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European national strategic plans for pandemic influenza

Progress and shortcomings in European national strategic plans for pandemic influenza

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Une traduction en français de ce résumé figure à la fin de l'article. Al final del artículo se facilita una traducción al español. المقالة لهذه الكامل النص نهائية في الخلاصة لهذه العربية الترجمة.

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Objective To repeat and update our previous evaluation (2005) of Europe's national pandemic influenza preparedness plans and assess what progress has been made.

Methods We assessed published national pandemic influenza preparedness plans from the European Union countries, from the two acceding countries (Bulgaria and Romania) and from Norway, Switzerland and Turkey. Plans were eligible for inclusion if formally published before 30 September 2006. We referred to WHO guidelines and used a systematically applied data extraction form. We considered plans in relation to border control measures, antiviral drugs and vaccines.

Findings 29 countries had plans that were included in the analysis, compared with 21 countries in 2005. Substantial differences existed in countries' plans for border control measures, and many plans diverged from WHO guidelines. Likewise, countries' plans on antiviral drugs and vaccines vary and operational planning remained weak.

Conclusion Although progress has been made in the completeness of plans, problems remain to be resolved regarding national plans' divergence from international recommendations, persisting strategic incoherence and operational limitations in relation to potentially scarce resources. Border control plans also show gaps and inconsistencies, and these are likely to be politically volatile during a pandemic.

Introduction

With the emergence of the H5N1 avian influenza virus in Asia and outbreaks on the European continent and elsewhere, concerns about a human influenza pandemic are growing. In April 2005, WHO expressed concern about the general lack of global preparedness for pandemic influenza,¹ and updated its 1999 global influenza preparedness plan to outline the components that each country's plan should include to ensure an effective response.² The Ministerial Meeting and Donor Conference that took place on 6–8 December 2006 in Bamako, Mali, drew attention to the urgent need for international organizations and the donor community to share emerging good practices, notably those coming from Europe, in order to guide the global response.³

In 2005, WHO published a checklist to facilitate preparedness planning. Its aim was to maintain essential services, to reduce disease transmission and the socio-economic consequences of a pandemic and to minimize cases, hospitalizations and deaths.⁴ The European Commission (EC) updated its planning in line with the revised WHO definitions of pandemic phases and the creation of the European Centre for Disease Prevention and Control (ECDC). A subsequent WHO document² urged every country “to develop or update a national influenza preparedness plan” and suggested that “each national authority should play its part towards achieving the international harmonization of preparedness measures”.

We previously analysed European national strategic preparedness plans for pandemic human influenza published before November 2005. This study's findings showed considerable variation between different countries' plans, and important gaps in many.⁵ These differences and gaps included border control issues, antiviral drugs and vaccines – all issues that are likely to test health systems' responses because of scarce resources or the need for international coordination, coherence and cooperation. During the Austrian Presidency of the European Union (EU), January to June 2006, these issues were predicted to be particularly politically sensitive by policy makers. We repeated our evaluation of national preparedness plans in Europe to assess progress made between November 2005 and November 2006 and analyse these three important strategic planning elements.

Methods

We sought plans from the 25 EU countries, the two acceding countries (Bulgaria and Romania), and three non-EU countries (Norway, Switzerland and Turkey). We evaluated each plan by methods similar to those described above, using the WHO checklist^{4,5,6} but expanding our assessment of the three areas of strategic interest.^{2,7,8} Plans in the public domain were identified and sourced through the ECDC, WHO, internet-based searches and countries' health ministries. Plans were eligible for inclusion if formally published before 30 September 2006. All plans not available in either English or French were translated into English by public health specialists fluent in the original language. We assessed national strategic plans and, where clear links were documented, national operational plans.

A data extraction tool was designed, piloted, modified and finalized. We selected variables with particular reference to WHO guidelines on vaccines, antiviral drugs and border control, and used 142 criteria to assess plans. We also recorded priority populations for antiviral drugs and vaccines, whether the sizes of populations were defined (and if so, what these sizes were) and

whether certain populations were ranked more highly than others in terms of favoured access. We recorded antiviral stockpile sizes if mentioned. Preparedness plans were scored independently by two researchers; where differences arose, agreement was reached through review and discussion.

Results

We identified 29 plans from a range of sources (Table 1). We translated 12 plans into English. Overall scores for key pandemic preparedness criteria concerned with border control, vaccine policies and antiviral policies are presented in Figures 1, 2 and 3.

Border control

Strategic planning in relation to border control varied in terms of completeness of issues considered and approaches discussed (Fig. 1). Travel restrictions, for example, were anticipated by 16 countries, whereas two countries explicitly advised against such measures. Notably, five countries envisaged an absolute ban on cross-border travel, while 16 countries expressed an intention to follow WHO travel advice. Only a minority of plans detailed the legal foundation for possible restriction of cross-border population movements.

