# ANNUAL REPORT

## 2002-2003 INFLUENZA SEASON

**European Influenza Surveillance Scheme**

European Influenza Surveillance Scheme

nivel

*Erratum*

Please note that the footnote to Table 2.3 on page 23 should read: “In addition, six isolates were subtyped as influenza A/H1”

European Influenza Surveillance Scheme

# Annual Report
# 2002-2003 influenza season

Utrecht, March 2004

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**European Influenza Surveillance Scheme: participating countries and institutions**

| | | |
|---|---|---|
| Belgium | Scientific Institute of Public Health | Brussels |
| Czech Republic | National Institute of Public Health | Prague |
| Denmark | Statens Serum Institut | Copenhagen |
| France | Open Rome | Paris |
| | Institut Pasteur | Paris |
| | Université Claude Bernard Lyon I | Lyon |
| Germany | ArbeitsGemeinschaft Influenza | Marburg |
| | Niedersächsisches Landesgesundheitsamt | Hanover |
| | Robert Koch Institut | Berlin |
| Ireland | National Disease 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 |
| Lithuania | Centre for Communicable Diseases Prevention and Control | Vilnius |
| Luxembourg | Laboratoire National de Sante | Luxembourg |
| Netherlands | Erasmus University | Rotterdam |
| | National Institute for Public Health and the Environment | Bilthoven |
| | Netherlands Institute for Health Services Research | Utrecht |
| Norway | National Institute of Public Health | Oslo |
| Poland | National Influenza Center<br>National Institute of Hygiene | Warsaw |
| Portugal | Instituto Nacional de Saude | Lisboa |
| Romania | Cantacuzino Institute | Bucharest |
| Slovak Republic | State Health Institute | Bratislava |
| Slovenia | Institute of Public Health | Ljubljana |
| Spain | Instituto de Salud Carlos III | Madrid |
| Sweden | Swedish Institute for Infections Disease Control | Solna |
| Switzerland | Swiss Federal Office of Public Health<br>University Hospital of Geneva | Geneva |

| | | |
|---|---|---|
| United Kingdom | Public Health Laboratory Service | London |
| | Royal College of General Practitioners | Birmingham |
| | Scottish Centre for Infection and Environmental Health | Glasgow |
| | National Public Health Service for Wales | |
| | Communicable Disease Surveillance Centre | Cardiff |
| | Communicable Disease Surveillance Centre (N.-Ireland) | Belfast |

See Appendix 5.6 for further details

**Abbreviations**

| | |
|---|---|
| ARI | Acute respiratory infection |
| CNRL | Community Network of Reference Laboratories |
| EISS | European Influenza Surveillance Scheme |
| EC | European Commission |
| EPIET | European Programme for Intervention Epidemiology Training |
| EU | European Union |
| EuroGROG | European Groupe Régional d'Observation de la Grippe |
| FluNet | Global WHO surveillance system of influenza |
| GPs | General practitioners |
| GROG | Groupes Régionaux d'Observation de la Grippe |
| ILI | Influenza-like illness |
| NIVEL | Netherlands Institute for Health Services Research |
| SARS | Severe Acute Respiratory Syndrome |
| WHO | World Health Organization |

**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 foundation. In 2002 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

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 2002-2003 influenza season, and 3) EISS project developments during the 2002-2003 season.

EISS has gradually grown over the years and had 20 member countries covering 23 influenza surveillance networks during the 2002-2003 influenza season. Three new members joined the scheme during the 2002-2003 influenza season: Northern Ireland, Lithuania and Luxembourg. EISS included 28 national reference laboratories, at least 10,600 sentinel physicians and covered a total population of 441 million inhabitants during the 2002-2003 season.

The surveillance of influenza by EISS members is based on an integrated clinical and virological surveillance model. Sentinel primary care physicians report cases of influenza-like illness (ILI) and/or acute respiratory infection (ARI) to a data collection centre and take nose and/or throat swabs from patients for laboratory testing. All laboratory tests are performed by a national reference laboratory. The integration of clinical and virological information allows the presentation of clinical incidences and virological data in the same population.

The 2002-2003 influenza season was a heterogeneous one in terms of the intensity of clinical activity and virus type/subtype diversity. Some countries reported high levels of influenza activity (the Czech Republic, Denmark, Germany and Poland) whilst others had very quiet seasons (Ireland, the Netherlands, Norway, Sweden and the United Kingdom). Some countries had activity that was mainly due to influenza B (mainly in the western part of Europe), whilst in other countries it was influenza A (usually influenza A(H3N2)). Influenza B activity was generally earlier in the season (weeks 49/2002-08/2003), it lasted a longer time period and was associated with lower weekly incidences.

During the winter of 2002-2003 there was a heightened awareness for respiratory symptoms as a result of the spread of SARS (severe acute respiratory syndrome). If SARS would have spread to the general population in Europe, EISS could have contributed to the surveillance of SARS. A laboratory based surveillance system for the SARS virus could have been established using the national reference laboratories for influenza in EISS that were involved in the testing of respiratory specimens for the SARS coronavirus.

Another important occurrence during the 2002-2003 season was an epidemic of avian influenza A(H7N7) virus in the Netherlands. This virus was transmitted to humans and mainly caused mild conjunctivitis, with sporadic case of ILI, but also one case of severe fatal pneumonitis. Fortunately, the epidemic was contained and the last human case of H7N7 influenza (laboratory-confirmed) occurred on the 19th of April 2003.

EISS implemented a number of projects during the 2002-2003 influenza season, including: the presentation of strain characterisation data, the second Quality Control Assessment of laboratories participating in EISS, the collection and presentation (when available) of both ILI and ARI incidences and the establishment of the Community Network of Reference Laboratories on 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

## 1.1 Introduction

Influenza is an important public health problem in the industrialised world. 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, health care and influenza pandemic planning.

The 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 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 influenza (Fleming et al., 1995). The swabs were sent to national influenza reference laboratories for testing and subtyping. The integration of clinical and virological data collected in the same population is the basis of the EISS project (Fleming & Cohen, 1996; Paget et al., 2002).

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-) (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 got together to share information. Influenza is a communicable disease that spreads rapidly and efficiently; this means that it is very beneficial for countries to be informed about influenza activity in neighbouring countries (clinical incidences and types/subtypes/strains). Other benefits of working together are that surveillance systems can learn from each other and improve their surveillance activities. Collaboration also helps the creation and development of disease surveillance networks across the whole of Europe.

## 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 actually 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).

The provisions of the different Treaties have enabled the development of a range of policies on communicable disease prevention and control (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 22 December 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 Decision describes procedures for the exchange of information, and stipulates the action to be undertaken in case of potential threats and in the case of confirmed threats to public health.

The second Decision (2000/96/EC) identifies the communicable diseases and special 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). Discussions are currently under way concerning the creation of a European Centre for Disease Prevention and Control.

To better co-ordinate and exchange 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 EISS project

### *1.3.1 Objectives*

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.

### *1.3.2 Membership*

The European Influenza Surveillance Scheme aims to include all member states of the European Union: the current 15 members and the 10 applicant countries (EC Decision 2119/98/EC). 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 12 EU (Belgium, Denmark, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom), 5 applicant countries (the Czech Republic, Lithuania, Poland, Slovenia and the Slovak Republic) and three other countries (Norway, Romania and Switzerland) were active members of EISS during the 2002-2003 influenza season. Since Northern Ireland, Scotland and Wales have their own influenza surveillance networks, there were 23 surveillance networks in EISS during this season.

Six networks were “associate” members of EISS during the 2002-2003 season (Northern Ireland, Lithuania, Poland, Romania, the Slovak Republic and Sweden), as they did not completely fit the membership criteria (Paget et al., 2003). The associate members reported clinical and virological data on influenza to the EISS database and were included in the presentation of results where possible. Luxembourg has an observer status as no data was reported to EISS during the 2002-2003 influenza season.

### *1.3.3 Methods*

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

For the virological surveillance of influenza, the sentinel physicians are asked 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). Laboratory tests are based on rapid diagnostic tests (immuno-enzymological or immunofluorescence) and cell cultures with specific identification. Certain laboratories also use reverse transcription polymerase chain reaction (RT-PCR) routinely as a rapid test.

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). This data is collected to better describe influenza activity across Europe, as a range of indices is used to monitor influenza activity in different countries. It also allows the validation of the virological data obtained from the sentinel sources.

The clinical and virological data are collected from week 40 to week 20 of the following year. After processing and analysis by national centres, the weekly data are entered into the EISS database by Thursday morning of the following week.

### *1.3.4 EISS website*

The EISS project involves different 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 launch detailed clinical and virological queries.

During the influenza season, a Weekly Electronic Bulletin is published on the EISS website. The Bulletin is written by four experts from within the EISS group and is based on data entered into the EISS database. It 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;
- Ensure the Weekly Electronic Bulletin is published during the influenza season;
- Co-ordinate EISS projects (e.g. harmonisation projects);
- 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 meetings and Steering Committee meetings);
- Write an Annual Report.

### *1.3.6 Funding*

EISS has three sources of funding: the European Commission (EC), national governments and industry. It has been funded by national governments since EISS began in 1996. It began receiving funding from the EC in November 1999 and has received funding from industry since September 2000 (GlaxoSmithKline and Roche). GlaxoSmithKline stopped funding the EISS project in December 2002.

During the 2000-2001, 2001-2002 and 2002-2003 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 annual meetings and the harmonisation and standardisation projects (e.g. the quality control studies).

Industry funding:

> All other projects (e.g. the creation of the Weekly Electronic Bulletin, 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 EISS documents, reports and publications.

# 2 Influenza activity: 2002-2003 season

## 2.1 Introduction

This chapter provides an overview of influenza activity during the 2002-2003 season and is largely based on an article published in Eurosurveillance (Paget et al., 2003 (1)).

## 2.2 Methods

Table 2.1 presents the general characteristics of the different sentinel surveillance systems during the 2002-2003 influenza season. With the exception of Norway, all EISS networks reported cases of ILI and/or ARI per 100,000 population. The general methods for influenza surveillance can be found in section 1.3.3. Clinical and virological data are presented in for week 40/2002 (30/9/2002 - 6/10/2002) to week 16/2003 (14/4/2003 - 20/4/2003).

