The noted improvement in data quality is also important as this availability of more complete information should enable national authorities to respond in a more timely and appropriate manner. While we only selected 7-8 data fields per disease as indicators of data quality the general superiority of electronic reports suggests that improved completeness is also likely in unexamined data fields.

A potential concern in comparisons such as this is variation in coding between the fields in the electronic and paper-based systems. However, in this study as we only selected variables that were equivalent on the hardcopy and the electronic surveillance forms, direct comparability was ensured. Also, before the introduction of the electronic system staff training, technical assistance was provided at local level to ensure any data entry and coding problems were identified and managed appropriately [5]. Another potential concern is that the relative benefits of electronic reporting in this study could be secondary to deterioration in the conventional system. As the transition from conventional to electronic reporting occurred mid-year in 2002 and we selected only years when one system functioned at GGD level, a decline in the conventional working process could not explain the improved reporting times in 2003. In addition, the consistency of our results for all nine conditions suggests that the improved reporting times are real.

OSIRIS has achieved its objectives. Data received at national level is more timely and of better quality than with conventional reporting. However, the primary purpose of surveillance is not merely speedy and complete transmission of data. Technologically innovative reporting systems, as OSIRIS, also need to be consistent with the purpose of disease reporting, that is, of translating information into action [1,7]. Thus, it must be a two-way communication process of information exchange between public health agencies and the clinical community. Even in this technologically advanced age, observations made by astute clinicians still remain important, in timely reporting of certain notifiable diseases [8]. In these instances, electronic surveillance systems help us verify suspicions of outbreaks as was recently observed in the Netherlands when action was taken as a result of the observed increased notifications of hepatitis A cases. This action was due to a combination of clinical observation and national notification by OSIRIS [9,10].

This study documented improved timeliness and completeness of national infectious disease surveillance data that has occurred as a result of the use of electronic communication.

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ORIGINAL ARTICLES

Surveillance report

HARMONISATION OF THE ACUTE RESPIRATORY INFECTION REPORTING SYSTEM IN THE CZECH REPUBLIC WITH THE EUROPEAN COMMUNITY NETWORKS

J Kyncl[1], WJ Paget[2], M Havlickova[1], B Kriz[1]

Respiratory virus activity is detected in Europe each winter, yet the precise timing and size of this activity is highly unpredictable. The impact of influenza infection and/or acute respiratory infection in European countries is continuously monitored through a variety of surveillance systems. All of these sources of information are used to assess the nature and extent of activity of influenza and other respiratory viruses, and to offer guidance on the prevention and control of morbidity and mortality due to influenza at a local, national and international level.

The early warning system for a forthcoming influenza epidemic is mainly based on the use of a set of thresholds. In the Czech Republic, the acute respiratory infection (ARI) reporting system, with automated data processing, uses a statistical model for the early detection of unusual increased rates of the monitored indicators. The collected data consists of the number of ARI, the number of complications due to ARI and the population registered with the reporting general practitioners and paediatricians, all collected separately in five age groups. To improve the reporting system in the Czech Republic, clinical data on the weekly incidence of influenza-like illness (ILI) within the same population and the same age groups was started in January 2004. These data fit the European Commission's recently adopted ILI case definition and allows a better comparison of data with other countries in Europe, in particular those participating in EISS (European Influenza Surveillance Scheme).

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Euro Surveill 2005;10(3):30-33 Published online Mar 2005
Key words: acute respiratory infection, early warning system, European Union, influenza surveillance.

Introduction

Information on the occurrence of infectious diseases is very important for maintaining public health in Europe. Every European country has its own national notification and surveillance system and legislation [1, 2]. National laboratories participate in many international surveillance programmes organised by the European Union, WHO and other organizations. Recently the Community

network for epidemiological surveillance has been established in accordance with Decision No. 2119/98/EC of the European Parliament and of the Council.

Acute viral rhinitis, pharyngitis, laryngotracheitis, tracheobronchitis, bronchitis, bronchiolitis or pneumonia are associated with a large number of viruses, each of which is capable of producing a wide spectrum of acute respiratory illness, with different causes in children and adults [3].

Viral diseases of the respiratory tract may be characterised by fever and one or more systemic reactions, such as chills, headache, general aching, malaise and anorexia. Morbidity from acute respiratory diseases is particularly significant in children. In adults, the relatively high incidence and resulting disability, with consequent economic loss, make acute respiratory diseases a major health problem worldwide [3-5]. As a group, acute respiratory diseases are one of the leading causes of death from any infectious disease worldwide.

