Report of the Fifth Joint WHO Regional Office for Europe/ECDC Meeting on Influenza Surveillance

Budapest, Hungary, 14–16 June 2016

Contents

Executive summary

The WHO Regional Office for Europe and the European Centre for Disease Prevention and Control (ECDC) coordinate surveillance activities related to the prevention and control of influenza in the WHO European Region. Since 2011, the two institutions have jointly organized annual meetings focused on epidemiological and virological aspects of influenza surveillance, seasonal influenza vaccination and the global situation regarding outbreaks of avian influenza and other emerging respiratory pathogens. This is the fifth joint ECDC and Regional Office annual meeting, the main focus of which was to improve the quality of influenza surveillance data and key outputs, namely Flu News Europe, seasonal risk assessments and reports of virus characterization data. The key action points from the meeting are summarized below:

- Improvements to Flu News Europe will continue to be made: maps displaying influenza activity in the European Region have already been included ready for the 2016–2017 influenza season;
- Training and external quality assessment programs for National Influenza Centres (NIC; including increasing the capacity of the network to conduct sequencing and antiviral susceptibility testing) will continue to be provided and training opportunities for influenza epidemiologists will be increased;
- Work with the network to improve the quality of surveillance data will continue, through supporting countries to assess their surveillance system where needed. In particular, the quality of data from the surveillance of severe disease will be improved, by obtaining denominator and case-based data from additional countries, and by supporting the piloting of epidemic and intensity thresholds;
- Future seasonal influenza risk assessments will be conducted jointly by WHO/Europe and ECDC 2016–2017.
- WHO/Europe and ECDC will continue to support seasonal influenza vaccination programs in countries by monitoring policies and coverage and by helping countries to increase demand, e.g. through the use of the newly published WHO TIP FLU Guidance and the new online ECDC course Influenza Vaccination of Health Care Workers – can uptake be improved?
- With vaccines for Respiratory Syncytial virus (RSV) expected to come to market in the near future, the network will continue to work on RSV surveillance and studies to determine the burden of disease, thus contributing to the global WHO pilot.

In addition, the meeting offered a unique opportunity for national focal points for epidemiological and virological surveillance from the 53 Member States of the WHO European Region to network with international institutions, partners and networks (US CDC, I-MOVE and VENICE consortia, WHO Collaborating Centres for Reference and Research of Influenza, WHO H5 reference laboratories and the WHO Collaborating Centre for Pandemic Influenza and Research, University of Nottingham, United Kingdom).

67% of participants returned an evaluation form and the overall evaluation of the quality of the content of the meeting was very positive.

Keywords
Influenza
Influenza surveillance
Influenza vaccine
Outbreaks and pandemics
Influenza epidemiology
Influenza virology

Session 1: Welcome and Introduction

I. Overview and goals of the meeting

Krizstina Biro of the State Health Department, Ministry of Human Capacities, Hungary, opened the meeting by stating the importance of influenza as a public health priority in Hungary and the European Region as a whole, and by commending the role of the influenza surveillance network in the prevention and control of seasonal, zoonotic and pandemic influenza.

Caroline Brown, WHO/Europe, and Pasi Penttinen, ECDC, described the aims of the meeting, namely to provide an overview of the 2015–2016 influenza season and discuss opportunities and challenges related to influenza surveillance and seasonal influenza vaccination programmes for the upcoming 2016–2017 influenza season. New developments with respect to the joint ECDC-WHO Regional Office for Europe's Flu News Europe bulletin and a proposal for joint seasonal influenza risk assessment were also to be discussed. Surveillance topics covered severe disease reporting and the use of next generation sequencing as well as training to support NICs. Lastly, developments related to the expected availability of vaccines against respiratory syncytial virus (RSV) within the next few years and the need to establish RSV surveillance were on the agenda.

The four presentations in this opening session described the characteristics of the 2015–2016 influenza season at country (Hungary), regional and global level.

II. Influenza surveillance in Hungary and overview of the 2015–2016 influenza season

Agnes Csohan of the Hungarian National Center for Epidemiology described how Hungary has conducted influenza surveillance since 1931. The surveillance has evolved from a syndromic universal surveillance to a country-wide network of general practitioners conducting sentinel surveillance of influenza-like illness (ILI) supported by a WHO-recognized National Influenza Centre and national surveillance unit, with reporting being facilitated by an electronic information system. In contrast to many countries in the region where influenza A(H1N1)pdm09 predominated, Hungary had a season dominated by the Victoria lineage of influenza B virus and, based on outpatient data, the season was milder compared with the 2014–2015 season. Hungary currently does not collect data from hospitalized cases of influenza to assess the severity of the influenza season. Hungary has a comprehensive seasonal influenza vaccination program whereby the government provides locally produced trivalent inactivated influenza vaccine to WHO-recommended risk groups free of charge. Administered doses in 1990 were 290 000, which increased to about 1.3 million doses in 2008, but which declined to about 750 000 doses during the 2015–2016 season.

III. Characteristics of the 2015–2016 influenza season

René Snacken, ECDC, reported that the 2015–2016 influenza season in the WHO European Region was characterized by a high predominance of influenza A(H1N1)pdm09 at the start of the season, followed by a high predominance of influenza B (Victoria lineage) from about week 09/2016 (https://flunewseurope.org/). Particularly in countries of eastern Europe, an early rise in severe cases concomitantly with a high predominance of influenza A(H1N1)pdm09 was experienced compared with previous seasons. Throughout the Region, severe cases of influenza were reported

mainly in adults under 65 years of age and results from the EuroMOMO consortium (European monitoring of excess mortality in 15 EU countries for public health action) indicated an excess in all-cause mortality among those aged 15–64 years at the beginning of 2016. Reports of severe cases and deaths this season raised the question as to whether the A(H1N1)pdm09 virus had become more virulent. However, current data suggest that, antigenically, the A(H1N1)pdm09 virus has not changed significantly compared with this season's vaccine strain, although most viruses fell within a new genetic clade (subgroup 6B.1.).

Most countries in the WHO European Region utilized trivalent inactivated vaccines containing a virus representative of the influenza B Yamagata lineage, while the predominating circulating influenza B viruses were of the Victoria lineage (included in quadrivalent influenza vaccines). There were no indications of reduced susceptibility to neuraminidase inhibitors among influenza viruses this season. Looking forward to the 2016–2017 influenza season, WHO has recommended that trivalent seasonal influenza vaccines contain the same A(H1N1)pdm09 strain but updated A(H3N2) and B viruses:

- an A/California/7/2009 (H1N1)pdm09-like virus;
- an A/Hong Kong/4801/2014 (H3N2)-like virus;
- a B/Brisbane/60/2008-like virus (Victoria lineage).

Furthermore, WHO recommends that quadrivalent vaccines containing two influenza B viruses contain the above three viruses and a B/Phuket/3073/2013-like virus (Yamagata lineage).

IV. Review of characteristics of influenza A(H1N1)pdm09 viruses emerged in 2015–2016.

John McCauley, Director of the WHO Collaborating Centre, Francis Crick Institute, London, described the emergence of a new genetic group of influenza A(H1N1)pdm09 viruses (genetic group 6B.1). Viruses in this new genetic group were first detected in August 2015 after which they rapidly spread globally. Alerts about severe cases and deaths associated with A(H1N1)pdm09 were received from a number of countries in 2015, including from India in March, Saudi Arabia in September, Iran in early December, followed by Israel, Armenia, Georgia and Ukraine in late December 2015 and January 2016. Data that would determine the extent to which severe cases might be related to A(H1N1)pdm09 viruses of the 6B.1 genetic group were not available.

Rapid sharing of A(H1N1)pdm09 influenza viruses by national influenza centres (NICs) in the Region allowed the WHO Collaborating Centre to conduct antigenic analyses to compare the antigenic properties with the virus contained in the vaccine. Based on analyses with ferret antisera, A(H1N1)pdm09 6B.1 viruses were found to be antigenically similar to the vaccine strain. However, a very small number of post-vaccination human sera from adults reacted poorly with 6B.1 viruses but representative data, including data from post-vaccination sera from children, are not available.

Preliminary vaccine effectiveness (VE) estimates (all ages) from the United Kingdom show levels of protection similar to the 2010–2011 season, when this vaccine virus was first used in the seasonal vaccine.

Taken together, the data support the decision to recommend the inclusion of an A/California/7/2009 (H1N1)pdm09-like virus in the influenza vaccine for the 2016–2017 northern hemisphere influenza season.

V. Global influenza update and risk factors for severe disease due to influenza

Seasonal influenza

Katelijn Vandemaele, WHO headquarters, reported that throughout the northern hemisphere, A(H1N1)pdm09 predominated during the 2015–2016 influenza season, as it did for most of the season in the WHO European Region. The 2016 southern hemisphere season is just starting with predominantly B viruses reported, followed by A(H1N1)pdm09 and very little A(H3N2). Since 2015, 21 countries have been participating in the Pandemic Influenza Severity Assessment (PISA; ref), including Germany, Spain and the UK from the WHO European Region.

During 2015–2016, most countries participating in PISA reported variable levels of ILI and SARI activity, equivalent to low or moderate transmission. Regarding clinical seriousness, as in other influenza A(H1N1)pdm09-dominated seasons, severe disease was experienced more frequently in adults less than 65 years compared with seasons during which A(H3N2) was the dominant virus, equivalent to low or moderate seriousness according to PISA indicators. Regarding the impact on hospital and intensive care capacities, most countries reported no or low impact.

Human infections with influenza viruses of animal origin

An overview of the global situation regarding human infections with influenza viruses of animal origin was given. All cases of human infection with a new subtype of influenza A must be notified to WHO under the International Health Regulations (2005). Since 2003, human infections with avian influenza viruses A(H5N1), A(H5N6), A(H6N1), A(H7N9), A(H9N2) and A(H10N8) have been reported. The majority of infections have been caused by A(H5N1) and A(H7N9). Between 2003 and 17 May 2016, 851 laboratory-confirmed human cases of avian influenza A(H5N1) virus infection have been notified to WHO from 16 countries; of these cases, 450 have died (case fatality ratio 53%). The median age was 19 years and cases 20 years or older were more likely to have fatal outcomes compared to cases less than 20 years of age (Odds Ratio 1.9). From 2014 through 30 May 2016, 15 laboratory-confirmed human cases of avian influenza A(H5N6) virus infection in China have been reported, including seven severe and six fatal cases.

