

European Influenza Surveillance Scheme

Annual Report
2006-2007 influenza season

Utrecht, May 2008

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Acknowledgements: We are grateful that Ina Wienand based at the Institute for Hygiene and Public Health, University of Bonn, provided the Geographical Information Systems (GIS) maps on page 21.

EISS is funded by The European Centre for Disease Prevention and Control (ECDC). EISS also receives funding from F. Hofmann-La Roche Ltd (Switzerland), Sanofi Pasteur and Sanofi Pasteur MSD.

Neither ECDC, F. Hofmann-La Roche Ltd, Sanofi Pasteur, Sanofi Pasteur MSD, nor any person acting on their behalf, is liable for any use made of the information in this report.

Suggested citation:
European Influenza Surveillance Scheme. Annual report: 2006-2007 influenza season. Utrecht, the Netherlands. NIVEL, 2008.

The report is accessible via the EISS website: http://www.eiss.org/html/annual_reports.html

ISBN 97-890-6905-9037

EISS Co-ordination Centre, Utrecht, January 2008



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Table of contents

European Influenza Surveillance Scheme: participating countries and institutes	5
Summary	7
1 Background	9
1.1 Introduction	9
1.2 Historical background	9
1.3 The European Influenza Surveillance Scheme	10
1.3.1 Objectives	10
1.3.2 Membership	11
1.3.3 Methods	11
1.3.4 Funding	12
2 EISS developments during the 2006-2007 season	15
2.1 Introduction	15
2.2 Objectives	15
2.3 Results	16
2.3.1 Routine surveillance activities	16
2.3.2 Epidemiological projects	16
2.3.3 Virological projects	17
2.3.4 Management of EISS	19
2.3.5 Other projects	20
2.4 Conclusions	21
3 Influenza activity in Europe during the 2006-2007 season	23
3.1 Introduction	23
3.2 Epidemiological and virological data	23
3.3 Influenza vaccine for the 2007-2008 season	25
3.4 Summary	26
4 Retrospective	27
4.1 Introduction	27
4.2 Persons	27
4.3 Historical epidemiological and virological data	30
5 EISS publications	41
References	49

European Influenza Surveillance Scheme: participating countries and institutes

Austria	Bundesamt für Gesundheit und Frauen	Vienna
	Österreichische Agentur für Gesundheit und Ernährungssicherheit	Vienna
	Medical University of Vienna, Institute of Virology	Vienna
Belgium	Scientific Institute of Public Health	Brussels
Czech Republic	National Institute of Public Health	Prague
Cyprus	Medical and Public Health Services, Ministry of Health	Nicosia
Denmark	Statens Serum Institut	Copenhagen
Estonia	Health Protection Inspectorate	Tallinn
Finland	National Institute for Public Health	Helsinki
France	GROG/Open Rome	Paris
	Hospices Civils de Lyon	Lyon
	Institut Pasteur	Paris
Germany	Robert Koch Institut	Berlin
	Arbeitsgemeinschaft Influenza	Marburg
Greece	Hellenic Centre for Infectious Diseases Control	Athens
	National Influenza Center for Southern Greece	Athens
	National Influenza Center for Northern Greece	Thessaloniki
Hungary	B. Johan National Center for Epidemiology	Budapest
Ireland	Health Protection Surveillance Centre	Dublin
	Irish College of General Practitioners	Dublin
	National Virus Reference Laboratory	Dublin
Italy	Università degli Studi di Milano	Milan
	Istituto Superiore di Sanità	Rome
	Università di Genova	Genoa
Latvia	State Public Health Agency Laboratory of Virology	Riga
Lithuania	Centre for Communicable Diseases Prevention and Control	Vilnius
	Lithuanian AIDS Centre Laboratory	Vilnius
Luxembourg	Laboratoire National de Sante	Luxembourg
Malta	Disease Surveillance Unit	Msida
	St. Luke's Hospital	G'Mangia

Netherlands	Erasmus University National Institute for Public Health and the Environment Netherlands Institute for Health Services Research	Rotterdam Bilthoven Utrecht
Norway	National Institute of Public Health	Oslo
Poland	National Institute of Hygiene	Warsaw
Portugal	Instituto Nacional de Saude	Lisbon
Romania	Cantacuzino Institute	Bucharest
Serbia	Torlak Institute of Immunology and Virology Institute of Public Health of Serbia	Belgrade Belgrade
Slovakia	State Health Institute	Bratislava
Slovenia	Institute of Public Health	Ljubljana
Spain	Instituto de Salud Carlos III Dirección General de Salud Pública y Consumo Hospital Clínic Facultad de Medicina	Madrid Madrid Barcelona Valladolid
Sweden	Swedish Institute for Infections Disease Control	Solna
Switzerland	Swiss Federal Office of Public Health University Hospital of Geneva	Bern Geneva
Ukraine	L.V.Gromashevskiy Institute of Epidemiology and Infectious Diseases Ministry of health of Ukraine	Kiev Kiev
United Kingdom	Health Protection Agency Royal College of General Practitioners Health Protection Scotland Gartnavel General Hospital NPHS Communicable Disease Surveillance Centre University Hospital of Wales Communicable Disease Surveillance Centre (N.-Ireland) Royal Victoria Hospital	London Birmingham Glasgow Glasgow Cardiff Cardiff Belfast Belfast

For the individual members in each country, see page 2.

Netherlands Institute for Health Services Research (NIVEL)

The EISS Co-ordination Centre is based at NIVEL in Utrecht, the Netherlands. NIVEL is a non-profit research institute. In 2007 NIVEL had approximately 200 employees and a gross annual turnover of roughly € 11 million.

NIVEL has operated the Dutch sentinel surveillance system since 1970. It is a WHO Collaborating Centre for Primary Health Care and has had a full ISO-9001 accreditation for its research activities since 2001.

Summary

The European Influenza Surveillance Scheme (EISS) has grown considerably over the last eleven years and included 26 of the 27 EU countries (only Bulgaria was not included), Norway, Serbia, Switzerland and Ukraine during the 2006-2007 season. EISS integrated two new member countries (Serbia and Ukraine) during the 2006-2007 season.

The surveillance of influenza and different projects within EISS were carried out in close collaboration with the European Centre for Disease Prevention and Control. EISS also co-ordinates its activities with WHO and actively supports WHO's FluNet influenza surveillance system.

Seasonal influenza epidemics in Europe started around New Year and first occurred in Greece, Scotland and Spain. Influenza activity then moved gradually across Europe from south to north and lasted until the end of March. In 29 out of 33 countries, the consultation rates for influenza-like illness or acute respiratory infections in the 2006-2007 winter were similar or somewhat higher than in the 2005-2006 winter.

The predominant virus strain was influenza A (97% of total detections; N=18 278) of the H3 subtype (93% of H-subtyped A viruses; 7% was A(H1)). The influenza A(H3) and A(H1) viruses were similar to the vaccine reference strains for the 2006-2007 season, A/Wisconsin/67/2005 (H3N2) and A/New Caledonia/20/99 (H1N1) respectively. The majority of the influenza B viruses were similar to the reference strain B/Malaysia/2506/2004, included in the 2006-2007 vaccine. Of all viruses that were antigenically and/or genetically characterised (N=3877), the vast majority (N=3318; 86%) were A/Wisconsin/67/2005 (H3N2)-like (a drift variant of A/California/7/2004 included in the vaccine for the 2006-2007 winter).

In summary, the 2006-2007 influenza season in Europe was characterised by moderate clinical activity, a south to north spread pattern across Europe with a dominance of influenza A(H3). Overall there was a good match between the vaccine virus strains and the reported virus strains.

1 Background

1.1. Introduction

Influenza is an important public health problem in Europe. It is associated with increased general practice consultation rates (Glezen, 1982), hospital admissions (Fleming, 2000) and excess deaths (Fleming, 2000; Thompson, 2003). It must also be considered in terms of increased days lost to absence from work and school and the extra pressure put on health care services during the winter season. Another important aspect of influenza is the threat of the emergence of a potentially high-pathogenic novel virus subtype capable of causing an influenza pandemic.

Influenza surveillance networks in Europe have co-operated and shared information since the mid-1980s. They have done this as influenza is a communicable disease that spreads rapidly and efficiently; this means that it is beneficial for countries to be informed about influenza activity (consultation rates and types/subtypes/strains) in neighbouring countries. Other benefits are that surveillance systems can learn from each other and initiate common surveillance and/or research projects. The threat of an influenza pandemic has further encouraged this collaboration. During a pandemic, EISS would provide rapid, transparent and detailed information on the epidemiological and virological spread of influenza in Europe.

This report covers the 2006-2007 influenza season and consists of five chapters. Chapter one provides background information on EISS; chapter two outlines EISS developments undertaken during the 2006-2007 season; chapter three provides a brief summary of influenza activity during the season, chapter four provides a retrospective summary of EISS data since 1996 and chapter five lists EISS publications since 1996.

1.2. Historical background

WHO established an international network for the surveillance of influenza in 1949 (WHO, 2000). This global surveillance system comprises over 110 national influenza centres, and influenza activity is published every week on the internet (Flahault et al., 1998). National influenza centres in Europe have participated in the WHO surveillance system since its creation.

The surveillance of influenza morbidity in the general population began in the 1960s in western Europe (in England and Wales) and was based on sentinel physicians reporting clinical cases of influenza-like illness (ILI) to a central registry. In the early 1990s, the integration of virological information was achieved by the collection of nose and/or throat swabs from patients diagnosed with ILI (Fleming et al., 1995). The integration of clinical and virological data collected in the same population represents one of the founding principles of the EISS project (Fleming & Cohen, 1996; Paget et al., 2003).

Efforts to create a European surveillance project were ongoing as of the mid-1980s (Fleming et al., 2003). The first project was the Eurosentinel scheme (1987-1991). This was followed by the ENS-CARE Influenza Early Warning Scheme (1991-1994) (Snacken et al., 1995; Fleming & Cohen, 1996), the European Influenza Early Warning and Surveillance Scheme (1995) and EISS (1996-present) (Snacken et al., 1998). EISS began with the participation of seven countries: Belgium, France, Germany, the Netherlands, Portugal, Spain and the United Kingdom.

In 1998 the European Parliament and the European Council decided that a network for the epidemiological surveillance and control of communicable diseases should be established in the Community (2119/98/EC, 24 September 1998). On December 22nd 1999, two European Commission Decisions were adopted which further defined this framework. The first Decision (2000/57/EC) concerned the terms of action for an early warning and response system: events that are potential public health threats are to be monitored and reported. The second Decision (2000/96/EC) identified the communicable diseases and specific health issues that have to be covered by epidemiological surveillance in the "Community network". Influenza is one of the communicable diseases listed in this Decision.

As a result of these two Decisions, a new European early warning and response system for communicable diseases was officially launched on January 1 2000. EISS was one of the epidemiological surveillance networks that the EC funded to monitor communicable diseases in Europe. A number of additional Decisions further strengthened the epidemiological surveillance and control of communicable diseases in the Community (2002/253/EC, 2003/534/EC). In May 2005, the European Centre for Disease Prevention and Control (ECDC) became operational (Decision 2004/851/EC), and ECDC and EISS have become important partners.

The Community Network of Reference Laboratories for Human Influenza (CNRL) was established in 2003 (Meijer et al., 2005) and is located at the EISS-Co-ordination Centre. As of September 2006, ECDC took over the funding of EISS from the European Commission. This will continue until September 2008, when the epidemiological surveillance activities will be moved to ECDC. The CNRL will continue but will be based outside ECDC.

1.3 The European Influenza Surveillance Scheme

1.3.1 Objectives

The aim of EISS is to contribute to a reduction in morbidity and mortality related to influenza in Europe. The EISS project has the following objectives:

- To collect and exchange timely information on influenza activity in Europe;
- To aggregate, interpret and make publicly available clinical and virological data concerning influenza activity in Europe;
- To strengthen, and harmonise where appropriate, epidemiological and virological methods, primarily based on the integrated sentinel surveillance model, for assessing influenza activity in Europe;
- To contribute to the annual determination of the influenza vaccine content;
- To monitor influenza prevention and control policies in Europe, including influenza vaccine uptake;

- To contribute to European planning and response to pandemic influenza through surveillance, investigation and provision of information;
- To promote research in support of the objectives above;
- To establish and operate a Community Network of Reference Laboratories for Human Influenza in Europe.

1.3.2 Membership

EISS aims to include all Member States of the European Union. Full members of EISS must meet the following criteria:

- The network is nationally or regionally representative;
- The authority of the network is recognised by the national or regional health authority in the country or region;
- Clinical surveillance and virological surveillance are integrated in the same population (community);
- The network has functioned successfully for two years;
- The network can deliver data on a weekly basis.

26 of the 27 EU countries (only Bulgaria was not included), Norway, Serbia, Switzerland and Ukraine were active members of EISS during the 2006-2007 influenza season. For the EISS project, England, Northern Ireland, Scotland and Wales (who all have their own influenza surveillance network) are referred to as separate countries and there were therefore 33 member countries (see Table 1.1).

