SURVEILLANCE DATA ON BACTERIAL ENTEROCOLITIS IN BULGARIA FOR 2014-2018

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ABSTRACT

Worldwide, 30% of cases of infectious diarrhoea are caused by bacterial pathogens. As in other countries of the European Union, in Bulgaria the most common etiological agents are *Escherichia coli* (STEC), *Salmonella* spp.*, Shigella* spp.*, Campylobacter* spp. *and Yersinia enterocolitica*. Acute gastroenteritis and enterocolitis infections are most common in young children. According to our survey, the leading pathogens for 2014-2018 are *Salmonella* spp.*, E. coli* (EPEC, ETEC) and *Campylobacter* spp. The rate of infections caused by *Shigella* spp. is relatively high compared to other European countries.

The number of enterocolitis cases of undefined aetiology continues to increase because of the neglect towards diarrhoeal syndrome by patients who rarely visit a doctor or do not seek medical attention at all.

KEYWORDS:

enterocolitis, *Salmonella* spp.*, E. coli, Campylobacter* spp.*, Shigella* spp.

INTRODUCTION

Acute infectious diarrhoea has a major role in infectious pathology, with the most affected groups being young children and immunosuppressed patients. Worldwide, there are around 1.5 billion cases of acute enterocolitis every year. The etiological structure of acute infectious diarrhoea varies among different age groups and geographic regions. Bacterial pathogens account for 30% of cases of infectious diarrhoea and the most common etiological agents are *E. coli* (STEC), *Salmonella* spp.*, Shigella* spp.*, Campylobacter* spp. and *Yersinia enterocolitica* (1-3, 6).

This report describes surveillance data on laboratory-diagnosed infections caused by seven foodborne or waterborne enteric bacterial pathogens for the last five years in Bulgaria.

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MATERIAL AND METHODS

Infection cases, incidence and trends

In Bulgaria over the last five years intestinal infections account for 42.27% of registered cases of acute infectious diseases. Acute enterocolitis and gastroenteritis comprise 81.38% of all intestinal diseases and are most common in young children (4, 6). The etiological structure of acute infectious diarrhoea caused by bacterial pathogens is presented in Fig. 1. Bacteriological confirmation of the disease relies on isolation of the organism from stool samples. The distribution of bacterial isolates in cases of acute infectious diarrhoea in Bulgaria is presented in Fig. 2-7.

Salmonella species are the leading bacterial agents of enterocolitis in Bulgaria. A total of 1780 strains of *Salmonella enterica* were confirmed at the National Reference Laboratory (NRL) of Enteric Pathogens. For the last five years the most commonly found serotypes were: *S.* Enteritidis – 52.25%, *S.* Typhimurium – 12.36%, *Salmonella* 1,4,[5],12:i:- – 11.24%, *S.* Derby – 7.30%, *S.* Infantis – 5.9%, *S.* Schleissheim – 2.95%, other serotypes – 8%. These results coincide with other data on the most frequently isolated *Salmonella* spp. in Bulgaria (Enteritidis and Typhimurium) (5). Serotype distribution is presented in Fig. 8.

In the last five years have been reported several foodborne outbreaks involving *S.* Enteritidis. There were three outbreaks in the cities of Ruse and Varna in 2015, also Pleven and Veliko Tarnovo – in 2016, Stara Zagora – in 2018 and every year in the city of Sofia. In 2018 was reported an outbreak caused by the previously not described in Bulgaria *S. enterica* subsp. *enterica* serovar London, affecting only medical staff in two healthcare establishments. Furthermore, since 2016 culture isolation of single-phase *Salmonella* Typhimurium (1,4,[5],12:i:-) has been significantly increasing.