Table 2.1: Summary characteristics of the sentinel surveillance systems in EISS

| Network | Year network started | Year network joined EISS[1] | General practitioners[2] | Paedia-tricians[2] | Others[2] | Numerator (ILI – ARI)[3] | Case definition (yes - no) |
|---|---|---|---|---|---|---|---|
| *Full members* | | | | | | | |
| Belgium | 1985 | 1996 | 98 | 0 | 0 | ILI & ARI | yes |
| Czech Republic | 1968 | 1998 | 2230 | 1240 | 0 | ARI | yes |
| Denmark | 1995 | 1999 | 150 | 0 | 0 | ILI | yes |
| England | 1964 | 1996 | 360 | 0 | 0 | ILI & ARI | no |
| France | 1984 | 1996 | 378 | 74 | 0 | ARI | yes |
| Germany | 1992 | 1996 | 450 | 100 | 0 | ARI | yes |
| Italy | 1996 | 1998 | 500 | 40 | 0 | ILI | yes |
| Ireland | 2000 | 2000 | 34 practices* | 0 | 0 | ILI | yes |
| Netherlands | 1970 | 1996 | 67 | 0 | 0 | ILI | yes |
| Norway | 1975 | 2001 | 201 practices* | 0 | 0 | ILI | yes |
| Portugal | 1989 | 1996 | 170 | 0 | 0 | ILI | yes |
| Scotland | 1971 | 1996 | 90 | 0 | 0 | ILI | yes |
| Slovenia | 1999 | 2000 | 11 | 14 | 19[4] | ILI & ARI | yes |
| Spain | 1994 | 1996 | 226 | 54 | 0 | ILI | yes |
| Switzerland | 1986 | 1997 | 154 | 43 | 68[5] | ILI | yes |
| Wales | 1986 | 1996 | 30 | 0 | 0 | ILI | yes |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Associate members* | | | | | | | |
| Northern Ireland | 2000 | 2002 | 24 | 0 | 0 | ILI | yes |
| Lithuania | 1997 | 2002 | 321 | 327 | 396[6] | ILI & ARI | yes |
| Poland | 1946 | 2001 | n.k. | n.k. | n.k. | ILI | yes |
| Romania | 1992 | 2001 | 240 | 102 | 0 | ARI | yes |
| Slovak Republic | 1960 | 2001 | 2121 | 1202 | 0 | ILI | yes |
| Sweden | 1999 | 2000 | 118 | 0 | 0 | ILI | no |

[1] Many of the networks were members of pre-EISS surveillance projects in Europe – the Eurosentinel (1987-91) and ENS-CARE Influenza Early Warning System (1992-95) projects
[2] Number of physicians during the 2002-2003 influenza season
[3] ARI: acute respiratory infection; ILI: influenza-like illness (see Annex 5.2)
[4] Physicians working in community schools (children) and youth health services
[5] Physicians specialised in internal medicine
[6] Therapists
* One or more GP(s) per practice (e.g. there were 56.5 GPs in Ireland during the 2002/2003 season)
n.k. Not known

## 2.3 Results

### *2.3.1 Clinical data*

An overview of the influenza activity in the EISS networks during the 2002-2003 winter season can be found in Table 2.2 and Figure 1.

The geographical spread and intensity of influenza activity in the member networks was heterogeneous during the 2002-2003 season (Table 2.2). The geographical spread of influenza activity was sporadic in Ireland, Norway, Portugal, Sweden and the United Kingdom. In the Netherlands, Lithuania, Poland, Romania and Spain it was local or regional and in Belgium, the Czech Republic, Denmark, France, Germany, Italy, Slovak Republic, Slovenia and Switzerland it was widespread. The intensity of influenza activity (compared to historical data) ranged from low in the Netherlands, Norway, Portugal and the United Kingdom to high in the Czech Republic, Denmark, Germany and Poland. The peak levels of clinical morbidity in Europe were reached between week 02/2003 and 12/2003 (Table 2.2 and Figure 1), with the majority of networks reporting peak levels from mid-February to mid-March (weeks 07/2003 to 11/2003). Among countries which had age-specific incidences, the highest rates were observed among those aged 0-14 (Paget et al., 2003 (1)).

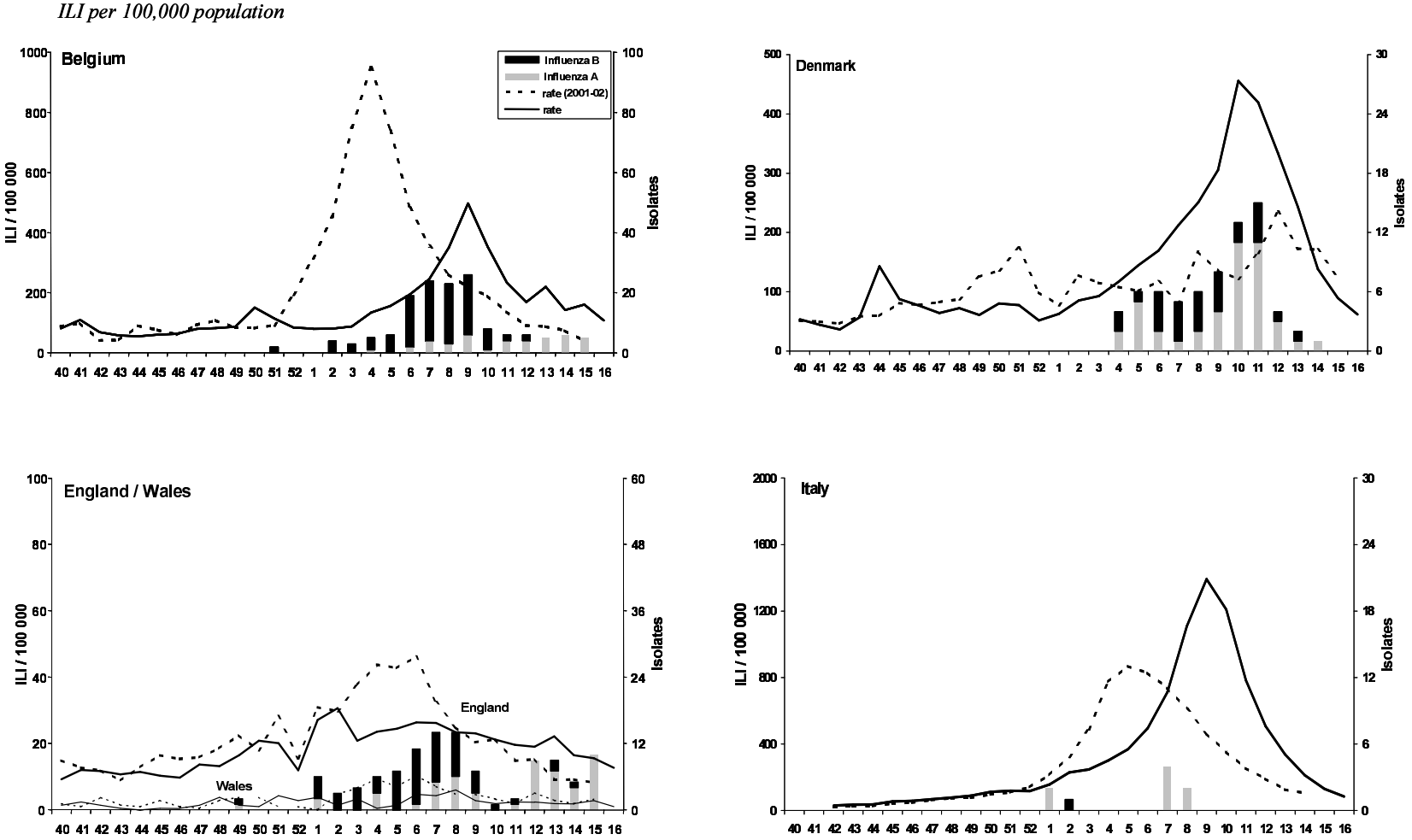
Table 2.2: Overview of influenza activity in the EISS networks during the 2002-2003 season

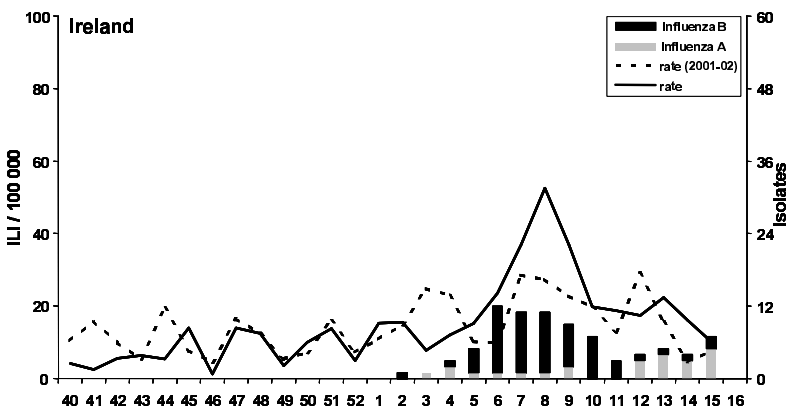
| Network | Week of peak clinical morbidity | Intensity (peak weekly level)[1] | Geographical spread (peak weekly level)[1] | Dominant virus type/subtype[2] |
|---|---|---|---|---|
| *Influenza-like illness:* | | | | |
| Denmark | 10 | High | Widespread | A(H3N2) |
| Poland | 11 | High | Regional | A(H3N2) |
| Belgium | 9 | Medium | Widespread | A(H3N2)&B |
| Ireland | 8 | Medium | Sporadic | B |
| Italy | 9 | Medium | Widespread | A(H3N2) |
| Lithuania | 12 | Medium | Local | A(H3N2) |
| Slovak Republic | 10 | Medium | Widespread | A(H3N2) |
| Slovenia | 9 | Medium | Widespread | A(H3N2) |
| Spain | 4 | Medium | Regional | A(H1N1)&B |
| Sweden | n.a. | Medium | Sporadic | n.a. |
| Switzerland | 10 | Medium | Widespread | A(H3N2) |
| England | 2 | Low | Sporadic | B |
| The Netherlands | 10 | Low | Local | A(H3N2) |
| Northern Ireland | 7 | Low | Sporadic | B |
| Norway | 10 | Low | Sporadic | A(H3N2) |
| Portugal | 5 | Low | Sporadic | B |
| Scotland | 5 | Low | Sporadic | B |
| Wales | 8 | Low | Sporadic | B |
| *Acute respiratory infections:* | | | | |
| Czech Republic | 9 | High | Widespread | A(H3N2) |
| Germany | 9 | High | Widespread | A(H3N2) |
| France | 7 | Medium | Widespread | A(H3N2)&B |
| Romania | 11 | Medium | Local | B |