Influenza virus activity in Europe is detected each winter, yet the precise timing and magnitude of this activity remain highly unpredictable. The age groups of the population affected and the severity of illness that they experience depend on several factors including the virus types and subtypes that circulate during a given season. Clinical and virological data is collected and presented at a European level by the European Influenza Surveillance Scheme (EISS) through the internet [6]. EISS reported data for 22 countries during the 2003-2004 season; collaborators included 30 reference laboratories, at least 11 000 sentinel physicians and the surveillance covered a population of 445 million inhabitants [7].

Epidemics of influenza are reported almost every year. Influenza pandemics occur at irregular intervals (three in the last century) and have been associated with unpredictable reassortments of genome segments of human, pig or avian viruses leading to surface antigens to which humans have no pre-existing immunity.

In an attempt to improve the health care information systems, substantial changes were made to the acute respiratory infection (ARI) reporting system from 2000 to 2002 in the Czech Republic [8]. The system (formerly based on sending the data by fax and entering them into a central database) was changed to a modern web-based system, which enables data to be entered at a local level with basic analysis in real time. Further changes were made in 2003 in accordance with the Commission Decision of 19 March 2002 laying down case definitions (Decision No. 253/2002/EC) for reporting communicable diseases to the Community network. The system was extended to enable the collection of age-specific incidence of influenza-like infections (ILI) as well.

Methods

The surveillance of influenza and other ARI is based mainly on clinical surveillance (morbidity reports and mortality statistics of influenza and respiratory infections as well as of all causes) and virological surveillance from the community and hospitals. The influenza morbidity monitoring program started in the Czech Republic in 1951. Since 1968, the age specific incidence of ARI and total incidence of complications have been monitored weekly. The system now includes approximately 2230 general practitioners (GP) and 1240 paediatricians and covers approximately 5 million inhabitants (half of the Czech population) in all 86 districts of the Czech Republic.

ILI is defined as: the clinical picture compatible with influenza, e.g. sudden onset of disease, cough, fever > 38 ºC, muscular pain and/or headache, in accordance with the EU case definition for influenza. ARI for reporting purposes is defined as every GP's clinical diagnosis of acute upper respiratory tract infection (as defined by the International Classification of Diseases, Tenth Revision (ICD-10), codes J00, J02, J04, J05, J06) and influenza (ICD-10 codes J10.1, J10.8, J11.1, J11.8).

Virological surveillance is performed by the Airborne Viral Infections Department at the National Institute of Public Health. The department is composed of two divisions: the National Reference Laboratory (NRL) for influenza and the NRL for non-influenza respiratory viruses. The virological surveillance program consists of a weekly assessment of routine laboratory test results of paired sera and nasopharyngeal swabs, provided by the collaborating virological laboratories. Test methods used are the complement fixation reaction (CFR), direct antigen dete ction from clinical specimens (ELISA) and isolation of the causative agent from a suitable cell culture. Lately, rapid diagnosis of the major causative agents of acute respiratory virus infections such as influenza virus of types A and B, respiratory syncytial virus, adenoviruses and parainfluenza viruses has been used within this program [9].

The data on morbidity from epidemiological surveillance are integrated with those from virological surveillance. After validation and assessment, the results are presented in a weekly bulletin. The bulletin is sent to the regional public health institutes, the Ministry of Health, collaborating laboratories and is also posted on the web page of the National Institute of Public Health [10]. Comprehensive outputs for international organisations such as EISS or WHO FluNet are provided by the National Reference Laboratory for influenza.

Results

Starting from the season 2001-2002, each regional public health service entered data from collaborating general practitioners and paediatricians into a central SQL database, using an encrypted web transfer with name and password controlled access. The district-specific data consists of the number of ARI, the number of complications due to an ARI and the population registered with the reporting GPs and paediatricians, all collected in five age groups (0-5, 6-14, 15-24, 25-59, 60+ years) [Figure 1]. There is also space for comments. Pneumonia only is now considered as a complication of the infection. Starting from January 2004, clinical data on incidences of influenza-like illness (ILI) within the same population and the same age groups as in ARI have also been collected [Figure 2].