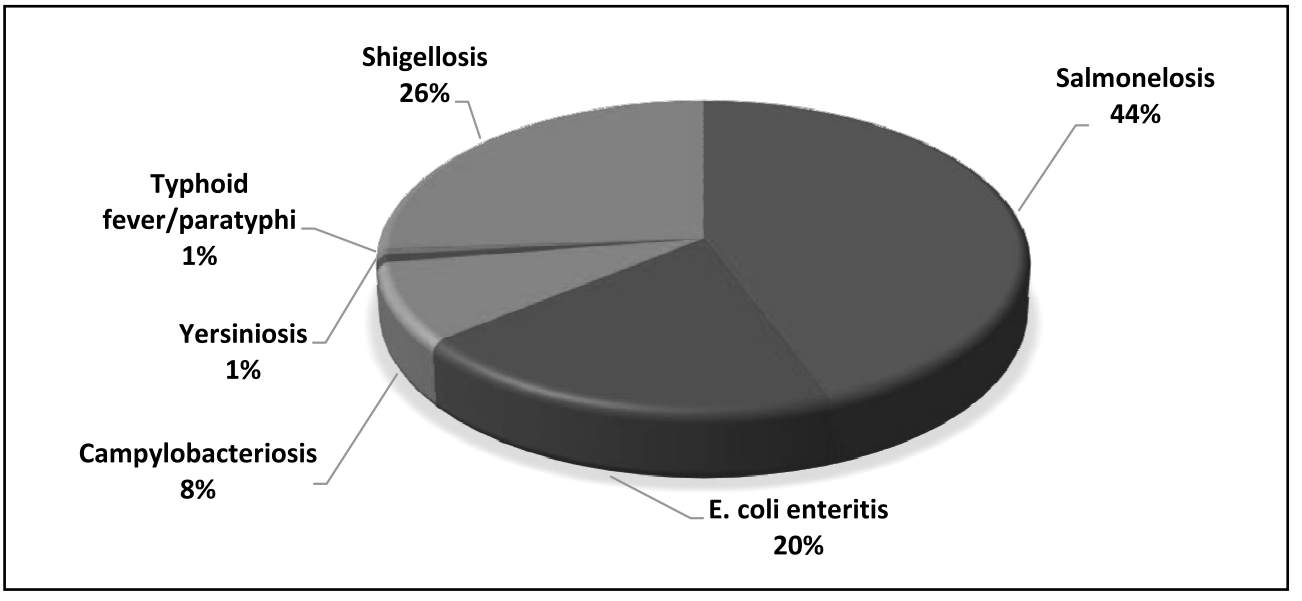

Figure 1. Etiological structure of acute infectious diarrhoea caused by bacterial pathogens over the last five years 2014 - 2018.