Twelve countries were ‘associate’ members of EISS during the 2006-2007 season. Austria, Finland and Sweden were associate members as they did not combine clinical and virological data in the same population. Cyprus, Estonia, Greece, Hungary, Latvia, Lithuania and Malta had this status as they did not fully fulfill the EISS criteria for full membership. Serbia and Ukraine were ‘corresponding’ members of EISS during the 2006-2007 season. A ‘corresponding’ member is an associate member that has no official relation / status (Member State, candidate country / pre-accession country, etc) with the European Union.

1.3.3 Methods

The EISS project involves several partners in each country: sentinel surveillance systems, national influenza reference laboratories and national communicable disease surveillance centres. The partners are connected via the Internet (www.eiss.org) (Snacken et al., 1995), which allows members to enter their data into the EISS database, to view influenza activity in the other networks and to perform detailed epidemiological and virological queries.

In each of the countries, one or several networks of sentinel physicians reported consultation rates due to influenza-like illness (ILI) and/or acute respiratory infection (ARI). Sentinel physicians obtained nasal, pharyngeal, or nasopharyngeal specimens from a subset of patients and these were sent to the national reference laborator(y)(ies) for virological analysis. Combining clinical and virological data in the same population – the integrated sentinel surveillance model (see 1.3.1) – allows the validation of clinical reports made by the sentinel physicians and provides virological data in a clearly defined population (the general population that visits their physician with an ILI or ARI) (Fleming et al., 1995).

In addition to the specimens obtained from physicians in the sentinel surveillance systems, the laboratories also collected and reported results on specimens obtained from other sources (e.g. from hospitals or non-sentinel physicians). These data are called ‘non-sentinel’ in this report and are collected to have a second measure of influenza activity and to analyse the representativeness of the data obtained from the sentinel physicians (Fleming et al., 1995).

The virological data includes results mostly from cell cultures followed by virus type and subtype identification, and from rapid diagnostic enzyme-immunological or immunofluorescence tests identifying the virus type only. Many laboratories also use reverse transcription polymerase chain reaction (RT-PCR) routinely for detection and (sub)typing (Meerhoff et al., 2004).

During the influenza season, a Weekly Electronic Bulletin is published on the EISS website. This Bulletin is based on data entered into the EISS database and provides a weekly overview of influenza activity in Europe in the form of a written commentary, a table and graphs for each country. As of the 2004-2005 season, the Bulletin has been written by the EISS Co-ordination Centre in collaboration with experts from within the EISS group. Since the 2005-2006 season, it has also been written in collaboration with ECDC.

During the 2006-2007 season, thirty countries (see table below; right column) actively monitored influenza activity from week 40/2006 (2/10/2006- 8/10/2006) to week 20/2007 (14/5/2006 - 20/5/2006) and appeared in the Weekly Electronic Bulletin.

Table 1.1: Countries which were included in EISS (and Chapter 3 of this report) and in the Weekly Electronic Bulletin during the 2006-2007 season:

Total number of countries in EISS and included in the 2006-2007 season analysis (Chapter 3)	Total number of countries included in the Weekly Electronic Bulletin
33 countries	30 countries
26 EU countries* [since England, Northern Ireland, Scotland and Wales are considered to be countries, the total number of countries in the EU is 29], Norway, Serbia, Switzerland and Ukraine	24 EU countries* [since England, Northern Ireland, Scotland and Wales are considered to be countries, the total number of countries in the EU is 27], Norway, Serbia and Switzerland.
* Only clinical data available for Cyprus and virological data available for Finland	* Excludes Cyprus, Finland and Ukraine as they did not report integrated clinical and virological data
Full members: 21 countries Associate members: 12 countries (Austria, Cyprus, Estonia, Finland, Greece, Hungary, Latvia, Lithuania, Malta, Serbia, Sweden and Ukraine)	Full members: 21 countries Associate members: 9 countries (Austria, Estonia, Greece, Hungary, Latvia, Lithuania, Malta, Serbia and Sweden)

1.3.4 Funding

EISS has been funded by three sources: national governments, the European Commission (EC/European CDC) and industry. National governments have funded EISS since 1996 (when the project began), the EC has funded EISS from November 1999 until August

2006 and ECDC from September 2006 onwards. EISS started receiving funding from industry in September 2000 (from September 2000 to December 2002: GlaxoSmithKline and Roche; from January 2003 to December 2007: Roche and Sanofi Pasteur and Sanofi Pasteur MSD).

During the 2003-2006 period, the contribution of national governments (including Switzerland) was around 52% of the total EISS budget, the contribution of the EC was roughly 42% and the contribution of industry was about 6%. EISS uses the following formula to separate EC/national government funding from industry funding:

EC/national government funding:

All projects that concern the ongoing running of the surveillance scheme, the EISS website, the Weekly Electronic Bulletin, the annual meetings and the harmonisation/standardisation projects (e.g. the quality control studies).

Industry funding:

All other projects (upgrades of the Weekly Electronic Bulletin, the implementation of a new website design).

EISS has a strict 'code-of-conduct' concerning the influence of industry on its activities and publications, including those on its website. Industry is not involved in the management structure of EISS (industry has an observer status at its annual meetings) or in the preparation of the EISS Weekly Electronic Bulletin, documents, reports and/or publications.

2 EISS developments during the 2006-2007 season

2.1 Introduction

This chapter presents management developments concerning EISS during the 2006-2007 season. The season objectives are outlined and actions undertaken by EISS and the EISS Co-ordination Centre are presented and commented.

2.2 Objectives

The following objectives were established for the 2006-2007 influenza season:

2.2.1 Routine surveillance activities

- Initiate contacts with Bulgaria, Croatia and Turkey to become members of EISS;
- Publish and improve the EISS Weekly Electronic Bulletin.

2.2.2 Epidemiological projects

- Maintain and strengthen routine epidemiological surveillance activities;
- Further develop baseline levels of influenza activity;
- Attempts to quantify the intensity indicator.

2.2.3 Virological projects

- Operate the Community Network of Reference Laboratories for Human Influenza in Europe (CNRL);
- Operate the Influenza Molecular Database;
- Operate the Antiviral resistance database;
- Maintain database on standardized reagents;
- Update the laboratory protocols;
- Implement a laboratory quality control study on molecular methods;
- Pilot antigenic/genetic data reporting;
- Maintain standardized reagents delivery for antigen characterization;
- Operate the five Task Groups within the CNRL;
- Prepare a laboratory pandemic preparedness protocol;
- Evaluate the activities of the CNRL.

2.2.4 Management

- Organise the annual EISS meeting;
- Organise two Steering Committee meetings;
- Evaluation of EISS by ECDC;
- Transfer process to ECDC.

2.2.5 Others

- Maintain Who-is-who database;
- Publications in peer-reviewed journals;
- Further develop a close collaboration with ECDC;
- Further develop and support influenza pandemic preparedness activities;
- Explore the possibility to publish the Weekly Electronic Bulletin a day earlier.

2.3 Results

2.3.1 Routine surveillance activities

Initiate contacts with Bulgaria, Croatia and Turkey

Bulgaria, Croatia and Turkey were invited and attended the annual meeting of EISS and became respectively associate (Bulgaria and Croatia) or corresponding (Turkey) members.

Weekly Electronic Bulletin

Year-round surveillance was carried out as planned. During the winter period, the Weekly Electronic Bulletin was published from week 41/2006 to week 17/2007. During the rest of the year (week 21-39), the Bulletin was published every two weeks.

The EISS website has been improved and updated. Historical virological data from week 40 has been added to the inter-season bulletin. Updating of details of the EISS members, laboratories and methods on the website have been automated and linked to the Who-is-who and reference database.

2.3.2 Epidemiological projects

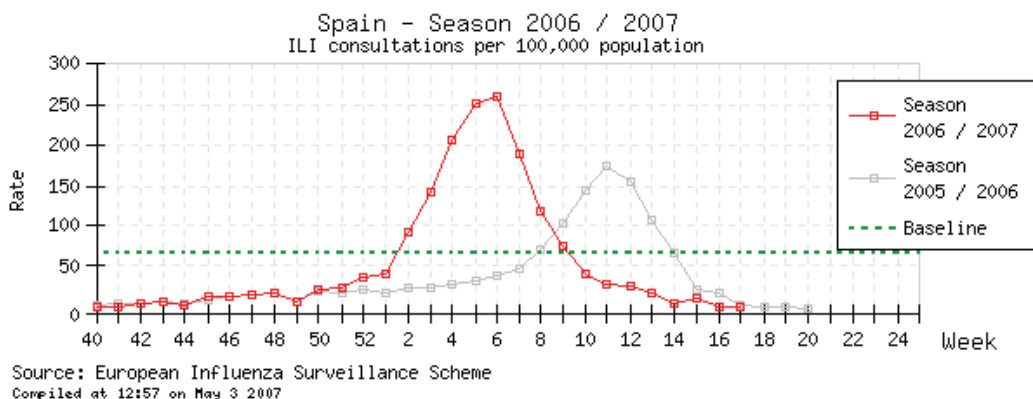
Maintain and strengthen routine epidemiological surveillance activities

The routine clinical surveillance was carried out. The levels of influenza activity were further improved by linking the intensity indicator to the baseline: clinical rates of influenza activity above the baseline indicate a medium intensity of influenza activity. This procedure better harmonizes the reporting of the intensity indicator in the EISS member countries.

Baseline levels of influenza activity

Clinical influenza activity can be collected all year round. Usually, there is a 6-12 week period in the winter when the level of clinical influenza activity is increased, which falls between weeks 40 and 20 of the following year.

The baseline level of influenza activity is a threshold level above which the consultation rate for influenza-like illness or acute respiratory infection is higher than the common background values in that country, and the influenza season is likely to have started (see Figure below). Because countries have different health care and surveillance systems, it is a challenge to establish a standardised method to calculate baselines across Europe.



A Baseline Working Group was established in May 2006. A Working Document was prepared and a proposed method presented at the annual meeting in May 2007. The method was modified after discussion at the meeting and presented at the Options for Control of Influenza VI in Toronto in June 2007 (Vega et al., 2007).

Quantification of the intensity indicator

The Baseline Working Group also worked on the quantification of the intensity indicator. A method was developed and discussed at the 2007 annual meeting. The approach has been outlined in a report for further development.

2.3.3 Virological projects

Community Network of Reference Laboratories (CNRL)

The CNRL includes 38 laboratories in 28 countries and includes the reference laboratories for influenza from all European Union member states, Norway, Romania, Serbia, Switzerland, Turkey and Ukraine. The activities of the EISS Co-ordination Centre with regard to the CNRL were mainly focused on the further building of the CNRL according to the previously defined and agreed requirements (Meijer et al., 2005).

Influenza Molecular Database

The Influenza Molecular Database was implemented during the 2005-2006 season. This database is based, as a private compartment dedicated to the needs of EISS, at the Los Alamos Influenza Sequence Database (ISD). ISD has served the world influenza community since 1998 and is already used by many EISS virologists. A mirror database was implemented in Paris. The implementation of season phylogenetic trees has started in 2007.

Antiviral resistance database (ViRgil)

ViRgil (the European surveillance network for vigilance against viral resistance) is an EU Framework-6 funded project, which aims to integrate and co-ordinate the activities of physicians and scientists from 55 institutions in 12 European countries in order to combat current and emerging antiviral drug resistance, the initial focus being on influenza and viral hepatitis B and C.

A database was developed for this project which was ready in May 2007. Data for the 2004-05, 2005-06 and 2006-07 seasons (ViRgil) are available on the EISS website. The system was operational around September 2007. An inventory of stockpiling and antiviral susceptibility testing was performed and this data is available on the website and is presented in a paper in Eurosurveillance (Meijer et al., 2007).

Database on standardized reagents

The EISS Co-ordination Centre offers a resources and order system for standardised reagents via the EISS website for: i) commercially available reagents of proven quality; ii) reagents prepared by the network (e.g. H5N1 controls); iii) primer composition; and iv) other reagents. The reagents database was maintained on the EISS website during the 2006-2007 season, including an extensive search facility. The EISS Co-ordination Centre and members entered a wide category of reagents from commercial sources and provided by colleagues from the CNRL. Where available, reagents were linked to protocols available on the website.

Laboratory protocols

The EISS Co-ordination Centre collates protocols used by the different laboratories and makes them available via the library on the EISS website in the member's only section. In the long term a laboratory manual for basic tasks will be written based on these protocols. The updating of protocols is an ongoing project and is performed regularly. New protocols have been added by EISS members and the EISS Co-ordination Centre.

Laboratory quality control study on molecular methods

The second molecular laboratory external quality assessment was carried out by EISS and Quality Control for Molecular Diagnostics (QCMD) in the period May to July 2007.

Pilot antigenic/genetic data reporting

The pilot antigenic/genetic data reporting has been implemented. It will be continued during the 2007-08 season.

Maintain standardized reagents delivery for antigen characterization

Reference virus strains and sera were provided by the WHO-collaborating centre, Mill Hill, UK.

Virology Task Groups within the CNRL

The Virology Task Groups meeting was organised on 30 November - 1 Dec 2006 in Berlin, Germany. A second Virology Task Groups meeting was held as a pre-meeting to the Annual Meeting on 9 May in Malaga, Spain. There are five task groups: Virus isolation, Antibodies, Molecular virology, Quality Control Assessment and Antiviral Susceptibility Testing.