Figure 1

Weekly ARI morbidity by age group per 100 000 population during the 2003-2004 season in the Czech Republic

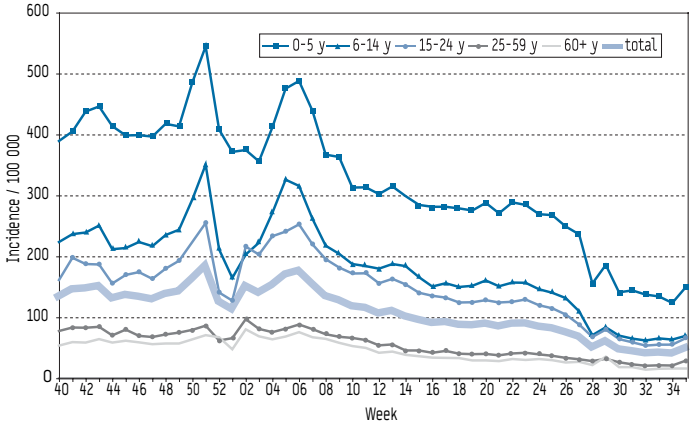
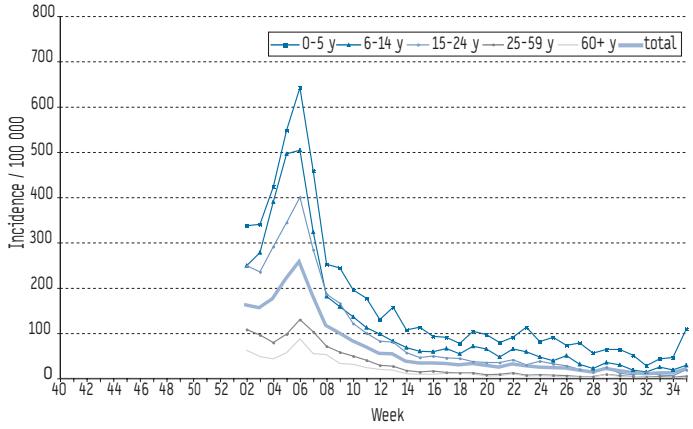


Figure 2

Weekly ILI morbidity by age group per 100 000 population during the 2003-2004 season in the Czech Republic



The basic data processing is automated and uses a statistical model for early detection of unusual increased rates of the indicators monitored, based on a general linear model for left-censored data. Usual weekly ARI incidence is modelled and this rate can only increase if a possible epidemic occurs. A threshold was established by averaging non-epidemic ARI incidences in the past years and applying an upper tolerance limit (covering 90% observations with 95% probability). The thresholds are available for the whole of the Czech Republic and also for each region. Direct standardisation and weighting for the size of the monitored population are also used to enable comparison of ARI and/or ILI morbidity among regions and districts. Figures 3 and 4 show the district distribution of ARI clinical incidence during two peak weeks.

FIGURE 3

The first peak of ARI morbidity (week 51/2003). ARI incidence per 100 000 population, by district, Czech Republic

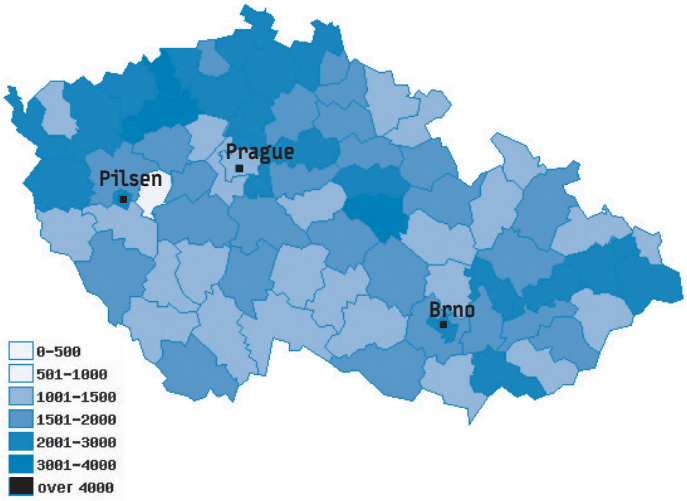
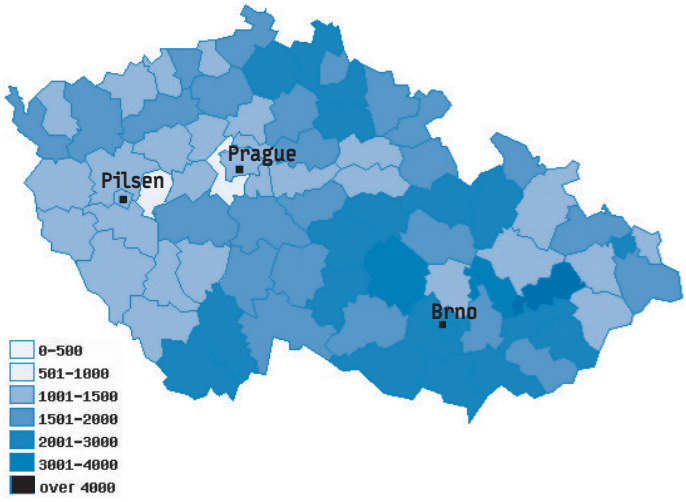


