ECDC HEALTH INFORMATION

ECDC and US CDC joint video conference to discuss the pandemic H1N1 2009

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Transcript

Todd Weber: Good morning and good afternoon to Europe and welcome to the Pandemic H1N1 Video Conference of the European Centre for Disease Prevention and Control in Stockholm, Sweden and the US Centers for Disease Control and Prevention in Atlanta, Georgia. I'm Todd Weber, US CDC's liaison to ECDC. I'm on the staff of CDC's influenza division international team and ECDC's influenza disease specific programme. Today's video conference will include presentations using CDC's experts and will focus on school closures in the context of pandemic influenza control. This programme is targeted to health experts in the European Union and others interested in this subject. The objectives of these presentations are for the audience to understand the effectiveness of school closures for preventing the transmission of influenza, to understand the operational issues associated with school closures such as how to use this intervention pro-actively and to understand specific aspects of school closures such as when to re-open schools and communications' issues. Speakers during this video conference will introduce themselves to ensure that we have names correctly pronounced and their correct titles and we'll have our first speaker from ECDC to discuss the epidemiology of H1N1 in the European Union and the response, so far, to the pandemic. Folks in Atlanta, while we're speaking over here in Stockholm, would you mute your microphones?

Francisco Averhoff: Yes, we will.

Pasi Penttinen: Thank you, Todd. Colleagues, viewers, I am Pasi Penttinen. I'm a senior expert at the European Centre for Disease Prevention and Control and currently work as the internal crisis manager for the pandemic response. I will use a brief ten minutes of your time to present the current situation with the pandemic within the EU area. In the next two minutes or so, I will show a series of maps depicting how the pandemic has evolved over here on the European side. Please follow the size of the red dots indicating the number of confirmed and reported pandemic influenza cases in Europe. They arrived quite soon after the first cases in Mexico to the areas of Europe which has the most connections with Mexico and North America, namely the UK, Spain and France and has been, ever since, evolving through pan-European spread to other European countries. With the next few slides, I will try to give an overview of the 27 member states and associated four EFTA member states in what the pandemic looks like yesterday evening.

We have widespread and moderate activity mainly judged by the ILI (influenza like illness) consultation rates in about a third of these countries. The UK and Ireland have been reporting decreasing consultation rates for the last two or three weeks while countries like Spain and France are slightly decreasing or unchanging from their previous heights. The largest numbers of deaths, so far, have been reported from the UK, Spain and France. So as an overview of these countries, you could say that these are the western European EU member states and the countries with high numbers of touristic travellers.

In the next group of countries, we could describe these countries as having local or low-level intensity activity in regards to pandemic influenza. We have countries a little bit more central to the EU areas like Belgium, Luxembourg and some of the Nordic countries included in this group but, as you see, we also have reasonable levels of ILI consultation rates in many of these countries. However, very few deaths have been reported from this group of countries. Then as we move further east, we will see that most of these countries have been reporting only sporadic cases or sporadic outbreaks within their borders. I would like to add that there is a warning signal as of mid-July. There have been considerable changes in the reporting patterns of countries when it comes to reporting the number of confirmed cases in the country. So once we progress to the last part of these slides, there

is considerable uncertainly in the number of reported cases and a mainly gross underestimation of what truly is happening there as, all of you working with influenza will be very familiar with.

I would then like to briefly move over to explaining a few parts of the response that has been happening in the European Union of the communities' level in Europe and to be able to do that, I would just like to quickly run you through this slide. The players involved in the organisation of public health interventions and actions at the EU level include these 27 EU member states plus the four EFTA [European Free Trade Association] member states. The activities are mainly co-ordinated by the European Commission and their directorate general for Health and Consumer Protection DG SANCO. They also provide the risk management support to other activities while the European Centre for Disease Prevention and Control (ECDC) is responsible for risk assessments and the technical or the scientific aspects of the work that we do here.

The member states together with these two EU partners commonly compose the Health Security Committee and the Early Warning and Response System which is a body to co-ordinate the activities between these 33 players. On top of this, we have the European Medicines Agency (EMEA) which forms the regulatory arm of the European Commission of the European Union activities and is based in London.

Very briefly, I will take you through the response part as on the vaccine sides for the pandemic influenza vaccines. The ECDC has produced an interim guidance document which is available on our website. The EMEA has been fast-tracking a regulatory process for the vaccines. There is a multi-lateral process involving both ECDC, EMEA and other partners in looking at vaccine safety and pharmacovigilance issues. There is a discussion ongoing on a joint procurement option for vaccines for those EU member states that have not yet procured their direct supplies. There is a discussion going on outside this framework looking at European Commission support to third countries for vaccine procurement issues and as of last week, the Health Security Committee published a statement on the vaccination priority groups on the European Commission website. You will also be able to find links to that through our website.

Shortly, the priority groups for pandemic vaccine, as agreed to by the Health Security Committee, as the first priority group. All persons from six months of age with underlying chronic conditions which might increase the risk for severe disease due to pandemic influenza and starting with the ones that have a severe, underlying condition. It includes pregnant women and it includes healthcare workers. That being said, it should be clear that within the European Union framework, the member states still have the mandate and the responsibility to develop their own vaccination strategies for pandemic influenza.