The need for information and guidance on travel was widely acknowledged. However, planning for implementation of travel-related public health measures was less coherent. Many countries diverged from WHO guidance; for example, 17 countries favoured the introduction of specific entry screening measures.⁹ Two countries planned to use thermal screening, and four planned to screen for symptoms. Although WHO guidance favours exit screening over entry screening, only 10 countries planned to implement exit screening.

Only nine countries had plans that addressed how travellers on board international conveyances from affected areas would be managed. Eight recommended separating sick travellers from others, and four aimed to provide masks to passengers, crew members or both. Border quarantine was advocated by 11 countries, mostly for travellers en route from an affected area, but most acknowledged that this strategy would be limited in scope. Thirteen countries addressed the issue of imported goods during a pandemic, with most referring to restrictions on poultry imports.

Only about half of countries explicitly planned to coordinate their strategies with those of neighbouring countries.

Vaccines

All but one country had plans for pandemic vaccination; Fig. 2 highlights these plans' key issues. Broadly, plans included details on sourcing vaccines, on which populations should be vaccinated first and on provisions to distribute and administer vaccine. Eighteen countries stated explicitly that they planned to vaccinate their whole population. Only three countries did not stipulate groups to be given priority when vaccine is in short supply.

Priority groups were broadly consistent, with health-care workers named as a priority group in 26 countries. "Essential" workers were given priority in 23 countries, and 19 countries prioritized older people and populations at risk of serious complications. The groups given highest priority were health-care workers in 16 countries, essential workers in four countries and people at risk of serious complications in three countries. Eight countries that defined priority groups for vaccination did not rank them explicitly. Sixteen countries estimated the size of priority groups. Some plans specifically prioritized vaccination of children, employees and people thought likely to pose a risk to vulnerable groups. Most plans explicitly prioritized groups in order to maintain health-care services and societal functions and to protect those at highest risk of death, yet the ethical reasoning for priority-setting was rarely explicit (Box 1).

Vaccination strategies revealed important gaps. A minority of plans referred to or included operational guidelines for factors such as provisions for vaccine storage, distribution mechanisms and vaccine administration. Only three countries referred to existing generic plans for mass vaccination. Nine countries described how vaccine will be delivered to priority groups, including four that stated the need for local administrations to determine in advance which individuals should be vaccinated first. Few details were provided on who would be responsible for vaccination and where it would be done.

The plans of Belgium, France, Germany, Hungary, the Netherlands, United Kingdom, Italy and Romania stated that these countries are capable of manufacturing vaccine. Four countries (Denmark, Norway, Sweden and Switzerland) intended to develop vaccine production capacity. Twenty-one countries planned to secure vaccine pre-purchase agreements, and four countries said such agreements were already in place. Five explicitly indicated that they have arranged to buy H5N1 vaccine; two countries, Finland and Switzerland, had placed orders for vaccine to cover their entire population.

Antiviral drugs

Although most countries had antiviral strategies, these varied considerably (Fig. 3). All countries but one advocated the use of antiviral drugs for treatment. Although treatment was generally clearly defined, use of antivirals for prophylaxis was less so. For some plans, distinctions between pre-exposure and post-exposure prophylaxis often were not clear. Just over half of the countries planned to supply antivirals for early containment, and 20 recommended specific treatment and prophylaxis strategies for animal workers. Five countries anticipated a need to supply antiviral drugs to their citizens abroad.

Plans for dosage and duration for treatment and prophylaxis were generally consistent with manufacturers' recommendations. Twenty-two countries specified which antivirals they intended to use, with half advising the possible use of M2-membrane protein inhibitors (amantadine and rimantadine) in addition to neuraminidase inhibitors (oseltamivir and zanamivir) for prophylaxis or as a second-line drug.

Treatment was explicitly given priority over prophylaxis by 15 countries, which mostly outlined plans for antiviral use according to WHO pandemic phase. They noted that in phase 6, prophylaxis probably will not be feasible and might result in drug resistance. The other countries did not distinguish between use of antivirals for treatment and prophylaxis.

Priority groups for antiviral treatment were stated by 19 countries, 16 of which indicated the size of these groups. Seventeen countries planned to treat patients at the greatest risk of complications. Patients with severe disease and complications were top-priority in eight countries, while health-care workers were top-priority in two countries. France and Switzerland suggested that they had sufficient stockpiles to treat all patients.

Twenty-two plans advised offering pre-exposure prophylaxis; of these, 21 suggested health-care workers as recipients, and 17 suggested essential workers. Only 12 countries explicitly ranked priority groups for prophylaxis. Some plans discouraged seasonal use of antivirals because this would rapidly deplete stockpiles. Norway prioritized prophylaxis for continuously exposed health-care workers over treatment of sick patients in order to maintain a functioning health service.