In 2013, WHO received the first reports of human cases of avian influenza A(H7N9) from China. In contrast to A(H5N1), which is highly pathogenic in poultry, A(H7N9) is of low pathogenicity causing few symptoms in poultry. As of 30 May 2016, 781 laboratory-confirmed human cases of avian influenza A(H7N9) virus infection have been notified to WHO from three countries and, of these cases, at least 313 have died (case fatality ratio 40%). The majority of cases have occurred in China, between week 51/2015 and week 20 of the following year. As for A(H5N1), there is no significant association between gender and outcome. 77% (599/781) of the cases were reportedly severe, critical, or fatal at the time of reporting. Median age was 57 years (range 0-91 years) with cases over 60 years of age nearly three times more likely to have fatal outcomes than cases less than 60 years of age.

For A(H5N1) and A(H7N9), although some family clusters have been reported, no sustained human-to-human transmission has occurred. The majority of cases had exposure to poultry or live poultry markets. The latest WHO risk assessment considers that, because A(H5N1), A(H5N6) and A(H7N9) viruses continue to be detected in animals and environments, further human cases, including imported travel-related cases, can be expected; however, the likelihood of sustained transmission among humans is low.

Between 1 January 2014 and 17 May 2016, 15 human cases of non-seasonal swine origin influenza viruses have been reported to WHO from the USA, China and Sweden.

Review of risk factors for severe disease due to influenza

Preliminary findings from a literature review of risk factors for severe disease due to influenza indicate that risk factors for death and other severe outcomes – intensive care unit (ICU) admission, mechanical ventilation, or extracorporeal membrane oxygenation (ECMO) – are generally similar for low and middle income (LMIC) and high income countries (HIC).

Regarding underlying conditions, persons with hematologic diseases have the highest relative risk of death when they have influenza disease, while pulmonary diseases were not associated with mortality in this preliminary review, a finding that requires further investigation.

Children (under 18 years) are at a lower risk of death from influenza disease than adults. The pooled risk of death does not differ for children under five compared to those between five and 18, nor for adults over 64 compared with those between 18 and 64. Preterm infants (data from HIC only) infected with influenza were associated with increased risk for severe outcomes as compared to other children and had a three-fold higher risk of being admitted to hospital, to an ICU unit and the need for mechanical ventilation, than full-term infants.

Pregnant women in general were at no increased risk for mortality or other severe outcomes compared with non-pregnant women of reproductive age, but pregnant woman in their third trimester were at higher risk of death when ill with influenza disease compared with non-pregnant women of childbearing age. Pregnant women with underlying diseases were at increased risk for mortality as compared to pregnant woman without those diseases. Regarding maternal outcomes, influenza disease during pregnancy was associated with a higher risk of stillbirth, early neonatal mortality and low birth weight. Women ill with influenza during the 28 days post-partum were at no increased risk for mortality than non-pregnant women of childbearing age.

Session 2A: Virology group session

Quality assessment and training

In order to maintain laboratory capacities and define training needs, external quality assessment (EQA) programmes are organized by WHO and ECDC. The results from the latest global WHO External Quality Assessment Programme (EQAP) panel[1] and the 2015 ERLI-Net/WHO EQA on influenza virus culture and antiviral susceptibility[2][3] were presented to the network.

The EQAP results show a high level of performance in PCR among laboratories and an improvement in detection of the influenza A (H5) from 83.1% to 87.9% and from 90.0% to 96.6% for A(H7) viruses and antiviral susceptibility testing from 93.3 to 100% compared with the last EQAP panel.

The ERLI-Net/WHO EQA results in the rapid detection component show that the proportion of laboratories receiving a maximum score increased between 2013 and 2015 from 80.0% to 92%. Overall, virus characterisation results, based on the combined results from genetic, antigenic and antiviral susceptibility characterisation, have improved over the last panel with more accurate results achieved with genetic characterization. The 2015 EQA showed a general improvement in the technical ability of network laboratories, but also identified topics for future training and monitoring.

An overview of training activities to strengthen capabilities of NICs and network capacities on different aspects of virological surveillance, pandemic preparedness and laboratory quality, management and biosafety supported by ECDC and the Regional Office was given. Participants in different training and twinning programmes reported about their experiences and the implementation of the techniques into their laboratories.

The updated WHO Regional Office for Europe laboratory assessment tool for WHO-recognition of National Influenza Centres (NIC-LAT) was presented to the network. The NIC-LAT combines the WHO evaluation NIC checklist (ref) with the Laboratory Assessment Tool4 , which is based on minimal standards of quality all laboratories should be able to achieve. It allows assessment of a laboratory in a standardized way with the automatic generation of numeric indicators related to laboratory capacities; identify resource and training needs using a standardized approach that can also be used for self-assessment and self-development and follow up the improvement of the same laboratory over time. Since its introduction in 2010 NIC-LAT has been used for assessment of national influenza laboratories that requested WHO-recognition as well as WHO-recognized NICs as part of overall assessment of influenza surveillance in a country. It was also used by laboratories for self-assessment in order to identify priority areas for improvement. Based on feedback received

[1] Detection of influenza virus subtype A by polymerase chain reaction: WHO external quality assessment programme summary analysis, 2015. Wkly Epidemiol Rec. 2016;91(1):3-11.

[2] European Centre for Disease Prevention and Control. External quality assessment scheme for detection, isolation and characterisation of influenza viruses for the European Reference Laboratory Network for Human Influenza – 2015. Stockholm: ECDC, 2016.

[3] European Centre for Disease Prevention and Control. External quality assessment scheme for influenza antiviral susceptibility for the European Reference Laboratory Network for Human Influenza – 2015. Stockholm: ECDC, 2016.

[4] World Health Organization. Laboratory assessment tool. Geneva: World Health Organization; 2012. Available from: http://www.who.int/ihr/publications/laboratory_tool/en/.

during the assessment and following release of the updated LAT by WHO headquarters the new version of NIC-LAT has been released in 2016.

Action points:

- Continue to provide EQA programs coupled with training and twinning as essential components to maintaining and expanding the expertize of the network;
- WHO/Europe will continue to use the NIC-LAT for on site assessment for WHO-recognition, and encourage self-assessment by NICs for maintaining recognition status.

Application of next generation sequencing (NGS) to influenza surveillance

Participants shared their experiences and insights related to the application and implementation of NGS in the field of influenza surveillance followed by group discussions on the rationale for conducting NGS in influenza surveillance, the pros and cons for NICs to implement NGS versus Sanger sequencing, and what support would be needed from ECDC and/or WHO/Europe.

Discussions around the benefits and limitations of both Sanger and NGS approaches concluded that Sanger sequencing may be a more timely and cost effective approach with fewer supply issues compared with NGS. Regarding the rationale for conducting NGS, most participants said that through collecting complete sequence data and maintaining a repository of sequences, more insightful, in depth analyses could be conducted, including better characterization of the virus population diversity for both currently circulating and new/emerging viruses. Although it is costly to develop the processing and reporting pipeline for NGS in laboratories, the benefits of NGS were that in addition to improved sensitivity, its application would enable upscaling of large batch analysis with economies of scale with increasing numbers of throughput samples. The benefit of using NGS compared to Sanger sequencing when mostly HA and NA genes are analysed and used for surveillance purposes was discussed and a question mark remained over the surveillance benefits of sequencing other gene segments. The limitation in terms of accuracy of applying NGS and identifying suitable reference strains were highlighted, as was the high resource intensiveness in person time and cost. Challenges in the timely and automated analysis of big sequence data were discussed and identified as one limitation of NGS implementation for the whole network. The group suggested that laboratories interested in implementing sequencing should consider starting with SANGER sequencing technology.

Implementation of NGS should begin in National Influenza Centres (NICs) where resources are available to establish such capacity. NGS integrated into existing surveillance systems would be required and accordingly consideration must be given to associated costs and data protection policies. It is likely to have cross-cutting application beyond influenza sequencing and ultimately will be the future technology of choice. The rapid development of the technology with different platforms and software solutions does not allow a recommendation of one particular system at the moment. However, it is likely too early to implement NGS in most NICs. Instead, it was recommended that some NICs pilot the introduction of NGS using different systems. In time novel commercial products might address some of the barriers that exist for NICs.

ECDC and WHO/Europe should contribute to setting objectives around the use of NGS and to facilitating discussions around implementation. In addition, it was agreed that ECDC and WHO/Europe had a role to play in facilitating training of NIC staff in the skills required for the implementation of and sustainable support for NGS – including bioinformatics and pipeline development – and in exploring options for twinning. In addition, laboratories should continue

receiving support with Sanger and NGS through training (i.e. WHO collaborating centres) and twinning with laboratories using the same technology (platforms) and algorithms.

Action points:

- Identify objectives and describe outputs for the use of NGS in influenza surveillance;
- Further facilitate work and discussion around implementation of NGS;
- Continue to provide support with Sanger and NGS through training and twinning with laboratories using the same technology (platforms) and algorithms.

Session 2B: Epidemiology group session

The epidemiology group focused on training opportunities and needs, as well as issues related to the quality of influenza surveillance systems.

Training for epidemiologists among the network

Training is vital to ensure the generation of quality surveillance data and the sufficient use of surveillance data for public health action. Until now, the network has provided mainly laboratory-related training for staff of NICs while fewer activities have been available for influenza epidemiologists. This session therefore aimed to explore the wealth of information that exists on influenza training activities in the network and opportunities for collaboration across Member States. In the plenary session, the ECDC Virtual Academy (EVA) was highlighted and an existing course on abstract writing open to all was described. The ECDC exchange training initiative for senior public health experts was also described and expressions of interest invited. The third School of Influenza, held in Siena in 2016, was described. WHO/Europe supported 5 participants this year (https://isirv.org/site/index.php/component/content/article/9-events/334-summer-school-2). The question posed as to whether this initiative should be continued in future years and, if so, whether the curriculum should be adjusted given evaluation of feedback.

In discussion groups, participants reported that there is little formal training on influenza surveillance at national level and, where it is available, it is generally integrated within other public health training or "on-the-job-training". The benefits of such training might be improved by including training in compliance and data quality. Member States expressed the need for training of clinicians on influenza vaccine and influenza surveillance; a number of countries have online materials which could be shared via an appropriate platform and which can be translated into English and Russian. In addition, clinicians might benefit from the development and dissemination of a digest of key policies and papers. It was suggested that clinicians may also be motivated by a sense of participation in global surveillance. With the forthcoming 65th anniversary of the WHO Global Influenza Surveillance and Response System (GISRS) in 2017, there might be an opportunity to harness this. Proposals for a mentoring/exchange programme and a summer school for eastern European countries were popular and should be explored with facilitation from WHO/Europe and ECDC.

