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The end of the pandemic – what will be the pattern of influenza in the 2010-11 European winter and beyond?

A Nicoll (influenza@ecdc.europa.eu)[1,2], M Sprenger[1]
1. European Centre for Disease Prevention and Control, Stockholm, Sweden
2. on behalf of the ECDC Influenza Programme Team

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On 10 August 2010 Margaret Chan, the Director-General of the World Health Organization (WHO), announced that the world has moved into the post-pandemic period [1]. Following the advice of the Emergency Committee, which based its assessment on the global situation, WHO declared that there has been a pandemic phase change and that the WHO post-pandemic definition, 'Levels of influenza activity have returned to the levels seen for inter-pandemic influenza in most countries with adequate surveillance', has been met [2]. In order to come to this conclusion it has been important to observe the pattern of influenza in the southern hemisphere temperate countries which are now experiencing their winter. What does this mean for the 2010-11 winter in Europe and winters beyond?

Current influenza activity in the southern hemisphere temperate countries

In their 2010 winter, the five southern hemisphere countries with ongoing surveillance (Argentina, Australia, Chile, New Zealand and South Africa) have experienced levels of influenza-like illness (ILI) or acute respiratory infection (ARI) that are considerably lower than those of the 2009 winter. In these countries the level of illness is looking more like inter-pandemic influenza than the pandemic levels seen in the winter of 2009 [3,4], as documented in a special issue by Eurosurveillance [5]. In 2010 in Chile there have been more cases of acute ARI in children but this is attributable to epidemics of respiratory syncytial virus infections (RSV) rather than influenza [3]. This emphasises the importance of countries being able to test for a suite of respiratory pathogens, not just influenza. In the equatorial countries, the combined epidemiological and virological surveillance needed for routine influenza surveillance was uncommon until the 2009 pandemic. Hence whether what is being seen in 2010 is normal for inter-pandemic influenza is unclear as there are simply no baseline data in many countries. However, in the locations that have consistently delivered good quality surveillance data for a wide range of respiratory pathogens, such as Singapore and southern China, the epidemics of 2010 have shown levels that are more similar to those of 2008 and not that of the 2009 pandemic [4]. Virologically the 2010 southern hemisphere winter epidemics have been mixed: New Zealand has been dominated by pandemic A(H1N1) viruses while Australia, Argentina and Chile have seen more of a mix of the pandemic A(H1N1), A(H3N2) and some B viruses [3,4]. Exceptional among the five, South Africa has experienced A(H3N2) and B viruses with few pandemic viruses resembling the situation reported from eastern Africa [4]. Indeed, it can be seen now that even in the pandemic winter of 2009 the A(H3N2) and B viruses never entirely disappeared in the southern hemisphere [6]. The viruses that are now missing everywhere are the previous inter-pandemic A(H1N1) viruses, whether oseltamivir resistant or not [7]: they have been displaced by the pandemic A(H1N1) virus [4,7]. Thus the WHO recommendation to have trivalent vaccines composed of a pandemic A(H1N1)-like virus, an A(H3N2)-like virus and a B virus for the northern and southern hemisphere seasonal vaccines for 2010 and 2010–11, respectively, is very reasonable [8].

Influenza during the 2010–11 winter in Europe – what is to come ?

Influenza in Europe has been at very low levels in 2010 after the end of the autumn–winter waves of the 2009–10 influenza A(H1N1) pandemic [9]. However, pandemic phases are global, not regional and the activity of influenza in the spring and summer has little predictive value for the subsequent winter. Some observations can be made based on the forward look risk assessment of the European Centre for Disease Prevention and Control (ECDC) and the data that has come forth subsequently which were recently reviewed by an ECDC convened expert group [10]. To date, it seems increasingly unlikely that the 2009-10 pandemic will follow the pattern of the last (1968) pandemic in Europe when transmissibility increased for the second winter [11]. There are two important differences between now and then. First, many people in their late fifties and older currently have natural immunity from exposure to a similar earlier influenza A(H1N1) virus circulating before the 1957 pandemic [12]. Second, there have been unprecedented influenza vaccination campaigns in some European countries, increasing the population protected beyond those who acquired natural

immunity when they became ill during the pandemic [13]. It may also be that in the 2009 pandemic the proportion of asymptomatic or very mild infections was exceptionally high as suggested by some serological surveys, notably the one from New Zealand. However that is speculation as there are few serological data from earlier pandemics [14]. It would therefore seem probable that the European 2010-11 winter epidemic will be similar in its levels to the current epidemics in the southern hemisphere - inter-pandemic influenza with a mix of the 2009 pandemic A(H1N1), A(H3N2) and B viruses [3,4]. However those predictions will need to be checked and confirmed or refuted. This can only be done by networks of laboratories at local, national and international level so that new virus variants can be detected in a timely manner [7, 15].

Beyond that further predictions on the pattern of infection and disease and for subsequent winters would be unwise. What happens in each pandemic changes the composition of the circulating inter-pandemic influenza A viruses, either entirely replacing the previous influenza A viruses or at least introducing a vigorous new competitor [16]. So essentially there is now a 'new' inter-pandemic influenza – a new mix of circulating influenza A and B viruses which may change the pattern of infection, perhaps introducing some features of the 2009 pandemic which differed from the preceeding seasonal pattern such as the higher rate of mortality in younger age-groups and the unusual appearance of cases of severe acute respiratory distress syndrome (ARDS) even in healthy adults [17,18]. Many of the previous assumptions and knowledge will need to be revisited and re-evaluated, notably on risk groups for severe course or outcome of infection, on other groups to be offered vaccination and on the effectiveness of antiviral drugs and vaccines. Evidence from the most recent (1970–2008) inter-pandemic influenza mixes provides reasonable information for now but that cannot be entirely relied upon. New evidence will need to be sought scientifically, mostly using observational approaches. For example ECDC-coordinated studies (among others) have found that the 2009-10 pandemic vaccines were effective against the pandemic strain but field effectiveness of the new trivalent seasonal vaccines will need to be monitored regularly [19, 20].

It should not be assumed that the new inter-pandemic influenza will be worse than its predecessor. It could be milder and/or affect different groups, for example continuing to affect pregnant women as the 2009 pandemic did [17]. It is the nature of influenza viruses that they constantly change. Some may adapt to humans to transmit more efficiently and perhaps also become more benign, but drift variants will also appear that may be more pathogenic, as were the variant A(H3N2) viruses that emerged in the 1990s [15]. Risk groups will need to be re-evaluated and ECDC will provide scientific analyses to support those who have to make recommendations in Europe [21,22]. While it is to be hoped that the cases of lethal acute respiratory distress syndrome (ARDS) that characterised the pandemic A(H1N1) will become very rare, that cannot be guaranteed [16]. If cases of ARDS still occur among fit, healthy younger people that may change thinking about inter-pandemic influenza and the case for who to vaccinate. Equally it may be that the 2009 pandemic A(H1N1) virus may add resistance to neuraminidase inhibitors to its existing adamantane (i.e. amantadine and rimantadine) resistance as its predecessor did in 2007–8 [4,7]. The Ministers of European Union (EU) and European Economic Area Member States have committed to improving the use of seasonal vaccines, and to learning from the many evaluations of the response to the 2009 pandemic [22-24]. Finally, an article by the French public health institute recently published in this journal reminded us that A(H5N1) has not gone away [25]. The main message from ECDC is ensure an appropriate surveillance and analysis capacity for health threats, both during and in between the emergencies, and also ensure immediate sharing of information through the relevant structures. Hence the recent EU Presidency conclusion from the informal Employment, Social Policy, Health and Consumer Affairs Council Health Council (EPSCO) to not just learn from the 2009 pandemic but to strengthen defences for one worse than the 2009 pandemic, and other threats, would be seen to be of the utmost importance [23] . In order to achieve the target that EPSCO set out, it is crucial to safeguard adequate resources and continued support to National Public Health Institutes and networks which are key in ensuring that measures are in place for all threats not just influenza.