On the other fronts, if we look at the anti-viral side, the anti-viral national stockpiles-, of the stockpiles available in the EU, there is no common EU stockpile for oseltamivir or other antivirals. The ECDC has produced interim guidance on the anti-viral use and the scientific basis for their use and we are involved in monitoring anti-viral resistance within the EU area through our partners at CNRL (Community Network Reference Laboratories).

Other individual parts of the response and I'm not aiming to be fully comprehensive here so there is a lot more, as you will appreciate, is happening at the EU level but some items I would like to pick out. ECDC together with partners has revised the influenza surveillance system for the pandemic and this will be launched tomorrow. The first outputs are expected in about two weeks' time on the Friday weekly report. We produce regular reviews of the risk assessment and the planning assumptions on our website. Since the beginning of this pandemic in April, we have been at Alert Level PHE1 briefly at PHE2 also, which means that our emergency operation centre here in Stockholm or Solna has been operational since then and the Health Security Committee has produced a statement on the co-ordination of case definitions in the early phase of the pandemic. There are also produced statements on travel restrictions related to sick passengers or infected passengers and it has produced statements on school closures which Professor Nicoll will go into shortly.

What we are now preparing for is a tough autumn and winter based on the experiences of you over there in the US as well as the southern hemisphere experiences so far. We expect major pressures on the healthcare systems and specifically on the high-end of the healthcare systems, their intensive care units and that part. We do expect to see adverse events reports coming out as soon as the mass vaccination programme starts and we also expect to see anti-viral resistance emerging within the EU area.

I believe that's all that I have time for. Thank you for your attention and I would be pleased to answer any questions, I believe, after the presentations.

Angus Nicoll: Thank you very much Pasi and good morning to colleagues in CDC. My name is Angus Nicoll. I've co-ordinated the influenza work here at the Centre since nearly the beginning so about for the past four years. What I'm going to briefly take you through is just some of our thinking and experience of school closures in a pandemic. A little bit of introduction and background then our understanding of the science and realities of a European perspective, what the plans and preparations were in just three of the countries and then how that has been an experience and adapted this year and particular reference to those three countries. Todd, at one point, encouraged me to explain a bit about Europe. First of all, though, I should tell you that all these people contributed to this talk, both their institutions and as individuals. This is all that you need to know about Europe. This is the five second version. Just to say that it's complex and particularly when it comes to schools and you're dealing with a multi-sectoral area.

Now I think that the reality that Pasi has taken you through there-, you have to remember that really we've had very little influenza from the pandemic so far and it's predominantly affected one country – the United Kingdom -

this is the deaths' information again. Just the definitions there-, these are the standard definitions that we use about making a bit of a distinction between school closures and class dismissals. A much bigger distinction between proactive closures, closures ahead of the virus reaching schools, and reactive closures, closures once the virus is transmitting in schools. Almost all that I'm going to be talking about here has been what actually happened, have been reactive closures.

We produced something that we call The Menu of Public Health Measures because one of the things that ECDC doesn't do is to make recommendations, or hardly ever does. It doesn't say, 'Do this or do that.' It tends to say, 'These are the pros and these are the cons,' and then it's up to member states to make decisions based on their particular circumstances. That's what our mandate says but inside the Menu that we've published, two of the big social distancing measures were reactive school closures and proactive school closures.

Over the past four years, we've been out to all of the member states in the European Union and some of them beyond and we've learned a lot about why countries are planning to do school closures and really, they're mostly talking about reactive closures. They come to two principal reasons why it's done. One is because they can, meaning that they've got centralised systems who can do it. Not all countries can but some can. Then there is also an element of tradition that there are certain countries-, and this is particularly true of the eastern countries both within the EU and further east, they've got a tradition of doing school closures during seasonal influenza.

Now this is our understanding of the science and some of the realities and a lot of it goes back to a workshop that was done in September of last year under the French presidency. Every six months, the European Union has a fresh presidency and it was the French who took an initiative and there was a workshop there with a number of countries represented. Most countries were represented. Out of that, came a review which Simon Cauchemez wrote and that has become well-known and that's the reference for it there. It appeared in The Lancet Infectious Diseases. This is a very simplified set of conclusions about what would happen. I should say that, in that review, it didn't just look at what the effectiveness might be, but also some of the complications, the costs and how you might want to mitigate against those costs.

What Simon concluded there was that depending on the model you chose, you got different answers. Let me just shoot forward there and you can see the reason for that is that if you assume that 50% of your transmission was occurring in schools, then you can have a huge impact on spread from closing schools and that if it was much lower, then obviously it's more marginal. What Simon and other French colleagues have done is looking at what actually happens when schools close with seasonal flu and looking at some particular models that have been done on the French school system which, because it closes at different times of year, you can see some of the effects there. They felt with an optimistic scenario, that is proactive school closures so ahead of the virus getting there and having, maybe, the same impact as during a holiday and managing to keep the children apart that you could present about one in seven cases but there was a more significant reduction to the peak attack rate. It's interesting when you see people looking at this paper that they can say, 'Well that's not very much,' and other people say, 'Well, wait a minute, 15% is still a lot of people.' So it depends a bit on your perspective on it and what you're trying to achieve and the reduction in peak attack rates is particularly attractive if you feel that there's going to be pressure on the Health Service.