Laboratory pandemic preparedness protocol

In order to complement the existing plan for the WHO National Influenza Centres, EISS will develop an assessment tool for laboratory preparedness for which the Who-is-who and resources database will be used and eventually extended. This tool will be used to assess the laboratory preparedness and was presented at the EISS annual meeting in May 2007. Further development of the tool is under preparation.

Evaluation of the CNRL

During the summer of 2006 a self-evaluation of the CNRL was performed in order to provide the CNRL members, as well as the EC and ECDC, a state of the art reference document about the functioning of the network. For this evaluation, written sources of information (e.g. progress reports of the CNRL, information on the website and provided facilities) and laboratory surveys (questionnaires and telephone interviews) were used.

The performance of the CNRL, as well as factors promoting and inhibiting the proper functioning of the network, were examined.

The self-evaluation report was reviewed by an independent expert, Dr. Yan Li, a virologist from FluWatch (Canadian influenza surveillance), and chief of the Influenza and Respiratory Viruses Section of the National Microbiology Laboratory of the Public Health Agency of Canada. The CNRL was praised for its achievements (e.g. the Quality Control Assessments and Task Groups) and its decentralised approach which aims to build on the strengths of national influenza centres. The full report is available on the EISS website, in the password protected area, including a SWOT-analysis (Strengths, Weaknesses, Opportunities and Threats of the CNRL).

2.3.4 Management of EISS

Annual EISS meeting

An annual meeting is organised each year at the end of the season (April/May) to co-ordinate the activities of EISS. The meetings have been organised on a regular basis since 1996 and represent an important platform to exchange information, research findings and initiate new projects. In May 2007 the meeting was held in Malaga, Spain, and the total number of participants was 107, including observer participants. The total number of countries that participated in the meeting was 29, excluding observer countries.

Steering Committee

One Steering Committee meeting was organised during the 2006-2007 season (February 2007) and included a representative from ECDC, as an observer.

Evaluation of EISS by ECDC

In April 2007 the EISS Co-ordination Centre was visited by an ECDC evaluation team. The team leader was Mike Catchpole (Health Protection Agency, London), other team members were Teresa Paixao (Portugal) and Elsa Negro Calduch (EPIET).

The major strengths in usefulness were found to be:

The core value of the EISS network is that it integrates sentinel clinical reporting with virological investigation to provide an output that is worth more than the sum of its parts. The clinical and virological outputs are complementary, in that the virological data adds aetiological precision, while the clinical report data provides added value to the virology results in that it can be used to extrapolate those results to assess the prevalence of different strains within a defined population. The protocols and guidelines that have been produced by the network have been used in many MS, either to establish new reporting systems or to improve existing reporting and/or laboratory methods. There is clear evidence that EISS facilitated the exchange of expertise and knowledge, particularly among virology members of the network e.g. exchange of expertise on sequencing analysis.

The production of the Weekly Electronic Bulletin based on data received during the previous week provides a regular, timely record of trends and epidemics of international importance. Impressive improvements have been achieved in virological investigation and surveillance, particularly through initiatives such as the development and implementation of the swabbing protocol and the introduction of Standard Operating Procedures (SOPs) and training in virus characterisation.

No major weaknesses were identified within the context of the contractually agreed outputs and activities. Minor weaknesses were that outputs do not provide good evidence for estimating the burden of disease. It should be noted that providing good evidence for estimating the burden of disease is not defined as a top level objective in the current grant agreement. Lack of information on healthcare infrastructure and detailed nature of reporting sentinel networks severely limits ability to compare data from different countries. There appears to be relatively poor engagement with, or understanding of information needs of, authorities responsible for making public health policy and for taking public health action. A report will become available on the ECDC website (http://ecdc.europa.eu/Activities/surveillance/EU_evaluation.html).

Transfer process of EISS to ECDC

Preparatory work has been carried out in the form of meetings and discussions with ECDC, to ensure that the transfer of surveillance activities to ECDC is arranged in an optimal manner. The routine surveillance activities of EISS will be moved to ECDC as of 2 September 2008. The CNRL activities will be located at a laboratory in Europe, via a tender from ECDC.

2.3.5 Other projects

Who-is-who database

The Who-is-who and resource database includes information on: the contact details of EISS members, laboratory capacities and facilities and the clinical/epidemiological networks. It aims to provide: i) rapid access to qualified persons and laboratories for specific needs, ii) up-to-date information on the characteristics of the networks, and iii) an easy analysis of the composition of the network. The Who-is-who and resources database was maintained during the 2006-2007 season.

Publications

The Annual Report 2005-06 was published in May 2007. The 2005-06 season paper and an antiviral susceptibility testing capacity paper were published in Eurosurveillance. Additionally, two Eurosurveillance Weekly publications were made during the influenza season (see Chapter 5 for references).

Collaboration with ECDC

EISS and ECDC have become close partners and EISS provides full support to ECDC activities, especially those in the areas of surveillance and influenza pandemic preparedness.

Influenza pandemic preparedness

The EISS group was involved in several activities to prepare for a possible influenza pandemic:

- Enhanced virological surveillance through the CNRL by the organisation of the distribution of necessary reagents in all participating laboratories and the continuation of five Task Groups;
- Publication of national influenza pandemic preparedness plans on the EISS website;
- Through its linkage with the network of excellence ViRgil, EISS has been involved in research concerning antiviral susceptibility (see above);
- Participation in WHO/ECDC meetings on pandemic planning;

- Intensified collaboration with the EU Community Reference Laboratory in Weybridge, especially the responsible persons for the avian influenza surveillance scheme; participation in the annual European meeting on Avian Influenza.

Publish the Weekly Electronic Bulletin a day earlier

A document was prepared by the EISS Co-ordination Centre outlining the possibility and possible problems to publish the Weekly Electronic Bulletin a day earlier.

2.4 Conclusions

During the period 2006-2007, EISS fulfilled its activities concerning the routine surveillance of influenza. The Weekly Electronic Bulletin was published in collaboration with partners, including ECDC. EISS collected and exchanged timely information through the Weekly Electronic Bulletin on influenza activity, providing relevant information about influenza to health professionals and the general public. The project has extended the number of participating countries to Bulgaria, Croatia and Turkey in May 2007.

Through the annual meeting, Task Group meetings and Steering Committee meetings progress was made on different epidemiological (e.g. further development of calculating a uniform baseline) and virological issues (e.g. reagents database, quality control of molecular methods). This has strengthened and harmonised epidemiological and virological methods based on the integrated sentinel surveillance model.

Databases for the CNRL were maintained and further developed. A quality control study for molecular testing was performed to enhance the quality of methods and the tool to assess the laboratory preparedness was further developed. The molecular database and well established contacts with WHO in London have provided relevant information for the WHO global influenza network and is important for the recommendations on the annual update of the influenza vaccine strain composition.

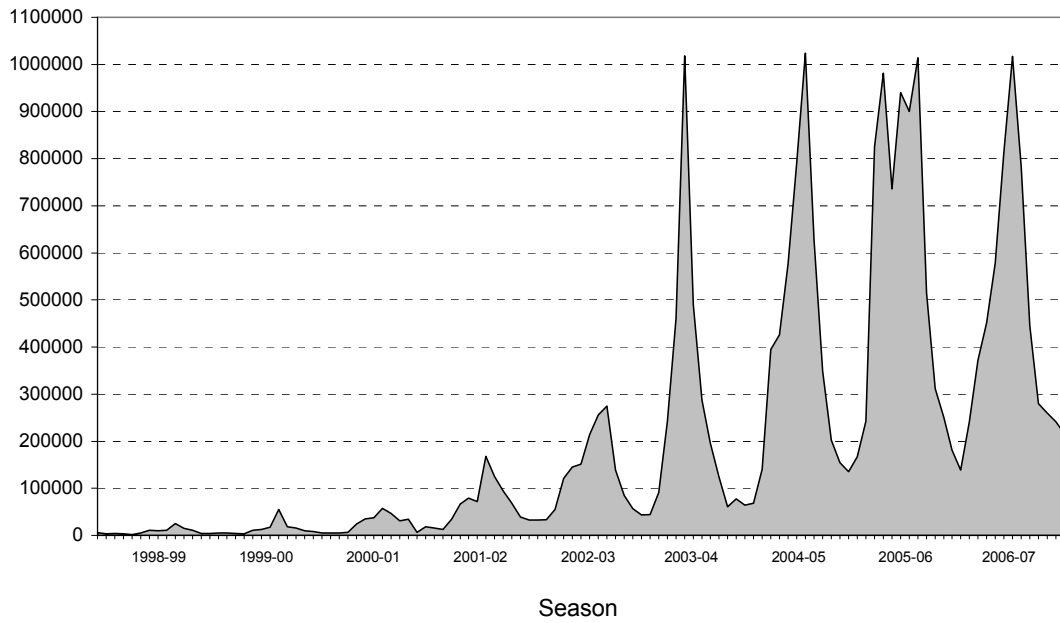
The feasibility of year-round surveillance of influenza activity using sentinel surveillance systems was assessed, and virological data has been made available every two weeks on the EISS website outside the influenza season. The EISS Co-ordination Centre collaborates with ECDC on improving influenza pandemic preparedness planning and response through enhancing laboratory and surveillance preparedness, investigation, provision of information and participation in meetings.

The antiviral resistance database was established in collaboration with the Vigilance against Viral Resistance project (ViRgil) funded by DG Research to combat viral resistance to treatments. Overall, the majority of the EISS projects have been carried out according to the planned activities.

Thanks to the continuous support of the EISS members, considerable progress has been achieved in the further establishment of the surveillance scheme. The further professionalization of these activities, including many of those carried out by the CNRL, has required a larger commitment from the EISS members than was previously assumed and additional funding will be required to cover operating costs, especially those associated with additional activities which are not covered by current budgets.

The communication of EISS remains strong with roughly 1 million website hits per month during the winter season:

EISS website, monthly hits: 1 April 1998 - 31 August 2007



3 Influenza activity in Europe during the 2006-2007 season

3.1 Introduction

Thirty-three countries reported epidemiological and/or virological data to EISS during the 2006-2007 season (see: 1.3.3) A detailed report on influenza activity during the season will be published in Eurosurveillance. A detailed supplement, with epidemiological and virological data presented for Europe and by country, accompanies this publication and can be downloaded from the EISS website (<http://www.eiss.org/html/reports.html>).

3.2 Epidemiological and virological data

Influenza activity was mainly associated with influenza A viruses (97%; N=18 278) during the 2006-2007 winter (see Table 3.1).

Table 3.1: Summary of total sentinel and non-sentinel virological data for Europe: historical data¹

Season	No of surveillance networks	Influenza virus detections			N-subtyped viruses			
		Total (N)	% of total positive for		Total (N)	% of total positive for		
			influenza A	influenza B		A(H1N1) ²	A(H1N2) ²	A(H3N2) ²
2006/2007	33	18 278	97.2	2.8	4712	10.7	-	89.3
2005/2006	30	11 303	42.0	58.0	1 108	48.0	0.2	51.8
2004/2005	27	15 295	83.3	16.7	2 569	18.2	0.1	81.8
2003/2004	24	14 025	99.1	0.9	4 284	0.5	0.4	99.1
2002/2003	21	7 616	63.4	36.4	2 987	9.7	1.5	88.8
2001/2002	19	7 296	74.9	25.1	2 718	3.8	8.8	87.3
2000/2001	14	6 352	70.3	29.7	1 357	96.7	0.2	3.1
1999/2000	12	7 663	98.8	1.2	4 093	1.8	-	98.2
1998/1999	11	6 950	71.9	28.1	2 760	0.4	-	99.6
1997/1998	9	6 008	92.7	7.3	2 155	4.4	-	95.6
1996/1997	7	5 503	79.9	20.1	1 339	1.0	-	99.0

¹ Based on data available in the EISS database on 27 July 2007.

² During the 2001-2002 season, a novel influenza A(H1N2) virus was reported by a number of countries in Europe; this has led to an improvement in reporting of the influenza A neuraminidase subtyping (N1 or N2), in addition to the hemagglutinin subtyping (H).

Seasonal influenza epidemics started around New Year, with consultation rates for influenza-like illness (ILI) or acute respiratory infection (ARI) above baseline levels first reported in Scotland (week 52/2006), Greece (week 01/2007) and Spain (week 02/2007). They increased in most other countries in the South and West of Europe around mid-January 2007 and in large parts of Central and North-East Europe in February. In most countries, influenza activity returned to levels seen outside the winter period by the end of

March (week 13/2007).

During the 2006-2007 season medium intensity was reported for the majority of countries (21/33 countries), however a high intensity of clinical influenza activity was reported in 7 countries (Denmark, Sweden, Norway, Estonia, Latvia, Lithuania and Luxembourg). Only one country (Wales) reported low overall levels of clinical activity. The highest consultation rates for ILI and/or ARI were reported in the 0-4 and 5-14 age groups.

A spatial analysis revealed a significant south-north pattern in the timing of peak influenza activity across Europe during the 2006-2007 winter. This analysis is based on a regression analysis of plots of the longitude and latitude of the centre of each country against the week of peak influenza activity of each country ($R^2 = 0.287$; $p < 0.05$ for south-north; $R^2 = 0.060$; $P = 0.003$ for west-east). This was not unusual, as data since 1999-2000 (eight winters) indicate four seasons when there was a west-east pattern and three seasons when there was a south-north pattern (Paget et al., 2007). The timing of peak influenza activity is visualized in Figure 3.1.