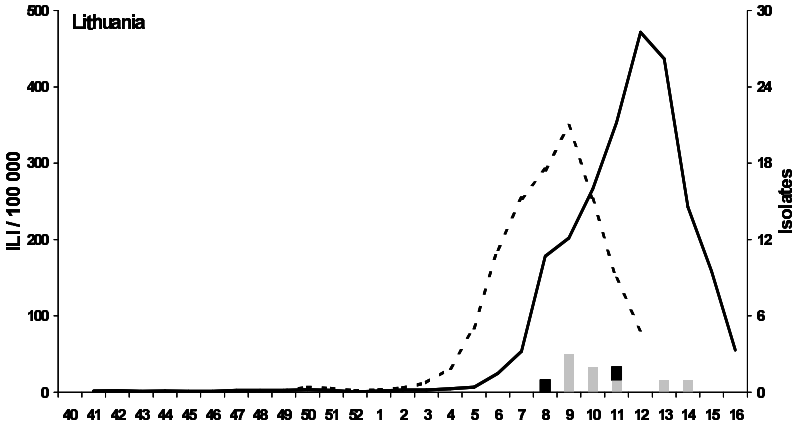
n.a: Not applicable as no data is available
[1] See appendix 5.3 for the levels of influenza activity
[2] Assessment based on sentinel and non-sentinel data

**Figure 1. Clinical and virological sentinel monitoring of influenza in EISS networks during the 2002-2003 influenza season.**

Morbidity rates for influenza-like illness (ILI) or acute respiratory infections (ARI) are presented by a line (line: 2002-03 season; dotted line: 2001-2002 season). Isolation/detection of cases of influenza infection are indicated in the bar chart (grey bar: influenza A; black bar: influenza B). For England and Wales the bar chart represents the number of influenza virus detections in the English network only.




Ireland
Influenza B
Influenza A
rate (2001-02)
rate
ILI / 100 000
Isolates
0 20 40 60 80 100
0 12 24 36 48 60
40 41 42 43 44 45 46 47 48 49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16


Lithuania
ILI / 100 000
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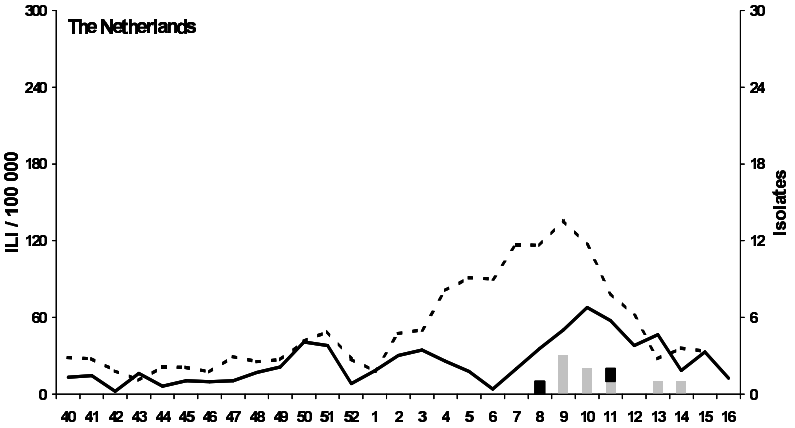
The Netherlands
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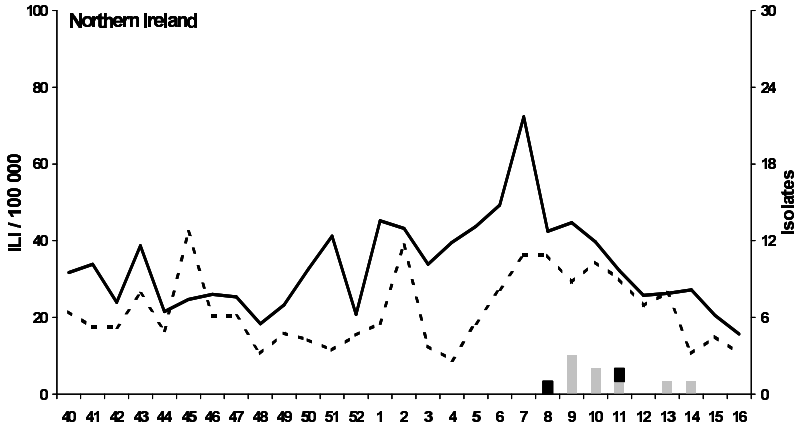
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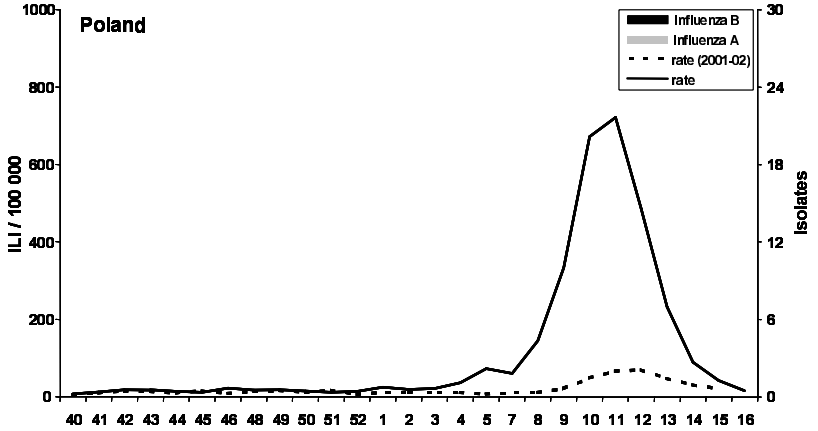
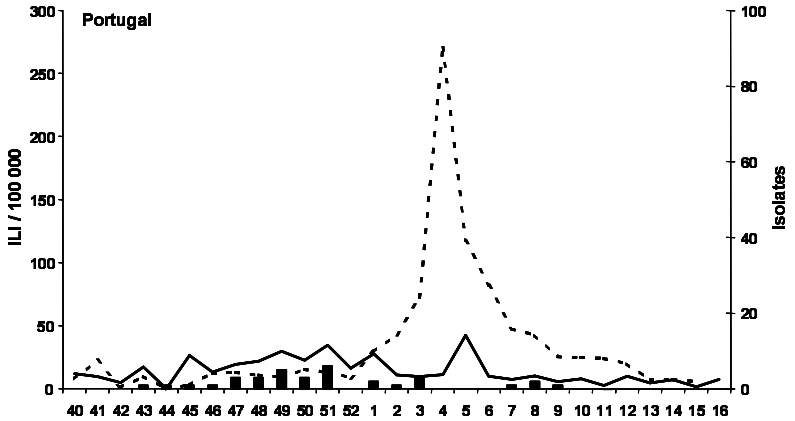
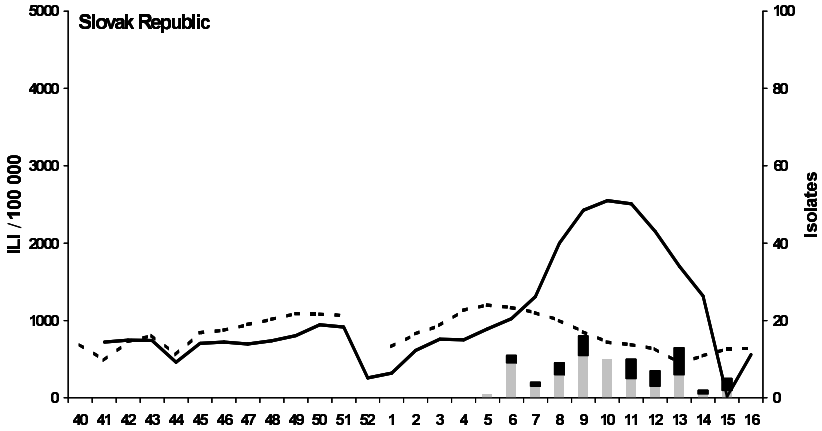
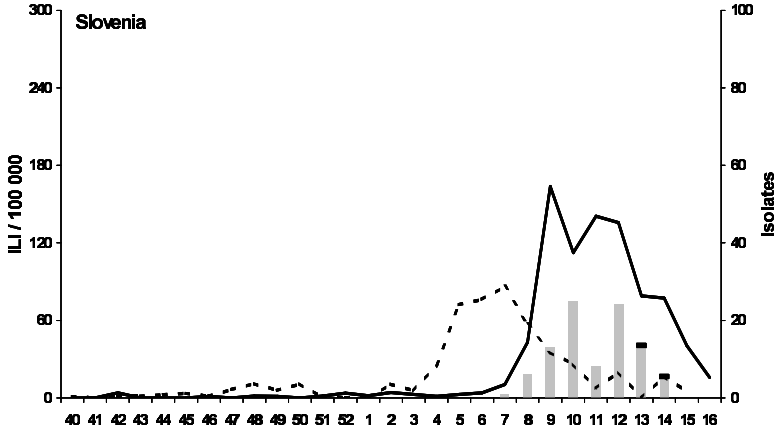
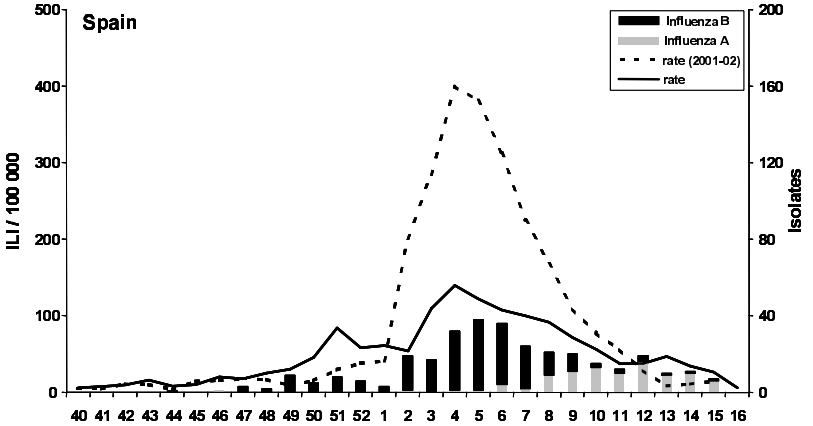
0 6 12 18 24 30
40 41 42 43 44 45 46 47 48 49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

