

Online Quiz

Test Your Knowledge: Ten Questions about Influenza

This quiz is related to a Policy Forum (DOI:10.1371/journal.pmed.0020359) in the December 2005 issue.

Gavin Yamey

Question 1. In the United Kingdom, roughly how many patients with influenza-like illness are hospitalized each year?

- 0.1%
- 1%
- 10%

Question 2. In tropical areas, when does influenza activity typically peak?

- Between late December and early March
- Between May and September
- There is no temporal peak during the year

Question 3. For how long is an otherwise healthy adult with symptomatic influenza infectious to others?

- Only while symptoms are present
- For about one day before the onset of the symptoms until about five days thereafter
- For about three days before the onset of the symptoms until about seven days thereafter

Question 4. Which of the following is true about avian flu (flu caused by avian viruses) at the time that this quiz was written (December 5, 2005)?

- There is currently no good evidence of human-to-human spread, but flu experts are concerned that such spread could occur in the future
- It is always fatal
- Symptoms are confined to the respiratory tract
- It has only occurred in Asia

Question 5. Which of the following groups does the United States Centers for Disease Control and Prevention recommend should receive the inactivated influenza vaccine every year?

- Children under six months of age
- Everyone over 40 years of age
- Residents of long-term care facilities

Question 6. Which of the following is an absolute contraindication to receiving inactivated influenza vaccination?

- Being HIV positive
- Pregnancy
- Hypersensitivity to eggs

Question 7. Which of the following best reflects the clinical evidence on influenza vaccination?

- There is no evidence that vaccination reduces the incidence of pneumonia
- Observational studies suggest that vaccination reduces the incidence of pneumonia
- There is very good evidence from randomized controlled trials (RCTs) that vaccination reduces the incidence of pneumonia

Question 8. Which of the following statements best reflects the evidence on treating influenza with oral oseltamavir (Tamiflu)?

- In high-risk individuals (those aged 65 years and older or those with chronic medical conditions), the drug reduces symptoms by about one day
- There is good evidence that the drug reduces the rate of complications of influenza (including pneumonia)
- In clinical trials, there was no difference in the rates of nausea and vomiting between the drug and the placebo
- In otherwise healthy people with influenza, the drug reduces the duration of symptoms by up to one day

Citation: Yamey G (2005) Test your knowledge: Ten questions about influenza. *PLoS Med* 2(12): e425.

Copyright: © 2005 Gavin Yamey. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Gavin Yamey is Senior Editor at *PLoS Medicine*. E-mail: gyamey@plos.org

DOI: 10.1371/journal.pmed.0020425

Question 9. Which of the following statements best reflects the evidence on treating influenza with oral amantadine or rimantidine?

- These drugs have specific antiviral activity against influenza A viruses, but not B viruses
- In people with influenza A, these drugs reduce the duration of symptoms by about three days
- There is good evidence from several RCTs that these drugs prevent serious complications of influenza, such as pneumonia

Question 10. Which of the following statements best reflects the evidence on treating influenza with inhaled zanamavir (Relenza)?

- The treatment is no better than placebo at reducing duration of symptoms
- There is no clinical evidence to suggest any major side effects from the drug
- The drug has activity against influenza A and B viruses

Answer 1. 1%

In the UK, 1.3% of patients with influenza-like illness are hospitalized each year (95% confidence interval, 0.6%–2.6%) [1].

Reference

1. Hansen L (2004) Influenza. *Clin Evid* 2004: 1095–1102.

Answer 2. There is no temporal peak during the year

In tropical areas, there is no temporal peak in influenza activity [1]. In contrast, in temperate areas, influenza typically peaks between May and September in the southern hemisphere and between late December and early March in the northern hemisphere.

Reference

1. Bridges CB, Fukuda K, Uyeki TM, Cox NJ, Bridges CB, et al. (2002) Prevention and control of influenza: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep* 51(RR-3): 1–31.

Answer 3. For about one day before the onset of the symptoms until about five days thereafter

People with influenza are infectious to others as long as they are shedding virus. Adults with influenza who are otherwise healthy shed virus from about one day before the onset of symptoms until about five days thereafter [1]. It is unclear if people with asymptomatic influenza infection transmit the virus.

Reference

1. Fleming D (2005) Influenza pandemics and avian flu. *BMJ* 331: 1066–1069.

Answer 4. There is currently no good evidence of human-to-human spread, but flu experts are concerned that such spread could occur in the future

To date, there has been no documented case in which avian flu has spread from human to human [1]. Avian flu is not always fatal; for example, in the first described outbreak of avian H5N1 infection in Hong Kong, six out of the 18 affected people died [1]. In 2003, the avian H7N7 virus was detected in the Netherlands in 86 humans who handled affected poultry and in three of their family members [2]. Of

these 89 patients, 78 presented with conjunctivitis, five with conjunctivitis and influenza-like illness, two with influenza-like illness, and four did not fit the case definitions. There was one fatality, which was due to pneumonia in combination with acute respiratory distress syndrome.

