

ECDC INTERIM GUIDANCE

Mitigation and delaying (or 'containment') strategies as the new influenza A(H1N1) virus comes into Europe

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Summary

Currently, as epidemics of the new influenza A(H1N1) virus are extending globally, some European countries are considering how robustly to undertake case-finding among the first cases and whether to pursue and treat contacts. A strategy to vigorously trace all of those entering or appearing and to treat both them and their contacts is known as 'delaying' (or even 'containment'), whereas a strategy to lessen the effect of the disease in many possible ways is known as 'mitigation'. Many of the tools and messages used are actually the same for both. However, the crucial difference is that, in delaying, they are used more widely and vigorously as attempts are made to identify all or most infected people and people at risk through contact tracing.

This guidance paper describes the background and presents the evidence, experience and practical considerations to assist EU/EEA countries in making policy decisions on this topic. It is noted that for both strategies it is important to have good messages for citizens travelling to and from Europe, with special attention to how those coming to or returning to European countries from affected areas would consider what to do should they fall sick following arrival.

1 Current epidemiological situation

A new influenza A virus, meeting the World Health Organization's (WHO) criteria for a pandemic strain, has been circulating widely in North America with cases or outbreaks being reported from almost all States in the USA. (See <http://www.who.int/csr/disease/swineflu/updates/en/index.html> for global situation updates). It is presumed that sustained community transmission is also widespread in Mexico and, to a lesser extent, in Canada and Japan, perhaps also in the Southern Hemisphere. While in Europe (in early June) the majority of reported cases have been in returning travellers, increasing numbers of people have been infected within their own countries (see http://www.ecdc.europa.eu/en/Health_topics/novel_influenza_virus/2009_Outbreak/ for latest figures and analysis). Initially, the majority of cases imported into Europe came from Mexico. There is presumably now a considerably greater force of infection from the Americas since IATA (International Air Transport Association) data indicates that the volume of airline passengers' trips between Canada and the USA and Europe is approximately 30 times that between Mexico and Europe.

2 Background and definitions

In the context of the 2009 epidemics of the new influenza A(H1N1) and an imminent pandemic, ECDC has been formally asked to provide guidance on the arguments for delaying (or 'containment') versus mitigation strategies. This was specifically in relation to persons potentially infected with the new A(H1N1) virus entering a country; endeavouring to detect such persons, isolate them, and treat them and also their contacts with antivirals. ECDC is also aware through the regular Early Warning and Response System (EWRS) teleconferences convened by the European Commission that this issue is concerning a number of EU/EEA Member States. Practices are varying with some authorities undertaking case-finding and contact tracing vigorously, others doing so partially and a third group not attempting it at all. It is noticeable that in North America 'containment' has rarely been attempted at all even in areas not initially affected. It should be noted, though, that transmission must have been widespread in some parts of the USA when it was first detected, which is not the case in Europe.

Delaying or 'containment'

Delaying or 'containment' means attempting to prevent spread of the infection by:

- case-finding: detecting imported infections and first generation transmissions; and
- taking actions to prevent their turning into chains of transmission and outbreaks, notably through vigorous contact tracing, treatment and/or quarantine of contacts.

The objective is to stop as many transmissions as possible. However, this is thought to be very difficult with influenza. The term 'containment' is not recommended in this context as it raises expectations that a pandemic virus can be contained once it has got beyond the initial outbreak, as is the case with the 2009 virus. This is why referring to 'delaying' is preferred. 'Containment' can be used for other 'containable' infections or in the context of influenza in a closed institution. For an influenza pandemic, the term is applied when a pandemic virus first emerges somewhere in the world, referring to attempts to stop transmission at an early stage, when containment is thought to be possible in a small delimited geographical area, as may be recommended by WHO in phase 4 of pandemic alert [1,2]. 'Containment' was not recommended by WHO for the new influenza A(H1N1) because, when it was discovered, transmission was already well beyond a delimited area [3].

Mitigation

Mitigation is a collective term recommended by WHO for actions in affected countries in phases 5 and 6 of pandemic alert, essentially reducing the impact of a pandemic [1,4].