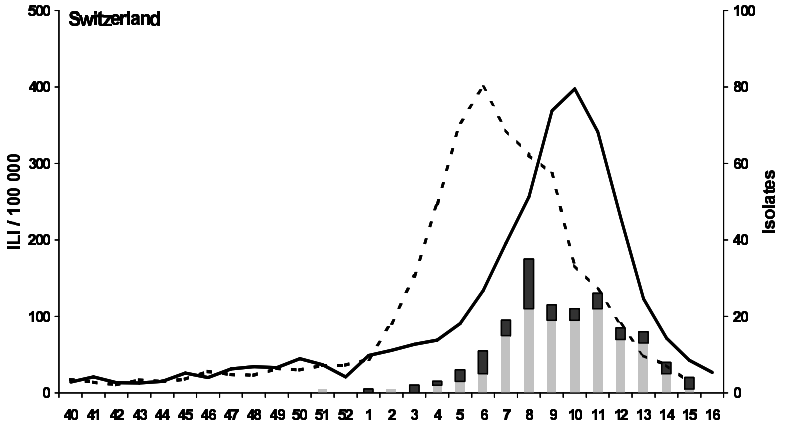

Poland
Influenza B
Influenza A
rate (2001-02)
rate
ILI / 100 000
Isolates
1000
800
600
400
200
0
30
24
18
12
6
0
40 41 42 43 44 45 46 48 49 50 51 52 1 2 3 4 5 7 8 9 10 11 12 13 14 15 16

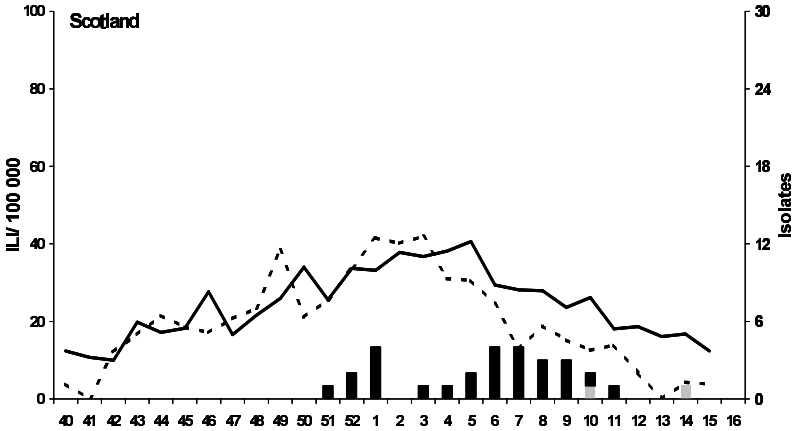

Portugal
ILI / 100 000
Isolates
300
250
200
150
100
50
0
100
80
60
40
20
0
40 41 42 43 44 45 46 47 48 49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16


Slovak Republic
ILI / 100 000
Isolates
5000
4000
3000
2000
1000
0
100
80
60
40
20
0
40 41 42 43 44 45 46 47 48 49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

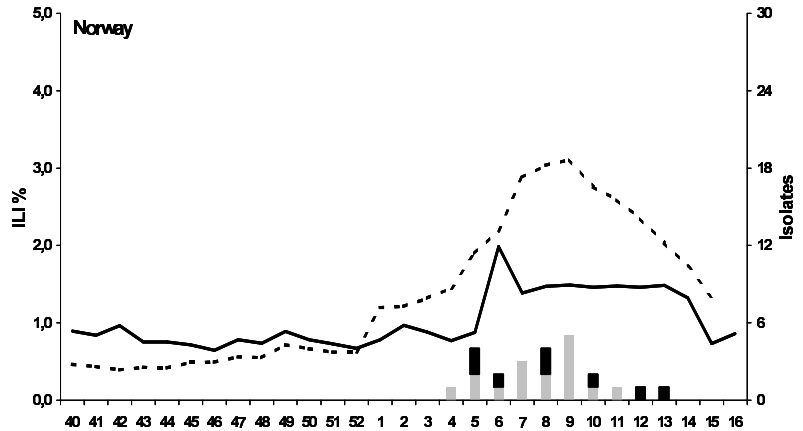

Slovenia
ILI / 100 000
Isolates
300
240
180
120
60
0
100
80
60
40
20
0
40 41 42 43 44 45 46 47 48 49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16



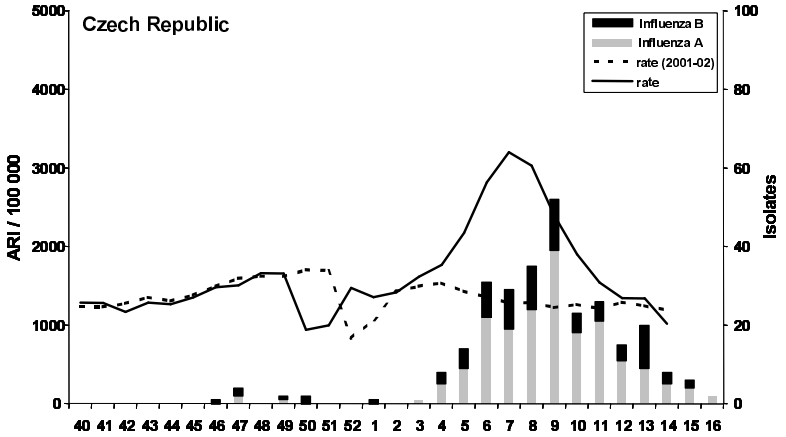



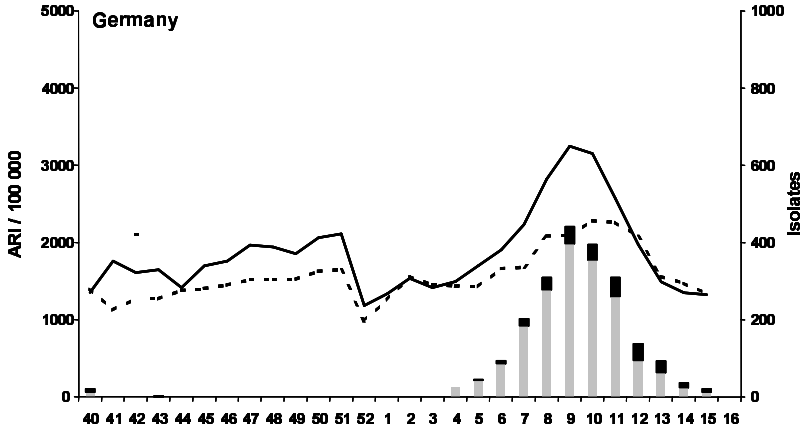



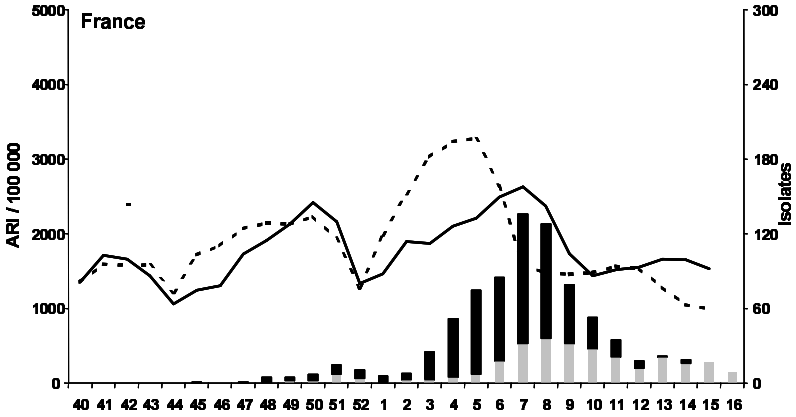

*ILI per 100 consultations*

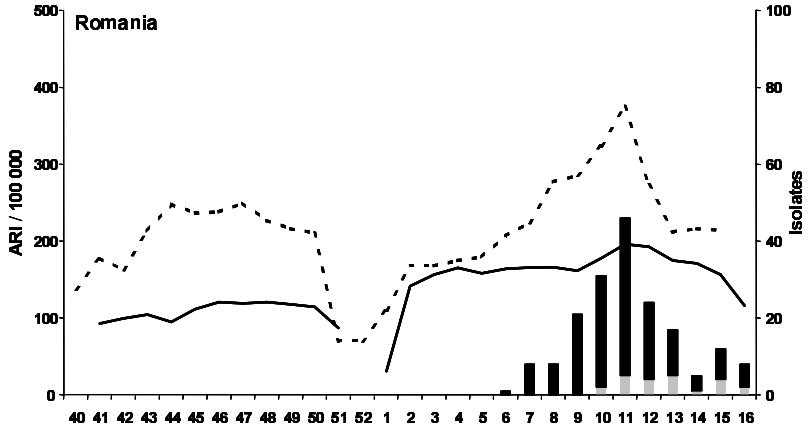


*ARI per 100,000 population*



### *2.3.2 Virological data*

The virological data for each network are presented in Tables 2.3 and 2.4. Overall, influenza B was the predominant virus in Ireland, Portugal, Romania and the United Kingdom and influenza A(H3N2) was predominant in the Czech Republic, Denmark, Germany, Italy, Lithuania, the Netherlands, Norway, Poland, Slovak Republic, Slovenia and Switzerland. Influenza B was reported earlier in the season and the period of influenza activity was longer. A number of countries (e.g. Belgium and France) had a mixed season, with influenza B reported at the beginning of the season and influenza A(H3N2) at the end of it.

