



TECHNICAL REPORT

PANDEMIC INFLUENZA PREPAREDNESS IN THE EU/EEA

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EXECUTIVE SUMMARY

Since 2005, the EU, its institutions and all its Member States (together with those others in the European Economic Area) have collectively made unprecedented progress in strengthening European preparedness against the next pandemic. This has followed guidance from WHO and the Commission and with support from a number of EU Agencies including ECDC.

The health sectors in all countries have developed preparedness plans and, at national level, much is being done to make these plans operational. There has been massive investment in research, and remarkable progress made by industry and academics in developing new vaccines and reducing the time that it will take to produce the pandemic-specific vaccines once a pandemic strain has emerged. In response to the specific threat from influenza type A/H5N1 ('bird flu') a collective response organised by the Commission has strengthened veterinary surveillance and biosecurity. Despite waves of challenges since 2005 there have been few outbreaks in poultry and no human cases. The Commission has run the largest pandemic exercise ('Winter Willow') ever carried out in the world and many Member States have organised their own national and cross-border exercises. A triple alliance has been formed between the European Commission, WHO European Regional Office and ECDC, resulting in a series of four Europe-wide workshops involving all 50 or so countries of the WHO European Region that have served to sustain momentum in the planning, preparedness and practice process. At the Member State and local levels many countries have developed good practices and produced innovative products that are now being shared across Europe. Arguably Europe is the best prepared region in the world.

A moderate pandemic like those of 1957 and 1968 will cause many additional deaths and be highly disruptive of European society; one as bad as 1918–19 even more so. Europe has never been more vulnerable to a pandemic due to steadily increasing populations of older people and people living well with chronic diseases, and ever more interdependent economies and services. Equally, however, the armoury of countermeasures has never been greater. No one has yet shown they are able to prevent or contain a pandemic but the next one will be the first where specific countermeasures like antivirals, specific pandemic vaccines, and modern business continuity planning will be deployed.

There has been no reduction in the threat of a pandemic which has to be seen as inevitable. All that has changed since 2005 is that we are two years nearer the next pandemic and citizens might mistakenly expect to be as protected as they can be by now. Policymakers could equally feel they have invested enough time and resources. That is not the case, reflecting the fact that preparing complex countries for a pandemic takes at least five years of sustained effort. It is also a fact that European countries as a whole are only half way to being prepared; also they are advancing at different paces reflecting different starting points and different amounts of resource that Member States have been able to invest. Also different Member States face varying challenges and tasks because of differences in their medical and administrative systems. Some systems will be more vulnerable to the disruption of a pandemic and others make the organisation of concerted countermeasures more difficult.

These statements are supported both by the most recent survey conducted by ECDC and by the self-assessments of Member States themselves.

ECDC estimates that a further two to three years of sustained effort and investment are needed by the EU and its Member States to achieve the level of preparedness needed to respond well to a pandemic. This means reaching a level of preparedness where citizens can be confident that when the inevitable pandemic comes their local services will meet ECDC's 'Acid Tests', namely:

- primary care systems will be able to deliver treatments like antivirals and antibiotics to most of those who need them, when they need them;
- hospital systems will be able to deliver acute care to the sickest influenza patients as well as continuing to provide essential treatment for non-influenza-related conditions despite inevitable high levels of staff sickness;
- essential services like power, food and fuel supplies will continue to function at the local level;
- pandemic vaccine will start to arrive in the hands of primary care services within six months of the pandemic and there will then be enough seasonal vaccine each year after that when annual epidemics of influenza can be expected to be more intense.

Much specific work remains to be done by EU structures and Member States. Five key areas on which Member States are particularly recommended to focus are: 1. Integrated planning and preparation across governments and sectors; 2. Making plans operational at the local level. This is probably the most difficult, but also the most important area if individual EU citizens are to feel the benefits of all the planning; 3. Ensuring inter-operability at the national and regional levels (that countries work together before and during a pandemic); 4. Stepping up prevention efforts against seasonal influenza, especially through vaccination; and 5. Extending and better directing influenza research to answer key questions.

In summary, by continuing to act together, Member States and the European Commission, supported by EU Agencies like ECDC, have made great progress in preparing Europe for a pandemic. However, the work is not yet finished and there is a danger that without completion the initial work will not be translated into real protection for EU citizens when the inevitable pandemic comes. A further two to three years of intense work are needed at all levels and by all European partners to finish the job.



INTRODUCTION

This final report on the state of pandemic preparedness in the European Union (EU) and European Economic Area (EEA) Member was requested by Commissioner Kyprianou and delivered in the Autumn of 2007. It follows and supersedes the interim survey and report¹ undertaken in the autumn of 2006 and published in January 2007. It underpins and provides the evidence for a more concise 'Report for Policymakers'².

Its first objective is 'to document progress on Pandemic Preparedness in the European Union and European Economic Area'; its second objective is to specifically make recommendations for the way forward and describe what more needs to be done by Member States and cross-European bodies before the end of the decade, i.e. to identify the key areas where work should focus in the period 2008 to 2010.

This second objective 'to identify the key areas where work should focus in the period 2008 to 2010' is especially important given that political and media interest in influenza may be waning. The challenge will be to sustain the momentum to finish the job. By then, countries that have reached a reasonable level of protection will move from development to active maintenance of preparedness, while others may still need to continue working at a more intense level.

METHODS

The report draws on three sources:

- 1 Results from a survey conducted in early September 2007 which investigated current status and documented progress since the 2006 report (Annex 1).
- 2 Cumulative results of the self-assessments of national preparedness undertaken since the summer of 2005 by EU and EEA counties with ECDC, working to a common protocol³ developed by ECDC with the WHO European Regional Office and the European Commission. These include a compilation of recommendations of further work that needs to be undertaken by Member States and ECDC that arose from the assessments in 2007 (See Annex 3).

¹ECDC Technical report: Pandemic influenza preparedness in the EU, stats report as of Autumn 2006, (22 February 2007). (www.ecdc.eu.int/pdf/Pandemic_preparedness.pdf).

²ECDC Policymakers Report 'Pandemic Preparedness in the European Union, Autumn 2007' (http://ecdc.europa.eu/pdf/2007_12_05_Pandemic%20preparedness%20for%20policymakers.pdf).

³ECDC/WHO/EC tool for national pandemic preparedness assessment in Europe (http://ecdc.europa.eu/Health_topics/Pandemic_Influenza/Assessment_tool.html).

- 3 A special session at the Fourth European Pandemic Preparedness Workshop⁴ held in September 2007 in Luxembourg (see Annex 2 for participants) where the draft content of the report was discussed in detail.

1. In order to document progress, the 2007 survey repeated a number of the direct questions that had been posed in 2006⁵, but also included new questions. These were on issues that had arisen from the 2006 and 2007 self-assessments and their addition reflects the increasing complexity of pandemic preparations; specifically the evolution from planning to preparedness, the increasing emphasis on multi-sectoral work (both across governments and extending into the private sector and civil society) national and regional (within country) interoperability and local preparedness.

2. The process of self-assessment is more revealing than a simple analysis of written plans, as was done for the Second European Pandemic Preparedness workshop in 2005⁶ and subsequently as academic exercises^{7,8}. Those analyses are essential and welcome, though they should not attempt to rank countries on a single scale for such a complex process. However, being external and not looking at preparedness, the approach of reviewing plans alone can only be a first step. It is also becoming increasingly difficult to undertake such desk-based reviews in Europe as plans become ever more complex with multiple annexes, modules and operational protocols.

3. The workshops were jointly organised by the European Commission, WHO European Regional Office and (for the latter three) ECDC. The last and largest of these was the fourth workshop, which especially highlighted examples of good practice and innovations put forward by Member States. These are the subject of a separate ECDC publication.

Earlier versions of this Technical Report were also commented on by ECDC's Advisory Forum, the national team leaders for the self-assessments and the external members of the team. The members of ECDC's Advisory Form and those who contributed to the special session are listed in Annex 2.

⁴ Home page of IVth Joint EC/ECDC/WHO Workshop on Pandemic Influenza Preparedness, Luxembourg, 25–27 September 2007. (http://ec.europa.eu/health/ph_threats/com/Influenza/ev_20070925_en.htm).

⁵ ECDC Technical report: Pandemic influenza preparedness in the EU, stats report as of Autumn 2006, (22 February 2007). (www.ecdc.eu.int/pdf/Pandemic_preparedness.pdf).

⁶ Report on the second joint WHO/European Commission workshop Copenhagen, 24–26 October 2005 (http://ec.europa.eu/health/ph_threats/com/Influenza/second_workshop.pdf).

⁷ Mounier-Jack S, Coker RJ 'How prepared is Europe for pandemic influenza? Analysis of national plans'. *Lancet* 2006 Apr 29;367(9520):1405–11
http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=16650650&ordinal_pos=22&itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_RVDocSum.

⁸ Mounier-Jack S, Jas R & Coker R 'Progress and shortcomings in European national strategic plans for pandemic influenza'. *Bulletin of the World Health Organization* 2007;85:923–929.
(<http://www.who.int/bulletin/volumes/85/12/06-039834.pdf>).



THREAT ASSESSMENT

Since 2005, and the first pandemic preparedness workshop organised by the European Commission and WHO European Regional Office held in Luxembourg in March of that year, all relevant EU institutions and all EU and EEA Member States have committed major resources for pandemic preparedness. This was guided both by national advisory bodies in Member States and a series of strategic documents, notably the 2005 Global Pandemic Preparedness Planning Guidance of WHO⁹ and the 2005 Communication from the Commission¹⁰ along with various technical guidance documents developed by ECDC and WHO (notably the latter's checklist¹¹).

There is no evidence that the threat of a pandemic has in any way diminished since 2005. Indeed, it is the view of WHO and ECDC that future pandemics are inevitable¹², though the timing of the next pandemic, its viral type and epidemiological and clinical characteristics cannot be predicted. All that can be said with certainty is that since intensive preparations began in March 2005 Europe has moved two years nearer the next pandemic. Many preparations have been made, much has been achieved but there is a danger that European citizens and policymakers might assume that after two years of work and investment everything should be ready. However, that is not consistent with the facts and ECDC's assessment that even with hard work and the commitment of considerable resources it will take individual European countries at least five years to prepare for a pandemic. It also ignores five key facts:

- that countries started in 2005 from different economic and social starting points and so some states have more to do than others and states have been proceeding at different tempos in 2005–07;
- that some states (notably the more federal ones, ones where healthcare is devolved locally and others where primary care is based on independent practitioners) face special challenges;
- that states most recently joining the EU tend to be less prepared and less well resourced;
- that even in the latest self-assessments countries are still coming up with substantial lists of further work to be done;

⁹ WHO global influenza preparedness plan (http://www.who.int/csr/resources/publications/influenza/WHO_CDS_CSR_GIP_2005_5/en/index.html).

¹⁰ Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions on Pandemic Influenza Preparedness and Response Planning in the European Community (http://eur-lex.europa.eu/LexUriServ/site/en/com/2005/com2005_0607en01.pdf).

¹¹ WHO checklist for influenza pandemic preparedness planning WHO Geneva 2006 (<http://www.who.int/csr/resources/publications/influenza/FluCheck6web.pdf>).

¹² WHO The world health report 2007 – A safer future: global public health security in the 21st century (<http://www.who.int/whr/2007/en/index.html>).

- that recent pandemic preparedness exercises in the Member States are still showing significant issues requiring resolution, indicating that to stop now would be dangerous for Europe.

The greatest concern has been over avian influenza viruses type A/H5N1 and the possibility that they will lead to a pandemic. For these ECDC's 2005–06 risk assessment¹³ remains unchanged, namely that 'at present these remain a group of influenza viruses of birds, poorly adapted to humans whom they find hard to infect except at high doses. They are dangerous as they are highly pathogenic in those few humans that do become infected, but then they generally do not transmit on to other humans'. These viruses are concerning because they remain endemic in parts of East and South-East Asia and Africa¹⁴ and in these countries infected poultry and humans continue to have close contact. The concern therefore remains about the potential for the development of an H5-based pandemic from these areas. Hence the work of individual countries and bodies like the Food and Agriculture Organization of the United Nations, World Organisation for Animal Health, and the UN System Influenza Coordinator, supported by the international community is essential in strengthening veterinary infrastructure and supporting surveillance and containment activities so as to contain and control the infection in animals. Equally important is that epidemiological and virological information and samples from humans and animals continue to be shared globally to maximise knowledge about potentially dangerous virus evolution. ECDC has issued a briefing¹⁵ on the issue of virus sharing explaining the importance of WHO's Global Influenza Surveillance Network¹⁶ to Europe.