Just a word about reactive school closures, we do believe that impressions can be deceptive. Quite often, it's said to us by people, 'Oh, but they work. When we close the schools the outbreaks go away,'; and that may be, of course, be true but then we pointed out some work from Ben Cowling and other colleagues in Hong Kong who came out with this observation from a school closure that took place in 2008. It looked very impressive but then when you went and saw that had happened the preceding year, and you saw that without there being any school closures and you saw exactly the same fall. So some of the times when the reactive closures take place, it is pure coincidence.

So, as I said, this is what the conclusions were from Simon Cauchemez but he made three big caveats. One is that the impact would be much smaller if you couldn't keep the children apart. That pandemics are not standard and in some of them like [19]57 and the one that we're in at the moment, children are more affected and more import transmitters than others. Then finally that the late reactive closures may seem to do a lot but they don't do much.

Then just a quick thought on what the countries' positions are. There isn't a standard European position at all. The UK's position in 2008 was that basically, schools should stay open unless it was a more severe pandemic. I'll go through the Swedish position in more detail and this is thanks to Anders Tegnell. Anders is on the National Board of Health. They look very carefully at what will be the social impact of closing schools in Sweden and they also question as to whether it would make sense about sending a message that the threat might actually be bigger than it is. They also ask the question, could they close schools? It's a complex answer in Sweden and we find this in a number of member states that either because of the complexity of the school system or because of a legal point, they can't always close schools. So they couldn't do it from a public health point of view. Yes, they could do it from an infectious diseases' point of view. Yes, from worker safety but they had problems with a low number of private schools that there are in Sweden. Other countries, it's frankly impossible. But their major worry was what would be the impact on the workforce if they suddenly had to close the schools? They think that they could lose up to 50% of the healthcare workers. This is the sort of calculation that Anders Tegnell did where if you start with 700,000 you close the pre-schoolers because of people looking after their children, you lose 100,000. You close the schools, you lose nearly 300,000 but some of those ones might be able to look after themselves so it comes up a

bit more. Then you've got people who are sick with flu and it keeps on coming down. So their conclusion was that school closures could prejudice the whole healthcare system.

Then a different approach is that of, say, France which in the past, has had a tradition of closing schools and they said, 'Well if we're going to close schools, we should mitigate the effect of that. We should ensure that there is good continuity of the administration and that there should be pedagogic continuity, i.e. that children shouldn't suffer by loss of their education and they have some very quite complex plans for that. Also complex plans about looking at how children could be looked after if they weren't in school and looking to other resources – grandparents and other retired people. Finally from the workshop, we just made the point that there's a huge communication issue once people start seeing that schools have been closed in one place and not in others.

Anyway, so just to finish up then, so what has happened so far and this has been mostly, as I say, in relation to the United Kingdom where it has had that experience. I like to make this nice quote from a European general who made the point that whatever your plans are, they're probably going to change and certainly that has been the case with here. In the UK, no proactive closures were attempted but some reactive closures just happened and the point was made that they couldn't have done proactive closures anyway because with the subtlety of this infection, by the time it was detected in the schools and it was occurring heterogeneously, it was already in the schools. Even if you had closed the schools, a lot of the transmission was taking place in the communities and in families. You might conclude that school closures, and I'll show you some data on this, were effective in the decline-, were associated with school closures and then a common theme was that European countries, UK, Sweden and France have produced guidance for schools. As you can imagine, Sweden is saying, 'No, we're not changing our policy,' but France has adapted its policy. It is going to open its schools in two days' time. Schools open on September 2nd across France and the plan is that they will stay open but we're giving people local discretion that they may close if there are a certain number of cases taking place in the schools.

Now this is the kind of thing that has been seen – this is from England – and we're grateful for the Department of Health for this information. You can see there that there was a decline. This is sentinel data of influenza-like illness and looking at it just in a bit more detail, you can see there. It's the right-hand peak that you're looking at and you can see there that was when schools closed for the summer holidays but exactly the same time, was when a treatment initiative was started where it became possible for people to get treatment without having to go to their GPs so that could've removed that peak. Then also this was summer just coming up so that could've also been there. So actually trying to work out what was responsible for that fall would be very difficult.

Just finally to list there, there have been four studies published already in Eurosurveillance from Europe. All of those have been descriptive studies so far. The interesting point there is that they record a certain amount of side-effects from giving-, also the time of year, particularly giving it prophylactically and also some people are not inclined to give it to their children.