FIGURE 4

The second peak of ARI morbidity (week 6/2004). ARI incidence per 100 000 population, by district, Czech Republic



Laboratory results for the season 2003-2004 [FIGURES 5,6] confirm that both regional outbreaks were caused by influenza. Weekly numbers of positive samples of the main circulating respiratory viruses of that season and the total ARI incidence is shown. Positive results for influenza can be seen to peak almost simultaneously with clinical illness incidence (positive results by the paired sera test are shown by the week when the second sample was tested and the results are therefore shifted by 2-3 weeks).

FIGURE 5

Detection of ARI using an antigen detection: number of positive samples by week, season 2003-2004, Czech Republic

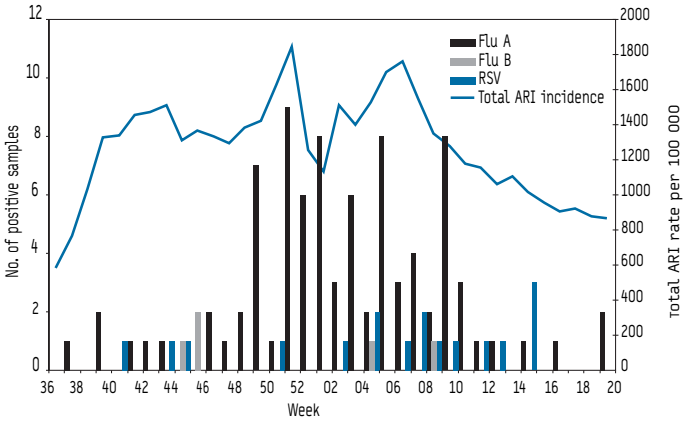
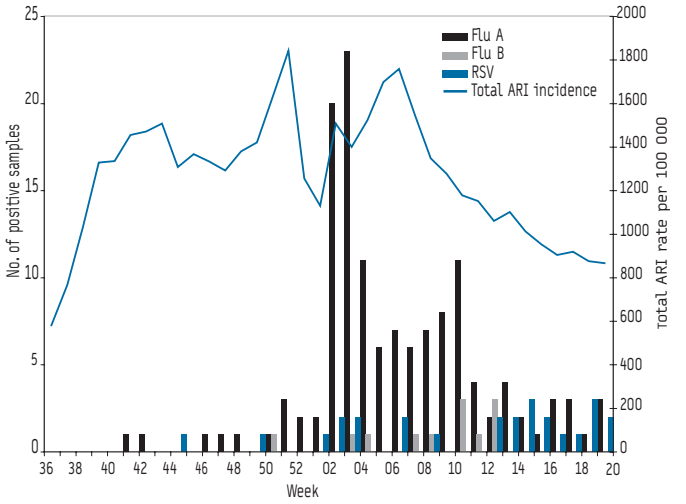


FIGURE 6

Detection of ARI using a serology: number of positive samples by week, season 2003-2004, Czech Republic



Discussion

Substantial changes have been made to the influenza reporting system in the Czech Republic in recent years. The changes started with an improvement of the ARI reporting system by making the system web-based during the 2001-2002 season. In January 2004, the reporting system also started a pilot ILI reporting project using an European Union adopted case definition.

Data collected by the influenza reporting system in the Czech Republic have been reported to EISS since 1998 [11]. During the 2003-2004 season, 20 networks reported weekly ILI incidences and four networks (the Czech Republic, France, Germany and Romania) reported ARI incidences [7]. The pilot ILI incidences from the Czech Republic means that it is now possible to compare influenza activity with many more countries in Europe. The ILI rates in Europe varied considerably during the 2003-2004 season, with the peak incidences ranging from 12 per 100 000 population in Wales to 1885 per 100 000 population in the Slovak Republic. The peak ILI incidence in the Czech Republic was 256 per 100 000 population, much lower than in the neighbouring Slovak Republic. This difference may be due to a number of factors, including different case definitions, different health care systems and recent changes in the surveillance systems [12].