The direct threat to human health in the EU/EEA countries from avian influenza A/H5N1 is relatively low compared with the threat from a pandemic¹⁷. There are repeated challenges from the appearance of H5N1, mostly among wild birds¹⁸. However, the general strength of veterinary preparedness and bio-security in the EU/EEA countries relative to other parts of the world, and the strenuous efforts made by Member States and the European Commission¹⁹

¹³ ECDC Technical Report: The Public Health Risk from Highly Pathogenic Avian Influenza Viruses Emerging in Europe with Specific Reference to type A/H5N1, Version 1 June 2006. (http://ecdc.europa.eu/Health_topics/Avian_Influenza/pdf/060601_public_health_risk_HPAI.pdf).

¹⁴ OIE (World organisation for animal health) update on highly pathogenic avian influenza in animals (Type H5 and H7). (http://www.oie.int/download/AVIAN%20INFLUENZA/A_AI-Asia.htm).

¹⁵ Interim ECDC Scientific and Public Health Briefing: Sharing influenza Virus Samples – November 2007. (http://www.ecdc.europa.eu/pdf/ECDC_influenza_briefing.pdf).

¹⁶ WHO Global Influenza Surveillance Network (<http://www.who.int/csr/disease/influenza/influenzanelwork/en/index.html>).

¹⁷ ECDC Technical Report: The Public Health Risk from Highly Pathogenic Avian Influenza Viruses Emerging in Europe with Specific Reference to type A/H5N1, Version 1 June 2006. (http://ecdc.europa.eu/Health_topics/Avian_Influenza/pdf/060601_public_health_risk_HPAI.pdf).

¹⁸ Influenza team (ECDC). Highly pathogenic avian influenza A/H5N1 in birds within the EU – Implications for Public Health. Euro Surveill 2007;12(7):E070705.2. Available from: <http://www.eurosurveillance.org/ew/2007/070705.asp#2>.

¹⁹ European Commission: Chronology of Events and Commission action in relation to Avian influenza. http://ec.europa.eu/food/animal/diseases/controlmeasures/avian/h5n1_chronology_en.htm.



have meant that there have been few outbreaks in domestic poultry. Yet, there are still weaknesses in bio-security and outbreaks continue to occur even late in 2007²⁰. These factors, together with prompt action by public health officials where outbreaks have occurred, have ensured that, to date, there have been no human cases of H5N1 in the EU. However, outbreaks of other avian influenzas putting people into hospitals²¹ are a reminder of ECDC standing advice namely that some people in the EU/EEA remain at risk, notably those owning or coming into contact with small domestic flocks²².

The possibility of an H5-based pandemic starting in an EU/EEA country is considered to be low in comparison with those areas where there is endemic animal infection coupled with close contact between infected poultry and humans. More likely would be pandemic emergence near the borders of the EU/EEA such as in North Africa. Most likely is the emergence in the Far East which is considered to have been the source of the last two pandemics (1957 and 1968)²³. In either case the WHO Rapid Containment Strategy²⁴ would be enacted and stockpiles of antivirals and vaccines (if relevant²⁵) deployed.

Certain ominous features of influenza A/H5N1 have made it a prime concern since its emergence: its high pathogenicity to humans, its extensive spread persistence in birds and at the same time its propensity to continue to evolve. However, it is by no means the only threat. Other influenza viral types such as those based on haemagglutinins H2, H7 and H9 are also candidates for causing the next pandemic.

WHAT WILL THE NEXT PANDEMIC BE LIKE?

When the next pandemic comes it is unlikely to be a trivial matter. All of the three pandemics of the 20th Century killed millions worldwide in their early waves²⁶. A recent published

²⁰ Needham H, Influenza team (ECDC). 'H5N1 in wild and domestic birds in Europe – remaining vigilant in response to an ongoing public health threat'. Euro Surveill 2007;12(12):E071206.1. Available from: <http://www.eurosurveillance.org/ew/2007/071206.asp#1>.

²¹ Editorial team. 'Avian influenza A/(H7N2) outbreak in the United Kingdom'. Euro Surveill 2007;12(5):E070531.2. Available from: <http://www.eurosurveillance.org/ew/2007/070531.asp#2>.

²² ECDC Scientific Advice: Who is at Risk of getting HPAI? Version 20 May 2006 (http://www.ecdc.europa.eu/Health_topics/Avian_Influenza/pdf/Table_Who_is_at_risk_H5N1.pdf).

²³ ECDC webpage summary: Pandemics of the 20th Century. (http://ecdc.europa.eu/Health_topics/Pandemic_Influenza/stats.html).

²⁴ WHO Interim Protocol: Rapid operations to contain the initial emergence of pandemic influenza. Updated October 2007. (http://www.who.int/csr/disease/avian_influenza/guidelines/draftprotocol/en/index.html).

²⁵ Note there are global stockpiles of antivirals available for when the new pandemic strain is first detected (if it has not extended too widely). This would be available for anywhere in the world including in the EU. Later it is planned to augment this with stockpiles of human AI viruses if they broadly match the new virus. See WHO Interim Protocol: Rapid operations to contain the initial emergence of pandemic influenza. Updated October 2007 (http://www.who.int/csr/disease/avian_influenza/guidelines/draftprotocol/en/index.html).

²⁶ ECDC webpage summary: Pandemics of the 20th Century. (http://ecdc.europa.eu/Health_topics/Pandemic_Influenza/stats.html).

estimate of the impact of a re-run of the 1918–19 pandemic predicted that it would result in over a million additional deaths in the EU/EEA (Table 1) alone. For every death there will be many more people with mild, moderate or very severe illness that will put immense, perhaps overwhelming strain on health and care services. These services may struggle to provide care for those affected by the pandemic. Without preparation they will also struggle to continue to deliver their core services (obstetric care, trauma care, emergency surgery, terminal care, etc). These stresses will be compounded by levels of acute influenza in the health sector workforce affecting health sector staff as much as anyone else. However, it is important to remember that each pandemic has its unique features (and it is possible to imagine a mild pandemic). While a number of Member States have made assumptions of the numbers that will be affected²⁷ for planning purposes, it is impossible to predict exactly how the pandemic will manifest itself. **However, a pandemic will be distinct from most other emergencies and crises and so needs special planning – generic emergency plans alone are never sufficient for a pandemic.** One of the reasons for this is that pandemics affect many parts of countries at about the same time, albeit to differing extents. This means that unlike for more isolated crises and disasters it will be less likely that one affected part of a country, or one part of Europe, can hope that others will come to its aid. Hence the importance of every EU country undertaking its own pandemic planning.²⁸

Table 1: Estimated additional deaths should a 1918–19 pandemic occur now

Austria	13 000	Latvia	13 800	Netherlands	23 100
Belgium	14 900	Lithuania	18 800	Poland	155 200
Bulgaria	47 100	Germany	116 400	Portugal	25 100
Czech Republic	34 100	Greece	27 400	Romania	149 900
Cyprus	1 900	Hungary	37 700	Slovenia	5 000
Denmark	7 300	Ireland	6 700	Slovakia	20 600
Estonia	6 100	Italy	95 200	Spain	87 100
Finland	8 100	Luxembourg	500	Sweden	13 300
France	89 600	Malta	1 100	United Kingdom	93 000
EU total			1.1 million		
Iceland	420	Norway	5 800		

Source: Murray et al. Lancet 2006 368: 2211–2218.

²⁷ UK Pandemic Influenza Scientific Advisory Group(SAG): Subgroup on Modelling. Modelling Summary, January 2007. (<http://www.advisorybodies.doh.gov.uk/sagpf/minutes/modelling-implications-summary-jan07.pdf>).

²⁸ Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions on Pandemic Influenza Preparedness and Response Planning in the European Community, November 2005. (http://europa.eu.int/urlex/lex/LexUriServ/site/en/com/2005/com2005_0607en01.pdf)



INCREASING EUROPEAN VULNERABILITY

Previous pandemics have affected all age groups. However, those at most risk of infection leading to severe disease will probably be very young children, the elderly and those with other illnesses. Demographic and secular trends, growing numbers of people over the age of 65 and ever-increasing numbers of people living and functioning well but with chronic illnesses means that from a medical perspective Europe has never been more vulnerable to a pandemic.

If preparations are not made, equally disruptive on society in general will be the effects of up to 20% of the workforce being off sick or having to care for sick relatives.²⁹ In small units the proportion off sick will be even higher at times. The economic and social disruption could be massive³⁰. Key services such as food, fuel and power relying on movement of supplies will be especially at risk. For example, efficient 'just in time' stock-management systems (which mean that for many supplies items arrive just before they are anticipated to run out) are now very common in Europe. However, these are considered especially vulnerable as the supply lines are liable to failure if numbers of key workers in production or delivery go off sick and no preparations have been made for this eventuality. In this sense the ever greater interdependence of Europe with goods and people moving rapidly around for day-to-day living makes it more vulnerable to a moderate or severe pandemic.

The impact of the next pandemic will extend well beyond its first wave or waves. Pandemics reinvigorate seasonal human influenza and the winters following the pandemic will experience much more severe epidemics of ordinary influenza than are seen at present. Hence in the decade following the pandemic there will be a heightened demand for vaccines, antivirals and increased 'winter pressures' on health services.

OPPORTUNITIES FOR PREPARATION, PREVENTION AND MITIGATION

While it is very unlikely that the next pandemic can be averted or contained³¹, **Europe is in a better position than ever before to prepare for the next pandemic and limit the damage.** This will be the first pandemic in history where there will be specific medical counter-measures available (antivirals and later a specific pandemic vaccine) as well as more

²⁹ UK Pandemic Influenza Scientific Advisory Group(SAG): Subgroup on Modelling. Modelling Summary, January 2007. (<http://www.advisorybodies.doh.gov.uk/sagpf/minutes/modelling-implications-summary-jan07.pdf>).

³⁰ Jonung L, Roeger W. The macroeconomic effects of a pandemic in Europe. A model-based assessment. DG for European and Financial Affairs. Report No. 251 June 2006 (http://europa.eu.int/comm/economy_finance).

³¹ See WHO Interim Protocol: Rapid operations to contain the initial emergence of pandemic influenza. Updated October 2007 (http://www.who.int/csr/disease/avian_influenza/guidelines/draftprotocol/en/index.html). Even if the WHO rapid containment protocol succeeds (and it is important to plan on the assumption that it will not) it is considered likely that the virus will re-emerge later. Relying on WHO and other countries to deal with the problem before it comes to Europe is not an option.

general medical care (see Table 2). Also modern business continuity planning can ensure that key functions continue during the three to four months of a pandemic. After all, though losing 20% of the workforce is significant, that is less than the percentage of the European workforce that can be off at any one time during the summer holidays. The difference is that during a pandemic the losses cannot be so readily planned and the 20% will not be evenly spread (**in small areas and groups the proportions off sick will be higher – that is the nature of respiratory infectious diseases with person-to-person spread**). Hence for particular functions that rely on small groups of very key workers, special arrangements will be needed. As described in a session at the Luxembourg Workshop on Business Continuity Planning such work has already started in a number of EU countries. However, since it involves planning in every sector of society (government, public, private and civil society) it is not an area amenable to a 'quick fix'; sustained work is needed.

