To Vaccinate or Not? The Potential for using Bird-flu Vaccines in U.S. Poultry Production

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What is the threat posed by Bird-flu to poultry and human health?

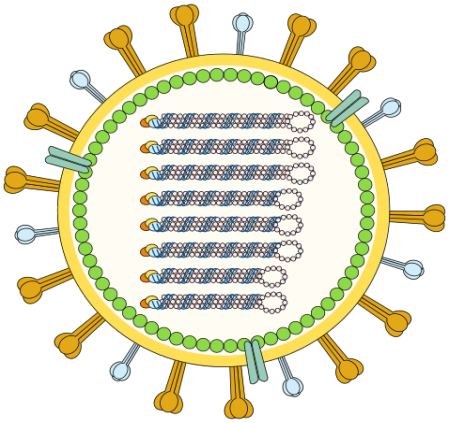

Fig: Illustration of Influenza type-A virus
Credit: Database Center for Life Science (DBCLS)

Bird-flu or the highly pathogenic form of avian influenza infection (HPAI) was responsible for death and depopulation of more than 58 million birds in United States during the 2022/2023 outbreak. Also, there have been numerous reports of Bird-flu infection in humans causing severe disease and deaths across the world but these infections as of now are isolated cases with no human-to-human transmission. The current outbreak is the most impactful in terms of the number of birds affected and economic loss has raised the fear that Bird-flu could persist and become an endemic disease in poultry population.

What are the approaches used to control HPAI?

To control Highly Pathogenic Avian Influenza (HPAI), two distinct approaches are being applied worldwide. One approach, which is the current strategy in the US, involves depopulating the infected flock and establishing a rigorous surveillance system around the outbreak area. Another strategy employed in other countries is vaccination to control the spread of HPAI.

How effective are HPAI vaccines and are they available in the U.S.?

- Vaccines do not provide sterilizing immunity, and vaccinated birds can still become infected with HPAI (Highly Pathogenic Avian Influenza).
- However, vaccines can significantly reduce the clinical signs, mortality of birds, and viral shedding in case of HPAI infection.
- Vaccine efficacy is greatly influenced by the degree of match between vaccine strains and field strains. Currently, there are no vaccines approved for use against the current HPAI H5N1 strain in the US.

What are the potential advantages of Vaccination against Bird-flu?

- **Reduction in Disease Spread**
  Immunity to HPAI due to vaccination can help reduce the transmission of infection by decreasing the viral shedding.
- **Reduction in Zoonotic Spillover Risk**
  The lower incidence of Bird-flu in poultry, the lower the risk of human exposure resulting in lower incidence of Bird-flu in humans and less opportunity to the virus for mammalian adaptation.

- **An extra layer of Protection**
  HPAI vaccination can be integrated with existing biosecurity measures to enhance the poultry health.
- **Reduced economic Loss.**
  The extent of depopulation of birds and disruption in poultry industry can be less.
- **Improved Animal Welfare**
  Vaccination can reduce the suffering of the bids caused by Bid-flu and depopulation of large number of healthy birds.

Why are The U.S. poultry flocks not vaccinated against Bird-flu?

Poultry flocks in the U.S. are not vaccinated against HPAI for multiple reason that include:

- **The Effectiveness of The Current Eradication Strategy:**
  The U.S. use of an extensive surveillance and depopulation approach has been effective in containing the HPAI. The 58 million birds lost in the current outbreak represents a minute percentage of the total U.S. production (roughly less than 3% across all production types).
- **Potential Trade Restriction and Bans**
  A large portion of the U.S. poultry production is targeted towards exports with export values exceeding $6 billion. Trading partners may impose trade restrictions on poultry products originating from territories that use mass vaccination against bird-flu.
- **Imperfect Effectiveness of Vaccines**
  Vaccines are not 100% effective, and many immunologists argue that it could allow the virus to spread silently and evolve to resist vaccines.
- **Interference with HPAI surveillance**
  serological surveillance of Bid-flu is widely used and inexpensive and it can be impaired by mass vaccination against HPAI.
- **The Cost and Logistical Challenges of Vaccination**
  Vaccination programs can be expensive and logistically challenging to implement, particularly in large-scale commercial poultry operations. HPAI Vaccination requires regular revaccination and strict monitoring.
- **Little Benefits to Producers**
  The infected flock and other birds within the premise would still be depopulated despite of the vaccination status, which provides little incentive for the producer to implement vaccination.

What is the international practice in this regard?

- International standard made by World Organization of Animal Health allows for HPAI vaccination without trade restrictions if regular surveillance of the vaccinated flock is conducted.
- Many countries, including China, the second largest poultry producer, are implementing routine vaccination against HPAI with positive results.
- Mexico has been vaccinating poultry against HPAI since 2022 after experiencing a huge outbreak which forced it to cull 5.9 million birds.
- The European Union (EU) is on a track to start vaccination against HPAI in near term. The bloc is gearing up towards agreement on the vaccination. France, a member state of EU worst hit by HPAI, is initiating vaccination of duck flocks.

What lessons and strategies could be learned from overseas HPAI vaccination?

- Vaccination against HPAI in accordance with WOAH guidelines and in combination with other biosecurity measures can have a powerful impact in disease incidence. Hongkong, which used to have regular outbreaks of HPAI is free of disease for more than 3 years after mass vaccination. However, this is example is not comparable to the scale U.S. production and geography.
- Vaccination should be supported by robust monitoring and surveillance to determine whether viral circulation is occurring in inadequately vaccinated birds.
- Incomplete vaccination can lead to partially protected birds remaining as source of infection and HPAI became an endemic disease with year around incidence. This situation increases the risk of the emergence of new variants of the virus.
- The vaccination strategy against HPAI, though effective in preventing disease incidence has been more expensive compared to testing and culling strategy, which is practiced in United States.

Going Forward

Active discussion on the potential benefits and harms of vaccination against Bird-flu can result meaningful conclusions and can provide future directions to consider. Deciding whether to vaccinate or not should consider the following factors:

- Comprehensive Risk Assessment of HPAI in United States and Impacts of Vaccination
- Cost-Benefit analysis of implementing HPAI Vaccination
- Engagement with Stakeholders to take multiple perspectives into account.
- Multilateral cooperation with International Partners

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