References

1. World Health Organization (WHO). H1N1 in post-pandemic period. 10 Aug 2010. Available from: http://www.who.int/mediacentre/news/statements/2010/h1n1_vpc_20100810/en/index.html
2. European Centre for Disease Prevention and Control (ECDC). WHO global pandemic phases (2009 guidance). Available from: http://www.ecdc.europa.eu/en/healthtopics/H1N1/Documents/100301_pandemic-_phases_table_may_2009.pdf
3. European Centre for Disease Prevention and Control (ECDC). Global influenza epidemiology overview for Europe – week 30. 30 Jul 2010. Available from: http://www.ecdc.europa.eu/en/activities/sciadvice/Lists/ECDC%20Reviews/ECDC_DispForm.aspx?List=512ff74f%2D77d4%2D4ad8%2Db6d6%2Dbfof23083f30&ID=919&RootFolder=%2Fen%2Factivities%2Fsciadvice%2FLists%2FECDC%20Reviews
4. World Health Organization (WHO). Pandemic (H1N1) 2009 – update 112. 6 Aug 2010. Available from: http://www.who.int/csr/don/2010_08_06/en/index.html
5. European Centre for Disease Prevention and Control (ECDC). Eurosurveillance Special Edition on the H1N1 influenza pandemic in the southern hemisphere. Available from: http://www.eurosurveillance.org/images/dynamic/EQ/V14N05/V14N05.pdf
6. Blyth C, Kelso A, McPhie K, Ratnamohan V, Catton M, Druce J et al The impact of the pandemic influenza A(H1N1) 2009 virus on inter-pandemic influenza A viruses in the southern hemisphere, 2009 Eurosurveillance 15; (31), 05 August 2010 http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19631
7. Meijer A, Lackenby A, Hungnes O, Lina B, van der Werf S, Schweiger B, et al. Oseltamivir-resistant influenza A (H1N1) virus, Europe, 2007–08 season. Emerg Infect Dis. 2009 April; http://www.cdc.gov/eid/content/15/4/552.htm
8. World Health Organization (WHO). Recommendations for influenza vaccines. Available from: http://www.who.int/csr/disease/influenza/vaccinerecommendations/en/index.html

9. European Centre for Disease Prevention and Control (ECDC). Bi-weekly influenza surveillance overview, July 30, 2010 - Weeks 28 - 29. Available from: http://www.ecdc.europa.eu/en/publications/Publications/Forms/ECDC_DispForm.aspx?ID=551
10. European Centre for Disease Prevention and Control (ECDC). ECDC forward look risk assessment. Likely scenarios for influenza in 2010 and the 2010/2011 influenza season in Europe and the consequent work priorities. Available from: http://www.ecdc.europa.eu/en/healthtopics/H1N1/Documents/1003_RA_forward_look_influenza.pdf
11. Jackson C, Vynnycky E, Mangtani P. Estimates of the transmissibility of the 1968 (Hong Kong) Influenza Pandemic: Evidence of Increased Transmissibility Between Successive Waves. Am J Epidemiol. 2010; 171(4):465-78
12. World Health Organization (WHO). Seroepidemiological studies of pandemic influenza A(H1N1) 2009 virus.Weekly Epidemiological Record (WER); 11 JUNE 2010, 85th YEAR; No. 24, 2010, 85, 229–236. http://www.who.int/wer/2010/wer8524.pdf
13. Waalen K, Kilander A, Dudman SG, Krogh GH, Aune T, Hungnes O. High prevalence of antibodies to the 2009 pandemic influenza A(H1N1) virus in the Norwegian population following a major epidemic and a large vaccination campaign in autumn 2009. Euro Surveill. 2010;15(31):pii=19633. Available online: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19633
14. Bandaranayake D, Huang S Seroprevalence of the 2009 influenza A (H1N1) pandemic in New Zealand ESR May 2010 http://www.moh.govt.nz/moh.nsf/pagesmh/10124/$File/seroprevalence-flu-2009.pdf
15. Russell C, Jones T, Barr I Cox NJ, Garten RJ, Gregory V et al. The global circulation of seasonal influenza A (H3N2) viruses Science 2008; 320 340-6.
16. Nicoll A. A new decade, a new seasonal influenza: the Council of the European Union Recommendation on seasonal influenza vaccination. Euro Surveill. 2010;15(1):pii=19458. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19458
17. Writing Committee of the WHO Consultation on Clinical Aspects of Pandemic (H1N1) 2009 Influenza, Clinical Aspects of Pandemic 2009 Influenza A (H1N1) Virus Infection N Engl J Med 2010 362: 1708-17 http://content.nejm.org/cgi/content/full/362/18/1708
18. European Centre for Disease Prevention and Control (ECDC). Table comparing Seasonal Influenza 2000/1 to 2008/9 and 2009 Pandemic Influenza. Available from: http://www.ecdc.europa.eu/en/healthtopics/H1N1/Documents/100713_seasonal_vs_pandemic_table.pdf
19. European Centre for Disease Prevention and Control (ECDC). Are inter-pandemic and pandemic vaccines effective. Executive Science Update No. 11. June 2010 http://www.ecdc.europa.eu/en/publications/Publications/1006_COR_Executive_Science_Update.pdf
20. Wichmann O, Stocker P, Poggensee G, Altmann D, Walter D, Hellenbrand W, Krause G, Eckmanns T. Pandemic influenza A(H1N1) 2009 breakthrough infections and estimates of vaccine effectiveness in Germany 2009-2010 Eurosurveillance 2010; 15 (18) http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19561
21. Nokleby H, Nicoll A. Risk groups and other target groups – preliminary ECDC guidance for developing influenza vaccination recommendations for the season 2010-11. Euro Surveill. 2010;15(12):pii=19525. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19525
22. Council of the European Union. Council Recommendation of 22 December 2009 on inter-pandemic influenza vaccination (Text with EEA relevance)(2009/1019/EU). Official Journal of the European Union. 2009. L 348/71. Available from: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:348:0071:0072:EN:PDF
23. Belgian Presidency Press Release from the informal EPSCO Council. Available from: http://www.eutrio.be/pressrelease/informal-meeting-epsco-council-regarding-public-health
24. European Centre for Disease Prevention and Control (ECDC). 2009 Influenza pandemic - Official evaluations relating to the EU/EFTA countries. Available from: http://ecdc.europa.eu/en/healthtopics/H1N1/pandemic_2009_evaluations/Pages/pandemic_2009_evaluations.aspx
25. Tarantola A, Barboza P, Gauthier V, Ioos S, El Omeiri N, Gastellu-Etchegorry M, for the Epidemic Intelligence team at InVS. The influenza A(H5N1) epidemic at six and a half years: 500 notified human cases and more to come. Euro Surveill. 2010;15(29):pii=19619. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19619

Ongoing outbreak of aseptic meningitis associated with echovirus type 30 in the City of Novi Sad, Autonomous Province of Vojvodina, Serbia, June – July 2010

G Ćosić[1], P Đurić (duricp@gmail.com)[1], V Milošević[2], J Đekić[1], G Čanak[3], V Turkulov[3]
1. Centre for Disease Control and Prevention, Institute of Public Health of Vojvodina, Novi Sad, Autonomous Province of Vojvodina, Serbia
2. Centre for Virology, Institute of Public Health of Vojvodina, Novi Sad, Autonomous Province of Vojvodina, Serbia
3. Clinic for Infectious Diseases, Clinical Centre of Vojvodina, Novi Sad, Autonomous Province of Vojvodina, Serbia

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Since June 2010, incidence of aseptic meningitis has increased in Novi Sad, Autonomous Province of Vojvodina, Serbia. From 2 June to 25 July 2010, 80 cases of aseptic meningitis were notified, with an incidence rate ranging from 10 to 366 per 100,000 population in different local communities. The majority of cases (n=64) were aged between two and 15 years. Echovirus 30 was cultured from two of four cerebrospinal fluid specimens. The outbreak, for which no common source has yet been identified, is ongoing.