I did have one final slide. You saw this earlier but I'll just go through it in a bit more detail. The European countries attempted to come up with a common statement, and this is not easy with the complexity and the diversity of Europe. You'll see there where the most important statement is the one at the top that the general view is that there is presently no need to enact mass school closures pre-emptively, that's proactively but allowing the people to be able to do some reactive closures and some feeling from some member states that that would be of benefit. That we re-evaluate this situation on a regular basis and because decisions like that are the responsibility of individual member states, that a very firm conclusion there that that is a responsibility of members states to make such decisions. So I'd like to finish at that point, Todd.

Todd Weber: Thank you very much. We're going to hand it over to Atlanta now for your presentations and hopefully we'll have a few minutes at the end or we can push outside the envelope of one hour to get a few questions in after your presentations are completed. Thanks.

Francisco Averhoff: My name is Francisco Averhoff and I work with the newly-formed Community Measures Taskforce here at CDC and I want to walk you through some slides. Just quickly, I'm going to briefly summarise some of the investigations and research that we've been undertaking as well as give you an update on our current school guidance. First, just as a reminder community mitigation or non-pharmaceutical interventions (NPIs) constitute more than school closure and there really are four major elements – isolation and treatment of ill persons, voluntary home quarantine of household contacts, dismissal of students from school and social distancing as well as day care closure and work-place and community social distancing. I think it's important to note that the historic data from the 1918 pandemic as well as modelling data have all, pretty much, determined that the sum is greater than the parts, if you will. School closure is one element of that however. It has been a predominant theme for us during this pandemic.

So I want to just quickly summarise some of the research that we've been doing and I'm again, going to focus on school closures. We've done research on effectiveness, knowledge, attitudes and behaviours including adherence to recommendations, that is, 'Do ill students and teachers stay home when the school is closed? Is there a quarantine of affected household members? Do children, when the school is closed, re-congregate in other settings such as malls or shops? How about hygiene? How much adherence is there to hygiene recommendations? In addition, we've undertaken quite a bit of a look at the importance and the consequences of school closure, that is both the economic consequences as well as other and I think it's important again, as I mentioned to consider other non-pharmaceutical interventions such as social distancing.

I want to focus on an investigation that we did and I think it's noteworthy and helps to get at this answer of the effectiveness of school closure which, I think, is the big question as it was noted earlier. It's hard to tell. Disease sometimes goes away when schools close. It makes sense but what's the hard data on it? In April 2009, Texas had reported 28 cases of novel H1N1 at the time and there were two areas in Dallas/Fort Worth [Texas, U.S.]. Dallas County and Terra County are a large metropolitan area. If you look at the highlighted area, the Forth Worth independent school district are FWISD, they closed all of their schools from April 30th to May 7th. While in Irving, a neighbouring community did not close their schools and we were invited to work with the local and state health officials to assess the impact of this. This is a map showing the greater Dallas/Fort Worth area. By the way, this is in Texas for those of you that may not be familiar with the geography.

So we looked at a variety of surveillance systems that were available to look for influenza-like illness, hospitalisations – there weren't enough hospitalisations really to look at it, there weren't enough deaths. So we focused our efforts on electronic surveillance systems for the early notification of community-based epidemics or ESSENCE. This is not found all over the United States but coincidentally, it happened to be available in this geographic area. What it does is it's intended to look at early detection of disease outbreaks, looking at chief complaint data. I think that's an important consideration, this is not as provider-diagnosed influenza but chief complaint. More than 80% of the Emergency Departments of Dallas and Terra Counties submit their data to ESSENCE. So the data elements that we had available to us was chief complaint, date of visits, sex, age, race, discharge diagnosis, hospitalisations, zip code [postal code] and I think very important, home zip code because people may seek care elsewhere than where they actually live and we wanted to look at impact in these two geographic areas. Again, they have syndromic categories such as influenza-like illness, respiratory, gastrointestinal and other.

Our objective was to determine if the school closure was associated with the decrease in the proportion of school-age children with influenza-like illness or ILI. This is interesting and important, we looked at data from January through June, 40 hospitals in both counties, a total of nearly 18,000 records were reviewed and schools closed – I think it's an important consideration – during January 1st through January, that's a winter break in both areas during March 14th through March 22nd, that was their spring break again in both areas and specifically in April 30th to May 7th which was just in the Fort Worth independent school district. This is, if you will, if you look at the data for ILI visits both among total in the solid lines and the hatched lines are among five to seventeen-year-olds in the two different age groups. You can't tell much from this but you do notice a bit of a decrease during the breaks. This is what we've affectionately called our V-tach graph. It kind of looks like a ventricular tachycardia but what's interesting to look at-, if you look at the far-, the H1N1 school closure in County A and this is looking at the proportion of five to seventeen-year-olds with ILI, you see a divergence of the two counties where County A you see a definite drop in the proportion of children with ILI. So what we did, we looked at the data, looked at the time when schools were open and comparing when schools were closed and the proportion of children, five to seventeen-year-olds that visited and had a chief complaint of ILI. What we noted was in the five to seventeen-year-olds, there was a marked decrease again during the periods of school closure. Again, this is no surprise. This is again, consistent with Simon's work, the 1918 work and modelling work and it also, I think, illustrates the difficulty of actually getting to cause and effect with this. These are really, if you will, ecologic data.

