

TRENDS OF LEPTOSPIROSIS IN EASTERN COUNTIES OF ROMANIA DURING THE PAST TWO DECADES

Angela Romaniuc, Raluca Mihaela Filimon, Anca Nistor, Mariana Virlan

Institute of Public Health Iasi

and

Mihaela Debita, Elena Duca, Anca Dancau, Roxana Pipirigeanu, Marina
Maiorov, Ecaterina Chihaia, V. Morariu

Districtual Public Health Departments of
Galați, Iași, Bacău, Neamț, Vrancea, Botoșani, Suceava

Abstract. Leptospirosis is a zoonosis with major implication for the public health. The incidence of the disease rises during the last decade in eastern counties of Romania. The change that occurred in agricultural sector brought mutations in the epidemiological process. Leptospirosis registered during past years a trend to dispersion the rural area. There are involved all the active age group in close relation into occupational hazards (plumbers, animal breeders). The clinical evolution of the disease is a severe one (21%) with a fatality rate of 4.5% and the specific mortality of 0.14 ‰. The incriminated serotypes found were: *L. icterohaemorrhagiae*, *wolffi* and *gryppothyphosa*. An efficient leptospirosis control needs a better collaboration between veterinary and human medical network.

Key words: leptospirosis, epidemiology, clinic symptoms, diagnosis, prevention and control

Rezumat. Leptospiroza este o zoonoză cu implicații majore în sănătatea populațională. Incidența bolii a crescut în Moldova în ultimul deceniu iar transformările din agricultură au favorizat mutații ale caracteristicilor procesului epidemiologic. Leptospiroza înregistrează în ultimii ani o tendință la dispersie în mediul rural. Sunt afectate grupurile de vârstă active cu caracter ocupațional (instalatori și îngrijitori de animale). Evoluția clinică este gravă (21%) cu o rată a mortalității de 4,5 % și mortalitatea specifică de 0,14 ‰. Serotipurile incriminate au fost *L. icterohaemorrhagiae*, *wolffi* și *gryppothyphosa*. Este necesară o corelare a acțiunilor sanitare-veterinare și medicale pentru controlul leptospirozei.

Cuvinte cheie: leptospiroza, epidemiologie, simptome clinice, diagnostic, prevenție și control

INTRODUCTION

Disease of natural source characterised by a polymorphous clinical course and a complex epizootic and epidemiological process, leptospirosis is a major zoonosis by its medical and socioeconomical implications.

In order to evaluate the morbidity level of leptospirosis, WHO organized in 1996 an international meeting which revealed that the incidence of this disease was underestimated, in some countries the case reporting not being compulsory (1,2). It is estimated

that approximately 100,000 cases are admitted annually.

Leptospirosis continues to re-emerge as a notable source of morbidity and mortality in the Western Hemisphere. The largest recorded outbreak in the continental U.S. (110 cases in a group of 775 exposed persons) occurred in June and July 1998. Significant increases in incidence were also reported from Peru and Ecuador following heavy rainfall and flooding in the spring of 1998 (3).

Thailand has also reported a rapid increase in incidence between 1995 and 2000 (4).

In Romania the cases of leptospirosis have been reported. The epidemiological and epizootic processes of this infectious disease have been studied by teams from prominent research institutes (5,6). These researches aimed to improve the knowledge on the animal reservoir, the evolution of leptospirosis in relation with the cooperativization of agriculture and forced urbanization, the frequency of infection in various occupational groups (7,8).

During the past decade, the epidemiology of leptospirosis in particular and of zoonoses in general, regained interest given the incidence and the features of the epizootic - epidemiological process induced by the fragmentation of the cattle farms and the difficulties in applying the prevention programs in the small peasant farms. Feral and domestic animal species may serve as source infection with one of the *Leptospira* serovars. Infection is transmitted to humans through direct

contact with (the urine of) infected animals or urine - contaminated environment, mainly surface waters, soil and plants. The course of disease in humans ranges from mild to lethal (9).

In view of improving the strategy for leptospirosis epidemiological surveillance and control the investigation of the present epidemiology of leptospirosis, as part of the National Program of Transmissible Diseases Surveillance and Control, is essential.

