

Rijeka and Its Surroundings in 1918-1919: The Public Impact and the Image of the Epidemic

Muzur, Amir; Buterin, Toni; Eterović, Igor; Doričić, Robert

Source / Izvornik: **History in Flux : Journal of the Department of History, Faculty of Humanities, Juraj Dobrila University of Pula, 2019, 1., 123 - 133**

Journal article, Published version

Rad u časopisu, Objavljena verzija rada (izdavačev PDF)

<https://doi.org/10.32728/flux.2019.1.6>

Permanent link / Trajna poveznica: <https://urn.nsk.hr/urn:nbn:hr:184:639213>

Rights / Prava: [Attribution 4.0 International](#)/[Imenovanje 4.0 međunarodna](#)

Download date / Datum preuzimanja: **2024-05-13**



Repository / Repozitorij:

[Repository of the University of Rijeka, Faculty of Medicine - FMRI Repository](#)



ROBERT DORIČIĆ, TONI BUTERIN, IGOR ETEROVIĆ, AMIR MUZUR

The Spanish Flu in the City of Rijeka and Its Surroundings in 1918-1919: The Public Impact and the Image of the Epidemic

ROBERT DORIČIĆ, TONI BUTERIN, IGOR ETEROVIĆ, AMIR MUZUR

DEPARTMENT OF SOCIAL SCIENCES AND MEDICAL HUMANITIES, FACULTY OF MEDICINE,
UNIVERSITY OF RIJEKA / DEPARTMENT OF PUBLIC HEALTH, FACULTY OF HEALTH STUDIES,
UNIVERSITY OF RIJEKA

UDC 616.98(497.561-37Rijeka)“1918/1919“

<https://doi.org/10.32728/flux.2019.1.6>

Original scientific paper

The Spanish Flu in the City of Rijeka and Its Surroundings in 1918-1919: The Public Impact and the Image of the Epidemic

The Spanish flu, one of the worst epidemics in history, appeared in 1918, on the eve of the end of the World War I. The characteristic of the epidemic on the territory of the city of Rijeka has been poorly studied. Certainly, the lack of primary sources, such as hospital registries, have made the understanding of the incidence and the course of the epidemic in the city more difficult. Therefore, the death certificates have emerged as the main primary source. The purpose of this paper is to explore and describe mortality caused by the (Spanish) flu during 1918 and at the beginning of 1919, using the death registers of those who lived in the area of the city center and the surrounding parishes. The results of the Spanish flu mortality research in the area of Rijeka are compared to the Spanish flu specific mortality on the territory of the three parishes situated in the wider area of Rijeka – Brseč, Mošćenice and Lovran. The elucidation of the characteristics of the Spanish flu epidemic and its impact on the quotidian life in the city of Rijeka is possible through the analysis of daily newspapers as well. In this paper, we have explored such articles in the *La Bilancia*, Rijeka's newspaper published in Italian.

KEYWORDS

Rijeka, Brseč, Mošćenice, Lovran, 1918, Spanish flu, death certificates, *La Bilancia*

The Spanish flu is a colloquial common name for the pandemic caused by the influenza virus A, subtype H1N1, which broke out in the spring of 1918. The final cases of this viral disease were noted two years later, in 1920. The epidemiological characteristics of the Spanish flu in Croatia with special regard to the phenomenology of this infective illness in the city of Rijeka and its broader surroundings will be presented in this paper.

Epidemiology

The Spanish flu pandemic differs in its characteristics from those that preceded it, as well from those that appeared after it. It includes the emergence of the three epidemic waves within one year, significantly higher mortality rate than expected, and especially high mortality of young adults.¹

The epidemic waves simultaneously emerged in different geographical areas within approximately 12 months' timeframe.² Aside from different disease duration, each epidemic wave had an unequal severity of clinical presentations among those infected, as well as different total number of deaths caused by the consequences of the disease. Some of the authors mention the fourth epidemic wave that started in the first months of 1920.³

The first epidemic wave was reported in March 1918 in the United States of America, while the reports from Europe show that the Spanish flu first occurred there a month later.⁴ There were reports about the Spanish flu epidemic in northern, western and southern Africa, Asia, India, China and the Philippines. In South America, the flu epidemics emerged in Brazil.⁵ Although it affected a large number of people, there were not so many lethal *exitus*.⁶

The following wave, commonly named *autumn*, lasted from September till November 1918. Unlike the first wave, it was characterized by a high mortality rate. The third, so called *winter epidemic wave* appeared in the early months of 1919. A high mortality rate in the United States of America was recorded in October and November 1918, while in Western Europe and Great Britain it primarily occurred in November 1918. During the third wave, the most affected patients died in February and March 1919.