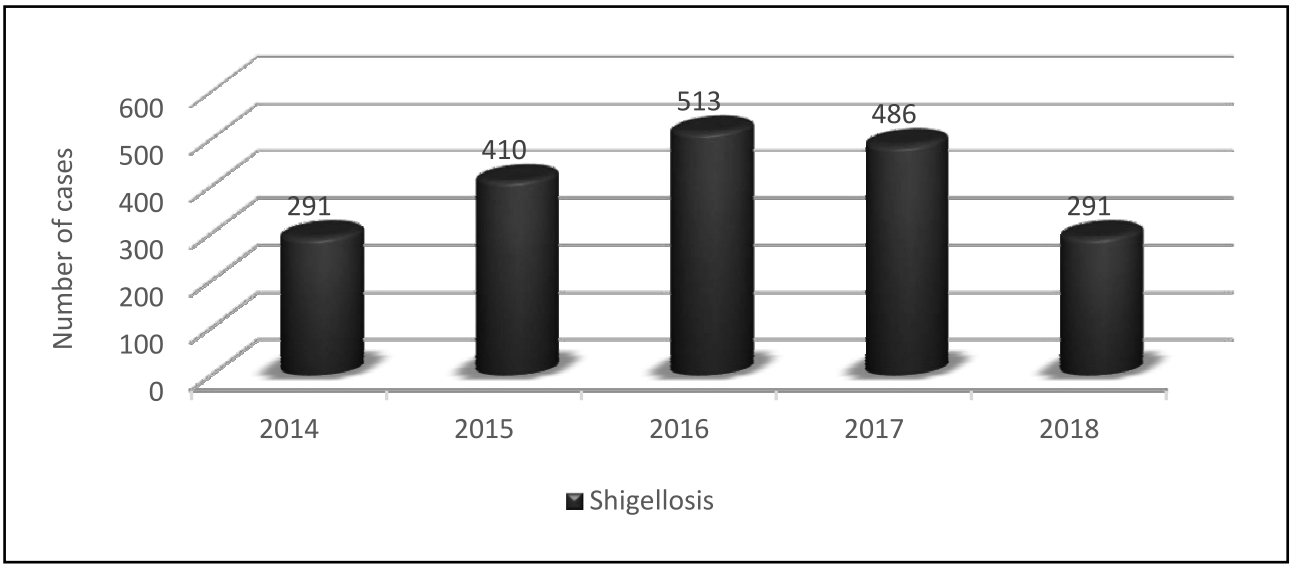

Figure 2. Distribution of shigellosis 2014-2018.

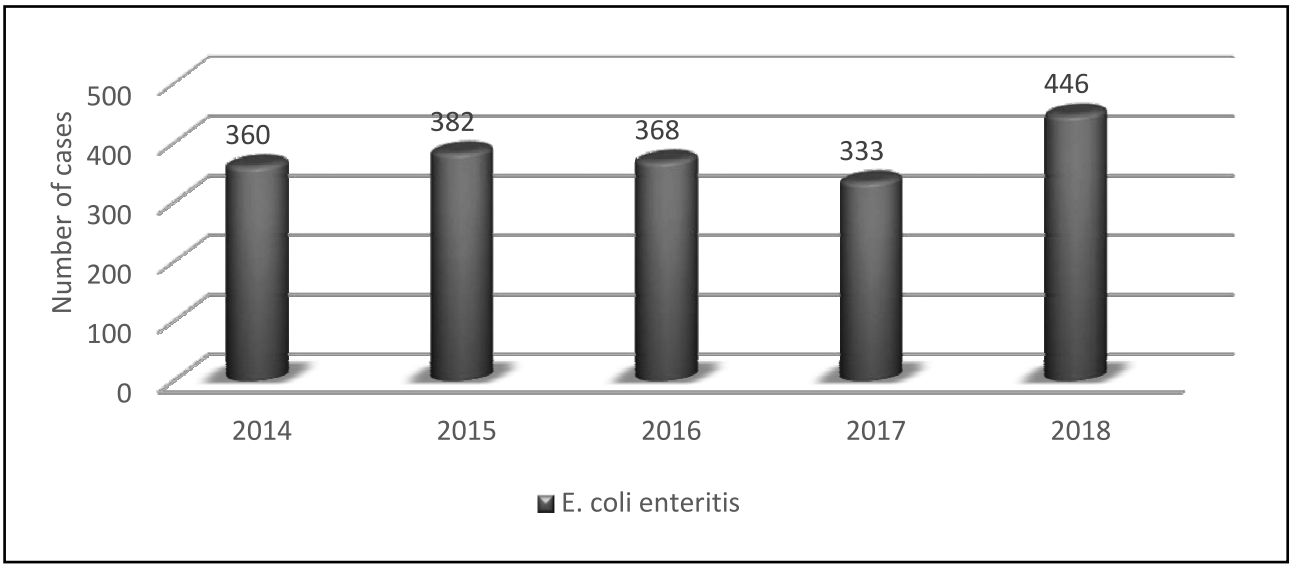

Figure 3. Distribution of *E. coli* enteritis 2014-2018.

