

## JAVNOZDRAVSTVENI NADZOR NAD LEGIONARSKOM BOLEŠĆU POVEZANOM SA PUTOVANJIMA U EVROPI I CRNOJ GORI

Sanja Medenica<sup>1,2</sup>, Božidarka Rakočević<sup>1,2</sup>, Zorica Đorđević<sup>1</sup>, Darinka Marković<sup>1</sup>

<sup>1</sup> Institut za javno zdravlje Crne Gore, Podgorica, Crna Gora

<sup>2</sup> Medicinski fakultet, Univerzitet Crne Gore, Podgorica, Crna Gora

\*Korespondencija: sanja.medenica@ijzcg.me

### SAŽETAK

Cilj ovog rada je da prikaže način sprovođenja javnozdravstvenog nadzora nad legionarskom bolešću povezano sa putovanjima kako u Evropi, tako i u Crnoj Gori. Procene Evropskog centra za kontrolu i prevenciju bolesti (engl. European Centre for Disease Prevention and Control - ECDC) ukazuju da se oko hiljadu turista iz Evrope godišnje inficira legionelama prilikom odmora i boravka u hotelima širom kontinenta. Evropske mreže za nadzor nad legionarskom bolešću (engl. *European Legionnaires' Disease Surveillance Network* - ELDSNet) je osnovana sa ciljem otkrivanja, suzbijanja i prevencije slučajeva obolevanja, formiranja klastera i izvora epidemija legionarske bolesti koja je najčešće povezana sa putovanjima, a koji su prijavljeni na području Evropske unije (engl. *European Union* - EU) i Evropske ekonomske zone (engl. *European Economic Area* - EEA), kao i pružanja pomoći pri otkrivanju i odgovoru na epidemije izvan EU/EEA. Razmena informacija dovodi do konkretnih i pravovremenih akcija članica ELDSNet-a, kako bi se zaštitili stanovnici EU/EEA koji putuju i van Evrope. ECDC preporučuje set mera koje treba da sprovedu javnozdravstvene vlasti i turistički sektor zemlje koju je posetio oboleli putnik. Ukoliko se te mere sprovedu, informacije se objavljuju *online* i veliki evropski turoperatoru mogu da ih koriste pri odabiru rezervacije aranžmana u inostranstvu. Operativne procedure obezbeđuju set zajedničkih mera koje treba da budu praćene od strane svih EU/EEA zemalja koje su uključene u zaštitu svojih građana od legionarske bolesti. Svaki slučaj obolevanja od legionarske bolesti kod turista u evropskom regionu, koji je u naveo boravak u Crnoj Gori, se takođe, epidemiološki obrađuje i to po propisanim procedurama ELDSNet mreže.

**Ključne reči:** legionarska bolest, evropska mreža za nadzor legionarske bolesti, putovanja

### Uvod

Legionarska bolest (LB) je prvi put identifikovana 1976. godine u Filadelfiji, registrovanjem teške upale pluća među učesnicima Američke legije i prvi put je opisana od strane *Fraser*-a i sar. 1977. godine (1,2).

*Legionella* je bakterija široko rasprostranjena u prirodi. U manjem broju se može naći u okruženju vodenih izvora (reka, jezera, rezervoara). Iz prirodnih izvora, prelazi na mesta koja sadrže veštačke rezervoare (vodovodni sistemi u naseljima, vodovodni sistemi u individualnim zgradama, itd.) (3). *Legionella* se ne razmnožava na temperaturi ispod 20°C (posebno soj *Legionella pneumophila*) i ne može preživeti u vodi koja se održava iznad 60°C (3). Može, međutim, da ostane u stanju mirovanja

u hladnoj vodi i da se razmnožava kada je temperatura između 20°C i 45°C. Prisustvo sedimenata, mulja, kamenca, rđe i ostalih materijala u okviru vodenog sistema, zajedno sa biofilmovima, igraju značajnu ulogu u zadržavanju i pružanju povoljnih uslova u kojima *Legionella* može da raste (3).

U svetu je do sada opisana 61 vrsta legionele, a 28 vrsta izaziva oboljenja kod ljudi (4,5). *L. pneumophila* serogrupa-1 je u gotovo 80% prouzrokovatelj legionarske bolesti, dok ostali deo čine manje rasprostranjeni ili retki uzročnici iz ostalih serogrupa.

Legionarska bolest se javlja sporadično, u vidu registrovanja klastera i u epidemijskoj formi, kao i više slučajeva povezanih sa zajedničkom vremenskom i prostornom izloženošću (3).

## PUBLIC HEALTH SURVEILLANCE OF TRAVEL-ASSOCIATED LEGIONNAIRES' DISEASE IN EUROPE AND MONTENEGRO

Sanja Medenica<sup>1,2</sup>, Bozidarka Rakocevic<sup>1,2</sup>, Zorica Djordjevic<sup>1</sup>, Darinka Markovic<sup>1</sup>

<sup>1</sup> Institute of Public Health of Montenegro, Podgorica, Montenegro

<sup>2</sup> Faculty of Medicine, University of Montenegro, Podgorica, Montenegro

\* Correspondence: [sanja.medenica@ijzcg.me](mailto:sanja.medenica@ijzcg.me)

### SUMMARY

The aim of this study is to show how public health surveillance of travel-associated Legionnaires' disease was conducted in Europe, as well as in Montenegro. The estimations of the European Centre for Disease Prevention and Control (ECDC) indicate that every year about one thousand tourists from Europe get infected by legionellae during their holiday and stay at hotels across the continent. The European Legionnaires' Disease Surveillance Network (ELDSNet) was established with the aim to detect, control and prevent cases, clusters and sources of outbreaks of travel-associated Legionnaires' disease within the European Union (EU) and European Economic Area (EEA), and to assist with detection and response to outbreaks outside the EU/EEA. Sharing information leads to concrete and timely actions of member states of ELDSNet, so that residents of the EU/EEA who travel abroad are protected. ECDC recommends a set of measures that should be followed by public health authorities and tourist sector of the country which was visited by the traveler who caught this disease. If the measures are not carried out, information is published online and European tour operators can use the information when booking holiday packages abroad. Operating procedures provide a set of common measures which should be followed by all EU/EEA member states involved in the protection of their residents against Legionnaires' disease. Each case of Legionnaires' disease which is reported in tourists, who stayed in Montenegro, is epidemiologically analyzed according to the operating procedures of ELDS Network.

**Key words:** Legionnaires' disease, European Legionnaires' Disease surveillance Network, travels

### Introduction

Legionnaires' disease was first identified in 1976 in Philadelphia, when severe pneumonia was registered among the participants of the American Legion and it was first described by Fraser and associates in 1977 (1,2).

*Legionella* is a bacterium which is widespread in nature. It can be found in low numbers in environmental water sources (rivers, lakes and reservoirs). From natural sources, it passes into sites that constitute an artificial reservoir (channeled water systems in towns and water systems in individual buildings, etc.) (3). *Legionella* does not multiply below 20°C (particularly *Legionella pneumophila* strains) and cannot survive in water maintained above 60°C (3). However, it may remain dormant in cool water and multiply when water temperature is between 20°C

and 45°C. The presence of sediment, sludge, scale, rust and other material within the water system together with biofilms play an important role in harboring and providing favorable conditions in which *Legionella* may grow (3).

In the world, 61 different species of *Legionella* have been described so far, while 28 species cause human disease (4,5). *L. pneumophila* serogroup-1 causes almost 80% of cases of Legionnaires' disease, while less widespread or rare species from other serogroups make the remaining part.

Legionnaires' disease appears sporadically, in the form of clusters and outbreaks, as well as several cases connected with the mutual temporal and spatial exposure (3). It affects more frequently people older than 40 years, men, smokers, people who drink alcohol, as well as people, who

Češće se javlja kod osoba starijih od 40 godina, muškaraca, pušača, korisnika alkohola, kao i kod osoba koji u ličnoj anamnezi navode transplantaciju organa, postojanje hroničnih bolesti i imunodeficijenciju (6).

## Učestalost i rasprostranjenost legionarske bolesti u EU/EEU i Crnoj Gori

U Evropskom regionu u 2019. godini, 28 zemalja je prijavilo 11.298 slučajeva obolevanja od legionarske bolesti, od kojih su 10.636 (94%) klasifikovani kao potvrđeni slučajevi. Broj novoobolelih od legionarske bolesti je iznosio 2,2 na 100.000 stanovnika, što je najveća do sada zabeležena stopa incidencije u EU/EEA (7). U posljednjih pet godina stope incidencije gotovo su se udvostručile u zemljama EU/EEA, i to sa 1,4/100.000 stanovnika u 2015. godini na 2,2/100.000 stanovnika u 2019. godini (tabela 1). U četiri zemlje EU (Francuskoj, Nemačkoj, Italiji i Španiji) broj prijavljenih slučajeva legionarske bolesti iznosio je čak 71% ukupnog broja prijavljenih slučajeva u EU/EEA, iako populacija ovih zemalja predstavlja oko 50% stanovništva EU/EEA (7).