References

1. Fleming D (2005) Influenza pandemics and avian flu. *BMJ* 331: 1066–1069.
2. Fouchier RA, Schneeberger PM, Rozendaal FW, Broekman JM, Kemink SA, et al. (2004) Avian influenza: A virus (H7N7) associated with human conjunctivitis and a fatal case of acute respiratory distress syndrome. *Proc Natl Acad Sci U S A* 101: 1356–1361.

Answer 5. Residents of long-term care facilities

People who live in long-term care facilities are at high risk for flu complications, so the US Centers for Disease Control and Prevention (CDC) recommends that they get vaccinated each year (<http://www.cdc.gov/flu/protect/keyfacts.htm>). People aged 65 years and older are at high risk for flu complications, so the CDC states that they should be vaccinated (<http://www.cdc.gov/flu/protect/keyfacts.htm>). In addition, since almost one-third of people 50–64 years of age in the US have one or more medical conditions that place them at increased risk for serious flu complications, vaccination is recommended for all persons aged 50–64 years (<http://www.cdc.gov/flu/protect/keyfacts.htm>). The vaccine is not approved for use in children younger than six months of age.

Answer 6. Hypersensitivity to eggs

One of the indications for receiving influenza vaccination is an underlying chronic medical illness, including HIV/AIDS, and the CDC states that “people with HIV/AIDS are considered at increased risk from serious influenza-related complications and should be vaccinated” (<http://www.cdc.gov/flu/protect/hiv-flu.htm>). The CDC states that people with HIV/AIDS should not receive the live attenuated flu vaccine (sold commercially as FluMist).

Pregnancy is not an absolute contraindication to receiving influenza vaccination, but hypersensitivity to eggs is a contraindication because flu vaccine is produced from viral material that is grown on hen eggs [1].

Reference

1. Fleming D (2005) Influenza pandemics and avian flu. *BMJ* 331: 1066–1069.

Answer 7. Observational studies suggest that vaccination reduces the incidence of pneumonia

In a systematic review of studies on influenza vaccination, Loeb found no RCTs that assessed the effects of influenza vaccination on preventing community-acquired pneumonia [1]. However, he found one systematic review of 20 cohort studies that compared influenza vaccination against no vaccination [2]. The review found that vaccination significantly reduced the incidence of pneumonia.

References

1. Loeb M (2005) Community acquired pneumonia. *Clin Evid* 2005: 1862–1875.
2. Gross PA, Hermogenes AW, Sacks HS, Lau J, Levandowski RA (1995) The efficacy of influenza vaccine in elderly persons: A meta-analysis and review of the literature. *Ann Intern Med* 123: 518–527.

Answer 8. In otherwise healthy people with influenza, the drug reduces the duration of symptoms by up to one day

A systematic review of three RCTs in 937 otherwise healthy people found that the drug reduced the median

time to alleviation of symptoms compared with placebo (the difference was -20.69 hours, 95% confidence interval, -33.97 – -7.41 hours) [1]. The same review identified five RCTs involving a total of 1,134 high-risk individuals, and it found no significant difference between the drug and the placebo in time for symptom alleviation in this patient group. The review identified one RCT (which did not report on the number of patients) that examined complication rates in otherwise healthy adults treated with drug or placebo; it found no significant difference in the need for antibiotics for complications [1,2]. In clinical trials, nausea and vomiting were significantly more common with the drug than with placebo [3,4].

References

- Cooper NJ, Sutton AJ, Abrams KR, Wailoo A, Turner D, et al. (2003) Effectiveness of neuraminidase inhibitors in treatment and prevention of influenza A and B: Systematic review and meta-analyses of randomised controlled trials. *BMJ* 326: 1235.
- Hansen L (2004) Influenza. *Clin Evid* 2004: 1095–102.
- Treanor JJ, Hayden FG, Vrooman PS, Barbarash R, Bettis R, et al. (2000) Efficacy and safety of the oral neuraminidase inhibitor oseltamivir in treating acute influenza: A randomized controlled trial. *JAMA* 283: 1016–1024.
- Nicholson KG, Aoki FY, Osterhaus AD, Trotter S, Carewicz O, et al. (2000) Efficacy and safety of oseltamivir in treatment of acute influenza: A randomized controlled trial. *Lancet* 355: 1845–1850.

Answer 9. These drugs have specific antiviral activity against influenza A viruses, but not B viruses

In vitro, these two drugs have specific antiviral activity against influenza A viruses, but not B viruses [1]. One systematic review [2] and three additional RCTs [3–5] found that the drugs reduce the duration of symptoms by about one day compared with placebo in people with influenza A. One systematic review found no evidence from RCTs that either of these drugs can prevent serious complications of influenza [6].