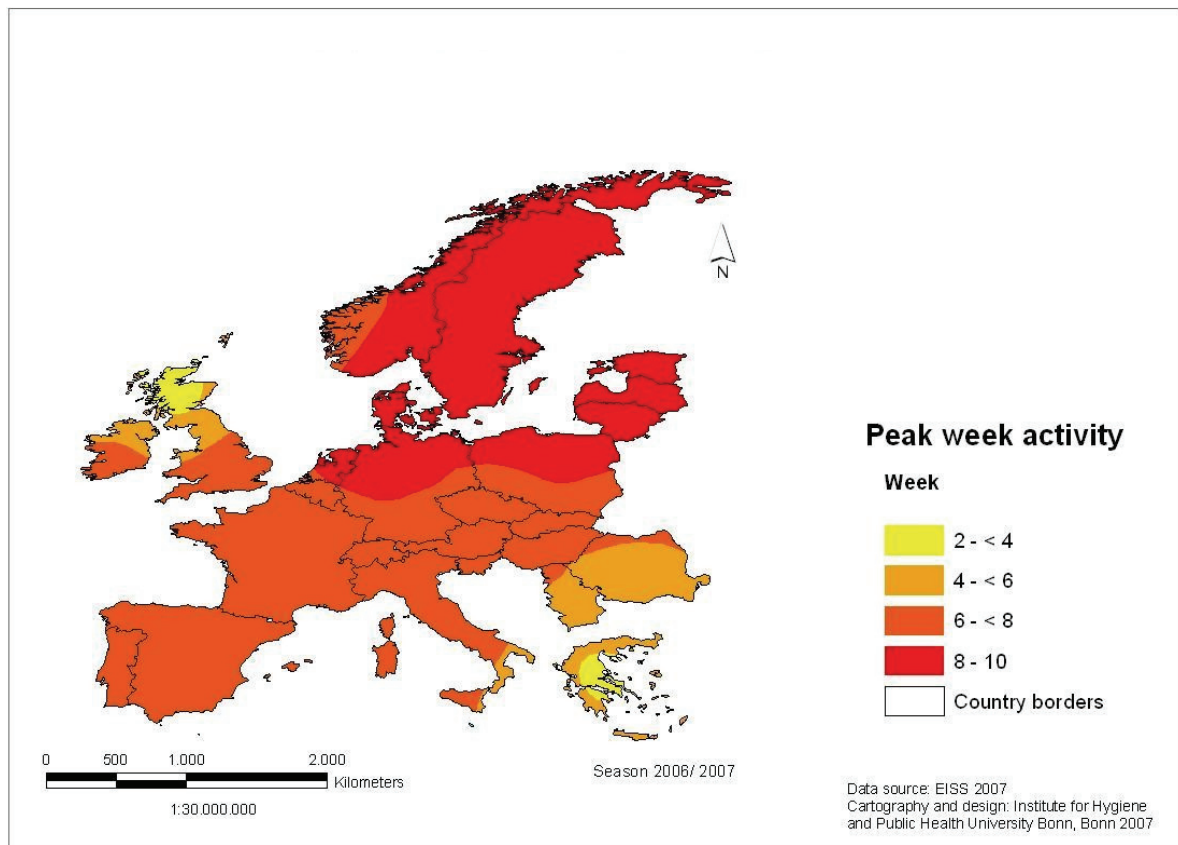


Figure 3.1. Timing of peak clinical influenza activity across Europe during the 2006-2007 season. The isobars on the contour maps represent interpolated time of peak activity distributed spatially at 2-week intervals. Countries included in this spatial analysis were Austria, Belgium, Czech Republic, Denmark, England, Estonia, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Northern Ireland, Norway, Poland, Portugal, Romania, Serbia, Slovak Republic, Slovenia, Spain, Scotland, Sweden and Switzerland.

Based on (sub)typing data of all influenza virus detections from sentinel and non-sentinel sources (N=18 278), 17 759 (97%) were influenza A and 519 (3%) were influenza B. Of the total influenza A virus detections (N=17 759), 8 825 (50%) were influenza A not-subtyped, 8 271 (47%) were A(H3) [of which the N-subtype was determined in 4208 and all were N2] and 663 (3%) were A(H1) [of which the N-subtype was determined in 501 and all were N1]. The distribution of the virus detections per week for Europe as a whole is displayed in figure 3.2.

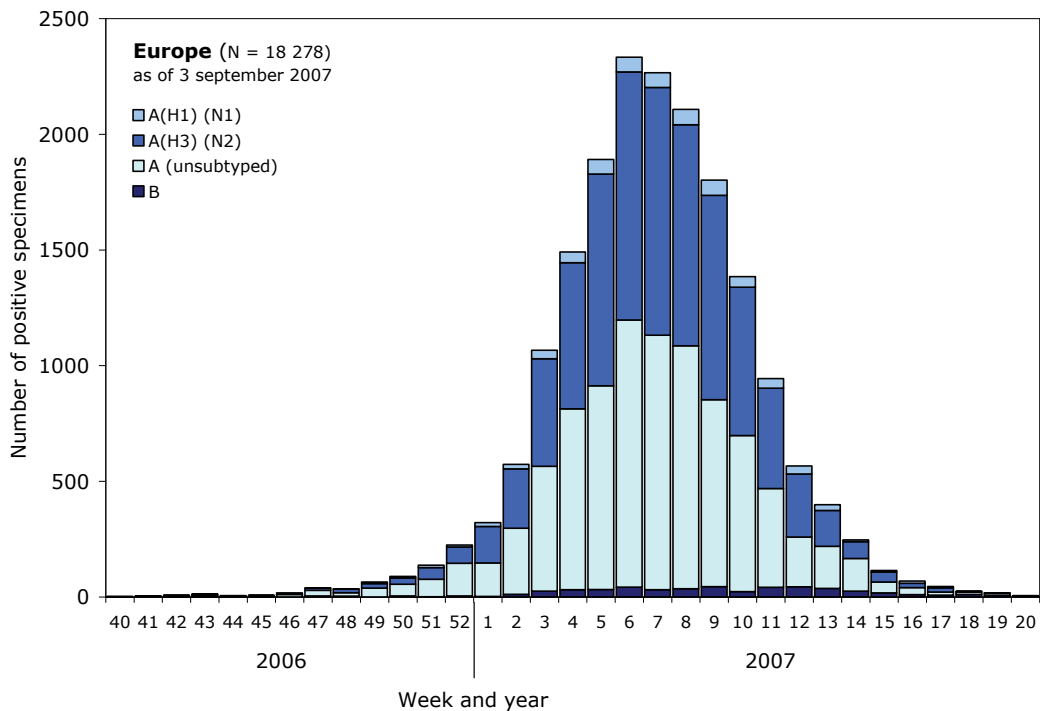


Figure 3.2. Total number of sentinel and non-sentinel specimens positive for influenza viruses by week for Europe as a whole during the 2006-2007 season.

Of all 18 278 influenza virus detections, 3 877 were antigenically and/or genetically characterised: 326 (8%) were A/New Caledonia/20/99 (H1N1)-like, 55 (1%) were A/California/7/2004 (H3N2)-like, 3318 (86%) were A/Wisconsin/67/2005 (H3N2)-like (a drift variant of A/California/7/2004 included in the vaccine for the 2006-2007 winter), 148 (4%) were B/Malaysia/2506/2004-like (B/Victoria/2/87-lineage) and 30 (1%) were B/Jiangsu/10/2003-like (B/Jiangsu/10/2003 is a B/Shanghai/361/2002-like virus from the B/Yamagata/16/88-lineage that was included in the vaccine for the 2006-2007 winter).

3.3 Influenza vaccine for the 2007-2008 northern hemisphere season

The World Health Organization announced the composition of the influenza vaccine for the Northern Hemisphere 2007-2008 influenza season in February 2007. Based on the analysis of influenza viruses from all over the world up until February 2007, the WHO modified the composition of the 2007-2008 influenza vaccine compared to the 2006-2007 vaccine. The slow evolution of A(H1N1) characterized in the last years as well as the circulation of different clusters during the 2006-2007 season has prompted the WHO to update the vaccine composition to include the A(H1N1)A/Solomon Islands/3/2006 strain.

The European Agency for the Evaluation of Medicinal Products (EMA) recommended the following composition for the 2007-2008 season influenza vaccine to be used in Europe (EMA, 2007):

- an A/Solomon Islands/3/2006(H1N1)-like virus;
- an A/Wisconsin/67/2005 (H3N2)-like virus;
- a B/Malaysia/2506/2004-like virus.

3.4 Summary

The 2006-2007 influenza epidemic in Europe was characterised by moderate clinical activity and a south-north spread pattern across Europe. The dominant virus strain was influenza A(H3) and overall there was a good match between the vaccine virus strains and the reported virus strains.

4 Retrospective

4.1 Introduction

Considering this is the last Annual Report prepared by the EISS Co-ordination Centre at NIVEL, it was considered relevant to provide historical information about the EISS project: the persons involved (a collection of available pictures) and a brief overview of the historical epidemiological and virological data (for countries with six or more seasons of data).

4.2 Persons

EISS meeting in Siena, Italy (May 2001)



Back row (standing from left to right): Piergiulio Lucaroni (Chiron Vaccines), Ingela Berggren-Palme, Tamara Meerhoff, Isabel Falcão, Douglas Fleming, Jean-Francois Aguilera, Brunhilde Schweiger, Tony Colegate (Chiron Vaccines), Maria Zambon, Martina Havlíčková, Pilar Pérez Breña, Steve Risbridger (Quad Logic), Helena Rebello de Andrade, John Watson, Magdalena Machala, Ann Smith, Lidia Brydak, Chantal Bruwers (Chiron Vaccines), John Mooney, Daniel Thomas, Koos van der Velden
Front row (kneeling from left to right): Tomás Vega, John Paget, Annika Linde, Aad Bartelds, Bjørn Iversen, Zuzana Křišťáková

EISS meeting in Uppsala, Sweden, 25-26 April 2003



From left to right: Koos van der Velden, Raymond Gani, Bertrand Verwee, Chris Barbara, Thomas Griffin, Olav Hungnes, Hugh O'Neill, Paul Taylor, Yves Thomas, Jan de Jong, Reto Hagmann, Jean-Francois Aguilera, John Watson, Maja Socan, Martine Vallette, Magdalena Machala, Anne Mosnier, Annika Linde, Zuzana Kristufkova, Bjorn Iversen, Douglas Fleming, Susanne Samuelsson, John Paget, Lisa Domegan, Pilar Perez-Brena, Brunhilde Schweiger, Seamus Dooley, Hilary Kennedy, Fernanda Yane, Martina Havlickova, Adam Meijer, Dalia Rokaita, Aad Bartelds, Pasi Penttinen, Helena Rebelo de Andrade, José Marinho Falcao, Tamara Meerhoff and Katarina Proscenc. Picture taken by Jean-Claude Manuguerra.

11th Annual EISS meeting Malta 2006



From left to right: Brunhilde Schweiger, Pilar Perez Brena, Jan de Jong, Angie Lackenby, Hana Blaskovicova, Jesus Olivia Dominquez, Martina Havlickova, Marianne van der Sande, Ala Mironenko, Daniel Thomas, Maja Socan, Alex Elliot, Inma Casas, Isabelle Thomas, Tomas Vega Alonzo, Martine Valette, Andrea Ammon, Fernanda Yane, Jasminka Nedeljko, Ann Smith, Ann Mazick, Joan O'donnel, Caroline Brown, Bruno Ciancio, Christina Tecu, Hilary Kennedy, Emilia Lupulescu, Annemarie Arkema, Gee Donker, Ann Mosnier, Annika Linde, Katarina Proscenc, Joanna Ellis, Simon Cottrell, Magdalena Machala, Tanya Melillo, Jan Kyncl, Catherine Moore, Jose Marinho Falcao, Koos van der Velden, Carol Joseph, Terry Collins, Anouk Faassen, Chris Barbara, Tamara Meerhoff, Bjorn Iversen, Tran Minh Nhu Nguyen, Ina Wienand, Algirdas Griskevicius, Katja Qureshi, Matthias Opp, Jean Marie Cohen, Vaira Irina Kalnina, Mark Witschi, Aad Bartelds, Olav Hungnes, Liesbeth Meuwissen, Maria Aranova, Georgia Spala, Inna Sarv, Fabrizio Pregliasco, Avraam Ellia, Andreas Mentis, Maria Kariofylla, Alan Hay, Caroline Seychell, John Paget, Filippo Ansaldo, Katalin Kazsas, Seamus Dooley, Simona Puzelli, Istvan Jankovics, Graziella Zara (Adam Meijer took the picture). Absent on the picture: Jean Thierry Aubin, Beatrice Barret, Maria Brytting, Isabel Burckhardt-Batista, Bruno Lina, Catherine Macken, Jim McMenamin, Angeliki Melidou, Remy Teysou, Yves Thomas, Sophie Vaux, John Watson

