

## Public Understanding of Pandemic Influenza, United Kingdom

**To the Editor:** Widespread outbreaks of influenza A (H5N1) in poultry and severe infections in humans have raised the possibility of an influenza pandemic. The 3 influenza A pandemics of the 20th century (1) were associated with considerable socioeconomic disruption as well as many deaths and pressure on health services. Experiences in the United States during the 1918–1920 pandemic (2) suggest that government advice that conflicts with personal or societal beliefs may not be followed, thus jeopardizing public health measures. Experience from the outbreak of severe acute respiratory syndrome has highlighted some pitfalls in achieving public understanding (3) and compliance (4) in the era of mass communication. Even if initial compliance is achieved, previous behavior patterns may reemerge during a pandemic as people begin to perceive that they have little control over the threat (5) or reduce their estimation of the risk (6).

Building robust public understanding has been made a priority in preparedness and response plans (7). However, despite widespread media coverage, little attention has been paid to assessment of public knowledge about the threat for pandemic influenza and surrounding issues. Such information may be essential to optimize public education strategies.

A questionnaire-based population survey was administered in March 2005 by 2 of the authors (MT and GB) to identify public knowledge about pandemic influenza, awareness of its potential effects, key information needs, and willingness to follow advice about public health measures.

A structured interview consisting of 20 questions was used. Participants were approached at random and interviewed (in English) in public places including parks, shopping malls, libraries, and train stations in northern London. This area has considerable ethnic diversity (55% of the population is nonwhite) and a socioeconomic status similar to the rest of London. Recruited participants were >18 years of age and resided in the United Kingdom. They were excluded if another family member had previously completed the survey. Age and sex ratios were selected to reflect population centiles calculated from the 2001 UK population census. Statistical analyses were conducted with Fisher exact tests and epidemiologic tabulations in Stata version 8.2 (Stata Corp., College Station, TX, USA).

Of 273 persons approached for interview, 225 accepted and were eligible. Nine questionnaires were incomplete and therefore excluded, leaving 216 (79%) for analysis. Demographic characteristics of participants are summarized in the Appendix Table, available online at <http://www.cdc.gov/ncidod/EID/06-0208-appT.htm>. Half the respondents chose the correct definition of a pandemic from 5 options. Statistical analysis demonstrated that those 32–44 years of age were more likely than those of other age groups to choose correctly ( $p = 0.001$ ). Persons who left school at ages  $\geq 17$  years were more likely than those who left school earlier to select the correct answer ( $p = 0.007$ ).

Sex of the respondent did not influence correct response; 56% of those 18–31 years of age versus 86% of those  $\geq 60$  years of age were aware of the threat of pandemic influenza ( $p = 0.006$ ). When asked the likelihood of a pandemic during the next 10 years, 71% responded that it was likely or very likely, whereas 16% considered it unlikely or very unlikely. When offered a list of 4 possible negative

affects identified by experts (health-care service, food distribution, fuel distribution, and disruption to tourism), only one fourth thought that all 4 would occur. Details about symptoms of pandemic influenza were most frequently cited as the main public information need in the event of a pandemic. Television was rated by 68% of respondents as their preferred means of receiving information during a pandemic. Almost all respondents (97%) would wash their hands  $\geq 5$  times each day if requested, and 86% would definitely or probably be willing to stay away from public gatherings (unspecified) if asked. However, only 61% would stay away from work (unspecified period) as a means of avoiding pandemic influenza.

As far as we know, this is the first population-based study of knowledge and understanding of pandemic influenza. Public understanding of this threat and its potential effect in the United Kingdom appears to be limited. Our findings that older adults are more aware than younger persons has also been found in other settings (8) as has the increased public health awareness in more educated groups (9,10). Economic considerations retain high importance even with a potentially fatal threat, a phenomenon that has been previously noted with regard to self-quarantine (4). Our study did not address whether reluctance to take time off from work was more likely to be associated with public or private sector employment or self-employment. Further study in this area would help preparedness strategy.

This study was limited by a relatively small sample size, and its setting in 1 region of London may have implications regarding the extent to which the findings are applicable elsewhere. Further, larger assessments are needed both before and after specific pandemic influenza awareness programs as part of the ongoing process of pandemic preparedness.

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## Influenza C Virus Infection in Children, Spain

**To the Editor:** Influenza viruses cause serious respiratory illness, particularly in infants <24 months of age (1). Despite serologic studies of French adults that showed an influenza virus seroprevalence of 60%–70%, influenza C infections have rarely been described (2). Given the technical difficulties involved in isolating influenza C virus in cell cultures, diagnosis is made only in certain laboratories. Detection of viral genome by reverse transcription (RT)–PCR in nasopharyngeal aspirates allows etiologic diagnosis of these infections (3). Mild upper respiratory infections in adults and adolescents are attributed to this virus (4,5). Some cases of lower respiratory infections have also been described in children (6).

A prospective study was conducted from September 1999 through July 2003. We determined the incidence and clinical manifestations associated with influenza C infection in all children <24 months of age admitted to Severo Ochoa Hospital in Madrid, Spain, with respiratory tract infections both with and without fever. All patients were evaluated by an attending physician. The study was approved by the Fondo de Investigaciones Sanitarias Committee of Spain.

Specimens of nasopharyngeal aspirates were obtained from each patient on admission (Monday to Friday) and sent to the Respiratory Virus Laboratory at the National Microbiology Center in Madrid for virologic studies. Specimens were processed within 24 hours of collection.

A multiplex RT-PCR was used for direct detection of respiratory syncytial virus A (RSV-A), RSV-B, adenoviruses, and influenza A, B, and C viruses in all nasopharyngeal samples,

as previously described (7). Primers were specific for the nucleoprotein gene segment of influenza virus, the fusion gene of RSV, and the hexon gene of adenoviruses.

An internal amplification control was included in the reaction mixture to exclude false-negative results caused by specimen inhibitors or extraction failure. Given the high sensitivity of nested PCR, precautions were taken to prevent reactions from being contaminated with previously amplified product, as well as to protect target RNA or DNA from other specimens and controls. All procedures were performed in laboratory safety cabinets at locations different from those where amplified products were analyzed. Detection levels of 0.1 and 0.01 50% tissue culture infectious doses of influenza A and B viruses and 1–10 molecules of cloned amplified products of influenza C virus, RSV-A, RSV-B, and adenovirus serotype 1 were achieved.

A total of 706 hospitalized infants were enrolled in the study; 496 specimens were positive for virus (76.1% were RSV). Thirty children were infected with influenza virus (4.3% of all respiratory infections and 6% of all confirmed viral infections). Six patients had confirmed influenza C virus infections. Three of them had co-infections, 2 with RSV and 1 with adenovirus. Clinical characteristics of these 6 patients are shown in the Table. Although clinical characteristics for 24 influenza A virus infections were similar to those for influenza C virus infections (no influenza B virus was identified), statistical analysis was not conducted because of small sample size.

Influenza virus infections are a major cause of hospitalization and illness in young children, particularly those <2 years of age (1). Influenza A virus infections are more common than influenza B virus infections (75% vs 25%) (8). Our results indicate that influenza C virus is present