Background

Aseptic meningitis, which can result from multiple aetiologies, has been a notifiable disease in the Autonomous Province of Vojvodina, Serbia, since 1974. Notification criteria include a syndrome characterised by acute onset of meningeal symptoms (severe headache, vomiting, neck stiffness and fever) and cerebrospinal fluid (CSF) pleocytosis with no laboratory evidence of bacterial or fungal meningitis [1]. Cases of aseptic meningitis in the province are diagnosed throughout the year, with most occurring during the summer months. Incidence rate in years without epidemics have ranged from 1.6 per 100,000 population to 6.3 per 100,000 population; the most common mode of transmission was faeco-oral [2]. There have been several outbreaks in the last 12 years associated with swimming pools, when people probably became infected by swallowing water containing the causative virus. Lack of correct disinfection as well as overcrowding of the pools were factors associated with the infections [3-5]. An outbreak of concurrent echovirus 30 and coxsackievirus A1 infections associated with swimming in the sea among a group of travellers to Mexico was reported recently [6], showing the importance of this mode of transmission. Detection of enteroviruses in water and determining the epidemiology of waterborne diseases are crucial in modern public health and epidemiological and virological survey systems [7].

Descriptive epidemiology

From weeks 22 to 29 (2 June – 25 July 2010), 80 cases of aseptic meningitis were detected in residents of the City of Novi Sad (an administrative unit that includes City of Novi Sad and various surrounding small towns and villages) and reported to the Institute of Public Health of Vojvodina, Serbia (Figure 1). The cumulative incidence for the period was 30 cases per 100,000 population (compared with two per 100,000 population for the same period in 2009 and four per 100,000 population in 2008).

From 2 to 11 June, 10 children aged from six to 15 years were admitted to the University Clinical Centre of Vojvodina, the only hospital treating meningitis in the City of Novi Sad, the capital of the Autonomous Province of Vojvodina. All 10 patients had symptoms of meningitis including severe headache, nausea or vomiting and fever, as well as moderate CSF pleocytosis (white blood cell count ≥10/mL). The Centre for Disease Control and Prevention of the Institute of Public Health of Vojvodina initiated an outbreak investigation to identify the causative agent, to describe the extent and severity of the outbreak, and to identify and exclude potential risk factors.

Case definitions

A clinical case of aseptic meningitis was defined as any person in the City of Novi Sad with a history of acute onset of severe headache, nausea and/or vomiting and fever, with bacteriologically sterile CSF cultures and moderate CSF pleocytosis (white blood cell count ≥10/mL) or without CSF culture and/or moderate CCF pleocytosis, but epidemiologically linked with confirmed case, since the beginning of June 2010.

A confirmed case was defined as a clinical case with bacteriologically sterile CSF cultures, CSF moderate pleocytosis (white blood cell count ≥10/mL) and/or

isolation of enterovirus from CSF or stools, since the beginning of June 2010.

A probable case was defined as a clinically compatible case diagnosed by a physician as aseptic meningitis with a CSF white cell count <10/mL or unknown CSF cell count (lumbar puncture not performed or negative), since the beginning of June 2010.

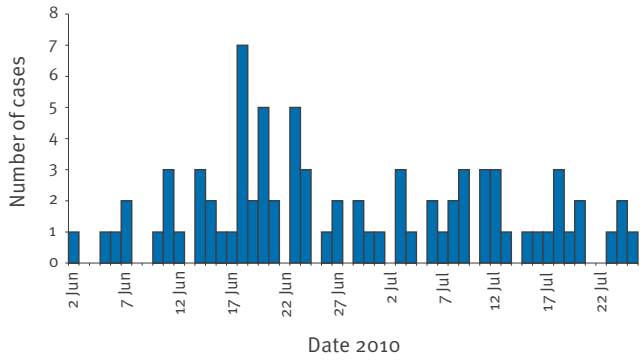
Clinical and epidemiological data were collected for every case using a structured questionnaire. According to the case definition criteria, there were 70 confirmed cases and 10 probable cases as of 25 July 2010. The prevalence of clinical features and CSF abnormalities in the cases in this outbreak are shown in the Table.

Of the 80 cases, 27 had symptom onset in week 24 (14–20 June). A total of 31 cases came from various districts of the city itself (incidence rate 17 per 100,000 population); the other cases were from neighbouring villages that belong to the City of Novi Sad. The highest incidence rate was in two villages across the Danube River, Ledinci and Sremska Kamenica (366 per 100,000 population and 318 per 100,000 population respectively). Specific incidence rates indicated local community spread mainly among children attending the same preschool or primary schools. In other villages of the City of Novi Sad, the incidence rate was much lower (range: 10 per 100,000 population to 28 per 100,000 population).

The male:female sex ratio of cases was 1.9:1. The median age was 12.8 years (range: two to 46 years); 64 of the 80 cases were under 15 years of age. All adult cases (confirmed and probable) were epidemiologically linked to confirmed child cases. Age-specific incidence rates are shown in Figure 2. All patients were immunocompetent and had good outcomes without sequelae.

Figure 1

Cases of aseptic meningitis by date of symptom onset, Novi Sad, Serbia, 2 June – 25 July 2010 (n=80)



Source: Institute of Public Health of Vojvodina, Serbia.

Table

Prevalence of clinical features and cerebrospinal fluid abnormalities in cases of aseptic meningitis, Novi Sad, Serbia, 2 June – 25 July 2010 (n=80)

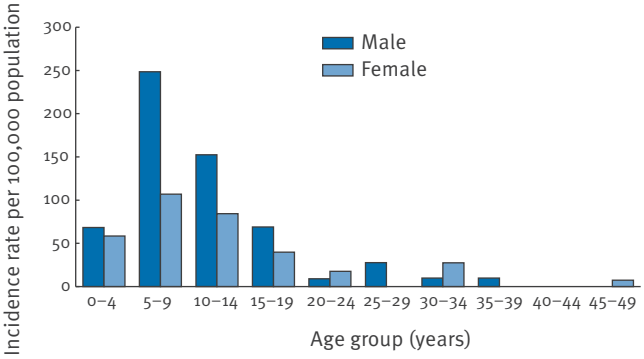
Features	Number of cases
Clinical features[a]	
Fever	80
Headache	80
Vomiting	80
Photophobia	64
Diarrhoea	5
Neck stiffness	80
Pharyngitis	13
CSF abnormalities	
White blood cell count ≥10/mL	70

CSF: cerebrospinal fluid.

[a] None of the patients had a rash.

Figure 2

Incidence rate of aseptic meningitis per 100,000 population, by age group and sex, Novi Sad, Serbia, 2 June – 25 July 2010 (n=80)



Microbiological findings

Bacterial meningitis was excluded in all cases. In 74 patients with lumbar puncture, bacteriological cultures were sterile. Lumbar puncture was not performed for the other six cases as their clinical manifestation was very benign. Bacterial meningitis was therefore excluded in these six cases on that basis; all six were epidemiologically linked to confirmed cases. The presence of enterovirus was confirmed by serological test (Virion-Serion) in samples from 16 patients. Four CSF samples and one stool sample were sent to the National Reference Laboratory for Poliomyelitis and Enteroviruses at the Torlak Institute for Virology, Vaccines and Sera, Belgrade, for viral culture. Enterovirus with apparent cytopathic effects was cultured from two of the four CSF samples. Enteroviruses are among the most common human viral pathogens causing the wide variety of diseases including aseptic meningitis. These RNA viruses are members of the picornavirus family and include coxsackieviruses A and B, echoviruses, numbered enteroviruses and polioviruses. The predominant agents identified in enteroviral meningitis outbreaks are echoviruses serotypes 6, 9, 11, 13, 19 and 30 [15,21,26]. In this outbreak, neutralisation with type-specific antisera established the identity of the virus as echovirus type 30.

Control measures

As a result of the outbreak, a number of control measures have been put in place. As in similar outbreaks [8], enhanced surveillance has been implemented – case definitions and a questionnaire were developed for the purposes of outbreak investigation. All cases were reported by infectious disease specialists to the Centre for Disease Control and Prevention on a daily basis and general practitioners and paediatricians in the area were informed about the outbreak and warned of a possible further increase in the number of cases. Early diagnosis of aseptic meningitis helps to avoid unnecessary antibiotic treatment and additional testing [9].