Table 2: Categories of available countermeasures for a pandemic with examples

Personal measures	Early self-isolation when becoming unwell, respiratory hygiene and regular hand-washing ³²
Public health measures ³³	Reducing meetings, proactive school closures and other forms of 'social distancing'
Specific medical countermeasures	Antivirals, specific pandemic vaccines and perhaps human avian influenza vaccines ³⁴
General medical countermeasures	Antibiotics, supportive medical care of those sick and those needing intensive care
Business continuity planning	Planning in all sectors (public, private and civil society) for continuing all functions during a pandemic

PROGRESS SINCE 2005 AND CURRENT PREPAREDNESS

Results of the 2007 survey and national self-assessments (Annexes 1 – 3)

All Member States answered the 2007 survey in a remarkably short time and ECDC expresses thanks to all those who did contribute to this process of providing the data, analysing it and then improving earlier versions of this report (Annex 2). The 2007 results and a specific

³² Personal (non-Pharmaceutical) Protective Measures for Reducing Transmission of Human Influenza – Interim ECDC Recommendations. (http://www.ecdc.eu.int/documents/pdf/PPHM_Recommendations.pdf).

³³ ECDC Pandemic Public Health Measures Menu. (http://www.ecdc.eu.int/Health_topics/Pandemic_Influenza/phm.html).

³⁴ ECDC technical report: Expert advisory groups on human H5N1 vaccines: Scientific Questions. Stockholm, August 2007. (<http://ecdc.europa.eu/pdf/Sci%20Questions%20final.pdf>).



comparison of the answers to the questions asked in the 2006³⁵ and 2007 surveys (Annex 1) showed that all countries have moved beyond simply having developed pandemic plans in the health sector to making these plans operational in 2007. Definite progress has been made at the country level in Europe. Notably, in national contingency planning, joint work between neighbouring countries, developing pandemic vaccination strategies³⁶ and communication strategies.

Many European Member States have significant strengths and have developed innovative approaches to pandemic preparedness. These were highlighted at the Fourth European Pandemic Preparedness Workshop in Luxembourg (September 2007) and they are documented in a separate document and on the ECDC website. All countries can learn from these approaches and so deliver 'European added value'. This is central to ECDC's 'Member State to Member State' approach as reflected, for example, in the inclusion of national experts from one country in the external part of teams helping other countries self-assess their preparedness.

Equally, however, all the national self-assessments led by ECDC with Member States have identified additional work needed over the next two years by the countries, ECDC and others (Annex 3). In other words, there are *no* countries that can declare they have done enough on pandemic preparedness. Equally ECDC itself still has much to do to assist them and deliver further European added value (Annex 3).

Though the 2007 preparedness survey (Annex 1) was significantly more demanding than its 2006 counterpart³⁷, there are many areas where all, or almost all, of the 30 EU/EEA countries reported good performance against the indicators:

- having national influenza surveillance (100% of Member States reporting 'yes');
- national laboratories capable of undertaking viral isolation (90%);
- national coordinating committee for pandemic preparedness (93%);
- national health sector command and control structure for a pandemic (97%);
- surveillance mechanisms to detect first cases of a pandemic strain (90%);
- antivirals countermeasures strategy agreed (97%);
- national system for influenza surveillance in birds (100%).

However, there are specific gaps where less than 80% of counties have reached the following standards:

- obtaining routine surveillance information for seasonal influenza below the national level (only 73% of Member States reporting 'yes');

³⁵ ECDC Technical report: Pandemic influenza preparedness in the EU, status report as of Autumn 2006, (22 February 2007). (www.ecdc.eu.int/pdf/Pandemic_preparedness.pdf).

³⁶ Prioritization strategies for pandemic influenza vaccine in 27 countries of the European Union and the Global Health Security Action Group: a review. Straetemans M et al, BMC Public Health 2007, 7:236doi:10.1186/1471-2458-7-236 (<http://www.biomedcentral.com/1471-2458/7/236>).

³⁷ ECDC Technical report: Pandemic influenza preparedness in the EU, status report as of Autumn 2006, (22 February 2007). (www.ecdc.eu.int/pdf/Pandemic_preparedness.pdf).

- being able to produce routine measures of the coverage of seasonal influenza vaccine in the largest risk group: those over age 65 years (69%);
- having cross-sectoral national planning structures for pandemic preparedness rather than just in the health sector (79%);
- having national contingency plans for maintenance of non-health essential services, such as power supply, food distribution, etc, publicly available (40%); indeed only a few countries as yet have a published multi-sectoral framework around their health sector plan, though a number of others are known to be moving in that direction;
- joint work undertaken with neighbouring countries on mutually relevant policy areas (66%);
- having undertaken a national level health sector exercise specifically for a pandemic (61%);
- cross-sectoral mechanisms for coordinating and assessing preparedness below national level (61%)³⁸;
- having issued a planning document to local health services (79%);
- having a recognised cross-sectoral group for developing the strategy on the public health measures, school closures, etc. (71%);
- having specific materials ready for the public for when the next pandemic comes (71%).

These results can be broadly verified as they are consistent with the findings of the self-assessment visits.

Special challenges – federal structures, devolved health responsibilities and independent services

Certain countries are experiencing particular difficulties and are requesting additional visits and general help from ECDC in 2008. Countries with federal structures and where healthcare is a devolved responsibility are finding it hard to ensure quality and consistency across their nations (though some countries have devised or are now devising mechanisms for this). Countries where local and primary healthcare services are provided by independent practitioners face particular difficulties, as do those where hospitals are independent of central management structures. In these circumstances it is especially difficult to ensure quality and consistency in local plans and preparedness, ensure interoperability during the pandemic itself, and decide how command and control will function.

Local preparedness

Achieving local preparedness has become the greatest challenge for Member States. What remains to be done in most countries is to make the national and regional level plans follow through to the local level. This is to be expected as the process necessarily operates in that order: national to regional to local. ECDC has developed some demanding Local Acid Tests³⁹ which are used in the self-assessments. These ask questions such as the following:

³⁸ Here there are special challenges for the more federal countries and countries where health is a devolved responsibility. This places particular emphasis on the central capacity needed for coordination.

³⁹ ECDC suggested 'Acid Tests' for helping assess, strengthen local preparedness for moderate or severe pandemics (http://www.ecdc.eu.int/Health_topics/Pandemic_Influenza/tests.htm).



- Can local services robustly and effectively deliver antivirals to most of those that need them inside the time limit of 48 hours from onset of symptoms?
- Have local primary and secondary care services identified which non-influenza core services they will sustain and which they will suspend in the peak period?
- Has business continuity planning been completed such that essential non-influenza-related core health services have been identified and could be delivered with significant numbers of personnel being unavailable for work? Specifically: a. social care for vulnerable groups; b. supermarket supply and delivery; c. fuel supply.

As would be expected, to date, no country can pass many of the tests. However, a number are now starting to tackle these most difficult of tasks⁴⁰.

Antivirals, vaccines and other supplies

Most countries in the EU have acquired stockpiles of antivirals⁴¹ though they vary in size, reflecting, amongst other factors, their different strategies. Member States are now working out how to deliver these at the local level. Attention needs to turn next to other medical and essential supplies that may run short in a pandemic.

Much is being done to improve the timeliness of development, testing and production of vaccines by industry, EU Agencies⁴² and national and EU projects like *Flusecure*⁴³. Many countries have placed orders for pandemic vaccines⁴⁴, though more work is needed to determine the prioritisation strategies regarding who should initially receive them.

A whole new class of vaccines against human avian influenza viruses using the H5 types is becoming available. Though they can be stockpiled ahead of a pandemic they will only work if the next pandemic is H5-based and even then the protective effect is likely to be less than for the specific vaccine when it becomes available.

However, overall vaccine production capacity in Europe is insufficient and will not be able to meet the needs and expectations for a pandemic vaccine in large volumes, nor meet the increased annual demand that will follow a pandemic. This is partly due to the generally sub-optimal use of seasonal vaccine as this determines the total industrial capacity. There are plans from industry to increase capacity and innovations, for example using adjuvants and live-attenuated vaccines, that will make vaccine production more efficient (gaining more vaccine and more protection from a small amount of adjuvant). However, fundamental to this

⁴⁰ See: ECDC Pandemic preparedness innovations. (http://www.ecdc.eu.int/Health_topics/Pandemic_Influenza/innovations.html).

⁴¹ European Parliament high level policy debate. Pandemic influenza in the EU: Are we sufficiently prepared? Brussels, European Parliament, 12 June 2007 ([http://www.atrakatellis.gr/Events/19/Final%20report%20\(3\).pdf](http://www.atrakatellis.gr/Events/19/Final%20report%20(3).pdf)).

⁴² European Medicines Agency (EMA). Update on H5N1 and Pandemic Influenza vaccines, 4th Joint EC/ECDC/WHO Workshop on pandemic influenza preparedness, Sept 2007. (http://ec.europa.eu/health/ph_threats/com/docs/ev_20070925_co10.pdf).

⁴³ DG Research *Flusecure* activities. (http://ec.europa.eu/research/health/influenza/proj15_en.html).

⁴⁴ Prioritization strategies for pandemic influenza vaccine in 27 countries of the European Union and the Global Health Security Action Group: a review. Straetemans M et al, BMC Public Health 2007, 7:236doi:10.1186/1471-2458-7-236 (<http://www.biomedcentral.com/1471-2458/7/236>).

is that European countries achieve the target (annual immunisation of 75% of elderly populations by 2010) to which they committed themselves at the World Health Assembly in 2003⁴⁵.

Research

The EU has invested heavily in influenza research both at the EU and national levels⁴⁶. This has greatly improved the knowledge base, especially in the field of vaccines where industry has also invested heavily in research and development⁴⁷. Now this broad support needs to be directed to research in other fields such as transmission and infection control of influenza⁴⁸.

Work at EU level

Much work has been done by the European Commission and its Agencies, the European Food Safety Authority (EFSA), the European Medicines Agency (EMA), the Joint Research Centre and ECDC itself. In addition, the EU and its Member States have contributed massively to the global strengthening of health security, specifically against bird flu but with increasing emphasis on pandemic preparedness⁴⁹.

Nevertheless, there remain many areas that need further work at the EU level. For example, in routine surveillance while primary care surveillance and virological surveillance are strong through the European Influenza Surveillance Scheme⁵⁰ and WHO's Global Influenza Surveillance Network⁵¹, routine mechanisms for monitoring severe disease and death due to influenza, influenza vaccine effectiveness and coverage have yet to be developed. However, monitoring of vaccine resistance has started through the VIRGIL research project⁵² and now needs to be put on a sustainable footing. Some of these developments are being considered

⁴⁵ Prevention and control of influenza pandemics and annual epidemics, 56th World Health Assembly, 28 May 2003 (http://www.who.int/gb/ebwha/pdf_files/WHA56/ea56r19.pdf).

⁴⁶ DG Research. Influenza research: EU-Funded projects 2001–2007. (http://ec.europa.eu/research/health/poverty-diseases/doc/influenza-research_en.pdf).

⁴⁷ See, for example, International Federation of Pharmaceutical Manufacturers and Associations (<http://www.ifpma.org/Influenza/index.aspx?1>).

⁴⁸ Influenza team (ECDC). Influenza transmission: research needs for informing infection control policies and practice. *Euro Surveill* 2007;12(5):E070510.1. Available from: <http://www.eurosurveillance.org/ew/2007/070510.asp#1>.

⁴⁹ Third UNSIC-World Bank report on third global progress report on responses to avian influenza and the state of pandemic readiness, December 2007. <http://www.undg.org/docs/8097/UN-WB%20AHI%20Progress%20Report%20final%20PRINT.pdf>.

⁵⁰ European Influenza Surveillance Scheme (EISS) homepage. <http://www.eiss.org/index.cgi>.

⁵¹ WHO Global Influenza Surveillance Network (<http://www.who.int/csr/disease/influenza/influenzanelwork/en/index.html>).

⁵² VIRGIL: European vigilance network for the management of drug-resistant viruses. http://ec.europa.eu/research/health/influenza/proj13_en.html.



for ECDC's workplan in 2008, and beyond under projects like 'Surveillance in a Pandemic'⁵³ and by sharing examples of good practice and innovation⁵⁴.