References

- Tominack RL, Hayden FG (1987) Rimantadine hydrochloride and amantadine hydrochloride use in influenza A virus infections. *Infect Dis Clin North Am* 1: 459–478.
- Jefferson TO, Demicheli V, Deeks JJ, Rivetti D (2002) Amantadine and rimantadine for preventing and treating influenza A in adults. *Cochrane Database Syst Rev* 2002: CD001169.
- Baker LM, Shock MP, Iezzoni DG (1969) The therapeutic efficacy of Symmetrel (amantadine hydrochloride) in naturally occurring influenza A2 respiratory illness. *J Am Osteopath Assoc* 68: 1244–1250.
- Galbraith AW, Schild GC, Potter CW, Watson GI (1973) The therapeutic effect of amantadine in influenza occurring during the winter of 1971–1972 assessed by double-blind study. *J R Coll Gen Pract* 23: 34–37.
- Walters HE, Paulshock M (1970) Therapeutic efficacy of amantadine HCl. *Mo Med* 67: 176–179.
- Hansen L (2004) Influenza. *Clin Evid* 2004: 1095–102.

Answer 10. The drug has activity against influenza A and B viruses

In vitro studies have shown that zanamivir has antiviral activity against both influenza A and influenza B viruses [1]. There is observational evidence that the inhaled drug may be associated with bronchospasm and worsening of underlying respiratory disease [2,3]. A systematic review of the evidence found that the drug reduces the duration of symptoms by about one day compared with placebo in people with influenza A or B [3].

Reference

- Woods JM, Bethell RC, Coates JA, Healy N, Hiscox SA, et al. (1993) 4-guanidino-2,4-dideoxy-2,3-dehydro-N-acetylneuraminic acid is a highly effective inhibitor of both the sialidase (neuraminidase) and growth of a wide range of influenza A and B viruses in vitro. *Antimicrob Agents Chemother* 37: 1473–1479.
- Henney JE (2000) Revised labeling for zanamivir. *JAMA* 284: 1234.
- Hansen L (2004) Influenza. *Clin Evid* 2004: 1095–1102.

References

- Baker LM, Shock MP, Iezzoni DG (1969) The therapeutic efficacy of Symmetrel (amantadine hydrochloride) in naturally occurring influenza A2 respiratory illness. *J Am Osteopath Assoc* 68: 1244–1250.
- Bridges CB, Fukuda K, Uyeki TM, Cox NJ, Bridges CB, et al. (2002) Prevention and control of influenza: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep* 51(RR-3): 1–31.
- Cooper NJ, Sutton AJ, Abrams KR, Wailoo A, Turner D, et al. (2003) Effectiveness of neuraminidase inhibitors in treatment and prevention of influenza A and B: Systematic review and meta-analyses of randomised controlled trials. *BMJ* 326: 1235.
- Fleming D (2005) Influenza pandemics and avian flu. *BMJ* 331: 1066–1069.
- Fouchier RA, Schneeberger PM, Rozendaal FW, Broekman JM, Kemink SA, et al. (2004) Avian influenza: A virus (H7N7) associated with human conjunctivitis and a fatal case of acute respiratory distress syndrome. *Proc Natl Acad Sci U S A* 101: 1356–1361.
- Galbraith AW, Schild GC, Potter CW, Watson GI (1973) The therapeutic effect of amantadine in influenza occurring during the winter of 1971–1972 assessed by double-blind study. *J R Coll Gen Pract* 23: 34–37.
- Gross PA, Hermogenes AW, Sacks HS, Lau J, Levandowski RA (1995) The efficacy of influenza vaccine in elderly persons: A meta-analysis and review of the literature. *Ann Intern Med* 123: 518–527.
- Hansen L (2004) Influenza. *Clin Evid* 2004: 1095–1102.
- Henney JE (2000) Revised labeling for zanamivir. *JAMA* 284: 1234.
- Jefferson TO, Demicheli V, Deeks JJ, Rivetti D (2002) Amantadine and rimantadine for preventing and treating influenza A in adults. *Cochrane Database Syst Rev* 2002: CD001169.
- Loeb M (2005) Community acquired pneumonia. *Clin Evid* 2005: 1862–1875.
- Nicholson KG, Aoki FY, Osterhaus AD, Trotter S, Carewicz O, et al. (2000) Efficacy and safety of oseltamivir in treatment of acute influenza: A randomized controlled trial. *Lancet* 355: 1845–1850.
- Tominack RL, Hayden FG (1987) Rimantadine hydrochloride and amantadine hydrochloride use in influenza A virus infections. *Infect Dis Clin North Am* 1: 459–478.
- Treanor JJ, Hayden FG, Vrooman PS, Barbarash R, Bettis R, et al. (2000) Efficacy and safety of the oral neuraminidase inhibitor oseltamivir in treating acute influenza: A randomized controlled trial. *JAMA* 283: 1016–1024.
- Walters HE, Paulshock M (1970) Therapeutic efficacy of amantadine HCl. *Mo Med* 67: 176–179.
- Woods JM, Bethell RC, Coates JA, Healy N, Hiscox SA, et al. (1993) 4-guanidino-2,4-dideoxy-2,3-dehydro-N-acetylneuraminic acid is a highly effective inhibitor of both the sialidase (neuraminidase) and growth of a wide range of influenza A and B viruses in vitro. *Antimicrob Agents Chemother* 37: 1473–1479.