Twenty-five plans recommended post-exposure prophylaxis. Thirteen stated that this strategy should be used only in the early phases for contacts of cases and exposed animal workers. Only one country estimated the number of contacts who might need antiviral drugs.

The operational management of antiviral storage, distribution and administration remained underdeveloped in most plans. Sixteen countries planned to devolve all or parts of these

responsibilities to local administrations. Only 13 mentioned distribution centres such as influenza pandemic centres, hospital pharmacies and community pharmacies, but these were not discussed in detail. Few plans mentioned the need for prescriptions. Eight plans addressed the need for security measures at antiviral drug distribution centres.

Most plans stated an intention to stockpile antiviral drugs, with 14 plans noting that a stockpile had been secured. Eleven plans quantified their existing stockpile and nine defined a target stockpile, usually assuming an attack rate of 25–30% of the population.

Discussion

Europe became better prepared for pandemic human influenza than it was before the study period.^{5,6,10,11} Between November 2005 and November 2006, more countries published national strategic plans, and many countries and international agencies (such as the ECDC) have made considerable efforts to support planning through regional workshops, country visits and analyses of preparedness status.¹² An increased number of plans consider an early containment strategy that offers prophylaxis to contacts and discuss the need to protect people who work with animals. Clarity and links to operational implementation also have improved. More countries prioritize the use of antivirals for treatment and prophylaxis, enhancing strategic clarity.

A recent World Bank report emphasizes the need for clear procedures and systems to manage rapid reporting and responses to human influenza, notably to ensure a rapid containment response. Our findings show that even in Europe, which may be better prepared than some regions,³ considerable gaps and inconsistencies persist and several areas of operational planning have not been addressed. For example, only half the countries have developed storage, distribution and administration strategies for vaccines and antivirals. The issue of how to deliver antivirals within 48 hours to individual patients remains largely unresolved. The recent increase in national antiviral stockpiles by many countries perhaps highlights this gap. Many countries are devolving responsibility to local administrations but providing little guidance. Consequently, they risk inconsistencies in practice, inequalities in provision of goods, chaotic service responses and public anxiety during a pandemic.

Likewise, although most countries have prioritized groups for vaccination and antivirals, details of how these policies would be put into action are still scarce. Plans do not always specify types of antiviral drugs to be used, and drug resistance is a concern with monotherapy.¹³ If international policies change in response to this risk, delivery systems need to be even more robust.

The size of priority groups is often unclear because their scope is not clearly defined. Additionally, groups are often much larger than the actual (or intended) stockpile could accommodate. Some countries attempt to resolve this issue by building stockpiles large enough that priority-setting is not an issue, but use of antiviral prophylaxis is likely to deplete stocks quickly. For example, our analysis of whether four countries have sufficient publicly acknowledged antiviral stockpiles to meet the needs stated in their plans suggest that shortfalls will occur (Fig. 4), despite assumptions that probably underestimate demand.

Governments need to balance policy in the face of uncertainty. Although considerable funds have been committed to stockpiling antivirals, many countries may have insufficient supplies. Moreover, if resistance emerges rapidly, then the expected public health benefits might not accrue. The ability of combination therapy to prevent resistance remains debatable,¹⁴ although the ineffectiveness of adamantanes in preventing transmission, the rapid development of resistance to these drugs and probable associated harms imply that neuraminidase inhibitors will require supplementation with other drugs.¹⁵ However, combination treatment would further stretch resources and compound logistical challenges.

If vaccine development cannot take advantage of the window of opportunity offered by antiviral drugs, further concerns arise. An effective vaccine is unlikely to be available for 3–6 months after a pandemic begins. Even if it can be made quickly enough,¹⁶ demand will outstrip supply. Six billion people worldwide could benefit from protection, but manufacturing capacity is currently about 300 million doses. Recent findings showing cross-protection with influenza virus from avian to human strains^{17,18} have led some countries to stockpile H5N1 vaccine in the hope that it could offer protection against an emergent pandemic strain.

Across Europe, plans for border control measures are inconsistent, especially in relation to screening practices and travel restrictions; such plans frequently diverge from WHO guidelines. These inconsistencies might reflect a lack of evidence. Recent research suggesting that very strict travel measures might delay a country's exposure to a pandemic may also have affected plans.^{19,20} In view of the political volatility attached to differences in national approaches, increased coherence is advisable.