MATERIAL AND METHODS

Our goal was to estimate the incidence, the clinical-epidemiological and laboratory features as well as the identification of some possible risk factors for leptospirosis in eastern counties of Romania.

With this goal in mind we carried out:

- a descriptive epidemiological study of the leptospirosis cases reported during the last two decades;
- on the basis of cases definition during 1999-2000, 140 cases were reported; the analysis of cases included epidemiological, clinical, laboratory data and the risk factors;

The data were processed in EpiInfo and the graphs were obtained in Excel.

RESULTS AND DISCUSSION

1. General epidemiological data

1.1 Incidence : then mean incidence rate of leptospirosis in eastern counties of Romania in the past two decades was of 3.6 ‰, higher than the average for Romania (2.0 ‰ inhabitants), with annual variations ranging from 1.4 ‰ in 1995 to 7.9 ‰ in 1999 (Fig. 1).

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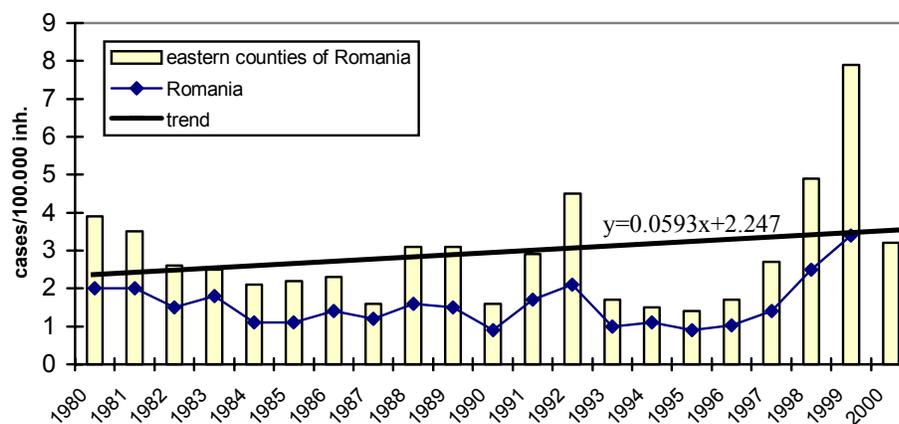


Fig. 1 Annual incidence rate of leptospirosis in Romania and eastern counties during the period 1980-2000

Between 1980 and 1989, the mean morbidity rate was of 2.69 ‰, with a sporadic epidemic characteristic feature in certain groups with occupational exposure (veterinarians, slaughterhouse workers and sewage workers) as well as in children and teenagers swimming in contaminated waters. The highest incidence rate have been recorded in Suceava, Iasi and Galati counties.

During the past decade, the highest incidence rate value appeared in 1999 year (7.9 ‰) although in the middle of this period, the lowest incidence values have been found (< 2.0 ‰). In the last year 2000, the mean incidence of leptospirosis in eastern

counties of Romania decreased to 3.8‰ inhabitants. The territorial distribution of cases showed a decrease in morbidity rate in Bacau, Botosani, Iasi, Suceava and Vaslui counties and a slight increase in Galati, Neamt and Vrancea counties (Fig. 2).

1.2 Seasonality: Influenced by natural conditions of temperature and humidity, leptospirosis had in the past decades a summer-autumn seasonal features, with half of cases recorded in the interval August-October and a low morbidity rate during the cold seasons. In the past few years, this seasonal feature has almost attenuate (Fig. 3).