Prema podacima Centra za suzbijanje i prevenciju bolesti iz Atlante (engl. *Centers for Disease Control and Prevention* – CDC), u Sjedinjenim Američkim Državama u 2018. godini prijavljeno je oko 10.000 slučajeva ove bolesti, što se može smatrati potcenjenim brojem slučajeva, zbog nedovoljnog sprovođenja dijagnostike legionarske bolesti (8). Nedavno sprovedena studija procenila je da stvarni broj obolelih od legionarske bolesti može biti 1,8-2,7 puta veći od onog što je prijavljeno (8).

Na osnovu podataka dobijenih iz registra za zarazne bolesti, Instituta za javno zdravlje, u periodu od 01.01.2011. do 31.12.2020. godine u Crnoj Gori, ukupno su registrovana 4 novoobolele osobe od legionarske bolesti i to 2013. godine dva slučaja (stopa incidencije 0,32/100.000 stanovnika) i 2019. godine dva slučaja (stopa incidencije 0,32/100.000 stanovnika) (9,10). Svi oboleli bili su muškarci, uzrasta od 30 do 60 godina. Svi oboleli nisu putovali i nisu bili epidemiološki povezani.

## Kliničke karakteristike legionarske bolesti i dijagnostika

Legionarska bolest se klinički manifestuje pneumonijom, a letalitet se kreće 10 –15% (3). Ova teška sistemska bakterijska infekcija, izazvana

gram negativnom bakterijom, često se manifestuje kao atipična upala pluća sa subakutnom temperaturom, kašljem i kratkim dahom (11).

Nije moguće klinički razlikovati pacijente s legionarskom bolešću od pacijenata s drugim vrstama upale pluća izazvanim nekim drugim uzročnikom. Međutim, na rendgenskom snimku prisutni alveolarni infiltrati su češći kod legionarske bolesti u odnosu na upale pluća uzrokovane drugim patogenima. Klinički simptomi koji opisuju legionarsku bolest su groznica, neproduktivni kašalj, glavobolja, bolovi u mišićima, ukočenost, otežano disanje, proliv, mentalna konfuzija i delirijum (12). Približno 25-50% ljudi inficirano legionelama može imati proliv, dok se kod oko 50% mogu pojaviti znaci mentalne konfuzije (6).

Period inkubacije se obično kreće od 2 do 10 dana, a u retkim slučajevima može biti od 16 do 20 dana nakon izlaganja agensu. Ukoliko se oboleli ne leče, simptomi se u normalnim okolnostima brzo pogoršavaju i mogu da dovedu do respiratorne insuficijencije, šoka, višestruke organske insuficijencije i smrti (3).

Pontijačna groznica je blaža forma bolesti izazvana ovom bakterijom, koja je slična gripu. Inkubacioni period je kraći, najčešće od 12 do 48 sati i javlja se kao bolest slična gripu koja traje nekoliko dana. Stopa javljanja je viša nego kod legionarske bolesti (do 95% od onih koji su izloženi). Slučajevi su uglavnom detektovani prilikom pojave epidemije pontijačne groznice, na primer izlaganje povezano sa upotrebom zajedničkog banjskog bazena u rekreativnom centru ili hotelu (3).

Za laboratorijsku dijagnostiku ove bolesti koristi se detekcija antigena u uzorku urina tokom akutne faze bolesti, uzimanje respiratornog uzorka za kulturu ćelija, serološka ispitivanja i PCR dijagnostika (12-14).

## Izvori i putevi prenošenja

Legionarska bolest pripada grupi zaraznih bolesti koje se prenose indirektnim putem, tj. prilikom udisanja vazduha koji sadrži legionele u aerosolu (16). Aerosol se formira iz sitnih kapljica koje mogu da se stvaraju pomoću rasprskavanja vode ili pomoću uduvavanja vazduha u vodu ili stajanjem izlivenne vode na čvrstim površinama. Što su manje kapljice, veća je verovatnoća da će one izazvati infekciju (3).

report organ transplants, chronic diseases and immunodeficiency in their personal anamnesis (6).

### The incidence and prevalence of Legionnaires' disease in the EU/EEA and Montenegro

In 2019, 28 countries from the European region reported 11.298 cases of Legionnaires' disease, while 10.636 (94%) cases were classified as confirmed cases. The number of new cases accounted for 2.2 per 100.000 population, which is the highest incidence rate reported so far in the EU/EEA (7). During the last five years, incidence rates in the EU/EEA countries grew by nearly two times, from 1.4/100.000 in 2015 to 2.2/100.000 in 2019 (Table 1). In four European countries (France, Germany, Italy and Spain), the number of registered cases of Legionnaires' disease accounted for 71% of all notified cases in the EU/EEA, although the population of these countries makes 50% of the EU/EEA population (7).

According to the data of the Center for Disease Control and Prevention from Atlanta in the United States of America in 2018, around 10.000 cases of this disease were reported, which may be an underestimated number of cases due to the insufficient diagnostics of Legionnaires' disease (8). A recent study estimated that the real number of cases of Legionnaires' disease might be 1.8-2.7 times higher than the notified number (8).

According to the data obtained from the infectious diseases register of the Institute of Public Health of Montenegro, there were 4 new cases of Legionnaires' disease that were registered from 1st January 2011 to 31st December 2020, that is, two cases in 2013 (incidence rate 0.32/100.000) and two cases in 2019 (incidence rate 0.32/100.000) (9,10). All affected people were men, aged 30 to 60 years. The affected people did not travel and they were not epidemiologically connected.

### Clinical characteristics of Legionnaires' disease and diagnosis

Legionnaires' disease is clinically manifested as pneumonia, while case-fatality rate ranges from 10-15% (3). This severe systemic bacterial infection, which is caused by gram-negative bacteria, is often manifested as atypical pneumonia with subacute temperature, cough and short breath (11).

It is not clinically possible to make difference between patients with Legionnaires' disease and patients with other types of pneumonia caused by other agents. However, alveolar infiltrates are more often present on chest X-rays in case of Legionnaires' disease in comparison to pneumonias caused by other agents. Clinical symptoms that describe Legionnaires' disease are the following: fever, non-productive cough, headache, muscle pains, arthralgia, difficulty in breathing, diarrhea, mental confusion and delirium (12). Approximately 25-50% of people infected with *Legionella* may experience diarrhea, while signs of mental confusion may appear in 50% of people (6).

The incubation period usually ranges from 2 to 10 days, and rarely up to 16-20 days after exposure. If not treated, the symptoms normally worsen rapidly and may result in respiratory failure, shock, multi-organ failure and death (3).

Pontiac fever is a mild form of disease, which is caused by *Legionella* bacteria, and which is similar to influenza. The incubation period is shorter, most frequently 12 to 48 hours and it presents an influenza-like illness lasting a few days. The attack rate is much higher than for Legionnaires' disease (up to 95% of those who are exposed). Cases are mainly detected when outbreaks of Pontiac fever occur, for example when exposure is linked to the use of communal spa pool in a leisure center or hotel (3).

The following laboratory procedures are used to obtain diagnosis: the detection of antigen in a urine specimen during the acute phase of the illness, obtaining a respiratory specimen for culture of cells, serological tests and PCR diagnostics (12-14).

### Sources and routes of transmission

Legionnaires' disease belongs to the group of contagious diseases which are transmitted indirectly, by breathing in air that contains *Legionella* bacteria in an aerosol (16). An aerosol is formed from tiny droplets that can be generated by spraying the water or by bubbling air into it, or by water impacting on solid surfaces. The smaller the droplets, the more likely they are to cause infection (3).

The most common sources of Legionnaires' disease are the following: hot and cold water systems, cooling towers and evaporative

**Tabela 1.** Distribucija prijavljenih novoobolelih slučajeva legionarske bolesti i stope incidencije na 100.000 stanovnika za zemlje EU/EEA za period 2015-2019. godine (Izvor: Godišnji izveštaj o kretanju LB u Evropi objavljen od strane ECDC; link: <https://www.ecdc.europa.eu/sites/default/files/documents/AER-legionnaires-2019.pdf>)