12th Annual EISS Meeting, Malaga, 12-14 May 2007



Present in alphabetical order: Boris Aleraj, Annemarie Arkema, Sabrina Bacileri, Chris Barbara, Beatrice Barret, Hana Blaskovicova, Golubinka Bosevska, Caroline Brown, Mia Brytting, Udo Buchholz, Isabel Burckhardt, Inma Casas, Viviane van Casteren, Valerie Chicu, Jean Marie Cohen, Simon Cottrel, Helena Dahl, Angela di Martino, Frederika Dijkstra, Gé Donker, Vladimir Drazenovic, Margaret Duffy, Avraam Elias, Joanna Ellis, Vincent Enouf, Anouk Faassen, Anna Falcon, Karoline Fernandez de la Hoz, Joy Field, Douglas Fleming, Georgia Gioula, Steffen Glismann, Gabriela Gomes, Martina Havlickova, Alan Hay, Olav Hungnes, Kate Hunter, Bjorn Iversen, Jan de Jong, Carol Joseph, Vaira Irisa Kalnina, Zarko Karadzovski, Maria Kariofylla, Daniel Koch, Mira Kojouharova, Rosita Kotseva, Sharon Kuhlman-Berenzon, Jan Kyncl, Angie Lackenby, Amparo Larrauri, Bruno Lina, Annika Linde, Jose Lozano, Mariken van der Lubben, Emilia Lupulescu, William Mackay, Jose Marinho Falcao, Richard Marquet, Ann Mazick, Jim McMcnamin, Tamara Meerhoff, Adam Meijer, Andreas Mentis, Piers Mook, Ann Mosnier, Boban Mugosa, Jasminka Nedeljkovic, Angus Nicoll, Lars Nielsen, Baltazar Nunes, Joan O'Donnell, Graeme O'May, Matthias Opp, Raoul Ortiz, John Paget, Pilar Perez Brena, Therese Popov-Kraupp, Agnes Portne Csohan, Sofia Poufta, Brit Pourroy, Fabrizio Pregliasco, Katarina Prosenec, Simona Puzelli, Helena Rebelo de Andrade, Grazina Rimseliene, Magdalena Romanowska, Sandra Rubinova, Guillermo Ruiz Carrascosco, Olga Sadikova, Marianne van der Sande, Inna Sarv, Brunhilde Schweiger, Petru Scoferta, Pauline Slotte, Ann Smith, Maja Socan, Georgia Spala, Reinhold Strauss, Christina Tecu, Isabelle Thomas, D. Ulqinaku, Koos van der Velden, Tomas Vega Alonzo, Bertrand Verwee, Zoran Vratnica, John Watson, Sylvie van der Werf, Asa Wiman, Mark Witschi, Neziha Yilmaz, Maria Zambon, Thedi Ziegler.

Note: Not all EISS members are on the photo (see members list on page 2)

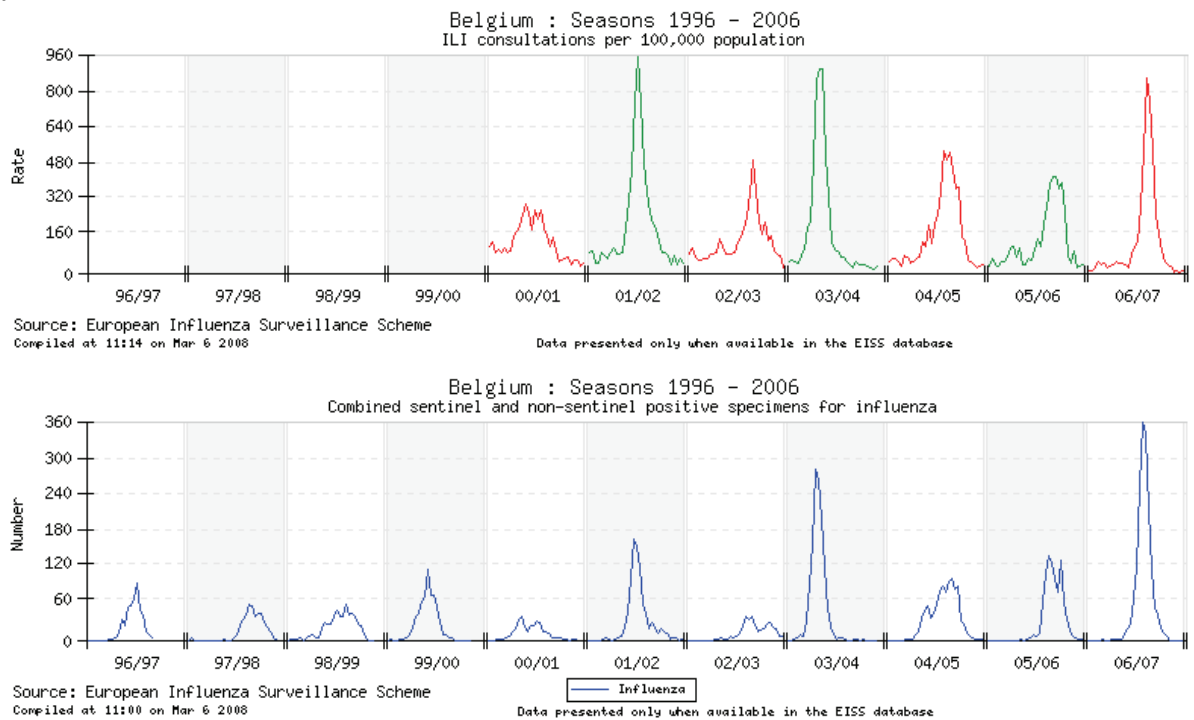
4.3. Historical epidemiological and virological data

A historical overview of the epidemiological and virological data is presented with no further analysis/interpretation of the data (this would need to take into consideration factors such as the different health care systems, laboratory methods, the circulating virus (sub)types and other respiratory viruses (e.g. RSV)).

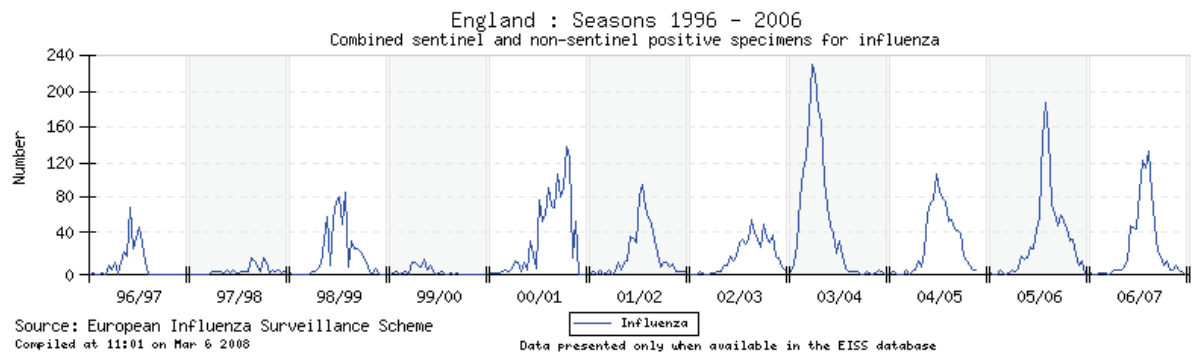
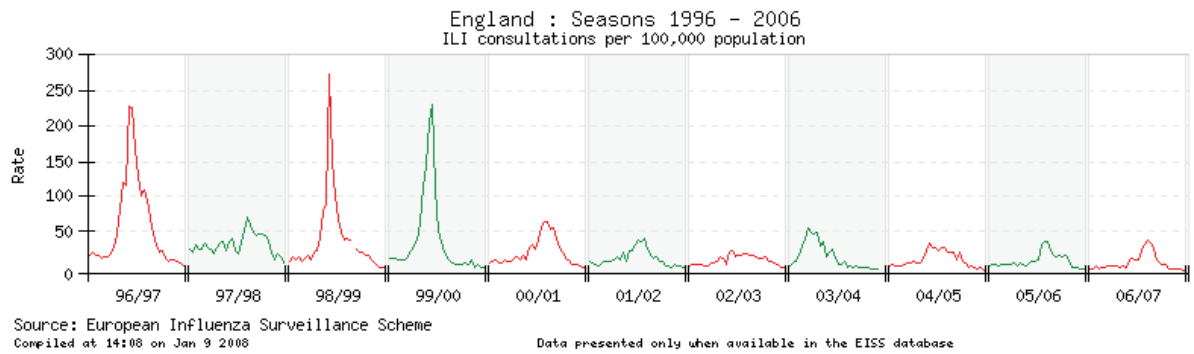
For reasons of space, only countries with six or more seasons of data are presented. Countries are listed by the number of seasons and in alphabetical order.

Figure 4.1. Epidemiological and virological historical graphs, starting with the graphs of countries collecting both epidemiological and/or virological data since 1996-1997 and ending with graphs of countries collecting epidemiological and virological data since 2001-2002. For the other countries, please visit the EISS website.

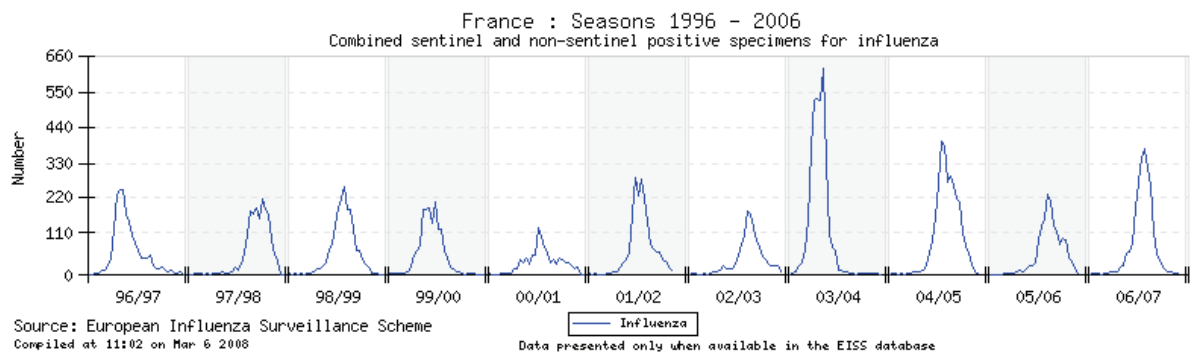
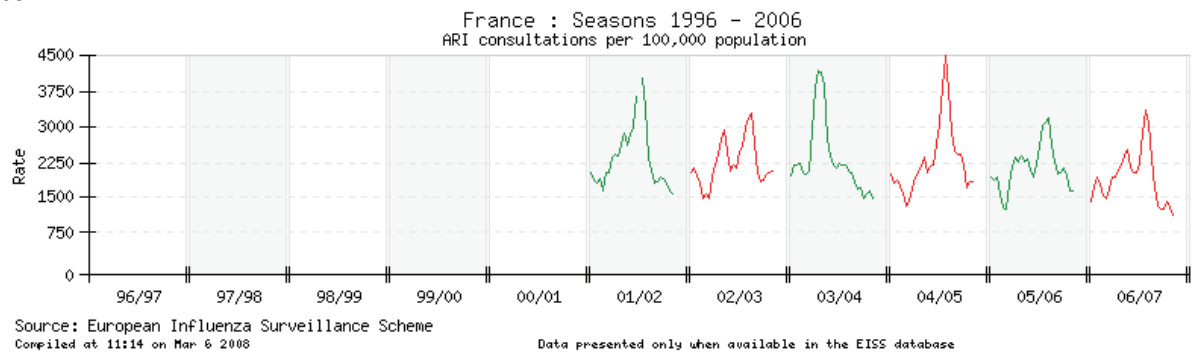
Belgium ¹