Monitoring and evaluation of influenza surveillance

Regular monitoring and evaluation of influenza surveillance is important for countries to understand the functioning of the system, for identifying data quality issues and potential duplication, and for providing recommendations for improving quality and efficiency. Evaluations also help assess whether a system delivers useful public health information and is meeting its stated objectives. In the plenary sessions, a newly developed WHO/Europe Microsoft Excel tool for assessing sentinel influenza surveillance was described. This tool was based on an approach developed by the US CDC and further refined using the Delphi technique to build a consensus on scoring with input from the network. A new WHO/Europe tool to assist in selecting sentinel sites for influenza surveillance was also described. Country level experiences of implementing new systems and the importance of system evaluation were also shared.

In working group discussions, many countries noted that they do not perform routine in-depth evaluation of the quality of influenza surveillance systems, but instead apply an ad-hoc approach to focused evaluations (e.g. sensitivity of ICU reporting compared with other sources, acceptability of

surveillance to clinicians). Many countries reported performing routine automated monitoring of surveillance data (including quality checks, timeliness and completeness) and some countries reported performing regular site visits to assess data quality. Perceived barriers to evaluation included lack of time or funding, being seen as a low priority, and high turnover of physicians involved in sentinel surveillance.

It was agreed that developing influenza specific indicators (e.g. timeliness, completeness, sensitivity etc.) for routine evaluation using existing materials (i.e. generic or flu specific guidance for evaluation and the existing tools) should be explored. However, there were mixed opinions regarding adapting a common approach to quality evaluation because approaches might need to be tailored to the system.

Action points:

- Continue to support participation from the network to the Sienna summer school on influenza, or similar training programs, as well as explore the development of a senior exchange programme to facilitate practical epidemiological training for influenza surveillance beyond the EU;
- Encourage and support countries to use the WHO/Europe sentinel site assessment tool to assess their influenza surveillance;
- Further explore the development of influenza specific indicators to evaluate the quality of influenza surveillance at the national and site level as well as development of a tool to assess national influenza surveillance systems.

Session 3. Seasonal influenza risk assessment

I. ECDC 2015–2016 seasonal influenza risk assessment for EU/EEA countries

René Snacken, ECDC, reported that since 2009, ECDC has conducted an annual early season risk assessment of seasonal influenza in EU/EEA countries using a survey-based approach and involving expert opinion from the network.

The ECDC seasonal influenza risk assessment for EU/EEA countries first identifies risks to be assessed and estimates the possible impact and the likelihood that they would occur in countries that had not yet been affected by influenza. The annual risk assessment allows to better manage identified risks and to optimise risk communication. The risk assessment used surveillance data from primary care and hospitals reported by first affected countries to ECDC and the European Reference Laboratory Network for Human Influenza (ERLI-Net); responses to a country-level questionnaire to assess the interim impact of influenza on a national level in terms of epidemiology, circulating viruses, severe outcomes and aspects related to influenza vaccine; and a number of other information sources.

The ECDC risk assessment found that the influenza season started in the Netherlands and Sweden, and that influenza A(H1N1)pdm09 predominated at the beginning of the season in most of the EU/EEA countries. As opposed to the previous season, where severe disease and mortality were more likely to occur among the elderly, in the 2015–2016 season, severe disease due to influenza was more likely to occur in middle-aged adults. Regarding fitness of vaccine strains compared to circulating strains, the assessment found that despite a good antigenic match with circulating A(H1N1)pdm09 viruses, it was uncertain if vaccine effectiveness could have been compromised by observed genetic changes of circulating A(H1N1)pdm09 viruses. For future years, timeliness of the assessment could be improved for instance with e-alerts from the scientific literature and the questionnaire that could be shortened or filled in via an on-line application.

II. WHO/Europe 2015–2016 seasonal influenza risk assessment for the European Region

Caroline Brown, WHO/Europe, presented the rapid risk assessment of the 2015–2016 influenza season. The assessment was conducted due to the earlier and more sudden rise of severe cases of influenza in eastern European countries in late 2015/early 2016 compared with previous seasons, and was based on the WHO manual for the rapid risk assessment of acute public health events (http://www.who.int/csr/resources/publications/HSE_GAR_ARO_2012_1/en/)

This assessment incorporated some of the same data sources as the ECDC assessment as it also used data available on Flu News Europe, but there were some differences, particularly with regard to the scope of the assessment, which included 50 of 53 European Region Member States. The assessment was developed through the use of a WHO manual on rapid risk assessment of acute public health events that offers guidance on rapid and defensible decision-making though a systematic process of event detection, risk assessment and communication to stakeholders and the public. Three components were evaluated: hazard (clinical and virological indicators); exposure (epidemiology of infection, susceptibility, population immunity, vaccine effectiveness and transmission); and context (socioeconomic, programmatic).

The WHO assessment identified a sharper and earlier rise in severe cases in countries of eastern Europe compared to the previous season. A higher proportion of adults under 65 years was more frequently affected compared to adults above 65 years in the early part of the season. The more severe cases among younger persons at the start of the season were likely due to the high predominance of A(H1N1)pdm09. However, the assessment could not predict how severe the remainder of the season would be. A number of questions remained, including the role of age, socioeconomic factors, and health systems in the early patterns of influenza in Europe (add links to WHO EURO website and to IRV paper).

Group session on risk assessment

Participants in small groups discussed the potential for a joint ECDC-WHO/Europe risk assessment in future influenza seasons. For now, most countries in the region perform ad hoc risk assessments when issues arise. Sometimes these assessments are topic-specific. There is a need for tools and a template in order that risk assessments can be standardized. Ideally, national risk assessments should be shared regionally and globally.

Country representatives described types of information that would be critical for the assessment. Population immunity – information about pre-season immune status in the population – would be important to know, yet difficult to obtain. In addition, influenza vaccine coverage by year, including breakdowns by age and risk groups, would be helpful. Assessments should include information regarding the clinical disease caused by circulating viruses. The match between the vaccine strain and circulating viruses should be included in the assessment, as well as information about any unusual circulating viruses. Both the clinical impact of the influenza season in terms of disease incidence and age groups affected as well as the severity of the season should be assessed.

It was noted that Regional assessments should be interpreted cautiously; as even in bordering countries several factors influencing the influenza season may vary, including health seeking behaviour.

In general there was support for an early season risk assessment conducted jointly by WHO/Europe and ECDC, but participants felt that additional risk assessments should be performed only in exceptional situations. The group also felt that it would be helpful to update and validate risk assessments later in the season and to establish a platform for Member States to regularly share information on certain aspects of the influenza season, including severity, and the identification of unusual viruses, e.g. through EPIS, EZcollab or the Flu News Europe platform.

Some voiced also to have a summary and assessment of the influenza season in the southern hemisphere . and a telephone conference for the countries before the start of the northern hemisphere season.

Finally the group felt that the joint risk assessment should be tailored to the target audience with regards to style and should be completed early in the season, ideally in January, so that the findings can be applied. The risk assessment should be reported in Russian and English and include clear definitions and terminology.

Action points:

- WHO/Europe and ECDC will develop a regional risk assessment methodology based on the current ECDC methodology and WHO manual for the rapid risk assessment of acute public health events;

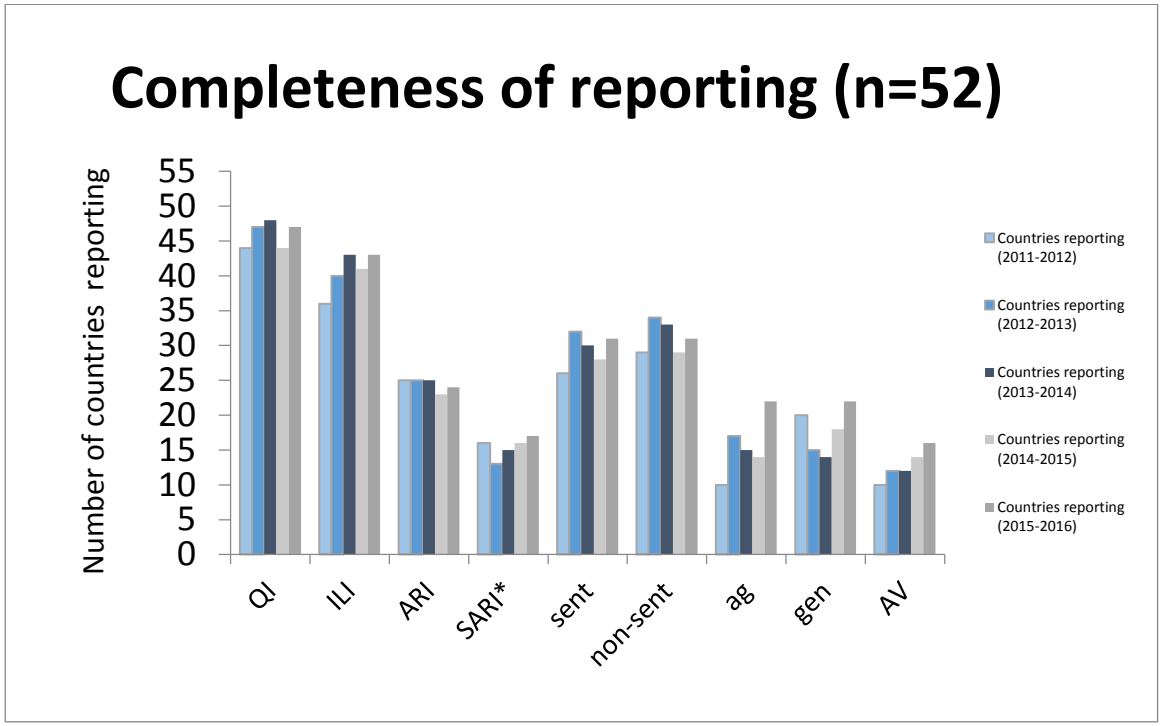
- Future early season regional risk assessments will include countries from the entire WHO European Region; later in the season they will be validated based on concrete measures where available (e.g. influenza intensity levels) and updated if needed;
- Regional risk assessments additional to the early season assessments should be performed only in exceptional situations;
- Provide training on the WHO manual for the rapid risk assessment of acute public health events to enable countries to conduct their own risk assessments;
- WHO/Europe and ECDC will establish a mechanism to enhance sharing of information including risk assessments on the influenza situation in countries, including the use of Flu News Europe.