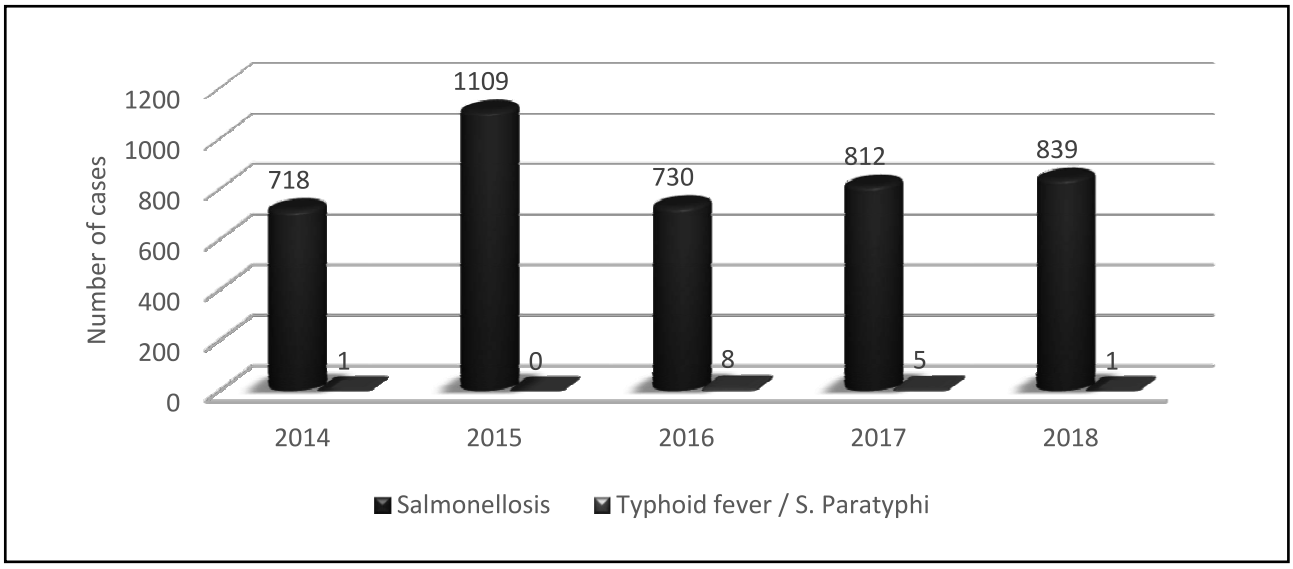

Figure 4. Distribution of salmonellosis and typhoid fever 2014-2018.

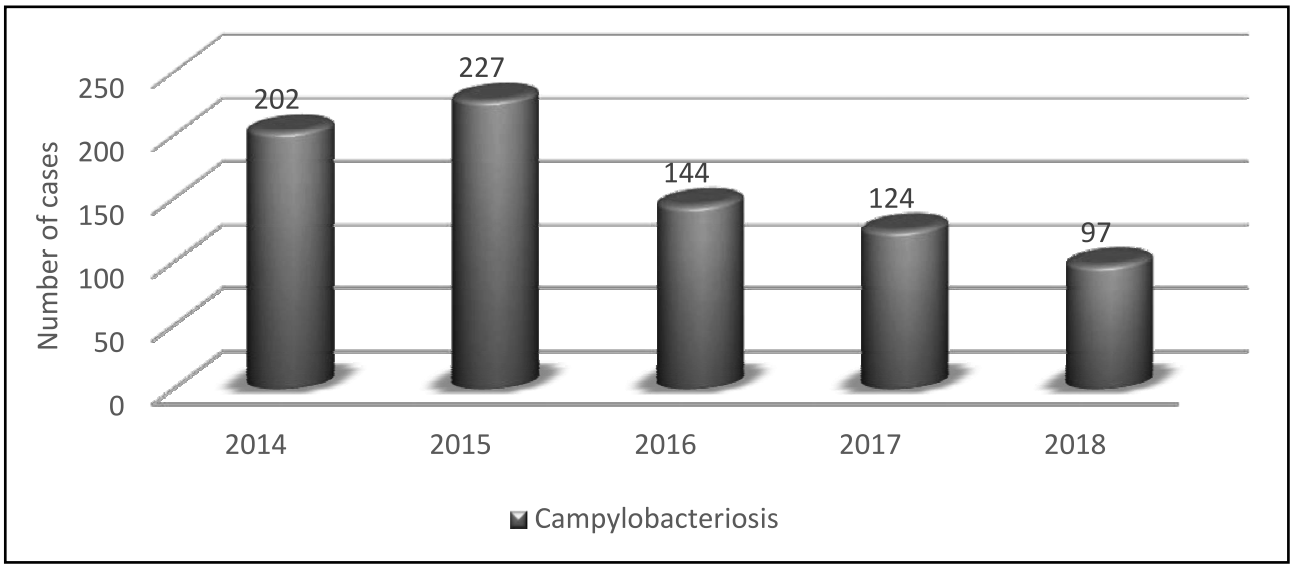

Figure 5. Distribution of campylobacteriosis 2014-2018.