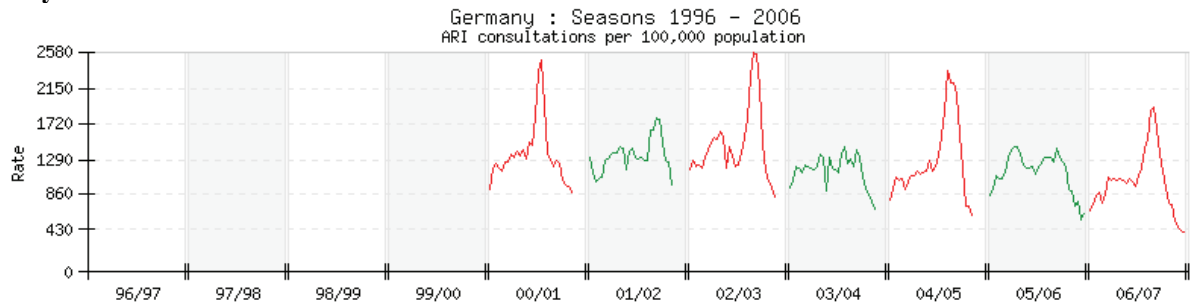
England



France²

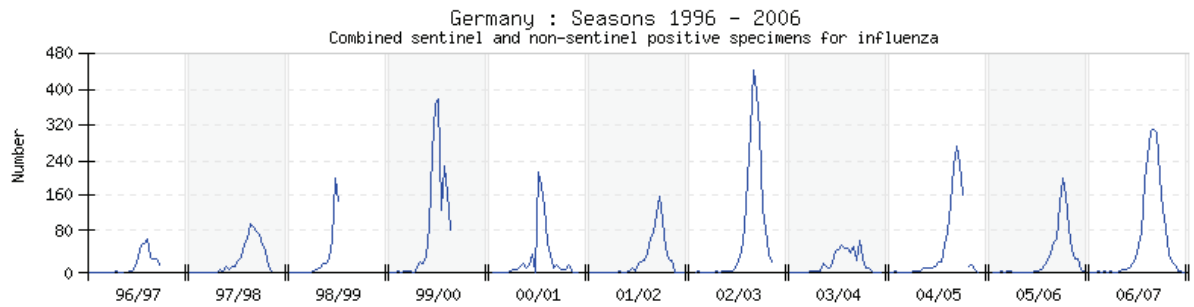


Germany¹



Source: European Influenza Surveillance Scheme
Compiled at 11:15 on Mar 6 2008

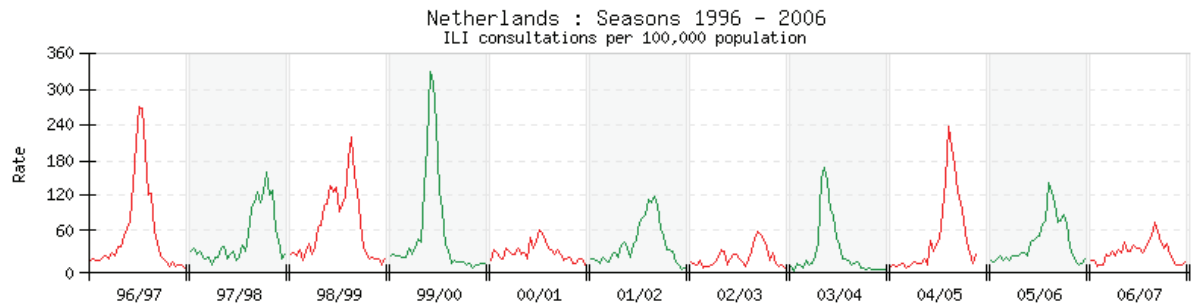
Data presented only when available in the EISS database



Source: European Influenza Surveillance Scheme
Compiled at 11:02 on Mar 6 2008

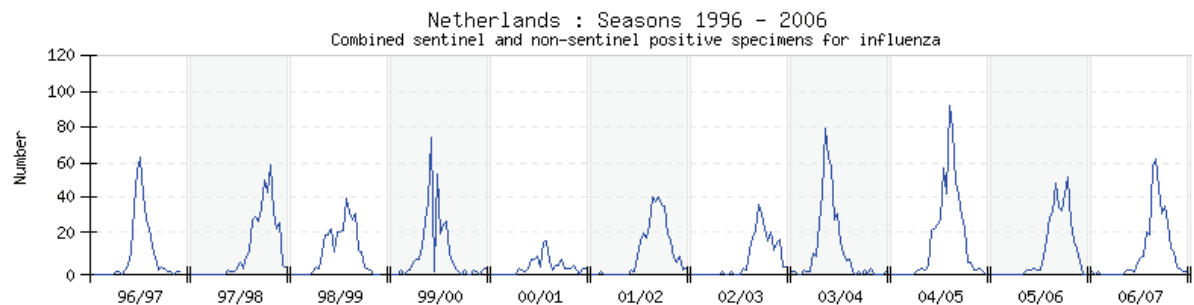
Data presented only when available in the EISS database

Netherlands



Source: European Influenza Surveillance Scheme
Compiled at 13:44 on Jan 9 2008

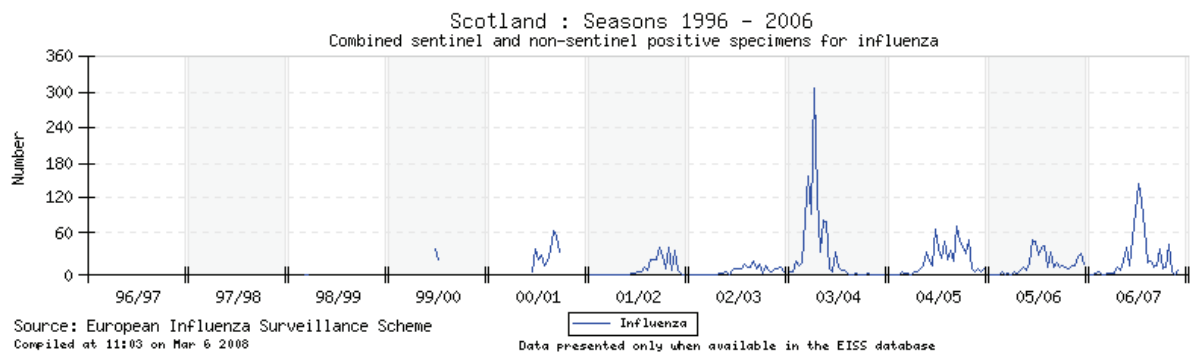
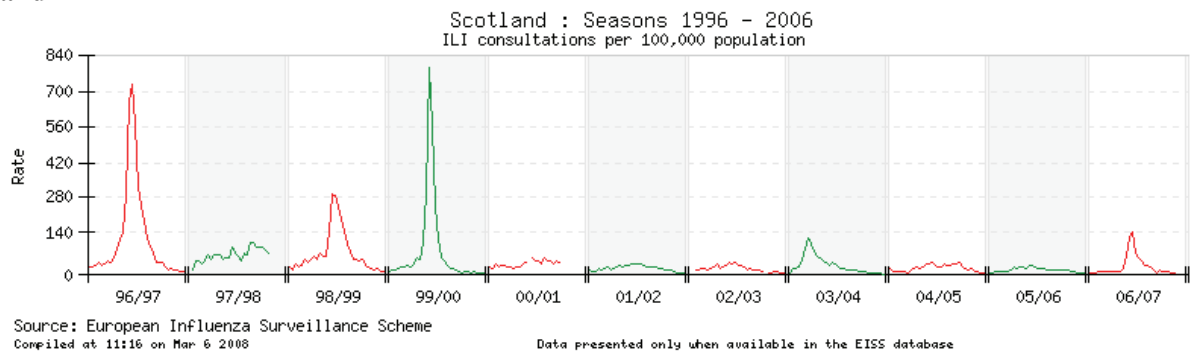
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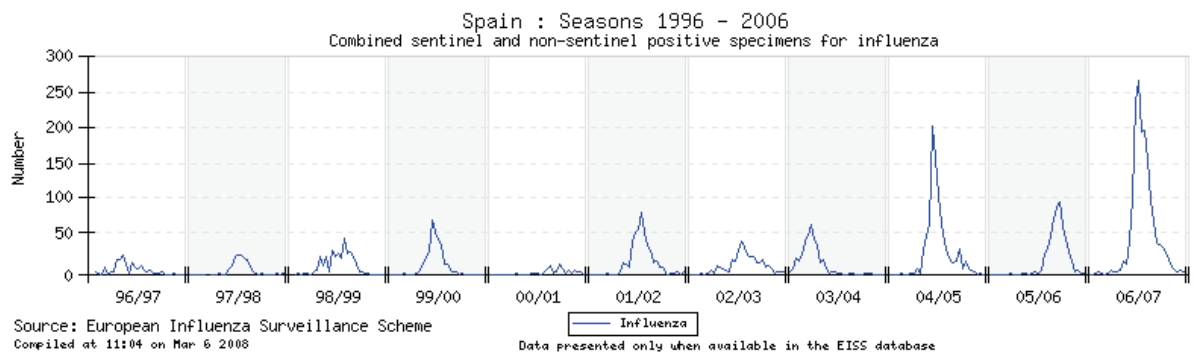
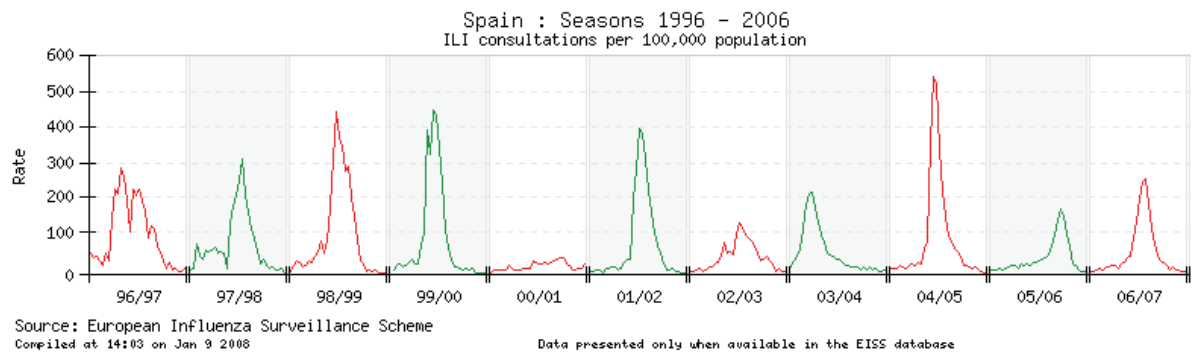
Source: European Influenza Surveillance Scheme
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Data presented only when available in the EISS database

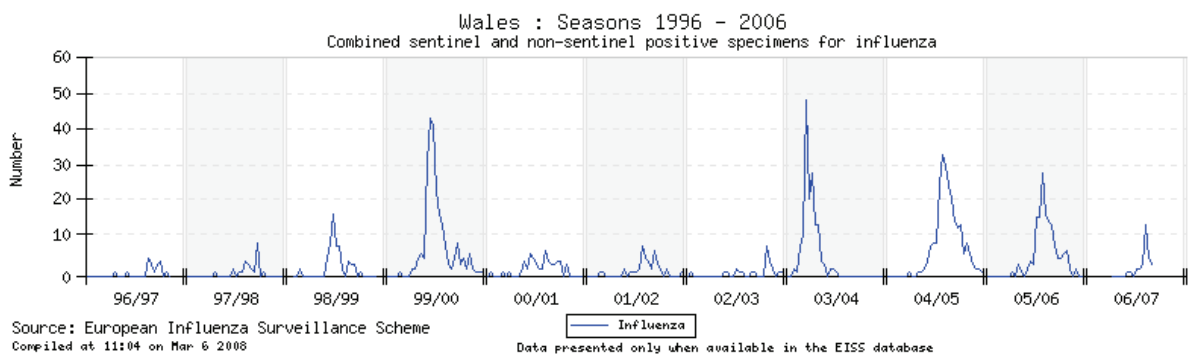
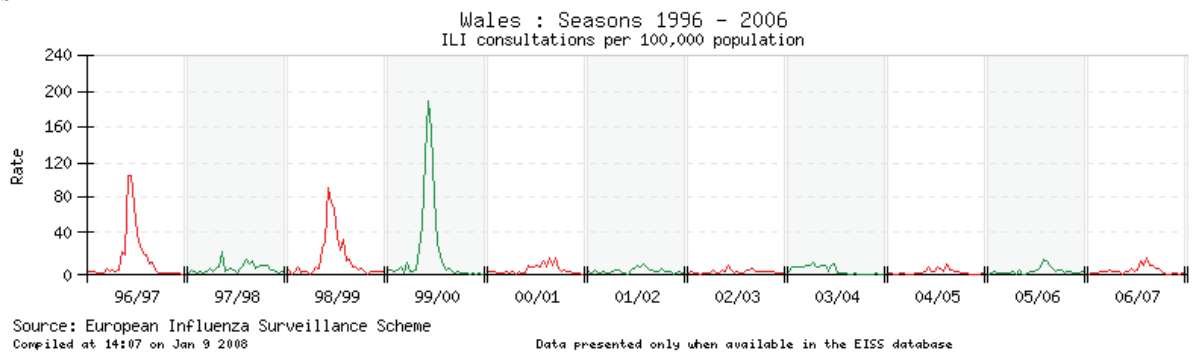
Scotland