In preparing for the next pandemic, governments face challenges that are beyond their purview and over which they have little control. Important lessons have been learned from SARS, and the international governance structure of public health has improved, particularly in surveillance

capacity, coordination and cooperation. However, response capacity and coherence remain relatively weak. These problems arise because risk management, even more than risk assessment, remains under sovereign states' control²¹ despite the authority provided through the new International Health Regulations.²² For example, Indonesia recently stopped sharing human genetic samples of H5N1 with foreign laboratories because its government wanted to retain control of the intellectual property rights of the virus strain²³ and secure early public health protection for its citizens. The potential delays in vaccine production that could result from such unilateral action could have far-reaching implications testing assumptions about global solidarity.²⁴

Our evaluation's limitations are similar to those of our previous study.^{5,6,25} Although our survey provides only a snapshot, it is based on a similar analysis from a year earlier so that changes and advances can be documented. Our results, as with earlier findings, agree largely with analyses done by other investigators using different methods.^{15,12,26} A second limitation is that plans are only one element in a preparedness strategy, albeit an important one. By revisiting plans after a year, we have at least shown that policy-makers have addressed some previously neglected issues. A further limitation is the subjective nature of our assessment. We have tried, through independent review, to address this issue. However, variations in format, terminology and language mean that any evaluation of plans must be subjective.

Governmental commitment across Europe in preparing for a pandemic seems strong, and Europe has strengthened its plans since our last evaluation. However, the remaining gaps and inconsistencies need urgent attention. Although pandemic influenza will test health systems in many unforeseen ways, coherent regional planning should ensure that responses are coordinated, evidence-based and coherent in order to effectively protect public health.

Competing interests

Richard Coker has received funding and reimbursements on pandemic influenza preparedness research from F Hoffmann-La Roche, and from several European Union institutions and national governments.

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Box 1. Ethics and priority-setting

An influenza pandemic will raise many ethical challenges, including allocation of scarce resources and the needs to balance individual freedom against the common good, economic losses against the need to contain the disease, and health workers' duty to provide care against self-interest.^{a,b} Although national preparedness plans provide an important opportunity for transparent communication with the public, most of those examined for this analysis failed to discuss these issues. Plans usually stated that their goal was to decrease morbidity and mortality and ensure that society still functions. However, the lack of ethical reasoning, especially regarding resource allocation, might cause confusion when policies and practices need to be justified to an anxious population.

Finland and Norway discussed ethical concerns and expressed differing views. The Finnish plan suggested that beyond early containment of the disease, “long-term preventative medication with antivirals of essential personnel would not be justifiable and would create a feeling of unfairness within the population”. The Norwegian plan stated that “health care personnel who are continually exposed to the disease [should] receive the highest priority because they are crucial in providing care for a greater number of patients and because they have a higher risk of being infected.”

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^b Singer PA, Benatar SR, Bernstein M, Daar AS, Dickens BM, MacRae SK, et al. Ethics and SARS: lessons from Toronto. *BMJ* 2003;327:1342-4. Medline doi:10.1136/bmj.327.7427.1342.

Fig. 1. Border control measures mentioned in European national preparedness plans, by number of countries

