Infectious Diseases:
Bird Flu Today Public Awareness Campaign

It was 1918. World War I was coming to an end and American soldiers in Europe were looking forward to coming home. However, not all was well on the home front. On March 11, 1918 the Fort Riley Army Hospital in Kansas was inundated with patients complaining of headaches, sore throats, and fevers. Still contained to the Army hospital, the influenza epidemic had doctors on their feet for days on end. Doctors treated soldiers for their symptoms, and some of those soldiers were shipped to Europe to help bring the war to a close. However, something strange began to occur. The sick soldiers going abroad carried invisible invaders that had already mutated and were un treatable by available medicines. Doctors had no idea what was causing the outbreak and continued to treat the soldiers for their symptoms. As soldiers returned home later that summer, they brought back a virus that had evolved into an extremely lethal disease that was eventually called Spanish Influenza. This strain of flu was so powerful that people who fell ill in the morning were often dead by nightfall. By October of 1918, 195,000 Americans had died from this global pandemic. It was not until 1933 that scientists finally discovered that a mutated influenza virus was causing the outbreak.

Today, the source of this 1918 influenza pandemic is still being debated. Much of the evidence points to an avian (bird) flu that mutated into a form transmittable between humans. Recently, news reports about new strains of bird flu have raised concern among scientists and the public about the potential of an epidemic even worse than that of 1918. The H5N1 strand of the flu virus is primarily transferred between migratory birds and, in rare cases, from birds to humans. Human deaths from H5N1 are still rare; human infections were first reported in 1997, and in 2013 the World Health Organization (WHO) recorded 25 deaths. [1] The fear is that H5N1 could develop the ability to easily transfer between humans before a vaccine is developed. In 2005, the federal government issued The National Strategy for Pandemic Influenza, which focuses American efforts on “(1) stopping, slowing or otherwise limiting the spread of a pandemic to the United States; (2) limiting the domestic spread of a pandemic, and mitigating disease, suffering and death; and (3) sustaining infrastructure and mitigating impact to the economy and the functioning of society.” [2] Since 2005, the government has been implementing this action plan. [3]

With the potential threat of another deadly influenza pandemic looming and a limited federal budget, the government’s plan has attracted supporters and critics alike. What do you think? Is the impending threat of bird flu a cause for alarm?

References
**Individual Activity**

Your individual task is to become expert in a research area. After completing research on your topic, you must provide your team with a concise – but detailed – explanation of what you learned and how it can be applied to the current situation. Once each team member has completed the research, you will be ready to tackle the group project and put together a public awareness campaign. Your individual research is crucial, because without it, your team will not be able to answer overarching group questions that will inform your campaign. Download the appropriate materials for your role to access guiding questions, website links, and worksheets.

Researcher 1: *How is avian influenza different from the common flu?*

The common flu is not life threatening for much of the world’s population. If that is the case, then why is it that avian influenza poses such a high risk?

Researcher 2: *Is H5N1 on the verge of evolving into THE superbug of the century?*

The Spanish Flu epidemic of 1918 demonstrates why microbial evolution is a concern for scientists everywhere. What needs to happen for H5N1 to present a threat to public health?

Researcher 3: *Is finding and producing a vaccine for H5N1 an easy task?*

Each year a new seasonal flu vaccine is produced to fight different strains of the virus that are predicted to dominate in that particular period. What does this indicate about efforts to develop a vaccine for H5N1?

Researcher 4: *For avian influenza, are public health measures the most effective prevention option?*

Many will argue that public health measures are the best way to control and prevent the spread of infectious diseases. How can we learn from our past experiences dealing with pandemics?

**Group Activity**

Your team’s task is to develop a public awareness campaign based on your understanding of viruses, microbial evolution, vaccines, and public health. Your presentation to the class should address the following three questions:

1. (1) From an evolutionary perspective, should the United States be concerned about bird flu? Why or why not?

2. (2) Given the state of the federal budget, do you think we should spend a lot of money to stockpile a vaccine? Which segment of the population should be accounted for in stockpiling the H5N1 vaccine?

3. (3) According to the federal government’s plan, money should be directed to training medical personnel, improving disease surveillance and testing, and developing preparedness plans. Do you agree this is how the money should be spent?
**Researcher 1:** How is avian influenza different from the common flu?

The common flu is not life threatening for much of the world’s population. If that is the case, why does the avian influenza pose such high risks?

1. How does an influenza virus infect the host cell?
   
   https://www.hhmi.org/biointeractive/viral-lifecycle

2. What kinds of changes must occur to allow avian influenza to be transmitted between individuals of different species, such as from bird to human?
   
   http://www.pbs.org/wnet/secrets/caught-the-flu/220/ (Interactive Caught the Flu)
   https://www.smithsonianmag.com/history/journal-plague-year-180965222/

3. Can the existing avian influenza virus be transferred from one human host to another? Why or why not?
   
   https://www.cdc.gov/flu/avianflu/virus-transmission.htm
   View Emerging Infectious Diseases section of website

4. In what regions of the world can avian influenza be found today? Who is most at risk of getting it?
   
   http://declanbutler.info/blog/?p=58

**Try This Out Just for Fun:** [http://www.thegreatflu.com](http://www.thegreatflu.com) (created by the European Union’s Communicating European Health Research project)
Focus: How is avian influenza different from the common flu?