Following experience from other outbreaks [10], as public alarm was expected, a proactive media communication plan was put in place. Epidemiological reports were updated and published on a weekly basis on the website of the Institute of Public Health of Vojvodina.

Information leaflets on the main control measures were distributed to preschool facilities in the affected region. As the school year ended on 11 June, primary and secondary schools were already closed when the outbreak started.

Discussion

Outbreaks of aseptic enteroviral meningitis are notified in the Autonomous Province of Vojvodina every four to five years [3-5,11]. The largest previous outbreak occurred in 2000, with 461 cases reported that year (the incidence rate in the province was 23 per 100,000 population and incidence rate in the City of Novi Sad was 28 per 100,000 population). Outbreaks of aseptic enteroviral meningitis were notified in all neighbouring countries (Croatia, Hungary and Romania) in the last two decades [11-13]. In Kosovo under United Nations Security Council Resolution 1244, an outbreak with a total of 878 cases of acute neurological syndrome was reported in 2006 to the World Health Organization Regional Office for Europe: enteroviral origin was detected [14]. Enteroviral meningitis outbreaks involved many communities throughout other countries within Europe and also other continents [8,15-22].

As expected in temperate climate, the ongoing outbreak has occurred in hot summer months, spreading by direct or indirect contact. Although none of the common sources (contaminated food or water) has yet been implicated, since viral meningitis outbreaks are sometimes associated with recreational use of water, the use of public swimming pools had been considered a potential source of infection in this outbreak but no such exposure of cases has been identified.

Previously reported outbreaks of enteroviral meningitis have demonstrated a predominance of males in child cases, with a sex ratio of 2:1 [8,14,15,21]. Our findings are consistent with this. They are also in line with these reports that find a large proportion (70%) of cases under 15 years of age, but there was a higher incidence rate (149 per 100,000 population) in children aged 5–15 years [8,14,15,21].

According to its epidemiological features, this outbreak is likely to continue towards the autumn months [23]. No specific control measures are available for non-polio enteroviruses [9]. Good personal and communal hygiene is recommended (thorough hand washing as a routine practice, prompt and safe disposal of waste and faeces, and prompt washing or disposal of the soiled articles in preschool and nursery facilities), as well as disinfection of contaminated surfaces with household cleaning products, and avoidance of shared utensils and drinking containers [9]. All susceptible people and parents of young children are advised to ask for medical help immediately when there is onset of sudden headaches, fever, nausea and vomiting.

A three-step model has been suggested for diagnostic procedures in order to ensure comprehensive diagnostic investigation [24], including local medical investigation and usual analysis (polymerase chain reaction (PCR) and serology) of acute cases, then as a second step, extended analysis of suspected cases by a reference laboratory for commonly recognised causative agents (or less common agents if indicated, e.g. in returning travellers), and finally identification of specific pathogens in cases with unknown aetiology.

Monitoring circulating enteroviruses is important because individual serotypes have different temporal patterns of circulation and the changes in predominant serotypes can be accompanied by large-scale outbreaks of enteroviral illnesses [25]. Environmental surveillance has been used successfully in monitoring enterovirus circulation and assessing the extent or duration of epidemic non-poliovirus enteroviruses in specific populations [26].

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References

1. Centers for Disease Control and Prevention (CDC). Case Definitions for Infectious Conditions Under Public Health Surveillance. MMWR. 1997;46(RR10): 1-55. Available from: http://www.cdc.gov/mmwr/preview/mmwrhtml/00047449.htm
2. Stefanović S, Đurić P, Ilić S. [Epidemiological characteristics of intestinal communicable diseases in Vojvodina]. In: Popović D, editor. [Man and nature. Infectious and parasitary diseases in humans and animals in Vojvodina]. Novi Sad: Matica srpska; 2003. p. 89-99. Serbian.
3. Institute of Public Health of Vojvodina. [Communicable diseases in Vojvodina, 1998. Annual report]. Novi Sad: Institute of Public Health of Vojvodina; 1999. p. 93-4. Serbian.
4. Institute of Public Health of Vojvodina. [Communicable diseases in Vojvodina, 2000. Annual report]. Novi Sad: Institute of Public Health of Vojvodina; 2001. p. 76. Serbian.

5. Institute of Public Health of Vojvodina. [Communicable diseases in Vojvodina, 2008. Annual report]. Novi Sad: Institute of Public Health of Vojvodina; 2009. p. 182-3. Serbian.
6. Begier EM, Oberste MS, Landry ML, Brennan T, Mlynarski D, Mshar PA, et al. An outbreak of concurrent echovirus 30 and coxsackievirus A1 infections associated with sea swimming among a group of travelers to Mexico. Clin Infect Dis. 2008;47(5):616-23.
7. Leveque N, Laurent A. A novel mode of transmission for human enterovirus infection is swimming in contaminated seawater: implications in public health and epidemiological surveillance. Clin Infect Dis. 2008;47(5):624-6.
8. Gutiérrez Rodríguez MA, García-Comas L, Rodero Garduño I, García Fernández C, Ordobás Gavín M, Ramírez Fernández R. Increase in viral meningitis cases reported in the Autonomous Region of Madrid, Spain, 2006. Euro Surveill. 2006;11(44):pii=3072. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=3072
9. Centers for Disease Control and Prevention (CDC) . Outbreaks of aseptic meningitis associated with Echoviruses 9 and 30 and preliminary surveillance reports on enterovirus activity – United States, 2003. MMWR Morb Mortal Wkly Rep. 2003;52(32):761-4.
10. Ramsingh R, Outbreak of Echovirus 30 meningitis in Southern Saskatchewan. Can Commun Dis Rep. 1998;24(23):185-8.
11. Aleraj B, Kruzić V, Borcić B. [Epidemiology of enteroviral meningitis in Croatia 1958-1988 with special emphasis on the great epidemic of 1988]. Lijec Vjesn. 1990;112(9-10):305-9. Croatian.
12. Kapusinszky B, Szomor KN, Farkas A, Takacs M, Berencsi G. Detection of non-polio enteroviruses in Hungary 2000-2008 and molecular epidemiology of enterovirus 71, coxsackievirus A16, and echovirus 30. Virus genes. 2010;40(2):163-73.
13. Centers for Disease Control and Prevention (CDC). Outbreak of aseptic meningitis associated with multiple enterovirus serotypes- Romania,1999. MMWR Morb Mortal Wkly Rep. 2000;49(29):669-71.
14. National Institute of Public Health, Pristina, Kosovo - UN Administered Territory, Infectious Disease Clinic, Pristina, Kosovo - UN Administered Territory, Istituto Superiore di Sanità, Rome, Italy, WHO Reference Laboratory for Polio in the European Region, WHO Office, Pristina, Kosovo - UN Administered Territory, WHO Regional Office for Europe, Copenhagen, Denmark. Enteroviral meningitis outbreak, Kosovo, July-September 2006. Euro Surveill. 2006;11(37):pii=3047. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=3047
15. Hauri AM, Letz A, Schimmelpfennig M, Schreier E, Twisselmann B. Outbreak of aseptic viral meningitis in Germany. Euro Surveill. 2001;5(37):pii=1687. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=1687
16. Centers for Disease Control and Prevention (CDC). Outbreaks of aseptic meningitis associated with Echovirus 9 and 30 and preliminary Surveillance reports on Enterovirus activity- United States, 2003. MMWR Morb Mortal Wkly Rep. 2003;52(32):761-4.
17. Markey P, Davis J, Harnett G, Williams S, Speers D. Meningitis and a febrile vomiting illness caused by echovirus type 4, Northern Territory, Australia. Emerg Infect Dis. 2010;16(1):63-8.
18. Sarmiento L, Mas P, Goyenechea A, Palomera R, Morier L, Capó V, et al. First epidemic of Echovirus 16 meningitis in Cuba. Emerg Infect Dis. 2001;7(5):887-9.
19. Brunel D, Leveque N, Jacques J, Renois F, Motte J, Andreoletti L. Clinical and virological features of an aseptic meningitis outbreak in North-Eastern France, 2005. J Clin Virol. 2008;42(2):225-8.
20. Antona D, Chomel JJ, Enterovirus Surveillance Laboratory Network. Increase in viral meningitis cases reported in France, summer 2005. Euro Surveill. 2005;10(36):pii=2787. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=2787
21. Lee KY, Burgner D, Lee HS, Hong JH, Lee MH, Kang JH, et al. The changing epidemiology of pediatric aseptic meningitis in Daejeon, Korea from 1987 to 2003. BMC Infect Dis. 2005;5:97.
22. Machado BC, Ferreira RS, Compagnoli Carmona RC, Carmo Sampaio Tavares Timenetsky M. Aseptic meningitis by echovirus 30 in Sao Paulo State, Brazil. Braz J Microbiol. 2007;38(1)
23. Radovanović Z, editor. Epidemiology. Novi Sad: University of Novi Sad, Faculty of Medicine;2008.
24. Donoso Mantke O, Vaheri A, Ambrose H, Koopmans M, de Ory F, Zeller H, et al. Analysis of the surveillance situation for viral encephalitis and meningitis in Europe. Euro Surveill. 2008;13(3):pii=8017. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=8017
25. Centers for Disease Control and Prevention (CDC). Enterovirus surveillance – United States, 2002-2004. MMWR Morb Mortal Wkly Rep. 2006;55(6):153-6.
26. Kargar M, Sadeghipour S, Nategh R. Environmental surveillance of non-polio enteroviruses in Iran. Virol J. 2009;6:149.