In the health sector, the aims of mitigation include:

- reducing the overall number of people affected;
- reducing transmission;
- ensuring healthcare for those who may be infected;
- maximising care for those with disease;
- protecting the most vulnerable; and
- more general interventions [1,4].

This paper focuses on the actions in relation to individual people who may be infected or are known to be infected.

It is important to note that many of the actions and messages being undertaken or promulgated are the same for delaying and mitigation strategies (see next section).

Interventions being practised under 'delaying'

The following actions are usually considered as part of a delaying strategy. They address measures targeting travellers as well as measures targeting the general population (most of the measures apply also to mitigation, but those listed in *italics* below are not practised under a mitigation strategy. In addition measure 2, case finding, is practised more vigorously under a delaying strategy than in mitigation).

Measures targeting travellers:

1. Providing incoming and outgoing travellers with relevant information;
2. Case-finding, especially for symptomatic travellers from areas with community transmission;

3. Self or institutional isolation of symptomatic persons, probable and confirmed cases along with instructions on home management;
4. Early treatment of symptomatic persons with antivirals;
5. *Vigorous tracing of contact-persons and giving antivirals or alerting them to watch for symptoms;*
6. *Putting contact-persons under quarantine, or even all travellers from areas with community transmission.*

There are also suggestions of 'entry screening' such as through thermal screening, though WHO is clear that this is only a short term tactic [4].

Measures targeting the general population:

1. Providing the general public with relevant information;
2. Isolation of symptomatic persons;
3. Early treatment of persons under investigation;
4. *Vigorous case-finding and tracing of contact-persons and giving antivirals or alerting them to watch for symptoms;*
5. *Putting contact-persons under quarantine.*

In both delaying and mitigation strategies, there are universal practices, such as information for travellers and advice to people on what to do if they become sick, which all authorities would support. The implementation of these measures varies from country to country in Europe.

3 Purpose

The purpose of this document is to provide national authorities with evidence and guidance for informing their policy-making and implementing response strategies (delaying versus mitigation), specifically when the A(H1N1) virus infection will be spreading in communities in the EU/EEA countries.

4 The diversity of Europe

Acknowledging the diversity of the situation in Europe, one could imagine some cases (isolated communities) where delaying or even 'containment' would make more public health sense, though the numbers of European citizens in those communities is small. There are some actions, such as entry screening, which might be practical, if ineffective, in some countries, but which would not be practical in others with large international airline hubs. Many of the considerations and evidence stated draw on ECDC's published *Interim guide to public health measures*. Its 'menu of public health measures in pandemics' is currently being updated [5] and is compatible with the guidance from WHO [6].

5. Relevant considerations

The rationale of delaying or 'containment' in phase 5 has not been widely stated but has presumably been that it may be possible to prevent influenza transmission taking off in EU countries, or at least slowing the start of the acceleration phase of the epidemics. A variant of this argument is the observation that, since influenza transmission usually declines in the summer (for reasons that are not fully known), vigorous 'containment' in May could push an acceleration phase in Europe back until the autumn.

The WHO does not recommend attempting 'containment' strategies once phase 5 has been reached. However, it is silent on delaying [1]. During the declaration of phase 4 on 26 April 2009, the acting Assistant Director-General (Dr Keiji Fukuda) explicitly made the point that 'containment' was no longer possible and that WHO's approach was now mitigation [3]. WHO does have an intense and highly focused 'containment' plan but that was intended as a 'one-off' action only for use in phase 4, and then only for the first appearance of a pandemic strain in a small rural or small town population [2,7]. That could not be attempted when transmission had already extended to a large complex community like Mexico City [8,9].

