- More than half of the cases (53.9%) were recorded in Romania and Spain.

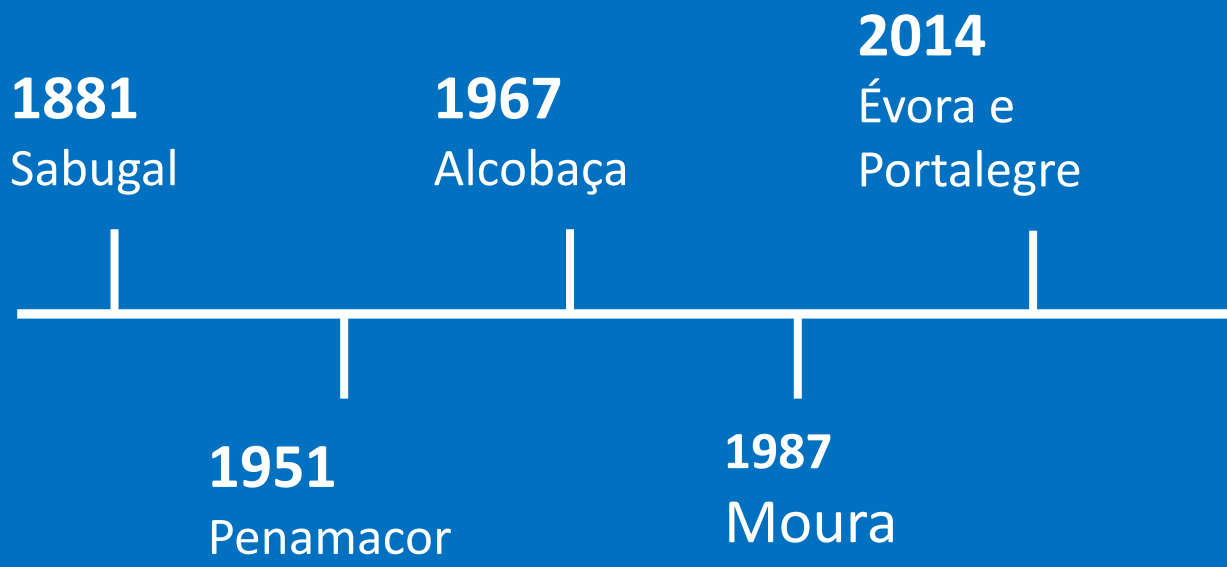
Epidemiology

PORTUGAL

- In Portugal, trichinellosis is a notifiable disease.

The first outbreak occurred in Sabugal (1881), followed by outbreaks in Penamacor (1951) and Alcobaça (1967). The largest documented outbreak in Portugal was identified in Moura (1987).

In 2014, INSA conducted a seroprevalence study in Évora and Portalegre. The results indicated a seropositivity rate of between 4% and 5.5% for *Trichinella spiralis*.



OBJECTIVE

Considering the similarity of dietary habits and epidemiological patterns with neighbouring Spain, where trichinellosis continues to be reported regularly, the apparent absence of recent cases in Portugal raises questions ???!!!

To assess the presence of anti-*Trichinella spp.* antibodies in individuals potentially exposed to undercooked and/or uninspected meat.

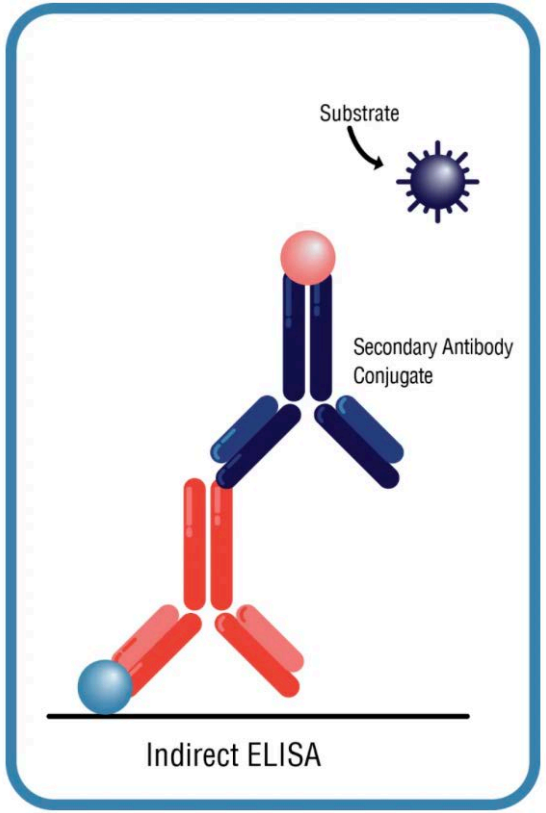
Materials and Methods

• 200 serum samples collected between 2023 and 2024 in the five regions of Portugal.