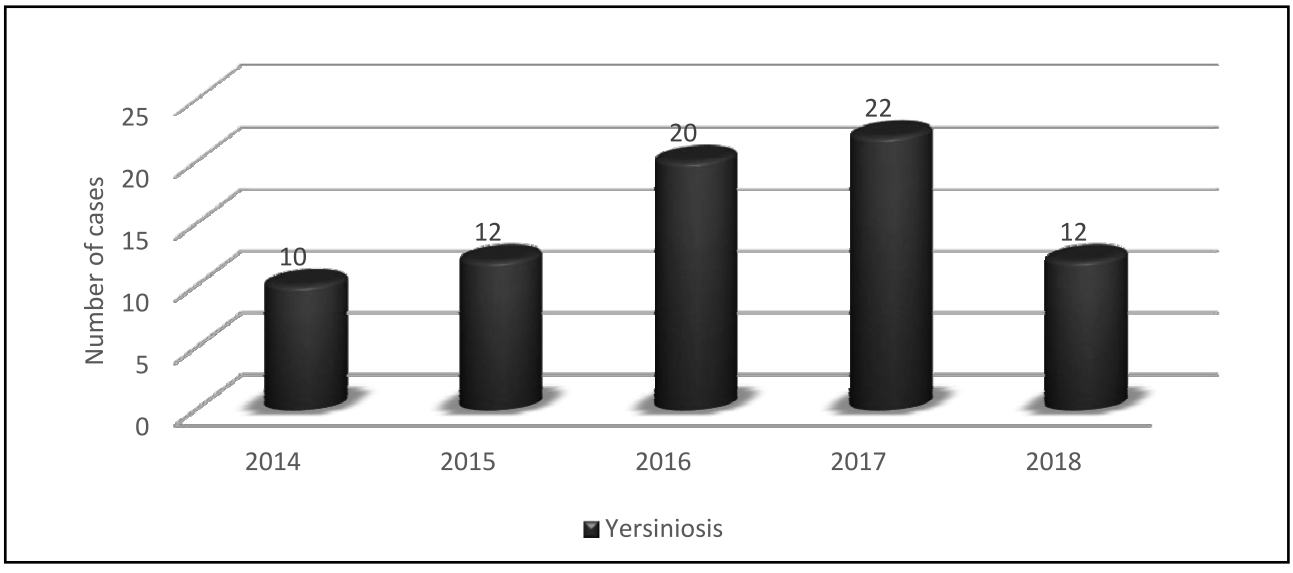

Figure 6. Distribution of yersiniosis 2014-2018.