The age groups 0-5 and 6-14 were chosen because compulsory education starts at the age of 6 in the Czech Republic. Dividing children into school and pre-school groups is relevant because of airborne spreading of respiratory infections.

Methods used for virological surveillance within EISS network were already Published in 2004 [13]. Although only a small part of all clinical cases are analysed virologically each year, the virological results

are of equal significance. Substantially more data are available for the specimens analysed, e.g. patient's age, clinical diagnosis, sampling date and onset of disease. First isolations of influenza virus and particularly an increase in their incidence may be predictive of the very beginning of an epidemic even before any change can be detected in the clinical morbidity rates. Routine detection of other viral respiratory pathogens yields complementary data which are useful in monitoring general trends in morbidity. Summary data are informative enough of the circulation of different agents in the population throughout the year. The virological results are also sometimes used to validate the clinical reports. For example, during the 2003-2004 season there were two ARI morbidity peaks in the Czech Republic [FIGURE 1]. This was caused by two regional influenza epidemics in different parts of the Czech Republic when the fast transmission was interrupted by the Christmas holidays [FIGURES 3,4].

The ARI / ILI reporting system of the Czech Republic is a modern and efficient surveillance system based on the collection of high quality data. The whole ARI / ILI reporting system is essential for pandemic planning in the Czech Republic. It can be linked with the system for crisis management to enable reporting and analysis on a daily basis. For efficient information at all levels, high quality local and national surveillance is necessary. Since using an internet-based platform, the reporting system in the Czech Republic as well as the EISS are easily accessible and provide timely information.

Acknowledgements

Thanks are given to Dr. Bohumir Prochazka, head of the Dept. of Biostatistics, National Institute of Public Health in Prague for statistical contribution and advices on the Czech reporting system. The authors wish to thank all Regional Public Health Institutes, general practitioners and paediatricians as well as the virological laboratories participating at the ARI surveillance in the Czech Republic.

The project was partly supported by the Ministry of Health of the Czech Republic.

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ORIGINAL ARTICLES

Surveillance report

SURVEY OF THE CONTAMINATION OF FOODSTUFFS OF ANIMAL ORIGIN BY SHIGA TOXIN PRODUCING *ESCHERICHIA COLI* SEROTYPE O157:H7 IN BELGIUM FROM 1999 TO 2003

A Chahed [1], Y Ghafir [1], B China [1], K Dierick [2], L De Zutter [3], D Piérard [4], G Daube [1].

A survey of the prevalence of Shiga toxin-producing *Escherichia coli* (STEC) of O157 serotype in foodstuffs of animal origin (beef, veal, pork, chicken, fish) from 1999 to 2003 in Belgium was performed. STEC strains were only isolated from beef with a prevalence of 0.73%. This percentage is low in comparison with the prevalence in other countries. Among the 76 isolated STEC O157 strains, 75% belonged to the serotype O157:H7 and 25% to the serotype O157 non H7. Moreover, the most frequent pathotype was *eae stx2 ehxA* (74%).

Euro Surveill 2005;10(3):33-36 Published online Mar 2005

Key words: Escherichia coli, Foodstuff, pathotype, Shiga toxin

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Introduction

Two legal texts Published by the European Parliament in November 2003 are dedicated to the survey and management of zoonoses and zoonotic agents in European Union (EU): Directive 2003/99/EC [1] on the survey of zoonoses and zoonotic agents and Regulation 2160/2003/EC [2] on the control of salmonella and other zoonotic agents present in food chain. These texts repeal the directive 92/117/CEE [3] concerning the survey of zoonoses and zoonotic agents in EU and indicate that each member country must collect relevant data concerning the major zoonotic agents and must report this to the European Commission. Among these zoonotic agents to be surveyed, the directive mentions verocytotoxigenic *Escherichia coli* (VTEC). These pathogens are a public health problem in Belgium: 46 pathologic cases associated with Shiga toxin-producing *Escherichia coli* (STEC) were identified in 2002 [4].

Enterohaemorrhagic *E. coli* (EHEC) are VTEC or STEC which can cause a broad spectrum of human diseases, including diarrhoea, haemorrhagic colitis, and the haemolytic uraemic syndrome (HUS).