THE WAY FORWARD – 2008 TO 2010

Local preparations

Emphasis in 2008–09 should continue to be placed on engaging all government sectors, the business community and civil society. Special attention needs to be paid at the local level so that national planning is translated into preparedness that benefits individual European citizens. If that is not done then citizens may find all the work on preparation was of little use to them and their families.

This means reaching levels of preparedness where EU countries can be confident that in the event of a severe pandemic they will meet criteria like those in the ECDC 'Acid Tests'⁵⁵.

Other required developments include:

- plans and preparations that incorporate effective public health measures which mitigate the impact of the pandemic;
- communication systems that allow delivery of information and messages in an EU-coordinated way;
- national command and control systems that allow rapid changes to default plans as the pandemic develops and new information becomes available;
- plans in place to ensure that pandemic vaccine arrives in the hands of primary care services within six months of the start of the pandemic, together with plans for speedy delivery and post-vaccination monitoring;
- a degree of interoperability between governments and other relevant institutions so that plans and actions in EU countries will support and not cut across those of other countries.

Five specific areas where further work is particularly needed are as follows.

1. Stepping up prevention efforts against seasonal influenza. The need to develop public health measures to reduce mortality and morbidity from seasonal influenza remains crucial within the EU and a number of countries report progress. Better prevention and treatment of seasonal influenza will save many lives each year across the EU. Equally such developments will have the added advantage of building capacity and strengthening

⁵³ Influenza Surveillance in a Pandemic: Paper from ECDC Working Group, August 2007. (http://www.ecdc.eu.int/Health_topics/Pandemic_Influenza/pdf/070801_Influenza_surveillance.pdf).

⁵⁴ ECDC Pandemic preparedness innovations. (http://www.ecdc.eu.int/Health_topics/Pandemic_Influenza/innovations.html).

⁵⁵ ECDC suggested 'Acid Tests' for helping assess, strengthen local preparedness for moderate or severe pandemics (http://www.ecdc.eu.int/Health_topics/Pandemic_Influenza/tests.htm).

preparedness against pandemic influenza, including notably immunisation. The more effective Europe is in preventing and treating seasonal influenza the better it will deal with a pandemic.

2. Integrated planning across governments and societies. A pandemic will impact on the whole of government and society and many countries are making steps to involve non-health sectors of government, the business community and civil society. Yet there are few published examples of government-wide pandemic plans in EU countries. Most have essentially health sector plans and many countries report not yet having business continuity plans to maintain essential public services during the sustained stress of a pandemic (e.g. transport, utilities, police, etc.).

3. Making plans operational at the local level. This is probably the most difficult area. But equally it's the most important if EU citizens are to feel the benefit of all the plans and preparations. Most countries are starting to prepare local primary care and hospital services, since national preparedness efforts will not be effective unless the frontline responders are properly prepared. However, further and sustained work is needed in all countries. Specific issues that need to be addressed include reconfiguring hospitals so they can deliver essential services at the height of a severe pandemic and the logistics of rapidly distributing antiviral drugs to those who need them, when they need them. The use of well-designed pandemic exercises to test operational planning at a local level remains a priority to improve preparedness and highlight areas for further development.

4. Interoperability at the national and EU level. It is important that national plans and actions work well together between countries and within countries. To that end, countries need to undertake more joint planning and exercises with their neighbours, as well as participate in EU-wide exercises.

5. Extending and directing influenza research. More operational research is needed on issues such as how seasonal influenza spreads and can be prevented, as well as conducting further work on improving seasonal and prototype pandemic vaccines.

Most countries are not yet in a position to deliver all or many of the above though coordination of pandemic preparedness is now developing at an EU level under the Health Security Committee and its new Influenza Section. Hence it remains the case that the period to the end of 2009 will need sustained effort and investment by the EU and its Member States to achieve the level of preparedness needed to respond to a severe pandemic as adequately as European citizens expect. Beyond that, Member States that have reached that level could move over into a maintenance phase.

MORE DETAILED COMMENTS AND POTENTIAL ACTIONS FOR FURTHER STRENGTHENING OF PREPAREDNESS⁵⁶

It must be emphasised that some Member States, EU bodies and others have already undertaken activities in the areas identified in this sections. Also in

⁵⁶ This section was prepared following group discussions on an earlier circulated draft by representatives from 22 EU/EEA Member States at the Fourth European Pandemic Preparedness Workshop (Annex 2).



accordance with the *mandate of ECDC* and its essentially advisory role, the potential actions for Member States should be seen as options. The suggested actions for ECDC are more directed though they would still need to be incorporated into proposed ECDC workplans and resources, and then be considered by ECDC's Management Board.

Seasonal influenza

Improved prevention and control of seasonal influenza are essential components of pandemic preparedness. More understanding of how to deal with seasonal influenza through personal protective measures⁵⁷ will prepare European citizens better for the next pandemic. Increasing the use of seasonal influenza vaccine within the EU would itself give many direct health gains. Member States could consider recommitting to EU-wide vaccination coverage standards such as those adopted at WHO's World Health Assembly of 2003⁵⁸ including a target of 75% annual immunisation coverage in the elderly by 2010. In addition, it would result in increased capacity for production of a pandemic vaccine when the next pandemic occurs, and would support the WHO Global Action plan to increase vaccine use and production⁵⁹.

Currently influenza immunisation is unusual among EU/EEA national routine vaccination programmes in that coverage is not always monitored regularly. Also while all Member States have childhood vaccination programmes there are no *elderly* vaccination programmes. Member States could usefully establish annual monitoring of the vaccine coverage in the elderly (and other risks groups where possible). ECDC should work with countries to help establish routine coverage monitoring as well as monitoring of the effectiveness of the vaccine, and develop surveillance of severe morbidity and mortality due to seasonal and pandemic influenza.

Awareness of avian influenza ('bird flu') was increased in the short term by the media interest in 2005–06. However, knowledge and understanding of seasonal influenza and what to do in the event of a pandemic varies widely across Member States. ECDC should work with them to increase awareness of influenza and how to prevent it among European citizens by better use of communication messages and educational materials for the public and healthcare workers. This work should draw from the best examples in Member States as well as materials produced by ECDC itself such as its tool-kit⁶⁰.

⁵⁷ Personal (non-Pharmaceutical) Protective Measures for Reducing Transmission of Human Influenza – Interim ECDC Recommendations. (http://www.ecdc.eu.int/documents/pdf/PPHM_Recommendations.pdf).

⁵⁸ Prevention and control of influenza pandemics and annual epidemics, 56th World Health Assembly, 28 May 2003 (http://www.who.int/gb/ebwaha/pdf_files/WHA56/ea56r19.pdf).

⁵⁹ WHO Global pandemic influenza action plan to increase vaccine supply. (http://www.who.int/csr/resources/publications/influenza/WHO_CDS_EPR_GIP_2006_1/en/index.html).

⁶⁰ ECDC Influenza Communication Toolkit (http://ecdc.europa.eu/Health_topics/Seasonal%20Influenza/toolkit/index.html).

Pandemic preparedness

The recent Fourth European Pandemic Preparedness Workshop demonstrated that there are many examples of good practice and innovations being developed by Member States. ECDC should continue to facilitate information exchange on good and innovative approaches⁶¹ being taken by Member States and the actions that Member States intend to take during a pandemic.

Planning, coordination and maintaining essential services

Member States could usefully discuss possible common approaches to the application of countermeasures to a pandemic (public health measures, antivirals and vaccines) across EU Member States, especially between neighbouring countries. Though the diversity of Europe means that the adoption of common approaches is neither justifiable nor desirable, there would be particular advantages to some coordination of content and timing between neighbouring Member States where the adoption of certain measures will directly affect each other. The new Influenza Section of the Health Security Committee provides a forum for this though first there is a need to gather information on the respective policies of Member States to determine where there are important inconsistencies.

In countries where health and other functions are devolved responsibilities, for example in federalised EU countries, authorities are considering how best to ensure preparedness and interoperability at regional levels. Delivering coordinated responses in such countries requires significant central management expenditure.

Communication between different levels (national, sub-national, local) needs to be strengthened to ensure consistency and coordination. Methods and tools to increase communications that are proving useful are videoconferencing facilities as well as more traditional methods such as meetings, workshops, etc. However, this will require significant investment in facilities for some countries.

Business continuity planning

Business continuity planning for pandemics is essential in public, private and civil society sectors. This can be achieved by identifying all the services and functions that must be sustained and those who deliver them ('core services' and 'essential workers') and specifically developing plans for providing surge capacity where demand will rise (parts of the health sector) and coping with the foreseeable staff absenteeism during a pandemic.

Protecting staff at risk

National planning and preparations need to extend down to regional and local levels with special reference to both front line staff having contact with patients and other staff essential to the functioning of society. As discussed at the Fourth European Pandemic Preparedness Workshop, approaches to infection control, for example regarding the use of masks and respirators, have to balance the desire to maximise staff protection with practicality and staff

⁶¹ ECDC Pandemic preparedness innovations.
(http://www.ecdc.eu.int/Health_topics/Pandemic_Influenza/innovations.html).



acceptability. Currently there are different plans and practices across Europe but no clear evidence base promoting coherence (see 'Research', below).

Exercises

Countries are finding it important to test preparedness in healthcare and other essential services through targeted and well planned pandemic exercises. Countries developing whole government approaches are often finding occasional large complex exercises useful to concentrate efforts as well as to identify weak areas and topics requiring further work. At the same time there are innovative exercises that extend outside the public sector into other areas such as the business sector. There are advantages in Member States, ECDC and the European Commission acting as observers in each other's exercises, as well as contributing to banks of pandemic exercises through which Member States can share tried exercise plans.

Ethical issues

European countries anticipate that ethical issues will arise during a pandemic, notably over limited access to treatments, medicines and vaccines. Some Member States are having systematic and national level discussions of likely ethical questions that may arise during a pandemic, including issues of shortages and prioritisation related to medical care. They are doing so by drawing on the work already done by WHO⁶² as well as other Member States. Some countries are also preparing messages that address public knowledge and preferences regarding ethical issues.

Surveillance, situation monitoring and assessment in a pandemic

There have been some initial developments by ECDC in this area⁶³ and there are now plans for WHO to develop guidance. Some Member States already have plans for surveillance during a pandemic, with special emphasis on the early determination of the essential parameters of a pandemic (viral characteristics, severity of disease, key transmission groups, etc) and methods for making *real-time* estimates and short-term projections of the numbers affected, severe morbidity and morbidity.

Member States are also considering how best to monitor activities in health and non-health sectors in order to manage resources and to know how these sectors are functioning; specifically, knowing whether they are coping or need more resources. ECDC recommends that these two areas 'surveillance' and 'service monitoring' be tackled separately.

Health services in a pandemic

Some countries are now integrating pandemic preparedness in the health sector across primary and secondary healthcare systems, training all healthcare workers as needed, and prioritising which core healthcare functions are to continue during a pandemic. This is not proving an easy process for busy health services with many other functions. However, it is

⁶² WHO Document: Addressing Ethical Issues in Pandemic Influenza Planning. (http://www.who.int/ethics/influenza_project/en).

⁶³ Influenza Surveillance in a Pandemic: Paper from ECDC Working Group, August 2007. (http://www.ecdc.eu.int/Health_topics/Pandemic_Influenza/pdf/070801_Influenza_surveillance.pdf).

considered an essential one as other acute needs such as obstetric services, care for the chronic sick and emergency services will clearly still be needed and citizens will expect them to continue during a pandemic. The integration of primary and secondary care is considered especially important so that the two do not come into conflict passing ill patients between each other.

Pandemic vaccines, antivirals and antibiotics

There are particular advantages to preparing EU-wide (EMA, ECDC and Member States, along with WHO) consideration of systems for determining and monitoring the effectiveness of medical countermeasures such as antivirals, antibiotics and pandemic vaccines including side-effects and resistance. Not all Member States will need to develop these systems if the results are shared; EMA and ECDC are clarifying their respective roles in coordinating this work.

Member States are developing plans for the deployment and delivery of antivirals. However, this is proving especially difficult because there is only a short period (24 or 48 hours) following development of symptoms in which the drugs have to be delivered. It is considered important that Member States share progress in this area though the systems they develop will differ according to the variety of primary care systems. It is now appreciated that more attention should be paid to supplies of other therapeutic agents during a pandemic, especially antibiotics.

