European Influenza Surveillance Scheme

Annual Report
2003-2004 influenza season

Utrecht, January 2005
This report was prepared by the EISS co-ordination centre staff, with the collaboration of the members of EISS.

EISS co-ordination centre staff (2003-2004 season):

- Koos van der Velden (Chairman)
- John Paget (Project leader, epidemiologist)
- Adam Meijer (Co-ordinator virology)
- Tamara Meerhoff (Researcher)
- Joan Deckers (Researcher - ViRgil*)
- Anouk Faassen (Administrative assistant)

* ViRgil (Vigilance against Viral Resistance) is a European surveillance network that aims to address current and emerging antiviral drug resistance developments for influenza and hepatitis (B and C). This project is funded by DG Research.

François Schellevis and Jouke van der Zee supervised the EISS project within NIVEL.

Members of EISS:

- Alexandrescu V (Romania), Barbara C (Malta), Bartelds AIM (Netherlands), Blaskovicova H (Slovak Republic), Brydak L (Poland), Buchholz U (Germany), Burguiere A-M (France), Carman W (Scotland), Cohen J-M (France), Coughlan S (Ireland), Coyle P (Northern Ireland), Crovati P (Italy), Domegan L (Ireland), Donatelli I (Italy), Dooley S (Ireland), Falcao IM (Portugal), Falcao JM (Portugal), Fleming DM (England), Grauballe P (Denmark), Griskevicius A (Lithuania), Grueber A (Germany), Hagmann R (Switzerland), Havlickova M (Czech Republic), Heckler R (Germany), Hungnes O (Norway), Iversen B (Norway), Joyce M (Ireland), de Jong JC (Netherlands), Kalina V (Latvia), Kazanov L (Latvia), Kennedy H (Northern Ireland), Kristufkova Z (Slovak Republic), Kyncl J (Czech Republic), Libotte Chasseur M-L (Belgium), Lina B (France), Linde A (Sweden), Lupulescu E (Romania), Machala M (Poland), Manuguerra I-C (France), de Mateo S (Spain), Melillo T (Malta), McMenamin J (Scotland), Mosnier A (France), Nolan D (Ireland), O’Donnell J (Ireland), O’Flanagan D (Ireland), O’Neill H (Northern Ireland), Opp M (Luxembourg), Penttinen P (Sweden), Pérez-Brena P (Spain), van der Plas S (Netherlands), Pregliasco F (Italy), Prosenc K (Slovenia), Quinn P (Ireland), Rokaite D (Lithuania), Rebelo de Andrade H (Portugal), Victoria Romanus (Sweden), Samuelsson S (Denmark), Schweiger B (Germany), Socan M (Slovenia), Thomas D (Wales), Thomas Y (Switzerland), Uphoff H (Germany), Valete M (France), Velicko I (Latvia), Vela TA (Spain), Watson J (England), van der Werf S (France), Westmoreland D (Wales), Wilbrink B (Netherlands), Wunderli W (Switzerland), Yane F (Belgium) and Zambon M (England).

EISS Steering Committee:

- Jean-Claude Manuguerra, John Paget, Pilar Pérez-Brena, Maja Socan, Helmut Uphoff, Koos van der Velden (Chairman), John Watson.

Acknowledgements:

We are grateful to Dr Alan Hay (WHO Influenza Centre, Mill Hill, United Kingdom) for providing the haemagglutination inhibition tables for characterized viruses in Europe during the 2003-2004 season (see Appendix 5.4).

EISS is funded by the European Commission (DG-Health and Consumer Protection). EISS also receives funding from Aventis Pasteur and Roche.

Neither the European Commission, Aventis Pasteur nor Roche, nor any person acting on their behalf is liable for any use made of the information in this report.

Suggested citation:


The report is accessible via the EISS website: [www.eiss.org](http://www.eiss.org)

Table of contents

European Influenza Surveillance Scheme: participating countries and institutes  4
Abbreviations  5
Netherlands Institute for Health Services Research (NIVEL)  5
Summary  7

1 Background  9
  1.1 Introduction  9
  1.2 The surveillance of communicable diseases in Europe  10
  1.3 The European Influenza Surveillance Scheme  11
    1.3.1 Objectives  11
    1.3.2 Membership  11
    1.3.3 Methods  12
    1.3.4 EISS website  12
    1.3.5 EISS co-ordination centre  13
    1.3.6 Funding  13

2 Influenza activity: 2003-2004 season  15
  2.1 Introduction  15
  2.2 Methods  15
  2.3 Results  15
    2.3.1 Clinical data  15
    2.3.2 Virological data  24
  2.4 Discussion  28

3 EISS developments during the 2003-2004 season  31
  3.1 Objectives  31
  3.2 Activities  31
  3.3 Conclusions  34

4 References  35

5 Appendices  37
  5.1 Partners  37
  5.2 Case definitions  38
  5.3 Levels of influenza activity  40
  5.4 Characteristics of influenza viruses isolated in Europe in 2003-2004  41
  5.5 EISS Publications  45
  5.6 Members  49

### European Influenza Surveillance Scheme: participating countries and institutes

<table>
<thead>
<tr>
<th>Country</th>
<th>Institute</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>Scientific Institute of Public Health</td>
<td>Brussels</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>National Institute of Public Health</td>
<td>Prague</td>
</tr>
<tr>
<td>Denmark</td>
<td>Statens Serum Institut</td>
<td>Copenhagen</td>
</tr>
<tr>
<td>France</td>
<td>Open Rome</td>
<td>Paris</td>
</tr>
<tr>
<td></td>
<td>Hospices Civils de Lyon</td>
<td>Lyon</td>
</tr>
<tr>
<td></td>
<td>Institut Pasteur</td>
<td>Paris</td>
</tr>
<tr>
<td>Germany</td>
<td>Robert Koch Institut</td>
<td>Berlin</td>
</tr>
<tr>
<td></td>
<td>ArbeitsGemeinschaft Influenza</td>
<td>Marburg</td>
</tr>
<tr>
<td></td>
<td>Niedersächsisches Landesgesundheitsamt</td>
<td>Hannover</td>
</tr>
<tr>
<td>Ireland</td>
<td>National Disease Surveillance Centre</td>
<td>Dublin</td>
</tr>
<tr>
<td></td>
<td>Irish College of General Practitioners</td>
<td>Dublin</td>
</tr>
<tr>
<td></td>
<td>National Virus Reference Laboratory</td>
<td>Dublin</td>
</tr>
<tr>
<td>Italy</td>
<td>Università degli Studi di Milano</td>
<td>Milan</td>
</tr>
<tr>
<td></td>
<td>Istituto Superiore di Sanità</td>
<td>Rome</td>
</tr>
<tr>
<td></td>
<td>Università di Genova</td>
<td>Genoa</td>
</tr>
<tr>
<td>Latvia</td>
<td>State Public Health Agency Laboratory of Virology</td>
<td>Riga</td>
</tr>
<tr>
<td>Lithuania</td>
<td>Centre for Communicable Diseases Prevention and Control</td>
<td>Vilnius</td>
</tr>
<tr>
<td></td>
<td>Lithuanian AIDS Centre Laboratory</td>
<td>Vilnius</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>Laboratoire National de Sante</td>
<td>Luxembourg</td>
</tr>
<tr>
<td>Malta</td>
<td>Disease Surveillance Unit</td>
<td>Msida</td>
</tr>
<tr>
<td></td>
<td>St. Luke’s Hospital</td>
<td>G’Mangia</td>
</tr>
<tr>
<td>Netherlands</td>
<td>Erasmus University</td>
<td>Rotterdam</td>
</tr>
<tr>
<td></td>
<td>National Institute for Public Health and the Environment</td>
<td>Bilthoven</td>
</tr>
<tr>
<td></td>
<td>Netherlands Institute for Health Services Research</td>
<td>Utrecht</td>
</tr>
<tr>
<td>Norway</td>
<td>National Institute of Public Health</td>
<td>Oslo</td>
</tr>
<tr>
<td>Poland</td>
<td>National Institute of Hygiene</td>
<td>Warsaw</td>
</tr>
<tr>
<td>Portugal</td>
<td>Instituto Nacional de Saude</td>
<td>Lisbon</td>
</tr>
<tr>
<td>Romania</td>
<td>Cantacuzino Institute</td>
<td>Bucharest</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>State Health Institute</td>
<td>Bratislava</td>
</tr>
<tr>
<td>Slovenia</td>
<td>Institute of Public Health</td>
<td>Ljubljana</td>
</tr>
</tbody>
</table>
Spain        Instituto de Salud Carlos III        Madrid
Sweden       Swedish Institute for Infections Disease Control        Solna
Switzerland  Swiss Federal Office of Public Health        Bern
             University Hospital of Geneva        Geneva
United Kingdom    Health Protection Agency        London
             Royal College of General Practitioners        Birmingham
             Health Protection Scotland        Glasgow
             Regional Virus Laboratory        Glasgow
             NPHS Communicable Disease Surveillance Centre        Cardiff
             NPHS Microbiology, University Hospital of Wales        Cardiff
             Communicable Disease Surveillance Centre (N.-Ireland)        Belfast

See Appendix 5.6 for further details

**Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARI</td>
<td>Acute respiratory infection</td>
</tr>
<tr>
<td>CNRL</td>
<td>Community Network of Reference Laboratories</td>
</tr>
<tr>
<td>EISS</td>
<td>European Influenza Surveillance Scheme</td>
</tr>
<tr>
<td>EC</td>
<td>European Commission</td>
</tr>
<tr>
<td>EPIET</td>
<td>European Programme for Intervention Epidemiology Training</td>
</tr>
<tr>
<td>ESWI</td>
<td>European Scientific Working Group on Influenza</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FluNet</td>
<td>Global WHO surveillance system of influenza</td>
</tr>
<tr>
<td>GPs</td>
<td>General practitioners</td>
</tr>
<tr>
<td>ILI</td>
<td>Influenza-like illness</td>
</tr>
<tr>
<td>NIVEL</td>
<td>Netherlands Institute for Health Services Research</td>
</tr>
<tr>
<td>RSV</td>
<td>Respiratory syncytial virus</td>
</tr>
<tr>
<td>ViRgil</td>
<td>Vigilance against Viral Resistance</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>

**Netherlands Institute for Health Services Research (NIVEL)**

The EISS co-ordination centre is based at NIVEL in Utrecht, the Netherlands. NIVEL is an independent, non-profit research institute. In 2003 NIVEL had approximately 160 employees and a gross annual turnover of about € 12 million. NIVEL has been in charge of the Dutch sentinel surveillance system since 1970. It is a WHO Collaborating Centre for Primary Health Care and received full ISO-9001 accreditation for its research activities in December 2001.
Summary

The European Influenza Surveillance Scheme (EISS) has gradually grown over the years and had 22 member countries covering 25 influenza surveillance networks during the 2003-2004 influenza season. Two new members joined the scheme during this season: Latvia and Malta. EISS included 30 national reference laboratories, at least 11,000 sentinel physicians and covered a total population of 445 million inhabitants.