From the epidemiological point of view, the main characteristic of the Spanish flu epidemic is a high mortality rate caused by secondary complications, mostly resulting from bacterial pneumonia, which caused the death of young adults during their most productive years. The age limit of young adults who died of the Spanish flu differs but is defined between 20 and 40 years of age.⁷

¹ Jeffery K. Taubenberger and David M. Morens, "1918 Influenza: the Mother of all Pandemics," *Emerging Infectious Diseases* 12, no. 1 (January 2006): 15-22.

² Ibidem.

³ Anton Erkoreka, "Origins of the Spanish Influenza Pandemic (1918-1920) and its Relation to the First World War," *Journal of Molecular and Genetic Medicine* 3, no. 2 (2009): 190-94.

⁴ Antoni Trilla, Guillem Trilla, and Carloyn Daer, "The 1918 'Spanish flu' in Spain," *Clinical Infectious Diseases* 47, no. 5 (September 2008): 668-73; Wade H. Frost, "The epidemiology of influenza (1919)," *Public Health Reports* 121, suppl. 1 (2006): 148-59.

⁵ Frost, "The epidemiology," 148-59.

⁶ Taubenberger and Morens, "1918 influenza," 15-22.

⁷ Jeffrey Luk, Peter Gross, and William W. Thompson, "Observations on Mortality during the 1918 Influenza Pandemic," *Clinical Infectious Diseases* 33, no. 8 (October 2001): 1375-78, <https://doi.org/10.1086/322662>.

The global Spanish flu mortality rate is hard to estimate. According to the common opinion, a total number of 200 million people were affected,⁸ and approximately 50 million people died.⁹ However, the total number of those who died of influenza varies from 20 million to five times more. These differing estimates are explained by the lack of death records during this pandemic for the greater part of the world.¹⁰

The death records are missing for Europe as well. Analyzing the data on early deaths in the 1918-1919 period for 14 European countries, which represented approximately 75% of the European population, Ansart et al. gave the estimate that during the pandemic an early death of 2 640 000 people might have been caused by the consequences of the Spanish flu.¹¹

The data on early deaths in the abovementioned 14 European countries show that cumulative early and expected mortality ratio during the pandemic was the highest in Italy and the lowest in Finland. This data collection does not include the early deaths of the population that lived on the current territory of the Republic of Croatia at the time of the pandemic. Furthermore, a significantly higher early age mortality rate was found in southern European countries and not in the northern ones. The highest mortality was recorded in October and November 1918 in all countries included in the survey. All countries, except Italy and Denmark, had at least two pandemic waves.

The Spanish Flu in Croatia

According to some estimates, 100 000 people died of the Spanish flu in Croatia during the pandemics.¹²

Namely, systematic statistical data, which could show the mortality rate of the population associated with the Spanish flu, are missing for the Croatian area.¹³ The absence of data can be interpreted by the fact that exactly at the peak of pandemics the Austro - Hungarian Empire broke down and the State of Slovenes, Croats and Serbs was formed.¹⁴ Considering this

⁸ Branko Kolarić, "Gripa" [Flu], in *Epidemiologija zaraznih bolesti* [Epidemiology of infectious diseases], eds. Darko Ropac, Dinko Puntarić, and collaborators (Zagreb: Medicinska naklada, 2010), 13-15.

⁹ Taubenberger and Morens, "1918 influenza," 15-22; Terrence M. Tumpey, Christopher F. Basler, Patricia V. Aguilar, Hui Zeng, Alicia Solórzano, David E. Swayne, Nancy J. Cox et al., "Characterization of the reconstructed 1918 Spanish influenza pandemic Virus," *Science* 310, no. 5745. (October 2005): 77-80; Vladimir Draženović and Andreja Barišin, "Usporedba pandemijskog virusa A/H1N1/ iz 1918. s potencijalnim pandemijskim virusom A/H5N1/ iz 2005. godine" [A comparison between the pandemic virus A/H1N1 from 1918 and the potential pandemic virus A/H5N1 from 2005], *Infektološki glasnik* 26, no. 1 (2006): 19-23.

