

The Economic Impact of HPAI on U.S. Egg Consumers: Estimating a \$1.41 Billion Loss in Consumer Surplus

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Billions of eggs are grown in large-scale, layer houses each year in the United States. These eggs are distributed through grocery stores, food service industries, and processed into liquid or powdered forms for use in various food products. American per capita egg consumption will reach 275 eggs in 2025 (USDA-ERS, 2024). Because eggs are a staple food, any disruption in production—such as highly pathogenic avian influenza (HPAI)—can have a noticeable impact on availability and prices in grocery stores across the country.

HPAI is a highly contagious viral disease that affects domestic and wild birds, with the largest economic impacts derived from commercial poultry. Often carried by migratory waterfowl, the virus can spread rapidly through direct contact, contaminated surfaces, or airborne transmission. HPAI is noted for its high mortality (>75%) in infected flocks, often requiring large-scale depopulation efforts to control viral spread. The U.S. Department of Agriculture (USDA) and other regulatory bodies monitor and respond to outbreaks to mitigate their economic and food supply impact. Despite these efforts, the loss of birds continues to grow each year, dramatically influencing egg supply chains and, consequently, consumer prices.

Given the size of these impacts, empirically estimating the size of the economic loss is of critical importance. This paper extends the findings of Mitchell, Thompson, and Malone (2024), which established an appropriate framework for modeling HPAI disease dynamics within the egg supply chain, accounting for both the lagged and cumulative effects of HPAI on egg prices; When a flock is depopulated due to HPAI, it takes six months for a new flock to reach maturity and begin laying eggs. Additionally, each successive depopulation compounds the impact on egg prices.

According to USDA-APHIS (2024), HPAI affected 38.4 million commercial egg laying birds and 29 flocks in 2024. As a result, we estimate a 9% increase in retail egg prices, independent of other sources of egg price inflation. Using own-price elasticities of demand from the literature, we estimate that quantity demanded for retail eggs declined by 2%.

This reduction in consumption, coupled with higher prices, led to an estimated consumer surplus loss of \$1.41 billion (Table 1). This estimate reflects the economic burden on consumers due to reduced availability and affordability of eggs following HPAI outbreaks. The magnitude of these losses underscores the importance of understanding how disease outbreaks in the egg supply chain influence consumer welfare and market dynamics.

Table 1. HPAI impacts on retail egg prices, quantities, and consumer surplus

Variable	Value
Retail Egg Price (\$/doz)	2.73
Per Capita Egg Consumption (eggs)	202
Own-Price Elasticity	-0.228
Retail Egg Price (% Chg)	9%
Quantity Demand (% Chg)	-2%
Consumer Surplus (million dollars)	-1,414.28

Note: *Retail Egg Price (\$/doz)* represents the estimated average price of eggs in 2024 in the absence of HPAI cases. *Per Capita Egg Consumption (eggs)* refers to projected 2024 shell egg consumption per person under the same assumption. *Own-Price Elasticity* is an estimated average demand elasticity from the literature, indicating the percentage change in quantity demanded for a 1% change in price. *Retail Egg Price (% Chg)* and *Quantity Demand (% Chg)* represent the percentage change in retail egg prices and quantity demanded due to HPAI outbreaks in 2024. *Consumer Surplus (million dollars)* reflects the estimated economic loss to consumers resulting from higher egg prices and lower consumption.

These estimates come with a few important caveats. First, the estimate assumes that consumer preferences and purchasing behavior remained stable, meaning that consumers responded to price increases in the same way as they have in the past. Second, the analysis focuses on the direct impact of HPAI on egg prices and consumer surplus, meaning it does not account for any indirect effects, such as potential changes in producer behavior or government policy responses. Despite these considerations, this estimate provides a clear and useful benchmark for understanding how HPAI affected egg prices and consumer spending in 2024.

References

Mitchell, J. L., J. M. Thompson, T. Malone. 2024. "Biological Lags and Market Dynamics in Vertically Coordinated Food Supply Chains: HPAI Impacts on U.S. Egg Prices." *Food Policy* 126: 102655

USDA-APHIS. 2024. 2022-2024 Confirmations of Highly Pathogenic Avian Influenza in Commercial and Backyard Flocks. Available at: <https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections>.

USDA-ERS. 2024. Livestock, Livestock, Dairy, and Poultry Outlook: July 2024. Available at: <https://www.ers.usda.gov/publications/pub-details?pubid=109570>