Zemlja	2015		2016		2017		2018		2019		uzrasno standard-izovana stopa
	broj obolelih	stopa inci-dencije	broj obolelih	stopa inci-dencije	broj obolelih	stopa inci-dencije	broj obolelih	stopa inci-dencije	broj obolelih	stopa inci-dencije	
Austrija	160	1,9	161	1,9	219	2,5	237	2,7	255	2,9	2,6
Belgija	118	1,1	157	1,4	235	2,1	270	2,4	224	2	1,8
Bugarska	1	0,0	0	0,0	2	0,0	11	0,2	5	0,1	0,1
Češka	120	1,1	147	1,4	217	2,1	231	2,2	277	2,6	2,3
Danska	185	3,3	170	3,0	278	4,8	264	4,6	270	4,7	4,2
Estonija	6	0,5	14	1,1	16	1,2	18	1,4	12	0,9	0,8
Finska	17	0,3	15	0,3	27	0,5	24	0,4	44	0,8	0,7
Francuska	1389	2,1	1218	1,8	1630	2,4	2133	3,2	1816	2,7	2,7
Grčka	29	0,3	31	0,3	43	0,4	65	0,6	45	0,4	0,4
Hrvatska	48	1,1	31	0,7	33	0,8	43	1,0	-	-	-
Holandija	419	2,5	454	2,7	561	3,3	584	3,4	566	3,3	3,0
Irska	11	0,2	10	0,2	25	0,5	25	0,5	21	0,4	0,5
Island	1	0,3	3	0,9	3	0,9	5	1,4	-	-	-
Italija	1572	2,6	1733	2,9	2037	3,4	3018	5,0	3143	5,2	4,2
Kipar	2	0,2	3	0,4	1	0,1	5	0,6	4	0,5	0,5
Latvija	22	1,1	24	1,2	31	1,6	37	1,9	42	2,2	2,1
Lihtenštajn	-	-	-	-	-	-	-	-	-	-	-
Litvanija	7	0,2	11	0,4	14	0,5	21	0,7	17	0,6	0,6
Luksemburg	5	0,9	3	0,5	9	1,5	10	1,7	14	2,3	2,3
Mađarska	58	0,6	66	0,7	62	0,6	74	0,8	113	1,2	1,1
Malta	6	1,4	8	1,8	11	2,4	13	2,7	5	1	0,8
Norveška	60	1,2	43	0,8	52	1,0	69	1,3	65	1,2	1,2
Njemačka	842	1	974	1,2	1278	1,5	1446	1,7	1545	1,9	1,6
Poljska	23	0,1	24	0,1	38	0,1	70	0,2	74	0,2	0,2
Portugal	145	1,4	197	1,9	232	2,3	211	2,1	201	2,0	1,7
Rumunija	3	0,0	2	0,0	19	0,1	62	0,3	19	0,1	0,1
Slovačka	14	0,3	14	0,3	14	0,3	54	1,0	85	1,6	1,6
Slovenija	106	5,1	93	4,5	117	5,7	160	7,7	195	9,4	8,3
Španija	1024	2,2	951	2,0	1363	2,9	1513	3,2	1542	3,3	2,9
Švedska	142	1,5	145	1,5	189	1,9	198	2,0	182	1,8	1,6
Ujedinjeno Kraljevstvo	412	0,6	383	0,6	504	0,8	532	0,8	517	0,8	0,7
EU/EEA	6947	1,4	7085	1,4	9260	1,8	11403	2,2	11298	2,2	1,9

Izvor: Izveštaji zemalja; . nema dostavljenih podataka; - nije izračunata stopa incidencije

**Table 1.** Distribution of reported cases of Legionnaires' disease and incidence rates per 100.000 population for the EU/EEA states for the period 2015-2019 (Source: Annual report on LD in Europe published by ECDC; link: <https://www.ecdc.europa.eu/sites/default/files/documents/AER-legionnaires-2019.pdf>)

Country	2015		2016		2017		2018		2019		Age-standardized rate
	Number of cases	Incidence rate	Number of cases	Incidence rate	Number of cases	Incidence rate	Number of cases	Incidence rate	Number of cases	Incidence rate	
Austria	160	1.9	161	1.9	219	2.5	237	2.7	255	2.9	2.6
Belgium	118	1.1	157	1.4	235	2.1	270	2.4	224	2	1.8
Bulgaria	1	0.0	0	0.0	2	0.0	11	0.2	5	0.1	0.1
Czechia	120	1.1	147	1.4	217	2.1	231	2.2	277	2.6	2.3
Denmark	185	3.3	170	3.0	278	4.8	264	4.6	270	4.7	4.2
Estonia	6	0.5	14	1.1	16	1.2	18	1.4	12	0.9	0.8
Finland	17	0.3	15	0.3	27	0.5	24	0.4	44	0.8	0.7
France	1389	2.1	1218	1.8	1630	2.4	2133	3.2	1816	2.7	2.7
Greece	29	0.3	31	0.3	43	0.4	65	0.6	45	0.4	0.4
Croatia	48	1.1	31	0.7	33	0.8	43	1.0	-	-	-
Netherlands	419	2.5	454	2.7	561	3.3	584	3.4	566	3.3	3.0
Ireland	11	0.2	10	0.2	25	0.5	25	0.5	21	0.4	0.5
Island	1	0.3	3	0.9	3	0.9	5	1.4	-	-	-
Italy	1572	2.6	1733	2.9	2037	3.4	3018	5.0	3143	5.2	4.2
Cyprus	2	0.2	3	0.4	1	0.1	5	0.6	4	0.5	0.5
Latvia	22	1.1	24	1.2	31	1.6	37	1.9	42	2.2	2.1
Liechtenstein	-	-	-	-	-	-	-	-	-	-	-
Lithuania	7	0.2	11	0.4	14	0.5	21	0.7	17	0.6	0.6
Luxembourg	5	0.9	3	0.5	9	1.5	10	1.7	14	2.3	2.3
Hungary	58	0.6	66	0.7	62	0.6	74	0.8	113	1.2	1.1
Malta	6	1.4	8	1.8	11	2.4	13	2.7	5	1	0.8
Norway	60	1.2	43	0.8	52	1.0	69	1.3	65	1.2	1.2
Germany	842	1	974	1.2	1278	1.5	1446	1.7	1545	1.9	1.6
Poland	23	0.1	24	0.1	38	0.1	70	0.2	74	0.2	0.2
Portugal	145	1.4	197	1.9	232	2.3	211	2.1	201	2.0	1.7
Romania	3	0.0	2	0.0	19	0.1	62	0.3	19	0.1	0.1
Slovakia	14	0.3	14	0.3	14	0.3	54	1.0	85	1.6	1.6
Slovenia	106	5.1	93	4.5	117	5.7	160	7.7	195	9.4	8.3
Spain	1024	2.2	951	2.0	1363	2.9	1513	3.2	1542	3.3	2.9
Sweden	142	1.5	145	1.5	189	1.9	198	2.0	182	1.8	1.6
United Kingdom	412	0.6	383	0.6	504	0.8	532	0.8	517	0.8	0.7
EU/EEA	6947	1.4	7085	1.4	9260	1.8	11403	2.2	11298	2.2	1.9

Source: Country Reports; . no data provided; - incidence rate not calculated

Najčešći izvori legionarske bolesti su hladni i topli vodeni sistemi, rashladni tornjevi i kondenzatori za isparavanje, banjski bazeni/prirodni bazeni/termalni izvori, fontane/prskalice, ovlaživači vitrine za hranu, oprema za respiratornu terapiju, baštenska zemlja/kompost, uređaji za pranje, mašinski alati za vodeno hlađenje itd. (15).

## Javnozdravstveni nadzor nad zaraznim bolestima u Crnoj Gori

Zakonskim aktima u Crnoj Gori definisane su bolesti koje se obavezno prijavljuju, način njihovog prijavljivanja, javnozdravstveni nadzor i mere sprečavanja i suzbijanja zaraznih bolesti (16). Međunarodne obaveze u vezi sa sprečavanjem, suzbijanjem, odstranjivanjem i iskorenjivanjem zaraznih bolesti utvrđenih Listom zaraznih bolesti, kao i ozbiljne prekogranične pretnje zdravlju, izvršavaju se u skladu sa međunarodnim zdravstvenim propisima, programima Svetske zdravstvene organizacije (SZO) i drugim međunarodnim aktima (17-19).

U Crnoj Gori, u nadzoru nad zaraznim bolestima učestvuje Institut za javno zdravlje kao krovna institucija i 11 lokalnih epidemioloških službi koje pokrivaju teritorije za koje su zadužene. Sve primorske opštine imaju razvijene epidemiološke službe, kako bi pravovremeno i potpuno odgovorile na javnozdravstvene rizike zbog velikog priliva turista tokom letnje turističke sezone. U ostalim delovima zemlje pojedine epidemiološke službe pokrivaju više opština.

Prema zakonskoj regulativi legioneloza (prema MKB 10 šifra je A48.1.) se obavezno prijavljuje Institutu za javno zdravlje Crne Gore, u kome se nalazi registar za zarazne bolesti (17,18). Svi domovi zdravlja i opšte bolnice, elektronski prijavljuju zarazne bolesti, dok se iz Kliničkog Centra Crne Gore, specijalnih bolnica i privatnih zdravstvenih ustanova, prijavljivanje zaraznih bolesti vrši u papirnoj formi, tj. preko zakonom definisanih prijavnih kartica za zarazne bolesti, koje se naknadno ukucavaju u bazu podataka za zarazne bolesti.

## Evropska mreža za nadzor nad legionarskom bolešću

Međunarodna saradnja po pitanju praćenja obolevanja od legionarske bolesti koja je povezana sa putovanjima na Evropskom nivou je počela 1986. godine, kada je formirana Evropska radna grupa za infekcije izazvane legionelom (engl. *Eu-*

*ropean Working Group for Legionella Infections - EWGLI*), dok je nadzor nad legionarskom bolešću koja je povezana sa putovanjima počeo da se sprovodi od 1987. godine. Od aprila 2010. godine za rad mreže je odgovoran ECDC i njeno prvobitno ime je promenjeno u Evropsku mrežu za nadzor legionarske bolesti (engl. *European Legionnaires' disease Surveillance Network - ELDSNet*). Mreža pokriva sve države članice EU/EEA, kao i zemlje koje su na putu pristupa EU, a koordiniše ga ECDC (20).