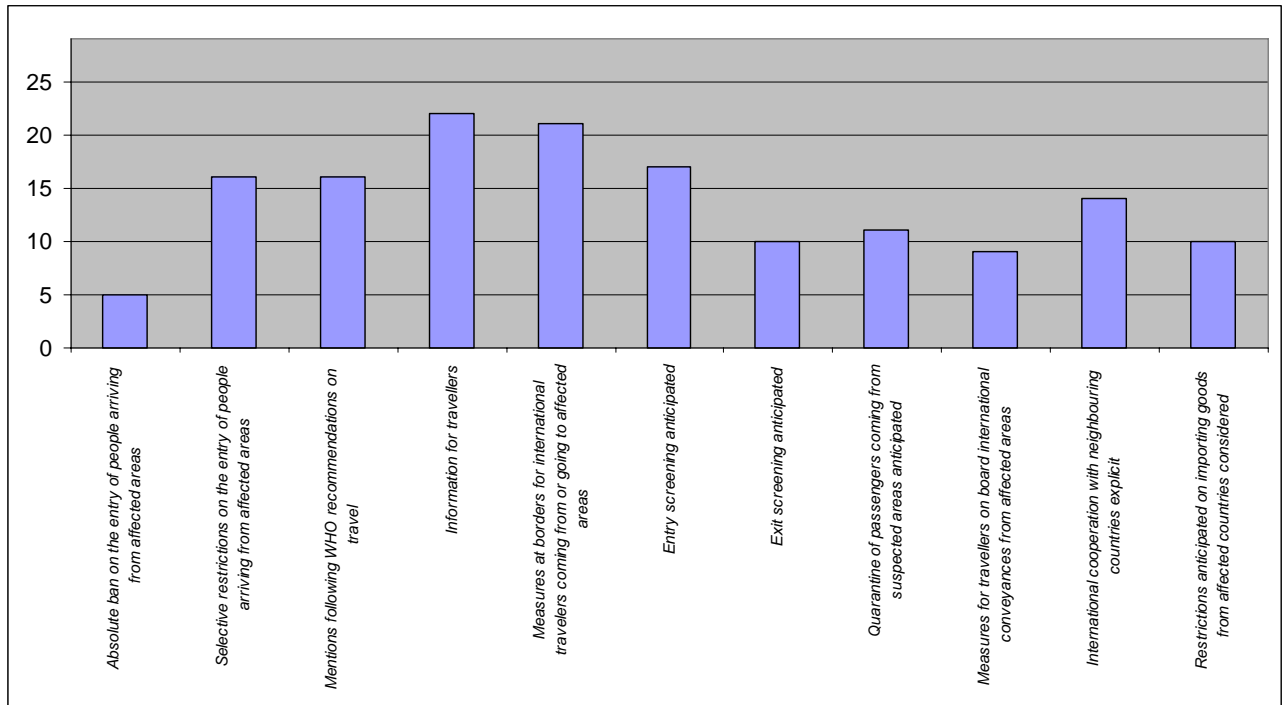


Fig. 2. Vaccine strategy measures mentioned in European national preparedness plans, by number of countries

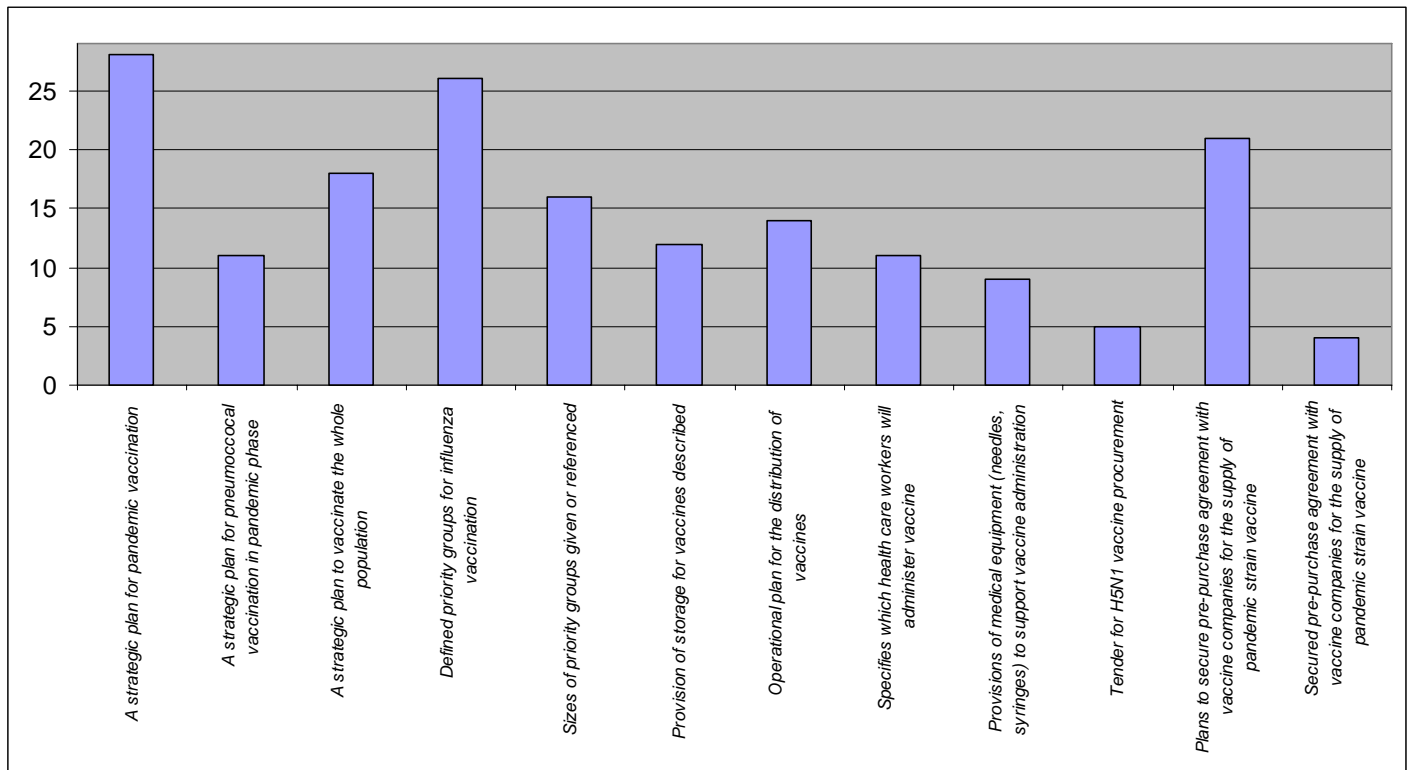


Fig. 3. Antiviral viral strategy measures mentioned in European national preparedness plans, by number of countries