Prioritisation of those for receipt of antivirals and specific pandemic vaccines is a complex topic and not one where Europe-wide solutions are possible. However, there is much to be gained from Member States sharing their plans with each other and with the European Commission, ECDC and EMA.

Communications

It is now accepted that while much work on communication can be undertaken before the event there will need to be 'surge capacity' for communication when the pandemic comes and this needs to be considered in the planning.

Under a group brought together by the Commission and ECDC, Member States are sharing information on pandemic messages and materials, incorporating mechanisms to reach minority populations and foreign nationals, including addressing language barriers. Coordinated messages for all healthcare workers within countries are essential and should include information on how they should reduce the risk to themselves and their families.

Interoperability between countries

Systematic discussions on pandemic issues are starting to take place between working-level policy officials in neighbouring Member States. However, there is yet to be a systematic survey of the policies that countries intend to pursue during a pandemic over topics like border controls, school closures, etc. There is also some interaction between Member States and countries bordering the EU to discuss and agree on a list of issues such as compatible arrangements for primary and secondary care, common communication strategies and messages, sharing triggering mechanisms and conducting cross-border exercises.



Local preparedness

This is an area deserving special attention if EU citizens are to really feel the benefit of the higher level planning. The ECDC 'Acid Tests'⁶⁴ provide a good set of bench-marks for what countries should strive to achieve.

Avian influenza

Information presented at the Fourth Pandemic Preparedness Workshop indicates that European domestic bird populations will continue to face occasional challenges from highly pathogenic avian influenza A/H5N1 and plans have to be made accordingly. Hence it remains important that high priority is given to animal health surveillance for the early detection of H5N1 and other avian influenzas, and that any such infection is rapidly contained.

A number of Member States are developing integrated or coordinated approaches to avian influenza and other zoonoses across the human health and animal health sectors. Joint CMO and CVO meetings at EU level took place in 2005 but these have not taken place more recently. It was suggested that these could usefully resume and expand discussions to include other zoonoses as well as avian influenza.

Given the global threat to human health from avian influenza there should be continued international support to strengthen the veterinary and public health infrastructure including surveillance and containment activities in resource-poor countries. It is self-evident that this should include ready sharing of epidemiological data and viral samples from human and animal cases of H5N1 among the global scientific community.

Research

Much good research work has been done on influenza in Europe, including that funded by the European Commission⁶⁵, individual MS and industry. However, there remain many important gaps. There needs to be more research at EU and MS level directed at, for example, improving vaccines, and understanding the mechanisms of influenza transmission, infection control and the effectiveness of public health measures and antivirals. Research on seasonal influenza will improve the understanding needed for pandemic preparedness.

⁶⁴ ECDC suggested 'Acid Tests' for helping assess, strengthen local preparedness for moderate or severe pandemics (http://www.ecdc.eu.int/Health_topics/Pandemic_Influenza/tests.htm).

⁶⁵ DG Research. Influenza research: EU-Funded projects 2001–2007. (http://ec.europa.eu/research/health/poverty-diseases/doc/influenza-research_en.pdf)

ANNEX 1

RESULTS OF SURVEY OF PREPAREDNESS INDICATORS FROM 30 EU AND EEA MEMBER STATES (SEPTEMBER 2007)

Goal	Key indicator	Current status
Seasonal influenza and virology		
1. An influenza surveillance system in place collecting epidemiological and virological information	Surveillance data published during the influenza season for: National Level? Administrative regional level?	30/30 (100%) 21/29 (72%)
2. National laboratory capacity able to provide timely, high quality, validated routine and diagnostic influenza laboratory support with committed budget to facilitate this work	National laboratory capacity to perform: Virus isolation? Influenza typing? Influenza sub-typing?	27/30 (90%) 28/30 (93%) 25/29 (86%)
3. National annual seasonal influenza vaccination programme in place achieving >75% uptake in over 65s and increasing uptake in occupational and clinical risk groups	National annual uptake in persons aged >65 available:	19/28 (68%)
Planning and coordination		
4. National planning committee/structure in place that has a coordinating role for pandemic preparedness	National planning committee/structure in place that has a coordinating role for pandemic preparedness If yes, % cross-sectional?	27/29 (93%) 22/28 (79%)
5. National pandemic plan consistent with international (WHO and EU) guidance, publicly available	National health sector influenza plan?	28/28 (100%)
6. National command and control structure in place for managing an influenza pandemic	National command and control structure? Health services command and control structure Cross-sectoral command and control structure	27/29 (93%) 28/29 (97%) 25/29 (86%)
7. National contingency plan for maintenance of non-health essential services, such as power supply, food distribution, etc, publicly available	National contingency plan for maintenance of non-health essential services?	12/29 (41%)
8. Potential impact of measures for neighbouring countries and the EU discussed	Joint work undertaken with neighbouring countries on mutually relevant policy areas?	18/28 (64%)



Goal	Key indicator	Current status
Situation monitoring and assessment		
9. Pandemic preparedness regularly and systematically tested at all levels and across sectors, including lessons learnt, report published and fed back into planning	National level health sector exercise specifically for a pandemic?	18/30 (60%)
10. Regional/local planning and coordination structure for pandemic preparedness in place	Mechanisms at central level foreseen to monitor and assess regional/local preparedness planning and coordination? If yes, cross-sectoral?	26/28 (93%) 19/24 (79%)
11. Regional/local health services able to cope with an influenza pandemic and continue to provide other essential services	Planning document issued to local health services which includes the nationally agreed parameters for which local services should plan (expected range of cases and percentage of staff off/sick)	22/28 (79%)
12.– 14. Ability to detect and investigate initial cases and to monitor the spread and impact during the different phases of a pandemic	12. Pandemic-specific surveillance plan for the detection of primary cases 13. Outbreak investigation capacity? 14. Pandemic surveillance plan to monitor mortality and morbidity during a pandemic	26/28 (93%) 30/30 (100%) 23/28 (82%)
Prevention, mitigation and treatment (includes health system response)		
15. National strategy for community non-pharmaceutical public health measures (travel, mass gatherings, school closures, etc.)	Group developed to develop such a strategy?	21/30 (70%)
16. National antiviral strategy developed, including plans for procurement, stockpile and delivery to patients	Antiviral strategy developed?	29/30 (97%)
17. National pandemic vaccination strategy developed, including procurement, distribution and targeting of pandemic vaccines	National pandemic vaccination strategy developed?	26/30 (87%)
Communications		
18. National communication strategy developed and published	National communication strategy? Material on pandemic influenza ready	25/30 (83%) 20/27 (74%)
Avian influenza		
19. National system in place for influenza surveillance in animals (including wild birds) which meets EU requirements	National system for influenza surveillance in animals?	30/30 (100%)



	Goal	Key indicator	Current status
20.	National capacity for managing an outbreak of HPAI with human health implications, developed in collaboration between health and veterinary authorities	Joint health and veterinary plan or complementary plans?	20/24 (83%)

*current status below 80% marked in yellow.



ANNEX 2 NATIONAL TEAM LEADERS FOR THE SELF-ASSESSMENT MISSIONS AND THE EXTERNAL MEMBERS, MEMBERS OF ECDC'S ADVISORY FORUM AND THOSE WHO CONTRIBUTED TO THE SPECIAL SESSION AT THE FOURTH EUROPEAN PANDEMIC PREPAREDNESS WORKSHOP IN LUXEMBOURG

Major contributors to the pandemic self-assessments 2005–07

Those identified were either on the central visits to the country or led the internal (national) team. No attempt is made to include all the many other national and local staff that were met or contributed to the report from the national side though they are listed in the national reports.

Name	Country or institution	Number of country visits
Adamčaková, Jaroslava	Slovakia	1
Amato, Andrew	ECDC	2
Amela, Carmen	Spain	1
Ammon, Andrea	ECDC	4
Boxall, Naomi	Czech Republic	1
Braun, Christian	Germany	1
Briem, Haraldur	Iceland	1
Ciancio, Bruno	ECDC	1
Ciotti, Massimo	ECDC	4
Clancy, Lisa	Ireland	1
Cody, Teresa	Ireland	1
De Martin, Sarah	ECDC	2
Depoortere, Evelyn	ECDC	2
Duncan, Ben	ECDC	2
Duns, Jeremy	ECDC	1
Ekdahl, Karl	ECDC	3
Erne, Sabine	Luxembourg	1
Fernandez de la Hoz, Karoline	ECDC	2
Furtunescu, Florentina	Romania	1
Giesecke, Johan	ECDC	5
Gilsdorf, Andreas	WHO	1
Gruntar Činč, Mojca	Slovenia	1
Haas, Walter	Germany	1
Habicht, Jarno	WHO	1
Hamers, Françoise	ECDC	1
Hansen Koenig, Danielle	Luxembourg	1
Hatzakis, Angelos	Greece	1
Hegermann-Lindencrone, Michala	WHO	3

Name	Country or institution	Number of country visits
Hrabcik, Hubert	Austria	1
Kaiser, Reinhard	ECDC	3
Karcher, Franz	Commission	1
Kocik, Janusz	Poland	2
Kravcenko, Olita	Latvia	1
Kreidl, Peter	ECDC	4
Kunchev, Angel		1
Kutslar, Kuulo	Estonia	1
Leitmeyer, Katrin	ECDC	1
Lopaco, Pierluigi	ECDC	2
Manissero, Davide	ECDC	1
Muchl, Robert	Austria	2
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Participants at a special session at the 4th European Pandemic Preparedness Workshop Luxembourg

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ANNEX 3

CONSOLIDATED RECOMMENDATIONS GIVEN FOR MEMBER STATES – WORK REMAINING TO BE DONE

These lists represent a compilation of the detailed recommendations agreed with EU-EEA Member States during the pandemic preparedness self-assessments that took place in 2007. They have been edited to standardise the language and terminology. Inevitably there is a degree of overlap and duplication in the topics. Some comments and elaborations have been added for clarity by ECDC staff.

Because not every assessment can cover all the topics that now make up pandemic preparedness they are listed here so that all Member States, especially those that underwent the process in 2005 and 2006 (when the assessments were more limited), can take advantage of them and see if the recommendations also apply to them.

1. Seasonal influenza surveillance

1. Extend sentinel seasonal influenza surveillance to include automated hospital and death surveillance based on syndromes and multiple ICD codes and/or all-age deaths.
2. Make primary care surveillance more robust so that it would be more likely to be sustainable in a pandemic.
3. Develop electronic reporting from sentinel GPs to ensure the simplicity of the system and make it less subject to the disruptive pressures that will result from a pandemic.
4. Extend the dates of seasonal influenza surveillance to cover the period outside the influenza season (noting that recently the influenza season has been starting and finishing later in recent years).
5. Expand the evidence base for public health action against seasonal influenza through the evaluation of the effectiveness of influenza vaccination and use of antiviral medications. **To be done by ECDC.**
6. Geo-code data on influenza cases so that they can be mapped using GIS mapping tools. Such a GIS approach would allow high-resolution identification of influenza activity throughout the country.
7. Inform GPs in a timely manner about the status of influenza activity nationwide to ensure and encourage their continuing participation in the surveillance system, and link the information to potential action (e.g. use of antivirals).
8. Increase local awareness in countries and communities at higher risk of avian influenza outbreaks⁶⁶ in domestic poultry. Plan for effective case detection of human AI infection to be

⁶⁶ ECDC Scientific Advice: Who is at risk of getting HPAI? Version 20 May 2006 (http://www.ecdc.europa.eu/Health_topics/Avian_Influenza/pdf/Table_Who_is_at_risk_H5N1.pdf).



used in areas with bird outbreaks and test the Draft ECDC Tool-kit for outbreaks. **ECDC to make this available.**

2. Seasonal influenza vaccination programmes

1. Immunisation for influenza in the EU is usually generally lower than that agreed by the World Health Assembly⁶⁷. Interventions should be initiated at different levels in order to seize all opportunities to inform and vaccinate the risk groups.
2. Routinely collect data on vaccine uptake in the target high risk groups and healthcare workers in order to better define specific immunisation strategies. **ECDC to prepare guidance on how this can best be done.**
3. Acknowledging the difficulties in identifying high risk groups, efforts should be made to improve mechanisms for collection of data on vaccine uptake in such groups.
4. Wherever possible administrative methods to routinely monitor vaccine uptake by providers and detect under-performance should be developed in preference to survey methods.
5. Where administrative methods will take some years to develop, use telephone, or other surveys in the mean time, performed by national authorities and routinely supplement them with the estimates of total numbers of vaccines used in a season.