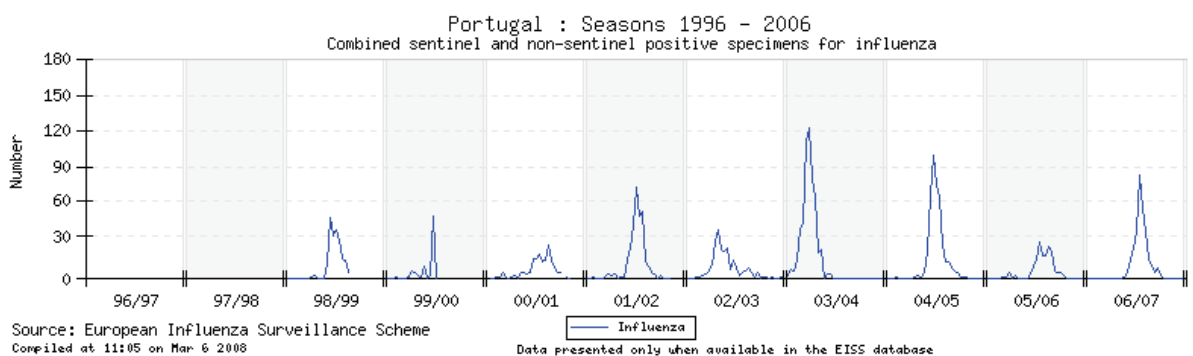
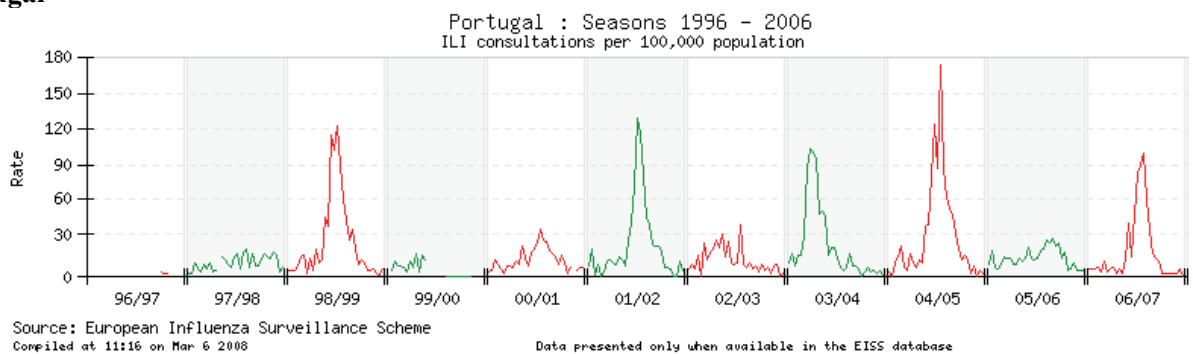
Spain



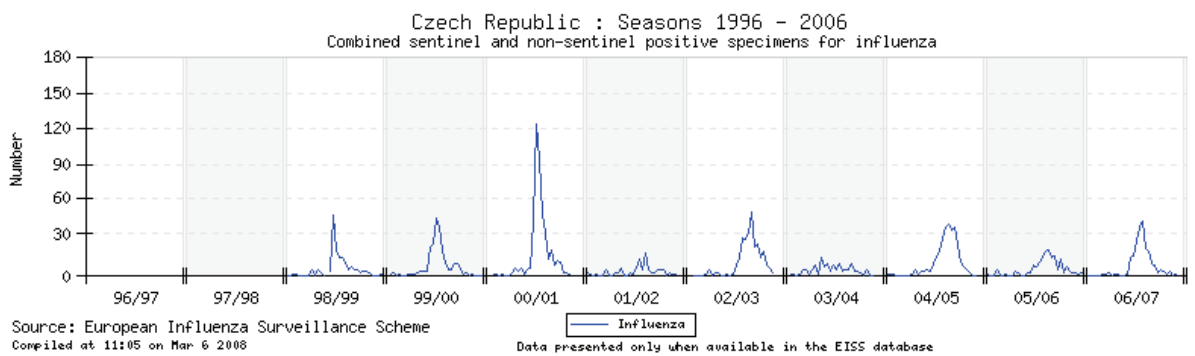
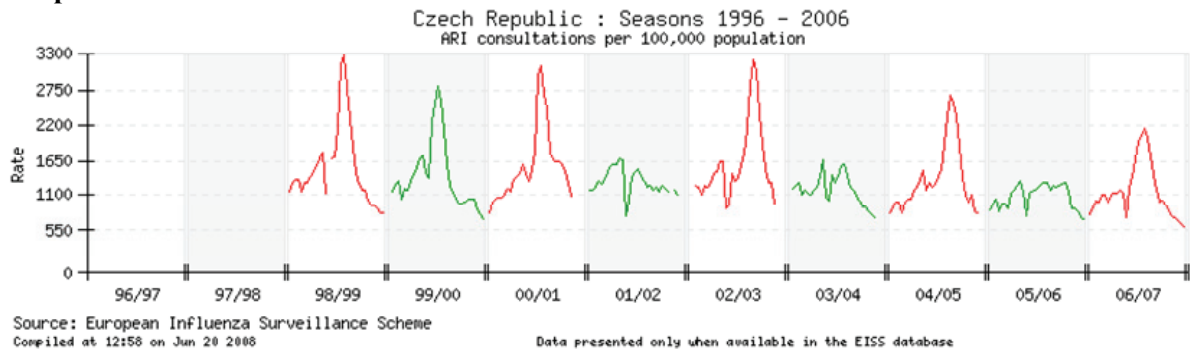
Wales



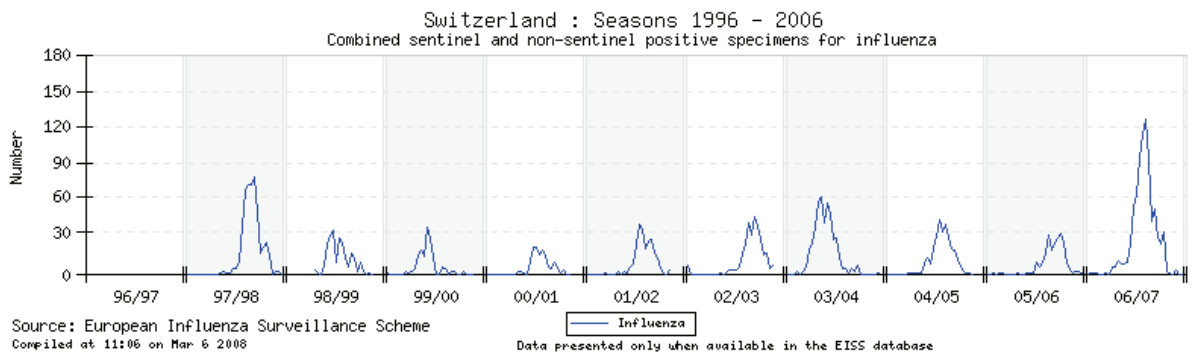
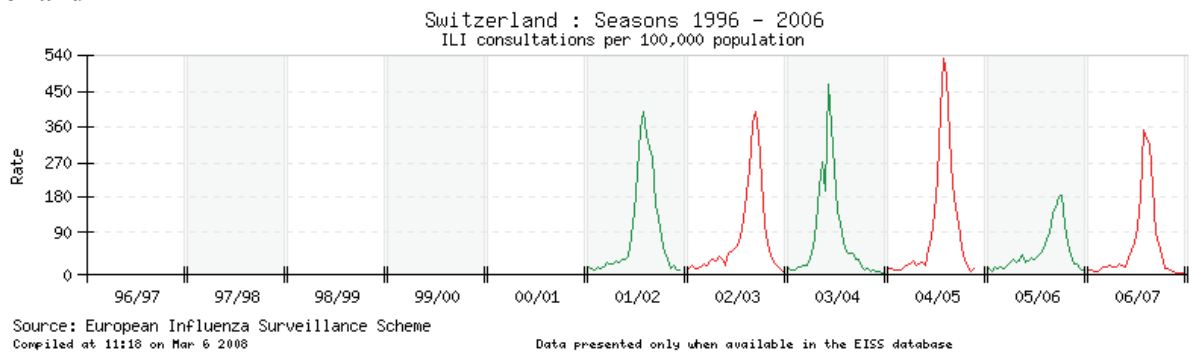
Portugal



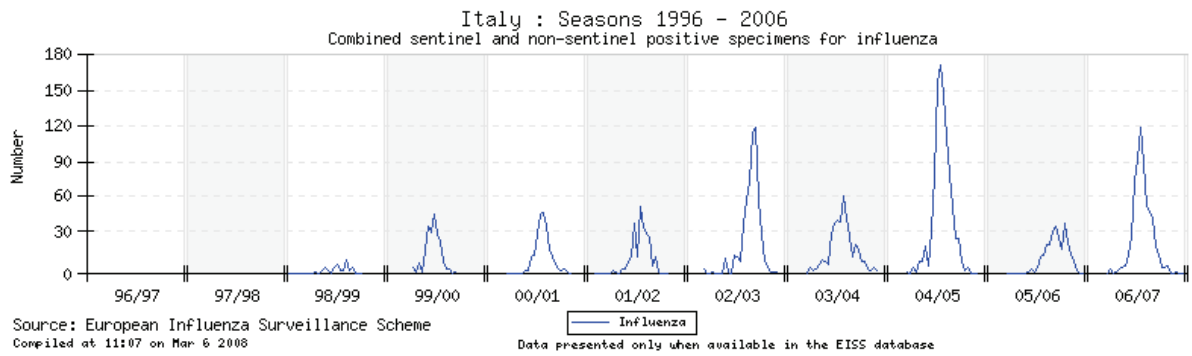
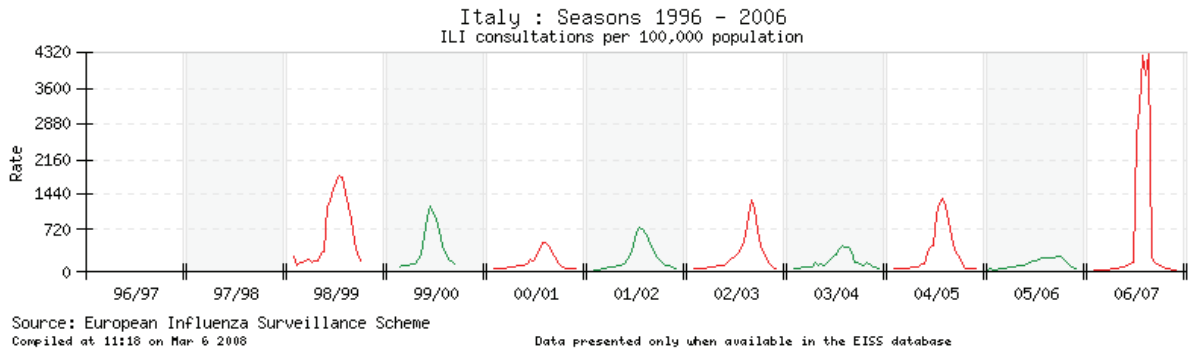
Czech Republic



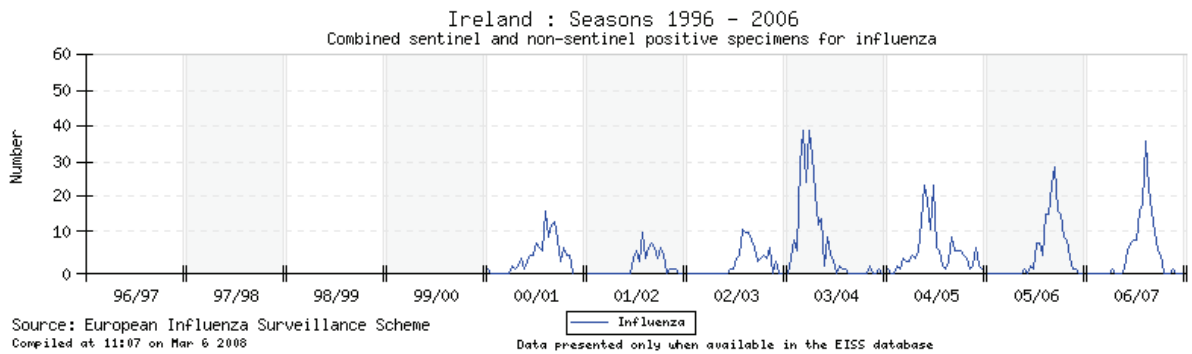
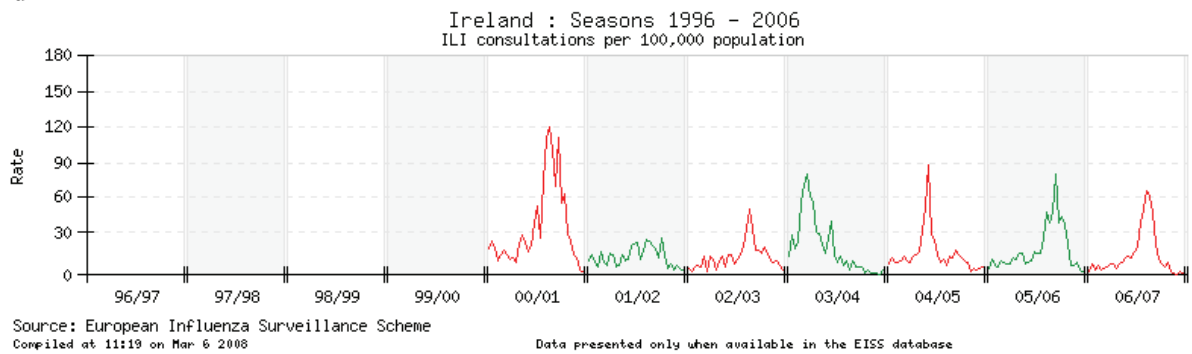
Switzerland³