So what we did in this area is that we did a second study simultaneously where we did a cluster sample survey, a 'school-based backpack survey' we call it where we sent the surveys home with the children from the schools at selected classrooms in all schools actually. We compared communities that closed their schools with those that did not looking at disease rates, adherence to other NPIs as well as social and economic consequences. So we were hoping that looking at the ecologic data whilst putting it with the survey data that we may be able to get a more clear picture. Unfortunately I don't have a lot of results here. The only survey results I have here are the participation rates and they were quite low but we did get a substantial number reported. The preliminary results on these are due in early September but I'll just say that in the early looks at this, it does look like there was a difference again consistent with the school closure having an effectiveness during the period of time in terms of ILI rates by this method as well. So it was also consistent with the ecologic data.

I just want to add for a moment that one of our investigators, Harvey Lipman, a statistician passed away this weekend after a long battle with cancer. He was really instrumental in working with us and so we're thinking about him and remembering him and really this work could not have been done without his diligence. So we thank him for that.

So quickly I just want to look at some other studies that we've done. This is a knowledge, attitudes and behaviour [survey] looking at an investigation of community measures related to schools in Chicago and some of the things that are important are, among parents a large proportion agreed with the decision to close schools. This is where there was a school closure in Chicago. A couple of schools closed. However, a large proportion of those reported difficulties including economic and educational impact on their children and well as on themselves. Among the students, there was pretty good compliance with social distancing. Better than expected. There were communication problems at all levels. There was a source of anxiety. Possible reduction of transmission following the school closure suggested-, again it's difficult to say cause and effect from these kinds of things and the schools at that time were closing based on recommendations for one or more cases. I think that it's important to note that this school closure occurred very early in the introduction in the United States where there was greater fear than we have now. Late in April/early in May of 2009, there was still a lot unknown and we were being much more aggressive about this. As you all know, in the backdrop, Mexico was having what was feared to be a very severe pandemic with a lot of morbidity and mortality and we really didn't have a good handle of the severity on this.

So this was in the context of the population believing that it was a more severe pandemic than, what I think, it's turning out to be currently. Also, we found that private schools were actually having quite a bit of diverse policies and practices from that study.

This is a public opinion survey, sort of a national survey that we worked with Harvard School of Public Health on conducted in June asking people about the problems that they may face around school and day care with closings. This is the percent of people answering yes to these questions. That they would have to miss work in order to care for children – over 50%. That they would lose pay or income and have money problems as a result – over 40%. That they would lose a job or a business as a result of having to stay home to care for children – 26% or one-fourth. So what this really tells us is that we have to think very carefully about recommendations about such as school closures at least here in the United States, because they have the potential for severe, adverse outcomes as noted as well from our previous speakers in the UK and Sweden.

So we have some ongoing studies. We worked with Mexico looking at the effectiveness of school closures as well as knowledge, attitudes and behaviours and adherence. We've worked with Texas. I showed you some of that data. We did a study at a university in Delaware where they had an early outbreak looking again at adherence to recommendations. Chicago, I mentioned to adherence to recommendations. Pennsylvania, adherence as well as economic impact. New York City, economic impact. These are studies that are supported by the CDC and in collaboration with the CDC but there are other studies ongoing as well. I think I want to put in a plug for those of you that may be interested. At the bottom, September 29th and 30th of this year we'll be having a meeting to look at research around this field of school closure and non-pharmaceutical interventions. We'd like to invite those of you that could possibly make it to please considering attending and even presenting some of the data from Europe. I think that would be very helpful.

So just to quickly now look at studies that were ongoing and planned for the summer and fall - one is the effectiveness of the summer holiday on ILI in select cities. I'm going to show you a graph of that in the next slide but again, it's an ecologic study again, if you will. The descriptive epidemiology of school closures in spring and fall – we want to take a look back at what were some of the characteristics of those schools? Why did some close and others not? What are the risk factors for school outbreaks for ILI in the fall? Again, I think it's very striking that if you go to a community some schools have large outbreaks and close, other schools seem to not be affected. What are those factors? We think there are modifiable factors as well as well as non-modifiable factors. Non-modifiable factors may be things such as the density of children in schools such as the density as the number of kids per classroom or something. There might be modifiable factors such as use of hand sanitizers upon entering and exiting, there may be some staggering of classes. So we want to really understand better what the factors are that can prevent and avert school outbreaks which we think is significant and an important thing to know about.

We have a lot of summer camps in the United States for children. We've had lots of outbreaks. We're undertaking a study to look at the impact that H1N1 had on summer camps. We're working with a group and looking at universities and the impact on H1N1 on universities and their preparedness for the fall. We're working very closely with Argentina. In July during the peak of their outbreak of H1N1 in the southern hemisphere, they closed their schools for three weeks and we're working with them to again, look at the possible impact that may have had as well as, again, some of the issues around economic and adherence to NPIs.