The 2003-2004 influenza season was dominated by the spread of a new drift variant, A/Fujian/411/2002 (H3N2)-like virus. Sporadic reports of this virus were documented in Europe at the end of the 2002-2003 season and influenza associated with this virus began relatively early during the 2003-2004 season. Generally, influenza activity first occurred in the west of Europe (Ireland, the United Kingdom and the Iberian Peninsula) and gradually moved east across Europe.

At the beginning of the 2003-2004 season, there were reports of deaths in children from the UK, which initially seemed to confirm the concern about the escape of the A(H3N2) Fujian-like virus from pre-existing or vaccine induced anti-A(H3N2) immunity. However, although we observed the highest clinical incidences among children aged 0-14 in countries reporting age-specific data, these were not especially high compared to historical data. This suggests the illness was not particularly severe despite the A(H3N2) Fujian-like virus being antigenically different from the previously circulating A(H3N2) virus and the A(H3N2) virus used in the vaccine.

EISS implemented a number of projects during the 2003-2004 influenza season, including the introduction of baseline levels of influenza activity and the establishment of the Community Network of Reference Laboratories for Human Influenza in Europe. EISS collaborates with other EC-funded communicable disease surveillance networks in Europe and actively supports the global WHO FluNet influenza surveillance system.
1 Background

This report consists of three chapters: 1) background information on the European Influenza Surveillance Scheme (EISS), 2) an epidemiological and virological description of influenza activity during the 2003-2004 influenza season, and 3) EISS project developments during the 2003-2004 season.

1.1 Introduction

Influenza is an important public health problem in Europe. It is associated with increased general practice consultation rates, hospital admissions (Fleming, 2000) and excess deaths (Simonsen et al., 1997; Fleming, 2000). It must also be considered in terms of increased days lost to absence from work and school, extra pressure put on health care services during the winter season and influenza pandemic planning.

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 this 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 is the fundament of the EISS project (Fleming & Cohen, 1996; Paget et al., 2003).

Efforts to create a European surveillance project have been ongoing since 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.

There are many reasons why influenza surveillance networks in Europe have co-operated to share information. Influenza is a communicable disease that spreads rapidly and efficiently; this means that it is beneficial for countries to be informed about influenza...
activity (clinical incidence 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.

1.2 The surveillance of communicable diseases in Europe

The European Union’s competence in public health has steadily increased over time. While some mention of health was present in the early treaties, going back as far as the European Coal and Steel Community (ECSC) Treaty of 1951, its first substantive appearance was in the Single European Act of 1987. This Act enabled the development of the Europe Against Cancer and Europe Against AIDS programmes (McKee & Maclehose, 2000/2001).

It was only in 1992, in Article 129 of the Maastricht Treaty, that a competence in the field of communicable disease was defined. The Amsterdam Treaty of 1997 (Article 152) reinforced this competency and emphasised that “a high level of health protection should be ensured in the definition and implementation of all Community policies and activities” (McKee & Maclehose, 2000/2001).

In 1998 the European Parliament and the 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 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 1 January 2000. EISS is one of the epidemiological surveillance networks that the EC funds to monitor communicable diseases in Europe. A number of additional Decisions have further strengthened the epidemiological surveillance and control of communicable diseases in the Community (2002/253/EC, 2003/534/EC). Recently, a European Centre for Disease Prevention and Control has been established (Gouvras, 2004) which will be fully operational in May 2005 (Decision 2004/851/EC).

To improve the co-ordination and exchange of information, a Network Forum was established which groups together the different community surveillance projects in Europe (e.g. EuroTB, EPIET and Eurosurveillance). EISS is an active member of the Network Forum.
1.3 The European Influenza Surveillance Scheme

1.3.1 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

The European Influenza Surveillance Scheme aims to include all member states of the European Union. Full members 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.

A total of 19 (including pre-accession) EU countries (Belgium, Czech Republic, Denmark, France, Germany, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Spain, Slovenia, Slovak Republic, Sweden and United Kingdom) and three non-EU countries (Romania, Norway and Switzerland) were active members of EISS during the 2003-2004 influenza season. Since Northern Ireland, Scotland and Wales have their own influenza surveillance networks, there were 25 surveillance networks in EISS during this season.

Nine networks were ‘associate’ members of EISS during the 2003-2004 season (Latvia, Lithuania, Luxembourg, Malta, Northern Ireland, Poland, Romania, the Slovak Republic and Sweden). Poland, Romania, the Slovak Republic and Sweden were associate members as they did not combine clinical and virological data in the same population. Luxembourg, Malta, Northern Ireland, Latvia and Lithuania had this status as they did not fulfil the EISS criteria of two years of successful functioning prior to the 2003-2004 season or were recent members of EISS.
1.3.3 Methods

The clinical surveillance of influenza by the EISS networks is generally based on reports made by sentinel physicians, these being mainly general practitioners (Aguilera et al., 2001). Ten sentinel surveillance systems also include paediatricians (the Czech Republic, France, Germany, Italy, Lithuania, Romania, Slovenia, Slovak Republic, Spain and Switzerland) and physicians with other specialisations (Lithuania, Slovenia and Switzerland). In most countries, the sentinel physicians represent 1-5% of physicians working in the country, community or region.

For the virological surveillance of influenza, sentinel physicians are requested to take nose and/or throat swabs from patients with influenza-like illness (ILI) or acute respiratory infection (ARI) (Aguilera et al., 2003). The swabs are sent to a national reference laboratory and tested for influenza viruses (if positive, subtypes are determined and isolates are further antigenically and/or genetically characterised). Laboratory tests for virus identification are based on rapid diagnostic tests (enzyme-immunological, immunofluorescence or reverse transcription polymerase chain reaction (RT-PCR) and cell culture of virus. During the 2003-2004 season, about 55% of the laboratories reported antigenic characterisation data (by haemagglutination inhibition assay) and about 30% of the laboratories reported genetic characterisation data (by sequencing) of the virus isolates (Meijer et al., 2004).

In addition to the respiratory specimens obtained from sentinel practitioners, the laboratories also collect and report results on specimens obtained from other sources (e.g. from hospitals, non-sentinel physicians or institutional homes). Collection of these non-sentinel data allows a better description of influenza activity across Europe, as a range of indices (see Appendix 5.2) is used to monitor influenza activity in different countries. It also validates the virological data obtained from the sentinel sources.

The associate members reported clinical and virological data on influenza to the EISS database and were included in the presentation of results where possible. The EISS co-ordination centre operates on a continuous basis throughout the year. Active influenza surveillance occurs from week 40 to week 20 of the following year.

1.3.4 EISS website

The EISS project involves several partners in each country: sentinel surveillance systems, national influenza reference laboratories and national communicable disease surveillance centres. These various partners are connected via 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 clinical and virological queries.

During the influenza season, a Weekly Electronic Bulletin is published on the EISS website. As of the 2003-2004 season, the Bulletin has been written by the co-ordination centre in collaboration with experts from within the EISS group. 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.

1.3.5 EISS co-ordination centre

The co-ordination of the EISS project is based at the Netherlands Institute for Health Services Research (NIVEL) in Utrecht, the Netherlands. The role of the co-ordination centre is to:
- Manage the EISS website;
- Manage the EISS database;
- Publish the Weekly Electronic Bulletin during the influenza season;
- Co-ordinate EISS projects (e.g. harmonisation projects);
- Operate the Community Network of Reference Laboratories for Human Influenza in Europe;
- Implement decisions taken by the EISS group and/or Steering Committee;
- Present results (e.g. write scientific articles);
- Encourage the exchange of information between EISS members;
- Exchange information with key partners (e.g. EC and WHO);
- Represent EISS at meetings (e.g. EC meetings);
- Manage contracts (with the EC and industry);
- Organise EISS meetings (the Annual meeting and Steering Committee meetings);
- Write an Annual Report.

1.3.6 Funding

EISS has been funded by national governments since 1996 (when the project began) and has received funding from the EC since November 1999. It started receiving funding from industry in September 2000 (GlaxoSmithKline and Roche from September 2000 to December 2002, Roche and Aventis Pasteur from January 2003 to December 2004). During the 2001-2002, 2002-2003 and 2003-2004 influenza seasons, the EC contributed roughly 50% of the total EISS budget, national governments approximately 30% and industry roughly 20%.

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 **Influenza activity: 2003-2004 season**

2.1 **Introduction**


2.2 **Methods**

The general characteristics of the different sentinel surveillance systems during the 2003-2004 season are presented in Table 2.1. A detailed description of the methods is found in section 1.3.3.

Nose and/or throat swabs were collected by the sentinel physicians and these were sent to the national reference laborator(y)(ies) for virological analysis. Specimens from other sources (e.g. from hospitals or non-sentinel physicians) were also tested for influenza in the national reference laborator(y)(ies) and these are called ‘non-sentinel’ in this chapter.

2.3 **Results**

2.3.1 **Clinical data**

Influenza activity was first observed in the west of Europe (Ireland, the United Kingdom and the Iberian Peninsula) in October/November and moved east, eventually affecting Poland during the month of January/February 2004. This is reflected in the peak weekly clinical morbidity during the 2003-2004 season (see Table 2.2). The intensity of influenza activity (compared to historical data) ranged from low in Luxembourg, Wales and Germany to high in nine networks. Most countries reported widespread influenza activity during the 2003-2004 season (16 out of 25).