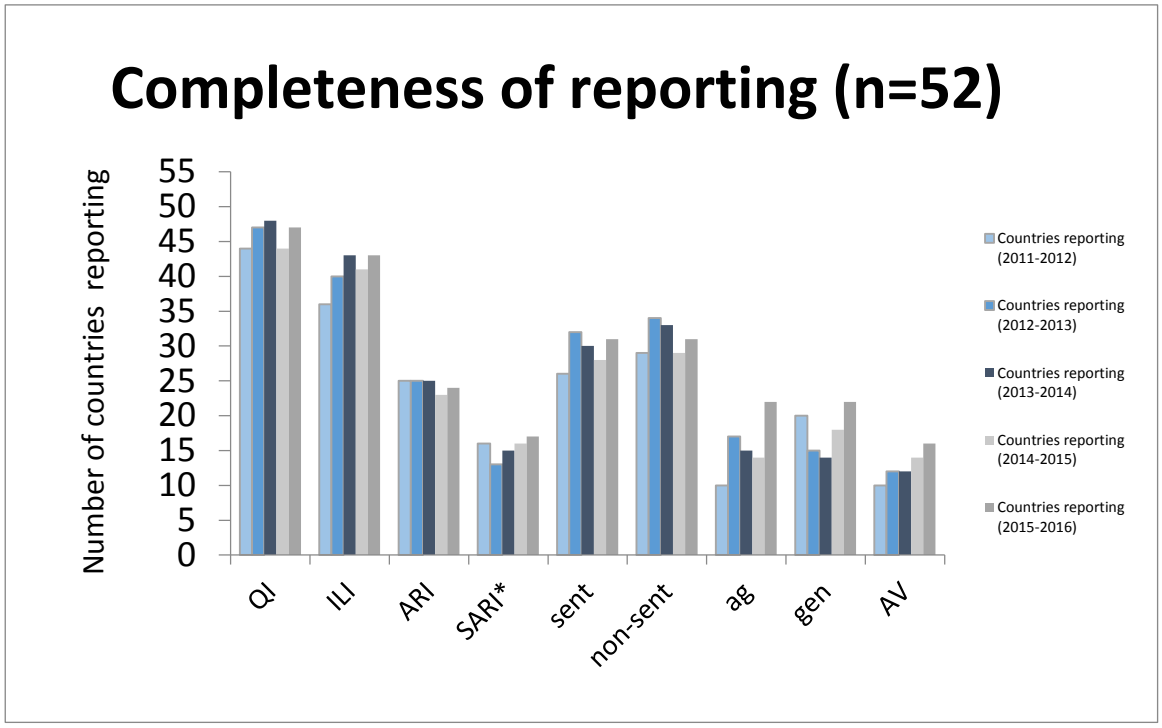
Session 4: Improving influenza surveillance

Overview of Flu News Europe reporting in 2015–2016, changes in 2016–2017 and country profiles

The second season of Flu News Europe has been completed. The number of countries reporting data for at least 80% of the weeks between week 40 and week 20 has remained quite stable over the past five years (Fig. 1). Currently, 27/50 countries report a threshold for ILI and/or ARI incidence. For the 2015–2016 influenza season, 14 countries had a threshold for ILI, eight had a threshold for ARI, five had thresholds for both, and 23 countries did not have thresholds for either. Virus detection data were available from all countries, and virus characterization data were available from some countries. Data from patients hospitalized due to influenza were reported from 17 countries.

Regarding the quality of the data reported, there are a number of gaps: not all countries report data on time to be included in Flu News Europe, historical data is missing from some countries, there is currently very limited reporting of denominators for hospital surveillance data and epidemiological data are often incomplete for the case-based SARI data.





Abbreviations x-axis: QI: qualitative indicators geographic spread, intensity and trend; ILI; influenza-like illness; ARI: acute respiratory infection; SARI: hospital-based surveillance covering case-based or aggregated data on SARI cases; sent: sentinel virological data; non-sent: non-sentinel virological data; ag: antigenic characterization data; gen: genetic characterization data. AV: antiviral resistance data.

Flu News Europe is being continuously improved. The main change for the 2016–2017 influenza season is the implementation of maps showing data from the qualitative indicators. WHO/Europe is in the process of finalizing the 2015–2016 country influenza surveillance profiles.

Action points:

- WHO/Europe and ECDC should conduct regular, automated data checks for the timeliness and completeness of data reported to TESSy.
- WHO/Europe and ECDC should work with countries to increase the number of countries reporting data from severe cases of influenza to Flu News Europe;
- WHO/Europe and ECDC will continue to make improvements to Flu News Europe based on feedback from the network and other sources;
- Updated country influenza surveillance profiles for the 2016–2017 influenza season will be published by November 2016.

Topic 1: MEM thresholds to assess severity, and improving the quality of severe disease surveillance data

The aim of the group session was to discuss the piloting of thresholds for sentinel SARI data using surveillance data from the country's previous seasons. This threshold would be used to assess the severity of the season and may also contribute to determining the start and the impact of an influenza season.

In addition, it was discussed how the quality of data from surveillance of severe disease could be improved.

Improving the quality of severe disease surveillance data

In Europe, countries report either case-based (the majority being laboratory-confirmed influenza) data from hospitalized cases, or aggregated data from Severe Acute Respiratory Infections (SARI) from sentinel hospitals. Tamara Meerhoff introduced how severe disease surveillance data are important for monitoring and assessing the impact of influenza on high-risk populations, the severity of seasonal outbreaks, and future global pandemics. To understand risk factors, severity, impact, and clinical outcomes of influenza-associated disease, detailed epidemiologic data collection and standardized sampling strategies are required.

The two datasets that are currently used in Europe both have their strengths and limitations. The case-based data, largely based on countries reporting data on influenza-positive cases only, can help to identify risk factors for a severe outcome, but on the other hand does not routinely collect data on negative cases and denominator. The aggregated SARI data does collect information on negative cases and potentially can look at the broader spectrum of SARI and the proportion of cases that are infected by influenza and/or other respiratory pathogens. The disadvantage is that the aggregated format does not allow more detailed risk factor analyses.

Regarding the use of data and reports from severe disease surveillance, countries use TESSy and Flu News Europe data to compare their national data within a broader European context. Flu News Europe should provide a synopsis for influenza activity for the region, but it should also include links to other useful sources like national reports and web sites. It would be helpful to indicate each week the number of countries that reported severe disease surveillance data.

National data protection/data sharing legislation and policies may be barriers to data reporting to, and data sharing from, TESSy.

In addition, some countries are implementing influenza surveillance systems but not yet uploading data, because they either do not have sufficient data or they do not have adequate time or resources to extract data. Communication should be maintained with these countries to facilitate integration of their data into the broader reporting system.

Action points:

- Work with representative countries to obtain case-based data and/or virological data by age group from SARI data;
- For case-based hospital data, work with countries to obtain denominator data and to improve data completeness;
- Present a more integrated analysis of severe influenza activity in the Region on Flu News Europe;
- Countries will be asked to provide links to national influenza bulletins so that they can be made available through the Flu News Europe website;
- WHO/Europe and ECDC will explore with the network whether the issue of national data protection legislation, and policies on data sharing, are acting as barriers to data reporting to TESSy.

MEM thresholds to assess severity and improve the quality of severe disease surveillance data

Tomás Vega introduced how the Moving Epidemic Method (MEM) has shown to be a reliable method for modelling ILI and ARI historical data to establish national epidemic and intensity thresholds, allowing for comparisons of influenza seasons over time within and between countries. Recently, MEM has been tested using Severe Acute Respiratory Infections (SARI) data from selected European countries with the aim of assessing and comparing the severity of influenza and other respiratory infections within countries over time.

The working groups agreed that the MEM concept was useful and theoretically possible to implement in several countries. However, this is not the only method for assessing severity. The MEM approach was found to be useful for determining intensity thresholds, but appeared less robust for epidemic thresholds. The meaning of and terminology for the intensity, severity and impact, however, needs to be better defined. In addition, SARI data should be validated for correlation with influenza using laboratory detections.

The usefulness of the system will depend on the quality of the data. The suggestion was made that a small number of countries in the European region should pilot the approach first in the background, and then, following a review of the pilot, to decide whether to include it as part of routine surveillance on the Flu News Europe website. The application of this approach could help improve communication with the public and clinicians regarding severity of an influenza season.

Other approaches to evaluating severe disease could include using the number of fatal cases, the case fatality ratio, and surveillance of cases undergoing extracorporeal membrane oxygenation (ECMO). Several countries expressed interest in pilot testing the MEM approach for severe disease during the next influenza season.

Action points:

- Countries are encouraged to pilot the use of MEM for establishing epidemic and intensity thresholds setting for severe disease and present the findings at the next annual meeting;
- WHO/Europe and ECDC will provide information to countries on the use and interpretation of MEMs, and on how to communicate the results.

Topic 2: Generation of genetic characterization data for risk assessment

In combination with antigenic characterization data, genetic characterization data are a key component in the development of WHO recommendations on the composition of seasonal influenza virus vaccines. Genetic characterization reveals how influenza viruses are related to one another, how the viruses have evolved over time. Genetic characterization can also indicate how well the influenza vaccine might protect against circulating viruses and provide information on genetic variations conferring reduced antiviral drug susceptibility, as well as on adaptations in animal influenza viruses that may enhance transmission to, and among, humans. Taken together, this information is important to understand the genetic make-up of circulating influenza viruses and their propensity to cause severe disease, making genetic characterization data a critical component of risk assessment. The group considered risk assessment of zoonotic infections and outbreaks to be most critical, while risk assessments of seasonal influenza are valued as situation reports.

Group discussions focused on identifying possible triggers for risk assessment based on antigenic and genetic characterization data, and addressed issues of timelines for producing and sharing this information. There could be consideration of the development of an absolute measure, such as a 3%

change in the HA sequence, or the number of viruses in a particular cluster, to define the clade and subclade. Other criteria for action could include seeing an eight-fold reduction in the titre of the post infection ferret antiserum against the vaccine virus compared to homologous titre and the observation of large numbers of viruses within a subtype or lineage showing four-fold reduction. It was noted that in the future, use of human sera and monoclonal antibodies may replace/backup ferret antisera. Regarding decisions around criteria for initiating a risk assessment, the group considered it to be important to strengthen interactions between epidemiologists and virologists. As no defined criteria currently exist regarding the level of antigenic drift or other factors that would trigger action, global guidance on this issue would be useful.