• Samples were analyzed by enzyme-linked immunosorbent assay (indirect ELISA).

• Positive and equivocal samples were subsequently confirmed by immunoblot.

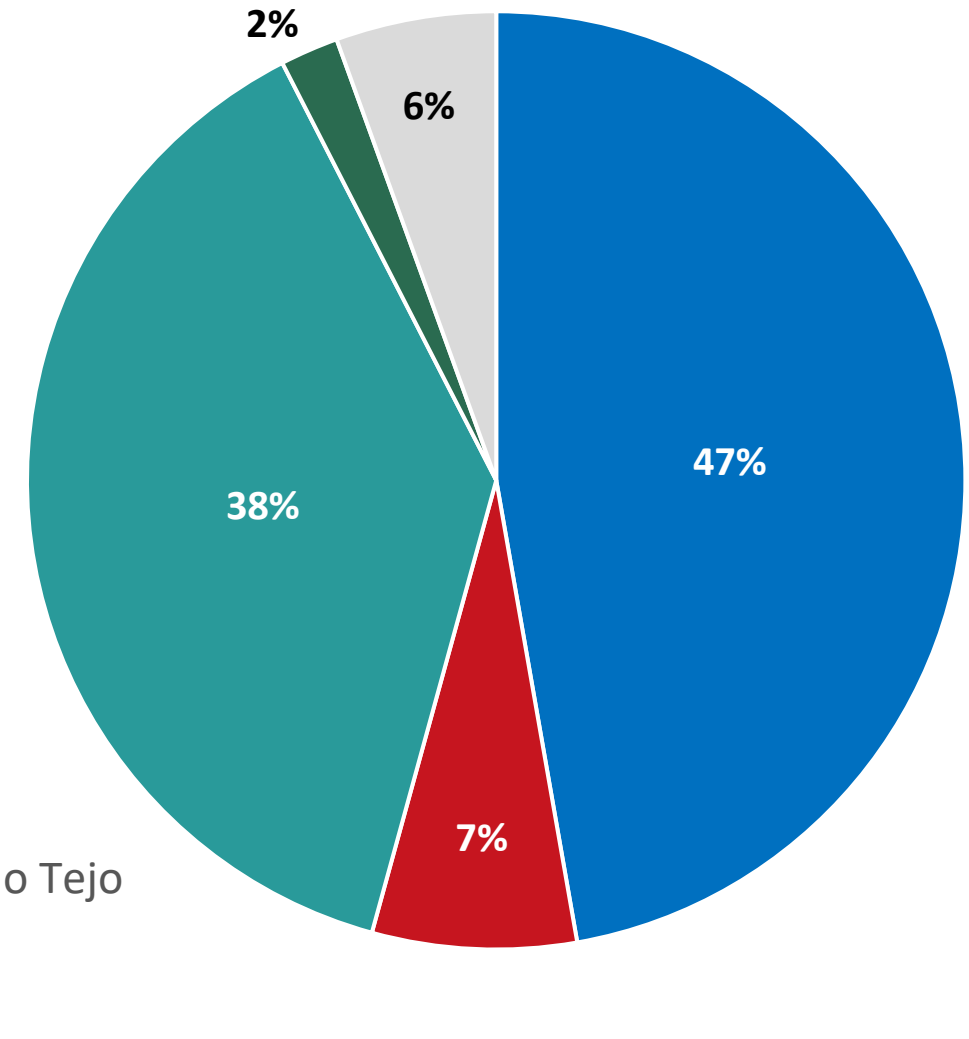
• In addition, positive cases were evaluated for cross-reactivity with other helminths.