¹⁰ Séverine Ansart, Camille Pelat, Pierre-Yves Boelle, Fabrice Carrat, Antoine Flahault, and Alain-Jacques Valleron, "Mortality burden of the 1918-1919 influenza pandemic in Europe," *Influenza and Other Respiratory Viruses* 3, no. 3 (2009): 99-106, doi: 10.1111/j.1750-2659.2009.00080.x.

¹¹ Ibidem.

¹² Ibidem.

¹³ Nikola Anušić, *U sjeni Velikoga rata: pandemija španjolske gripe 1918.-1919. u sjevernoj Hrvatskoj - metodološki izazovi demografske analize* [In the shadow of the Great War: the Spanish flu pandemic of 1918-1919 in Northern Croatia - methodological challenges of a demographic analysis] (Zagreb: Srednja Europa, 2015).

¹⁴ Goran Hutinec, "Odjeci epidemije 'španjolske gripe' 1918. godine u hrvatskoj javnosti" [The

situation, contributions from investigations of archival sources, primarily death registers, hospital reports, and former newspapers, are especially valuable. Using these sources it is possible, at least partially, to determine the course of the pandemic, the awareness of the symptomatology and therapy, to reveal information about the planned and implemented measures against the epidemics, and finally to estimate the mortality rates related to the Spanish flu on the territory of Croatia in those days.¹⁵ This is primarily true for the northern part of Croatia – on the territory of the following three counties: Varaždin, Zagreb and the Bjelovar-Križevci County and in several Croatian cities: Osijek, Zagreb and Pula or smaller parishes on the Istrian peninsula.¹⁶ Investigations of hospital reports and reports of communal public services for the town of Zagreb reveal that 900 citizens succumbed to the consequences of the Spanish flu. However, the number of death cases is not final, because it does not include all categories of deaths from the Spanish flu.¹⁷ The number of deaths in Osijek was lower, and can be roughly estimated on the basis of hospital reports that provide data on 114 citizens of Osijek who died of this disease in the town's hospital.¹⁸

The first news in Croatia about the unusual flu in Spain was published in the newspaper *Hrvatska riječ* on May 29, 1918,¹⁹ and just a month later, on July 1, 1918, the first death case was registered in Zagreb. In the following period, newspapers, although partially censured because of the war activities and tendency to avoid spreading fear among the population, were publishing news about the occurrence and spreading of the epidemic in Europe, about its symptoms, notices about the closing of schools at the height of the *autumn wave*,²⁰ recommendations from the city authorities about the prevention of spreading the epidemics,²¹ and information about procedures in the case of illness. They were also publishing news about discoveries of medications which successfully treated this disease²² and a number of suggestions as to which preparations to use (Keglević' cognac

echos of the Spanish flu epidemic of 1918 in the Croatian public], *Radovi-Zavod za hrvatsku povijest* 38, no. 1 (2006): 227-42.

¹⁵ Ibidem.

¹⁶ Anušić, "U sjeni"; Maja Vonić, "Španjolska gripa u Osijeku 1918." [The Spanish flu in Osijek in 1918.], *Scrinia Slavonica* 14, no. 1 (2014): 217-234; Julija Pantić, Marijan Marijan, and Andrija Lovrić, "Španjolska gripa u Zagrebu" [The Spanish flu in Zagreb], *Povijest u nastavi* 4, no. 7 (June 2006): 105-15; Iva Milovan Delić, "Vijesti o španjolskoj gripi u puljskom dnevniku Hrvatski list" [News on the Spanish flu in the Pula quotidian Hrvatski list], *Tabula – Časopis Odjela za humanističke znanosti, Sveučilište Jurja Dobrile u Puli* 12 (October 2014): 173-182; Robert Doričić and Igor Eterović, "Veliki rat: analiza demografskih kretanja na području župe Lovran i župe Vele Mune" [The Great War: an analysis of demographic movements on the territory of the parish of Lovran and on the territory of the parish of Vele Mune], in *Istra v Veliki vojni: glad, bolesti, smrt – zbornik radova sa skupa, Tar, 2014*. [Istra in the Great War: hunger, diseases, death – conference proceedings, Tar, 2014] (Koper: Humanističko društvo Histria, 2017), 63-84.