3. Public health institutes

1. Public health institutes (PHIs) are to be found in many, but not all, EU countries albeit in different forms. They will play an essential role in preparing for pandemics as part of whole health sector and whole government approaches. However, they cannot undertake the whole responsibility for pandemic preparedness any more that they can deliver the national response during a pandemic.
2. Each function potentially allocated to a PHI needs to be examined critically to ensure that it is best done by the Institute rather than by the Ministry or another body.
3. Like other key players during a pandemic, PHIs need to have strong business continuity plans that can be used to reallocate staff and sustain the response through the months of a pandemic.
4. PHIs are often well placed to provide expert scientific advice in preparing for a pandemic and during a pandemic itself.
5. PHIs need exceptionally good communications with ministries of health, other bodies and other parts of the country. They will need robust emergency operations centres (EOCs) to achieve this. These are also needed for other operations.
6. There are advantages to PHIs sharing facilities with other similar institutions (e.g. veterinary institutes).

⁶⁷ Prevention and control of influenza pandemics and annual epidemics, 56th World Health Assembly, 28 May 2003 (http://www.who.int/gb/ebwha/pdf_files/WHA56/ea56r19.pdf).

7. PHIs should prepare to undertake the role of providing surveillance during a pandemic. However, they cannot take on the broader role of monitoring of national functions, and the two should be separated.

8. There are a number of central functions and capacities that PHIs should have. These include national surveillance, modelling and training.

4. Influenza laboratory capacity, National Influenza Centres

1. Triggers for changing and amending the test strategy during a pandemic should be formally defined and agreed (i.e. at what level efforts would be made to test all those thought to be infected).

2. Where one does not already exist, there needs to be a nationally recognised reference centre for influenza that should also be a WHO-recognised National Influenza Centre (NIC). This centre should also have a national responsibility for quality assurance schemes and should be resourced accordingly. The level of national capacity should not be less for human influenza than it is for animal influenza.

3. NICs are best placed within a PHI or should work very closely with them so that they can deliver integrated virological and epidemiological surveillance.

4. National reference centres would need adequate space and proper BSL3 facilities. Standards should be agreed across the EU.

5. Central laboratory surge capacity under adequate biosecurity conditions should be secured.

6. There should be frameworks and protocols for inter-pandemic population-based serological surveys undertaken in some countries so as to determine the incidence of influenza.

7. Regional laboratories in a country should be coordinated under the NIC so there is one unified system.

8. Initiatives for training laboratory personnel and activities to expand regional laboratory capacity should be supported to allow for up-scaling activities when necessary such as during a pandemic.

9. In countries where more than one national reference laboratory or NIC exists, the respective roles and responsibilities of the NICs should be reviewed and agreed and the organisational structure and flow of information between laboratory networks should be reviewed. Also practical laboratory plans for use in Phase 6 at the national and regional levels should be developed, including how and when clinical testing will be turned on and off, and how the laboratory staff and functions will be protected, e.g. through formalisation of special recruitment procedures to increase capacity.

10. Laboratory plans should explicitly refer to operations in two circumstances: a) during an H5N1 outbreak involving humans; and 2) during a pandemic. The latter should include an explanation of when the laboratory would move from testing all specimens to only sampling. There should also be explicit plans for providing surge capacity.



11. Ensure there is more than one virologist at a national level. This is necessary to provide continuous service. This will be even more important in a pandemic because of the higher demands of laboratory services during a pandemic (more tests, short turnover times), but also because the staff will fall sick.
12. Plan so that diagnostic capacities can be increased when needed through developing and rolling out rapid testing capacities in peripheral laboratories with testing for the new pandemic strain.
13. Routine primary virus detection and identification capabilities should be further developed at other local institutions to partly take over the pandemic diagnostics from the NIC and allow it to focus work on better characterisation of the emerging threats (new or changing viruses, markers of antiviral resistance).
14. Policies for handling samples from humans with suspected HPAI should be developed further, including written SOPs and higher biosafety level BSL2+ for preparation of the unknown sample for PCR analysis.
15. Link in with other national laboratories in Europe through the EISS Community Network of Reference Laboratories to agree who performs what for Europe with regard to specialist work, such as testing for antiviral resistance, especially during a pandemic.

5. National planning and coordination

1. National authorities need to develop mechanisms for ensuring that their regions will work together in a pandemic. National exercises will assist in this. There are models from other countries that ECDC should draw to their attention but probably a solution would need to be devised to suit the specific country.
2. A country with a more federal structure and where healthcare is a devolved responsibility requires more, rather than less, management capacity centrally to ensure national coordination and interoperability.
3. Pandemic preparedness should include emergency scenarios that differ from a short-term, localised disaster type (i.e. scenarios for which experience of the civil protection agency and other bodies may be limited). Classical hospital emergency plans generally do not transfer easily to pandemics without major adaptation.
4. All levels of the health administrations should consider how they would maintain services over a sustained period of up to four months with staff illness of up to 20% at some points. Higher levels of the administration should consider how they would relieve intense pressure at lower level administrations.
5. Pandemic planning should be moved out of the health sector and broadened to include other parts of government. Particular consideration should be given to making preparations on the maintenance of essential services in a pandemic, including the supply of food, water and energy.
6. Ensure there are resources and plans to rapidly reinforce the existing 'flu teams' and sustain the response for several months.

7. Triggering points should be defined and consideration be given to having 'forward look' groups that would convene in a pandemic to anticipate needs in the near and medium future of the crisis.
8. There should be guidance on hospital management planning during a sustained crisis like a pandemic with tools to estimate impact and needs. This needs to be developed centrally with local authorities assisted in their operational planning process as well as in conducting simulation exercises to test the level of preparedness. National plans should then have 'reality checks' through local exercises.
9. Pay special attention to the provision of emergency supplies (e.g. antivirals, masks) and procedures for their access and distribution require special attention and planning (e.g. definition of priority groups).
10. Consider the implications for providing surge capacity staff from sources such as medical students, retired staff, etc, and develop further planning on these issues. This includes ensuring there is a legal basis for their use.
11. Development and testing of curriculum and materials for short practical courses on influenza and infection control for surge capacity staff.
12. The national coordination structure should build a monitoring system aimed at measuring progress in operational planning and its implementation at local levels. This should include a clear list of indicators and analytical capacity to provide information for decision-making at local, regional and federal level specific to their competence and responsibilities. This would be particularly valuable when planning for health crises in large federal countries.
13. There should be central spreadsheets to monitor how different sectors are performing during a pandemic and these should be tested in national exercises. **ECDC to provide examples from other countries.**
14. Vulnerable groups (those living in rural areas, the poor, retired, minority groups, etc) should be identified and plans made on how to reach and protect them during a pandemic. Ensure that representatives of these sectors of society are involved in discussions.
15. Where most of the initial efforts have been made preparing for avian influenza the work should move on to preparing for pandemic influenza.

6. Legal issues

1. Legal frameworks should be established and be coherent with international legislation (International Health Regulations).
2. Legislative developments should be made that improve the ability to centrally manage large scale complex national outbreaks, epidemics and pandemics. Testing this system could be one of the goals of a national exercise.
3. Legal framework may be for emergencies in general or for specific diseases such as a pandemic or an unknown / novel emerging infection. If emergency legislation does not cover pandemic influenza, potential time delays to adapt the current law should be discussed. Examples of legal issues that might need to be addressed are many but include:



- the enforcement of quarantine for cases or suspected cases (overruling individual freedom of movement);
 - use of privately-owned buildings for hospitals;
 - off-licence use of drugs where necessary – for example, prolonged use of antiviral drugs after the expiry of the normally accepted shelf-life;
 - ability to close schools for medical reasons;
 - implementation of emergency shifts in essential services.
4. Ethical committees may need to be involved in some discussions on legal issues and vice versa.
5. The legal basis for the public health measures should be judged against the broader public interest.

7. Ethical issues

1. Pandemics will bring ethical dilemmas because the medical need will exceed supplies (antivirals and intensive care) and one particular countermeasure (specific pandemic vaccine) will only become available slowly. Governments or Ministries of Health should anticipate these issues. This can be done either through pre-existing or special committees to advise them on the special ethical issues that arise during a pandemic.
2. Public health authorities should identify issues for the consideration of ethical committees.
3. Mechanisms should be put in place to allow the ethical committees to be contacted and consulted quickly during a pandemic. ECDC should direct the authorities to other countries (e.g. UK, France and Finland) that have developed such mechanisms.

8. Maintenance of basic services in a pandemic

1. Work should be undertaken by/with the other Ministries to ensure that basic services are sustained in their area of responsibility as well as for Ministry staff during an influenza pandemic.
2. It should be clarified whether or not there are high-level plans prepared under other Ministries for the maintenance and monitoring of essential services during the pandemic.
3. A severe pandemic would be analogous to an external assault on the country. Authorities should review whether current models for dealing with such events (crisis management plans) would be appropriate during a severe pandemic, especially if the maintenance of basic services such as power, food and fuel distribution is threatened.
4. The authorities should examine how best to integrate preparedness across the non-health sectors at the national level.
5. A framework should be developed for private companies and other non-health sectors, essential to the continuity of essential functions during a pandemic.

6. Examples of guidelines of business continuity in the private sector produced in Ireland to encourage private sector planning should be developed to further improve business continuity.

9. Simulation exercises

1. There are advantages to working towards national multi-sectoral exercises in 2008 or 2009 to give a focus to pandemic planning and preparedness especially in non-health sectors.
2. National and regional simulation exercises (including cross-border exercises) should be used to identify weak points in the planning and further improve preparedness. There should be further exercises organised at national and local level. Extensive and sustained command post exercises should be undertaken at national and state level. As opportunities arise these arrangements should be tested out in other health events and crises.
3. Focused local exercises should be planned and carried out in order to make local plans operational and test their capacity to manage the large number of people that could be requiring care during a pandemic.
4. The work required to plan and organise exercises should not be underestimated.
5. There needs to be mechanisms for measuring the effectiveness of simulation exercises which should be spaced out so as to allow for proper feedback and assimilation of the lessons. Specifically there needs to be efforts to avoid 'exercise exhaustion' among central staff.
6. Local and focused exercises can be done to investigate particular issues (e.g. managing patients in primary care, hospital preparedness, antiviral distribution, communications, etc).
7. Regions, and even more local authorities, should be encouraged/required to organise and conduct their future exercises and to consider the lessons learnt from the ones undertaken at national level and vice versa.
8. Through exercises, ensure a programme of regular testing of regional pandemic plans and their interoperability.
9. Consideration should be given by national authorities to the development of an exercise toolkit for use at regional levels, including basic scenarios, etc.
10. So called 'exercise banks' can be expanded to include best practices from regions on pandemic preparedness.
11. As an indication of priority it is suggested that the following set of exercises can be conducted.

Desktop:

- Infection control during Phase 6 in one or more hospitals.
- Triggering of provincial emergency mechanisms and sustained management for a long period, including essential services other than health.
- Implementation of public health measures in one or more regions with cross-border issues.