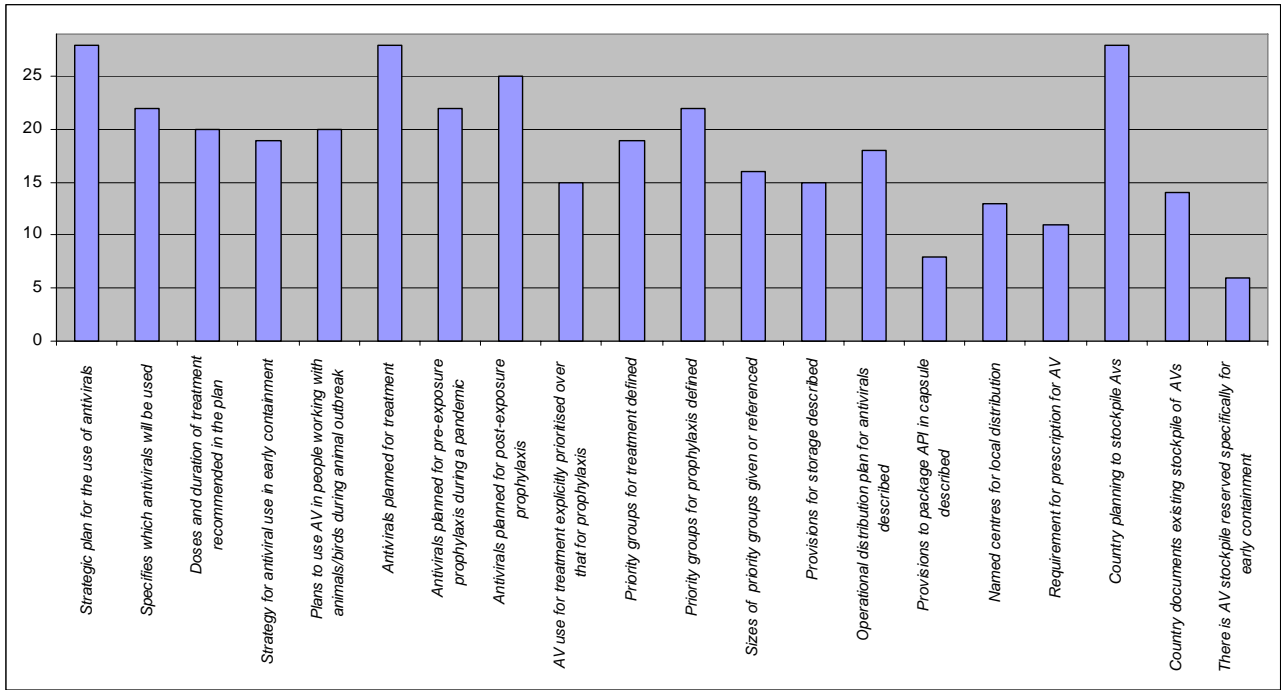
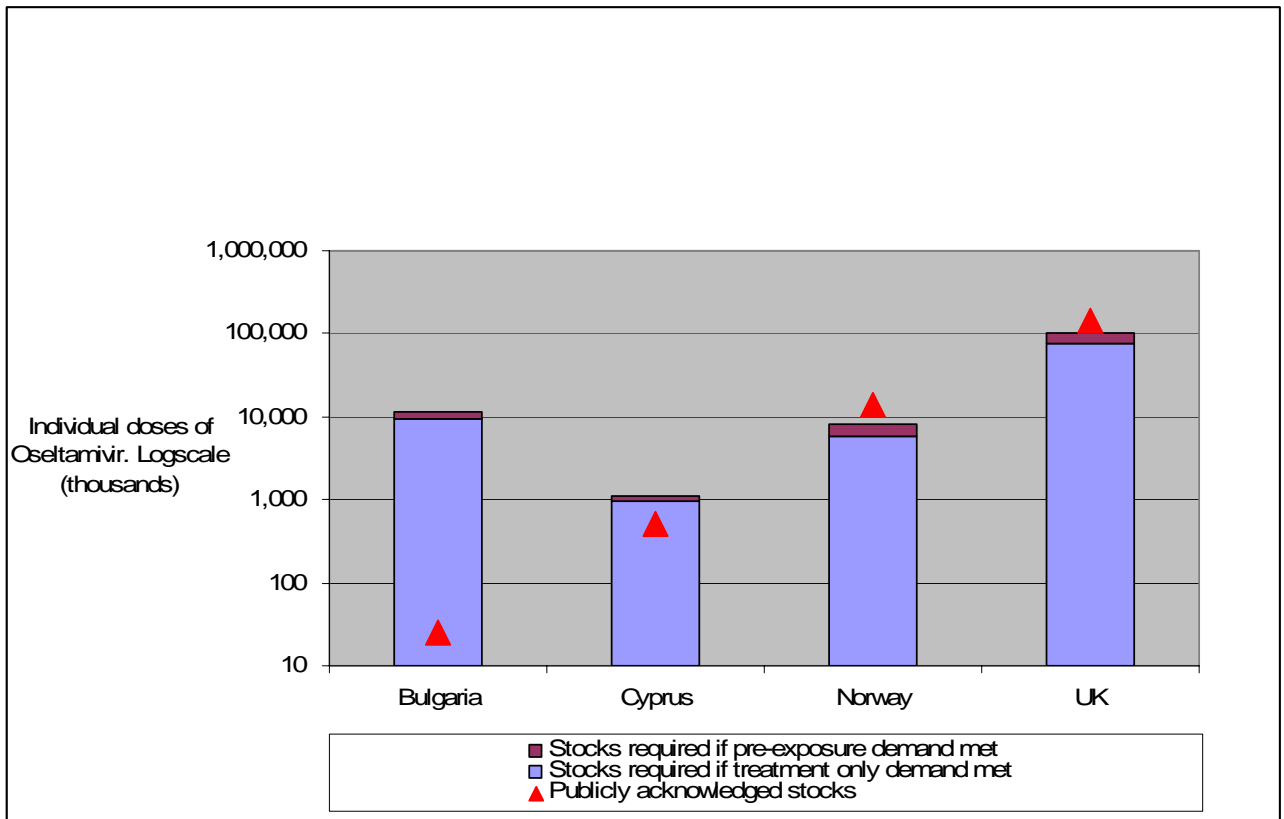