The peak levels of weekly ILI/ARI incidences in Europe were reached between week 46/2003 and week 6/2004 (Table 2.2), with the majority of countries reporting peak levels before the end of the year (16 out of 24). In countries reporting age specific data, the highest consultation incidences were observed among children aged 0-14 (Paget et al., submitted).
Table 2.1  General summary of characteristics of the sentinel surveillance systems in EISS

<table>
<thead>
<tr>
<th>Network</th>
<th>Year started</th>
<th>Year joined EISS</th>
<th>General practitioners</th>
<th>Paediatricians</th>
<th>Others</th>
<th>Numerator</th>
<th>Case definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full members</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td>1985</td>
<td>1996</td>
<td>98</td>
<td>0</td>
<td>0</td>
<td>ILI &amp; ARI</td>
<td>Yes</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>1968</td>
<td>1996</td>
<td>2230</td>
<td>1240</td>
<td>0</td>
<td>ARI</td>
<td>Yes</td>
</tr>
<tr>
<td>Denmark</td>
<td>1995</td>
<td>1999</td>
<td>150</td>
<td>0</td>
<td>0</td>
<td>ILI</td>
<td>Yes</td>
</tr>
<tr>
<td>England</td>
<td>1964</td>
<td>1996</td>
<td>360</td>
<td>0</td>
<td>0</td>
<td>ILI &amp; ARI</td>
<td>No</td>
</tr>
<tr>
<td>France</td>
<td>1984</td>
<td>1996</td>
<td>378</td>
<td>74</td>
<td>0</td>
<td>ARI</td>
<td>Yes</td>
</tr>
<tr>
<td>Germany</td>
<td>1992</td>
<td>1996</td>
<td>450</td>
<td>100</td>
<td>0</td>
<td>ARI</td>
<td>Yes</td>
</tr>
<tr>
<td>Ireland</td>
<td>2000</td>
<td>2000</td>
<td>34 practices*</td>
<td>0</td>
<td>0</td>
<td>ILI</td>
<td>Yes</td>
</tr>
<tr>
<td>Italy</td>
<td>1996</td>
<td>1998</td>
<td>500</td>
<td>40</td>
<td>0</td>
<td>ILI</td>
<td>Yes</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1970</td>
<td>1996</td>
<td>67</td>
<td>0</td>
<td>0</td>
<td>ILI</td>
<td>Yes</td>
</tr>
<tr>
<td>Norway</td>
<td>1975</td>
<td>2001</td>
<td>201 practices*</td>
<td>0</td>
<td>0</td>
<td>ILI</td>
<td>Yes</td>
</tr>
<tr>
<td>Portugal</td>
<td>1989</td>
<td>1996</td>
<td>170</td>
<td>0</td>
<td>0</td>
<td>ILI</td>
<td>Yes</td>
</tr>
<tr>
<td>Scotland</td>
<td>1971</td>
<td>1996</td>
<td>90</td>
<td>0</td>
<td>0</td>
<td>ILI</td>
<td>Yes</td>
</tr>
<tr>
<td>Slovenia</td>
<td>1999</td>
<td>2000</td>
<td>11</td>
<td>14</td>
<td>19</td>
<td>ILI &amp; ARI</td>
<td>Yes</td>
</tr>
<tr>
<td>Spain</td>
<td>1994</td>
<td>1996</td>
<td>226</td>
<td>54</td>
<td>0</td>
<td>ILI</td>
<td>Yes</td>
</tr>
<tr>
<td>Switzerland</td>
<td>1986</td>
<td>1997</td>
<td>154</td>
<td>43</td>
<td>68</td>
<td>ILI</td>
<td>Yes</td>
</tr>
<tr>
<td>Wales</td>
<td>1986</td>
<td>1996</td>
<td>30</td>
<td>0</td>
<td>0</td>
<td>ILI</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Associate members</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ireland</td>
<td>2000</td>
<td>2002</td>
<td>24</td>
<td>0</td>
<td>0</td>
<td>ILI</td>
<td>Yes</td>
</tr>
<tr>
<td>Lithuania</td>
<td>1997</td>
<td>2002</td>
<td>321</td>
<td>327</td>
<td>396</td>
<td>ILI &amp; ARI</td>
<td>Yes</td>
</tr>
<tr>
<td>Latvia</td>
<td>n.k.</td>
<td>2003</td>
<td>n.k.</td>
<td>n.k.</td>
<td>n.k.</td>
<td>ILI</td>
<td>Yes</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>2003</td>
<td>2003</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>ILI &amp; ARI</td>
<td>Yes</td>
</tr>
<tr>
<td>Malta</td>
<td>2002</td>
<td>2003</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>ILI</td>
<td>Yes</td>
</tr>
<tr>
<td>Poland</td>
<td>1946</td>
<td>2001</td>
<td>n.k.</td>
<td>n.k.</td>
<td>n.k.</td>
<td>ILI</td>
<td>Yes</td>
</tr>
<tr>
<td>Romania</td>
<td>1992</td>
<td>2001</td>
<td>240</td>
<td>102</td>
<td>0</td>
<td>ARI</td>
<td>Yes</td>
</tr>
<tr>
<td>Slovakia</td>
<td>1960</td>
<td>2001</td>
<td>2121</td>
<td>1202</td>
<td>0</td>
<td>ILI</td>
<td>Yes</td>
</tr>
<tr>
<td>Sweden</td>
<td>1999</td>
<td>2000</td>
<td>118</td>
<td>0</td>
<td>0</td>
<td>ILI</td>
<td>No</td>
</tr>
</tbody>
</table>

1 Many of the networks were members of pre-EISS surveillance projects– the Eurosentinel (1987-91) and ENS-CARE Influenza Early Warning System (1992-95) projects.
2 Number of physicians during the 2003-2004 influenza season.
3 ARI: acute respiratory infection; ILI: influenza-like illness (see also Appendix 5.2).
4 Physicians working in schools (children) and youth health services.
5 Physicians specialised in internal medicine.
6 Therapists.
7 One or more GP(s) per practice.
8 n.k. Not known.

The clinical rates and the virological results are presented by country in Figure 1. There was a good match between the ILI clinical incidence peak and the peak of virus isolation for most countries. The peak activity for ILI was generally earlier than the previous season (Paget et al., 2003). Not all networks reported cases of ILI per 100,000 population: Malta and Norway reported ILI per 100 consultations and the Czech Republic, France, Germany and Romania reported ARI per 100,000 population. For the countries that collected both ILI and ARI rates, only graphs for ILI are presented in Figure 1.

A number of countries introduced a baseline during the 2003-2004 influenza season. The baseline is the level of clinical activity in the period that the virus is not epidemic (summer and most of the winter). It is established at a national level and is based on historical data (5-10 influenza seasons).
Table 2.2  Overview of influenza activity in the EISS networks during the 2003-2004 season

<table>
<thead>
<tr>
<th>Country/network</th>
<th>Week of peak clinical morbidity</th>
<th>Intensity (peak weekly level)</th>
<th>Geographical spread (peak weekly level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>46</td>
<td>Medium</td>
<td>Widespread</td>
</tr>
<tr>
<td>Ireland</td>
<td>46</td>
<td>Medium</td>
<td>Widespread</td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>46</td>
<td>Medium</td>
<td>Local</td>
</tr>
<tr>
<td>Scotland</td>
<td>46</td>
<td>Medium</td>
<td>Widespread</td>
</tr>
<tr>
<td>Portugal</td>
<td>47</td>
<td>High</td>
<td>Widespread</td>
</tr>
<tr>
<td>Spain</td>
<td>47</td>
<td>Medium</td>
<td>Widespread</td>
</tr>
<tr>
<td>Wales</td>
<td>48</td>
<td>Low</td>
<td>Local</td>
</tr>
<tr>
<td>France</td>
<td>49</td>
<td>Medium</td>
<td>Widespread</td>
</tr>
<tr>
<td>Malta</td>
<td>50</td>
<td>High</td>
<td>Widespread</td>
</tr>
<tr>
<td>Norway</td>
<td>50</td>
<td>High</td>
<td>Widespread</td>
</tr>
<tr>
<td>Belgium</td>
<td>51</td>
<td>Medium</td>
<td>Widespread</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>51</td>
<td>Medium</td>
<td>Regional</td>
</tr>
<tr>
<td>Denmark</td>
<td>51</td>
<td>High</td>
<td>Widespread</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>51</td>
<td>Low</td>
<td>Local</td>
</tr>
<tr>
<td>Netherlands</td>
<td>51</td>
<td>Medium</td>
<td>Widespread</td>
</tr>
<tr>
<td>Romania</td>
<td>51</td>
<td>High</td>
<td>Widespread</td>
</tr>
<tr>
<td>Switzerland</td>
<td>1</td>
<td>High</td>
<td>Widespread</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>4</td>
<td>Medium</td>
<td>Widespread</td>
</tr>
<tr>
<td>Latvia</td>
<td>5</td>
<td>High</td>
<td>Regional</td>
</tr>
<tr>
<td>Lithuania</td>
<td>5</td>
<td>Medium</td>
<td>Local</td>
</tr>
<tr>
<td>Slovenia</td>
<td>5</td>
<td>High</td>
<td>Widespread</td>
</tr>
<tr>
<td>Germany</td>
<td>6</td>
<td>Low</td>
<td>Regional</td>
</tr>
<tr>
<td>Italy</td>
<td>6</td>
<td>Medium</td>
<td>Widespread</td>
</tr>
<tr>
<td>Poland</td>
<td>6</td>
<td>High</td>
<td>Regional</td>
</tr>
<tr>
<td>Sweden</td>
<td>n.a.</td>
<td>Medium</td>
<td>Regional</td>
</tr>
</tbody>
</table>

1 Ordered by peak week of clinical morbidity and alphabetically by country name.
2 See Appendix 5.3 for the definitions of levels of influenza activity.

NB The intensity and geographical spread presented in this table represents the maximum intensity and geographical spread during the 2003-2004 season.
Figure 1: Clinical and virological sentinel monitoring of influenza in EISS networks during the 2003-2004 influenza season.

Morbidity rates for influenza-like-illness (ILI) or acute respiratory infections (ARI) are presented by a line on the first y-axis (continuous line: 2003-2004 season; dotted line: 2002-2003 season). Isolation/detection of cases of influenza infection are indicated in the bar chart on the second y-axis (grey bar: influenza A; black bar: influenza B). Not all networks have a baseline.
ILI per 100 consultations
2.3.2 **Virological data**

The 2003-2004 influenza season was dominated by the spread of the new drift variant A/Fujian/441/2002 (H3N2)-like virus. Sporadic detections of this virus were reported at the end of the 2002-2003 influenza season in Switzerland and Norway (Paget et al., 2003).

The sentinel virological data are presented in Table 2.3. A total of 18,464 specimens were collected by the sentinel physicians. The overall percentage of positive samples was 27% (range 11-60%). Comparisons between countries are difficult to make due to international variation in specimen collection and transport, swabbing protocols and laboratory methods. Of the 4,916 sentinel samples that tested positive for influenza virus, 99.1% were influenza A. Of the subtyped influenza A viruses (H and N determination) (N=2,134), 98.9% were influenza A(H3N2), 0.6% were influenza A(H1N1) and 0.5% were influenza A(H1N2) (detections in Italy and Norway only). The peak weekly level of influenza virus detections varied among the member countries, and coincided well with the week of peak clinical morbidity (see also Figure 1).