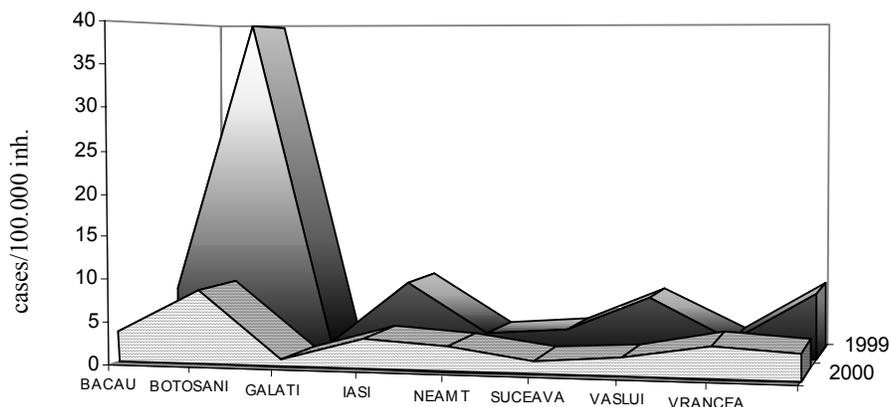


Fig. 2 - Leptospirosis incidence in eastern counties of Romania during 1999-2000

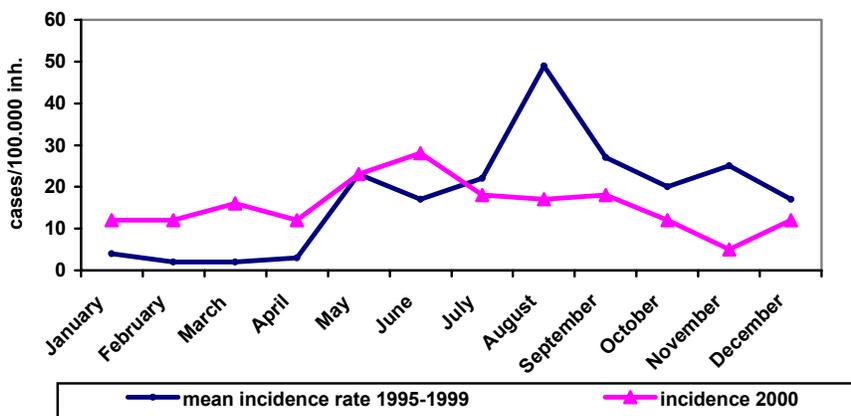


Fig. 3 The seasonal evaluation of the leptospirosis morbidity in eastern counties of Romania in the year 2000 comparing with the mean morbidity registered during the last 5 year

1.3 Distribution of rural/urban areas: With the transformations of the

forest in cultivated intensive areas, the natural reservoirs was disturbed and

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this diseases, which generally was found in rural areas presented an “urbanisation“ period (1968-1986).

In the past 10 years a tendency to return back to rural, was evident (Fig. 4).

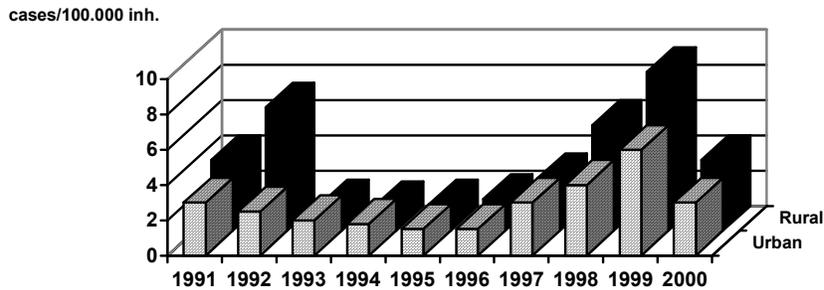


Fig. 4 Leptospirosis morbidity dynamics on rural/urban areas in eastern counties of Romania during the last 10 years

1.4 Age groups distribution.

The disease concerned especially people of active age, with the highest

specific morbidity rate at 35÷44 y age, followed by people of 15÷19 y age and 25÷34 y age.

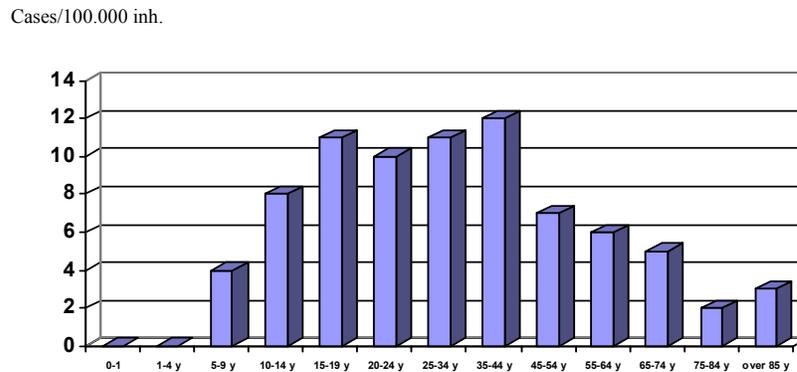


Fig. 5 Leptospirosis specific morbidity of different age groups in the year 2000

2. Clinical and epidemiological features of cases.

Analysis of cases was achieved on 140 cases corresponding clinical and serological criteria of confirmed cases definition: persons who had acute generalized illness with fever, infection which may mimic other diseases and had positive reactions at double blood

samples in microscopic agglutination test (MAT) or IgM-based test (ELISA, Lepto-Distick).