Glavni cilj postojanja ELDSNet-a jeste detekcija, suzbijanje i prevencija slučajeva obolevanja, formiranja klastera i izvora epidemija legionarske bolesti povezane sa putovanjima, a koje su prijavljene u područjima EU/EEA, kao i pružanje pomoći pri otkrivanju i odgovoru na epidemije izvan EU/EEA. Operativne procedure obezbeđuju set zajedničkih mera koje treba da budu praćene od strane svih EU/EEA zemalja koje su uključene u zaštitu svojih građana od legionarske bolesti. Cilj ovih procedura je napraviti standardizovan pristup registrovanju slučajeva koji su prijavljeni od strane zemalja članica EU i drugih zemalja koje su uključene u sistem nadzora, kako bi se detektovali klasteri i kako bi se odgovorilo na pojavu klastera obolevanja od legionarske bolesti udružene sa putovanjima (engl. *Travel-associated Legionnaires' disease - TALD*) (3). Klasteri predstavljaju registrovanje više slučajeva obolelih od neke bolesti koji se mogu povezati sa istom vremenskom ili prostornom izloženošću određenom agensu. Članovi ELDSNet-a su zvanično imenovani od strane nacionalnih vlasti za javno zdravlje i deluju kao nacionalna kontakt osoba za nadzor nad legionarskom bolešću, i to jedna nacionalna kontakt osoba za epidemiološki nadzor i jedna nacionalna kontakt osoba za mikrobiološki nadzor. Oni poseduju naučna znanja u pogledu legionarske bolesti i odgovorni su za epidemiološki i mikrobiološki nadzor nad ovom bolešću u svojoj zemlji. Od 2014. godine Crna Gora ima imenovane kontakt osobe za epidemiološki i mikrobiološki nadzor.

U aktivnosti ELDSNet nadzora i odgovora uključeno je 50 zemalja sveta. Preostale zemlje obaveštavaju se putem saradnje sa SZO preko kontakt osobe za Međunarodni zdravstveni pravilnik (engl. *International Health Regulation – IHR*) (20).

Ciljevi mreže nadzora nad legionarskom bolešću u evropskom regionu podrazumevaju brzo otkrivanje slučajeva i klastera legionarske bolesti udružene sa putovanjima, koji su prijavljeni u zem-

condensers, spa pools/natural pools/thermal springs, fountains/sprinklers, humidifiers for food display cabinets, equipment for respiratory therapy, potting soil/compost, vehicle washes, water-cooled machine tools etc. (15).

### Public health surveillance of infectious diseases in Montenegro

Laws and regulations in Montenegro define diseases that are mandatory to be reported, ways of reporting, epidemiological surveillance and measures of control and prevention of infectious diseases (16). International obligations relating to preventing, controlling, eliminating and eradicating infectious diseases, as well as to cross-border threats to health, are carried out according to the International Health Regulations, programs of the World Health Organization and other international legal acts (17-19).

In Montenegro, the surveillance of infectious diseases is conducted by the Institute of Public Health as the main institution, as well as by 11 local epidemiological services which are in charge of some territories. All coastal municipalities have developed epidemiological services that enable timely and complete response to public health risks due to a large number of tourists during the tourist season. In other parts of the country, some epidemiological services cover several municipalities.

According to health regulations, Legionellosis (according to the ICD-10, disease code is A48.1) must be reported to the Institute of Public Health of Montenegro, which coordinates the infectious diseases register (17,18). All health care centers and general hospitals report infectious diseases electronically, while the Clinical Center of Montenegro, special hospitals and private health care institutions report infectious diseases with the help of paper report cards for infectious diseases, which are regulated by the law, and which are later entered into the data base for infectious diseases.

### The European Network for the surveillance of Legionnaires' disease

The international collaboration across Europe with regards to travel-associated Legionnaires' disease started in 1986, when the European Working Group for Legionella Infections (EWGLI) was set up, while they started to carry out the

surveillance of travel-associated Legionnaires' disease in 1987. Since April 2010, the Network has been coordinated by ECDC and its name changed to the European Legionnaires' disease Surveillance Network – ELDSNet. The Network includes all member states of the EU/EEA, as well as countries who have applied to join the EU, while it is coordinated by ECDC (20).

The main objective of ELDSNet is to detect, control and prevent new cases, clusters and sources of outbreaks of travel-associated Legionnaires' disease that were reported in the EU/EEA area, as well as to assist with the detection and response to outbreaks outside the EU/EEA. Operating procedures provide a set of common measures which should be followed by all member states of the EU/EEA that are involved in the protection of all residents against Legionnaires' disease. The aim of these procedures is to create a standardized approach to registering cases that were reported by the EU member states and other countries that are involved in the surveillance system, in order to detect clusters and to respond to the occurrence of clusters of travel-associated Legionnaires' disease (3). Clusters present several registered cases of disease which can be associated with the same temporal or spatial exposure to some agent. Members of the ELDSNet were officially nominated by the national authorities for public health and they are national points for the surveillance of Legionnaires' disease, that is, one national contact person for the epidemiological surveillance and one national contact person for the microbiological surveillance. They have scientific knowledge about Legionnaires' disease and they are responsible for the epidemiological and microbiological surveillance of this disease in their country. Since 2014, Montenegro has nominated contact persons for the epidemiological and microbiological surveillance.

Fifty member countries are included in the activities of ELDSNet surveillance and response. Other countries are informed through collaboration with the WHO and contact points for the International Health Regulation (IHR) (20).

The objectives of the European surveillance network are to detect rapidly cases and clusters of travel-associated Legionnaires' disease reported in the EU and EEA area and affecting European residents, as well as to disseminate information on these cases and respond in a coordinated



ljama EU/EEA, a koji utiču na zdravlje evropskog stanovništva, kao i distribuciju informacija o slučajevima ove bolesti i koordinisan odgovor država. Preventivnim standardizovanim aktivnostima vrši se i povećanje svesti o legionarskoj bolesti koja je najčešće povezana sa putovanjima, kao i smanjenje učestalosti ove bolesti, kroz podršku i podizanje svesti o aktivnom suzbijanju i prevenciji u smeštajnim objektima.

### Pregled metoda nadzora

Po definiciji javnozdravstveni nadzor predstavlja stalno, sistematsko prikupljanje, analizu i tumačenje podataka o zdravlju, bitnih za planiranje, primenu i evaluaciju prakse javnog zdravlja, kao i pravovremeno slanje podataka svima koji treba da ih znaju (22). Nadzor nad legionarskom bolešću povezanom sa putovanjima u Crnoj Gori se sprovodi od 2010. godine i u nadzoru nad ovom bolešću primjenjuju se definicije legionarske bolesti povezane sa putovanjima prema preporukama ECDC (20).

Prema navedenim definicijama pojedinačni slučaj legionarske bolesti povezan sa putovanjem je slučaj koji je boravio ili posetio komercijalni smeštajni objekat 2 do 10 dana pre pojave bolesti, pri čemu se smeštajni objekat u posljednje dve godine ne dovodi u vezu sa pojavom legionarske bolesti. Klaster legionarske bolesti povezan sa putovanjem predstavlja dva ili više slučajeva bolesti koji su odseli ili posetili isti komercijalni smeštajni objekat 2 do 10 dana pre pojave bolesti, pri čemu je do obolevanja došlo u istom dvogodišnjem periodu. Klaster može biti okarakterisan kao brzo progredirajući, što podrazumeva pojavu tri ili više slučajeva obolevanja sa početkom bolesti u periodu od tri meseca, tokom šest meseci nakon otkrivanja klastera. Kompleksni klaster opisuje kombinaciju klusterskih lokaliteta sa jednim ili više zajedničkih slučajeva. Klaster može biti i aktivni klaster, u kojem se registruje bar jedan novi slučaj bolesti u dvogodišnjem periodu od pojave poslednjeg slučaja i može biti završen klaster, kada se ne registruju novi slučajevi obolevanja povezani sa smeštajnim objektom tokom dvogodišnjeg perioda od početka bolesti poslednjeg slučaja. Ukoliko se nakon isteka perioda od dve godine registruje slučaj obolevanja povezan sa istim smeštajnim objektom, prijaviće se kao novi pojedinačni slučaj.

### Prijava slučajeva legionarske bolesti povezane sa putovanjima

Na nivou jedne zemlje, kliničari i mikrobiolozi prijavljuju pojedinačne slučajeve legioneloze povezane sa putovanjima u svoju nacionalnu mrežu nadzora nad legionarskom bolešću. Nacionalna kontakt tačka (odgovorna osoba za nadzor) preko ELDSNet-a slučajevima ECDC koristeći definiciju slučaja prema EU. Sa kompletnim i brzim izveštavanjem, ELDSNet može otkriti klastere slučajeva koji imaju zajedničku istoriju putovanja i smeštaja. Razmena informacija dovodi do konkretnih i pravovremenih akcija članica ELDSNet-a, kako bi se zaštitili stanovnici EU/EEA koji putuju u i van Evrope. Slučajevi se obično prijavljuju ECDC-u od strane člana ELDSNet preko IT platforme. Informacije moraju da sadrže istoriju putovanja, datum boravka i svaku adresu smeštaja gde je putnik boravio. Poželjno je upisati i dodatne informacije kao što su telefonski broj, lokacija i internet strana smeštaja (3,20).