¹⁷ Pantić, Marijan and Lovrić, "Španjolska," 105-115.

¹⁸ Vonić, "Španjolska," 217-234.

¹⁹ Hutinec, "Odjeci," 227-242.

²⁰ Vonić, "Španjolska," 217-234; Pantić, Marijan and Lovrić, "Španjolska," 105-115.; Milovan Delić, "Vijesti," 173-182.

²¹ Vonić, "Španjolska," 217-234.

²² Ibidem; Milovan Delić, "Vijesti," 173-182.

Franz Josef Bitter Water), stressing that they could prevent the development of the disease or help in healing.²³ Except for aspirin, which was used for healing the flu symptoms, the usage of other newly discovered medications and preparations was scientifically unfounded.

The Spanish Flu in Rijeka

Despite the fact that Rijeka is one of the largest urban settlements in Croatia, a detailed analysis of the incidence of the Spanish flu on its territory has not been conducted to this date.²⁴ A possible reason for this could also be the scarcity of historical sources for the reconstruction of the outbreak of the Spanish flu in the city of Rijeka. Due to the missing hospital reports for that period, the only possible reconstruction would be on the basis of insight into Rijeka's Death Registry, including death certificates from the parishes whose territory is part of Rijeka's urban area today. Therefore, the death certificates of Rijeka, and the parishes of Trsat, Zamet and Drenova were analyzed.²⁵ Additional research on the mortality of the Spanish flu in Rijeka is difficult because the death certificates of the city of Rijeka were not located in one place at that time, and the cause of death was not explicitly stated as the Spanish flu. In the column listing the cause of death only the flu (*Influenza*) was mentioned. In addition to this cause of death, complications of influenza like pneumonia (*Pneumonia*) were sometimes also listed, and in some exceptional cases, other causes of death were listed (*Dementia*, *Epilepsy*, *Myocarditis*, *Marasmus senilis*). One exception in the listings of the cause of death stands out – the Spanish flu (*Influentia Spagnola*) was mentioned in one entry as the cause of death of a 3-year-old boy who died on November 15, 1918 in the parish and then the eponymous suburb Drenova, now integrated into the territory of the city of Rijeka.²⁶ In order to place a timeframe on the research of the death certificates on the current territory of the city of Rijeka for the evaluation of the incidents during the period of the so-called *autumn wave of the Spanish Flu*, the data of the three parishes on the western coast of Rijeka were collected, namely the parish of Brseč, the parish of Mošćenice and the parish of Lovran.²⁷

Table 1 shows the total number of deaths caused by the Spanish flu registered in the period from October 1918 to January 1919 in the abovementioned parishes.

²³ Hutinec, "Odjeci," 227-242.

²⁴ Amir Muzur and Toni Buterin, "Epidemija španjolske gripe u Rijeci 1918." [The Spanish flu epidemic in Rijeka in 1918]. Paper presented at the 15th scientific symposium "Rijeka and its Citizens in Medical History": Medicine and War – Humanity in Non-humanity (On Occasion of the 100th Anniversary of the Beginning of WW1), Rijeka, November 7, 2014.

²⁵ Register Office Rijeka: Registro di morte Primo esemplare dal 1 maggio 1918 al 4 marzo 1919, 043; Matica umrljih župe Trsat – Počam od god. 1912, vol. 7; Liber defunctorum in capellania Sv. Križ ab anno 1907–; Knjiga umrljih Drenova 1912–1948.

²⁶ Register Office Rijeka: Knjiga umrljih Drenova 1912–1948.

²⁷ Register Office Lovran: Liber defunctorum in parochia sancti Georgii martyris in Brseč, Thom. IV, 1901–1948; Matricula defunctorum parochiae Moschienicensis, VI; Liber defunctorum parochiae Laurana 1908.

Parish	First Entry	Last Entry	Female	Male	Total dead
Brseč	7. XI. 1918.	30. XII. 1918.	9	1	10
Mošćenice	17. X. 1918.	7. I. 1919.	10	6	16
Lovran	17. X. 1918.	14. I. 1919.	23	18	41

Table 1. Details of the Spanish flu based on the death certificates of the three parishes on the west coast of Rijeka.