Regarding data on susceptibility of influenza viruses to the neuraminidase class of antiviral drugs oseltamivir and zanamivir (AV data), the groups considered it useful to set a threshold for action in the case of an AV-resistant virus variant being detected. A previous WHO consultation and working group suggested a threshold for action of between 5-25% resistant viruses among circulating influenza viruses[5].

Antiviral susceptibility data are analysed weekly and included in Flu News Europe. If the resistance level is increasing in one country, this information should be shared with the network, as this may trigger actions in neighbouring countries. The country comment tab on TESSy could be used for this purpose, and information shared through Flu News Europe.

In the case of antiviral resistance being detected in a patient or among circulating viruses, data should be obtained regarding the use of antivirals among resistant case-patients. Additionally, epidemiologic investigations should be initiated and enhanced testing for resistance performed if indicated. Findings should be reported to the ministry of health and WHO. When AV resistant viruses have been detected, to a level that public health action is considered necessary, mechanisms should be in place to inform relevant institutions, including those responsible for antiviral treatment guidance and for seasonal influenza vaccination programs.

Regarding the routine use of antigenic and genetic characterization data generated by the network, it was agreed that the ideal timeframe for submitting data for the purposes of the February WHO Consultation on the Composition of Influenza Virus Vaccines (VCM) would be to upload genetic characterization data to TESSy by the end of January. Country influenza surveillance summary reports should be submitted 10 days before VCM. Any unusual findings should always be shared immediately with the WHO Collaborating Centre[6], even if this is just an issue regarding one virus. Attention should also be given to the end of season: specimens collected and tested from February through April should be sent by early May to the WHO Collaborating Centre. Antigenic and genetic data should be used to prioritize samples, including those showing any unusual patterns, to be sent to the WHO collaborating centres.

Additional to the weekly presentation of data in Flu News Europe, ECDC publishes monthly reports on the characterization of influenza viruses[7] that summarize genetic and antiviral susceptibility data

[5] Hurt, A. C., T. Chotpitayasunondh, N. J. Cox, R. Daniels, A. M. Fry, L. V. Gubareva, F. G. Hayden, D. S. Hui, O. Hungnes, A. Lackenby, W. Lim, A. Meijer, C. Penn, M. Tashiro, T. M. Uyeki, M. Zambon, and W. H. O. Consultation on Pandemic Influenza A Virus Resistance to Antivirals. 2012. 'Antiviral resistance during the 2009 influenza A H1N1 pandemic: public health, laboratory, and clinical perspectives', Lancet Infect Dis, 12: 240-8.

[6] World Health Organization. WHO Collaborating Centres for influenza and Essential Regulatory Laboratories. Geneva: WHO; 2016 [updated 31 March 2016]; Available from: http://www.who.int/influenza/gisrs_laboratory/collaborating_centres/list/en/#.

[7] European Centre for Disease Prevention and Control. Influenza virus characterisation, summary Europe ECDC; [cited 2016 1 July]. Available from:

submitted by NICs to TESSy and provide detailed characterization data generated by WHO CC London based on the analysis of viruses received from NICs in the EU/EEA countries. It was discussed that it would be useful for both interpretation of data on Flu News Europe and for risk assessment to include data from all countries in the WHO European Region in the monthly reports.

In order to provide individual NICs with a context for their characterization results, and to look for possible patterns or discrepancies in these results, it was considered to be important to perform routine analysis of the European virus characterization data in TESSy and to produce bi-yearly reports similar to the reports previously prepared by the ERLI-Net Virus characterisation and Molecular diagnosis and sequencing Task Groups. These reports included characterization reports by country by week, number of characterized viruses reported in the period by week, etc., as well as interpretation of the data and comparison with previous seasons. Between 2011 and 2013, the task groups made up to 3 genetic and antigenic characterization reports per year published on ECDC's extranet accessible to all ERLI-Net members. In 2014–2015 at least one report was prepared annually by ECDC and network members. In 2016, an early characterisation report was shared with the network and WHO VCM in February 2016 and with the network in June before the annual meeting.

Regarding the threshold difference in antigenic or genetic properties of circulating viruses for introducing a new antigenic or genetic reporting category in TESSy, there was consensus that it is best to continue as previously: decisions should be made after the September southern hemisphere WHO VCM. New categories should be introduced as soon as possible after the start of the season.

Action points:

- Develop criteria that would trigger risk assessment as well as thresholds for action related to AV use when resistant viruses are circulating;
- WHO/Europe, ECDC and WHO CC London to discuss the feasibility of expanding both the monthly ECDC influenza virus characterization reports and ERLI-Net characterization reports to include data from all NICs that characterise and share influenza viruses; (
- Encourage NICs to report antigenic and genetic characterization data to TESSy by the end of January, so the ERLI-Net characterization report could be prepared and shared with the WHO GISRS before the Northern Hemisphere VCM;
- Develop a mechanism (e.g. Country comment tab on TESSy) for countries to share with the network information when an increase in antiviral resistance is detected.

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http://ecdc.europa.eu/en/healthtopics/seasonal_influenza/epidemiological_data/Pages/Influenza_virus_characterisation.aspx.

Session 5: RSV

Respiratory Syncytial Virus (RSV) is the leading viral cause of acute lower respiratory tract infections, including bronchiolitis and pneumonia, in infants and young children. RSV vaccines for maternal or childhood immunisations are progressing past phase two trials and are expected to be available on the markets within the coming 4-10 years. Phase 3 trials in the elderly are also ongoing. Due to the rapid development of RSV vaccines, RSV surveillance programmes need to be considered to document the effect of possible vaccine introduction.

I. RSV: burden of disease, clinical signs, vaccine development

Thea Kølsen Fischer, SSI, Denmark, reported that RSV is the most common cause of acute lower respiratory infection in children aged less than five years worldwide, and that the importance of RSV has been acknowledged for decades. In adults, asthma, congestive heart failure or chronic obstructive pulmonary disease, and immunodeficiency are risk factors for RSV infection or severe RSV. Colleagues in Denmark are currently conducting a registry study to assess the burden of severe RSV disease. Age-specific RSV incidence rates and hospitalizations, as well as and direct and indirect health care system costs associated with RSV disease will be published soon.

II. Targeting RSV – antivirals and vaccine development

Kari Johansen, ECDC, reported that there are a number of vaccine and antiviral candidates currently in the developmental pipeline and that two vaccine candidates are already in phase 3 trials in pregnant women and phase 3 trials in the elderly. A concept paper detailing the preparation of a guideline on the evaluation of medicinal products indicated for the treatment and prophylaxis of respiratory syncytial virus (RSV) infection is under development by the European Medicines Agency. It is currently unknown when the first RSV vaccine will become authorised and for which target group since there are several strategies being pursued by the manufacturers.

III. Update on WHO activities

Wenqing Zhang reported that surveillance is required to prepare for the arrival of RSV vaccines and to ensure evidence-based policies on vaccination. Guidance for RSV surveillance is being finalized by WHO. Immediate objectives are to understand epidemiologic and virological features of RSV circulation globally and to generate evidence on seasonality and on risk groups in order to support vaccination policy development. Mid- and long- term objectives are to extrapolate burden associated with RSV and to evaluate the impact of RSV vaccines. A global pilot for up to three years will be conducted in 15 countries and will assess feasibility, generate evidence to adjust surveillance strategies and develop a better understanding of associated costs. Hospital-based surveillance will use the global SARI case definition (with and without fever), while community-based surveillance will use the ARI case definition and, in infants aged 0-3 months of age, will include apnoea and sepsis. Sampling quotas from hospital-based surveillance – supplemented using community based surveillance to reach minimum levels, as needed – will be used to ensure a quarter of samples are from children aged less than six months and from those aged 65 years and over as part of continuous year-round sampling.

IV. Surveillance options: WHO pilot country Germany

Brunhilde Schweiger, Robert Koch Institute, Germany, reported that RSV surveillance has been integrated into national influenza surveillance (virological and syndromic) using the ARI case definition in Germany. ILI and ARI can be used as case definitions for swabbing. Surveillance has provided timely data on RSV circulation, and age distribution. These data will also be used to understand the burden of disease.

V. Use of EuroFlu data to determine burden of disease due to RSV

Jonathan Nguyen-Van-Tam, University of Nottingham, United Kingdom, reported that a retrospective ecological study was undertaken to describe the epidemiology of RSV and to investigate the burden of this infection using sentinel and non-sentinel surveillance data in the European Region Member States between 2006 and 2012. Negative binomial regression against ILI and ARI, stratified by country, RSV season, age group (all ages, <5, >64) was conducted. A maximum of 34% of ILI variation was explained by RSV, but much lower in most seasons (mainly <10%) and a maximum of 15.5% of ARI variation explained by RSV, but usually <10%. Current surveillance systems using ARI or ILI may not be optimal for RSV and may underestimate burden; there are insufficient data altogether in >65s.

VI. Update on ECDC RSV activities

Eeva Broberg, ECDC, reported that RSV detection data is collected in TESSy (32/53 countries, most with infrequent reporting). ECDC hosted an expert meeting on RSV burden and surveillance in November 2015 and is collaborating with WHO headquarters and WHO/ Regional Office for Europe on global surveillance of RSV, and with the Innovative Medicine Initiative call on RSV burden of disease.

Session 6: Seasonal influenza vaccine

I. Models for predicting the fitness of influenza viruses: application to influenza vaccine strain selection

Michael Laessig, University of Cologne, Germany, reported on possible fitness models to be used for prediction of upcoming dominating clades in order to inform the influenza vaccine composition selection. Genetic, phylogenetic tree, antigenic, and epidemiological data are all integrated into a model for the prediction of genetic and anti-genetic evolution. In general, sequence data of up to ~2000 strains per year are combined into the model, along with information about the protein structure and host interactions of the HA. Data about mutations that decrease protein stability and binding affinity and, respectively, decrease and increase fitness, are also included. Evolutionary trees are constructed from strain sequences.

Such fitness models can be used for both the early detection of high fitness antigenic variants (rapid growth is evidence of high fitness) and for the prediction of clade evolution and possible dominance and consequently vaccine effectiveness, and therefore ultimately can provide useful information for the process of vaccine strain selection. The accuracy of predictions depends on the joint availability of sequence and antigenic data, and timely sample analysis and reporting. Using historical data, a fitness model based on sequence and antigenic data successfully has predicted influenza evolution. Because this model can provide early identification of new antigenic variants, it is used/expected in future to be used for the WHO VCM to inform predictions for the following year and vaccine strain selection.