The non-sentinel data are presented in Table 2.4. The overall percentage of positive samples was not calculated because some networks do not know the total number of specimens tested. Of the 8,736 non-sentinel samples that tested positive for influenza virus 99.2% were influenza A. Only in Ireland and Italy was there a substantial number of influenza B detections. Of the subtyped influenza A viruses (H and N determination) (N=1,728), 99.25% were influenza A(H3N2), 0.52% were influenza A(H1N1) and 0.23% were influenza A(H1N2) (detections only in Norway and Denmark). With the exception of Ireland, the non-sentinel and sentinel data showed a similar proportion of influenza type A and influenza type B detections.

EISS received no reports of influenza A(H5N1), A(H7N2) or A(H7N3) virus detections. These viruses caused outbreaks among poultry in South-East Asia (H5N1) (Tran et al., 2004), Canada (H7N3) (Tweed et al., 2004), and the USA (H7N2) (Promed, 2004) during the 2003-2004 influenza season in Europe, and infected also humans.

A summary of the historical European data is presented in Table 2.5. This table includes both sentinel and non-sentinel data for eight influenza seasons. Overall, the total number of specimens increased over time as the number of member countries participating in the EISS project increased. The specimens tested more frequently positive for influenza A than influenza B, the proportion of which varied by season (range 0.9% to 36.4%). In seven out of eight seasons the influenza A(H3N2) subtype was reported most often. In one season (2000/2001) the subtype influenza A(H1N1) was reported most frequently.
<table>
<thead>
<tr>
<th>Network</th>
<th>Total Positives</th>
<th>Total % A(H) subtyped only</th>
<th>Total % A(HxN) subtyped</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>A (%)</td>
<td>B (%)</td>
</tr>
<tr>
<td>Belgium</td>
<td>1059</td>
<td>631 60 100 0</td>
<td>266 100 0</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>812</td>
<td>117 14 97 3.4</td>
<td>35 100 0</td>
</tr>
<tr>
<td>Denmark</td>
<td>219</td>
<td>55 25 98.2 1.8</td>
<td>0 n.a. n.a.</td>
</tr>
<tr>
<td>England</td>
<td>654</td>
<td>248 38 100 0</td>
<td>53 100 0</td>
</tr>
<tr>
<td>France</td>
<td>3866</td>
<td>1094 28 99.7 0.3</td>
<td>1 0 100</td>
</tr>
<tr>
<td>Germany</td>
<td>2740</td>
<td>552 20 99.8 0.2</td>
<td>155 100 0</td>
</tr>
<tr>
<td>Ireland</td>
<td>348</td>
<td>149 43 95.3 4.7</td>
<td>0 n.a. n.a.</td>
</tr>
<tr>
<td>Italy</td>
<td>2856</td>
<td>393 14 94.7 5.3</td>
<td>0 n.a. n.a.</td>
</tr>
<tr>
<td>Latvia</td>
<td>105</td>
<td>49 47 100 0</td>
<td>1 0 100</td>
</tr>
<tr>
<td>Lithuania</td>
<td>35</td>
<td>6 17 100 0</td>
<td>0 n.a. n.a.</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>223</td>
<td>25 11 100 0</td>
<td>0 n.a. n.a.</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>111</td>
<td>34 31 100 0</td>
<td>29 100 0</td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>76</td>
<td>38 50 100 0</td>
<td>37 100 0</td>
</tr>
<tr>
<td>Norway</td>
<td>266</td>
<td>145 55 98.6 1.4</td>
<td>123 95 5</td>
</tr>
<tr>
<td>Poland</td>
<td>n.a.</td>
<td>n.a. n.a. n.a. n.a. n.a.</td>
<td>n.a. n.a. n.a. n.a.</td>
</tr>
<tr>
<td>Portugal</td>
<td>270</td>
<td>156 58 100 0</td>
<td>4 100 0</td>
</tr>
<tr>
<td>Romania</td>
<td>1122</td>
<td>225 20 100 0</td>
<td>0 n.a. n.a.</td>
</tr>
<tr>
<td>Scotland</td>
<td>904</td>
<td>193 21 100 0</td>
<td>0 n.a. n.a.</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>637</td>
<td>182 29 99.5 0.5</td>
<td>59 100 0</td>
</tr>
<tr>
<td>Slovenia</td>
<td>321</td>
<td>77 24 98.7 1.3</td>
<td>0 n.a. n.a.</td>
</tr>
<tr>
<td>Spain</td>
<td>1227</td>
<td>303 25 99.3 0.7</td>
<td>5 100 0</td>
</tr>
<tr>
<td>Switzerland</td>
<td>613</td>
<td>236 38 99.2 0.8</td>
<td>223 100 0</td>
</tr>
<tr>
<td>Wales</td>
<td>N/K</td>
<td>8 n.a. 100 0</td>
<td>8 100 0</td>
</tr>
<tr>
<td>Europe (N)</td>
<td>18464</td>
<td>4916 999 2134</td>
<td>26.6 99.1 0.9</td>
</tr>
</tbody>
</table>

* The frequencies are based on the EISS database downloaded on 29.07.2004
n.a.: not known
N/K: not known
Malta and Sweden are excluded as no virological data was reported
Table 2.4  Non-sentinel virological data for the 2003-2004 influenza season*

<table>
<thead>
<tr>
<th>Network</th>
<th>Total Positives</th>
<th>Total % A(H) subtyped only</th>
<th>Total % A(HxNx) subtyped</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>A (%)</td>
<td>B (%)</td>
</tr>
<tr>
<td>Belgium</td>
<td>629</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>0</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Denmark</td>
<td>337</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>England</td>
<td>1456</td>
<td>98.6</td>
<td>1.4</td>
</tr>
<tr>
<td>France</td>
<td>29825</td>
<td>99.4</td>
<td>0.6</td>
</tr>
<tr>
<td>Germany</td>
<td>0</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Ireland</td>
<td>1741</td>
<td>87.4</td>
<td>12.6</td>
</tr>
<tr>
<td>Italy</td>
<td>90</td>
<td>92.9</td>
<td>7.1</td>
</tr>
<tr>
<td>Latvia</td>
<td>3479</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Lithuania</td>
<td>0</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>13</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>381</td>
<td>99.2</td>
<td>0.8</td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>490</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Norway</td>
<td>6737</td>
<td>98.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Poland</td>
<td>149</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Portugal</td>
<td>622</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Romania</td>
<td>399</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Scotland</td>
<td>946</td>
<td>99.9</td>
<td>0.1</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>295</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Slovenia</td>
<td>167</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Spain</td>
<td>450</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Switzerland</td>
<td>220</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Wales</td>
<td>609</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Europe (N)</td>
<td>8736</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The frequencies are based on the EISS database downloaded on 29.07.2004
N/K: countries that do not know the exact total of respiratory specimens tested for influenza
n.a.: not applicable
Malta and Sweden are excluded as no virological data was reported
Table 2.5  Summary of total sentinel and non-sentinel data for Europe: historical data

<table>
<thead>
<tr>
<th>Season</th>
<th>Total number of specimens tested positive for influenza</th>
<th>Percentage positive influenza A</th>
<th>Percentage positive influenza B</th>
<th>Total N-subtyped</th>
<th>% A(H1N1)</th>
<th>% A(H1N2)</th>
<th>% A(H3N2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003/2004</td>
<td>14,025</td>
<td>99.1%</td>
<td>0.9%</td>
<td>4,284</td>
<td>0.5%</td>
<td>0.4%</td>
<td>99.1%</td>
</tr>
<tr>
<td>2002/2003</td>
<td>7,616</td>
<td>63.4%</td>
<td>36.4%</td>
<td>2,987</td>
<td>9.7%</td>
<td>1.5%</td>
<td>88.8%</td>
</tr>
<tr>
<td>2001/2002</td>
<td>7,296</td>
<td>74.9%</td>
<td>25.1%</td>
<td>2,718</td>
<td>3.8%</td>
<td>8.8%</td>
<td>87.3%</td>
</tr>
<tr>
<td>2000/2001</td>
<td>6,352</td>
<td>70.3%</td>
<td>29.7%</td>
<td>1,357</td>
<td>96.7%</td>
<td>0.2%</td>
<td>3.1%</td>
</tr>
<tr>
<td>1999/2000</td>
<td>7,663</td>
<td>98.8%</td>
<td>1.2%</td>
<td>4,093</td>
<td>1.8%</td>
<td>-</td>
<td>98.2%</td>
</tr>
<tr>
<td>1998/1999</td>
<td>6,950</td>
<td>71.9%</td>
<td>28.1%</td>
<td>2,760</td>
<td>0.4%</td>
<td>-</td>
<td>99.6%</td>
</tr>
<tr>
<td>1997/1998</td>
<td>6,008</td>
<td>92.7%</td>
<td>7.3%</td>
<td>2,155</td>
<td>4.4%</td>
<td>-</td>
<td>95.6%</td>
</tr>
<tr>
<td>1996/1997</td>
<td>5,503</td>
<td>79.9%</td>
<td>20.1%</td>
<td>1,339</td>
<td>1.0%</td>
<td>-</td>
<td>99.0%</td>
</tr>
</tbody>
</table>

1 Based on data available in the EISS database on 10 November 2004.
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).

Figure 2 presents the results of the antigenic strain characterisations of influenza virus isolates reported by the national reference laboratories in EISS (combined sentinel and non-sentinel data). The hemagglutinin was antigenically characterised for a total of 3,457 virus isolates. The largest number of characterisations were reported by Latvia (796), Germany (491), France (392), the Netherlands (390), and England (348). A subset of isolates collected by the EISS networks has also been characterized by the WHO Collaborating Centre Mill Hill in London. The antigenic analysis and a summary statement can be found in Appendix 5.4.

Over 97% of the characterised isolates had an A/Fuijan/411/02 (H3N2)-like hemagglutinin; this A/Fuijan/411/02 (H3N2)-like virus is a new drift variant which was not included in the 2003-2004 vaccine. There were 46 isolates with an H3 hemagglutinin similar to the vaccine strain A/Moscow/10/99 (H3N2); the widely used vaccine strain is A/Panama/2007/99, 34 with an H1 hemagglutinin similar to the vaccine strain A/New Caledonia/20/99 (H1N1) and 7 with a hemagglutinin similar to the vaccine strain B/Hong Kong/330/2001. There were 11 non-vaccine strain reports of influenza B isolates: seven with a hemagglutinin similar to the B/Sichuan/379/99-like virus (three in the Netherlands, one in France, one in Germany and two in Switzerland) and four with a hemagglutinin similar to the B/Shanghai/361/2002-like virus (in England, Italy and Norway).
The European influenza vaccine for the 2003-2004 season contained (EMEA, 2003):
- An A/NewCaledonia/20/99 (H1N1)-like virus
- An A/Moscow/10/99 (H3N2)-like virus (the widely used vaccine strain is A/Panama/2007/99)
- A B/Hong Kong/330/2001-like virus (currently vaccine strains include B/Shandong/7/97, B/HongKong/330/2001, B/HongKong/1434/2002).