2.1 The distribution of cases by age, sex and residence area (Table 1).

The cases studies were aged between 6 y and 75 y, 59.3% (95% CI:51.3-67.3) of the cases were from rural areas, men representing 92% of the cases (95% CI:88-96).

Table 1. The distribution of cases by age, sex and residence area

Age (years)	Sex		Residence medium		Total n
	Female	Male	Urban	Rural	
< 15	1	3	2	2	4
15 – 19	0	10	7	3	10
20-54	11	91	40	62	102
55-64	3	12	4	11	15
> 65	2	7	4	5	9
TOTAL	17	123	57	83	140

2.2 General socioeconomic data on housing conditions, such as: water supply, solid and liquid waste removing showed a higher percentage of cases among people living in houses (65%) (95% CI:57-73), use well water

(50%) (95% CI:42-58), without of a system for household remove (40-41.2%) (95% CI:36.2-46.8) and recorder presence of rats in their household (50%) (95% CI:42-58) (Table 2).

Table 2 : Socioeconomic characteristics of leptospirosis cases

Characteristics		Percentage (n = 140)	95% CI	p values
Dwelling	Household	65.0	57-73	0.00022
	Apartment	35.0		
Water supply	Central supply	37.5	29.5-45.5	0.00063
	Pump	12.5	7.50-67.5	
	Well	50.0	42.0-58.0	
Solid waste removing	Storage container	32.5	25.5-39.5	0.05
	Solid waste landfill	25.5	19.4-34.8	
	Unorganized	40.0	32.0-48.0	
Liquid waste removing	Sewerage	37.5	29.5-45.5	0.00023
	Outhouse	20.0	14.8-26.6	
	Unorganized	42.5	34.5-50.5	
Presence of rats		50.0	42.0 -58.0	0.00063

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2.3 Distribution on work-related practices reveals the activities at risk, through exposure to water or soil contaminated by infected animal urine: breeders (55.2%) (95% CI: 47.2-63.4), repairs of the sewage system (22.5%) (95% CI: 15.5-29.4) recreational water use, such as swimming or fishing (5%) (95% CI: 2-5), contact with

swampland (16.5%) (95% CI: 10.2-22.3).

48% (95% CI: 39.6-55.7) of cases had an occupational risk (plumbers, slaughterhouse employees, veterinarians, agricultural workers, breeders), 20% represented non occupational groups (unemployment workers, pensioner) and 32% had a risk by occasional activities (Fig.6).

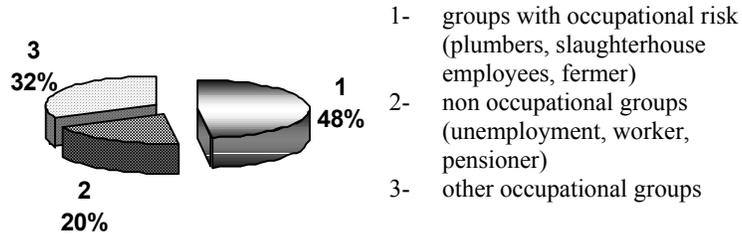


Fig. 6 - Leptospirosis distribution on different occupational groups

2.4 Clinical aspects. Of the broad spectrum of clinical manifestations, fever (95% of the cases) with impaired hepatic and renal function and/or

meningeal reaction were the mostly common features (Fig. 7).