This is a slide-, I think that it was shown similarly for the UK or France perhaps-, I'm sorry, I forgot. This is Pennsylvania, the influenza activity, again the epi-curve on the left is seasonal influenza and you see the predictable increase every-, this is for this season, I'm sorry. 2008/2009. What you see there is a normal increase again including number of patients testing positive for Influenza A. Then you noted as we get into the far right of the curve, in May we start to see the swine flu or H1N1 and again you saw a second peak that you normally-, we do not have this in the United States. Again, the school ends and the disease goes away. Cause and effect – how can we determine that? We are working with a number of cities to look at this kind of ecologic data and also put it together with the opening of school. We're seeing, perhaps coincidentally that in the south-east United States where schools open earlier, we're seeing a lot more influenza-like activity than other parts of the country. Again, we just don't believe that it's coincidence. So we also have plans for monitoring and surveillance of NPIs for this fall. We're going to follow school closures, looking nationally with direct daily reporting to CDC as well as reviewing the media.

I want to just note that there are 130,000 schools in the United States with about 55 million children. So it's a big job but we've worked with the [U.S.] Department of Education and [individual] states' departments of education to get a handle with what's going on with school closures.

We're also working with our local public health departments, there are approximately 3,000 of them in the United States and we've worked to develop a system of about 150 sentinel counties including the 50 largest urban areas where we're going to do weekly surveys to monitor NPIs at the local level including things like school policies. Are they doing anything with public gatherings, etc? So this is going to be an ongoing surveillance system looking at about 150 local health departments covering about a third of the US population when you put the 50 largest urban areas. Again, the survey that I mentioned before, the Harvard survey, we're going to continue to do those regularly over the next six months.

I want to just quickly turn now to school guidance for fall 2009 and the title of it is School Guidance for State and Local Public Health Officials and School Administrators for Schools, Kindergarten through Twelfth [grade] in Response to Influenza during 2009/2010 School Year. This was recently released in August 2009. By this focus on

schools I mean that it's quite obvious but children are more infectious than adults. They tend to be more susceptible than adults to influenza strains. High contact rates in school settings compared to other community settings. Schools seem to be places of epidemic amplification which we've seen with H1N1, of course, this year. These are just some surveillance data again showing a peak among five to 24-year-olds, most of those are actually school-age kids, again, why we focused our efforts there.

There are some lessons learned from the spring wave we had. Firstly, that all epidemics are local and they're focused largely around schools. There's been a high degree of variability and we think that it[s important to empower local decision-making. There's a lot uncertainty. We're not going to be able to predict which areas are hit and not hit. So it does create some fact-finding challenges. Feedback and surveillance – I think that it's important to prepare our systems and feedback loops and that's why we're doing some of the schools closure surveillance as well as our sentinel counties. Flexibility – I think we have to be able to change. I'll talk about our guidance in a minute. There could be changes in the virus; there could be changes in the transmission. There would be changes in the pathogenicity and these changes may require that we change our guidance rapidly and we have to communicate that message to society. The effectiveness – what interventions we do such as school closure are hard to discern in real time and we're going to really learn this stuff after the fact, if you will, but that's not a reason not to do it.

Social disruption is an important consideration. The tolerance is low however it does depend on the risk benefit perceptions as well from the local community. Around morbidity and mortality, we've seen that local values in society are very important. In addition to the science, if you have a high profile death in the media it does change people's behaviours and these are things that we really cannot do on a national level and can't predict. Communications are critical and CDC recommendations do tend to be usually followed. I'll just demonstrate that with our rapidly changing recommendations around school closure early on. On April 27th, we recommended that schools have a dismissal for seven days should they have a case of diagnosed H1N1. We see a rapid rise in the number of children as well as the number of schools dismissing children. On May 1st, we changed it to fourteen days again thinking of transmission and considerations. On May 5th, we again changed it recommending that school dismissal not be necessary when we recognised that the severity may not have been as bad as initially intended and you see the rapid drop in school closures and students affected. At the peak, about 600,000 children were affected, over 1% of the 55 million in the United States but again you see that-, in fact CDC recommendations are-, even though decision-making is local, they do have an impact and we have to be very keenly aware of that.

So our current guidance for 2009 is not about transmission but it's about reducing illness and death and minimising social disruption. We did change our exclusion period. It was initially for seven days after onset of symptoms think that, by that time, people would not be infectious. We changed that to individuals with influenza-like illness should remain at home at least 24 hours after they're free of fever. That basically is not consistent with a longer period of time because in fact, most fevers last about two to four days which requires an isolation period of three to five days. If you look at this graph, this was done with Simon Cauchemez and others as well, looking at the percentage of households with ILI transmission occurring each day. What this basically tells you is that by Day Five about 91% of transmission in household studies done during the spring has already occurred. Again, this has not taken into account, if you will, the exhaustion of susceptibles in the household but it does give some indication that infectivity does go away after about five days. I noted earlier, with the recommendation of 24 hours after they're free of fever, this should go into about five days so we're confident that this should be an adequate period.