Fig. 4. Potential demand and stockpiles for antiviral drugs for four European Union countries



Assumptions: stockpiles have been made public,^a attack rate of 25%, treatment needed for 50% infected. Estimates for pre-exposure prophylaxis requirements are for health care workers only, and do not include other groups mentioned in the plans.^b Norway has committed to procuring an additional 12 million doses of rimantadin/amantadin for prophylaxis alone; this is not included here.

^a Stockpile size sources: Bulgaria, *BBC Monitoring International Reports*, 12 January 2006; Cyprus, *Cyprus Mail*, 25 January 2006; Norway, *Norway National Pandemic Preparedness Plan*, 2006; United Kingdom, *Reuters*, March 2006

^b Population data taken from Eurostat website

(http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1996,39140985&_dad=portal&_schema=PORTAL&screen=detailref&language=en&product=Yearlies_new_population&root=Yearlies_new_population/C/C1/C11/caa10000). Health-care worker figures taken from WHO, *World Health Statistics 2006*. (Geneva: WHO Press; 2006).

Table 1. European national preparedness plans for pandemic human influenza

Country	Date of plan	Length (pages)	Original language	Source	Websites	Documents		
						Strategic plan	Operational plan	Plan with elements of both
Austria	September 2005	76	German	ECDC website (direct link)	http://www.bmgf.gv.at/cms/site/attachments/3/6/8/CH0019/CMS1126084167391/pandemieplanh3neu.pdf	–	–	Yes
Belgium	July 2006	52	French	ECDC website (via MoH website)	http://www.influenza.be	–	–	Yes
Bulgaria	October 2006	100	English	UNDG website (direct link)	http://www.undg.org/documents/7926-Bulgaria_National_Influenza_Plan.pdf	–	–	Yes
Cyprus	September 2005	96 + 11 (tabulated appendices)	Greek	ECDC website (via MoH website)	http://www.moh.gov.cy/moh/moh.nsf/All/4CCD90ECED95DD174225718800218F00?OpenDocument	–	–	Yes
Czech Republic	April 2004	53	English	WHO web (direct link)	http://www.who.int/csr/disease/influenza/nationalpandemic/en/index.html	–	–	Yes
Denmark	April 2006	57 + 97 (appendix)	Danish	ECDC website (via MoH website)	http://www.sst.dk/Forebyggelse/Sygdomsforebyggelse_og_vaccination/Smitsomme_sygd/Influenza/Pandemibere_dskab.aspx?lang=da	–	Yes (appendix)	Yes
Estonia	March 2006	55	Estonian	ECDC website (direct link)	http://www.sm.ee/est/HtmlPages/Sotsiaalministeeriumigripipandeemiak_svalmisolekupaalanaprill2006a/\$file/Sotsiaalministeeriumi%20gripipandeemiaks%20valmisoleku%20palaan%20aprill%202006%20a.doc	–	–	Yes
Finland	2006	202	Finnish	WHO Regional Office for Europe Website (direct link)	http://www.euro.who.int/flu/related/20060822_1 (WHO web page) http://www.stm.fi/Resource.phx/publishing/documents/6425/index.htm (plan location)	–	–	Yes
France	January 2006	68	French	ECDC website (direct link)	http://www.grippeaviaire.gouv.fr/IMG/pdf/Plan_pandemie_grippale_janvier_2006.pdf http://www.sante.gouv.fr/dossiers/grippe_aviare/fiches_techniques.htm (Appendices, accessed 31/08/06)	–	Yes (appendices)	Yes
Germany	March 2005	90 (in 3 parts)	German	ECDC (via MoH website)	http://www.rki.de/cln_011/nn_879788/DE/Content/InfAZ/I/Influenza/Influenzapandemieplan.html	–	–	Yes
Greece	October 2005*	44	English	ECDC website (via MoH website)	http://www.keel.org.gr/keelpno/National_plan.pdf	–	–	Yes
Hungary	October 2005	22	English	MoH website	http://www.eum.hu/index.php?akt_menu=2652&hir_reszlet=8	–	–	Yes