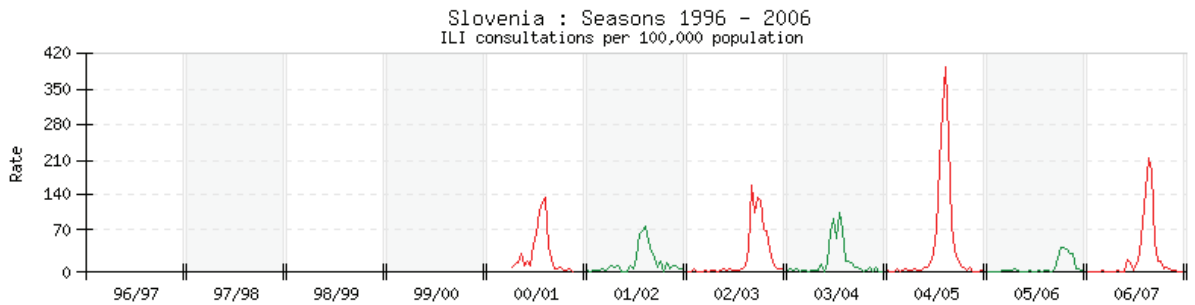
Italy



Ireland

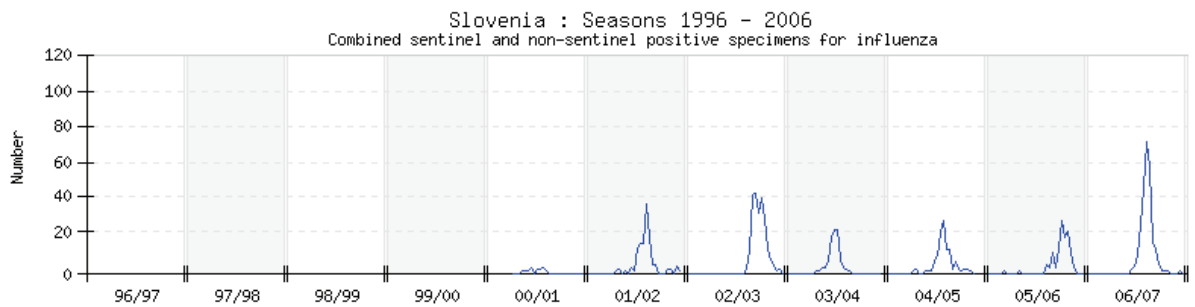


Slovenia



Source: European Influenza Surveillance Scheme
Compiled at 11:20 on Mar 6 2008

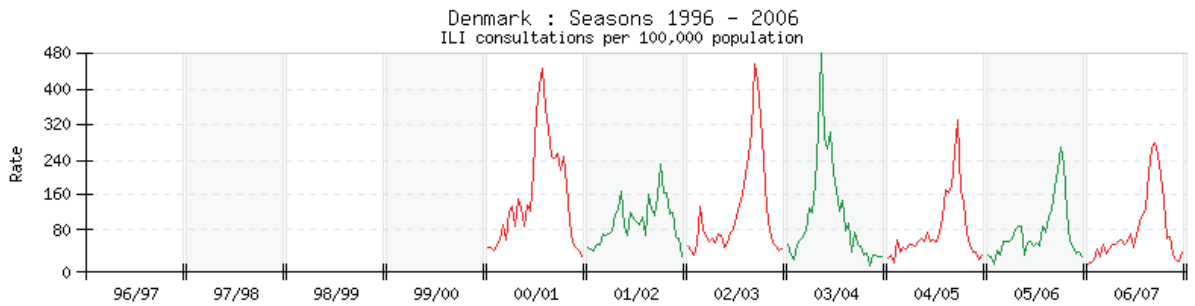
Data presented only when available in the EISS database



Source: European Influenza Surveillance Scheme
Compiled at 11:08 on Mar 6 2008

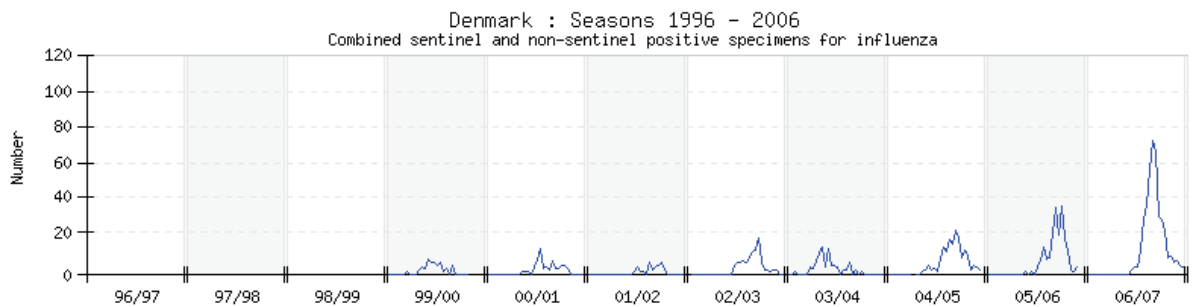
Data presented only when available in the EISS database

Denmark⁴



Source: European Influenza Surveillance Scheme
Compiled at 11:21 on Mar 6 2008

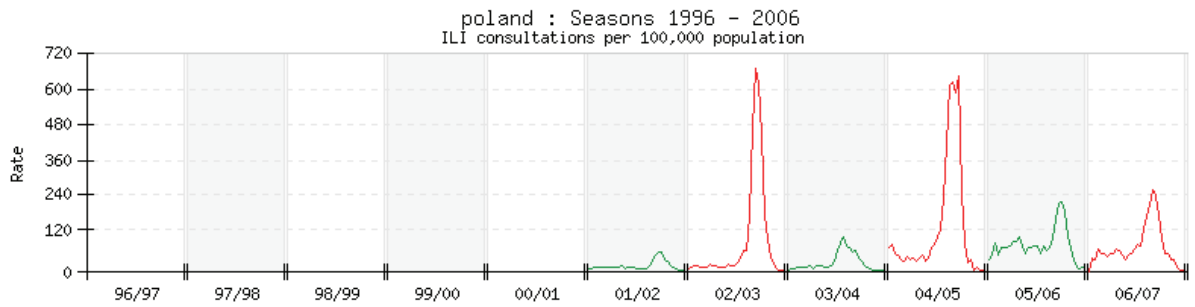
Data presented only when available in the EISS database



Source: European Influenza Surveillance Scheme
Compiled at 11:10 on Mar 6 2008

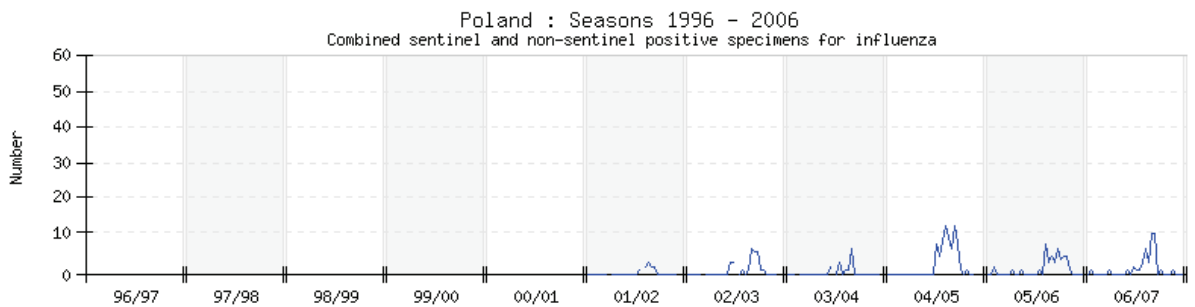
Data presented only when available in the EISS database

Poland



Source: European Influenza Surveillance Scheme
Compiled at 11:22 on Mar 6 2008

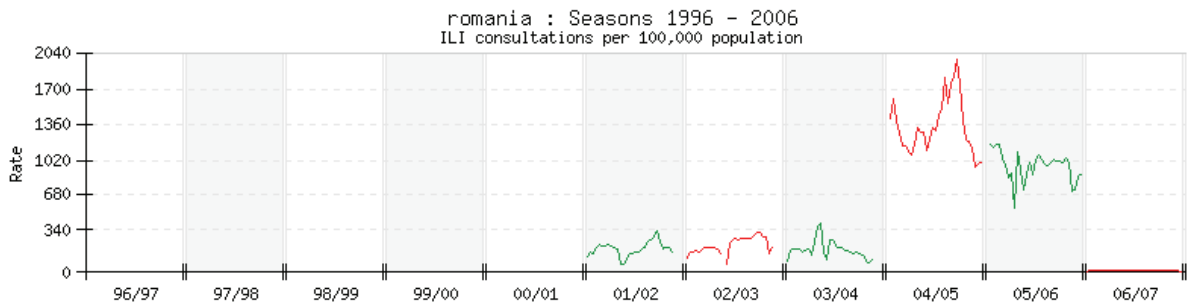
Data presented only when available in the EISS database



Source: European Influenza Surveillance Scheme
Compiled at 11:10 on Mar 6 2008

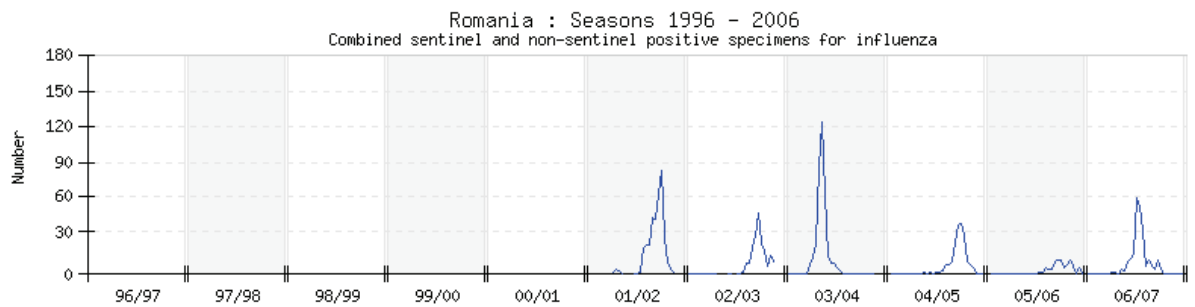
Data presented only when available in the EISS database

Romania



Source: European Influenza Surveillance Scheme
Compiled at 11:22 on Mar 6 2008

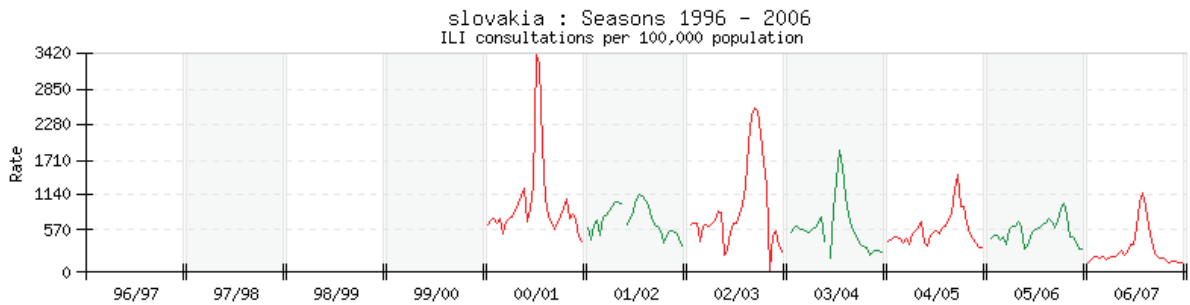
Data presented only when available in the EISS database



Source: European Influenza Surveillance Scheme
Compiled at 11:12 on Mar 6 2008

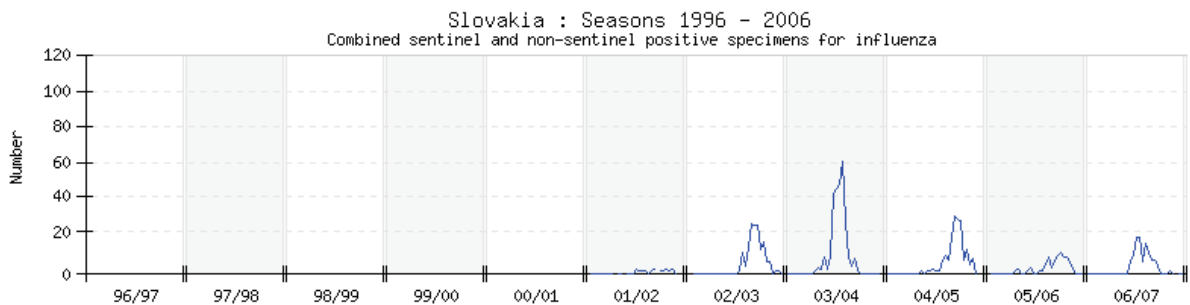
Data presented only when available in the EISS database

Slovakia



Source: European Influenza Surveillance Scheme
Compiled at 11:24 on Mar 6 2008

Data presented only when available in the EISS database



Source: European Influenza Surveillance Scheme
Compiled at 11:12 on Mar 6 2008

Data presented only when available in the EISS database

Notes:

¹ Belgium and Germany have reported consultation rates since 1996-1997, however, between 1996-1997 and 2000-2001 the rates were cases per 100 consultations and the data does not therefore appear in the graph above

² France has reported consultation rates since 1996-1997, however, between 1996-1997 and 2001-2002 the rates were ARI cases per 100 consultations and the data does not therefore appear in the graph above

³ Switzerland has reported consultation rates since 1997-1998, however, between 1997-1998 and 2001-2002 the rates were ILI cases per 100 consultations and the data does not therefore appear in the graph above

⁴ Denmark has reported consultation rates since 1999-2000, however, between 1999-2000 and 2000-2001 the rates were ILI cases per 100 consultations and the data does not therefore appear in the graph above

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