Treba naglasiti da pojedinačni slučajevi i klasteri povezani sa specifičnim smeštajem mogu nastati slučajno, dok izvor infekcije može biti na drugom mestu. U ELDSNet-u se podrazumeva da obaveštenje koje se odnosi na obolevanje od legionarske bolesti povezane sa putovanjima, slučaj ili klaster, ne mora nužno da implicira da je navedeni objekat pravi izvor infekcije, ali se očekuje da se preduzmu sve standardizovane procedure i aktivnosti u cilju provere da li taj smeštajni objekat može biti povezan sa obolevanjem (3,20).

Jednom kada se slučaj unese u bazu podataka ECDC-a, ECDC proverava podatke o slučaju i podatke o smeštaju. Pretraživanje se vrši u bazi podataka kako bi se identifikovali prethodno prijavljeni slučajevi povezani sa ovom smeštajnom lokacijom, utvrđuje se da li su ovi slučajevi imali početak bolesti u roku od dve godine pre ovog prijavljenog slučaja. Ako takvi slučajevi nisu identifikovani u bazi podataka, ECDC obaveštava zemlju u kojoj se nalazi smeštajno mesto za tzv. „notifikaciju jednog slučaja“. Zemlje van EU/EEA se obaveštavaju o pojedinačnim slučajevima preko kontakt tačke ELDSNet-a ili alternativno putem SZO, preko IHR i kontakt tačke za IHR za zemlju. Obaveštenje se, takođe, elektronski šalje u zemlju koja je prijavila slučaj (3,20).

Primer notifikacije jednog slučaja legionarske bolesti, koji je poslat od strane ECDC-a nacionalnoj

way. Preventive standardized activities increase awareness of travel-associated Legionnaires' disease and reduce the incidence of this disease through the support of active control and prevention in accommodation sites.

### A review of epidemiological methods

Epidemiological surveillance is defined as the ongoing systematic collection, analysis and interpretation of health data that are essential to the planning, implementation and evaluation of public health practice and timely dissemination of health data (22). Epidemiological surveillance of travel-associated Legionnaires' disease has been carried out in Montenegro since 2010 and definitions of travel-associated Legionnaires' disease according to the ECDC recommendations have been applied for this surveillance.

According to the mentioned definitions, single cases of travel-associated Legionnaires' disease are cases who in the two to ten days before the onset of illness stayed at or visited a commercial accommodation site that has not been associated with other cases of Legionnaires' disease in the two years prior to the date of onset of disease. A cluster of travel-associated Legionnaires' disease represents two or more cases who stayed at or visited the same accommodation site two to ten days before the onset of illness, and whose onset is within the same two-year period. A cluster can be classified as rapidly evolving when three or more cases appear and the onset of illness is within a three-month period occurring in the six months preceding the cluster notification. A complex cluster is described as a combination of cluster sites having one or more cases in common. A cluster can be active when at least one new case is registered within two years from the most recent case and it can be expired when no new cases associated with the accommodation site are reported within two years of the most recent case disease onset. If a new case associated with the same accommodation site is reported after two years, it will be reported as a new single case.

### Reporting cases of travel-associated Legionnaires' disease

At the national level, clinicians and microbiologists report single cases of travel-associated Legionellosis to their national networks

of surveillance of Legionnaires' disease. These cases are reported to ECDC through ELDSNet by the national contact point (person responsible for the surveillance), using the case definition of the EU. Complete and timely reporting enables ECDC to detect clusters of cases that have common history related to travels and accommodation. Sharing information leads to concrete and timely actions of ELDSNet member states, so that the EU/EEA residents who travel within the EU or abroad are protected. Cases are usually reported to ECDC by an ELDSNet member via an IT platform. The information must contain the travel history, dates of stay and each accommodation site's address. Some additional information such as the telephone number, location and the accommodation's web page should be provided (3,20).

It should be emphasized that single cases and clusters associated with the specific accommodation site can occur accidentally, while the source of infection can be somewhere else. In ELDSNet, the notification of a single case or cluster of travel-associated Legionnaires' disease does not imply that the accommodation site is the real source of infection, but it is expected that all standardized procedures and activities should be carried out in order to check whether that accommodation site may be associated with the infection (3,20).

Once a case is entered into the ECDC database, ECDC checks the data about the case and the accommodation. A search is performed in the database in order to identify previously reported cases associated with this accommodation site and to determine if these cases had the onset of illness within the two years prior to this reported case. If such cases were not identified in the database, ECDC notifies the country where the accommodation site is located of a "single-case notification". Countries outside the EU/EEA are issued a single-case notification through the ELDSNet contact point or alternatively through WHO, through IHR or contact points of IHR for the country. The notification is also electronically sent to the country that reported the case (3,20).

One example of notification of one case of Legionnaires' disease, which was sent by ECDC to the national contact person for the epidemiological surveillance in Montenegro, is presented in picture 1. When the ELDSNet sends notification that a tourist, who reported to have stayed in

kontakt osobi za epidemiološki nadzor u Crnoj Gori prikazan je na slici 1. Kada se dobije obaveštenje od ELDSNet-a, o obolevanju turista od legionarske bolesti, a koji je naveo da je boravio u Crnoj Gori, nacionalna kontakt osoba za epidemiološki nadzor u Crnoj Gori, obaveštava nadležnu higijensko-epidemiološku službu (HES), čiji predstavnici, epidemiolog i tehničar, zajedno sa sanitarnom inspekcijom obavljaju epidemiološko istraživanje (obilaze smeštajnu jedinicu, prikupljaju podatke, uzorke, predlažu preventivne i korektivne mere, itd). Nakon epidemiološkog istraživanja nadležni epidemiolog u pisanoj formi izveštava nacionalnu kontakt osobu o zatečenom stanju u smeštajnom objektu, a ona je u obavezi da, na propisanom obrascu (A i B), o istom povratno izvesti ELDSNet mrežu ECDC-a. Pojava grupisanja obolelih (klastera) zahteva neodložno reagovanje i ECDC-a i javnozdravstvenih ustanova u zemlji gde se nalazi smeštajni objekat povezan sa obolevanjem, tj. neodložno reagovanje Instituta za javno zdravlje, higijensko-epidemioloških službi i Sanitarne inspekcije u Crnoj Gori.

U ELDSNet mreži se formira identifikacioni kôd klastera i izdaje se obaveštenje sa datumima putovanja i datumima pojave bolesti za svaki pojedinačni slučaj u okviru klastera. Svi članovi ELDSNet mreže bivaju odmah informisani o pojavi klastera. Takođe, ukoliko je u prethodnih pet godina registrovana pojava pojedinačnih slučajeva ili klastera obolevanja od legionarske bolesti koji su povezani sa istim smeštajnim objektom, članovi ELDSNet-a se i o tome obaveštavaju. Primer obaveštenja nacionalne kontakt tačke za epidemiološki nadzor nad legionarskom bolešću u Crnoj Gori, od strane ELDSNet mreže za klaster obolevanja od legionarske bolesti koja je povezana sa putovanjem prikazan je na slici 2.

Nakon obaveštavanja o pojavi klastera, član ELDSNet mreže u državi u kojoj se nalazi smeštajni objekat koji može biti povezan sa obolevanjem, dalje preuzima komunikaciju sa relevantnim javnozdravstvenim autoritetima u svojoj državi, koja rezultira započinjanjem ispitivanja i sprovođenjem mera suzbijanja.

Kontakt osoba za nadzor u Crnoj Gori obaveštava nadležnu HES. Vršiti se obilazak smeštajnog objekta od strane nadležne HES i zdravstveno-sanitarne inspekcije. Istraživanje i procena rizika se vrši u skladu sa nacionalnim i evropskim vodičima. Istraživanje uključuje i uzorkovanje iz sredine, npr.

prikupljanje uzoraka vode iz vodovodnog sistema. U istraživanju se implementiraju mere suzbijanja i daju preporuke za smanjenje rizika od pojave obolevanja od legionarske bolesti u narednom periodu.

U periodu od 2014. do 2019. godine, na osnovu baze podataka nacionalne kontakt osobe u Crnoj Gori, svake godine u letnjem periodu su higijensko-epidemiološke službe u Crnoj Gori vršile od 1 do 5 istraživanja na osnovu notifikacija dobijenih od ECDC-a, bilo za pojedinačan slučaj ili za klaster obolevanja kod turista koji su naveli putovanje u Crnu Goru. Rezultati procene rizika i preduzete mere se prijavljuju ECDC na standardizovanim obrascima. Država član ELDSNet-a može kontaktirati ECDC i zahtevati savet ili tehničku ekspertizu sa ciljem podrške u istraživanju.