During the 2002-2003 influenza season, a total of 18,345 respiratory specimens were collected by the sentinel physicians and tested for influenza (Table 2.3); 4,620 (25%) were positive for influenza (2938 (16%) for influenza A and 1682 (9%) for influenza B). Of the 1,994 subtyped influenza A viruses, 1,815 (91%) were of the H3N2 subtype, 155 (8%) of the H1N1 subtype and 24 (1%) of the H1N2 subtype.

Table 2.3: Sentinel virological data per network for the 2002-2003 influenza season*

| | **Total**[1] | **Positives** | | | **Total subtyped for influenza A** | | | |
|---|---|---|---|---|---|---|---|---|
| **Network** | **N** | **N**[2] (%) | **A (%)** | **B (%)** | **N**[3] | **A/H1N1 (%)** | **A/H1N2 (%)** | **A/H3N2 (%)** |
| Belgium | **557** | **113** (20) | 41 | 59 | **38** | 42 | 3 | 55 |
| Czech Republic | **1499** | **280** (19) | 69 | 31 | **50** | 10 | 0 | 90 |
| Denmark | **198** | **70** (35) | 61 | 39 | **42** | 5 | 2 | 93 |
| England | **470** | **115** (24) | 49 | 51 | **36** | 0 | 3 | 97 |
| France | **4379** | **812** (19) | 34 | 66 | **111** | 67 | 0 | 33 |
| Germany | **4623** | **2145** (46) | 86 | 14 | **1481** | 0 | 0 | 100 |
| Ireland | **237** | **83** (35) | 29 | 71 | **15**[4] | 0 | 0 | 100 |
| Italy | **58** | **9** (16) | 89 | 11 | **6** | 0 | 0 | 100 |
| Lithuania | **76** | **8** (11) | 100 | 0 | **n.a.** | n.a. | n.a. | n.a. |
| The Netherlands | **54** | **10** (19) | 80 | 20 | **8** | 37,5 | 0 | 62,5 |
| Northern Ireland | **9** | **3** (33) | 67 | 33 | **n.a.** | n.a. | n.a. | n.a. |
| Norway | **116** | **24** (21) | 67 | 33 | **16** | 6 | 31 | 63 |
| Poland | **n.a.** | **n.a.** | n.a. | n.a. | **n.a.** | n.a. | n.a. | n.a. |
| Portugal | **147** | **37** (25) | 8 | 92 | **3** | 0 | 33 | 67 |
| Romania | **945** | **181** (19) | 13 | 87 | **9** | 44 | 0 | 56 |
| Scotland | **1626** | **29** (2) | 7 | 93 | **0** | n.a. | n.a. | n.a. |
| Slovak Republic | **1026** | **88** (9) | 65 | 31 | **48** | 35 | 6 | 58 |
| Slovenia | **430** | **98** (23) | 97 | 3 | **9** | 11 | 89 | 0 |
| Spain | **1233** | **320** (26) | 30 | 70 | **33** | 94 | 0 | 6 |
| Sweden | **n.a.** | **n.a.** | n.a. | n.a. | **n.a.** | n.a. | n.a. | n.a. |
| Switzerland | **662** | **195** (29) | 73 | 27 | **89** | 1 | 4 | 94 |
| Wales | **n.a.** | **n.a.** | n.a. | n.a. | **n.a.** | n.a. | n.a. | n.a. |
| Europe (N) | **18345** | **4620** | **2938** | **1682** | **1994** | **155** | **24** | **1815** |
| Europe (%) | | | 64 | 36 | | 8 | 1 | 91 |

* The frequencies are based on the EISS database downloaded on 18.06.2003
1 Total number of respiratory specimens
2 Total number of respiratory specimens tested positive for influenza A or B
3 Total number of subtyped influenza A viruses
4 Six were subtyped as influenza A/H1
n.a. not applicable

At least 31,188 non-sentinel respiratory specimens were tested (Table 2.4) for influenza during the 2002-2003 influenza season (the total number is actually higher as some countries do not know the total number of respiratory samples tested and only report positive test results). A total of 2,586 non-sentinel respiratory specimens tested positive for influenza. Of the positive specimens, 1,576 (61%) were typed as influenza A and 1,010 (39%) as influenza B. Of the 789 subtyped influenza A viruses, 671 (85%) were of the H3N2 subtype, 98 (12%) of the H1N1 subtype and 20 (3%) of the H1N2 subtype.

Table 2.4: Non-sentinel virological data per network for the 2002-2003 influenza season*

| | Total[1] | Positives | | | Total subtyped for influenza A | | | |
|---|---|---|---|---|---|---|---|---|
| Network | N | N[2] | A (%) | B (%) | N[3] | A/H1N1 (%) | A/H1N2 (%) | A/H3N2 (%) |
| Belgium | **n.k.** | **168** | 61 | 39 | **65** | 52 | 0 | 48 |
| Czech Republic | **n.a.** | **n.a.** | n.a. | n.a. | **n.a.** | n.a. | n.a. | n.a. |
| Denmark | **262** | **27** | 74 | 26 | **17** | 0 | 0 | 100 |
| England | **n.k.** | **426** | 47 | 53 | **99** | 5 | 6 | 89 |
| France | **21226** | **441** | 54 | 46 | **16** | 62,5 | 0 | 37,5 |
| Germany | **n.a.** | **n.a.** | n.a. | n.a. | **n.a.** | n.a. | n.a. | n.a. |
| Ireland | **951** | **1** | 100 | 0 | **0** | n.a. | n.a. | n.a. |
| Italy | **4082** | **461** | 94 | 6 | **375** | 5 | 1 | 94 |
| Lithuania | **n.a.** | **n.a.** | n.a. | n.a. | **n.a.** | n.a. | n.a. | n.a. |
| The Netherlands | **n.k.** | **210** | 81 | 19 | **145** | 11 | 0 | 89 |
| Northern Ireland | **n.k.** | **3** | 0 | 100 | **n.a.** | n.a. | n.a. | n.a. |
| Norway | **1893** | **135** | 53 | 47 | **6** | 0 | 0 | 100 |
| Poland | **763** | **29** | 97 | 3 | **18** | 17 | 0 | 83 |
| Portugal | **538** | **188** | 3 | 97 | **6** | 50 | 33 | 17 |
| Romania | **56** | **10** | 20 | 80 | **2** | 0 | 0 | 100 |
| Scotland | **n.k.** | **133** | 20 | 80 | **n.a.** | n.a. | n.a. | n.a. |
| Slovak Republic | **343** | **63** | 60 | 40 | **32** | 28 | 0 | 72 |
| Slovenia | **535** | **131** | 98 | 2 | **8** | 0 | 100 | 0 |
| Spain | **351** | **39** | 46 | 54 | **n.a.** | n.a. | n.a. | n.a. |
| Sweden | **n.a.** | **n.a.** | n.a. | n.a. | **n.a.** | n.a. | n.a. | n.a. |
| Switzerland | **188** | **98** | 82 | 18 | **n.a.** | n.a. | n.a. | n.a. |
| Wales | **n.k.** | **23** | 65 | 35 | **n.a.** | n.a. | n.a. | n.a. |
| Europe (N) | **31188** | **2586** | **1576** | **1010** | **789** | **98** | **20** | **671** |
| Europe (%) | | | 61 | 39 | | 12 | 3 | 85 |

* The frequencies are based on the EISS database downloaded on 18.06.2003
[1] Total number of respiratory specimens
[2] Total number of respiratory specimens tested positive for influenza A or B
[3] Total number of subtyped influenza A viruses
n.k. Countries that do not know the exact total of respiratory specimens tested for influenza (most of them only have data on positive test results)

The overall percentage of positive samples taken in sentinel networks was 25% (range 2-46%). Comparisons between countries are difficult to make due to international variation in specimen collection and transport, swabbing protocols, lab techniques etc. As mentioned above, roughly two-thirds of the positive samples consisted of influenza A and one-third were influenza B. The distribution between influenza A and B is very similar in the samples taken in the non-sentinel setting.

Figure 2 presents the results of the strain characterisations of influenza virus isolates reported by the national reference laboratories in EISS. These data were collected for the first time during the 2002-2003 season and combine sentinel and non-sentinel data. Over 99% of the isolates characterised by the reporting networks were covered by the 2002-2003 vaccine. There were 26 reports of non-vaccine strain A/Fujian/411/02(H3N2)-like viruses (13 in Norway and 13 in Switzerland; reported at the end of the season) and these isolates represented less than 0.75% of all characterised isolates. EISS also received information on strain characterisation from the WHO Collaborating Centre in Mill Hill (London). The information provided by Alan Hay (Mill Hill, London) can be found in the box at the end of this paragraph. A comparison of the EISS- and WHO-data will be further studied in the next season.

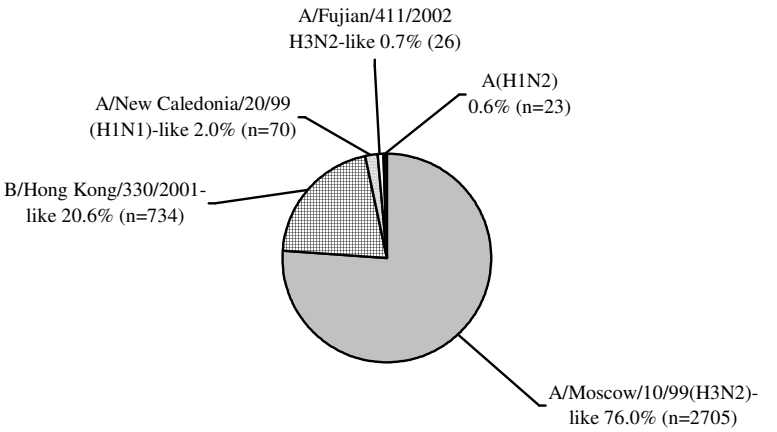



**Figure 2: Pie chart of cumulative influenza strain characterisations:** Sentinel and non-sentinel data for the 2002-2003 season.