So the guidance that we have currently as I mentioned in early August has a background section, school responses by scenario with two scenarios to look at, a spring-like wave conditions, that is basically unchanged from what we saw in the spring, and with a greater than expected severity what you might consider doing. Then there's also another section that we think is very important on decision-making and how to take a course of action. First on the background, an important consideration is that, like all countries, I think, we're not doing a lot of testing so you have to treat seasonal flu as well as 2009 H1N1 exactly the same. You're not going to know what's exactly circulating specifically in your school so the recommendation is that your actions are the same for both. Try to keep schools open however, keep sick people at home which are the current recommendations. Very important that you have collaborative local decision-making. Again, attempts to minimise morbidity – that would be things like early treatment of high-risk individuals, consider schools that have a high proportion of children with high-risk conditions, they may perhaps more aggressively. Again, the goals of minimising social disruption.

If we have similar severity to spring 2009, the recommendations are to stay home when you're sick, separate ill students and staff, hand hygiene and respiratory etiquette to be highlighted, routine cleaning. We also found in the spring that there was a lot of excessive cleaning of schools. Schools would close and they would go through with bleach solutions throughout the school which are not necessary for flu so we're reinforcing that routine cleaning is sufficient. Again, as I mentioned, early treatment of high-risk both students and staff and selected schools dismissals and closures.

Should we have increased severity, we're recommending consideration of-, again, this is if it becomes more severe than it is now and we have greater rate of hospitalisation, a greater rate of mortality, to consider other things such as active screening, actually allowing high-risk students and staff staying home. Effectively that's like a protective sequestration. Students with ill household members stay home. Increasing distance between people at school, again the space between if possible. Extend the period if ill to stay home – again, we go back to seven days. Consider school dismissals and closures and that would be pre-emptive school dismissals and closures. An

important consideration again is the decision-making. We think that early on before these things happen is that it's important that local health departments to work with stakeholders and decisions-makers both public health and schools as well as political leaders in the community. It's important to have information on local epidemiology of what's going on in your community, what's going on in schools, what the absenteeism rate is doing. Consider the feasibility. What are the resources of doing some of these activities and what's the acceptability when you're dealing with public concerns?

Again, we've been very busy with guidance this year, preparing specific guidance around community events that include guidance for public gatherings, for schools, for summer camps, for schools K through twelve, the updated schools, schools we did April 28th, May 1st and May 5th and then our most recent one on August 5th. School and employers' guidance has been up since August 19th, guidance for higher education since August 20th and we're planning childcare guidance scheduled for September. These are all found on the CDC website.

Okay, that's all I have. Sorry for speaking so rapidly but I'll turn it back over to ECDC.

Todd Weber: First I want to thank all of our speakers for really covering quite a lot of territory and speaking to issues that cover about 800 million people and many of those being school children. So thanks very much. It was really a tour de force, I think, on everybody's part and I appreciate that. I'll take the moderator's prerogative of asking a quick question of Francisco, I think one of the challenges in influenza in general and certainly in this pandemic is monitoring the epidemic and measuring the impact of our interventions by having to use surrogate markers for actual disease, that is, using influenza-like illness as opposed to confirmed influenza infection, doctors' visits and such to measure the severity of illness.

I wonder in the data that you presented from the two counties in Texas where you looked at the difference in doctor's visits between the two areas - one where schools were closed and one where they weren't, whether there couldn't be maybe a counter-intuitive effect of that closure. For example, if you have a school closed and you're already at home, there may be no reason to go and see the doctor if the illness is mild. Whereas if the school is open and in order to stay home which is all you really need to do, you actually have to go and see the doctor to get the doctor's note or examination or that sort of thing. I'm not saying that happened but maybe these are things that could be examined in these surveys or the backpack surveys that you described. I wonder if you have any information that would clarify whether that kind of thing is going on.

Francisco Averhoff: Yes, thank you. That is a good question and that is precisely one of the reasons why we undertook the survey as well to get at some of those reasons and what was really happening on that level. Again, to look at cause and effect is very difficult. Intuitively, it makes sense that if schools are closed and children are away from each other that there is a lesser risk, if you will, of disease transmission. Again, this was early in the introduction in the United States. People were afraid at that time. That's why that district decided to close the schools to be pro-active and to try to avert serious disease and the community was of that mindset as well. So I think you're right. The issue of cause and effect especially in these ecologic studies is very difficult. It has its limitations but we're doing the best that we can to study it and understand it as best we can in case we need to use these interventions in the fall and winter.

Todd Weber: Let me give CDC the opportunity to ask any questions of our speakers here, Angus or Pasi.

Francisco Averhoff: I do want to invite some folks to come to our meeting in September for sure to see if they can't present what's going on in Europe. Aside from that, I did want to hear a little bit more about the social impact. I was curious what was going on in the UK with the school closures and also some thoughts on why the UK was hit so much harder than some of the other countries?

Angus Nicoll: Okay. Certainly whilst we were talking, Todd and I were exchanging notes about figuring out how it is best that we can disseminate information about your meeting in a month's time. I know of one country that's been contacted but I think we ought to make sue that other countries are aware because the action with this is really going on at the country level. To be honest, I don't want to say too much about the social impact because that varied. I would expect it to vary between countries in Europe but within countries because we had one spectacularly well-known school near London, Eton, was affected and then we also had schools in some relatively poor parts of the UK and I'm sure that had a very different impact. So I think you would have to ask the people from the countries who come to your meeting.