Genuine containment can be a legitimate public health tool. There are other infections where this is effective. These include respiratory infections (e.g. tuberculosis, smallpox), ones where the routes of infection are more

easily interrupted (e.g. contaminated food and water) or transmission is mostly confined to certain settings (e.g. SARS). In some of these case-finding, contact tracing and other ways of achieving containment are highly recommended. However, that is not the case for human influenza, especially a pandemic strain with an observed R_0 of 1.4–1.6 in Mexico (cf. seasonal influenza whose all-age R_0 is often considered to be around 1.1 to 1.2) [4,7]. Three caveats here are:

- that at this stage in Europe it is difficult to estimate the R_0 of the new influenza virus with any precision;
- that the effective reproduction number R is more important for influenza than R_0 ;
- the behaviour of pandemic viruses can change from one place to another and over time.

It is often not appreciated that it can take some time for human influenza transmission to start up in a country, even when a pandemic strain is involved. With low effective reproductive number, many infection chains self-terminate. For example, the 1968 pandemic took more than a year to take off in some countries without any interventions. Hence a delaying strategy can appear to be successful when in fact it is having no impact. It is important, therefore, to consider the resource and energy that is applied (the significant opportunity costs) and the difficulties that come when a strategy has to change from delaying to mitigation.

Despite these points, it should also be considered that even a delay of a few weeks can be important at a time when final preparations are being made. Hence some would legitimately consider it worth making the effort.

6 The evidence

Outside of outbreaks in confined setting (e.g. seasonal influenza outbreaks in residential homes), history shows that it is almost impossible to contain or even delay influenza. Even in a confined setting, it is done by whole population interventions (mass immunisation or prophylaxis) — not by case-finding and contact tracing.

The suggestion of a case-finding and treatment approach to contain an emerging pandemic coming into a country has also been considered and rejected in modelling exercises, which concluded that it would not be a sustainable strategy and would require enormous stocks of antivirals and herculean case-finding efforts [10,11].

Though not necessarily part of delaying strategies, the practice of trying to slow the spread of pandemic influenza by travel restrictions has been modelled on a number of occasions and this has always suggested that travel has to be drastically curtailed to achieve any significant delay [12].

Persuading ill people to defer travel (sometimes known as ‘exit screening’) has been thought to be useful by WHO and others in a pandemic [4]. But this is really not different from the standard WHO and ECDC advice for self-isolation by people who suspect they have or are developing influenza [13,14].

In contrast, ‘entry screening’ has generally been considered to be wasteful and uneconomic and is not recommended by WHO, except as a short-term strategy right at the start of a pandemic affecting a country [1,15]. Formal evaluation of entry screening during SARS pointed out that it discovered surprisingly few cases [16].

In previous pandemics there were some very isolated communities that seemed to successfully practise ‘containment’ successfully by quarantining those arriving [17].

7 Practical and communication considerations

Many aspects of delaying or ‘containment’ strategies are simply the application of standard advice for those who may be infected, namely to practise self-isolation when they become unwell, along with any other approaches that are standard in their countries. This includes sensible advice for those considering travelling. They are also part of mitigation strategies. For example, with travellers coming into a country from areas where there is community transmission, it is always important that they understand what to do, should they become unwell. Also that provision is made for them to be cared for properly and in a way that minimises the risk of them infecting others.

The main practical difficulty with the delaying strategy is to practice case-finding vigorously and to extend action to contacts of ill incoming travellers when transmission starts occurring in the community, which can be very labour-intensive. The severity of the disease should be considered as well with regards to the resources mobilised.

Currently, most people infected suffer a mild self-limiting illness. However, initial data from North America indicate that there are some people who are at higher risk of experiencing more severe disease when they are infected, namely people with chronic medical conditions, pregnant women and young children [18]. Those might deserve more attention in a case-finding approach, i.e. taking a *risk-based* approach.

Attempts at entry screening are difficult at large airport hubs with many flights from the areas of community transmission. They may seem more feasible in airports with only a few direct flights. However, it has to be remembered that for those countries the majority of travellers from areas experiencing community transmission probably do not come through direct flights. Rather they come into major hubs and then travel on within Europe.

As demonstrated with SARS, a practical difficulty is to know which the areas of community transmission are and being aware that these are going to change rapidly. Often, the only practical approach is to identify the country as a whole, greatly increasing the number of people having to be dealt with.