Ongoing outbreak of aseptic meningitis in south-eastern Latvia, June – August 2010

J Perevoscikovs (jurijs.perevoscikovs@lic.gov.lv)[1], A Brila[1], L Firstova[1], T Komarova[1], I Lucenko[1], J Osmjana[1], L Savrasova[1], I Singarjova[1], J Storozenko[1], N Voloscuka[1], N Zamjatina[1]
1. State Agency Infectology Center of Latvia, Riga, Latvia

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An outbreak of aseptic meningitis has been ongoing in several areas of Latgale region, in the south-eastern part of Latvia since the end of June 2010. By 9 August 2010, 114 cases had been notified. Most of the cases were registered in the city and amalgamated municipality of Daugavpils and neighbouring territories. According to current evidence, two types of enteroviruses, coxsackie A-9 virus and echovirus 30, are the causative agents of the outbreak.

Outbreak detection

The most important causative agents of aseptic meningitis are different types of enteroviruses, including coxsakieviruses and echoviruses [1]. Enterovirus activity in populations may be either sporadic or epidemic [2]. Outbreaks of infection with coxsakieviruses and echoviruses have occurred in various years in different countries [3].

Onset of symptoms in the first case of aseptic meningitis connected with the current outbreak was on 30 June 2010, in Ilukste amalgamated municipality in the Latgale region, in the south-eastern part of Latvia. Since then new cases have been reported almost every day in different municipalities of the Latgale region, where 15% of the Latvian population live. By 9 August 2010, the total number of cases had reached 114.

The aim of this article is to provide rapid epidemiological assessment of this ongoing outbreak and describe the prevention and control measures undertaken so far.

Surveillance of aseptic meningitis in Latvia

In Latvia, surveillance of aseptic meningitis is based on mandatory clinical (syndromic approach) and laboratory notification. The State Agency 'Infectology Center of Latvia' is responsible for epidemiological surveillance and control of infectious diseases in the country. All reported cases of aseptic meningitis are processed through an online computerised state infectious diseases surveillance and monitoring system (VISUMS).

Outbreak investigation

In order to investigate the outbreak, cases of aseptic meningitis were selected by the date of symptom onset from the VISUMS for descriptive epidemiological analysis of the outbreak for the period 30 June to 9 August 2010 and for analysis of seasonal trends for the period from January 2007 to July 2010.

From 30 June to 9 August 2010, 136 cases of aseptic meningitis were registered in total in Latvia (6 cases per 100 000 population), 114 of whom were reported from Latgale region (33 cases per 100,000 population) (Figure 1).

Most cases were reported from the city and amalgamated municipality of Daugavpils (n=74) and neighbouring amalgamated municipalities (Table). All patients were treated or continue to be treated in hospitals. Their clinical features were compatible with aseptic meningitis: fever, headache and vomiting. In this investigation, there were no case definitions for aseptic meningitis.

According to available information there was no increase of enteroviral meningitis in the border areas of neighbouring countries (Belarus and Lithuania).

The ages of the reported cases of aseptic meningitis ranged from two to 66 years. However, most cases (94 of 114, 82%) were children and adolescents (aged two to 19 years). Among the cases, 75 (66%) were males and 39 (34%) were females. The male:female ratio was 1.92:1 (Figure 2).

The previous largest outbreak of aseptic meningitis in Latvia occurred in Latgale region in August to November 2006, due to echovirus 30 infection [4]. By November 2006, the total number of cases had reached 408. A substantial increase of aseptic meningitis was observed also in 2007 in different parts of the country, including Latgale region, where 60% of all cases were registered (Figure 3). Echoviruses 6 and 18 were the dominant enteroviruses in 2007.

The last case of aseptic meningitis before the current outbreak was reported from Daugavpils city at the end of May 2010. Coxsackie A-9 virus was detected in a stool sample from the case.

As of 9 August 2010, four cases of enteroviral meningitis have been laboratory confirmed in the amalgamated municipality of Ilukste in Latgale region: two cases with coxsackie A-9 virus (identified in stool samples) and two cases with echovirus 30 (identified in cerebrospinal fluid (CSF) samples). A further case of enteroviral infection with detected in stool sample coxsackie A-9 virus was reported at the beginning of July in Daugavpils city in a child with gastrointestinal symptoms only. These findings suggest at least two causative agents of the current outbreak.

Enteroviruses were also detected in stool or CSF samples from a further eight patients with aseptic meningitis and in two sewage samples from Latgale region. Typing results are pending.

Although there are signs of geographical clustering, interviews with cases with aseptic meningitis did not indicate any epidemiological link between most cases. Nevertheless, eight clusters with secondary cases of aseptic meningitis were identified: one cluster with three cases in a children's institution, one cluster with three cases and five clusters with two cases in households and one cluster with two cases in children from a dancing group. The majority of cases (n=80) went swimming in various lakes, rivers and ponds, thus excluding swimming water as the common source in this outbreak.

Prevention and control measures

In this outbreak, the following surveillance, prevention and control measures were undertaken:

- epidemiological investigation of cases of aseptic meningitis including interview with patients or their parents, and organisation of control measures in the affected settings attended by children;

Figure 1

Cases of aseptic meningitis by week of symptom onset and administrative territories, Latvia, 30 June – 9 August 2010 (n=136)

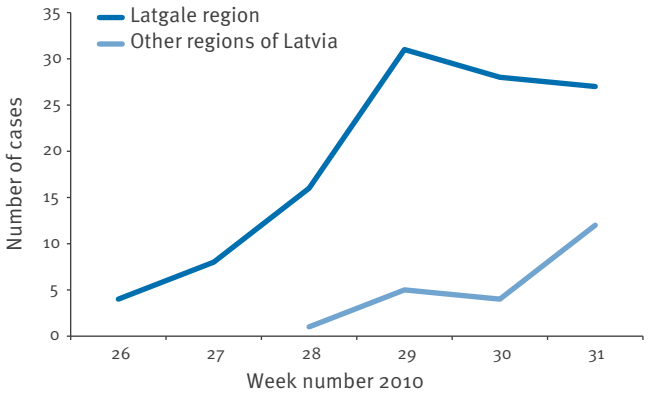
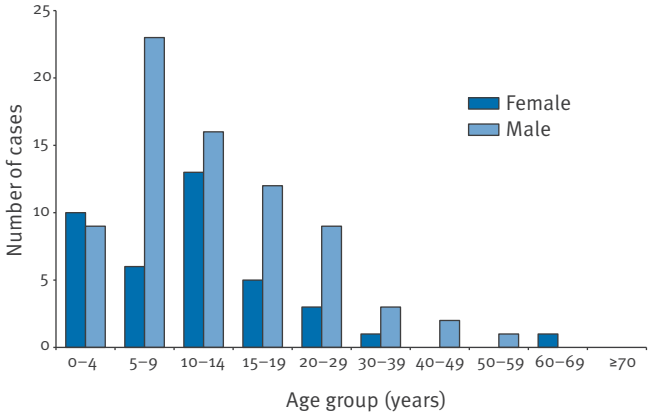