II. Results influenza vaccine effectiveness studies 2015–2016 in EU/EEA

Amparo Larrauri from the EU/EEA I-MOVE network presented data for the 2015–2016 influenza season from the I-MOVE collaboration – a multicentre case control study measuring influenza vaccine effectiveness following use of inactivated seasonal influenza vaccines in EU/EEA countries. Data were collected from general practitioners in 12 study sites in the following countries: Croatia, France, Germany, Hungary, Ireland, Italy, the Netherlands, Poland, Portugal, Romania, Spain, and Sweden. For the first time laboratory samples from nine study sites in the following countries France, Germany, Hungary, Ireland, Netherlands, Portugal, Romania Spain and Sweden were selected to undergo more in depth genetic and antigenic analysis in order to evaluate virus heterogeneity in the region and relate vaccine effectiveness to virus clades causing disease.

Over 10 000 records were included in the I-MOVE vaccine effectiveness analysis this year. This is one of the largest sample sizes ever for the network. Preliminary results (late season has delayed final calculations) showed a statistically significant vaccine effectiveness (VE) against influenza A(H1N1)pdm09, but not against influenza B viruses. VE estimates varied by age group for both A(H1N1)pdm09 and B. VE against influenza B was particularly low among children. A mismatch in the circulating B strain compared to the B virus component likely explains this mismatch; nearly all circulating B viruses were part of the Victoria lineage, while B Yamagata lineage was included in the 2015–2016 northern hemisphere trivalent seasonal influenza vaccine. It was pointed out that children that had received the quadrivalent LAIV (with two B-strains) were not included in this analysis. Most A(H1N1)pdm09 viruses fall within a new genetic clade 6B.1.

III. Update on seasonal influenza policies and uptake in EU and EEA countries

Jolita Mereckiene from the VENICE network reported that the results from the VENICE multicountry collaboration on national influenza vaccine policies and coverage showed that during the 2014–2015 influenza season, vaccination coverage for the elderly varied but was suboptimal in most countries. The VC among elderly population reported from 26 EU/EEA countries varied from 1% in Estonia to 77.4% in UK-Scotland (median 45%) and did not meet the WHO and EU targets of 75% in almost all countries. Coverage for health care workers, children and pregnant women was generally low with the exception of a few countries. Median uptake in the 17 countries reporting coverage for HCWs was ~25%. Vaccination coverage trends for most risk groups were either static or slowly decreasing.

IV. Improving influenza Vaccine Virus Selection: New Technologies and Approaches, Dan Jernigan (Director, Influenza Division, CDC, Atlanta, USA)

Dan Jernigan, Director, Influenza Division, CDC, Atlanta, USA reported on new approaches being taken to improve influenza virus strain selection. The recent antigenic drift of influenza A(H3N2) viruses during the 2014–2015 influenza season prompted a number of meetings in the US to discuss ways in which virus strain selection could be improved. Areas of focus included surveillance and virus Collection, virus Characterization, candidate Vaccine Viruses (CVV), vaccine potency assays, decision-making, communication and coordination, and new vaccines. The Global Influenza Surveillance and Response Network (GISRS) is being expanded, and new techniques are being developed to characterize haemagglutinin and neuraminidase proteins. Efforts are being made to increase the production scale and techniques for candidate vaccine viruses. The techniques for real-time genomic and antigenic virus fitness forecasting are improving. Efforts are being made to improve communication among WHO Collaborating Centres, other GISRS labs, and manufacturers. Finally, there are new vaccines in the pipeline, that will aim to be more broadly protective and longer lasting, although these will take some time to be developed.

V. Improving influenza vaccination coverage in health care workers

James Brown, Head of Communications, Engagement & Marketing, Liverpool Community Health NHS Trust, United Kingdom reported on high impact, low cost behavioural campaigns to improve influenza vaccine uptake among health care workers in the National Health Service system in the United Kingdom using traditional vaccination campaigns engaging some staff in posters, leaflets but also as champions for the campaign complemented by social media activities to engage all staff.

The work set out to identify staff perceptions of influenza vaccine and identify key “nudges” – points that would resonate among healthcare considering getting influenza vaccines. Despite many myths and misconceptions among health care workers regarding the need to be vaccinated against seasonal influenza, positive messages conveyed using different avenues, including social media, helped increase vaccination uptake by about 25% from 45 to 70%.

Action points:

- ECDC and WHO/Europe will continue support to the influenza strain selection process by stimulating countries in the region to make isolated and sequenced influenza strains

available as early as possible to the WHO CC laboratory in the UK before the end of January each year.

- ECDC and WHO EURO to continue support to monitoring seasonal influenza vaccine coverage in risk and target group in countries with such policies and universal coverage in children in countries with such policies.
- ECDC and WHO EURO to continue support to monitoring seasonal influenza vaccine effectiveness by age and virus subtype/lineage (if possible even by clade).
- ECDC and WHO EURO to continue support to increase uptake of seasonal influenza vaccination in health care workers through the use of the newly published WHO TIP FLU Guidance and the new online ECDC course Influenza Vaccination of Health Care Workers – can uptake be improved?

Evaluations

Of the 138 participants, 93 (67%) returned an evaluation form.

Many valuable comments with suggestions for improvements were received and overall the evaluations are very satisfying. For example, the average response to the question "How would you rate the overall quality of the content of this meeting?" was 4.0, where 1 = Poor and 5 = Excellent. Only 16 respondents (17%) rated the quality of the content as less than 4 and the average rating for these 16 responses was 2.8.

Likewise, the average assessment of this year's meeting length was 2.9, where 3 = Just right.

This year's distribution between plenary sessions and working groups was respectively 58% and 42%. 18 people (19%) proposed alternative distributions as follows:

Plenary%	Working groups%	Number of proposers
30	70	1
40	60	1
42	58	1
45	65	1
50	50	2
60	40	1
65	35	1
70	30	3
75	25	1
80	20	6
Total:		18

The full results of the evaluation and all the comments received are presented in the Appendices.

Appendices

Evaluation results

Participants' comments

List of participants

Programme

Evaluation results

93 evaluation forms were received – 66 English and 27 Russian. The combined results are shown in Table 1.

Table 1: Evaluation results

	1 = Poor 5 = Excellent
The main objective was to focus on network activities and country surveillance systems. To which extent were they covered?	
Network activities	4,1
Country surveillance system	4,0
Proportion between plenary (P) and working groups (WG) was respectively 58% and 42%. Please rate.	3,9
How would you rate the overall quality of the content of this meeting?	4,0
How useful was this meeting for influenza surveillance?	4,1
Mark which were the 2 most useful sessions in your opinion.	1 = Most important 7 = Least important
Session 6: Seasonal influenza vaccine	1
Session 2: Parallel group work for virologists and epidemiologists	2
Session 3: Seasonal influenza risk assessment	3
Session 4: Improving influenza surveillance	4
Session 5: RSV	5
Session 7: Feedback from group sessions	6
Session 1: Opening session	7
	1 = Poor 5 = Excellent
How would you rate the overall administrative organization of this meeting?	4,4
How would you rate the overall meeting venue and facilities?	4,7
	1 = Too short 3 = Just right 5 = Too long
This year's meeting has been two whole days. Rate this year's meeting length.	2,9

Participants' comments

Table 2 to Table 5 list the evaluation comments made by participants in response to the following questions:

- 6. Name one important topic that was not covered during the meeting
- 10. Other

Table 2: Important topics not covered

Definition of surveillance (usefulness of NGS).
Antigene characterization issues.
Definition of flu parameters: severity, impact, seriousness – there is no clear definition of this.
Not enough focus on training and twining programs.
Serology.
Pregnant women vaccination against influenza coverage.
Pandemic preparedness.
More time dedicated to virological/laboratory issues on antigenic characterization, serological studies.
Vaccine effectiveness.
New technologies for antigenic characterization, genetic characterization.
Serology.
What will it take to have more countries to submit data in TESSy + GISAvD – Antiviral resistance denominator.
Seroprevalence studies in depth. Circulation of zoonotic influenza virus.
All sessions were excellent. Really hard to choose.
There should be more focus on severe flu disease.

Table 3: Important topics not covered – Russian responses

Новые методы диагностики гриппа в эпиднадзоре	New diagnostic methods for influenza in the surveillance system
Охвачены все главные направления	All main topics have been covered
Все вопросы охвачены	All issues have been covered
Прогноз эпидситуации, используя многофакторный анализ: клинико-эпидемиологических, вирусологических, генетических [данных], антигенную структуру, сопутствующие патологии, сезонность и др.	Forecasting an epidemiological situation using multivariate analysis: clinical, epidemiological, virological, genetic [data], [information on] antigenic structure, comorbidities, seasonality, etc.
Все вопросы охвачены	All issues have been covered
Популяционный иммунитет	Population immunity

Обзорный доклад о современных актуальностях в плане других инфекций, новые данные по противовирусным препаратам	A presentation with an overview of the current important issues regarding other infections; new data on antivirals
Повышение уровня готовности к пандемии: дополнительные элементы надзора	Pandemic preparedness improvement: additional elements for the surveillance

Table 4: Other comments

Concentrate plenaries more – maybe 1-5 days instead of 2 "days" across 3 days.
Fantastic location. But couldn't get hotel room cause last name was incorrect – also on name tag etc. * It's obvious that WHO EURO has strong ties to certain countries and they get more support. Also why is it always the same countries (e.g. Norway) doing country presentations? * Why were not all countries invited to WHO EURO's inf. charact. network meetings?
A bit too long sessions, esp. working groups. Wow, those translators were amazing!
Seems as though the network would like at least 1 activity which is harmonized across all countries, but how that will be accomplished was not terribly clear.
Very useful and well organized, thank you.
Working group facilitators should be much better prepared (epid.).
Overall this meeting was great. It is necessary to speak about an influenza as dangerous pathogen.
Working group facilitators not always prepared. Confusion regarding group work and purpose of GW.
Why not have two full days, instead of 1 full and 2 half days?
Comment on point 2 The proportion between plenary and working groups was fine. I was not satisfied with the way they were planned (virology). There was a lot of general discussion about the proposed questions and good points and suggestions/conclusions were certainly obtained. I would like that one part of the working group would be dedicated to resolve specific laboratory issues that were spotted during the season – how to overcome the problems, guidance from WHO CC and other labs. Comment on point 6 Molecular technology is progressing very fast and bring many benefits for diagnostics and for surveillance purposes. However, we should not neglect methods and information that only virus isolation and antigenic characterization and serological surveillance can give (regarding vaccine effectiveness etc.). Laboratories do meet many difficulties with this methods and more attention should be given to this topics. Thank you for a great meeting. Continuous discussions of problems and topics contribute to better influenza surveillance. Networking also improves the functioning of the surveillance system, as intra laboratory exchange of knowledge and experience occurs. All the best wishes for the future work.