Command Post:

- Crisis management during a peak of phase 6 with interaction with media, addressing specific competences of partner institutions and their respective line of command
12. Preparedness exercises concerning 'bird flu' including scenarios with bird outbreaks and transmission to humans are needed at the national and regional level. **ECDC to organise this with veterinary authorities at EU level.**
13. Adapt exercises developed in other countries for countries where specific exercises have not yet been organised. **ECDC to alert Member States on exercises undertaken in other countries through the pandemic good practices innovations pages⁶⁸ on its website.**

10. Avian influenza (H5N1) issues

1. As interest in avian influenza declines attention should be paid to how the good relationships between Ministries of Health and Agriculture can be maintained and extended to other zoonoses.
2. Each State should have and practise an operational set of arrangements between human and animal health services for dealing with a zoonotic crisis, including having the ability to focus forces at an outbreak.
3. Plans of States/regions in federal countries should be reviewed to a national specification on the issue of whether it is clear what protection should be given to those engaged in control during an outbreak in poultry and that these plans are practical. It should be checked that the lessons learnt from the avian influenza crisis have been implemented at the local level.
4. The risks to humans from culling in non-H5N1 avian influenza outbreaks should be assessed within the hierarchy of risks. This should be done by linking with ECDC which is doing a short risk assessment on this and the other countries having discussions on this aspect (Denmark, Netherlands and the UK). **ECDC to undertake a (non-H5N1) risk assessment.**
5. There should be more integrated operational plans for human and animal health responses to animal cases as recommended by WHO and using the ECDC toolkit.
6. Attention should be paid to the laboratory surge capacity and an interim emergency plan be developed in case of outbreaks.
7. The national case definitions of avian influenza in humans should be harmonised with the new EU case definition.
8. Systems and routines for active case detection of human cases of AI (taking into account the possibility also of mild disease) should be in place and well known to local doctors.

⁶⁸ ECDC Pandemic preparedness innovations.
(http://www.ecdc.eu.int/Health_topics/Pandemic_Influenza/innovations.html).

9. Avian influenza emergency plans (including animal and human health) should be part of pandemic preparedness plans.

10. There should be an agreed strategy for the use of antivirals in a containment approach and technical factsheets should be offered for formal endorsement by professional bodies and then extensively distributed. It seems necessary to also explore the feasibility of protection of the healthcare workers most exposed to risk during the early phases, and the use of antivirals for vets and poultry workers should be described and made operational.

11. The plans for the human health and animal health response to outbreaks should be either integrated or closely linked. **ECDC should ensure this also happens at an EU level.**

11. Pandemic surveillance, situation monitoring and assessment

1. Where possible, an electronic integrated system should be set up that links the entry points in the health centres and hospitals. Computerisation of surveillance data would increase system ease of operation during a pandemic.

2. Separate the issue of 'monitoring' from 'surveillance' the latter should be orientated and linked to public health action using the working paper developed by ECDC in conjunction with experts from MS and from other EU partners. **ECDC to make available the 'Surveillance in a Pandemic'⁶⁹ paper.**

3. It should be made explicit who will undertake situation monitoring during a pandemic, and develop coordination between this monitoring system and a separate surveillance system.

4. Surveillance plans should be developed and made coherent with objectives and decision points that will operate under the stress and strain of a pandemic.

5. Surveillance plans should include exercises where those who will expect outputs from the surveillance should participate so that they do not have unrealistic expectations of what outputs can be produced during a pandemic.

6. Plans for situation monitoring systems and reports should be developed in advance of a pandemic.

7. Specific teams should be identified, in addition to the staff doing routine surveillance, to carry out specific studies to collect essential information during the pandemic.

8. Specific studies (pragmatic surveillance in a pandemic) should be further developed defining the outputs that would be needed to inform action, e.g. for evaluation of interventions. ECDC should assist in the coordination and the exchange of information at EU level since some studies will be done in few countries and the results should feed back to the rest.

9. The following kinds of information will be needed: number and characteristics of ill persons; severity (for resource allocation, treatment and further planning); deaths; adverse vaccine events; treatment failures.

⁶⁹ Influenza Surveillance in a Pandemic: Paper from ECDC Working Group, August 2007. (http://www.ecdc.eu.int/Health_topics/Pandemic_Influenza/pdf/070801_Influenza_surveillance.pdf).



10. Developing near real-time modelling ('now-casting' and short-term forecasting) combining modelling and surveillance data and expertise to produce regular outputs early in a pandemic drawing on developments in other countries and future meetings being convened by ECDC.

11. Criteria for when to scale down collection of routine surveillance data (both epidemiological and laboratory diagnosis) should be defined ahead of time.

12. Planning for monitoring health crises in a federal country produces special difficulties. A structured reporting system based on a clear set of indicators self-assessed at all levels should be rapidly developed and adopted to facilitate the task and provide the central level with up-to-date knowledge and monitoring of the status of preparedness of the country, including information on available resources within (and outside) of the health sector.

12. Outbreak investigation capacity, general and during a pandemic

1. Consideration should be given to how national and local experience with outbreak investigation for other infectious diseases can be utilised during the first part of Phase 6 of a pandemic.
2. To strengthen outbreak investigation capacity, dedicated resources and personnel have to be identified (including alternates) and committed and responsibilities have to be allocated to the staff involved.
3. Out of hours service should be in place for outbreak detection and investigation.
4. A legislative basis for the early involvement of national public health/surveillance institutes in significant local outbreaks should be developed where needed.
5. The WHO plan for rapid containment⁷⁰ should be used in the case of the emergence of a pandemic strain within or close to the EU/EEA area.
6. Develop thinking and clarify policy and protocols around use of antivirals for PEP in avian influenza incidents (WHO Phases 3–5) and early pandemic cases (WHO Phase 6).
7. If it is decided to develop the option of containment around the first cases in a country after world-wide spread has started there should be clear criteria for when attempts are abandoned.
8. At national level, protocols for national assistance in major outbreaks, including protocols for unusual types of outbreaks such as a pandemic, should be developed and tested with the involvement of local medical officers.
9. Protocols for activities during nationally coordinated outbreaks should be developed at a local level.
10. Review the capacity in terms of human resources for outbreak investigation at the local level, and strengthen it where necessary.

⁷⁰ WHO Interim Protocol: Rapid operations to contain the initial emergence of pandemic influenza. Updated October 2007. (http://www.who.int/csr/disease/avian_influenza/guidelines/draftprotocol/en/index.html).

11. Consideration should be given to establishing national training of local staff through field epidemiology and microbiology training programmes that would undertake nationally-directed investigations during a pandemic. The same training will be used to strengthen national and local capacity to protect the health of the public against other threats.
12. The already existing training options for public health officers should be continued. The close cooperation with WHO and ECDC in the field of training for outbreak investigation should be continued in order to educate key persons as regional level 'multipliers', who educate their staff within the region.
13. Outbreak capacity should be highlighted in any review of public health capacity.
14. Exercises to assess the functioning of alert systems for outbreak detection during Phase 6 should be conducted within national and local outbreaks.
15. Outbreak investigation plans should emphasise more the necessity of management of single outbreaks (e.g. avian flu) in order to allow the public health authorities to apply the full range of containment measures and antivirals in a timely manner. All staff expected to participate in this task should receive simple but special training in the epidemiological investigation of these or similar outbreaks.

13. Planning assumptions

1. It is important, especially for federal countries, to have national planning assumptions – that is the range of numbers of patients that local and regional units of primary and secondary care can be expected to have to deal with in Phase 6 along with levels of absenteeism.
2. Centrally agreed planning assumptions should be published to ensure that all parts of the country are working to a single range of assumptions. More extreme assumptions should be avoided.
3. Estimates should also allow for more intense pressures of morbidity and mortality at local level including pressures involving up to 20–30% sickness absence. **ECDC should produce recommended planning assumptions for European countries at different administrative levels, based on what some Member States have already developed.**
4. It is important that accurate inventories of resources are available to use as a baseline for planning purposes.
5. Modelling capacity should be further developed either at national level or to extend across groups of countries. Special emphasis should be made concerning practical operational planning which is usually neglected by academic investment.
6. Where assumptions have been developed for hospital planning, this should be expanded to plan other essential services as well (e.g. primary health care, food, transport, etc.). This would be essential to determine the required surge capacity and to prioritise the resources.



14. Antivirals and other medicines and supplies needed for health care

1. Local public health authorities should urgently develop models and practical plans for the timely delivery of antivirals to individual patients in the event of a pandemic. These would need to be centrally coordinated though there may not be just one single model suitable for any single country.
2. Although plans for acquiring and managing stockpiles at national and regional level have been developed, it should be clarified what would happen in Phase 6 at the very local level in primary care.
3. The logistics for the distribution of antivirals should be further developed at strategic and local levels. This should include piloting and exercising the proposed mechanisms for distribution and management of antivirals and antibiotics at the local level and their more strategic use across the country.
4. Technical plans on use of antivirals should be offered for formal endorsement by professional bodies and then extensively distributed.
5. The plans for the therapeutic use of antivirals have to be further refined: currently stocks are available on national level for prophylactic use. There should be a preparedness concept for the therapeutic use of antivirals.
6. Training those in primary care in the use of antivirals during the influenza season based on antiviral indication for high risk groups.
7. There should be stockpiled supplies of antibiotics for use in a pandemic as local supply capacity will be exceeded by demand and there may be difficulties in delivering further supplies at the height of a pandemic.
8. Where they do not already exist, consider developing monitoring mechanisms for utilisation of hospital services (pressure on hospitals) including maintaining flows of relevant hospital supplies.
9. National mechanisms should be developed for the strategic management of antiviral stocks, for monitoring levels and predicting when they will be exhausted, for equitable distribution (so that areas that are affected late in a pandemic are not deprived), and for changing indications at a national level.
10. Test the delivery of antivirals and antibiotics and other strategic supplies from national stockpiles to the local level and down to the patient level.
11. Develop national guidance on when and how to give antivirals to healthcare workers and ill patients.
12. Each hospital should do their own small-scale simulation exercise and amend plans accordingly.
13. There is also a need to develop more general solutions for the mass distribution of medicines following the laws and regulations in place.

14. During the pandemic, there should be mechanisms in place to document whether antivirals are effective and what kinds of side effects occur.
15. Monitoring of antiviral resistance is recommended.

15. Public health measures and personal measures

1. So that these can be effectively planned and implemented, a cross-sectoral approach should be made involving different governmental authorities and ministries.
2. Work on non-pharmacological public health measures should continue in a systematic way in the coming one to two years, taking advantage of common EU approaches as they develop and drawing on the ECDC 'Guide to public health measures'⁷¹ as a technical resource and as a tool for discussion.
3. There should be common discussion of the most difficult public health measures at the EU level between Member States.
4. Prepare information materials for the general public on non-pharmacological personal measures and public health measures utilising the guidance produced by ECDC⁷² and WHO⁷³, and include these in communication packages.
5. Information kits should be prepared drawing on the ECDC guidance⁷⁴ containing clear instructions to members of the public so that they can protect themselves and their families. These should be developed for seasonal influenza so that the public is used to them well ahead of a pandemic.
6. ECDC should propose that WHO takes on responsibility for the grading and basic description of pandemics.
7. The legal basis for the public health measures should be judged against the broader public interest.
8. It should be noted that during Phase 6 of a pandemic there is, according to WHO⁷⁵, little value in exit/entry screening, but as in other circumstances people who are acutely unwell should not travel.

⁷¹ ECDC Pandemic Public Health Measures Menu.
(http://www.ecdc.eu.int/Health_topics/Pandemic_Influenza/phm%20.html).

⁷² Personal (non-Pharmaceutical) Protective Measures for Reducing Transmission of Human Influenza – Interim ECDC Recommendations. (http://www.ecdc.eu.int/documents/pdf/PPHM_Recommendations.pdf).

⁷³ ECDC Pandemic Public Health Measures Menu.
(http://www.ecdc.eu.int/Health_topics/Pandemic_Influenza/phm%20.html).

⁷⁴ Personal (non-Pharmaceutical) Protective Measures for Reducing Transmission of Human Influenza – Interim ECDC Recommendations. (http://www.ecdc.eu.int/documents/pdf/PPHM_Recommendations.pdf).

⁷⁵ ECDC Pandemic Public Health Measures Menu.
(http://www.ecdc.eu.int/Health_topics/Pandemic_Influenza/phm%20.html).