Figure 2

Cases of aseptic meningitis by sex and age group, Latgale region, Latvia, 30 June – 9 August 2010 (n=114)



Table

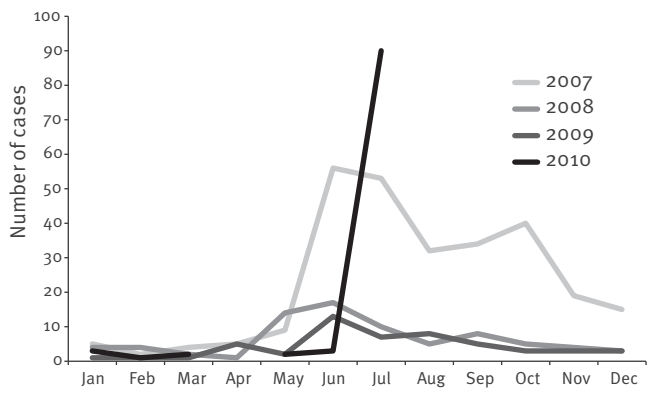
Cases of aseptic meningitis by week of symptom onset, Latgale region, Latvia, 30 June – 9 August 2010 (n=114)

Territory	Week number 2010						
	26	27	28	29	30	31	Total
Aglonas AM	0	0	0	2	0	1	**3**
Dagdas AM	0	0	0	0	1	0	**1**
Daugavpils city	1	6	11	18	15	11	**62**
Daugavpils AM	0	0	2	5	5	1	**13**
Ilūkstes AM	2	2	2	5	1	3	**15**
Krāslavas AM	0	0	1	1	6	11	**19**
Rēzeknes AM	1	0	0	0	0	0	**1**
Total, Latgale region	**4**	**8**	**16**	**31**	**28**	**27**	**114**

AM: amalgamated municipality.

Figure 3

Cases of aseptic meningitis by month of symptom onset, Latvia, 2007–2010[a]



[a] For 2010, January to July only.

- investigation of environmental samples (lake water, tap water and sewage water) to detect circulation of enteroviruses;
- daily data analysis of aseptic meningitis at the national level;
- regular publication of data analysis on the website of the Infectology Center of Latvia [5];
- consultations with and recommendations to the general public and target institutions, including publication of detailed information on prevention of enteroviral meningitis for the general public, childcare centres, schools and food handlers on the website of the Infectology Center of Latvia [6];
- standard operational plan drawn up for municipalities in Latgale region on prevention and control of enteroviral infection, information for clinicians on aseptic meningitis and recommendations for virological investigation of cases;
- communication with mass media on the prevention and control measures.

Discussion and conclusions

A large aseptic meningitis outbreak caused by at least two enteroviruses (coxsackie A-9 virus and echovirus 30) is still ongoing in the south-eastern part of Latvia. The epidemiological pattern of the outbreak (age and sex distribution of cases) corresponds to the usual characteristic of the enteroviral infection, with the majority of cases in males and young children or adolescents. The incidence of aseptic meningitis was high in 2006 and 2007, and low in 2008 and 2009. Although in previous non-epidemic years (2007–2009), seasonal increases of enteroviral meningitis began in May to June, this year the outbreak started later, at the end of June.

In view of the seasonal character (summer–autumn) of enteroviral infections and taking into account reopening of schools after the summer holidays, further spread, importation and transmission of infection to other Latvian regions cannot be excluded. The risk of international spread is assessed as not significant. Further monitoring and data analysis are to be performed on a regular basis.

References

1. Gorbach SL, Bartlett JG, Blacklow NR, editors. Infectious Diseases. 2nd ed. W.B.Saunedr Company; 1998:1408-1409.
2. Rotbart HA, editor. Human enterovirus infections. Washington: ASM Press;1995:271.
3. Evans AS, Kaslow RA, editors. Viral Infections of Human. 2nd ed. New York and London: Plenum Medical Book Company; 1997:599.
4. Perevoscikovs J, Lucenko I, Nikiforova R. Outbreak of enteroviral meningitis in Latvia, August – October 2006. Euro Surveill. 2006;11(40):pii=3060. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=3060
5. Infectology Center of Latvia. [Updated information on aseptic meningitis (meningitis serosa) outbreak in Latgale region]. Riga: Infectology Center of Latvia. Latvian. Available from: http://www.lic.gov.lv/?p=8470&lang=258
6. Infectology Center of Latvia. [Recommendations for enteroviral meningitis (meningitis serosa) prophylaxis. Information for population]. Riga: Infectology Center of Latvia. Latvian. Available from: http://www.lic.gov.lv/docs/268/2010/Enterovirusu_meningits_2010.pdf

Small pharmacies are more likely to dispense antibiotics without a medical prescription than large pharmacies in Catalonia, Spain

C Llor (carles.llor@urv.cat)[1], D L Monnet[2], J M Cots[3]
1. Primary Healthcare Centre Jaume I, Tarragona, Spain
2. Scientific Advice Unit, European Centre for Disease Prevention and Control, Stockholm, Sweden
3. Primary Healthcare Centre La Marina, Barcelona, Spain

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The aim of this study was to explore the relationship between pharmacy size and the likelihood of obtaining antibiotics without medical prescription at a pharmacy. In 2008 in Catalonia, two actors presented three different cases in a randomised sample of pharmacies and asked pharmacists for an antibiotic. Pharmacies were considered as small when having limited space with only one counter and a maximum of two professionals selling medicines, as medium sized with three or four attending professionals, and as large with a large selling space and more than four attending professionals. Of the 197 pharmacies visited, 88 (44.7%) were considered as small while only 25 (12.7%) were large. Antibiotics were obtained without a medical prescription in 89 (45.2%) pharmacies, mainly in small pharmacies (63.6%), followed by medium-sized pharmacies (35.7%) and large pharmacies (12%) ($p<0.001$). Large pharmacies, that probably have a greater income, more closely followed the prevailing legislation of not selling antibiotics to patients without a medical prescription. This observation should now be confirmed in other countries where over-the-counter sales of antibiotics are prevalent and should be taken into account by programmes aiming at achieving a more prudent use of antibiotics.

Introduction

The majority of antibiotic prescriptions are used for outpatients in the community [1]. Use of antibiotics can contribute to the emergence and selection of antimicrobial-resistant bacterial strains, which have become a problem in most countries [2,3]. Not surprisingly, there is a relationship between the overall uptake of antibiotics in a population and resistance to antibiotics in bacteria responsible for infections in this population [4-6]. This is the background for public awareness campaigns aiming at decreasing unnecessary use of antibiotics in the community [7,8].

Despite being designated as prescription-only medicines, antibiotics may be requested by and dispensed to patients without a medical prescription in many areas of the world. This has been described as common practice in developing countries [9]. In Europe, obtaining antibiotics without a medical prescription is reportedly more prevalent in Mediterranean countries than in northern countries [10-12]. In Spain, over-the-counter sale of antibiotics still occurs despite being illegal, as in other European Union countries, and despite many public awareness campaigns targeting self-medication carried out by the Ministry of Health. A prospective study was performed in 2008 in a randomised sample of pharmacies in Catalonia, Spain, with the objective of quantifying the percentage of pharmacies selling antibiotics without an official medical prescription [13]. Antibiotics were obtained in nearly 80% for a supposed urinary tract infection, and in 35% for sore throat. From our experience, certain pharmacies in Spain sell antibiotics without a prescription while others seem to scrupulously follow the law. An analysis of European data showed a relationship between the number of inhabitants per pharmacy in a country and the annual revenue from prescription medicines per pharmacy in this country [14], thus suggesting that pharmacies serving fewer inhabitants may have lower revenues from prescription medicines and an incentive for over-the-counter sales of prescription medicines. Using the same database as the prospective study mentioned above [13], the present study was performed to explore the relationship between the size of a pharmacy and the likelihood of obtaining antibiotics without a medical prescription.