2.4 Discussion

The 2003-2004 influenza season in Europe was dominated by the emergence and spread of the new drift variant A/Fujian/411/2002 (H3N2)-like virus. Sporadic cases of this virus were detected at the end of the 2002-2003 season in Switzerland and Norway (Paget et al., 2003) and activity related to this virus started relatively early during the 2003-2004 winter compared to previous seasons. The intensity of clinical activity was higher than during the 2002-2003 season in 13 out of 20 networks (Paget et al., 2003), but did not reach particularly high levels compared to historical data.

During the 2003-2004 season, the ILI weekly incidence rates in Europe varied considerably, with the peak incidences ranging from 12.1 per 100,000 population in Wales to 1884.6 per 100,000 population in the Slovak Republic. The weekly incidences of ILI for the Slovak Republic are relatively high compared to other countries in Europe. This might be explained by a recent change in the surveillance system: sentinel physicians must now report ILI instead of ARI and they may tend to still report cases of ARI, thus increasing the ILI incidences.

Differences in weekly ILI incidences can be due to many factors, including the seasonal variation and geographic spread of influenza activity by region and also by different case definitions and health care systems (Kyncl et al., submitted). Other factors (e.g. the need for a medical certificate when absent from work) may also play a role as ILI weekly incidences also varied considerably between neighbouring countries (e.g. the Netherlands.
The general west-east spread of influenza activity across Europe during the 2003-2004 season has also been observed during previous seasons. Plotting the peak weeks of clinical sentinel activity against the longitude and latitude of each network in EISS during five winter seasons (1999-2000 to 2003-2004) indicated that there was a west-east spread of influenza activity in three of the previous five winters (2003-2004, 2002-2003 and 2001-2002) and that in one of these seasons (2001-2002), there was also a north-south spread (Paget et al., 2004). Another finding was that influenza activity during the 2003-2004 season, for Europe as a whole, was longer (18-22 weeks) than in previous winters (14 to 18 weeks during the 2001-2002 season) (Paget et al., 2004).

The identification of circulating viruses within the population and the recognition of virological changes are important tasks for EISS. There is a particular need to detect and monitor the emergence or re-emergence of viruses with pandemic potential and viruses that have a ‘mismatch’ with the vaccine strain components. The virological database was therefore upgraded at the beginning of the 2003-2004 season enabling more detailed information to be collected (e.g. separate recording of H and N subtyping and antigenic and genetic strain characterisation results) and also rapid and easy modification for the collection of information on emerging influenza viruses (e.g. a new avian influenza virus). These developments proved particularly relevant in the light of the occurrence of avian influenza outbreaks and transmission to humans in South-East Asia (H5N1) (Tran et al., 2004), Canada (H7N3) (Tweed et al., 2004) and the USA (H7N2) (Promed, 2004) during the 2003-2004 influenza season.

Objective determination of the predominant virus by type and H- and N-subtype in a country was difficult as in many countries only a minority of influenza A virus isolates was hemagglutinin subtyped and the neuraminidase to an even lesser extent. More importantly, determining the H- and N-subtype of influenza A viruses is essential to detect the emergence of new (avian) subtypes or reassortant viruses, illustrated by the emergence of the A(H1N2) reassortant virus in 2001 (Gregory et al. 2002). EISS is aiming at H- and N-subtyping of at least a representative sample of isolates throughout the season in each country in order to fulfil its early warning function (Meijer et al., 2004).

The predominant virus circulating in Europe had a hemagglutinin similar to the A/Fujian/411/2002 (H3N2)-like virus. The A(H3N2) Fujian-like virus is antigenically different from the influenza A/Moscow/10/99 (H3N2) vaccine virus strain included in the 2003-2004 vaccine and there were concerns about the effectiveness of the vaccine in preventing influenza illness (Paget et al., 2003). Studies have shown that estimates of influenza vaccine effectiveness ranged from 25% to 49% in children and 38% to 52% in adults in preventing illness during the 2003-2004 influenza season in the USA (CDC, 2003). Although estimated protection rates are higher when the match between the vaccine and circulating virus is perfect (70-90% in adults <65 years) (CDC, 2003), our epidemiological data for the 2003-2004 season indicate that the season was not particularly intense compared to historical data (EISS, 2001).
At the beginning of the 2003-2004 season, there were reports of deaths in children from the UK (HPA, 2003) which initially seemed to confirm the concern about the escape of the A(H3N2) Fujian-like virus from pre-existing or vaccine induced anti-A(H3N2) immunity. However, although we observed the highest clinical incidences among children aged 0-14 in countries reporting age-specific data, these were not especially high compared to historical data (data not shown). From these observations, we may conclude that, despite the A(H3N2) Fujian-like virus being antigenically different from the previously circulating A(H3N2) virus and the A(H3N2) virus used in the vaccine, illness was not particularly severe.

The composition of the influenza vaccine for the 2004-2005 season (northern hemisphere winter) was announced by the World Health Organization in March 2004 (WHO, 2004). Based on the analysis of influenza viruses from all over the world till February 2004, the A/Moscow/10/99 (H3N2)-like and B/Hong Kong/330/2001-like vaccine strains in the influenza vaccine of 2003-2004 have been exchanged with more current viruses. The European influenza vaccine (EMEA, 2004) for the 2004-2005 season contains:

- A/NewCaledonia/20/99 (H1N1)-like virus (the currently used vaccine virus is reassortant virus IVR-116 which is derived from A/NewCaledonia/20/99)
- A/Fujian/411/2002 (H3N2)-like virus (the currently used vaccine virus is reassortant virus X-147 which is derived from A/Wyoming/3/2003)
- B/Shanghai/361/2002-like virus (the currently used vaccine virus is B/Jiangsu/10/2003).

The spread of virus strains in Europe during the 2004-2005 season will be carefully monitored by the virological, epidemiological and clinical experts within EISS. Assessments of influenza activity will be made in collaboration with the WHO Collaborating Centre in London and will be reported on the EISS website on a weekly basis.
3 EISS developments during the 2003-2004 season

3.1 Objectives

The following EISS co-ordination centre objectives were established for the 2003-2004 influenza season:

- Integrate new members into EISS;
- Modify and improve the EISS Weekly Electronic Bulletin;
- Introduce baseline levels of influenza activity;
- Establish an automatic data transfer between the EISS and WHO FluNet;
- Collaborate with the EC to prepare for a possible influenza pandemic;
- Establish the Community Network of Reference Laboratories of Human Influenza in Europe;
- Establish an RSV (respiratory syncytial virus) Task Group;
- Collaborate with the Vigilance against Viral Resistance project (ViRgil) funded by DG Research to combat viral resistance to treatments;
- Organise two Steering Committee meetings;
- Organise the annual EISS meeting;
- Apply for continued EC funding.

3.2 Activities

**New members**

Two new influenza surveillance networks (Malta and Latvia) were successfully integrated into EISS. The new members were accepted as “associate” members and actively participated in the project during the 2003-2004 influenza season. Contacts with Austria and Finland were also established during the season.

**The Weekly Electronic Bulletin**

The Weekly Electronic Bulletin was modified and improved for the 2003-2004 influenza season. For example, virological and strain characterisation data were presented for each country in more detail. Twenty-eight bulletins were published during the 2003-2004 season (from week 41/2003 to week 16/2004).

**Introduce baseline levels of influenza activity**

Baseline levels of influenza activity were integrated into the clinical graphs that appeared in the Weekly Electronic Bulletin during the 2003-2004 season. The baseline is the level of clinical influenza activity remains in throughout the summer and most of the winter. Usually, there will be a 6-12 week period in winter when the level of clinical influenza activity rises above the baseline threshold, but in the very occasional winter (perhaps 1 in 10) activity does not exceed the baseline level. Networks can either define their baseline
as a line or curve and it can be modified from one season to another. Eleven networks provided a baseline during the 2003-2004 season.

**Automatic data transfer between EISS and FluNet**

Networks participating in EISS enter their data into the EISS database every week during the influenza season (from week 40 to week 20 of the following year). Most of the networks also enter their virological data into the WHO-FluNet database. EISS would like to establish an automatic data transfer from the EISS database to FluNet, so that its members only have to enter their virological data into one database. The FluNet website was moved to WHO Geneva during the 2003-2004 season and the automatic data transfer was therefore not initiated.

**Influenza pandemic planning**

The EISS group has been involved in an EU initiative to prepare for a possible influenza pandemic. EISS representatives have taken part in the following activities:
- In October 2003 they visited the newly established European Early Warning and Response System unit (EWRS) at the EC in Luxembourg, 2003. The EWRS has instructed EISS/surveillance networks to report unusually severe outbreaks or changes in the virus at an early stage, so that the EC can take timely measures.
- They participated in a meeting on October 21st-22nd, 2003, at the EC in Luxembourg of the newly established Community Planning and Response Working Group. The meeting dealt, (among other issues) with the draft Community Influenza Pandemic Plan.
- They advised their respective national or regional governments with regard to pandemic planning and related activities.

In addition, the complete set of available national Influenza Pandemic Plans was published on the EISS website and the European Commission adopted the Community Influenza Pandemic Planning and Response Programme on the 26th of March, 2004. Other EISS activities related to pandemic preparedness include involvement in a multi-country influenza vaccine-uptake survey in EU Member States, carried out under the responsibility of ESWI and NIVEL. Through its linkage with the network of excellence, ViRgil, EISS is involved in research towards antiviral resistance susceptibility. Finally, an important development within EISS in relation to pandemic planning is the building of the Community Network of Reference Laboratories for Human Influenza in Europe (see next point).

**Community Network of Reference Laboratories**

The Community Network of Reference Laboratories (CNRL) for Human Influenza in Europe was launched at the 2003 annual EISS meeting. Based on discussions and decisions made at this meeting, the terms of reference were written, discussed and accepted at the annual EISS meeting of 2004. Following the 2003 meeting, decisions (e.g. about the basic diagnostic tasks of the CNRL) were already implemented in the 2003-2004 season. A questionnaire sent out in the autumn of 2003 concerning the capacities and preparedness of the CNRL to identify (emerging) influenza viruses in relation to the defined basic tasks showed that most laboratories were able to carry out the basic tasks, but that there was room for improvement. The entry and presentation of virological data in the EISS database was enhanced to reflect the results of the basic tasks. This allowed the reporting of accurate data concerning the Fujian flu to the public and the EC. Agreements with the WHO Collaborating Centre, Mill Hill, London, were signed for the
delivery of standardised reagents for identification and characterisation of seasonal and emerging influenza viruses. Discussion lists for rapid communication between all laboratories have been implemented on the EISS website to share and discuss virology-related items. Rapid sharing of information, protocols, and reagents during the A(H5N1) and A(H7N3) epizootics in Asia and Canada in 2004 ensured the preparedness of the laboratories for detection of these possibly pandemic viruses. The foundation for further enhancement and collaborations has been laid. The next steps include further developing laboratories to carry out all basic tasks, harmonisation and standardisation of diagnostic methods, initiation and taking part in research projects (ViRgil), development of new databases and enhanced collaboration with WHO and the new European Centre for Disease Prevention and Control.