16. Pandemic vaccines

1. Discussions at national level should be commenced and work should be undertaken on refining detailed plans as to how the pandemic vaccine will be prioritised and delivered when it becomes available.
2. In parallel to securing supplies, detailed plans should be drawn up as to how the pandemic vaccine will be delivered to the population. This includes planning the logistics for mass vaccination, and also some advance thinking on planning the prioritisation within populations (including the ethical considerations).
3. When a new vaccine is introduced a system needs to be in place to practically monitor the effectiveness and side effects of the vaccine. This should be based on systems that work routinely with seasonal influenza. **ECDC should discuss this with EMEA.**
4. There should also be discussion over whether an H5N1 human vaccine (pre-pandemic) should be considered, drawing on the technical guidance produced by ECDC⁷⁶ and the work of EMEA.
5. Given the availability of human H5N1 vaccines, attention should be given to the acceptability and delivery to specific groups.
6. National authorities should continue to develop their pandemic vaccine policy, including considering the option of having available human H5N1 vaccines and discussing these options with other European states.
7. For countries with low seasonal influenza vaccine uptake, efforts should be made to achieve a higher coverage in risk groups because, in addition to the primary benefit, this would be likely to positively affect the country's capacity to deliver pandemic vaccines when needed.
8. Plans for rapid mass-distribution of vaccine may be built upon other mass emergency vaccination programmes that have been already tested in exercises (e.g. smallpox vaccines).
9. Since clear strategies for the use of antivirals and plans to purchase pandemic vaccines are difficult to make, more consideration needs to be given to protect crucial workers including healthcare personnel, to plan for personnel surge capacity, and to respond to the first phase of person-to-person transmission in the population.
10. MS should comply with the procedures put in place by EMEA for the monitoring of adverse events following immunisation and with attempts by ECDC, EMEA, the Commission and WHO to pre-plan methods for evaluating whether credible adverse events are real or not.

17. Interoperability issues

1. Bilateral discussions should take place between neighbouring states both at the national level and by the regions where this applies.

⁷⁶ ECDC technical report: Expert advisory groups on human H5N1 vaccines: Scientific Questions. Stockholm, August 2007. (<http://ecdc.europa.eu/pdf/Sci%20Questions%20final.pdf>).

2. Regions with external borders should be encouraged to undertake cross-border command post exercises with neighbouring countries during national exercises so as to explore interoperability. Lessons learnt from these exercises should be reported via the national level to ECDC and the Commission.
3. National pandemic plans should be discussed, and tested, with neighbouring countries.
4. Cross-border exercises with external observers at each other's national exercises should be encouraged.
5. The European Commission should be encouraged to facilitate these bilateral arrangements by having multi-national discussions, for example, under the Health Security Committee.
6. Common solutions, cross-border co-operation and regular communication need to be developed among neighbouring countries.

18. Resilience of state and local healthcare systems

1. All levels of health administrations should consider how they would maintain services over a sustained period of up to three months with staff illness of up to 20% for some short periods. Higher level administrations should consider how they would relieve intense pressure at lower level administrations.
2. The ECDC 'Acid Tests'⁷⁷ should be used to give necessary targets so that local services can be ready to ensure that citizens would benefit from the national plans and preparedness.
3. Special attention should be paid to protecting staff in a pandemic though, as for other infections, personal protective measures and equipment need to be balanced against operational considerations.
4. Implement the regional and local planning, in collaboration between the authorities and the health organisations and institutions.
5. The primary care organisation and the capability of GPs to continue their activity during the crisis should be extensively tested through simulation exercises.
6. There should be a requirement that all hospitals have a pandemic preparedness plan working to nationally agreed local planning assumptions. Models for such preparedness should be developed. These are likely to be distinct from conventional hospital emergency plans or at least have significant variations.
7. Consideration should be given to identifying specific regional hospitals to act as reference hospitals to meet the increased demand.
8. Distribution of antiviral medication and masks to the primary healthcare personnel should be subject to local mathematical modelling as well as part of simulation exercises.
9. Further discussions are needed on the role of pharmacists in administering antiviral medication and antipyretics.

⁷⁷ ECDC suggested 'Acid Tests' for helping assess, strengthen local preparedness for moderate or severe pandemics (http://www.ecdc.eu.int/Health_topics/Pandemic_Influenza/tests.htm).



10. A variety of models for delivering antivirals should be explored and tested with operational modelling and small scale exercises.

11. There need to be intensive information and education campaigns to inform healthcare workers. These should include advice on how to rapidly train workers to perform different tasks during a pandemic from those that they usually undertake.

19. Hospital preparedness

1. Models of resilience for preparing hospitals for Phase 6 should be devised with the aims of hospitals protecting their staff, providing essential services and dealing with severely ill influenza patients. This should be done drawing on work undertaken by WHO, ECDC and other European countries.

2. Guidance on hospital management planning during a long crisis with tools to estimate impact and needs will need to be developed at central level and local authorities assisted in their operational planning process as well as in conducting simulation exercises to test the level of preparedness.

3. Support for hospital managers in planning for pandemic preparedness should be developed.

4. Hospital preparedness should be evaluated by the competent authorities against some standard pandemic assumptions. Hospitals would need national guidance on when and how to give antivirals to healthcare workers and ill patients.

5. Mechanisms should be devised for the systematic auditing of local preparedness using or adapting ECDC's 'Local Acid Tests'⁷⁸.

6. All hospitals should be required to have a pandemic preparedness plan agreed nationally and locally and based on planning assumptions produced by national authorities.

7. Stockpile capacity should be checked in each hospital and, where not available, plans should be developed to centralise shared stocks.

8. Each hospital should undertake their own small scale simulation exercise and amend plans accordingly. Lessons from these exercises should be shared across the health services.

9. Recommendations should be made on how local secondary care systems (e.g. hospitals and care homes, etc.) should function during a pandemic.

10. Non-infectious diseases (ID) hospital services should be engaged in pandemic preparedness, through education and training. There should be further planning to prepare non-ID hospital services to cope with pandemic 'overspill' and more emphasis on infection control training to cope with a medium/low hazard.

11. Expand general business continuity planning for hospital functions to include pandemic provisions.

⁷⁸ ECDC suggested 'Acid Tests' for helping assess, strengthen local preparedness for moderate or severe pandemics (http://www.ecdc.eu.int/Health_topics/Pandemic_Influenza/tests.htm).

12. Develop monitoring mechanisms for utilisation of hospital services (pressure on hospitals) including maintaining flows of hospital supplies.
13. Sharing plans between hospitals to provide specific ideas which could further improve individual hospital plans.
14. At hospital level specific training on case-finding, risk assessment, clinical management (including treatment policies on antivirals and antibiotics), triaging, lab support, and infection control practices should be developed locally and shared across EU countries.
15. Special attention needs to be paid to how local primary care, social care and hospitals will work together during the combined stress of surges in people needing care and significant temporary loss of staff through illness.

20. Local public health manpower

1. It should be considered nationally as to whether the public health manpower is adequate at the local level for supporting a response to pandemic influenza and other crises.
2. A public health out of hours service should be set up where it is not already in place.
3. Allocating resources for pandemic preparedness has to be managed within overall staffing resources and with regard to other competing demands and has to be based on making the best use of existing resources, including through improved work practices and skill mix where appropriate.
4. There should be an inventory of trained medical personnel (public health officers, doctors in hospitals and private practice) in the different medical fields needed during the response to a pandemic.
5. Authorities should consider investing resources in the development of a field epidemiology training programme so as to strengthen local public health capacity that could be utilised in a pandemic.
6. Training in epidemiological investigation should be on general public health and thus a worthwhile investment independent from a pandemic.

21. Large cities' pandemic preparedness

1. Exercises on decision-making level in crisis management in the EU capitals are recommended, with the health sector in a supporting but not decisive mode. Better delineation of competences between public health institutions and among different crisis management institution should be carried out.
2. A balanced approach may be required in order that the capital is not deprived of its vital international personnel and so as not to paralyse regional transportation (for example, in the case of border closures).
3. Additional burden on public health in the city and the airport should be anticipated to retain business continuity.



4. Consideration should be given to the suggestion from Berlin authorities of organising a meeting on pandemic preparedness in large European cities.

5. Stockholm's work on the potential impact of a pandemic on the transport system is innovative and interesting, and can be usefully shared with others.

22. Communications

1. There should be more communications on the basic influenza facts and protection against seasonal influenza as preparation for a pandemic.

2. It will be important to determine in pandemic planning that there are clear definitions for each of the phases of 'strategic communication' which involves all the relevant sectors of government (national and local levels), their administrations, and national/international organisations to ensure consistent and accurate messages to the public.

3. Structured communication plans should be developed at federal, regional and local level for the pandemic period (WHO Phase 6) as well as the pandemic alert period (WHO Phases 4 & 5). This should be done so that the messages coming from the human and animal institutions are clear and harmonised whether from federal, regional or local institutions.

4. Preparation of ready-to-use media briefings and nomination of pandemic spokespersons at national and local levels should be undertaken to meet the demands for communication in the event of a pandemic or even for extended inter-pandemic periods.

5. Ready-to-use messages should be used for the public media and health professionals.

6. There should be networking about communication amongst key stakeholders, including risk communicators, non-health government departments, and professional and technical groups early on in any national or regional simulation exercises.

7. Surge capacity plans should be developed to deliver what would be expected in a pandemic when communication staff will be working under pressure for six months or more and with the same levels of staff absenteeism as any other parts of society.

8. There should be a critical review of the communication strategy at operational level to ensure that material and capacity identified are able to cope at the height of a pandemic.

9. Communication exercises for other health issues should be used to test communications systems in a pandemic.

10. Operationally a horizontal communication staffing will be needed and prepared for in order to release key coordinators at the top of the ministries to reinforce the staff capacity for a pandemic.

11. While a close relationship between risk assessors and communicators is useful and gives information credibility, it is important that the public is clear that decisions are ultimately political, and although they must be guided by science-based risk assessments, these should not be used erroneously in the communication of pandemic action.

12. Communication plans are heavily based on a 'top down' approach from national to federal level. It is important therefore that federal-level communicators fully buy into this strategy,

and implement it to ensure consistency. Central to this is clearly defining and communicating trigger points when moving to different phases of the national communication strategy to all communication officers at federal level.

13. Communication channels are understandably reliant in the continued maintenance of key infrastructures, such as websites and telecommunications. It will therefore be useful to consider innovative approaches to communication in the event that such infrastructures are not functioning.

14. There should be further development of messages concerning use of public health measures and personal protective measures (early self-isolation, hand-washing, etc.) in the overall communication plan using the media and/or other institutions to spread messages to more remote and marginalised communities in the country.

15. Telephone hotlines should be tested to ensure that there is both the capacity and robustness to function efficiently in a pandemic situation, including, for example, how the required manpower and logistics for this will be managed, particularly given staff absenteeism, etc.

16. Response mechanisms that are not people dependent (given that many staff will be ill during the pandemic) should be investigated, e.g. use of voice recognition technology in terms of phone line response.

17. Communication centres should have the support of adequate IT equipment.

18. Healthcare workers are deserving of special attention. Particular care needs to be taken to communicate about staff protection. There should be joint efforts from the ministries of health and public health institutes to determine who has responsibility for educating healthcare workers about avian and pandemic influenza, and how this will be achieved in a widespread and systematic way.

19. There needs to be clarity and pre-planning on who would speak on health service functioning and broader service issues ahead of the pandemic.

20. More pandemic communication awareness and activities should be undertaken at the regional, provincial and local levels. Communication should also focus on raising awareness in other sector departments less prone to consider themselves at risk of impact by the pandemic.

21. Studies should be conducted to better understand what the public currently understand and what advice they perceive they will need if the pandemic threat increases.

22. Consideration should be given to the development of a one-channel information source for flu pandemic, i.e. development of a web portal, following on from the positive avian flu response.

23. Press conferences should be linked with any new information available (e.g. the publication of the communications plan detailing all messages and forecasting numbers that will fall ill, hospitalisations and deaths or announcements of money to be spent by government to fund vaccines).



24. Development of training courses and materials for health staff for use in preparation for a pandemic would be beneficial.

25. Apart from the general population, material specific to target groups could be developed for special groups (e.g. for immigrants and other minority groups).