Methods

The methodology of the study has been described elsewhere [13]. In brief, a prospective study was performed in 2008 in a randomised sample of 197 pharmacies in Catalonia, stratified by provinces, socioeconomic status and location. Actors impersonated two patients in three different case scenarios: sore throat, acute bronchitis, and urinary tract infection. They entered the pharmacies stating that they were not from the neighbourhood or city, that they were commercial representatives, and that they were passing through. Three levels of demand were used to convince the

pharmacists to sell an antibiotic: Initially the actor asked for something to alleviate the symptoms of the infection. If an antibiotic was not offered, the actor said "This medication is not very strong, can't you give me something stronger?" The highest grade of demand was asking openly for an antibiotic, if the medicine was not offered by the pharmacist before.

For the present study, pharmacies were classified in three groups depending on their size (based on the actors' assessment): small pharmacies with limited space with only one counter and a maximum of two professionals selling medicines, medium pharmacies with three or four attending professionals, and large pharmacies with a large selling space and more than four attending professionals. The following variables were also considered: age of the pharmacist or salesperson attending the patient (estimated by the actor as a categorical variable: under 30 years of age, between 30 and 50 years and over 50 years), gender of the pharmacist or salesperson, location (rural or urban) and socioeconomic status of the area on the basis of the gross disposable household income per inhabitant (rich when this measure in relation to the national average was >100 and poor when it was <100) taken from the last official report published by the government of Catalonia [15].

We performed descriptive statistical analyses of the results using chi-square tests to compare qualitative variables and analysis of variance to compare three mean values. Differences were considered significant with p values under 0.05.

Results

Of the 197 pharmacies visited, 88 (44.7%) were considered as small while only 25 (12.7%) were large. A total of 94 pharmacies were located in richer socioeconomical areas (47.7%). From a demographic point of view, most Catalans live in urban areas and only 44 (22.3%) visited pharmacies were in rural areas. Most of the pharmacies in rural areas were small (59.1%), whereas most of the pharmacies located in urban areas were medium-sized (46.4%), regardless of the socioeconomic status. Because the sample of pharmacies was stratified by provinces, socioeconomic status and location, but not by size, the urinary tract infection scenario was used by the actors mostly in small pharmacies, while a higher percentage of sore throat and acute bronchitis scenarios were used in medium-sized and large pharmacies ($p<0.05$).

Antibiotics were obtained without a medical prescription in 89 (45.2%) of the 197 pharmacies surveyed. Antibiotics were obtained from 79.7% of the pharmacies when a urinary tract infection was simulated, from 34.8% for a sore throat and from 16.9% for an acute bronchitis. Sales of antibiotics without a medical prescription were highest in small pharmacies (63.6%) and lowest in large pharmacies (12%) ($p<0.001$) (Table). This pattern was found in all three simulated case scenarios. In the few large pharmacies in rural areas, antibiotics were never obtained.

The percentage of antibiotics sold was slightly higher among community pharmacies in poorer areas (49.5%) compared with those located in richer areas (40.4%), with no statistically significant difference. Overall, no

Table

Percentage of pharmacies in which the antibiotic was obtained, by simulated case of infection, size of pharmacy and type of area, Catalonia, 2008 (n=197)

Simulated case of infection by type of area	All pharmacies n (%)	By size of pharmacy n (%)			p
		Small pharmacies	Medium-sized pharmacies	Large pharmacies	
Urban					
Urinary tract infection	41/52 (78.8)	23/25 (92.0)	16/24 (66.7)	2/3 (66.7)	NS
Sore throat	20/53 (37.7)	15/23 (65.2)	4/18 (22.2)	1/12 (8.3)	<0.01
Acute bronchitis	10/48 (20.8)	6/14 (42.9)	4/29 (13.8)	0/5 (0)	<0.05
All cases	**71/153 (46.4)**	**44/62 (71.0)**	**24/71 (33.8)**	**3/20 (15.0)**	**<0.001**
Rural					
Urinary tract infection	14/17 (82.4)	9/10 (90.0)	5/6 (83.3)	0/1 (0)	NS
Sore throat	4/16 (25.0)	3/12 (25.0)	1/3 (33.3)	0/1 (0)	NS
Acute bronchitis	0/11 (0)	0/4 (0)	0/4 (0)	0/3 (0)	NS
All cases	**18/44 (40.9)**	**12/26 (46.2)**	**6/13 (46.2)**	**0/5 (0)**	**NS**
Both areas combined					
Urinary tract infection	55/69 (79.7)	32/35 (91.4)	21/30 (70.0)	2/4 (50.0)	<0.05
Sore throat	24/69 (34.8)	18/35 (50.7)	5/21 (23.8)	1/13 (7.7)	<0.01
Acute bronchitis	10/59 (16.9)	6/18 (33.3)	4/33 (12.1)	0/8 (0)	<0.05
All cases	**89/197 (45.2)**	**56/88 (63.6)**	**30/84 (35.7)**	**3/25 (12.0)**	**<0.001**

NS: non significant ($p \geq 0.05$)

differences were observed in the sales of antibiotics between urban and rural areas (46.5% versus 40.9%, non-significant). When performing sub-analyses by pharmacy size, this pattern was observed for large and small pharmacies, but curiously not for pharmacies considered of medium size (Figure). For medium-sized pharmacies, the sale of antibiotics without prescription was slightly greater in rural compared to urban areas (46.2% vs. 33.8%), although no statistical difference was found. Nor did we find any statistical differences in the sales of antibiotics without a medical prescription with regard to the gender of the actor or to the age or gender of the pharmacist or salesperson, although a trend towards selling more antibiotics was observed among men and those over the age of 50 years.

Discussion

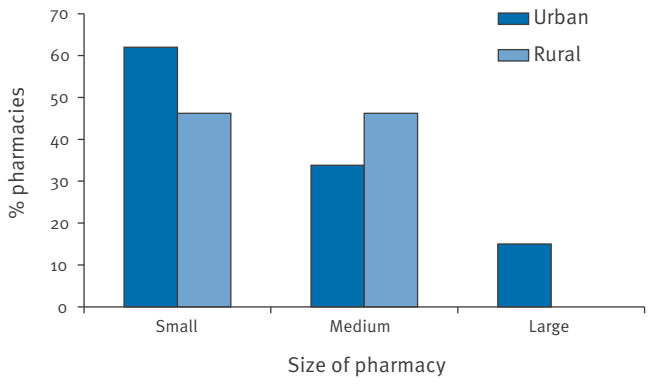
Even though pharmacists are not allowed to dispense prescription-bound medicines without a medical prescription under any circumstance, antibiotics were obtained without a medical prescription in nearly one half of the visited community pharmacies. The results of this study confirm the initial hypothesis that small pharmacies are more likely to sell antibiotics without a prescription than large pharmacies. One reason may be that small pharmacies have a smaller income than large pharmacies, which may be an incentive to generate more revenues by selling prescription-bound medicines over-the-counter, without a medical prescription. In addition, in small pharmacies, the person behind the counter may be the owner, whereas in large pharmacies the person behind the counter is more likely to be a pharmacist or a salesperson who is an employee who has no direct benefit from selling more medicines. To our knowledge, this is the first study to investigate the relationship between size of a pharmacy and over-the-counter sale of antibiotics. In a general study of sales of medications without medical prescription, Rogers *et al*. observed that the lowest level of over-the-counter medicine purchases was recorded in inner cities whilst the highest levels were found in rural pharmacies and small towns [16]. In our study, more than 80% of the large pharmacies were located in cities and these pharmacies were more likely to follow the legislation.