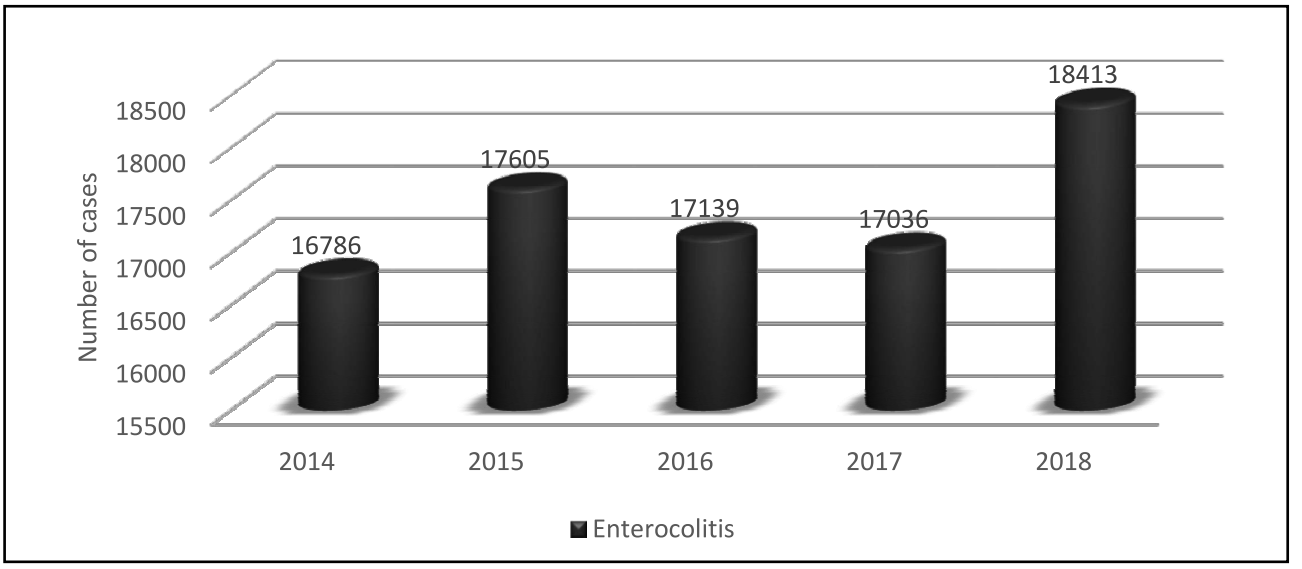

Figure 7. Distribution of enterocolitis 2014-2018.