Kontakt tačka za epidemiološki nadzor u državi obaveštava ECDC popunjavanjem i slanjem formulara A u roku od dve nedelje od registrovanja klastera; opisuje se terensko epidemiološko istraživanje i procena rizika, opisuju se mere suzbijanja koje su preduzete, a i daju se informacije o tome da li je smeštajni objekat povezan sa obolevanjem otvoren za boravak. ECDC ažurira tabelu na svojoj ELDSNet internet platformi sa ograničenim pristupom, i na taj način se informišu i ostali članovi ELDSNet mreže.

Ukoliko ECDC u roku od dve nedelje od pojave klastera ne primi formular A ili je u izveštaju navedeno da nikakve mere suzbijanja nisu preduzete, ECDC kontaktira člana ELDSNet mreže u državi u kojoj se smeštajni objekat povezan sa obolevanjem nalazi. Zajedno sa njim ELDSNet, na osnovu formulara i statusa ispitivanja, donosi odluku da li će u sledećih 48h naziv smeštajnog objekta koji je povezan sa pojavom klastera, biti naveden u listi objekata na sajtu ECDC-a, kao objekat u kom postoji povećan rizik za pojavu legionarske bolesti. Ukoliko se naziv smeštajnog objekta ne objavi online, razlog zbog kojeg to nije urađeno (npr. zato što je zatvoren) mora biti obrazložen članovima mreže ELDSNet (3,20).

Članu ELDSNet države u kojoj se nalazi smeštajni objekat povezan sa obolevanjem se prosleđuje podsetnik 2-3 dana nakon isteka roka od dve nedelje ukoliko formular A nije primljen.

Konačne informacije o sprovedenim merama suzbijanja i laboratorijskim rezultatima uzoraka vode šalju se ECDC-u u roku od šest nedelja nakon otkrivanja klastera. Izveštavanje se vrši na formu-

Montenegro, got Legionnaires' disease, the national contact person for the epidemiological surveillance in Montenegro notifies the sanitary-epidemiological service, whose representatives, an epidemiologist and a technician, together with sanitary inspection, conduct epidemiological investigation (they go to that accommodation unit, collect data, samples, suggest preventive and corrective measures, etc.). After epidemiological investigation, public health authority notifies the national contact person in the written form about the notified accommodation site, and this person should necessarily respond to ELDSNet of ECDC using forms A and B. Identification of a cluster warrants an immediate action by ECDC and the public health authorities in the country where the associated accommodation site is located, that is, the immediate action of Public Health Institute, sanitary-epidemiological services and sanitary inspection in Montenegro.

In ELDS network, a cluster identification code is created and a notification is issued with travel dates and dates of disease onset for all cases within the cluster. All ELDSNet members are immediately informed about the cluster. Also, ELDSNet members are informed of any single cases or clusters associated with the same accommodation site in the last five years. One example of notification, when the national contact point for the epidemiological surveillance of Legionnaires' disease in Montenegro was notified by ELDSNet for the cluster of travel-associated Legionnaires' disease, is presented in picture 2.

After the notification of a cluster, the ELDSNet member for the country where the accommodation site, which may be associated with the infection, is located initiates communication with the relevant public health authorities from their country, which results in starting investigations and implementing control measures.

The contact person for the surveillance in Montenegro notifies the authorized sanitary-epidemiological service. The accommodation site is inspected by the authorized sanitary-epidemiological service and sanitary inspection. Investigations and risk assessment are carried out according to the national and European guidelines. Investigations include environmental sampling, e.g. sampling of the building's water systems. In the investigations, authorities implement control measures and draw up recommendations in order

to reduce risks of Legionnaires' disease in the following period.

From 2014-2019, according to the database, contact points in Montenegro during the summer period were sanitary-epidemiological services in Montenegro and they conducted 1 to 5 investigations according to notifications sent by ECDC for single cases or clusters in tourists, who reported to have stayed in Montenegro. The results of risk assessment and taken measures are reported to ECDC in a standardized form. ELDSNet member state may contact ECDC and request advice or technical expertise in support of site investigations.

A contact point for the epidemiological surveillance in a country notifies ECDC by completing and sending Form A within two weeks of the cluster registration; field epidemiological investigations and risk assessment are described, taken control measures are described, and information whether the accommodation site remains open is provided. ECDC updates the table on the restricted ELDSNet platform, and other ELDSNet members are informed in that way.

If ECDC does not receive Form A within two weeks from the cluster notification or the form reports that no preventive control measures were taken, ECDC contacts the ELDSNet member of the accommodation site country. Together with the ELDSNet member it is agreed, based on the form and the status of the investigations, whether the accommodation site name will be listed on the accommodation site list of the ECDC website within the next 48 hours as the accommodation site which is at the increased risk of Legionella infection. If the accommodation site's name is not published online, the reasons for not doing that should be communicated to the ELDSNet network (3,20).

ELDSNet members from the country, where the accommodation site related to infection is located, will be sent a reminder 2-3 days in advance of the due date if Form A was not received. Final information about taken control measures and laboratory results of water samples should be sent to ECDC within six weeks after the cluster notification. Reporting is done with the help of Form B. ECDC informs other members of the ELDS network when Form B is received.

If a completed Form B is not received within the specified time period or if control measures



**European Legionnaires' Disease Surveillance Network (ELDSNet)**

European Centre for Disease Prevention and Control (ECDC)  
Gustav III:s Boulevard 40  
16973 Solna, Sweden  
Telephone: +46 (0)8 5860 1000  
Email: eldsnet@ecdc.europa.eu

Date: 13/08/2018  
To: ELDSNet Montenegro - (ME)  
CC: ELDSNet Poland - (PL)

**CONFIDENTIAL**

**Notification of a Single Case of Legionnaires' Disease**

ELDSNet has been informed of a confirmed case (PLLegio182200035) of Legionnaires' disease in a 52 year old male resident of Poland, whose illness may be associated with travel to: [redacted] Ulcinj, Ulcinj, Montenegro.

The reported date of onset was 25/07/2018 and the patient's outcome is unknown. Legionella infection was diagnosed by urinary antigen test.

She/he reported a history of travel to:

Accommodation/ Place of Stay	Town/ Region	Dates of Stay
[redacted]	Ulcinj/ Ulcinj	21/07/2018 - 31/07/2018

We are not aware of any cases in the past two years at the above named accommodation.

Site address: [redacted] Ulcinj.

More information may be available from the reporter:

[redacted]  
Narodowy Instytut Zdrowia Publicznego -  
Państwowy Zakład Higieny  
Poland

This notification does not imply that the accommodation named is the source of the infection.

[redacted]  
Acting Head of Unit  
Surveillance and Response Support  
ECDC

**Slika 1.** Primer notifikacije pojedinačnog slučaja legionarske bolesti poslate od strane ELDSNet mreže ECDC-a kontakt osobi za epidemiološki nadzor nad legionarskom bolešću u Crnoj Gori



**European Legionnaires' Disease Surveillance Network (ELDSNet)**

European Centre for Disease Prevention and Control (ECDC)  
SE 171 83 Stockholm, Sweden  
Telephone: +46 (0)8 5860 1000  
Fax: +46 (0)8 5860 1001  
Email: eldsnet@ecdc.europa.eu

Date: 30/06/2017  
To: ELDSNet Montenegro - (ME)

CC: ELDSNet Austria - (AT); ELDSNet Belgium - (BE); ELDSNet Bulgaria - (BG); ELDSNet Croatia - (HR); ELDSNet Cyprus - (CY); ELDSNet Czech Republic - (CZ); ELDSNet Denmark - (DK); ELDSNet Estonia - (EE); ELDSNet Finland - (FI); ELDSNet France - (FR); ELDSNet Germany - (DE); ELDSNet Greece - (GR); ELDSNet Hungary - (HU); ELDSNet Iceland - (IS); ELDSNet Ireland - (IE); ELDSNet Italy - (IT); ELDSNet Latvia - (LV); ELDSNet Liechtenstein - (LI); ELDSNet Lithuania - (LT); ELDSNet Luxembourg - (LU); ELDSNet Malta - (MT); ELDSNet Netherlands - (NL); ELDSNet Norway - (NO); ELDSNet Poland - (PL); ELDSNet Portugal - (PT); ELDSNet Romania - (RO); ELDSNet Slovakia - (SK); ELDSNet Slovenia - (SI); ELDSNet Spain - (ES); ELDSNet Sweden - (SE); ELDSNet United Kingdom - (GB); ELDSNet WHO Europe

**CONFIDENTIAL**

**Cluster Update of Travel Associated Cases of Legionnaires' Disease**

3 cases of Legionnaires' disease have been reported to ELDSNet whose illness may be associated with a visit to the: [redacted] Herceg Novi, Montenegro.

Cluster C17/19556

Case ID	Diagnostic Status	Date Of Onset	Dates Of Travel	Outcome	Reporter
NL126170 2	Probable	16/05/2017	04/05/2017- 13/05/2017	Unknown	Netherlands
NL126480 4	Probable	13/06/2017	30/05/2017- 08/06/2017	Unknown	Netherlands
SE274	Confirmed	16/06/2017	06/06/2017- 13/06/2017	Alive	Sweden

The most recently reported case is a confirmed case in a 70 year old male diagnosed by urinary antigen test.