1. How does an influenza virus infect the host cell? Include a diagram with your explanation.

2. What kinds of changes must occur to allow avian influenza to be transmitted between individuals of different species, such as from bird to human?
3. Can the existing avian influenza virus be transferred from one human host to another? Why or why not?

4. In what regions of the world can avian influenza be found today? Who is most at risk of getting it?
Researcher 2: *Is H5N1 on the verge of evolving into THE superbug of the century?*

The Spanish Flu epidemic of 1918 demonstrates why microbial evolution is a concern to scientists everywhere. What needs to happen for H5N1 to become a threat to public health?

1. How do microbes evolve?

   Explore the Rapid Evolution section of the Koshland Science Museum’s Infectious Disease exhibit.

2. In what ways have influenza viruses evolved in the past?

   http://www.pbs.org/wnet/secrets/the-evolution-of-a-virus/224/
   https://www.hhmi.org/news/virologist-s-perspective-influenza-ah1n1

3. Why was the 1918 Spanish Flu pandemic such a concern in terms of microbial evolution?

   http://www.pbs.org/wgbh/nova/evolution/evolving-flu.html
   http://www.pbs.org/newshour/updates/science-july-dec08-influenza_08-22/

4. How does microbial evolution lead to antibiotic and antiviral drug resistance?

   Explore the Antibiotics & Emerging Drug Resistance section of the KSM exhibit Explore the Antiretrovirals & The HIV Pandemic section of the KSM exhibit
   http://www.pbs.org/wgbh/evolution/educators/teachstuds/svideos.html (view video 6)
   http://www.thebody.com/content/art46022.html

5. How does our knowledge of microbial evolution give us a better understanding of the threats posed by avian influenza?

   http://www.cdc.gov/flu/avianflu/h5n1/inventory-qa.htm

Try this Out Just for Fun:  http://nobelprize.org/educational_games/medicine/immunity/
Focus: Is H5N1 on the verge of evolving into THE superbug of the century?

1. How do microbes evolve?

2. In what ways have influenza viruses evolved in the past?

3. Describe why the 1918 Spanish Flu pandemic was such a concern in terms of microbial evolution.
4. How does microbial evolution lead to antibiotic and antiviral drug resistance?

5. How does our knowledge of microbial evolution give us a better understanding of the threats posed by avian influenza?
**Researcher 3:** Is finding a vaccine for H5N1 an easy task?

Each year a new seasonal flu vaccine is produced to fight the different strains of the virus that threaten to dominate in that particular period. What does this indicate about efforts to develop a vaccine for H5N1?

1. **What is a vaccine?**
   
   [Explore the Vaccines & Human Immunity section of Koshland Science Museum’s Infectious Disease exhibit](http://www.wisegEEK.com/how-do-vaccines-work.htm)
   
2. **How does a vaccine work with an individual’s immune system to protect against disease?**
   
   [Explore the Vaccines & Human Immunity section of KSM’s exhibit](http://www.wisegEEK.com/how-do-vaccines-work.htm)
   
   [https://www.vaccines.gov/basics/work/index.html](https://www.vaccines.gov/basics/work/index.html)

3. **How are vaccines made?**
   
   

4. **What role do vaccines play in ensuring the overall health of society?**
   
   [http://www.who.int/bulletin/volumes/86/2/07-040089/en/](http://www.who.int/bulletin/volumes/86/2/07-040089/en/)
   
   See vaccine section of exhibit

5. **Are there antivirals and vaccines for avian influenza? What needs to be done in order to develop some?**

   
   [http://www.cdc.gov/flu/antivirals/whayoushould.htm](http://www.cdc.gov/flu/antivirals/whayoushould.htm)

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**Try this Out Just for Fun:** [http://nobelprize.org/educational_games/medicine/tuberculosis/](http://nobelprize.org/educational_games/medicine/tuberculosis/)
1. What is a vaccine?

2. How does a vaccine work with an individual’s immune system to protect against disease?

3. How are vaccines made?
4. What role do vaccines play in ensuring the overall health of society?

5. Are there antivirals and vaccines for avian influenza? What needs to be done in order to develop some?
**BIRD FLU TODAY**
**PUBLIC AWARENESS CAMPAIGN**
What *should* we do? What *shouldn’t* we do?

**Researcher 4:** For avian influenza, are public health measures the most effective prevention option?

Many will argue that public health measures are the best way to control and prevent the spread of infectious diseases. How can we learn from our past experiences dealing with pandemics?

1. What effects have public health measures had on reducing deaths due to infectious disease in the United States? What measures have had the greatest impact?