SAMPLE

Geographical Distribution

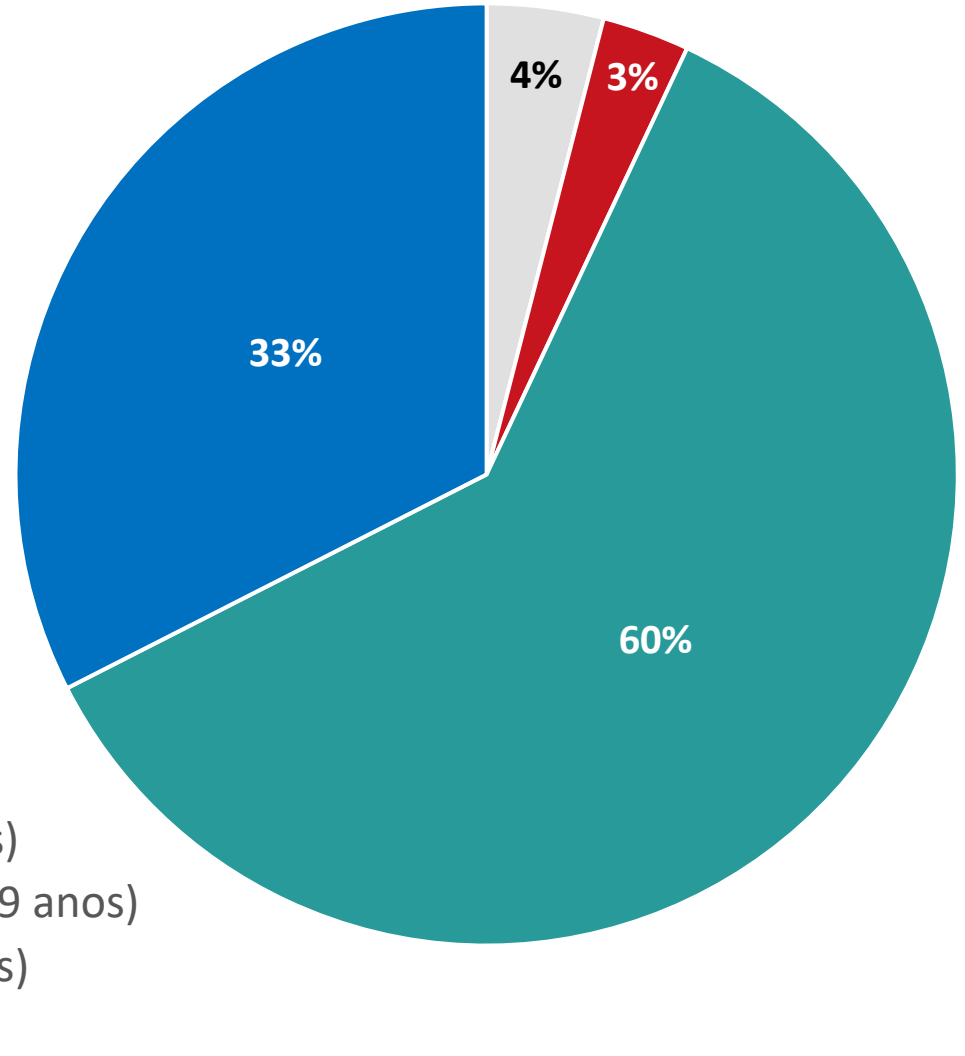
Most came from the North (47%) and the Lisbon and Tagus Valley region (38%).



SAMPLE

Distribution Age Group

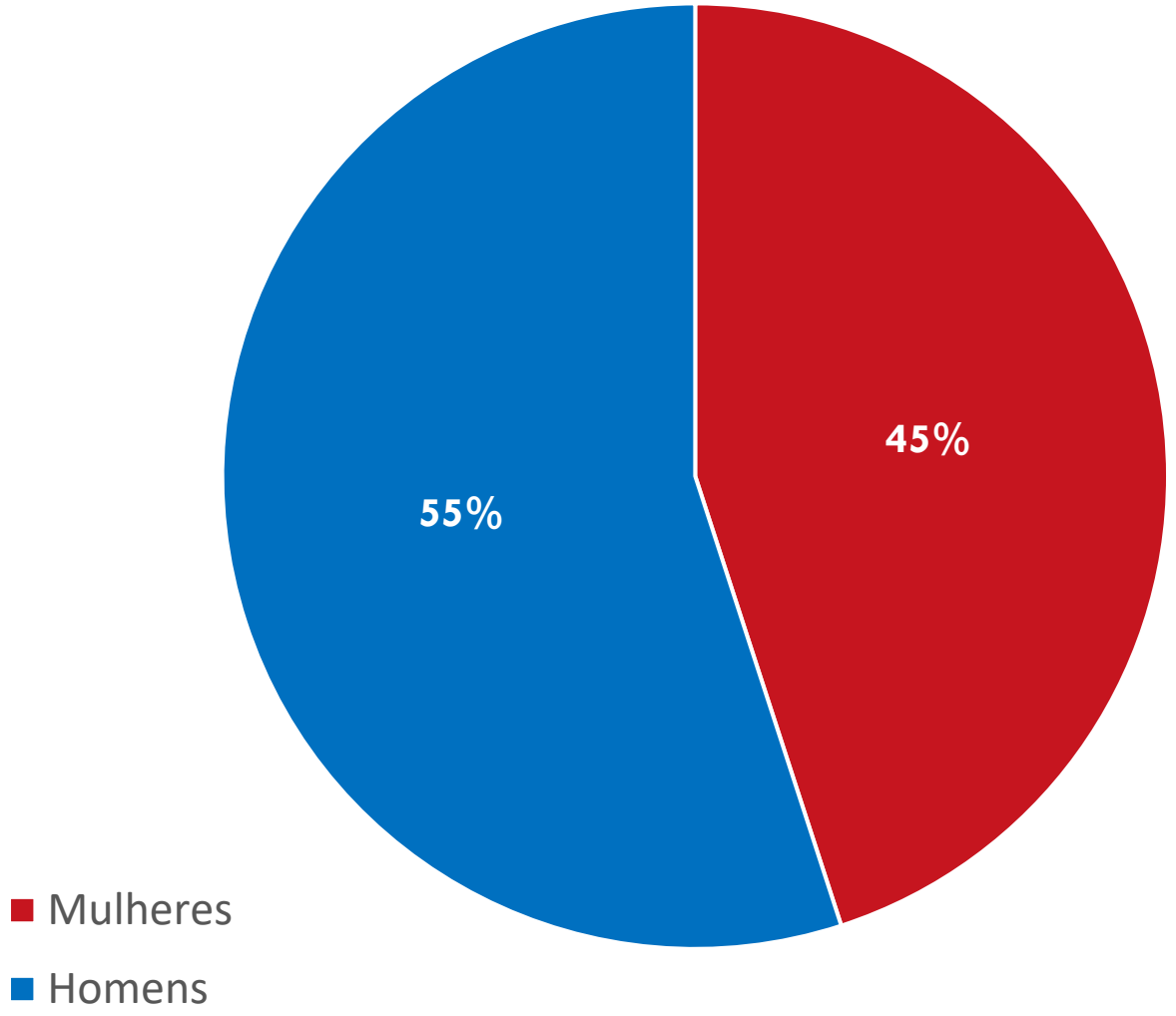
The most represented age group was adults (60%), followed by the elderly (33%).