Since large scale prophylaxis of contacts is not sustainable long-term, a major difficulty with the communication strategy is explaining to the public and professionals the inevitable change away from offering general prophylaxis. The term 'containment' in particular raises unattainable expectations in the minds of policymakers that pandemic influenza can still be contained once phase 4 has been passed.

Vigorous case-finding and contact tracing is hard work and tiring for field staff. The potential early exhaustion and demoralisation of the public health workforce before transmission has widely spread in a country is an important consideration.

8 From delaying/containment to mitigation

Preventing the introduction of infected visitors through vigorous case-finding, as well as active contact tracing, can be a legitimate measure for countries confident that they are not yet affected by sustained community transmission. However, to be effective at all, this strategy needs to be comprehensively implemented, targeting incoming travellers from all areas of sustained community transmission. Judgements also need to be made as to whether this is the best use of limited national or local resources, especially in the context of mainly mild cases occurring, and how to manage and communicate the radical change in policy to the public and field staff.

As many public health measures are common for both strategies, moving away from containment/delaying strategy to mitigation strategy would mainly imply giving up public health measures actively targeting incoming travellers from affected areas and not actively pursuing case-finding outside of the groups at higher risk of experiencing severe disease. Such scaling down of the delaying strategy could be phased over a certain period.

Therefore, if a country has decided to undertake delaying/containment in the first place, moving away from detecting incoming symptomatic travellers and contact tracing may be considered:

- when it is no longer feasible to maintain a comprehensive approach to containment/delaying;
- if the effort is distracting from other important activities, such as detecting community transmission; and/or
- when there is sustained community transmission established in the country, despite the delaying/containment attempts.

Note that the term 'sustained community transmission' is the one used by WHO to define an 'affected area'. Note also that the actions by countries recommended by WHO are the same in phase 5 and 6 — they differ only by whether a country is an affected area or not [4].

9 Conclusions

Arguments for strategies including both delaying and mitigation:

- There is some possibility that vigorous case-finding and contact tracing with treatment or isolation could delay the acceleration phase of a pandemic in a country. However, this is probably impossible to prove;
- 'Containment' is a legitimate infection control strategy for other infections, though not for human influenza beyond phase 4, outside of the special circumstance of closed communities;
- It may seem to work and represents actions that the public might expect and shows that action is being taken;
- There are difficulties in explaining why there are no attempts to detect infected cases coming in the

- country to prevent or delay establishment of transmission;
- There are some isolated communities where it might be expected to be effective in Europe.

Arguments for strategies limited to mitigation alone:

- There is no scientific evidence of the effectiveness of delaying at this stage and indeed reasons to believe it will not be effective;
- There will be difficulties in explaining to the public and practitioners of the eventual change in tactics away from delaying (or 'containment') to mitigation alone;
- There are difficulties in explaining why delaying is being done in one country and not others and will give a legacy of trying again next time (e.g. in the autumn);
- Delaying involves a heavy use of strategic resources (such as antivirals), staff time and probable negative impact on staff morale before the pandemic has begun to seriously affect Europe;
- While WHO ask Member States to consider at this stage exit screening for affected countries and entry screening for not affected countries, containment is not recommended by WHO at this phase and was not attempted in North America even in areas not initially affected.

It is important to acknowledge that most of the components of delaying would be part of a mitigation strategy namely:

- Providing the public, including incoming travellers, with relevant information;
- Promoting self isolation of symptomatic persons and treatment according to national protocols, with special consideration given to non-nationals visiting the country;
- Guidelines and provision for people developing illness on aircraft and negotiation at the EU level that airline companies accept self-declaration of illness supported by medical confirmation as a legitimate reason for people delaying travel without loss of tickets;
- Ensuring early treatment of all those in a country developing illness according to national policies.

