

## LOCAL BRUCELLOSIS OUTBREAK ON THASSOS, GREECE: A PRELIMINARY REPORT

R Vorou (vorou@keelpno.gr)<sup>1</sup>, K Gkolfinopoulou<sup>1</sup>, G Dougas<sup>1</sup>, K Mellou<sup>1</sup>, IN Pierroutsakos<sup>1</sup>, T Papadimitriou<sup>1</sup>

1. Hellenic Center for Disease Control and Prevention, Ministry of Health and Social Solidarity, Athens, Greece

### Introduction

Brucellosis is a zoonosis resulting in reproductive failure in wild and domestic animals and febrile disease and occasionally severe infections of the central nervous system and endocarditis in humans. In animals and humans alike, it is found worldwide, including southeastern Europe, the Mediterranean basin (Portugal, Spain, southern France, Italy, Greece, Turkey, northern Africa), parts of Mexico, Central and Latin America, Asia, and Africa [1]. Human brucellosis represents a professional hazard, being acquired via ingestion, inhalation in laboratories or abattoirs, conjunctiva and skin trauma contamination with infected animal tissues and products [1,2]. Symptoms can appear as acute or insidious onset, after five to 60 days and last for days, months and occasionally as long as a year. Relapses can also occur. Treatment is effective with antibiotics. Untreated brucellosis can lead to death (case-fatality ratio around 2%), usually by heart complications.

### Epidemiological situation in Greece

Between 2000 and 2007, the mean yearly incidence rate of brucellosis in Greece was 2.9/100.000 population. The annual incidence rate shows a decreasing tendency: 5 in 2000, 3.7 in 2001, 3 in 2002, 2.2 in 2003, 2.1 in 2004, 3.1 in 2005, 2.6 in 2006, and 1.38 in 2007. The data indicate that the disease mainly affects rural areas of the mainland, all cases either engaged in a high-risk occupation (shepherds, workers in animal husbandry, vets) or sharing unpasteurized milk or dairy products with friends and relatives [3,4,5]. Strict regulation in Greece only permits the circulation in the market of licensed producers' fully processed milk and its products (either pasteurized or cheese matured for at least three months before consumption) and Human Public Health and Veterinary Public Health authorities in all prefectures of the country ensure implementation by performing regular inspections in all restaurants, hotels, catering establishments and other settings. During the summer months, the Ministry of Health and Social Solidarity (MHSS) reinforces more frequent inspections for the prevention of all foodborne diseases, including brucellosis.

The majority of islands, including Thassos of Kavala mainland Prefecture, are free from human cases and herds are considered brucellosis-free, with serology conducted sporadically that prove this. The Ministry of Rural Development and Food (MRDF), regularly provides these results to the Hellenic Center for Disease Control and Prevention (HCDCP) and the MHSS, both of which it collaborates with closely. All animals are tested before importation to the islands, so no brucellosis vaccination is conducted thereafter. On the other hand, in mainland Greece the brucellosis control program includes vaccination of herds and regular testing for brucellosis.

### Outbreak in Thassos

No cases of human brucellosis were reported in Thassos in 2007 or during the first quarter of 2008, until early May 2008, when a considerable number of cases were notified to the Department of Epidemiologic Surveillance and Intervention, of the HCDCP MHSS (Table 1). The onset of symptoms of the first case was 1 April 2008. As of 17 June 2008, 55 human cases have been reported: 53 had consumed unpasteurized milk and/or dairy products (Figure 1): eight had a high-risk profession (six herd owners and two butchers), and nine had had systematic contact with sheep and/or goats. A total of 50 cases and five cases were permanent residents of Thassos and Kavala respectively, the age ranging from eight to 88 years old, with a median of 46 years, sparing only 0-4 years old (Figure 2); 26 cases were male, 29 female.