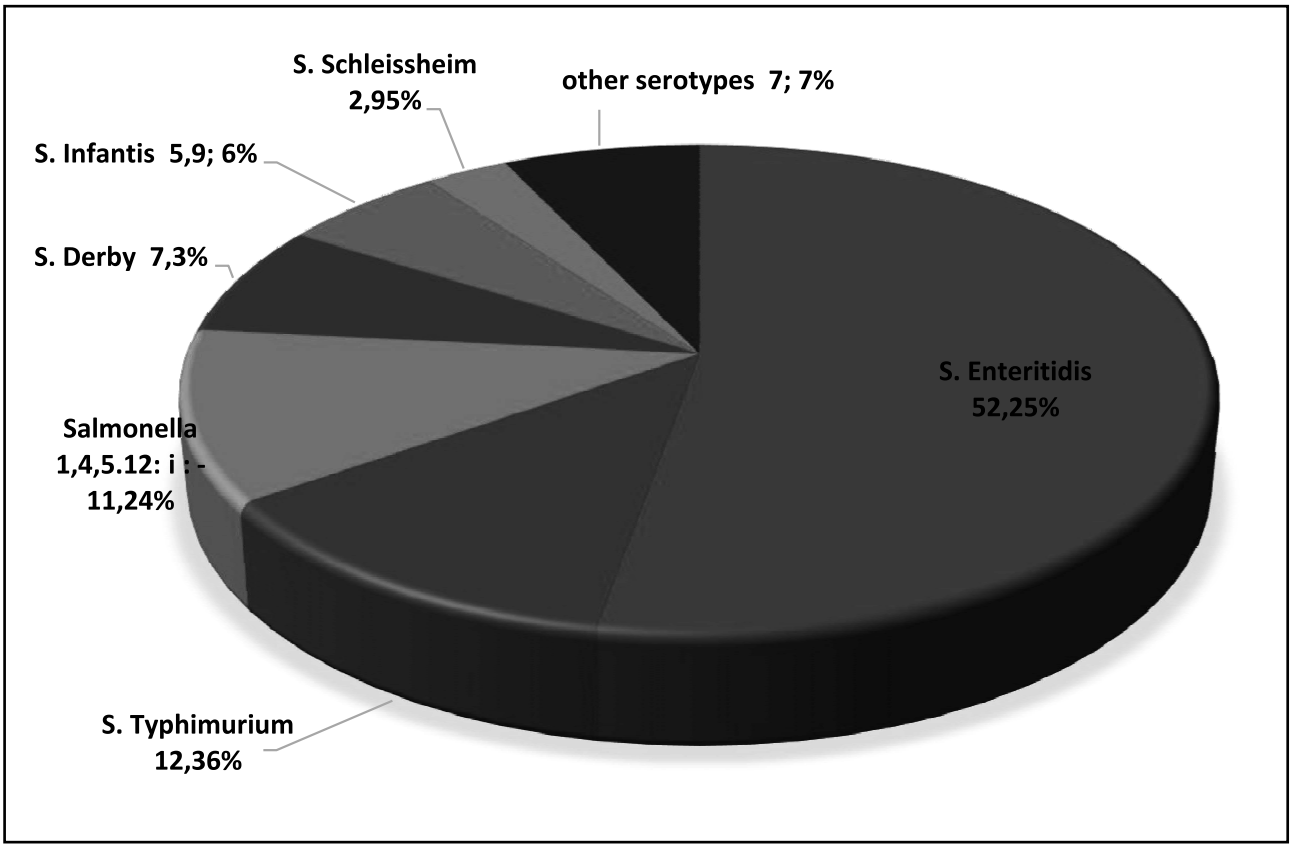

Figure 8. Distribution of *Salmonella* serotypes in Bulgaria 2014-2018.

Typhoid fever is an infectious disease occurring primarily in developing countries, while in developed countries it is still confined to returning travellers or contacts of patients (8, 9). There have been a few cases of *Salmonella* Typhi over the last five years – sporadic cases in patients arrived from abroad (India, Pakistan, Thailand, etc.) and an epidemic outbreak affecting six patients in a hospice in 2014.

The recently increasing number of human isolates of *S. enterica* subsp. *enterica* serovar Paratyphi B biovar Java is often associated with illnesses manifesting as prolonged fever with or without other systemic symptoms. All Paratyphi isolates were confirmed as biovar Java by a PCR-based method at the NRL of Enteric Pathogens, NCIPD.

Although *Salmonella* is the most commonly reported causative agent of bacterial enterocolitis, the number of enterocolitis infections of undefined aetiology continues to increase.

In our country, shigellosis morbidity is higher compared to other European countries. The leading etiological agents are *Shigella flexneri* – 80%, followed by *Shigella sonnei* – 16% and *Shigella boydii* – 2%. Most cases of shigellosis affect minority populations. The underlying sanitary and hygienic conditions are indicated as the main factor for the spread of infection.

E. coli enteritis is most common in infants and young children. According to the database collected at the NRL of Enteric Pathogens, the leading etiological agents are EPEC O6 in 55% of the cases, followed by EPEC O127 and O44 (Fig. 9). To date, there is no registered case of infection caused by Shiga/Vero toxin-producing *E. coli* in Bulgaria.