   Explore the Public Health section of the Koshland’s Infectious Disease exhibit

2. What is epidemiology?

   [https://www.cdc.gov/careerpaths/k12teacherroadmap/epidemiology.html](https://www.cdc.gov/careerpaths/k12teacherroadmap/epidemiology.html)

3. How have public health measures worked in the past to eradicate disease from parts of the world?

   Explore the Public Health section of KSM’s exhibit

4. What animals are involved in spreading and transmitting avian influenza? Can this information be used to control the spread of the disease?


5. Why is avian influenza spreading so quickly in some regions and not in others? What are some possible ways that it may spread globally?

   [https://www.nature.com/articles/437937a.pdf?origin=ppub](https://www.nature.com/articles/437937a.pdf?origin=ppub)

**Try this Out Just for Fun:** [http://nobelprize.org/educational_games/medicine/malaria/](http://nobelprize.org/educational_games/medicine/malaria/)
Task: *For avian influenza, are public health measures the most effective prevention option?*

1. What effects have public health measures had on reducing deaths due to infectious disease in the United States? What measures have had the greatest impact?

2. What is epidemiology?

3. How have public health measures worked in the past to eradicate disease from parts of the world?
4. What animals are involved in spreading and transmitting avian influenza? Can this information be used to control the spread of the disease?

5. Why is avian influenza spreading so quickly in some regions and not in others? What are some possible ways that it may spread globally?
Your team’s task is to develop a public awareness campaign based on your understanding of viruses, microbial evolution, vaccines, and public health.

First, answer the three questions on the following pages. Make sure to cite facts from your individual research to support your claims. You may also want to refer to the following websites:

- The Koshland Science Museum’s Infectious Disease exhibit
- http://www.cdc.gov/flu
- http://www.flu.gov/planning-preparedness/federal

(1) From an evolutionary perspective, should the United States be concerned about bird flu? Why or why not?

Sub-Questions/Points to Consider:
- Microbial evolution
- Viral resistance to vaccines (antigenic drift & shift)
- Herd immunity
- Are we worrying about the wrong flu? Should there be more concern about the impact of seasonal flu?
- Human responses to current flu antivirals & vaccines

(2) Given the state of the federal budget, do you think we should spend a lot of money to stockpile a vaccine? Which segment of the population should be accounted for in stockpiling the H5N1 vaccine?

Sub-Questions/Points to Consider:
- Who is the current flu vaccines recommended for?
- Who should be vaccinated for avian flu if a pandemic were to occur?
- What other types of measures could be taken in addition to vaccination?
- What are the most effective ways pandemics have been stopped in the past?
- Where are current outbreaks of avian flu concentrated?
- Should the federal government spend its money a vaccine for the future or on other public health measures?
(3) According to the federal government’s plan, money should be directed to training medical personnel, improving disease surveillance and testing, and developing preparedness plans. Do you agree that this how the money should be spent?

Sub-Questions/Points to Consider:
- Does your research for question 2 support your opinions on the best response plan for the country?
- Should the emphasis on spending right now be local or global?
- Based on your new understanding of how similar epidemics have been dealt with in the past, how do you think U.S. money would be best spent today?

Next, decide what type of message you would like to communicate about bird flu. Do you want to warn people about a looming threat, calm them about a worrisome potential danger, or something else? Choose a strategy and at least three awareness tools to create your public awareness campaign. Based on your choice of a campaign plan and message, you must identify for yourselves and your teacher who you are representing and who your audience is.

Campaign options
- Bird Flu Safety and Awareness Kit
- Public Service Announcement (PSA) video educating people about bird flu
- A public spaces ad campaign that educates people about bird flu
- A community action plan addressing the potential threat that identifies which information would be disseminated and through which means
- A lobbying action plan, presented to Congress and ultimately the President about what the nation should be doing about bird flu (taking into consideration what has been done so far and your opinions about it)
- Other ideas approved by your teacher

Awareness tools are common ways through which groups disseminate information about their cause to the general public. Some types of tools:
- Tri-fold informational flyer
- Magazine article
- Ad jingle
- Mural/artwork
- Keepsake (e.g., wristband, ribbon) with an information card
- A speech, to be given by someone in your group
- Summary of an event that your group is planning
- Homepage for a website
- Radio ad
- Other ideas approved by your teacher

Once you’ve identified a campaign, tools, primary message, and audience, answer the questions on the next page to summarize your plan and use the check points to stay on deadline for the project.
Public Awareness Campaign Summary

Group name:

Who are you representing?

Campaign option chosen:

Who is the target audience?

Where will the campaign be presented?

What awareness tools will you use to spread your message?

What are the details of your campaign plan?

Check Point Outline (fill in the dates that your teacher assigns for deadlines):

☐ Determine group position and campaign idea as related to group question one.
   Due date:

☐ Collect data to be used in support of your argument (individual assignments)
   Due date:

☐ Develop detailed story board, script, and outline for your campaign
   Due date:

☐ Present final campaign plan to the class (Your campaign should take no more than 5
   minutes to present) Due date: