Should poultry vaccination be used during a highly pathogenic avian influenza outbreak in the United States?

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Summary of Findings:
- Highly pathogenic avian influenza (HPAI) is a rapidly spreading virus that can severely impact the US poultry industry and the entire economy.
- Vaccination is not currently used since HPAI is not normally found in the US.
- Implementing vaccination during a HPAI outbreak has advantages and disadvantages:
  - Advantages: Vaccination may help control an outbreak by slowing disease spread between birds, resulting in reduced economic impact on producers. It can also help protect valuable genetic poultry lines and support a steady food supply.
  - Disadvantages: Quickly administering avian influenza (AI) vaccine to large numbers of birds is logistically difficult. Additionally, current vaccines do not fully prevent infection so vaccinated birds may continue to spread infection without showing clinical signs of the disease. Implementing vaccination may make distinguishing infected from vaccinated flocks difficult so US trading partners may refuse to accept vaccinated US poultry exports.

Background
The largest highly pathogenic avian influenza (HPAI) outbreak to date in the United States began on the West Coast in December 2014 and spread through much of the Midwest. In an effort to control the outbreak, states enforced movement controls, depopulation of affected birds (a process to eliminate infected and potentially infected birds through selective euthanasia), and mandatory environmental testing before a farm was able to house poultry again.

At the time of the outbreak's conclusion in June 2015, over 48 million birds in 15 states were depopulated including poultry in both large commercial operations and privately owned backyard flocks.

Additionally, international trade was impacted when other countries banned US poultry imports to avoid risk of disease spread. Economic losses from the 2014-2015 outbreak were estimated at over $3.3 billion. Losses include individual producer losses, industry loss from decreased export markets and related business loss (i.e. feed mills).

In light of the 2014-2015 HPAI outbreak, the issue of implementing AI vaccination in future outbreak situations is being debated. Implementing avian influenza (AI) vaccination for poultry during a HPAI outbreak is a controversial issue with pros and cons on both sides. While vaccination alone is insufficient to stop HPAI outbreaks, proponents argue that vaccinating during an outbreak will reduce the viral load and shedding by infected birds, ultimately limiting the spread of virus between locations. Decreasing the number of birds that must be depopulated to control the spread of the disease will reduce the economic impact on individual poultry producers. The opposing view holds that the logistics of vaccinating flocks on a large scale (millions of birds) in a short amount of time could be
challenging in terms of cost and resources. Current vaccines do not provide complete protection from HPAI infection, which could mask clinical signs and delay diagnosis. Certain AI vaccines eliminate the ability to identify HPAI-infected flocks from vaccinated flocks, which can cause US trading partners to refuse poultry exports.

Why choose vaccination?

- Vaccination can help strengthen outbreak control responses. Targeted AI vaccination based on movement patterns could help decrease viral shedding from infected flocks, slow disease spread between locations and allow State and federal authorities more time to implement other control measures.\(^5,10,11\)
- Implementing AI vaccination in poultry can decrease viral shedding and reduce exposure risk to human workers.\(^5\)
- Vaccination of valuable poultry lines, i.e., birds that have highly desired and selected genetic traits, commercial breeding flocks and endangered species in zoos, may help protect these birds during a widespread or fast moving outbreak.\(^11\)

Why choose not to vaccinate?

- Having sufficient vaccine stocks (millions of doses) on hand is essential to effectively vaccinate the majority of poultry within a control area.\(^6\) Having sufficient quantity specific to the outbreak virus strain and stored properly is costly and logistically difficult.
- Resources, including time, manpower and other materials, to distribute and administer large numbers of vaccines could overwhelm existing capabilities and slow other outbreak response efforts.\(^3\)
- Current AI vaccines are not 100% effective in preventing the spread of disease between birds.\(^10,11\) Vaccinated flocks could potentially become infected and spread the virus, though to a lesser extent than a non-vaccinated flock, without showing clinical signs and extending the time to diagnosis.\(^4\)
- If infected birds cannot be differentiated from vaccinated poultry, other countries may not allow US poultry imports for fear of importing HPAI. Vaccine use would likely increase the number and prolong the duration of trade bans as the World Organisation for Animal Health (OIE) imposes a longer waiting period before declaring a country HPAI free after vaccination.\(^3,11\)
- Even if vaccination were only implemented in a small section of the country, that decision could impact international trade for the entire US. The US is the world's largest exporter of turkey meat and the second largest exporter of broiler meat.\(^8\) During the 2014-2015 HPAI outbreak, 18 trading partners imposed complete bans on US poultry and 38 imposed partial or regional trade bans.\(^1\)

References

7. USDA Avian Influenza. Accessed 10/21/2015