During the winter of 2002-2003 there was a heightened awareness for respiratory symptoms as a result of the spread of SARS (Severe Acute Respiratory Syndrome). The appearance of SARS during the winter of 2002-2003, may have had an impact on the laboratory testing of respiratory specimens. The number of non-sentinel specimens tested is higher than previous season, however not all networks entered the number of specimens tested which makes the comparison difficult.

An important event during the 2002-2003 season was the outbreak of avian influenza with the highly pathogenic influenza A/H7N7 virus in the Netherlands and the transmission of this virus to humans causing mainly mild conjunctivitis, sporadically ILI, but also one case of severe fatal pneumonitis (Koopmans et al., 2004). Vaccination and antiviral treatment were used to contain the outbreak among humans. The main objective of this measure was to avoid simultaneous infection and reassortment of human and avian viruses in humans raising a virus with potential pandemic properties. Fortunately, the epidemic among poultry was contained and the last human case of H7N7 influenza (laboratory-confirmed) occurred on the 19$^{th}$ of April 2003 (Koopmans et al., 2004), indicating that the outbreak among humans was over. The virological findings of this outbreak were reported via the "News items" section of the EISS website with references to reports in ProMed and Eurosurveillance Weekly.

**WHO Collaborating Centre, Mill Hill, London**

The networks participating in EISS also send virus samples to Mill Hill in London for further characterisation. The haemagglutination inhibition tables for influenza A H1N1 and H1N2, H3N2 and B viruses can be found in Appendix 5.3.

*General comment concerning the tables*
The HAs of most of the H1N1 and H1N2 viruses were shown in HI tests to be indistinguishable from each other and to be closely related to that of the current vaccine strain, A/New Caledonia/20/99 (H1N1) and A/Egypt/96/02 (H1N2). Their HA and NA sequences were in general similar to those of viruses isolated during the previous year, with relatively little drift in amino acid sequence. Most of the H3N2 viruses isolated during the latter part of 2002 were closely related antigenically to the vaccine strain A/Panama/2007/99 and the more recent A/Moscow/10/99-like reference viruses, A/New York/55/01 and A/Hong Kong/1550/02. An increasing proportion of viruses isolated during 2003 were distinguishable from A/Panama/2007/99 and were more closely related to A/Fujian/411/02 and other A/Fujian/411/02-like reference viruses, such as A/Finland/170/03 and/or A/Sendai/4952/02. The HAs of A/Fujian/411/02-like viruses have diverged to a greater extent from the sequence of A/Panama/2007/99 HA and have accumulated 11 characteristic amino acid changes. The sequences of the NAs of these viruses exhibited 9 amino acid differences from the NA of A/Moscow/10/99. The HAs of the majority of B viruses were antigenically closely related to the prototype vaccine strain, B/Hong Kong/330/01, and the vaccine strain B/Shandong/7/97, as well as the more recent reference viruses, B/Hong Kong/335/01, B/Tehran/80/02 and B/Brisbane/32/02 (B/Victoria/2/87 lineage). Few were B/Sichuan/379/99-like (B/Yamagata/16/88 lineage).

## 2.4 Conclusions

The 2002-2003 influenza season in Europe was a heterogeneous one in terms of intensity and strain diversity. Some countries reported high levels of influenza activity (the Czech Republic, Denmark, Germany and Poland) whilst others had very quiet seasons (Ireland, the Netherlands, Norway, Sweden and the United Kingdom). Some countries had activity that was driven by the influenza B virus (mainly in the western part of Europe) whilst in other countries it was influenza A (usually influenza A(H3N2)). Influenza B activity was generally earlier in the season (weeks 49/2002-08/2003), it lasted a longer time period, and was associated with lower weekly incidence rates.

Influenza activity in North America during the 2002-2003 season was slightly different to that in Europe. In America, where the influenza season was mild, influenza A (H1) (this includes A(H1N1) and A(H1N2)) and B viruses circulated widely, and the predominant virus varied by region and time of season (CDC, 2003). In Canada, the predominant virus was influenza A(H1) (Canada Health, 2003). In contrast to large areas of Europe, influenza A(H3N2) did not play an important role in the influenza activity in North America during the 2002-2003 influenza season.

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 emergence of two 'novel' viruses during the 2001-2002 season (influenza A(H1N2) and B/Victoria/2/87 lineage) were carefully documented by EISS and exemplified the benefit of having a surveillance system to facilitate the rapid exchange of information across Europe (Paget et al., 2002). During the 2002-2003 season, a new drift variant of the influenza virus circulated: the A/Fujian/H3N2-like virus. Fortunately, only sporadic cases were detected and patients had typical clinical symptoms.

The appearance of SARS has led to an enhanced surveillance of influenza-like illness. This may have had an impact on the number of specimens tested for influenza. If SARS would have spread to the general population in Europe, EISS could have contributed to the surveillance of SARS. A laboratory based surveillance system for the SARS virus could have been established using the national reference laboratories for influenza in EISS that were involved in the testing of respiratory specimens for the SARS coronavirus (Paget et al., 2003 (2)).

During the winter of 2002-2003 there was a heightened awareness for respiratory symptoms as a result of the spread of SARS (severe acute respiratory syndrome).

At the end of the 2002-2003 season (late February 2003), the Netherlands experienced an epidemic of highly pathogenic avian influenza A(H7N7) in poultry that also went on to affect Belgium and Germany (in the regions bordering the Netherlands). This outbreak was closely monitored by EISS but, probably, poorly integrated into the routine procedures. To improve this situation, procedures have been changed to allow the entering of data of divergent and totally new influenza virus subtypes into the EISS database; these functions will be available for the 2003-2004 season.

The composition of the influenza vaccine for the 2003-2004 season (Northern Hemisphere winter) was announced by the World Health Organisation in Geneva (WHO, 2003). The strains are unchanged compared to the 2002-2003 season. The WHO delayed the announcement of the strains due to the fact that at the end of the season some cases were detected of reduced reactivity to the A/Panama/2007/99 antiserum (and appeared to be similar to A/Fujian/411/2002). Considering that these viruses are uncommon (e.g. less than 0.4% in Europe) and there is no A/Fujian/411/2002-like virus suitable as a vaccine strain candidate isolated in embryonated eggs, the composition of the 2003-2004 influenza vaccine in the Northern Hemisphere will remain the same as the current season.

The European influenza vaccine (EMEA, 2003) for the 2003-2004 season contains:

- an A/New Caledonia/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/HongKong/330/2001-like virus (currently used vaccine strains include B/Shandong/7/97, B/Hong Kong/330/2001, B/Hong Kong/1434/2002)

# 3 EISS developments during the 2002-2003 season

## 3.1 Objectives

The following objectives were established for the 2002-2003 influenza season:

- Integrate new members into EISS;
- Implement a new, dynamic website;
- Modify and improve the EISS Weekly Electronic Bulletin;
- Present ILI and ARI incidence rates in the Weekly Electronic Bulletin;
- Implement the Quality Control Assessment study among EISS laboratories;
- Publish the EISS Clinical Reporting Evaluation Protocol;
- Establish an automatic data transfer between the EISS and WHO FluNet;
- Collaborate with the EC to prepare for a possible influenza pandemic;
- Initiate the Community Network of Reference Laboratories of Human Influenza in Europe;
- Initiate an international meeting to discuss key indicators used to assess influenza activity;
- Establish an EISS Steering Committee;
- Organise an EISS management meeting and the annual EISS meeting.

## 3.2 Activities

**New members**
Two new influenza surveillance networks (Northern Ireland and Lithuania) were successfully integrated into the EISS project. Northern Ireland and Lithuania were accepted as "associate" members and actively participated in the project during the 2002-2003 influenza season. Luxembourg also joined the EISS project, but had an observer status as it did not report data.

**New website**
The EISS website was upgraded. The website is now constructed using databases: information entered into a database can be more easily made public and managed by EISS members. A new graphical design was also implemented.

**The Weekly Electronic Bulletin**
The Weekly Electronic Bulletin was modified and improved for the 2002-2003 influenza season. For example, separate graphs and a pie chart are now available for the virological data. A summary of virological data entered into the database is now presented for 'Europe'. Twenty-six Bulletins were published during the 2002-2003 season (from week 42/2002 to week 15/2003).

**ILI and ARI data**
A number of networks collect cases of ILI and ARI (e.g. England, Lithuania and Slovenia) and were willing to share this clinical data with EISS. The database was modified to allow this data to be collected and the Weekly Electronic Bulletin was

adapted so that weekly ILI and ARI incidences could be presented. The idea behind this initiative is to provide a broader picture of the impact of respiratory diseases in Europe during the winter season.

**Influenza vaccine uptake study in risk groups**
A research project was carried out by NIVEL, with the assistance of EISS. The project was funded by the European Scientific Working Group on Influenza (ESWI). The influenza uptake in risk groups was assessed. Furthermore insight in vaccination practices in European countries could be obtained. Questionnaires were completed by 26 influenza experts from 26 countries. The development of a uniform influenza vaccination monitoring method was recommended to allow for comparison of uptake data in Europe.

**The Quality Control Assessment study among EISS laboratories**
In December 2002 the University of Lyon sent out a blinded panel of 14 simulated respiratory samples containing influenza A, B, RSV and cells. 25 National Reference Laboratories (20 countries) participated in the assessment. Preliminary results of the assessment were presented to the EISS group in April 2003 and showed improvements in laboratory testing results since the 2000 assessment.

**The EISS Clinical Reporting Evaluation Protocol**
The EISS Clinical Reporting Evaluation Protocol has been developed to harmonise and standardise clinical surveillance methods in Europe. It has been used to evaluate the Belgian and Spanish surveillance systems and will be used to evaluate other surveillance systems in Europe in the future. The protocol has been shared with WHO and is now available on the EISS website as a PDF file. Its publication was announced in Eurosurveillance Weekly (26 June 2003).

**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 automatic data transfer was not implemented during the 2002-2003 influenza season and had to be postponed to the 2003-2004 season.