References

1. WHO. Pandemic influenza preparedness and response — WHO guidance document, April 2009. Available from: <http://www.who.int/csr/disease/influenza/pipguidance2009/en/index.html>
2. WHO. Interim Protocol: Rapid operations to contain the initial emergence of pandemic influenza. WHO 2007. Available from: http://www.who.int/csr/disease/avian_influenza/guidelines/draftprotocol/en/index.html
3. WHO. Press briefing, Dr Keiji Fukuda, 26 April 2009. Available from: http://www.who.int/mediacentre/multimedia/swineflu_presstranscript_2009_04_26.pdf
4. WHO. Pandemic influenza preparedness and response 2009 — Extract Recommended Actions in Phase 5 & 6. Available from: http://www.who.int/csr/disease/influenza/extract_PIPGuidance09_phase5_6.pdf
5. ECDC. Influenza Pandemics and Severe Influenza Epidemics — Interim Guide to Public Health Measures to Reduce the Impact of Influenza Pandemics During Phase 6 — *'The Menu of Measures'*; ECDC Consultation version October 2007. Available from: http://ecdc.europa.eu/en/Health_Topics/Pandemic_Influenza/phm.aspx
6. WHO. WHO Global Influenza Preparedness Plan 2005. Annex One: Recommendations for non-pharmaceutical public health measures (pp. 42-46). Available from: http://www.who.int/csr/resources/publications/influenza/WHO_CDS_CSR_GIP_2005_5.pdf
7. Ferguson Cummings DA, Cauchemez S, Fraser C, Riley S, Meeyai A, Iamsirithaworn S, Burke DS. Strategies for containing an emerging influenza pandemic in Southeast Asia. *Nature* 2005 Sep 8;437(7056):209–14. Epub 2005 Aug 3.
8. United States CDC. Update Novel influenza A(H1N1) virus infections — Worldwide May 6 2009. *MMWR* 2009;58:453–8. Available from: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5817a1.htm>
9. Fraser C, Donnelly CA, Cauchemez S et al. Pandemic potential of a strain of influenza A(H1N1): early findings. *Science Express* May 11th 2009. doi: 10.1126/science.1176062
10. Ferguson NM, Cummings DA, Fraser C, Cajka JC, Cooley PC, Burke DS. Strategies for mitigating an influenza pandemic. *Nature* 2006 Jul 27;442(7101):448–52. Epub 2006 Apr 26; doi:10.1038/nature04795
11. Ferguson NM, Cummings DA, Fraser C, Cajka JC, Cooley PC, Burke DS. Supplementary material and downloadable movie presentation. *Nature* 2006 Jul 27;442(7101):448–52.
12. Cooper BS, Pitman RJ, Edmunds WJ, Gay NJ. Delaying the international spread of pandemic influenza. *PLoS Med* 2006 3(6):212. doi: 10.1371/journal.pmed.0030212
13. ECDC. Public health guidance on case and contact management. Version 3, 19 May 2009. Available from: [http://www.ecdc.europa.eu/en/files/pdf/Health_topics/0905_Influenza_A\(H1N1\)_ECDC_public_health_guidance_on_case_and_contact_management.pdf](http://www.ecdc.europa.eu/en/files/pdf/Health_topics/0905_Influenza_A(H1N1)_ECDC_public_health_guidance_on_case_and_contact_management.pdf)

14. WHO. What should I do if I think I have the illness? WHO Frequently asked questions, 18 May 2009. Available from: http://www.who.int/csr/disease/swineflu/frequently_asked_questions/what/en/index.html
15. WHO Writing Group. Nonpharmaceutical interventions for pandemic influenza, international measures. *Emerg Infect Dis* 2006 Jan. Available from: <http://www.cdc.gov/ncidod/EID/vol12no01/05-1370.htm>
16. WHO Working Group on Prevention of International and Community Transmission of SARS. Public health interventions and SARS spread, 2003. *Emerg Infect Dis* 2004;10:1900–1906.
17. Markel H, Stern AM, Navarro JA, Michalsen JR, Monto AS, DiGiovanni C. Nonpharmaceutical influenza mitigation strategies, US communities, 1918–1920 pandemic. *Emerg Infect Dis* 2006;12(12):1961–1964.
18. CDC. Hospitalized Patients with Novel Influenza A(H1N1) Virus Infection — California, April–May, 2009. *MMWR* 22 May 2009;58(19):536–541. Available from: <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5819a6.htm>

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