Topics for WG not the most relevant/interesting: training/evaluation/risk ass./MEM. Exchange of ideas/examples of SARI surveillance in WG would have been useful + more in-depth disc of specific features of 2015-16 epidemic: age distr., severe cases on ICU etc. But overall meeting extremely useful!
Too many known topics and not enough benefit for the more than 3 days out of the office. 1.5 days next time?
Comment 1: The group work sessions were too long and too repetitive. Comment 2: The morning session of June 16th was the best!!!
Having 2 half days is useful! Enjoyed the off-site activity.
Should have been allocated more time for questions and discussion.
WG should be working together (at least some of participants) already before AM and then address more concrete topics at AM. This time WG questions were mostly focused to what ECDC and WHO need.
It was difficult to see the English slides from the other side of the room.
Great opportunity to network at breaks and lunch. Very nice evening event. Not enough time for discussion and Q & As.
WG on severe disease surveillance that I attended needed to be more structured and organized. Excellent wide range topics overall. Informative meeting.
1. Explanation of group discussions was poor. 2. [Comment removed – Ed. Point noted.] 3. Timing on last day should have left time for questions.

Table 5: Other comments – Russian responses

Совещание прошло в новом формате обсуждения важных тем, необходимых для практической работы. Полезен обмен опытом.	The meeting has had a new format for discussing important topics that are needed for the day-to-day work. Experience sharing was also useful.
Благодарю всех организаторов	I would like to express my gratitude to all organizers
Следующее совещание провести в Праге	To hold the next meeting in Prague
Комментариев нет	No comments
Было бы полезно, чтобы участвовали и клиницисты из различных звеньев медицинского обслуживания: первичное, среднее и высшее звено, касаясь вопросов диагностики, вакцинации, использования антивирусных препаратов и т.п.	It would have been useful to invite clinicians from different parts of the health care delivery system: primary care staff, nurses, and doctors – to discuss issues on diagnostics, vaccination, antiviral use, etc.
Комментариев нет	No comments
Для презентаций дано мало времени	Little time was given to presentations
Необходимо больше методических рекомендаций	More methodological guidelines are needed

List of participants

Including WHO and ECDC participants, a total of 155 people attended this year's Annual Meeting.

Table 6: Participants

Country/organization	Family name	First name
Albania	Hasibra	Iris
	Simaku	Artan
Armenia	Sargsyan	Shushan
Austria	Popow-Kraupp	Therese
Azerbaijan	Abdullayeva	Nazakat
	Salimov	Oleg
Belarus	Gribkova	Natalia
	Karaban	Inna
Belgium	Bossuyt	Nathalie
	Thomas	Isabelle
Bosnia and Herzegovina	Kojic	Dusan
	Musa	Sanjin
	Rodić-Vukmir	Nina
Bulgaria	Georgieva	Teodora
	Korsun	Neli
Croatia	Katičić	Ljiljana
	Medić	Alan
Cyprus	Karagiannis	Christos
Czech Republic	Havlickova	Martina
	Kynčl	Jan
Denmark	Grove Krause	Tyra
	Kolsen Fischer	Thea
	Trebbien	Ramona
	Vestergaard	Lasse
Estonia	Sadikova	Olga
	Simonlatser	Grethel
Finland	Haveri	Anu
	Ikonen	Niina
	Murtopuro	Satu
France	Bonmarin	Isabelle
	Enouf	Vincent
	Lina	Bruno

Country/organization	Family name	First name
Georgia	Machablishvili	Ann
	Tarkhan Mouravi	Olga
Germany	Buda	Silke
	Schweiger	Brunhilde
	Tolksdorf	Kristin
Greece	Kossyvakis	Thanos
	Mouratidou	Elisavet
	Vasiliki	Pogka
Hungary	Biro	Krisztina
	Csohan	Agnes
	Jankovics	Istvan
	Kis	Zoltan
	Molnar	Zsuzsanna
	Rózsa	Mónika
	Szalai	Baliat
	Toth	Judith
Ireland	Domegan	Lisa
	Duffy	Margaret
	Mereckiene	Jolita
	O'Donnell	Joan
Israel	Freedman	Aharona
	Mandelboim	Michal
Italy	Castrucci	Maria Rita
Kazakhstan	Medetov	Zhumagul
	Nussupbayeva	Gaukhar
	Sultanova	Meirim
Kyrgyzstan	Otorbayeva	Dinagul
	Saparova	Gulbarchyn
Latvia	Nikiforova	Raina
	Zamjatina	Natalija
Lithuania	Griškevičius	Algirdas
	Skrickiene	Asta
Luxembourg	Opp	Matthias
Malta	Barbara	Christopher
	Melillo Fenech	Tanya
Montenegro	Rakocevic	Bozidarka
	Vratnica	Zoran

Country/organization	Family name	First name
Netherlands	de Jong	Jan
	Meijer	Adam
	Van Der Hoek	Wim
Norway	Bragstad	Karoline
	Hauge	Siri Helene
	Hungnes	Olav
Poland	Cieślak	Katarzyna
	Paradowska-Stankiewicz	Iwona
Portugal	Guiomar	Raquel
	Rodrigues	Ana Paula
Republic of Moldova	Eder	Veronika
	Gheorghita	Stefan
	Spinu	Constantin
Romania	Ivanciuc	Alina-Elena
	Popovici	Odette
Russian Federation	Burtseva	Elena
	Sominina	Anna
Serbia	Dimitrijevic	Dragana
	Filipovic-Vignjevic	Svetlana
Slovakia	Hudecova	Helena
	Ticha	Elena
Slovenia	Berginc	Nataša
	Lamovsek	Mateja
	Prosenc	Katarina
Spain	Larrauri Cámara	Amparo
	Oliva	Jesús
	Ortiz de Lejarazu Leonard	Raúl
	Pozo	Francisco
Sweden	Carnahan	Anna Sara
	Wiman	Åsa
Switzerland	Perisa	Damir
Tajikistan	Akhrorov	Firdavs
	Zakirova	Niginamo
The Former Yugoslav Republic of Macedonia	Bosevska	Golubinka
	Mikikj	Vladimir
Turkey	Başak Altaş	Ayşe
	Pehlivantürk	Gülen

Country/organization	Family name	First name
Turkmenistan	Gylyjov	Arslangylych
	Gylyjov	Ashyrmyrat
Ukraine	Demchyshyna	Iryna
	Dykhanovska	Tetiana
United Kingdom of Great Britain and Northern Ireland	Brown	James
	Harrison	Ian
	Lackerby	Angie
	Pebody	Richard
	Phin	Nick
	Reynolds	Arlene
Uzbekistan	Pleshkov	Boris
	Rakhimov	Ravshan A.
University of Cologne	Lässig	Michael
WHO Temporary Advisers	Daniels	Rodney
	Lozano Alonso	Jose Eugenio
	McCauley	John
	Meerhoff	Tamara
	Nguyen Van Tam	Jonathan
	Safarov	Abdulakhad
	Vega Alonso	Tomás
CDC	Jernigan	Daniel B.
	Moen	Ann
	Moffett	Daphne B.
European Centre for Disease Prevention and Control	Adlhoch	Cornelia
	Broberg	Eeva
	Deckert	Brenna
	Johansen	Kari
	Penttinen	Pasi
	Snacken	René
Institute of Public Health - SECID	Bino	Silvia
National Influenza Centre Kiev	Mironenko	Alla
National Influenza Centre St. Petersburg	Komissarov	Andrey
	Ryzhikov	Alexander
	Stolyarov	Kirill
Observers	Gunga	Pranvera
	Rexhepi	Magbule

Country/organization	Family name	First name
WHO Regional Office for Europe	Andersen	Anne-Marie
	Brown	Caroline Sarah
	Gross	Diane
	Hagebro	Krystyna
	Hasanova	Sayohat
	Jorgensen	Pernille
	Mook	Piers
	Pereyaslov	Dmitriy
WHO Regional Office for Europe - National Professional Officer	Pashalishvili	Anna
World Health Organization headquarters	Palkonyay	Laszlo
	Vandemaele	Katelijn
	Zhang	Wenqing
WHO Country Office, Kyrgyzstan	Kasymbekova	Kaliya
WHO Consultants	Johnston	Charles
	Katz	Mark
	Nikisins	Sergejs
	O`Flanagan	Darina
	O`Leary	Maureen
	Torosyan	Liana
Interpreters	Aleksinskaya	Olga
	Ilyukhin	Vladimir
	Nikolskaya	Anna
	Pignastyy	Georgy

WHO Regional Office for Europe and
European Centre for Disease Prevention and Control
Annual Influenza Meeting
Budapest, Hungary
14–16 June 2016

25 May 2016
Original: English

Programme

Tuesday, 14 June 2016

12:00-12:45 Registration of participants and light lunch

Session 1: Welcome and Introduction – Chair Krizstina Biro, State Health Department, Ministry of Human Capacities, Hungary

13:00-13:15	Opening and aims of the meeting (Krizstina Biro, State Health Department, Ministry of Human Capacities, Hungary; Caroline Brown, WHO Regional Office for Europe; Pasi Penttinen, ECDC)
13:15-13:30	Influenza surveillance in Hungary. Overview of the 2015–2016 influenza season, Agnes Csohan, National Center for Epidemiology, Hungary)
13:30-13:45	Characteristics of the 2015–2016 influenza season (René Snacken, ECDC)
13:45-14:15	A review of characteristics of influenza A(H1N1)pdm09 viruses that emerged in 2015–2016 (John McCauley, WHO Collaborating Centre, Francis Crick Institute, London)
14:15-14:45	Global influenza update and risk factors for severe disease due to influenza (Katelijn Vandemaele, WHO headquarters)
14:45-15:00	Discussion
15:00-15:30	*Coffee break*

Session 2: Parallel group work sessions for virologists and epidemiologists

15:30-18:00 Group Work – Virologists

Topic 1 Quality assessment and training
(Lead Dmitriy Pereyaslov, WHO Regional Office for Europe)

Quality assessment:

- Results of 2015 ERLI-Net/WHO EQA on influenza virus culture and antiviral susceptibility (Ian Harrison, Public Health England/ERLI-Net Coordination)
- Results of the 2015 WHO EQAP for the detection of influenza virus by PCR (Sergejs Nikisins, WHO Regional Office for Europe consultant)