I'll try and quickly deal with the issue about why the UK and we give three answers to that. One is that it's flu and you can't predict what it's going to get up to. Secondly, it was the summer and so it wasn't spreading that fast. Whilst flu went everywhere in Europe, it didn't transmit everywhere. So you found flu in most parts of Europe but you certainly didn't find it taking off in every part of Europe and you can also point out there that it didn't take off in every part of the UK. Really, it was in the London area, it was in the West Midlands and it was in the central belt of Scotland, so why those three? Why Victoria in Australia to start off with? Things have got to start somewhere. Then the final point as to why the UK? The UK has got a particular number of links internationally and I know when people have run some of the models that factor in those links, quite a few times the UK lights up first.

The question that I'd like to ask back to you is a difficult one, I'm sure, what's it going to be like in the autumn? Is it going to be worse than in the spring? I don't think you'd like that question.

Francisco Averhoff: I think the answer is clear that we're expecting it to be much worse than it was in the spring. Actually here in Atlanta, we're having quite a bit of activity. In fact, Georgia has the greatest activity in the

United States right now. In fact, I just got a call that my daughter had a fever and was being sent home from school so it's hitting home quite personally actually. So I think we're preparing for it to be quite severe. We're looking that there are going to be school closures. We've already had, in Puerto Rico, where they delayed their opening for about a week due to fears of increased morbidity and mortality and so they opened late and they brought significant amounts of hand hygiene materials and things of this nature to the schools the last minute before opening schools. So that's why we think it's really important to monitor what's going on, to get an understanding. We have good disease surveillance systems generally but we don't have established systems for these kinds of interventions. Maybe I'll flip back a question to you, are there any activities that you're aware of to get a good handle on what kind of interventions and school closures and other school activities are being done in any countries? I'm very curious about that, and how to do it.

Angus Nicoll: I can't answer that one very well except to say that I think it's important to get people to your meeting. I was struck in a meeting recently in another country and hearing presentations from Japan just how different school closure policies can be in different countries. So we say, 'Okay. Some schools closed. We just did that in the UK,' whilst the people from the National Institute for Infectious Diseases in Japan were showing something that was much more regimented and much more organised because of a tradition of school closures and simultaneous clamping down on the karaoke bars so that the children couldn't escape out to what they usually liked to do in the evenings. Parents were quite concerned like you were describing earlier on and were not allowing their children to go out whilst the descriptions from the UK that we've seen is of, 'Yes, some of the schools were closed but life went on and the children were still mixing inside their families and with their friends.'

Todd Weber: Let me ask a question which is more a request for clarification. Given the recent recommendation by Eric Lander and the president's science advisory group regarding preparation for the pandemic, I think it's important to clarify what it means to prepare for a certain scenario versus what we actually expect will happen in terms of the science that we have so far. This has caused, I think, some confusion since the report got considerable publicity and I think it may have created some confusion as to what it means to prepare for the worst and yet anticipate less than that. Could you maybe clarify the terms a little bit and how the US government is preparing for the pandemic?

Francisco Averhoff: Yes, thank you. That's a good point. I think there was a lot of confusion with that. Those were planning assumptions. They were assumptions to be used for our planning purposes so that when we're talking about community measures and we're talking about vaccines, we're talking about the capacity in our hospitals, what we should plan for. They were not, if you will, estimates and predictions of what might happen. So I think that there was a lot of confusion with that. Again, that being said, we do have annually estimated in the United States over 30,000 deaths with seasonal flu. We do fully expect that this will be worse than regular seasonal flu so, I think as mentioned it is unpredictable so perhaps it's prudent to have these types of planning assumptions. I'll certainly say that at CDC, we're all very feverishly planning in our certain fields and community measures for surveillance, for vaccine distribution, for vaccine safety. A lot of these groups are working very diligently with these types of assumptions but again we're planning for the worst, hoping for the best, if you will.

Todd Weber: Thanks. Are there any further questions from your side for ECDC experts?

Angus Nicoll: I don't think there are and like you, we're very busy but I did want to say on behalf of ECDC how much we appreciate the preparation that you've done for this and to assure you that it will be useful. Our intention of this is to make sure that this is seen by colleagues across Europe so that they can learn what you've been doing and a little bit about what other countries inside Europe have been doing. So thank you very much Francisco and colleagues.

Francisco Averhoff: Thank you. Again, likewise, we very much appreciate opportunities for this type of exchange and I think that we can all benefit from the experiences we're all having so I do hope that we will see some colleagues at our meeting in late September. I will continue our communication with that. We do have a better agenda so we're making a little progress on that so, thank you.

Todd Weber: Again, I will take the moderator's prerogative or duty to adjourn the meeting. Thanks very much to my colleagues in Atlanta. We really appreciate it and we look forward to having similar exchanges as the pandemic wears on. Thanks so much.