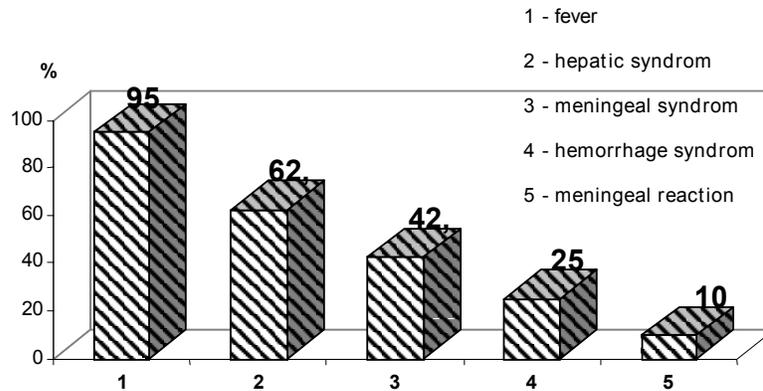


Fig. 7 - Clinical picture of leptospirosis

The moderate (62.2%) (95% CI: 54.2-70.1) and severe forms (21.6 %) (95% CI: 18.6-24.7) prevailed, many of these cases requiring hemodialysis.

2.5 The specific mortality in the year 2000 in eastern counties of Romania was of 0.14 ‰ and the estimated case-fatality rate of 4.5%. The deaths prevailed among the patients at high occupational risk, for all age groups, the responsible serotype being *L.icterohaemorrhagiae*.

2.6 Etiological laboratory diagnosis

was made by serological tests with acute phase markers (ELISA) (32.5%) or by standard microscopical agglutination test (MAT) based on sera collected in dynamics (55 %); a small number of cases were confirmed by complement fixation test (CFT) (12.5 %). In the analysed cases the responsible serotypes were: *L.icterohaemorrhagiae*, *wolffi* and *gryppothyphosa* (Fig. 8).

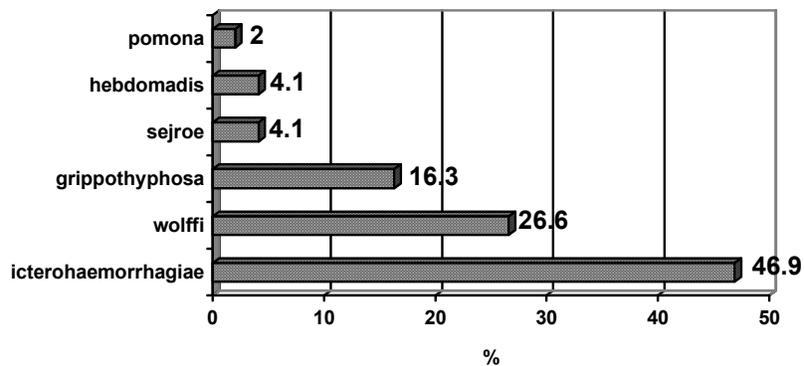


Fig. 8 The frequencies of *Leptospira* serotypes incriminated in the etiology of cases recorded during 2000 year

2.7 Leptospira antibodies seroprevalence in the groups exposed to occupational risk: (central heating and sewage system workers), in the investigated series (550) a positive test was obtained in 27 % of cases (95% CI: 23-34) with variable titres and very high frequency of the markers for *L. icterohaemorrhagiae* (75.2%) (95% CI: 68.1-82.5).

CONCLUSIONS

- Leptospirosis represents a priority problem in the surveillance process of the transmissible diseases in eastern counties of Romania.
- The disease is spread throughout the entire eastern Romania, being more common in rural areas and to the active age groups with occupational exposure.

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- The epidemiological surveillance based on the case definition introduced in the year 2000 eliminated the diagnostic over-estimation, determining a decrease of the incidence rates.
- It is necessary the continuation of the Regional Surveillance and Control Program with special emphasis on:
 - Training the general practitioner for early detection of the cases and their referral to specialists for treatment initiation;
 - Informing both the urban and rural authorities and population about the hygienic conditions in the basements of houses and building, effective rat control, drainage of stagnant waters;
 - Collaboration with the veterinary network for joint prevention and control measures in the individual farms;
 - Health education of the population in view of avoiding the activities at risk and about the necessity application of labour protection in risk sectors;
 - Vaccination of the occupational groups at risk against serovar *icterohaemorrhagiae*, as a measure of specific prophylaxis has to be introduced.

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