SAMPLE

Distribution by Gender

The distribution by gender was balanced
55% of men and 45% of women.



RESULTS

Of the 200 samples analyzed by ELISA:

- *7 positive samples*
- *6 equivocal samples*

These 13 samples were analyzed by immunoblot :

- **1 positive sample**

The immunoblot confirmed only one positive case, a sample from an elderly woman from Lisbon.

DISCUSSION

The only positive sample also showed reactivity to *Toxocara sp.*

This reactivity may indicate a true **co-infection with *Toxocara sp*** or a **possible cross-reaction**.

As the samples were anonymized, it was not possible to collect a new blood sample and conduct a clinical and epidemiological research to clarify the infection.

DISCUSSION

7 False-positive results obtained by ELISA

Due to Cross-reactions with antibodies generated against other helminths *Echinococcus granulosus*, *Toxocara* sp., *Taenia solium*, *Schistosoma* sp...

Cross-reactivity is a well-known limitation of serological diagnostics for helminths, resulting from conserved structures (proteins and carbohydrates) shared between these organisms.

The ELISA kit used is based on excretory-secretory antigens of *T. spiralis*, conserved among species of the genus *Trichinella.*

DISCUSSION

Despite the low prevalence reported in this study and the absence of recent notifications, **trichinosis is still present in Portugal.**

- *Trichinella* is present in Portuguese wildlife, with the first case of *T. britovi* confirmed by molecular methods in wild boars being detected in 2020.

- In this study it is possible that some of the serums with positive ELISA results, which were unconfirmed by Imunoblot, could be *T. britovi*.

- Eating habits and traditions in Portugal are similar to Spain neighboring country where *Trichinella spp*. have often been identified at significant levels.
- In this small serological study of 200 samples, we obtained a positive result.
- The absence of reporting is probably due to the fact that the symptomatology can be easily confused with other pathologies, thus leading to the under-diagnosis and subsequently the underreporting of this infection in our country.

CONCLUSION

Dispite the low seroprevalence of antibodies against *Trichinella* observed in the study population suggests that human trichinosis is present in Portugal.

However, given the limitations of the study and the zoonotic potential of the infection, it is essential to promote awareness among hunters and animal breeders, reinforcing that meat from hunting or domestic slaughter should only be consumed after veterinary inspection, as required by Portuguese legislation.

Finally, raising awareness among health professionals is equally crucial in order to encourage testing for trichinellosis in patients with compatible symptoms and patient eating habits.

FUTURE PERSPECTIVES

- Conduct serological studies with larger and more geographically diverse cohorts.
- Collect detailed epidemiological data.
- Obtain informed consent for clinical follow-up.
- Improve the specificity of serological tests. The incorporation of synthetic antigen assays or the identification of new *Trichinella*-specific epitopes may increase the specificity of serological tests and reduce false positives.

THANK YOU FOR YOUR ATTENTION!