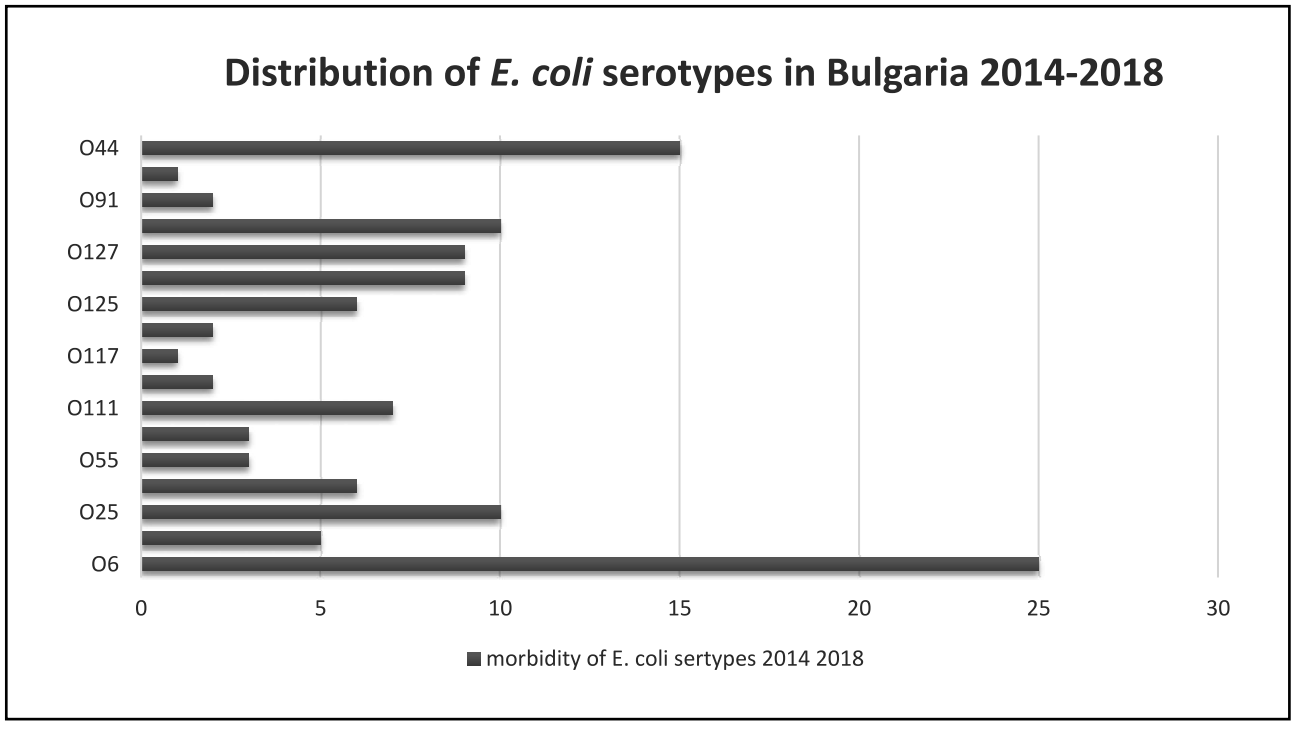

Figure 9. Distribution of E. coli serotypes in Bulgaria 2014-2018.

All registered cases of yersiniosis were laboratory-confirmed with the isolation of *Y. enterocolitica*. There is a steady trend in the reporting of sporadic cases mostly in immunosuppressed patients or those with concomitant illnesses.

The incidence of *Campylobacter* infections, taking into account only cases with positive culture results, was significantly lower in Bulgaria compared to other EU countries (7). A confirmed bacterial infection is defined as isolation of the bacterium from a clinical specimen by culture. However, pathogen detection could be affected by laboratory testing practices. The unwillingness to perform laboratory diagnosis impedes the determination of the actual morbidity due to campylobacteriosis which is a leading disease among foodborne infections in the EU countries. Pathogen detection could be enhanced if clinical laboratories adopt DNA-based tests (automated systems) as they are quicker and easier to perform than traditional culture methods. Also laboratories could examine pathogens that are not often included in the routine stool culture. Nevertheless, it should be noted that each year there is an increase in the number of *Campylobacter* clinical isolates sent for microbiological confirmation to the NCIPD.

RESULTS

Routine stool cultures performed in clinical laboratories typically include methods that identify only *Salmonella*, *Campylobacter*, *Shigella*, *E. coli* (EPEC, ETEC, EIEC) and one of the Shiga toxin–producing types of *E. coli* O157 for some laboratories.

In the last five years, intestinal infections comprise 31.02% of the recorded acute cases of infectious diseases in the country. Acute gastroenteritis and enterocolitis remain

the leading infectious intestinal diseases – 81.38%. There is an increased incidence of bacterial enterocolitis during the summer months and the most affected group is young children. Salmonellosis remains the leading bacterial intestinal infection in Bulgaria followed by *E. coli* (EPEC, ETEC).

CONCLUSION

The number of enterocolitis cases of undefined aetiology continues to increase because of the neglect towards diarrhoeal syndrome by patients who rarely visit a doctor or do not seek medical attention at all.

DATA SOURCES:

- National Centre of Public Health and Analyses (NCPHA) – Sofia, Bulgaria;
- Regional Health Inspections (RHI) - annual analyses of current diseases;
- National Reference Laboratory for Pathogenic Diseases at the National Centre of Infectious and Parasitic Diseases, Sofia;

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