**Influenza pandemic planning**
The EISS group has been involved in an EU initiative to prepare for a possible influenza pandemic. One of the outcomes of these discussions has been the decision to create a Community Network of Reference Laboratories (CNRL) for Human Influenza in Europe.

**Community Network of Reference Laboratories**
The EC asked EISS to establish a Community Network of Reference Laboratories (CNRL) for Human Influenza in Europe based on the EC Community Influenza Pandemic Preparedness and Response Plan. A plan to establish the CNRL was developed and launched during an EISS meeting held at the end of the influenza season.

Subsequently, a discussion document was prepared describing the needs to operationalise the CNRL. This document describes: (1) the definition of basic tasks each laboratory must be capable of to perform, (2) the quality assurance of these tasks by QC studies, and (3) specific (research) projects to facilitate the operationalisation of the previous two items. Discussions with the WHO have been initiated on how the establishment of the CNRL will fit into the WHO's global influenza surveillance and pandemic preparedness

planning activities and how to co-operate with WHO. A questionnaire concerning the capacities and preparedness of the CNRL to identify emerging influenza viruses in relation to the defined basic tasks was circulated and the findings will be presented and published next season.

**International meeting to discuss key indicators of influenza activity**
In collaboration with WHO, EISS organised a workshop during the First European Influenza Conference in Malta (20-23 October 2003) to discuss "Enhancing the Surveillance of Influenza". An important discussion point was the harmonisation of key indicators used to assess influenza activity in Europe and the rest of the world.

**EISS Task Groups**
To study specific issues in more detail, two task groups were formed. The first investigated near patient tests. Some countries in EISS (e.g. Switzerland and France) use near patient tests for a rapid detection of influenza virus antigen in respiratory specimens . The sensitivity of this test is not optimal (lower than cell culture) and therefore it is not to be used for individual diagnosis. However, since the test is rapid and the specificity is high it may be an attractive tool for the surveillance of influenza epidemics (Thomas et al., 2003). To evaluate this new surveillance tool a Task Group was established by the EISS group. This Group has made a statement on the use of near patient tests for influenza surveillance (Thomas et al., 2003).
A second similar Task Group was established at the general EISS meeting in Sweden (2003) for the report of respiratory syncytial virus (RSV) within the EISS.

**EISS Steering Committee**
The co-ordination centre organised an EISS Steering Committee meeting in June 2002 and February 2003. 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 project.

**EISS management and plenary meetings**
Two meetings are organised each year to co-ordinate the activities of EISS, a management meeting before the influenza season (September/October) and a plenary meeting at the end of the season (April/May). The meetings have been organised on a regular basis since 1996 and represent an important moment to exchange information, research findings and initiate new projects. In October 2002 the meeting was held in Hilversum, the Netherlands, and in April 2003 it was held in Uppsala, Sweden.

## 3.3 Conclusions

The EISS project successfully reached most of its objectives for the 2003-2003 season. A very important development for the EISS co-ordination centre and the management of the project was the creation of the Steering Committee. The creation of the CNRL will improve collaborations in Europe and should lead to an increase in common virological projects within EISS. For the second year running, EISS was unable to implement the automatic data transfer between EISS and FluNet. It is hoped that this transfer will function during the 2003-2004 season.

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# 5 Appendices

## 5.1 Partners

**European Commission**
Health & Consumer Protection Directorate-General
Luxembourg

**Industry**

| | |
|---|---|
| GlaxoSmithKline | Roche Pharma |
| United Kingdom | 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)

| Surveillance networks | "Influenza-like illness" case definitions | "Acute respiratory infection" case definitions |
|---|---|---|
| Belgium | Sudden onset with fever, myalgia and respiratory symptoms (cough or thoracic pain) | Any infection involving the respiratory tract , with or without fever, which lasts 1-2 weeks |
| Czech Republic | | No case definition used |
| Denmark | Sudden onset of disease with fever, myalgia and symptoms of respiratory infection | |
| England | No case definition used | |
| France | | Sudden onset of respiratory symptoms with infection context (fever, headaches), in the absence of other diagnosis |
| Germany | | Acute pharyngitis, acute bronchitis or pneumonia, with or without fever |
| Iceland | No answer (not a sentinel practitioner-based network) | |
| Ireland | 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 | |
| Italy | Sudden onset of symptoms, with temperature >38°c, plus at least 1 systemic symptom and at least 1 respiratory symptom | |
| Latvia | Every illness characterized by sudden onset of fever (>38°C) with respiratory symptoms (dry cough and sore throat), headache and/or myalgia | |
| Lithuania | No case definition used | No case definition used |
| Luxembourg | No case definition used | No case definition used |
| Malta | Fever with coryza | |
| The Netherlands | Pel criteria 1 | |
| Northern Ireland | Case definition unknown | |
| Norway | A patient with clear general symptoms, primarily acute fever >38°C, headache, muscle ache, and in addition a dry cough | |
| Poland | No case definition used | |
| Portugal | ICHPPC-2-D definition[2] | |
| Romania | | Case definition unknown |
| Scotland | No case definition used | No case definition used |
| Slovak Republic | 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 | |
| Slovenia | Sudden onset of fever (>38°C) with general weakness, muscle and joint pain, dry cough and symptoms of upper respiratory tract affection | No case definition used |
| Spain | ICHPPC-2-D case definition[2] | |
| Sweden | No case definition used | |
| Switzerland | Respiratory illness with fever >38°C, myalgia, general pain, chills, anorexia. (optional symptoms are: cough, rhinitis and arthralgia) | |
| Wales | Upper respiratory tract symptoms, fever, chills, myalgia, cough | |

[1]: Pel criteria [12] An acute onset (i.e. at most a prodromal stage of three to four days), accompanied by a rise in rectal temperature of >38$^{o}$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 [10]
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 2002-2003 influenza season:
The levels of influenza activity in European countries reported by EISS members during the 2002-2003 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 Haemagglutination inhibition (HI) assays[1]

**Antigenic analyses of influenza A H1N1 and H1N2 viruses[1]**

| Viruses | Isolation Date | Haemagglutination inhibition titre[2] Post infection ferret A/Bay 7/95 | A/Beij 262/95 | A/NC 20/99 | A/Mad 57794/00 | A/Eg 96/02 |
|---|---|---|---|---|---|---|
| **A/Bayern/7/9** | | **1280** | 320 | 80 | 40 | 40 |
| **A/Beijing/262/9** | | 80 | **2560** | 320 | 320 | 320 |
| **A/New** | | 40 | 640 | **640** | 320 | 640 |
| **A/Madagascar/57794/** | | 40 | 640 | 640 | **640** | 640 |
| **A/Egypt/96/0** | | < | 320 | 640 | 320 | **1280** |
| **H1N1** | | | | | | |
| A/Navarra/RR1252/0 | Dec-02 | 80 | 80 | 320 | 640 | 1280 |
| A/Lyon/1541/0 | 2.12.02 | < | 80 | 160 | 160 | 640 |
| A/Paris/0655/0 | Jan-03 | 40 | 160 | 320 | 320 | 640 |
| A/Prague/8/0 | 26.1.03 | < | 40 | 320 | 320 | 640 |
| A/Netherlands/02/0 | 29.1.03 | < | 80 | 80 | 160 | 640 |
| A/Latvia/1381/0 | 3.2.03 | 40 | 160 | 640 | 320 | 1280 |
| A/Segovia/17/0 | 17.2.03 | < | 160 | 320 | 320 | 640 |
| A/St. | 17.2.03 | 40 | 640 | 320 | 640 | 640 |
| A/Israel/2/0 | 18.2.03 | < | 320 | 640 | 640 | 1280 |
| A/Hungary/7/0 | 20.2.03 | 80 | 640 | 640 | 320 | 1280 |
| A/Sachsen/252/0 | 3.3.03 | 40 | 160 | 320 | 160 | 640 |
| A/Lisbon/2/0 | 11.3.03 | < | 80 | 320 | 320 | 320 |
| A/Moscow/6/0 | 12.3.03 | < | 640 | 640 | 640 | 640 |
| A/Geneva/4099/0 | 14.3.03 | < | 320 | 320 | 320 | 640 |
| A/Bucharest/796/0 | 19.3.03 | 40 | 320 | 320 | 160 | 320 |
| A/Finland/299/0 | 27.3.03 | < | 160 | 320 | 160 | 640 |
| A/Barcelona/69830/0 | 10.4.03 | < | 320 | 320 | 320 | 320 |
| A/Zagreb/4889/0 | 9.5.03 | < | 80 | 640 | 320 | 640 |
| A/Iceland/46/0 | 10.6.03 | < | 160 | 160 | 160 | 320 |
| **H1N2** | | | | | | |
| A/Lyon/1723/0 | 18.12.02 | < | 80 | 160 | 160 | 640 |
| A/Slovakia/258/0 | 6.2.03 | < | 80 | 160 | 160 | 640 |
| A/Belgrade/1062/0 | 21.2.03 | < | 160 | 80 | 160 | 640 |
| A/Rheinland- | 28.2.03 | < | 320 | 640 | 320 | 1280 |
| A/Parma/24/0 | 3.3.03 | 40 | 160 | 160 | 160 | 640 |
| A/Geneva/3762/0 | 6.3.03 | < | 160 | 320 | 320 | 640 |
| A/Denmark/56/0 | 13.3.03 | < | 320 | 320 | , | 320 |
| A/Finland/294/0 | 22.3.03 | < | 160 | 320 | 160 | 640 |
| A/Oslo/3389/0 | 20.4.03 | < | 160 | 160 | 160 | 640 |