Correspondingly, in the present-day city of Rijeka during the period from early October 1918 through the end of January 1919, influenza was recorded as the cause of death in 145 cases (Figure 1). Most of them were recorded in October 1918, during the peak of the *autumn wave* of the Spanish flu. The gender distribution of fatalities caused by the flu in Rijeka is comparatively similar to the gender distribution of the Spanish flu-related deaths in other parts of Croatia, i.e. more women succumbed to the consequences of the disease than men. Most deaths were reported for the 25 to 34-year-old age group. It is also worth mentioning that all the deaths recorded in the parish of Trsat were French soldiers.

129

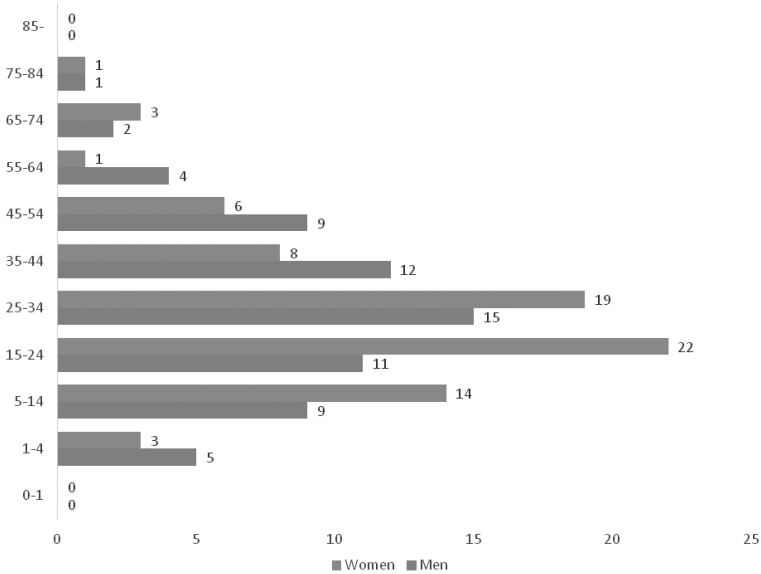


Figure 1. Gender and age distribution of deaths caused by the flu in the city of Rijeka, from October 1918 to January 1919.

Regarding the age distribution observed in the three parishes on the west coast of Rijeka, the parish of Brseč and the parish of Mošćenice in the area of today's Municipality of Mošćenička Draga, and the parish of Lovran, which largely corresponds to the present area of the Municipality of Lovran, deaths were recorded in the 26–33 year-old age group. In these parishes, researched with regard to the Spanish flu, women had higher mortality rates.

In the absence of primary historical sources, the characteristics of the epidemic can be partially reconstructed from the historical records of Rijeka's Italian newspaper *La Bilancia*. In the city of Rijeka the Spanish flu was first mentioned in the newspaper *La Bilancia*, dated July 8, 1918. The newspaper said that numerous cases of patients with a new disease had emerged over the previous week in the city. The disease originating from Spain had the characteristics of an epidemic and was initially characterized as benign.²⁸ However, by late September it was said that the number of patients had been alarmingly increasing, but still no deaths had been reported.²⁹ The first fatalities were reported in the issue from October 2, 1918.³⁰ On the following day the newspapers outlined the recommendations for preventing the illness and information on spreading of the disease.³¹ In order to prevent the disease, the city's schools, cinemas, dance halls and other city entertainment were to be closed, and hospitalized patients' visits were to be prohibited.³² The article published on October 16, probably overestimated the number of infected people to 10 000, which would have made up a quarter of the urban population at that time, and only two days later the newspaper issued an estimate to 15 000 patients.³³ A second epidemic, the epidemic of fear that pervaded the city, could be witnessed in a great demand for aspirin. According to the provisions of the city government, pharmacists were obliged to issue the symptomatic medication without a prescription and free of charge, provided that the medication was issued in the city pharmacies.³⁴ The city administration asked people not to bother doctors and pharmacists during the night.³⁵ *La Bilancia* reported on the termination of production in several factories and shipyards in Rijeka.³⁶ The situation in the city was further aggravated by the problem of burial of deceased citizens, and an unpleasant stench that spread from the city morgue, which was partly the result of an insufficient number of undertakers and the lack of coffins for the dead. Furthermore, due to low supplies and such high demand, the burial costs increased excessively.³⁷

²⁸ "La nuova malattia," *La Bilancia*, July 8, 1918, 2; "La malattia spagnuola," *La Bilancia*, July 10, 1918, 2.

²⁹ "La malattia spagnuola," *La Bilancia*, September 27, 1918, 3.

³⁰ "La malattia spagnuola," *La Bilancia*, October 2, 1918, 2.

³¹ "Per evitare il contagio della febbre spagnuola," *La Bilancia*, October 3, 1918, 2–3.

³² "La chiusura delle scuole," *La Bilancia*, October 4, 1918, 2; "La chiusura dei cinematografi e locali di divertimento," *La Bilancia*, October 7, 1918, 2; "Le visite agli ammalati all' ospedale sospese," *La Bilancia*, October 11, 1918, 2.

³³ "La malattia spagnuola," *La Bilancia*, October 16, 1918, 2; "Una seduta della commissione sanitaria," *La Bilancia*, October 18, 1918, 3.

³⁴ "La malattia spagnuola consighi importanti alla popolazione," *La Bilancia*, October 18, 1918, 3.

³⁵ "Una seduta della commissione sanitaria," *La Bilancia*, October 11, 1918, 2.

³⁶ "La malattia spagnuola," *La Bilancia*, October 17, 1918, 2.

³⁷ "Le condizioni al cimitero," *La Bilancia*, October 9, 1918, 2; "Cadaveri insepolti," *La Bilancia*,

Conclusion

The Spanish flu has been described as one of the hugest flu pandemics for many reasons. Namely, since mostly young, working, active population had succumbed to it, the Spanish flu became the cause of significant negative demographic and economic markers in communities around the world. In spite of its importance for mankind, a curious "scientific oblivion" with respect to it occurred at the global, as well as at the local level. The research on the Spanish flu epidemic has also been missing on the territory of the city of Rijeka. The records of the deaths of those who lived within the inner city nucleus and those parish communities constituting the present city of Rijeka are the only primary historical sources that can be used for establishing the presence of the Spanish flu on the Rijeka territory. Those sources, however, enable only the formulation of an approximate estimate of the epidemic characteristics. The flu-associated mortality in Rijeka showed that the epidemic reached its peak in the autumn of 1918, during the month of October. Regarding the age distribution, far more young than older people died, while in relation to gender distribution, more women than men succumbed to death caused by the flu. In spite of the limitations of this study, the collected data demonstrate, through both sex- and age distribution, as well as through the period of the highest mortality, that the epidemic of the Spanish flu in Rijeka presented all the major characteristics evidenced by the research on the epidemic in other Croatian cities and regions.

SOURCES

1. La Bilancia, 1918.
2. Liber defunctorum in capellania Sv. Križ ab anno 1907- [Register of the dead in the curacy of the Holy Cross from the year 1907-]. Register Office Rijeka, Croatia.
3. Liber defunctorum in parochia sancti Georgii martyris in Brseč, Thom. IV, 1901-1948 [Register of the dead in the parish of Saint George the Martyr in Brseč, Vol. IV, 1901-1948]. vol. 4, Register Office Lovran, Croatia.
4. Liber defunctorum parochiae Laurana 1908 [Register of the dead in the parish of Lovran 1908]. Register Office Lovran, Croatia.
5. Matica umrlih župe Trsat – Počam od god. 1912. [Register of the dead, the parish of Trsat – beginning with the year 1912], vol. 7. Register Office Rijeka, Croatia.
6. Matricula defunctorum parochiae Moschienicensis, VI. [Register of the dead in the parish of Mošćenice, VI.], vol. 6. Register Office Lovran, Croatia.
7. Knjiga umrlih Drenova 1912-1948 [Register of the dead of Drenova, 1912-1948]. Register Office Rijeka, Croatia.
8. Registro di morte Primo esemplare dal 1 maggio 1918 al 4 marzo 1919 [Register of the dead First record from May 1, 1918 to March 1919], 043. Register Office Rijeka, Croatia.

BIBLIOGRAPHY

1. Ansart, Séverine, Camille Pelat, Pierre-Yves Boelle, Fabrice Carrat, Antoine Flahault, and Alain-Jacques Valleron. "Mortality burden of the 1918-1919 influenza pandemic in Europe." *Influenza and Other Respiratory Viruses* 3, no. 3 (2009): 99-106.
2. Anušić, Nikola. *U sjeni Velikoga rata: pandemija španjolske gripe 1918.-1919. u sjevernoj Hrvatskoj – metodološki izazovi demografske analize*. [In the shadow of the Great War: the Spanish flu pandemic of 1918-1919 in Northern Croatia – methodological challenges of a demographic analysis]. Zagreb: Srednja Europa, 2015.
3. Doričić, Robert, and Igor Eterović. "Veliki rat: analiza demografskih kretanja na području župe Lovran i župe Vele Mune" [The Great War: an analysis of demographic movements on the territory of the parish of Lovran and on the territory of the parish of Vele Mune]. In *Istra v Veliki vojni: glad, bolesti, smrt – zbornik radova sa skupa, Tar, 2014*. [Istra in the Great War: hunger, diseases, death – conference proceedings, Tar, 2014], 63-84. Koper: Humanističko društvo Histria, 2017.
4. Draženović, Vladimir and Andreja Barišin. "Usporedba pandemijskog virusa A/H1N1/ iz 1918. s potencijalnim pandemijskim virusom A/H5N1/ iz 2005. godine" [A comparison between the pandemic virus A/H1N1 from 1918 and the potential pandemic virus A/H5N1 from 2005]. *Infektološki glasnik* 26, no. 1 (2006): 19-23.
5. Erkoreka, Anton. "Origins of the Spanish Influenza Pandemic (1918-1920) and its Relation to the First World War." *Journal of Molecular and Genetic Medicine* 3, no. 2 (2009): 190-94.
6. Frost, Wade H. "The epidemiology of influenza (1919)." *Public Health Reports* 121, suppl. 1 (2006): 148-59.
7. Hutinec, Goran. "Odjeci epidemije španjolske gripe 1918. godine u hrvatskoj javnosti" [The echos of the Spanish flu epidemic of 1918 in the Croatian public]. *Radovi - Zavod za hrvatsku povijest* 38, no.1 (2006): 227-42.
8. Kolarić, Branko. "Gripa" [Flu]. In *Epidemiologija zaraznih bolesti* [Epidemiology of infectious diseases], edited by Darko Ropac, Dinko Puntarić, and collaborators, 13-15. Zagreb: Medicinska naklada, 2010.
9. Luk, Jeffrey, Peter Gross and William W. Thompson. "Observations on Mortality during the 1918 Influenza Pandemic." *Clinical Infectious Diseases* 33, no. 8 (October 2001): 1375-78, <https://doi.org/10.1086/322662>.
10. Milovan Delić, Iva. "Vijesti o španjolskoj gripi u puljskom dnevniku Hrvatski list" [News on the Spanish flu in the Pula quotidian Hrvatski list]. *Tabula - Časopis Odjela za humanističke znanosti, Sveučilište Jurja Dobrile u Puli* 12 (2014): 173-182.
11. Muzur, Amir, and Toni Buterin. "Epidemija španjolske gripe u Rijeci 1918." [The Spanish flu epidemic in Rijeka in 1918]. Paper presented at the 15th scientific symposium "Rijeka and its Citizens in Medical History": Medicine and War – Humanity in Non-humanity (On Occasion of the 100th Anniversary of the Beginning of WW1). Rijeka, November 7, 2014.
12. Pantić, Julija, Marijan Marijan and Andrija Lovrić. "Španjolska gripa u Zagrebu" [The Spanish flu in Zagreb]. *Povijest u nastavi* 4, no. 7 (2006): 105-15.
13. Taubenberger, Jeffery K. and David M. Morens. "1918 Influenza: the

- Mother of all Pandemics." *Emerging Infectious Diseases* 12, no. 1 (2006): 15-22, <http://dx.doi.org/10.3201/eid1209.050979>.
14. Trilla, Antoni, Guillem Trilla and Carloyn Daer. "The 1918 'Spanish flu' in Spain." *Clinical Infectious Diseases* 47, no. 5 (2008): 668-73, doi: 10.1086/590567.
 15. Tumpey, Terrence M., Christopher F. Basler, Patricia V. Aguilar, Hui Zeng, Alicia Sololzano, David E. Swayne, Nancy J. Cox et al. "Characterization of the reconstructed 1918 Spanish influenza pandemic Virus." *Science* 310, no. 5745. (2005): 77-80, doi: 10.1126/science.1119392.
 16. Vonić, Maja. "Španjolska gripa u Osijeku 1918." [The Spanish flu in Osijek in 1918.]. *Scrinia Slavonica* 14, no. 1 (2014): 217-234.