Training:

- Update on WHO Regional Office for Europe training activities and the NIC Laboratory Assessment Tool (Dmitriy Pereyaslov, WHO Regional Office for Europe)min
- Exchange training initiative for senior public health experts (Cornelia Adlhoch, ECDC) – 5 min
- ECDC/ERLI-Net twinning programme:
  - Rachel Guiomar (National Institute of Health, Portugal)
  - Nataša Berginc (National Laboratory of Health Environment and Food, Slovenia)
  - Alina Elena Ivanciuc (Cantacuzino Institute, NIC, Romania)

Topic 2 Application of next generation sequencing (NGS) to influenza surveillance
(Lead Cornelia Adlhoch, ECDC; Moderator; Rod Daniels, WHO Collaborating Centre Francis Crick Institute, United Kingdom)

- Implementation of NGS in influenza surveillance: experience of NIC Saint Petersburg and NIC Moscow (Andrey Komissarov, Research Institute of Influenza, the Russian Federation)
- NGS of influenza A and B and sequence assembly pipeline used at the Public Health Agency of Sweden (Åsa Wiman, Public Health Agency, Sweden)
- Application of NGS to influenza surveillance – implementation and analysis pipeline. (Adam Meijer, National Institute for Public Health and the Environment, the Netherlands)
- Workload: from lab-bench to bioinformatics analysis – work flow, prerequisites, person resources, time estimates, costs, equipment, requirement, technical solutions, bioinformatics pipeline. (Ian Harrison, Public Health England, United Kingdom)
- ECDC whole genome sequencing strategy and roadmap for molecular and genomic surveillance (Eeva Broberg, ECDC)

15:30-18:00 Group Work – Epidemiologists

Topic 1 Training opportunities and needs
(Lead Mark Katz, WHO consultant)

- Experience from Sienna summer school (Sayohat Hasanova, WHO Regional Office for Europe)
- ECDC virtual academy (EVA) and Senior Exchange programme (Kari Johansen, ECDC)

Topic 2 Evaluating the quality of influenza surveillance systems
(Lead Mark Katz, WHO consultant)

- Evaluating the quality of sentinel influenza surveillance – what methods and tools are available (Tamara Meerhoff, Radboudumc, the Netherlands) – 5 min
- Challenges of implementing SARI surveillance in SEE countries and use of regular assessment (Silvia Bino, South East European Center of Infectious Diseases Surveillance and Control, Tirana, Albania)
- The experience of Tajikistan with sentinel site selection methodology (Abdulakhad Safarov, WHO Country Office, Tajikistan)

Topic 3 RSV surveillance
(Lead Pasi Penttinen & Eeva Broberg, ECDC)

- Introduction to outcomes of ECDC expert consultation on RSV surveillance and proposed objectives of European RSV surveillance (Pasi Penttinen, ECDC)

19:00 *Buses depart for official dinner*

Wednesday, 15 June 2016

08:30-09:00 Registration for Day 2

Session 3: Seasonal influenza risk assessment – Chair

09:00-10:30 Plenary presentations as introduction

09:00-09:20 ECDC 2015–2016 seasonal influenza risk assessment for EU/EEA countries (René Snacken, ECDC)

09:20-09:30 WHO Regional Office for Europe 2015–2016 seasonal influenza risk assessment for the WHO European Region (Caroline Brown, WHO Regional Office for Europe)

09:30-10:15 Characteristics of the 2015–2016 influenza season (EuroMoMo and country presentations)

- Characteristics of the 2015–2016 influenza season – EuroMoMo (Tyra Grove Krause, Statens Serum Institut, Denmark)
- The results of influenza season 2015–2016 in Ukraine – Characteristics of the 2015–2016 influenza season on a base of data from influenza sentinel surveillance system in Ukraine (Alla Mironenko, L.V. Gromashevsky Institute of Epidemiology and Infectious Diseases, Ukraine)
- Influenza: Control and response measures carried out in Republic of Moldova, 2014–2016 (Constantin Spinu, National Influenza Center, Republic of Moldova)
- Influenza surveillance during the 2015–2016 season in Portugal (Raquel Guiomar, National Influenza Reference Laboratory, Portugal)
- Characteristics of the influenza season 2015–2016: The data used in the risk assessment (Dinagul Otorbaeva, Department of Supervision and Prevention of Infectious Diseases, Ministry of Health, Kyrgyzstan)
- National weekly and end of season influenza risk assessment fed by different data sources in Germany (Silke Buda, Respiratory Infections

Unit, Department for Infectious Disease Epidemiology, Robert Koch Institute, Germany)

10:15-10:30 Discussion

10:30-11:00 *Coffee break*

11:00-12:30 Group work session on risk assessment for seasonal influenza
(Lead Mark Katz & Caroline Brown, WHO Regional Office for Europe; René Snacken, ECDC)

- What information from the risk assessment do countries need?
- Is this information needed routinely or exceptionally?
- How can risk assessments performed by countries be incorporated into the regional risk assessment?
- What should be the methodology and focus of joint ECDC and WHO Regional Office for Europe risk assessments?

12:30-13:30 *Lunch*

Session 4: Improving influenza surveillance – plenary presentations then group sessions

Plenary

13:30-14:00 Overview of Flu News Europe reporting in 2015–2016, country profiles and changes in 2016–2017 (Caroline Brown, WHO Regional Office for Europe)
Introduction to Topic 1: MEM thresholds to assess severity, and improving the quality of severe disease surveillance data: Thresholds and start of season indicators (Tomás Vega, Temporary Adviser to WHO); Improving data from surveillance of severe disease (Tamara Meerhoff, WHO Regional Office for Europe)
Introduction to Topic 2: Generation of genetic characterization data for risk assessment (Eeva Broberg, ECDC)
Introduction to the group work: Objectives and way of working (Mark Katz, WHO consultant)

N.B. Participants must choose which topic they will attend during registration on Day 1.

14:00-16:30 Topic 1: MEM thresholds to assess severity, and improving the quality of severe disease surveillance data
(Lead Tomás Vega, Temporary Adviser to WHO)
Country presentations:

- A new surveillance system for severe influenza in hospitalized patients, experiences from Norway 2014–2016 (Siri Helene Hauge, Institute of Public Health, Norway)
- First results from a newly established SARI-surveillance based on ICD-10 codes (Kristin Tolksdorf, Respiratory Infections Unit, Department for Infectious Disease Epidemiology, Robert Koch Institute, Germany)

Topic 2: Generation of genetic characterization data for risk assessment (Lead Eeva Broberg, ECDC)

- Summary of virus characterization WG activities and decisions (Brunhilde Schweiger, Germany, Chair of the Virus Characterization Working Group)
- How virus characterization data from TESSy have been used in the recent seasonal risk assessments, for vaccine composition meeting and in early season reports (Olav Hungnes, Institute of Public Health, Norway)

Country presentations:

- Resistant A(H1N1)pdm09 viruses on the rise in Norway 2016 (Karoline Bragstad, Institute of Public Health, Norway)
- Features of the influenza epidemic 2015–2016 in the Russian Federation and possible factors that defined its severity (Anna Sominina, Research Institute of Influenza, Russian Federation

16:30-16:45 *Coffee break*

Session 5: Plenary – RSV – Chairs Bruno Lina and Martina Havlíčková

16:45-17:00 RSV: burden of disease, clinical signs, vaccine development (Thea Kølsen Fischer, SSI, Denmark)

17:00-17:10 Targeting RSV – antivirals and vaccine development (Kari Johansen, ECDC)

17:15-17:30 Update on WHO activities (Wenqing Zhang, WHO headquarters)

17:30-17:40 Surveillance options: WHO pilot country Germany (Brunhilde Schweiger, RKI, Germany)

17:40-17:50 Use of EuroFlu data to determine burden of disease due to RSV (Jonathan Nguyen-Van-Tam, University of Nottingham, United Kingdom)

17:50-18:00 Update on ECDC RSV activities (Eeva Broberg, ECDC)

18:00-18:15 Discussion

18:00-18:30 Rapporteurs work on group session feedback for plenary

18:30 *End of day two – free evening*

Thursday, 16 June 2016

08:30-09:00 Registration for Day 3

Session 6: Seasonal influenza vaccine – Chair Richard Pebody and Dan Jernigan

Key-note speaker – Michael Laessig

09:00-09:30	Models for predicting the fitness of influenza viruses: application to influenza vaccine strain selection (Michael Laessig, University of Cologne, Germany)
09:30-09:40	Comments by Wenqing Zhang (WHO headquarters) and John McCauley (WHO Collaborating Centre) on how modelling supports the VCM
09:40-09:45	Discussion
09:45-10:00	Results influenza vaccine effectiveness studies 2015–2016 in EU/EEA, Amparo Larrauri (I-MOVE network)
10:00-10:15	Update on seasonal influenza policies and uptake in EU and EEA countries, Jolita Mereckiene (VENICE network)
10:15-10:45	*Coffee break*
10.45-11.00	Improving Vaccine Virus Selection: New Technologies and Approaches, Dan Jernigan (Director, Influenza Division, CDC, Atlanta, USA)
11:00-11:15	Improving influenza vaccination coverage in health care workers using traditional vaccination campaigns complemented by social media activities engaging staff (James Brown, Head of Communications, Engagement & Marketing, Liverpool Community Health NHS Trust, United Kingdom)
11:15-11:45	Country presentations each o Impact of yearly seasonal influenza vaccination of children in the United Kingdom 2015–2016 (Richard Pebody, Public Health England, United Kindgdom) o Influenza infection in Israel 2015–2016: Vaccine inefficiency (Michal Mandelboim, Central Virology Laboratory, Sheba Medical Center, Israel) o Albania – results from a new vaccine monitoring system for HCW (Silvia Bino, South East European Center of Infectious Diseases Surveillance and Control, Albania)

Session 7: Feedback from the group sessions – Chair: Pasi Penttinen and Caroline Brown

11:45-12:45 Topics – 5 minutes presentation plus 5 minutes discussion (rapporteurs and facilitators):

- Training and quality assessment for NICs
- Training for epidemiologists and quality assessment for surveillance systems
- Information required for seasons' risk assessment (includes sequencing)
- Improving the quality of data from severe disease surveillance
- Planned changes on Flu News Europe in the 2016–2017 season and planned use of the country profiles (includes thresholds and other indicators)
- RSV

12:45-13:00 Next steps and closure of the meeting (WHO Regional Office for Europe and ECDC)

13:00-14:00 *Lunch and departures*