1 . Source: Dr. Alan Hay (WHO Influenza Centre, Mill Hill, UK)
2. < = < 40

## Antigenic analyses of influenza A H3N2 viruses

| Viruses | Isolation Date | Haemagglutination inhibition titre[1] Post infection ferret sera A/Pan 2007/99 | A/NY 55/01 | A/HK 1550/02 | A/Egypt 130/02 | A/Fuj 411/02 | A/Send 4952/02 | A/Fin 170/03 |
|---|---|---|---|---|---|---|---|---|
| **A/Panama/2007/99** | | **5120** | 1280 | 5120 | 2560 | 80 | 160 | 80 |
| **A/New York/55/01** | | 5120 | **2560** | 2560 | 5120 | 160 | 320 | 160 |
| **A/Hong Kong/1550/02** | | 5120 | 2560 | **5120** | 2560 | 160 | 320 | 80 |
| **A/Egypt/130/02** | | 1280 | 640 | 1280 | **2560** | 160 | 80 | 160 |
| **A/Fujian/411/02** | | 80 | 40 | 80 | 80 | **640** | 640 | 320 |
| **A/Sendai/4952/02** | | 320 | 320 | 640 | 320 | 320 | **640** | 320 |
| **A/Finland/170/03** | | 160 | 80 | 160 | 160 | 640 | 640 | **320** |
| A/Sofia/338/02 | Nov-02 | 5120 | 2560 | 5120 | – | – | – | – |
| A/Caen/406/02 | Dec-02 | 160 | 320 | 160 | 160 | – | – | – |
| A/England/455/02 | 30.12.02 | 2560 | 5120 | 2560 | 2560 | – | – | – |
| A/Austria/79807/03 | – | 2560 | 1280 | 1280 | 2560 | 80 | – | 80 |
| A/Ireland/789/03 | – | 1280 | 640 | 640 | 2560 | – | – | – |
| A/Poland/1/03 | Feb-03 | 2560 | 5120 | 1280 | 5120 | 80 | – | – |
| A/Trieste/9/03 | Feb-03 | 2560 | 2560 | 2560 | – | < | 40 | – |
| A/Prague/34/03 | 2.2.03 | 640 | 640 | 640 | – | < | < | – |
| A/Slovakia/252/03 | 5.2.03 | 320 | 2560 | 320 | 2560 | 160 | – | – |
| A/Latvia/1506/03 | 10.2.03 | 1280 | 2560 | 1280 | 2560 | 160 | 40 | – |
| A/Perugia/7/03 | 10.2.03 | 1280 | 2560 | 1280 | 5120 | 40 | – | < |
| A/Belgrade/1285/03 | 24.2.03 | 640 | 1280 | – | 2560 | 80 | 160 | 80 |
| A/Geneva/3340/03 | 25.2.03 | 1280 | 2560 | 1280 | 2560 | 160 | 160 | < |
| A/Rome/3/03 | 3.3.03 | 1280 | 1280 | 2560 | – | < | 40 | – |
| A/Goteborg/1/03 | 5.3.03 | 2560 | 1280 | 1280 | 2560 | 160 | – | 160 |
| A/Hannover/154/03 | 7.3.03 | 1280 | 640 | 1280 | 1280 | 40 | – | < |
| A/Denmark/39/03 | 10.3.03 | 160 | 160 | 320 | 160 | 640 | – | 320 |
| A/Albania/20/03 | 14.3.03 | 1280 | 1280 | 1280 | 1280 | 160 | – | 80 |
| A/Greece/109/03 | 21.3.03 | 320 | 1280 | 320 | 640 | 40 | 40 | – |
| A/Bucharest/972/03 | 8.4.03 | 80 | 40 | < | 320 | < | – | < |
| A/Oslo/3391/03 | 1.5.03 | 1280 | 640 | 320 | 2560 | 160 | 40 | – |
| A/Oslo/2221/03 | Feb-03 | 320 | 320 | 320 | 320 | 320 | 320 | – |
| A/Lyon/476/03 | 5.2.03 | 320 | 320 | 160 | – | 160 | 160 | – |
| A/Hungary/21/03 | 3.3.03 | 80 | 80 | 80 | 320 | < | – | < |
| A/Parma/18/03 | 3.3.03 | 320 | 640 | 640 | 320 | 1280 | – | 640 |
| A/Moscow/48/03 | 3.3.03 | 80 | 80 | 160 | 160 | 640 | – | 160 |
| A/Geneva/3767/03 | 6.3.03 | 160 | 160 | 320 | 160 | 640 | – | 320 |
| A/Hannover/131/03 | 11.3.03 | 160 | 80 | 160 | 80 | 640 | – | 160 |
| A/St. Petersburg/122/03 | 11.3.03 | 160 | 320 | 320 | 320 | 320 | – | 320 |
| A/Stockholm/10/03 | 17.3.03 | 320 | 80 | 320 | 320 | 1280 | – | 640 |
| A/Iceland/22/03 | 19.3.03 | 160 | 320 | 160 | 320 | 320 | – | 320 |
| A/Finland/300/03 | 28.3.03 | 160 | 320 | 320 | 320 | 640 | – | 320 |
| A/Barcelona/364/03 | 23.4.03 | 160 | 80 | 160 | 160 | 1280 | – | 320 |
| A/Israel/3650/03 | 3.6.03 | 160 | 320 | 160 | 640 | 640 | – | 320 |

1 . < = <40

## Antigenic analyses of influenza B viruses

| Viruses | Isolation date | Haemagglutination inhibition titre[1] | | | | | |
|---|---|---|---|---|---|---|---|
| | | | Post infection ferret sera | | | | |
| | | B/Shan[2] 7/97 | B/Shan 7/97 | B/HK 335/01 | B/Te 80/02 | B/Bris 32/02 | B/Sich 379/99 |
| **B/Shandong/7/97** | | **2560** | **640** | 640 | 160 | 320 | < |
| **B/Hong Kong/335/01** | | 2560 | 160 | **640** | 80 | 320 | < |
| **B/Tehran/80/02** | | 2560 | 320 | 320 | **320** | 320 | < |
| **B/Brisbane/32/02** | | 2560 | 320 | 640 | 160 | **320** | < |
| **B/Sichuan/379/99** | | < | < | < | < | < | **160** |
| B/Finland/11/02 | 4.11.02 | 2560 | 640 | 640 | 160 | – | < |
| B/Lisbon/3/03 | 13.11.02 | 2560 | 320 | 640 | 160 | – | < |
| B/Lyon/1436/02 | 20.11.02 | 1280 | 320 | 640 | 80 | – | < |
| B/Paris/242/02 | Dec-02 | 1280 | 160 | 320 | 40 | – | < |
| B/England/450/02 | 20.12.02 | 2560 | 320 | 160 | 160 | 160 | < |
| B/Madrid/G1334/02 | 26.12.02 | 2560 | 320 | 160 | 160 | 160 | < |
| B/Ireland/363/03 | 10.1.03 | 5120 | 160 | 160 | 80 | 160 | < |
| B/Prague/7/03 | 27.1.03 | 640 | 320 | 320 | 40 | 160 | < |
| B/Netherlands/1/03 | 28.1.03 | 2560 | 640 | 320 | 160 | 320 | 40 |
| B/Voronezh/236/03 | 28.1.03 | 640 | 320 | 640 | 80 | 160 | < |
| B/Trieste/1/03 | Feb-03 | 5120 | 160 | 160 | 80 | 160 | < |
| B/Rome/3/03 | Feb-03 | 2560 | 640 | 640 | 320 | 160 | < |
| B/Slovakia/238/03 | 4.2.03 | 5120 | 160 | 160 | 80 | 160 | < |
| B/Belgrade/622/03 | 5.2.03 | 2560 | 640 | 320 | 40 | 80 | < |
| B/Barcelona/215/03 | 6.2.03 | 5120 | 640 | 320 | 160 | 320 | < |
| B/Valladolid/11/03 | 7.2.03 | 5120 | 320 | 160 | 80 | 320 | < |
| B/Moscow/8/03 | 17.2.03 | 2560 | 320 | 640 | 80 | 320 | < |
| B/Hungary/4/03 | 21.2.03 | 1280 | 320 | 640 | 160 | 160 | < |
| B/Denmark/26/03 | 3.3.03 | 2560 | 640 | 640 | 160 | 320 | < |
| B/Albania/6/03 | 6.3.03 | 1280 | 320 | 160 | 160 | 160 | < |
| B/Turkey/15/03 | 17.3.03 | 2560 | 640 | 160 | 160 | 80 | < |
| B/Lipetsk/17/03 | 18.3.03 | 2560 | 640 | 640 | 160 | 320 | < |
| B/Latvia/3248/03 | 14.3.03 | 2560 | 160 | 320 | 80 | 320 | < |
| B/Greece/116/03 | 26.3.03 | 1280 | 320 | 640 | 80 | 320 | < |
| B/Oslo/3377/03 | 26.3.03 | 2560 | 640 | 320 | 80 | 80 | < |
| B/Hannover/52/03 | 27.3.03 | 2560 | 640 | 640 | 320 | 320 | < |
| B/Bucharest/872/03 | 31.3.03 | 2560 | 320 | 320 | 160 | 320 | < |
| B/Geneva/5079/03 | Apr-03 | 2560 | 320 | 320 | 80 | 160 | < |
| B/Israel/102/03 | 3.4.03 | 5120 | 640 | 320 | 40 | – | < |
| B/Iceland/36/03 | 10.4.03 | 2560 | 320 | 320 | 80 | 160 | < |
| B/Stockholm/2/03 | 10.4.03 | 320 | 320 | 80 | 160 | 80 | < |
| B/Austria/81287/03 | – | 40 | < | < | < | < | 160 |
| B/Finland/231/03 | 29.1.03 | < | < | < | < | < | 80 |
| B/Zagreb/4117/03 | 20.2.03 | 40 | 40 | < | < | < | 160 |
| B/Bucharest/795/03 | 19.3.03 | < | < | < | < | < | 160 |

1. < = < 40

2. hyperimmune sheep serum

## 5.5 EISS Publications

**Peer-reviewed articles**

**2003**

Aguilera JF, Paget WJ, Mosnier A, Heijnen L, Uphoff H, van der Velden J, Vega T, Watson JM. Heterogeneous case definitions used for the surveillance of influenza in Europe. *European Journal of Epidemiology* 2003: 18(8): 733-736.

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Manuguerra J-C, Mosnier A, Paget WJ (on behalf of EISS). Monitoring of influenza in the EISS European network member countries from October 2000 to April 2001. *Eurosurveillance* 2001; 6: 127-135.

Paget WJ, Aguilera J-F (on behalf of EISS). Influenza Pandemic Planning in Europe. *Eurosurveillance* 2001; 6: 136-140.

**2000**

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**1999**

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