Ireland	2002	119	English	Fluwiki (via MoH website)	http://www.fluwikie.com/pmwiki.php?n=Geographic.Ireland (Fluwiki web page) http://www.dohc.ie/publications/influenza_pandemic.html (MoH web page)	-	-	Yes
Italy	2006	32	English	ECDC (direct link)	http://www.ccm.ministerosalute.it/imgs/C_17_pubblicazioni_511_allegato.pdf	-	-	Yes
Latvia	October 2005	16	Latvian	ECDC (direct link)	http://phoebe.vm.gov.lv/faili/gripa/info_20051018.pdf	-	-	Yes
Lithuania	September 2005	7	English	ECDC (direct link)	http://www.vvspt.lt/aktai/gripas/2005%2009%2020%20GRIPO%20PLAN%20VERT.doc	-	-	Yes
Luxembourg	July 2006	24 (in 2 parts)	French	ECDC (via MoH website)	http://www.grippeaviaire.public.lu/	-	Yes	-
Netherlands	October 2005	59 + 246 (appendices)	Dutch	WHO Regional Office for Europe Website (via MoH website)	http://www.euro.who.int/flu/related/20060822_1 (WHO web page) http://www.infectieziekten.info/index.php3?lokatie=http%3A/www.infectieziekten.info/protocol.php3%3Fpagid%3D142 (MoH web page)	Yes	Yes	Yes
Norway	February 2006	145 + appendices	Norwegian	Fluwiki (direct link)	http://www.fluwikie.com/pmwiki.php?n=Geographic.Norway	Yes	Yes	-
Poland	August 2005	80	English	UNDG website (direct link)	http://www.undg.org/content.cfm?id=1575	-	-	Yes
Portugal	January 2006	23	Portuguese	ECDC (direct link)	http://www.dgs.pt/upload/membro.id/ficheiros/i007770.pdf	-	-	Yes
Romania	October 2005	23	Romanian	MoH contacted in person	Not applicable (paper copy obtained)	-	-	Yes
Slovakia	November 2005	103	English	ECDC (via MoH website)	http://www.health.gov.sk/redsys/rsi.nsf/0/D2869A65B5F83280C12570EC00517352?OpenDocument	-	-	Yes
Slovenia	July 2006	66	Slovenian	Ministry of Health, Slovenia				Yes
Spain	May 2005	43	English	ECDC (direct link)	http://www.msc.es/ciudadanos/enfLesiones/enfTransmisibles/docs/PlanGripIngles.pdf	Yes	-	-
Sweden	November 2005	23+32	Swedish	ECDC (via MoH website)	http://www.socialstyrelsen.se/Publicerat/2005/8972/2005-130-7.htm http://www.socialstyrelsen.se/Publicerat/2005/8660/2005-131-7.htm http://www.socialstyrelsen.se/Publicerat/2005/8662/2005-130-2.htm	-	-	Yes
Switzerland	May 2006	249 (in 3 parts)	French	MoHweb	http://www.bag.admin.ch/influenza/01120/01134/index.html?lang=fr	Yes (parts 1 and 2)	Yes (part 3)	-
Turkey	June 2006	184	English	ECDC (direct link)	http://www.grip.saglik.gov.tr/eng/index.html	-	-	Yes
United Kingdom	October 2005	177	English	ECDC (direct link)	http://www.dh.gov.uk/assetRoot/04/12/17/44/04121744.pdf (Department of Health plan);	-	-	Yes

					http://www.hpa.org.uk/infections/topics_az/influenza/pandemic/documents/HPAPanFluContPlanSept06.pdf (UK Health Protection Agency Plan)			
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MoH, Ministry of Health; ECDC, European Centre for Disease Prevention and Control; UNDG, United Nations Development Group.