**RSV Task Group**

An RSV Task Group was established at the annual EISS meeting in 2003 for reporting of respiratory syncytial virus (RSV) within the EISS. Two meetings were organised in Paris (in July 2003 and in January 2004). The objective of the Task Group is to explore the possibility of designing a comprehensive RSV surveillance scheme within the EISS framework, and to plan the development and implementation of such a scheme including a research agenda. It was agreed that 1) RSV is a public health problem, 2) there is a need for RSV surveillance, 3) research projects are needed to develop a comprehensive RSV surveillance system and 4) that EISS is the appropriate structure to develop a comprehensive RSV surveillance. For the implementation of RSV surveillance within EISS, we would like to have a better knowledge of which RSV data is collected and entered for each country in the EISS database, what the minimum requirements are and which technical methods are most suitable for RSV surveillance.

**ViRgil project**

ViRgil (Vigilance against Viral Resistance) is a European surveillance network that is aiming to address current and emerging antiviral drug resistance developments for hepatitis (B and C) and influenza. Several EISS members have been asked to participate in this European network of excellence. Its activities will be funded for four years by the 6th Framework programme of the EC (DG Research). The actual activities are expected to start in spring 2004 and will include 55 European organisations. One of the aims is to create a structure that is not limited to these initial three diseases but can be extended to other viral pathogens in the future. The ViRgil network consists of seven different platforms concentrating on various aspects of antiviral resistance. In general, patients are the central focus point. ViRgil covers hepatitis as well as influenza, the EISS involvement however is limited to influenza. Although EISS itself is not a partner in ViRgil, individual EISS-members are. The ViRgil surveillance and clinical virology platforms are led by Bruno Lina (Hospices Civils de Lyon, France) and Maria Zambon (Health Protection Agency, United Kingdom), respectively. The ViRgil societal impact platform is led by Jean-Marie Cohen (Open Rome, France).
EISS Steering Committee
The co-ordination centre organised an EISS Steering Committee meeting in September 2003 and April 2004. The Steering Committee now includes seven persons: Jean-Claude Manuguerra (Institut Pasteur, Paris), Pilar Perez-Brena (Instituto de Salud Carlos III, Spain), Maja Socan (Institute of Public Health, Slovenia), Helmut Uphoff (AGI, Germany), Koos van der Velden (Chairman, EISS co-ordination centre), John Watson (PHLS, London) and John Paget (EISS co-ordination centre). The objective is to organise regular Steering Committee meetings and to professionalize the overall management of the EISS.

EISS plenary meetings
A plenary 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 2004 the meeting was held in Sintra, Portugal. The total number of participants was 60, including an EC representative. The number of networks that participated in the meeting was 27 (including Austria and Greece).

EC Funding
The EC funding of EISS ended in April 2003. The EISS co-ordination centre therefore prepared a new grant application (within the EC’s Sixth Public Health Framework, 2003-2008) and this was submitted to the EC (Health and Consumer Protection Directorate General) in May 2003. In October 2003 EISS received written confirmation that the application was successful and it would receive funding until September 2006.

3.3 Conclusions
The EISS project successfully reached most of its objectives for the 2003-2004 season. One of the major projects for the 2003-2004 season was the creation of the CNRL which will improve collaborations in Europe and should lead to an increase in common virological projects within EISS. For example, a new Quality Control Assessment (QCA) is planned for the 2005/2006 season. The QCA was also performed during the winters of 2000 and 2002; the assessment is very important to evaluate the quality of the laboratories participating in EISS. In addition, the quality of the clinical data collection will be assessed, and a swabbing protocol is planned. All of these projects will lead to a higher quality influenza surveillance system in Europe. An important development in 2005 is the creation of the European Centre for Disease Prevention and Control and EISS plans to work closely with this new institution.
4 References


Kyncl J, Havlickova M, Paget WJ, Kriz B. Harmonization of the acute respiratory infection reporting system in the Czech Republic with the European community networks. Submitted (Eurosurveillance).


5 Appendices

5.1 Partners

European Commission
Health & Consumer Protection Directorate-General
Luxembourg

Industry
Aventis Pasteur Roche Pharma
France Switzerland

Web Service
Quad Logic
France
## 5.2 Case definitions

Influenza-like illness and acute respiratory infection case definitions by surveillance networks (Aguilera et al., 2003)

<table>
<thead>
<tr>
<th>Surveillance networks</th>
<th>Influenza-like illness</th>
<th>Acute respiratory infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>Sudden onset with fever, myalgia and respiratory symptoms (cough or thoracic pain)</td>
<td>Any infection involving the respiratory tract, with or without fever, which lasts 1-2 weeks</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>No case definition used</td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>Sudden onset of disease with fever, myalgia and symptoms of respiratory infection</td>
<td></td>
</tr>
<tr>
<td>England</td>
<td>No case definition used</td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>Sudden onset of respiratory symptoms with infection context (fever, headaches), in the absence of other diagnosis</td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>Sudden onset of symptoms with a temperature of 38°C or more in the absence of any other disease with at least 2 of the following: headache, myalgia, sore throat, dry cough</td>
<td>Acute pharyngitis, acute bronchitis or pneumonia, with or without fever</td>
</tr>
<tr>
<td>Ireland</td>
<td>Sudden onset of symptoms, with temperature &gt;38°C, plus at least 1 systemic symptom and at least 1 respiratory symptom</td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>Every illness characterized by sudden onset of fever (&gt;38°C) with respiratory symptoms (dry cough and sore throat), headache and/or myalgia</td>
<td></td>
</tr>
<tr>
<td>Lithuania</td>
<td>No case definition used</td>
<td>No case definition used</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>No case definition used</td>
<td>No case definition used</td>
</tr>
<tr>
<td>Malta</td>
<td>Fever (&gt;38°C) with cough and headache and/or muscular pain</td>
<td></td>
</tr>
<tr>
<td>The Netherlands</td>
<td>Pel criteria 1</td>
<td></td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>An acute respiratory illness accompanied by variable fever and myalgia</td>
<td></td>
</tr>
<tr>
<td>Norway</td>
<td>A patient with clear general symptoms, primarily acute fever &gt;38°C, headache, muscle ache, and in addition a dry cough</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>No case definition used</td>
<td></td>
</tr>
<tr>
<td>Portugal</td>
<td>ICHPPC-2-D definition²</td>
<td></td>
</tr>
<tr>
<td>Romania</td>
<td>Every illness characterized by sudden onset, fever, myalgia and respiratory symptoms (cough, coryza),</td>
<td>Common cold, rhinitis, rhino-pharyngitis, tonsilitis, sinusitis, otitis media, laryngitis, tracheitis, bronchitis, bronchiolitis, pneumonia and broncho-pneumonia</td>
</tr>
<tr>
<td>Scotland</td>
<td>No case definition used</td>
<td>No case definition used</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>Sudden onset and fever with (1) at least 1 respiratory symptoms: cough, rhinitis, sore throat, and (2) at least 1 general symptoms: headache, joint ache, chills, malaise</td>
<td></td>
</tr>
<tr>
<td>Slovenia</td>
<td>Sudden onset of fever (&gt;38°C) with general weakness, muscle and joint pain, dry cough and symptoms of upper respiratory tract affection</td>
<td>No case definition used</td>
</tr>
<tr>
<td>Spain</td>
<td>ICHPPC-2-D case definition²</td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
<td>No case definition used</td>
<td></td>
</tr>
<tr>
<td>Switzerland</td>
<td>Respiratory illness with fever &gt;38°C, myalgia, general pain, chills, anorexia. (optional symptoms are: cough, rhinitis and arthralgia)</td>
<td></td>
</tr>
<tr>
<td>Wales</td>
<td>Upper respiratory tract symptoms, fever, chills, myalgia, cough</td>
<td></td>
</tr>
</tbody>
</table>

---

1: **Pel criteria:** An acute onset (i.e. at most a prodromal stage of three to four days), accompanied by a rise in rectal temperature of >38°C, and at least 1 of the following symptoms: cough, coryza, sore throat, frontal headache, retrosternal pain, myalgia.

2: **International Classification of Health Problems in Primary Care**

ILI: at least one of the following characteristics:

1. Influenza virus culture positive or serological evidence of influenza virus infection
2. Context of influenza epidemic, plus 4 of the criteria in 3.
3. 6 of the following criteria: sudden onset (within 12 hours), cough, fever, chills, prostration and weakness, myalgia or general pain, rhinitis, pharyngitis, contact with a case.
5.3 Levels of influenza activity

Indicators of influenza activity used in the 2003-2004 influenza season:
The levels of influenza activity in European countries reported by EISS members during the 2003-2004 influenza season are based on two assessments of influenza activity:

1. An indicator of the geographical spread of influenza in that country;
2. An indicator of the overall intensity of influenza activity in that country.
Each of these assessments is described below.

1. Indicators of the geographical spread of influenza:
Each network defines the geographical spread of influenza according to the definitions outlined below. The definitions are based on those used by the WHO global influenza surveillance system - FluNet

|ILI:  | influenza-like illness |
|ARI:  | acute respiratory infection |
|Country: | countries may be made of one (e.g. the Netherlands) or more regions (e.g. France North and France South) |
|Region: | the population under surveillance in a defined geographical area. Countries may be made up of one or more regions for these purposes |

No report: no report received

No activity: reports indicate no evidence of influenza virus activity. Cases of ILI/ARI may be reported in the country but the overall level of clinical activity remains at baseline levels and influenza virus infections are not being laboratory confirmed. Cases occurring in people recently returned from other countries are excluded

Sporadic: isolated cases of laboratory confirmed influenza infection in a region, or an outbreak in a single institution (such as a school, nursing home or other institutional setting), with clinical activity remaining at or below baseline levels. Cases occurring in people recently returned from other countries are excluded

Local outbreak: increased ILI/ARI activity in local areas (such as a city, county or district) within a region, or outbreaks in two or more institutions within a region, with laboratory confirmed cases of influenza infection. Levels of activity in remainder of region, and other regions of the country, remain at or below baseline levels

Regional activity*: ILI/ARI activity above baseline levels in one or more regions with a population comprising less than 50% of the country's total population, with laboratory confirmed influenza infections in the affected region(s). Levels of activity in other regions of the country remain at or below baseline levels

* This term is not (generally) to be used in countries with a population of less than 5 million unless the country is large with geographically distinct regions

Widespread activity: ILI/ARI activity above baseline levels in one or more regions with a population comprising 50% or more of the country's population, with laboratory confirmed influenza infections

2. Indicators of the intensity of influenza activity:
The intensity of influenza activity is based on the overall level of influenza activity in the country. Each network assesses the intensity of activity based on the historical data at its disposal. Some networks have historical data that date back over 30 years (e.g. England and the Netherlands) and others have data that date back over shorter periods (e.g. Belgium).