The actors who participated in the study had many years of experience acting as patients in university tests for medical students and trainees in the specialty of family medicine. Nevertheless, this study has some limitations. Firstly, we did not obtain information on the income of the visited pharmacies. As a surrogate, we classified pharmacies according to their size based on the number of salespersons attending customers. These parameters were observed by the two actors. Another limitation is that we could not study the relationship between the profession, pharmacist or other employee, of the attending person and the likelihood of selling an antibiotic without a medical prescription. The actors attempted to approach them as normal customers and asking about the profession of the attending person may have raised suspicion. Another limitation to be taken into account is the fact that the distribution of cases was not uniform among the different sizes of pharmacies because the actors simulated cases with urinary tract infections less frequently and cases with sore throat more frequently in the largest pharmacies, while cases of acute bronchitis were simulated more frequently the medium-sized pharmacies. However, sales of antibiotics were highest among small pharmacies and lowest in large pharmacies, and this pattern was found for all three case scenarios.

With the growing importance of self care, deregulation of medicines and the perceived need to reduce workload of general practitioners, community pharmacists have, in the last years, sought to establish themselves as advice givers about medicine usage and symptom management [17]. In addition, pharmacists are very accessible in Spain and reach nearly the entire population, with a mean of 2,143 inhabitants served by each pharmacy [18]. This is one of the lowest ratios observed in the European Union. However, Spain is one of the European countries where community pharmacies are more strictly regulated, with clear restrictions on ownership. For instance only pharmacists are allowed to own a pharmacy and each pharmacist can only own a maximum of one pharmacy. As a consequence, pharmacy chains are not allowed in Spain [18]. Despite strict regulations, many pharmacies still sell antibiotics to patients without a medical prescription. This practice is also common, although illegal, in at least one other European country [12], and might be present in other countries since self-medication with antibiotics is common in southern and eastern European countries [19]. Most patients are aware of this practice and go directly to a pharmacy rather than wait and pay for a medical consultation. The practice is also well known from immigrants from countries that are strictly regulated in this context. Väänänen *et al*., for example, showed that the antibiotic use habits of Finns change completely when they move to Spain [20].

Figure

Percentage of pharmacies in which the antibiotic was obtained depending on size of pharmacy and type of area, Catalonia, 2008 (n=197)



This study showed that small pharmacies in Catalonia are more likely to dispense antibiotics without a medical prescription, whereas large pharmacies, that probably have a greater income, more closely follow the prevailing legislation of not selling antibiotics to patients without a medical prescription. This observation should now be confirmed in other countries where over-the-counter sales of antibiotics are prevalent and should be taken into account by programmes aiming at achieving a more prudent use of antibiotics.

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References

1. Carbon C, Bax RP. Regulating the use of antibiotics in the community. BMJ. 1998;317(7159):663-5.
2. Hawkey PM. Action against antibiotic resistance; no time to lose. Lancet. 1998;351(9112):1298-9.
3. World Health Organization (WHO). Report on infectious diseases 2000: overcoming antibacterial resistance. Switzerland: WHO; 2000. Available from: http://www.who.int/infectious-dissease-report/2000/index.html
4. Austin DJ, Kristinsson KG, Anderson RM. The relationship between the volume of antimicrobial consumption in human communities and the frequency of resistance. Proc Natl Acad Sci U S A. 1999;96(3):1152-6.
5. Goossens H, Ferech M, Vander Stichele R, Elseviers M, the ESAC Project Group. Outpatient antibiotic use in Europe and association with resistance: a cross-national database study. Lancet. 2005;365(9459):579-87.
6. Steinke D, Davey P. Association between antibiotic resistance and community prescribing: a critical review of bias and confounding in published studies. Clin Infect Dis. 2001;33 Suppl 3:S193-205.
7. Earnshaw S, Monnet DL, Duncan B, O'Toole J, Ekdahl K, Goossens H, et al. European Antibiotic Awareness Day, 2008 – the first Europe-wide public information campaign on prudent antibiotic use: methods and survey of activities in participating countries. Euro Surveill. 2009;14(30):pii=19280. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19280
8. Goossens H, Guillemot D, Ferech M, Schlemmer B, Costers M, van Breda M, et al. National campaigns to improve antibiotic use. Eur J Clin Pharmacol. 2006;62(5):373-
9. Hart CA, Kariuki S. Antimicrobial resistance in developing countries. BMJ. 1998;317(7159):647-50.
10. European Commission. [Antibiotics]. Eurobaromètre Spécial 183-3/Vague 58.2.European Opinion Research Group EEIG]. Luxembourg: 2003. [French]. Available from: http://ec.europa.eu/health/ph_threats/com/mic_res/eb582_antibio_fr.pdf
11. Grigoryan L, Haaijer-Ruskamp FM, Burgerhof JG, Mechtler R, Deschepper R, Tambic-Andrasevic A, et al. Self-medication with antimicrobial drugs in Europe. Emerg Infect Dis. 2006;12(3):452-9.
12. Plachouras D, Kavatha D, Antoniadou A, Giannitsioti E, Poulakou G, Kanellakopoulou K, et al. Dispensing of antibiotics without prescription in Greece, 2008: another link in the antibiotic resistance chain. Euro Surveill. 2010;15(7):pii=19488. Available from: http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19488
13. Llor C, Cots JM. The sale of antibiotics without prescription in pharmacies in Catalonia, Spain. Clin Infect Dis. 2009;48(10):1345-9.
14. Monnet DL. How do people obtain antibiotics in European countries: an overview. Available from: http://www.sante-sports.gouv.fr/dossiers/antibiotiques/Pres_Monnet.pdf
15. Official statistics website of Catalonia. Gross disposable household income per inhabitant, 2000-2004. Counties and areas. Institut d'Estadística de Catalunya. Barcelona. Available from: http://www.idescat.cat/pub/?id=aec&n=370&lang=en
16. Rogers A, Hassell K, Noyce P, Harris J. Advice-giving in community pharmacy: variations between pharmacies in different locations. Health Place. 1998;4(4):365-73.
17. Turner P. The Nuffield Report: a signpost for pharmacy. Br Med J (Clin Res Ed). 1986;292(6527):1031-3.
18. Lluch M, Kanavos P. Impact of regulation of community pharmacies on efficiency, access and equity. Evidence from the UK and Spain. Health Policy. 2010;95(2-3):245-54.
19. Grigoryan L, Burgerhof JG, Degener JE, Deschepper R, Lundborg CS, Monnet DL, et al. Self-Medication with Antibiotics and Resistance (SAR) Consortium. Determinants of self-medication with antibiotics in Europe: the impact of beliefs, country wealth and the healthcare system. J Antimicrob Chemother. 2008;61(5):1172–9.
20. Väänänen MH, Pietilä K, Airaksinen M. Self-medication with antibiotics- Does it really happen in Europe? Health Policy. 2006;77(2):166-71.

World Health Organization declares post-pandemic phase

Eurosurveillance editorial team (eurosurveillance@ecdc.europa.eu)[1]
1. European Centre for Disease Prevention and Control, Stockholm, Sweden

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On 10 August, following advice from the Emergency Committee the World Health Organization (WHO) declared that the world is no longer in phase 6 of influenza pandemic alert. Margaret Chan, the WHO Director-General, stated that the Committee based its assessment on the global situation and on reports from countries that are currently experiencing influenza epidemics. While noting the epidemics with concern, members of the Committee noted that there were indications that influenza activity worldwide has returned to levels that are normally seen for seasonal influenza.

In the post-pandemic period, levels of influenza activity are those usual for seasonal influenza and the pandemic virus is expected to behave like a seasonal influenza A virus. The post-pandemic phase is an opportunity to review the pandemic itself as well as its management in the past months, and to identify areas in the preparedness and response plans that may need to be adapted in light of the experience with the 2009 influenza pandemic [1].

Expert predictions for the European 2010-11 winter are for epidemics to be similar to those in the southern hemisphere temperate countries. Current epidemiological indicators do not show any influenza activity in 14 reporting European Union countries [2].

References

1. World Health Organization (WHO): Global Influenza Programme. Pandemic influenza preparedness and response: a WHO guidance document. Geneva: WHO; 2009. ISBN 9789241547680. Available from: http://www.who.int/csr/disease/influenza/PIPGuidance09.pdf.
2. European Centre for Disease Prevention and Control (ECDC). Weekly Influenza Surveillance Overview. 30 July 2010. Available from: http://ecdc.europa.eu/en/activities/surveillance/EISN/Pages/EISN_Bulletin.aspx