

need for this support can be understood given concerns about influenza A(H5N1) and the severe acute respiratory syndrome (SARS). However, conflating spread and severity allowed the suggestion that 2009 A(H1N1) was not a pandemic. It was, in fact, a classical pandemic, only much less severe than many had anticipated or were prepared to acknowledge, even as the evidence accumulated.

In 2009 WHO declared a pandemic several weeks after the criteria for the definition of a classical pandemic had been met. Part of the delay was no doubt related to the nexus between the formal declaration of a pandemic and the manufacture of a pandemic-specific vaccine. If a classical pandemic definition had been used, linking the declaration to vaccine production would have been unnecessary. This could have been done with a severity index and, depending on the availability and quality of the emerging evidence on severity, a pandemic specific vaccine may have been deemed unnecessary. Alternatively authorities may have decided to order vaccine in much smaller quantities.

The response to A(H1N1) has been justified as being precautionary, but a precautionary response should be rational and proportionate and should have reasonable chances of success. We have argued that the population-based public health responses in Australia and, by implication, elsewhere, were not likely to succeed.<sup>11</sup> Similarly, the authors of the draft report on the response to the International Health Regulations during the 2009 pandemic note that what happened during the pandemic reflected the activity of the virus and, by implication, not the interventions.<sup>10</sup>

Risk is assessed by anticipation of severity and precaution should be calibrated to risk. As Doshi has argued, we need to *redefine* pandemic influenza. We can then *describe* the potential severity range of future pandemics. Finally, we need to use evidence to assess severity early to anticipate risk. ■

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## Living forwards, understanding backwards

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It has been said that pandemics are lived forwards and understood backwards. The 2009 influenza pandemic is no exception. The identification of the new influenza virus strain in the United States of America coincided with many media reports describing a very severe pneumonia affecting young Mexican adults – echoes of 1918! Hard data were sparse and quoted case fatality rates ranged from 0.3% to 2.5% of confirmed cases as late as September 2009. With the benefit of hindsight it is easy to say that the disease caused by the virus was in fact mild for most people and that this action or that action should have been taken. However, in real time with little reliable data on the effects of the virus on individuals and communities and faced with the need to make time-critical decisions, sovereign nations across the world responded differently. It is important to remember that the World Health Organization (WHO) remit is to help governments determine the level of interventions required as part of their response to threats to international health.

Unfortunately, the fact that WHO issued revised pandemic guidance just as the pandemic was starting generated confusion. Under the new guidance,<sup>1</sup> pandemic phases 4 to 6 differed significantly from the 2005 guideline document,<sup>2</sup> and this made communication difficult.

Individuals have made great play of the change to the wording of one sentence that was part of a 60-page document before phase 6 (the so-called start of the pandemic) was declared. In fact, in several places the WHO 2009 guidance document describes phases 5 to 6 as the pandemic period and clearly states that “during phases 5–6 (pandemic) actions shift from preparedness to response at a global level.” From this it can be argued that the pandemic was actually declared on 29 April 2009, five days before the quoted change in definition.

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In the United Kingdom of Great Britain and Northern Ireland, a new national influenza pandemic strategy was published for consultation on 22 March 2011.<sup>3</sup> This has taken on board many of the lessons learned during the 2009 pandemic. However, the strategy still recognizes the need for an initially precautionary approach, given the speed with which the virus can spread and the paucity of data that will be available at the start of a pandemic, although it states that proportionality and flexibility should guide the response as information about the virus and its effects become available. The strategy is now better adapted to the needs of the United Kingdom and is proposing a new phased response that is not linked to the WHO phases. This reflects the fact that in the United Kingdom the first cases were detected in late April 2009 and that using the WHO phases, which are global indicators of spread, proved to be unhelpful.

Peter Doshi highlights the lack of a definition of a pandemic.<sup>4</sup> There is also no definition of a pandemic wave or severity, both key issues when it comes to describing the progress and impact of a pandemic. I don't believe this reflects a lack of willingness to formulate such definitions, but rather, a lack of international consensus stemming from the absence of key data and the recognition that severity, impact and other descriptors can only be applied with certainty historically. ■

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## Planning for uncertainty: a European approach to informing responses to the severity of influenza epidemics and pandemics

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The internationally accepted definition of a pandemic is straightforward and well known: “an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people”.<sup>1</sup> However, as Doshi reminds us, for any modern influenza pandemic, with many available powerful countermeasures, it is the detailed description that is crucial in determining proportionate responses, not the definition.<sup>2</sup>

Because of the inherent unpredictability of influenza viruses, preparing for and responding to epidemics and pandemics will always be an uncertain business.<sup>3</sup> Annual epidemics and irregular pandemics have several important characteristics that summary terms such as *mild*, *moderate* and *severe* gloss over.<sup>2</sup> For example, even the “moderate” or “mild” pandemic of 2009 was severe in its impact on many intensive care units and in its initial pressures on primary care services.<sup>4,5</sup>

Data and analyses that inform on the relevant features in the early course of pandemics and epidemics become available continuously. Initial analyses can be misleading and the pattern of infection and disease can also change over time. In the 2009 pandemic, the European Centre for Disease Prevention and Control (ECDC) used updatable published risk assessments to organize this information, comment on its implications for the response and identify the most important areas of uncertainty.<sup>6</sup> This approach was based on a list of “known unknowns” of pandemics, part of a pre-planned “surveillance in a pandemic” strategy.<sup>7</sup>

As recommended by the report adopted by the 64th World Health Assembly,<sup>3</sup> ECDC has further developed this approach applying it as a matrix (Table 1) to annual seasonal epidemics, starting with the 2010–2011 season. With powerful countermeasures increasingly available – public health interventions, antivirals, vaccines and higher-level intensive care – the matrix relates more to response than to conventional measures, such as transmission and infection fatality rates. Important as these are, they are rarely available in an accurate form early on, whereas the initial impressions of impact on services often appear rapidly. In the 2009 pandemic, the experience and reports of predominantly mild illness (but with some very severe cases) received from New York City and Melbourne, once verified, were highly informative in determining the proportionate European response.<sup>8</sup> The risk assessments are undertaken by ECDC staff drawing on both European experience (from the European Influenza Surveillance Network) and whatever verifiable epidemic intelligence is available.<sup>9</sup> For seasonal epidemics the information will be presented visually using internationally recognizable red, amber and green colours (Table 1 and Table 2). Red signals situations in which the evidence suggests action is justifiable, and amber signals those in which precautionary approaches may be needed. Europe has a particular advantage in that seasonal epidemics tend to progress from west to east, so that early experience and virology can be especially helpful in preparing countries for what they will experience later.<sup>10</sup> Variants on this approach have been used since the 2007–08 season, beginning with the appearance of oseltamivir-resistant viruses in Norway (Table 3). Though concerned with responses, the severity matrix cannot prescribe actions. The ECDC's mandate is to offer scientific information, guidance and options, not to make recommendations. Decisions on risk management are made by its individual Member States and collectively by European Union bodies, such as the Health Security Committee. Capacity, preparation and disease intensity vary across countries; so what can be coped

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