Some networks can establish numeric thresholds that define the intensity of influenza activity. For example, if the level of influenza activity rises above 200 cases per 100,000 population in England (and is below 400 cases per 100,000 population), the intensity of activity is considered to be “High” (“higher than average season activity”).

EISS uses the following definitions to indicate the intensity of influenza activity in each country:
Low: no influenza activity or influenza activity is at baseline level
Medium: level of influenza activity usually seen when influenza virus is circulating in the country based on historical data
High: higher than usual influenza activity compared to historical data
Very high: influenza activity is particularly severe compared to historical data

5.4 Characteristics of influenza viruses isolated in Europe in 2003-2004
Reported to EISS by Alan Hay, Director, WHO Collaborating Centre, Mill Hill, London

The networks participating in EISS also send virus samples to Mill Hill in London for characterisation. The haemagglutination inhibition tables for influenza A (H1N1) and (H1N2), (H3N2) and B viruses can be found in Tables 1, 2 and 3.

General comment concerning the tables
The few influenza A(H1N1) and (H1N2) viruses characterized were isolated sporadically or from localized outbreaks, e.g. in the UK in May 2004 (due to H1N1). The HAs (hemagglutinins) of most of the viruses were shown to be antigenically closely related to the HAs of the A/New Caledonia/20/99 (H1N1) vaccine strain and of the (H1N2) reference strain A/Egypt/96/02 (Table 1).

Influenza A(H3N2) viruses were predominant in most countries and accounted for the majority of virus isolates during the past season. In HI (haemagglutination inhibition) tests, most were shown to be closely related antigenically to A/Fujian/411/02 and the vaccine strain A/Wyoming/3/03, and to A/Christchurch/28/03 which was more representative in terms of HA and NA sequences (Table 2). Few were A/Panama/2007/99-like.

Most of the influenza B viruses, which were isolated sporadically in various European countries, in particular Norway, were closely related to B/Shanghai/361/02 (B/Yamagata/1688 lineage), the prototype vaccine strain recommended for 2004-2005, and the vaccine strain B/Jiangsu/10/03 (Table 3). On the other hand, viruses identified in Ireland and Italy were mainly B/Hong Kong/330/01-like (B/Victoria/2/87 lineage) and were closely related in HI tests to the vaccine strain B/Shandong/7/97. The NAs of several of these viruses were shown to fall within the Yamagata lineage close to that of the vaccine strain B/Brisbane/32/02, representative of the “Victoria HA/Yamagata NA” reassortants which were prevalent during 2002 and 2003.
## Table 1.
Antigenic analyses of influenza A(H1N1) and (H1N2) viruses

<table>
<thead>
<tr>
<th>Viruses</th>
<th>Isolation Date</th>
<th>A/Beij 262/95</th>
<th>A/NC 20/99</th>
<th>A/Eg 96/02</th>
<th>A/Chile 8885/02</th>
<th>A/Hung 2/03</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/Beijing/262/95</td>
<td>26.10.03</td>
<td>640</td>
<td>160</td>
<td>320</td>
<td>320</td>
<td>320</td>
</tr>
<tr>
<td>A/New Caledonia/20/99</td>
<td>Nov-03</td>
<td>80</td>
<td>320</td>
<td>640</td>
<td>640</td>
<td>1280</td>
</tr>
<tr>
<td>A/Egypt/96/02</td>
<td>40</td>
<td>160</td>
<td>640</td>
<td>320</td>
<td>640</td>
<td>640</td>
</tr>
<tr>
<td>A/Chile/8885/02</td>
<td>40</td>
<td>160</td>
<td>320</td>
<td>640</td>
<td>640</td>
<td>640</td>
</tr>
<tr>
<td>A/Hungary/2/03</td>
<td>40</td>
<td>80</td>
<td>320</td>
<td>640</td>
<td>1280</td>
<td></td>
</tr>
</tbody>
</table>

### H1N1
- A/Iceland/61/03 12.10.03 40 160 640 320 —
- A/Paris/650/03 Nov-03 80 160 640 320 640
- A/Poitiers/2168/03 18.11.03 80 160 640 160 320
- A/Lyon GII/346/2003 13.12.03 40 160 640 640 320
- A/Paris/2284/04 Apr-04 80 320 640 320 640
- A/England/40/04 20.5.04 80 320 640 320 640
- A/Lyon/CHU/28824/2004 8.7.04 80 320 640 640 320

### H1N2
- A/Oslo/149/03 3.11.03 160 160 640 320 1280
- A/Umea/3/03 26.11.03 80 160 640 160 640
- A/Iceland/123/03 8.12.03 80 160 640 320 320
- A/Oslo/628/03 16.12.03 160 320 640 320 640
- A/Denmark/86/03 18.12.03 80 320 640 160 320
- A/Umea/1/04 6.2.04 80 160 320 160 640

1. Source: Dr. Alan Hay (WHO Influenza Center, Mill Hill, UK)
Table 2.
Antigenic analyses of influenza A(H3N2) viruses

<table>
<thead>
<tr>
<th>Viruses</th>
<th>Isolation Date</th>
<th>A/Pan/2007/99</th>
<th>A/Egypt/130/02</th>
<th>A/Fujian/411/02</th>
<th>A/Wyoming/3/03</th>
<th>A/UK/1861/03</th>
<th>A/Christchurch/28/03</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/Panama/2007/99</td>
<td>2560</td>
<td>1280</td>
<td>80</td>
<td>320</td>
<td>160</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>A/Egypt/130/02</td>
<td>1280</td>
<td>2560</td>
<td>80</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>A/Fujian/411/02</td>
<td>80</td>
<td>80</td>
<td>640</td>
<td>1280</td>
<td>640</td>
<td>1280</td>
<td></td>
</tr>
<tr>
<td>A/Wyoming/3/03</td>
<td>1280</td>
<td>640</td>
<td>2560</td>
<td>5120</td>
<td>1280</td>
<td>5120</td>
<td></td>
</tr>
<tr>
<td>A/UK/1861/03</td>
<td>80</td>
<td>80</td>
<td>40</td>
<td>640</td>
<td>640</td>
<td>320</td>
<td></td>
</tr>
<tr>
<td>A/Christchurch/28/03</td>
<td>80</td>
<td>160</td>
<td>640</td>
<td>1280</td>
<td>320</td>
<td>1280</td>
<td></td>
</tr>
</tbody>
</table>

A/Paris/637/03 Nov-03 640 | 1280 < 40 160 40 —
A/Ireland/10108/03 16.9.03 320 | 160 640 2560 320 —
A/Israel/21/03 9.10.03 160 160 320 640 — 1280
A/Belgium/G24/03 23.10.03 160 320 320 1280 640 —
A/England/420/03 30.10.03 320 160 640 1280 640 —
A/Geneva/5361/03 7.11.03 160 160 320 640 320 —
A/Lisbon/17/03 16.11.03 160 160 640 1280 320 —
A/Barcelona/37/03 24.11.03 160 40 640 1280 320 —
A/Netherlands/327/03 19.11.03 160 160 1280 2560 320 —
A/Finland/324/03 28.11.03 320 160 2560 2560 640 —
A/Paris/861/04 Dec-03 160 160 320 2560 — 2560
A/Prague/316/03 1.12.03 320 320 1280 5120 640 2560
A/Bucharest/194/03 2.12.03 80 80 160 640 320 1280
A/Lyon/2209/03 2.12.03 160 160 640 1280 640 1280
A/Oslo/487/03 4.12.03 80 80 320 1280 320 1280
A/Moscow/50/03 10.12.03 80 160 640 1280 320 1280
A/Sachsen/366/03 11.12.03 320 320 1280 2560 640 5120
A/Belgrade/7103/03 15.12.03 160 320 640 1280 320 —
A/Stockholm/1/04 17.12.03 80 160 320 1280 320 1280
A/Denmark/85/03 18.12.03 160 160 640 1280 640 1280
A/Madrid/G1547/03 18.12.03 160 320 640 2560 640 —
A/Slovenia/1410/03 18.12.03 160 160 320 640 320 —
A/Austria/134419/03 29.12.03 160 160 320 640 320 640
A/Sclovakia/191/03 14.1.04 40 80 320 640 320 640
A/Omsk/37/04 16.1.04 80 80 160 640 320 1280
A/Hannover/3/04 20.1.04 160 160 320 640 320 1280
A/Latvia/1297/04 28.1.04 80 < 320 640 160 640
A/Genoa/21/0 3.2.04 160 80 320 640 160 640
A/Trieste/19/04 16.2.04 160 160 320 1280 320 1280
A/Iceland/6/04 18.2.04 80 160 160 640 — 1280
A/Denmark/12/04 19.2.04 80 320 320 640 320 1280
A/Parma/61/04 Mar-04 80 160 160 640 320 1280
A/Stockholm/13/04 23.4.04 160 160 640 1280 320 1280

1. Source: Dr. Alan Hay (WHO Influenza Center, Mill Hill, UK)
2. < = <40
Table 3.
Antigenic analyses of influenza B viruses