More information may be available from the reporter:

[redacted]  
Folkhälsomyndigheten  
Sweden

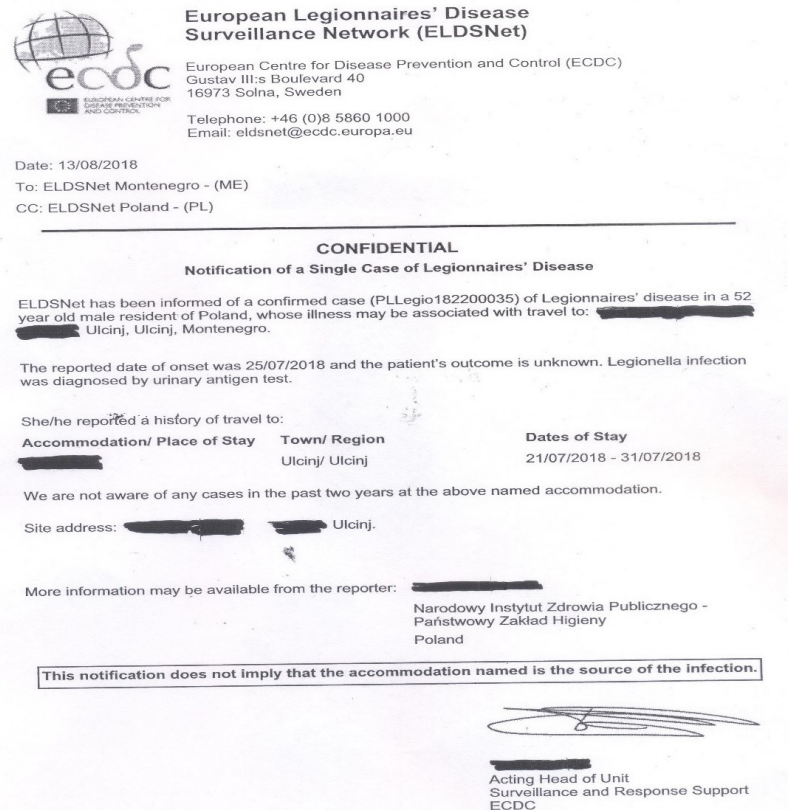
This notification does not imply that the accommodation named is the source of the infection.

Authorisation

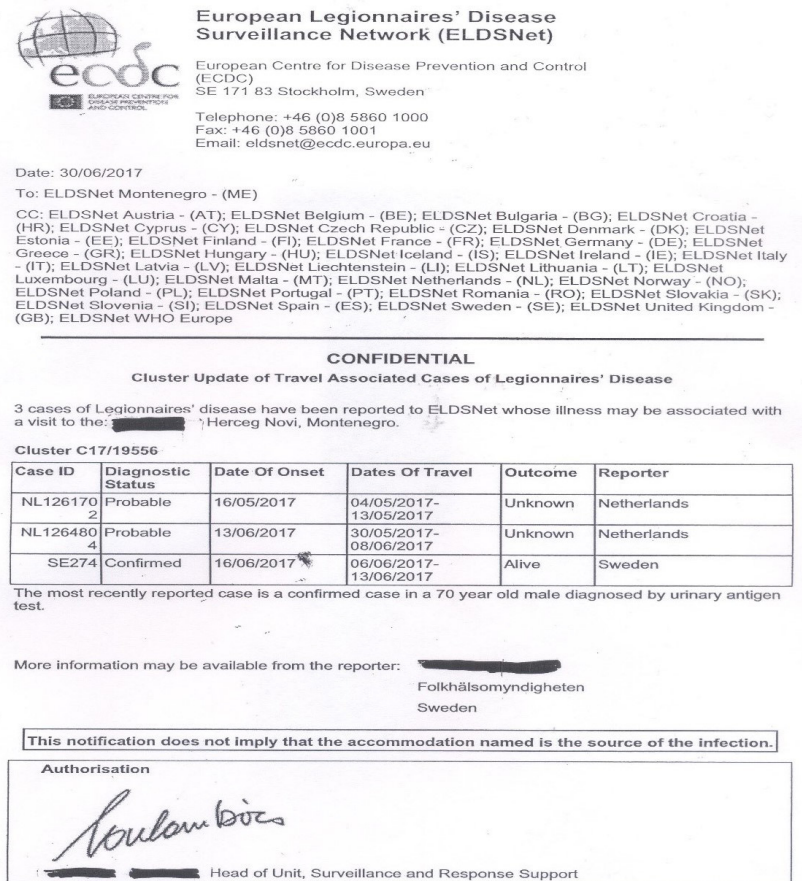
[redacted]  
[redacted]

Head of Unit, Surveillance and Response Support

**Slika 2.** Obaveštenje o klaster obolevanju putnika koji su u anamnezi naveli putovanje u Crnu Goru



**Figure 1.** An example of notification of a single case of Legionnaires' disease sent by ELDSNet network to ECDC contact point for the epidemiological surveillance of Legionnaires' disease in Montenegro



**Figure 2.** Notification of a cluster of tourists who stated that they traveled to Montenegro in their personal anamnesis

laru B. ECDC obaveštava ostale članove ELDSNet mreže nakon dobijanja formulara B.

Ukoliko popunjen formular B ne bude dostavljen u predviđenom roku od šest nedelja ili ukoliko su preduzete mere nezadovoljavajuće, ECDC kontaktira člana ELDSNet mreže u državi u kojoj se nalazi smeštajni objekat povezan sa obolevanjem i dalje se razmatra tok istraživanja. Na osnovu formulara B i tekućeg istraživanja, odlučuje se da li će naziv smeštajnog objekta biti javno objavljen na sajtu ECDC u roku od 48h. Ukoliko se naziv smeštajnog objekta ne nađe na listi smeštajnih objekata na sajtu ECDC, o tome se obavještavaju članovi ELDSNet mreže. Članu ELDSNet države u kojoj se nalazi smeštajni objekat povezan sa obolevanjem se prosleđuje podsetnik 2-3 dana nakon isteka roka od šest nedelja ukoliko formular B nije primljen.

Ukoliko je smeštajni objekat povezan sa pojavom klastera sezonski zatvara u periodu od šest nedelja od otkrivanja klastera, formular B se može popuniti u cilju obaveštenja o zatvaranju. Pre nego se smeštajni objekat opet otvori, ažuriran formular B sa rezultatima istraživanja treba da bude dostavljen ECDC-u. U listi objekata objavljenoj na sajtu ECDC navode se smeštajni objekti u kojima su trenutno identifikovani klasteri obolevanja od legionarske bolesti, a o kojima ELDSNet nema podatke o proceni rizika i sprovedenom istraživanju i za koji se smatra da u njima postoji povećan rizik za pojavu legionarske bolesti. Naziv smeštajnog objekta se objavljuje jer formulari A i B nisu prosleđeni ECDC u predviđenom vremenskom roku i rizik nije moguće proceniti, ili je formular B prosleđen, ali mere suzbijanja u smeštajnom objektu nisu sprovedene ili su nedovoljne.

Objavljivanje naziva smeštajnog objekta se obično vrši u roku od 48h od donošenja odluke o objavljivanju. Kao dodatno obaveštenje, naziv smeštajnog objekta se šalje članovima ELDSNet-a 48h pre objavljivanja na sajtu. Ime smeštajnog objekta se uklanja sa liste ukoliko se primi zadovoljavajući formular B ili se prijavi da su sprovedene adekvatne mere suzbijanja. Naziv smeštajnog objekta se uklanja sa liste ukoliko se ne identifikuju dodatni slučajevi legionarske bolesti tokom naredne dve godine od poslednjeg potvrđenog slučaja. Obaveštavanje nadležnih u smeštajnom objektu koji je povezan sa obolevanjem o tome da će naziv njihovog objekta biti objavljen na sajtu ECDC-a, se vrši od strane nacionalnih zdravstvenih autoriteta. Cilj objavljivanja naziva smeštajnog

objekta u listi na sajtu ECDC-a, je da omogući turističkim operaterima i javnosti da odluče da li da prilikom ponuda za putovanja uzmu u obzir i navedeni smeštajni objekat (3).

Pojava novih slučajeva obolevanja u klasteru, tokom dve godine od pojave poslednjeg slučaja bolesti u klasteru, zahteva ažuriranje u prijavljivanju. Za ovakve slučajeve potrebno je proslediti nove formulare A i B (iako je prethodno prosleđen adekvatan formular B). Potrebno je sprovesti i novo istraživanje. U slučaju pojave brzoprogredirajućih klastera u zemljama EU/EEA, o tome da li i kada je potrebno informisati goste smeštajnog objekta povezanog sa obolevanjem, obično odlučuju nacionalne i/ili lokalne zdravstvene službe. U ovim slučajevima potrebno je proslediti i dodatni formular (formular C). Svrha dodatnog prijavljivanja je dobijanje detaljnih informacija o tome koje su informacije dostupne gostima smeštajnog objekta povezanog sa obolevanjem. Formular C se dostavlja ECDC ELDSNet mreži u roku od jedne nedelje od kada je klaster označen kao brzoprogredirajući. Informacije o istraživanju, proceni rizika i sprovedenim merama se prijavljuju ECDC ELDSNet koordinacionom centru na isti način na koji se vrši i prijavljivanje kod standardnih klastera u državama EU/EEA (popunjavanjem formulara A i B u roku od dve, odnosno šest nedelja od pojave klastera). Turoperatori imaju odgovornost za zdravlje i bezbednost svojih klijenata. Turoperatori mogu i da nemaju informacije o mestima gde su se pojavili klasteri. ELDSNet im nudi zbirni izveštaj o određenim prijavljenim klasterima legionarske bolesti povezane sa putovanjem. Turoperatori se mogu elektronski pretplatiti na ovu uslugu i tada se rutinski obaveštavaju o klasterima koji se nalaze van zemalja EU/EEA.