### Laboratory results

All cases reported tested positive for brucellosis (Standard Agglutination Test), except for one patient who met the clinical and epidemiological criteria while the laboratory result was pending when reported. Eight were asymptomatic while testing positive, six of whom reported consumption of non-pasteurized milk/dairy products, and two reported their husbands' illness and high-risk profession.

There is a widespread custom among local residents of Thassos of consuming unpasteurized milk and its products around Easter-time in their households. This does not affect tourists from Greece or abroad visiting the island.

### Control measures

There is a standard procedure of close cooperation between the Human Public Health (HPH) and Veterinary Public Health (VPH) officials at the local level in the Prefectures of Greece, under the constant supervision of the Unit for Zoonoses and Foodborne Diseases, of the HCDCP-MHSS, and the Ministry of Rural

**TABLE 1**  
Number and percentage of brucellosis cases reported in an outbreak on Thassos, Greece, 2008

Health Unit	Number of cases (%)
Prinou's Primary Health Care Center	24 (43.7)
Thessaloniki's Hospital for Infectious Diseases	23 (41.8)
Kavala's General Hospital	1 (1.8)
Private Physicians	7 (12.7)

Development and Food. More specifically, once the HPH is informed by physicians of the National Health System (general practitioners, internists, pediatricians) of a single human brucellosis case, they define the animals or flock linked in any way with the patient and immediately provide this information to the Veterinary Public Health office so that brucellosis serology and/or testing of milk and its products are conducted in the veterinary reference laboratories. If indicated, the herd immediately undergoes all measures indicated by the brucellosis eradication and control programme operating in Greece. A spontaneous sharing of all data has been established across the country among local HPH, VPH authorities, HCDCP, and the General Veterinary Directorate, MRDF.

Soon after the first human case was notified early in May in Thassos, the above spontaneous usual procedure resulted in positive herds serology. The HPH officials, being aware of the local habit, distributed advice to all health authorities, and to all residents, door to door, suggesting the destruction of any improperly processed milk products in households.

Currently, the slaughter of seropositive animals and vaccination has been applied to all herds of the island, which is the control program already operating across mainland Greece [6], and this will continue until the island is again free of brucellosis.

Coordinated HPH and VPH inspections in all restaurants, groceries, hotels, and other settings proved that only licensed products were circulated in the market. A rapid telephone survey with a structured questionnaire was conducted by the Unit for

Zoonoses and Foodborne Diseases, HCDCP, and all interviewed cases confirmed that these household products were not offered to any tourist in any setting.

Work on a case control study has been initiated and is scheduled to take place shortly.

### Conclusions

Brucellosis is a disease of public health priority in Greece. The HPH and VPH authorities [7] at the central and local levels have a close collaboration and integration, aiming at the target of eradicating the disease which, judging by both reported cases and comments from leading hospitals' microbiologists, is thought to be in decline regarding annual incidence in the country. According to the information we have on this outbreak at the time of writing, it is unlikely that any tourists were exposed to brucellosis on Thassos. In addition, the public health measures applied after this local outbreak ensure that there is no future risk for tourists visiting the island.

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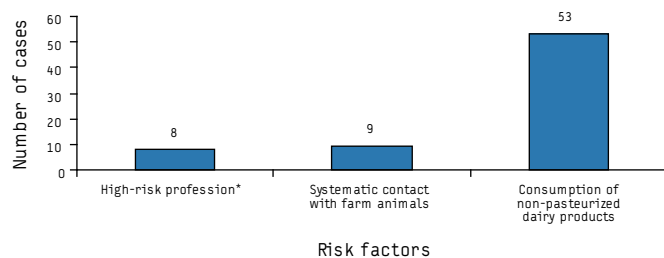
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**FIGURE 1**

**Distribution of brucellosis cases by risk factors, Thassos, Greece, 2008 (n=55)**



\*Shepherds, workers in animal husbandry and vets

**FIGURE 2**

**Distribution of brucellosis cases by age group, Thassos, Greece, 2008 (n=55)**