<table>
<thead>
<tr>
<th>Viruses</th>
<th>Isolation date</th>
<th>B/Shan&lt;sup&gt;3&lt;/sup&gt;</th>
<th>B/Shan&lt;sup&gt;3&lt;/sup&gt; 7/97</th>
<th>B/Shan&lt;sup&gt;3&lt;/sup&gt; 80/02</th>
<th>B/Bris&lt;sup&gt;2&lt;/sup&gt; 32/02</th>
<th>B/Sich&lt;sup&gt;2&lt;/sup&gt; 379/99</th>
<th>B/Shai&lt;sup&gt;2&lt;/sup&gt; 361/02</th>
<th>B/Jiang&lt;sup&gt;2&lt;/sup&gt; 10/03</th>
</tr>
</thead>
<tbody>
<tr>
<td>B/Shandong/7/97</td>
<td>7/97</td>
<td>5120</td>
<td>160</td>
<td>160</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
</tr>
<tr>
<td>B/Tehran/80/02</td>
<td>80/02</td>
<td>2560</td>
<td>160</td>
<td>320</td>
<td>160</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
</tr>
<tr>
<td>B/Brisbane/32/02</td>
<td>32/02</td>
<td>2560</td>
<td>160</td>
<td>80</td>
<td>160</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
</tr>
<tr>
<td>B/Sichuan/379/99</td>
<td>379/99</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
</tr>
<tr>
<td>B/Shanghai/361/02</td>
<td>361/02</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>320</td>
<td>320</td>
</tr>
<tr>
<td>B/Jiangsu/10/03</td>
<td>10/03</td>
<td>40</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>80</td>
<td>320</td>
</tr>
<tr>
<td>B/England/794/03</td>
<td>794/03</td>
<td>30.10.03</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>160</td>
<td>320</td>
</tr>
<tr>
<td>B/Geneva/6159/03</td>
<td>6159/03</td>
<td>27.11.03</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>160</td>
<td>320</td>
</tr>
<tr>
<td>B/Oslo/71/040</td>
<td>71/040</td>
<td>13.1.04</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>160</td>
<td>320</td>
</tr>
<tr>
<td>B/Lyon/GI/72/04</td>
<td>72/04</td>
<td>2.2.04</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>160</td>
<td>160</td>
</tr>
<tr>
<td>B/Israel/4/04</td>
<td>4/04</td>
<td>17.2.04</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>80</td>
<td>160</td>
</tr>
<tr>
<td>B/Milan/66/04</td>
<td>66/04</td>
<td>Mar-04</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>160</td>
<td>320</td>
</tr>
<tr>
<td>B/Stockholm/1/04</td>
<td>1/04</td>
<td>12.3.04</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>160</td>
<td>320</td>
</tr>
<tr>
<td>B/England/23/04</td>
<td>23/04</td>
<td>17.3.04</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>160</td>
<td>320</td>
</tr>
<tr>
<td>B/Paris/2282/04</td>
<td>2282/04</td>
<td>Apr-04</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>160</td>
<td>320</td>
</tr>
<tr>
<td>B/Oslo/586/04</td>
<td>586/04</td>
<td>27.5.04</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>&lt;</td>
<td>160</td>
<td>320</td>
</tr>
<tr>
<td>B/Ireland/13064/03</td>
<td>13064/03</td>
<td>17.12.03</td>
<td>5120</td>
<td>160</td>
<td>80</td>
<td>80</td>
<td>&lt;</td>
<td>&lt;</td>
</tr>
<tr>
<td>B/Parma/8/04</td>
<td>8/04</td>
<td>Apr-04</td>
<td>2560</td>
<td>160</td>
<td>160</td>
<td>160</td>
<td>&lt;</td>
<td>&lt;</td>
</tr>
<tr>
<td>B/Caserta/1/04</td>
<td>1/04</td>
<td>Apr-04</td>
<td>2560</td>
<td>80</td>
<td>160</td>
<td>160</td>
<td>&lt;</td>
<td>&lt;</td>
</tr>
<tr>
<td>B/Israel/13/04</td>
<td>13/04</td>
<td>7.6.04</td>
<td>1280</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>&lt;</td>
<td>&lt;</td>
</tr>
</tbody>
</table>

1. Source: Dr. Alan Hay (WHO Influenza Center, Mill Hill, UK)
2. < = <40
3. hyperimmune sheep serum
5.5 **EISS Publications**

Peer-reviewed journals (until June 2004)

**2004**


**2003**


**2002**


**2001**


**2000**

**1999**
Aymard M, Valette M, Lina B, Thouvenot D, the members of GROG and EISS. Surveillance and impact of influenza in Europe. *Vaccine* 1999; 17: S30-S41.

**1998**

1996

1995

**Eurosurveillance Weekly (2003 - until June 2004)**

2004


2003


Paget J, Zambon M, Uphoff H, Bartelds A, on behalf of EISS. Declining influenza activity in Europe while public concern over SARS has not increased general practice consultations for influenza-like illness or acute respiratory infections. Eurosurveillance Weekly 7(16): 17 April 2003.


**EISS reports (until June 2004)**

2004

2003

2002


2001


**EISS posters (until June 2004)**

2002
Aguilera JF, Paget WJ, Vega T, Ordobas M, Pasqual MF, Larrosa A. Evaluación de la calidad de la recogida de los datos clinicos en tres redes de vigilancia de la gripe en España. XX Scientific reunion of the Spanish Society for Epidemiology, Barcelona, Spain (12-14 September 2002). Reference number: 33/158


2001

2000


**EISS presentations at scientific conferences (until June 2004):**

2002


2001

2000

Other EISS presentations (until June 2004):

2003
Paget WJ. The European Influenza Surveillance Scheme and the Community Influenza Pandemic Preparedness and Response Plan. NATO/WHO symposium Strengthening influenza pandemic preparedness through civil-military co-operation. Saint-Petersburg, Russia (9-11 May 2003).

2002
Koos van der Velden, John Paget, Paul Taylor, Jean-Claude Manuguerra on behalf of EISS and EuroGROG. Influenza surveillance in Europe. WHO/CDC influenza surveillance training course, Atlanta, USA (4 November 2002).

Koos van der Velden, John Paget, Paul Taylor on behalf of the EISS Group. The European Influenza Surveillance Scheme (EISS). European Parliament Workshop on Communicable Disease Surveillance in Europe: Is there a Need for a European Centre (Brussels, 6 November 2002).

2001
5.6  Members (during the 2003-2004 season)

EISS co-ordination centre
Netherlands Institute for Health Services Research (NIVEL), Utrecht
Joan Deckers (ViRgil), Anouk Faassen, Tamara Meerhoff, Adam Meijer, John Paget, Koos van der Velden

Belgium
Scientific Institute of Public Health, Brussels
Marie-Louise Libotte-Chasseur, Fernande Yane

Czech Republic
National Institute of Public Health, Prague
Martina Havlickova, Jan Kyncl

Denmark
Statens Serum Institut, Department of Epidemiology, Copenhagen
Per Grauballe, Susanne Samuelsson

France
OPEN ROME - Groupes Régionaux d’Observation de la Grippe (GROG) Paris
Jean-Marie Cohen, Anne Mosnier

Institut Pasteur, Centre National de Référence de la Grippe (France Nord), Paris
Anne-Marie Burguiere, Jean-Claude Manuguerra, Sylvie van der Werf

Hospices Civils de Lyon, Centre National de Référence de la Grippe (France Sud), Lyon
Bruno Lina, Martine Valette

Germany
Robert Koch Institute, Berlin
Udo Buchholz, Walter Haas, Brunhilde Schweiger

ArbeitsGemeinschaft Influenza (AGI), Berlin
Andrea Grueber

Staatliches Untersuchungsamt Hessen, Zentrum fur Gesundheitsschutz, Dillenburg
Helmut Uphoff

National Reference Centre for Influenza, Niedersächsisches Landesgesundheitsamt, Hannover
Rolf Heckler

Ireland
Irish College of General Practitioners, Dublin
Michael Joyce, Dermot Nolan

National Disease Surveillance Centre, Dublin
Lisa Domegan, Joan O’Donnell, Seamas Dooley, Darina O’Flanagan,

National Virus Reference Laboratory, University College Dublin, Dublin
Suzie Coughlan, Peter Quinn

Italy
Istituto di Virologia, Università degli Studi di Milano, Milano
Fabrizio Pregliasco

Dipartimento di Scienze della Salute Università de Genova, Genova
Pietro Crovari

Istituto Superiore de Sanità (ISS), Laboratorio virus respiratori, Roma
Isabella Donatelli

Latvia
State Agency “Public Health Agency”, Riga
Vaira-Irisa Kalnina, Larisa Kazanova, Inga Velicko
Lithuania
Centre for Communicable Diseases Prevention and Control, Vilnius
Dalia Rokaite

Lithuanian AIS Centre Laboratory, Vilnius
Algirdas Griskevicius

Luxembourg
Laboratoire National de Sante, Luxembourg
Matthias Opp

Malta
Disease Surveillance Unit, Department of Public Health, Msida
Tanya Melillo

Virology Laboratory, St Luke’s Hospital , G’Mangia
Christopher Barbara

The Netherlands
Erasmus University Rotterdam, Faculty of Medicine, Department of Virology, Rotterdam
Jan de Jong

Netherlands Institute for Health Services Research (NIVEL), Utrecht
Aad Bartelds

National Institute for Public Health and the Environment (RIVM), Bilthoven
Simone van der Plas, Berry Wilbrink

Norway
National Institute of Public Health, Oslo
Olav Hungnes, Bjorn Iversen

Poland
National Influenza Centre, National Institute of Hygiene, Warsaw
Lydia Brydak, Magdalena Machala

Portugal
Instituto Nacional de Saude,
Isabel Marinho Falcão, Jose Marinho Falcão, Helena Rebelo de Andrade

Romania
National Reference Centre for Influenza, Cantazucino Institute, Bucharest
Viorel Alexandrescu, Emilia Lupulescu

Slovak Republic
National Public Health Institute of the Slovak Republic, Bratislava
Hana Blaskovicova, Zuzana Kristufkova

Slovenia
Institute of Public Health (IPH), Ljubljana
Maja Socan

Laboratory for Virology (IPH), Ljubljana
Katarina Prosenc

Spain
Instituto de Salud Carlos III, Centro Nacional de Epidemiología, Servicio de Vigilancia Epidemiológica
Madrid
Salvador de Mateo Ontanon, Pilar Perez-Brena, Tomás Vega Alonso

Sweden
Swedish Institute for Infectious Disease Control, Solna
Annika Linde, Pasi Penttinen, Victoria Romanus
Switzerland
Swiss Federal Office of Public Health, Division of Epidemiology and Infectious Diseases National Influenza Centre, Bern
Reto Hagmann
Laboratoire Central de Virologie, Division des Maladies Infectieuses, Hôpital Cantonal Universitaire de Genève, Geneva
Yves Thomas, Werner Wunderli

United Kingdom
England
Health Protection Agency, London
John Watson, Maria Zambon

Royal College of General Practitioners, Birmingham
Douglas Fleming

Northern Ireland
HPA Communicable Disease Surveillance Centre, Belfast
Peter Coyle, Hilary Kennedy, Hugh O’Neill

Scotland
Scottish Centre for Infection and Environmental Health, Glasgow
Jim McMenamin

Regional Virus Laboratory, Glasgow
William Carman

Wales
National Public Health Service for Wales Communicable Disease Surveillance Centre, Cardiff
Daniel Thomas

NPHS Microbiology, Cardiff University Hospital of Wales, Cardiff
Diana Westmoreland