Klasteri koji se brzo razvijaju unutar zemalja EU/ EEA i globalno obuhvaćeni su sumarnim izveštajem. Zbirni izveštaji se izdaju pretplaćenim turoperatorima 24 sata nakon obaveštavanja preko mreže ELDSNet-a. Ova vremenska razlika postoji da bi se nacionalnim javnozdravstvenim institucijama omogućilo da o slučajevima obaveste lokalne javnozdravstvene službe. Međutim, u slučaju brzog razvoja klastera koji se prijavljuje mreži, ažuriranje ovog zbirnog izveštaja može se izdati u roku kraćem od 24 sata. Informacije navedene u izveštajima sadrže ime i adresu smeštajnog objekta i datum putovanja za svaki prijavljeni slučaj koji je povezan sa klasterom.

are unsatisfactory, the network members of the accommodation site country will be contacted by ECDC and investigation status is further discussed. Based on Form B and the ongoing investigation, it will be decided whether the name of the accommodation site should be made public on the ECDC website within the next 48 hours. If the accommodation site's name is not included in the accommodation site list on the ECDC website, the ELDSNet network is informed. ELDSNet member state of the accommodation site associated with the infection will be sent a reminder 2-3 days in advance of the due date of six weeks if Form B is not received.

If an accommodation site that is associated with the cluster notification is closed down for the season within the next six weeks, Form B may be completed to inform of the closure. Before the accommodation site reopens, an updated Form B with investigation results should be submitted to ECDC. The list of accommodation sites on the ECDC website shows current accommodation sites where clusters of Legionnaires' disease were identified, but where ELDSNet was not informed about any assessment of the risk and conducted investigation, or where ELDSNet believes that there may be an increased risk of Legionnaires' disease. The accommodation site's name is made public because Forms A and B were not submitted to ECDC by the specified due date and therefore, the risk could not be assessed, or Form B was received but control measures were not taken at the accommodation site or they were not satisfactory.

Publication of accommodation site's name usually occurs within 48 hours once the decision to publicize is made. An additional notice of the name of the accommodation site is sent to the ELDSNet network members 48 hours before publication. The name of the accommodation site will be removed from the website if a satisfactory Form B is received or if satisfactory control measures are reported as implemented. The name of the accommodation site will also be removed if no further cases of Legionnaires' disease were associated with the site in the two years after the last confirmed case. Public health authorities inform the accommodation site that its name will be published on the ECDC website. The objective of publishing the accommodation site's name on the ECDC website is to allow members of

the public and tour operators to decide whether to consider the accommodation site in question.

The occurrence of new cases in a cluster within two years after the date of onset of the most recent case in a cluster demands a cluster notification update. For such cases, new forms A and B should be submitted (although an adequate Form B was previously submitted). Also, new investigations should be conducted. For rapidly evolving clusters in the EU/EEA, the national and/or local health authorities decide whether and when to inform guests of the accommodation site associated with the infection. An additional form (Form C) will be requested for such cases. The purpose of this additional form is to get more detailed information about what information was available to the guest of that accommodation site. Form C is submitted to ECDC ELDSNet one week after the cluster was notified as rapidly evolving. The information on site investigations, risk assessment and taken measures are reported to the ECDC ELDSNet coordinating center in the same manner as for standard clusters in the EU/EEA countries (by completing Forms A and B within two weeks, that is, six weeks after the cluster notification). Tour operators are responsible for the health and safety of their clients. Also, they may not have information on the sites where clusters appeared. ELDSNet offers summary reports on certain notified clusters of travel-associated Legionnaires' disease. Tour operators can electronically subscribe to this service and then they are routinely informed about clusters located in countries outside the EU/EEA.

Rapidly evolving clusters inside the EU/EEA are globally covered by the summary report. Summary reports are issued to subscribed tour operators 24 hours after the notification through the ELDSNet network. This time delay is to allow for national authorities to inform local public health authorities of this notification. However, in the event of a rapidly evolving cluster which is reported to the network, updates of the summary report may be issued within less than 24 hours. The information provided in the report contains the name and address of the accommodation site and the dates of travel for each reported case that is associated with the cluster.

Tour operators on the subscriber list will also be informed 48 hours in advance if the accommodation site's name and address in the EU/EEA member states is about to be published



Turoperatori na listi pretplatnika, takođe, će biti obavješteni 48 sati unapred, ukoliko će naziv i adresa smeštajnog objekta u zemljama EU/EEA biti objavljeni na internet stranici ECDC-a. Ukoliko se naziv i adresa smeštajnog objekta uklone sa internet stranice ECDC-a, turoperatori će biti obavješteni istog dana. Vrlo retko, turoperatori dobijaju obavještenja o slučajevima sumnje ili potvrde TALD-a direktno od klijenta – ugostiteljskih objekata. U takvim situacijama turoperatori posavetuju klijente koji su im dostavili informacije da se prvo obrate nadležnom lekaru i zatraže od lekara da prijavi slučaj/eve odgovarajućoj nacionalnoj javnozdravstvenoj službi. Ovo pomaže ELDSNet-u da primi relevantne informacije i identifikuje relevantne klastere. To kasnije dovodi do javnozdravstvenog istraživanja u zemlji gde se nalazi smeštajni objekat (3).

Institut za javno zdravlje Crne Gore prati preporuke javnozdravstvenih autoriteta SZO, ECDC, CDC, priprema smernice namenjene turističkom sektoru, organizuje obuke za udruženja ugostitelja u cilju jačanja svesti i adekvatnog sprovođenja preventivnih mera kako bi se rizik od obolevanja od legioneloze u ugostiteljskim objektima sveo na minimum. S obzirom da je turizam jedna od vodećih privrednih grana u Crnoj Gori, Privredna komora Crne Gore, udruženja ugostitelja i turistički radnici, shvataju značaj sprovođenja preporuka za sprečavanje i suzbijanje legionarske bolesti povezane sa putovanjima (22).

## Zaključak

Svaki slučaj obolevanja od legionarske bolesti kod turista u evropskom regionu, koji je naveo boravak u Crnoj Gori, se epidemiološki obrađuje po propisanim procedurama ELDSNet mreže. Operativne procedure obezbeđuju set zajedničkih mera koje treba da budu praćene od strane svih EU/EEA zemalja koje su uključene u zaštitu svojih građana od legionarske bolesti.

Institut za javno zdravlje Crne Gore svake godine šalje ažurirane preporuke za prevenciju obolevanja od legionarske bolesti Ministarstvu turizma i Nacionalnoj turističkoj organizaciji radi distribuiranja istih hotelijerima i ugostiteljskim radnicima, a u cilju jačanja svesti o postojanju legioneloze i neophodnosti preduzimanja svih mera za prevenciju ove bolesti.

## Konflikt interesa

Autori su izjavili da nema konflikta interesa.

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on the ECDC's website. If the accommodation is removed from the ECDC website, tour operators will be informed on the same day. Very occasionally, tour operators receive notifications of cases of suspected or confirmed TALD directly from a client – accommodation sites. In such situations, tour operators may wish to advise clients who submitted information to contact a medical doctor and request the doctor to report the case to the appropriate national public health service. This helps ELDSNet receive relevant information and identify relevant clusters. This could then lead to public health investigations in the country of accommodation site (3).

The Institute of Public Health of Montenegro follows the recommendations of the public health authorities of the WHO, ECDC and CDC and prepares guidelines intended for the tourist sector; organizes hospitality industry training sites aimed at raising awareness and adequate implementing of preventive measures in order to minimize the risk of Legionellosis in accommodation sites. Having in mind the fact that tourism is one of the leading economic sectors in Montenegro, the Chamber of Economy of Montenegro, hospitality industry associations and tourist workers realize the significance of implementation of recommendations for the prevention and control of travel-associated Legionnaires' disease.

## Conclusion

Each case of Legionnaires' disease in tourists in the European area, who reported to have stayed in Montenegro, is epidemiologically analyzed according to the regulated procedures of ELDSNet network. Operating procedures provide a set of common measures that should be followed by all EU/EEA member states that are involved in the protection of their residents against Legionnaires' disease.

Every year the Institute of Public Health of Montenegro sends the updated recommendations for the prevention of Legionnaires' disease to the Ministry of Tourism and the National Tourist Organization, so that they could be further distributed to hospitality industry workers, with the aim of raising awareness of Legionellosis and the necessity of taking all measures for the prevention of this disease.

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Received:11/28/2022    Revised: 03/15/2022    Accepted: 03/27/2022