

Iowa Highly Pathogenic Avian Influenza Response Plan



This is a draft plan and is subject to change

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Table of Contents:

1. Introduction
 2. Pre-Outbreak Actions
 - i. Biosecurity
 - a. General Recommendations
 - b. Outdoor Access
 - c. Personnel policies
 - Hunting
 - International travel
 - Clothing
 - Shower-in Shower-out
 - Outside materials
 - d. Mechanical vectors
 - ii. Premises Registration
 3. Classifications of an HPAI Outbreak in relation to Iowa
 - i. Continental: HPAI outbreak in Canada or Mexico but not in the U.S.
 - ii. Domestic: Confirmation of the first HPAI case in the U.S. but not in Iowa.
 - iii. In-State: Surveillance shows a positive case in Iowa or epidemiologic evidence proves a connection of an Iowa flock to an infected flock.
- Appendix 1: Standstill Order
- Appendix 2: Epidemiological Investigation and Surveillance
- Appendix 3: Mitigation
 - i. Quarantine
 - ii. Control Area
 - iii. Permitting
 - iv. Mass Depopulation
 - v. Carcass Disposal
 - vi. Cleaning and Disinfection
 - vii. Vaccination

1. Introduction

Highly Pathogenic Avian Influenza (HPAI) is a severe and highly contagious viral disease of birds that is often fatal to domestic poultry and can cause 90-100% mortality rates. HPAI can infect mammals, including people, after close contact with infected poultry [1]. In domestic poultry clinical signs include: marked depression, decreased feed and water intake, respiratory (with or without neurological) signs, or decreased egg production. However, the first indicator may be sudden death in a large percentage of a flock without any other displays of illness [2].

A single HPAI detection could close international export markets for poultry and egg products, causing billions of dollars in lost trade for the U.S. [3]. While there are vaccines against HPAI, the United States Department of Agriculture (USDA) [Animal and Plant Health Inspection Service \(APHIS\)](#) has not approved their use in the U.S. at this time [4] [5].

Therefore, the primary strategy to mitigate HPAI's impact on Iowa's agricultural economy is to prevent it from entering or eradicating it as quickly as possible if it does enter. This may be accomplished through instituting restricted and/or controlled movements of avian species if the virus is detected in the U.S. and stamping-out positive or epidemiologically linked flocks in Iowa. Identifying all premises before a potential outbreak would greatly increase IDALS' ability to control and mitigate an HPAI introduction.

In the event of an outbreak the primary transmission risk to Iowa flocks is direct transmission from infected birds or indirect transmission from fomites (contaminated people, supplies, or equipment). Transmission from infected birds could occur from domestic poultry or wildlife [2].

During any foreign animal disease (FAD) outbreak IDALS will work collaboratively with USDA to respond. The goals of any FAD response include: (1) detecting, controlling, and containing the disease as quickly as possible; (2) eradicating the disease using strategies that seek to stabilize animal agriculture, food supplies, the economy, and to protect public health and the environment; and (3) providing science- and risk-based approaches and systems to facilitate continuity of business for non-infected animals and non-contaminated products.

2. Pre-Outbreak Actions

i. Biosecurity

- a. IDALS places the responsibility of implementing good biosecurity practices on the producers and owners of a premises. At a minimum IDALS recommendations premises utilize existing enhanced biosecurity outbreak guidance available in the [NAHEMS Guidelines for Biosecurity](#) [6] and those outlined in the [Secure Poultry Supply](#), and [National Poultry Improvement](#)

83 [Plan](#), but also practice increased biosecurity practices, where appropriate, on a
84 daily basis.

85 b. IDALS further recommends:

- 86 • Premises utilize USDA Defend the Flock Resources to strengthen
87 biosecurity where appropriate
88 ([https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-](https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/defend-the-flock-program/df-resources)
89 [disease-information/avian/defend-the-flock-program/df-](https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/defend-the-flock-program/df-resources)
90 [resources](https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian/defend-the-flock-program/df-resources));
- 91 • All premises implement personnel policies that restrict employees
92 (and visitors) from:
 - 93 ○ entering a premises for a minimum of 5 days after arriving
94 in the U.S. after visiting any country or area of the world
95 experiencing active HPAI cases;
 - 96 ○ bringing any clothing (including footwear) that was worn
97 when hunting fowl, game birds, other birds, or visiting a
98 country or area of the world experiencing active HPAI
99 cases before it is completely washed and laundered;
 - 100 ○ entering a premises without adhering to the premises'
101 established biosecurity protocols;
 - 102 ○ bringing cellular phones and other outside materials that
103 have not been properly disinfected onto a premises; and
- 104 • Controlling potential mechanical vectors (such as flies) that may
105 be present on the premises.

106 ii. Premises Registration

107 Premises registration of all poultry premises and assignment of a premises
108 identification number will greatly enhance IDALS' ability to respond to and
109 mitigate an HPAI outbreak.
110
111

112 3. Classifications of an HPAI Outbreak in relation to Iowa

113
114 There are three classifications of an HPAI outbreak in relation to Iowa that would prompt
115 IDALS to initiate a response. Formal notification of confirmed HPAI cases outside of
116 Iowa would be announced by USDA. Any confirmation of HPAI within Iowa would be
117 announced jointly by IDALS and USDA.
118

119 The three classifications of an HPAI outbreak in relation to Iowa are:

- 120 • **Continental:** HPAI outbreak in Canada or Mexico but not in the U.S.
- 121
- 122 • **Domestic:** Confirmation of the first HPAI case in the U.S. but not in Iowa.
- 123
- 124 • **In-State:** Surveillance shows a positive case in Iowa or epidemiologic
125 evidence proves a connection of an Iowa flock to an infected flock.
126
127

Iowa Code [163.1](#) describes IDALS legal authority to control infectious or contagious diseases affecting animals. Therefore during any HPAI outbreak classification, IDALS may take the following actions:

i. Continental: HPAI outbreak in Canada or Mexico but not in the U.S.

Within the U.S. HPAI was last detected in Tennessee in 2017 and successfully eradicated that same year [7]. However, low pathogenic avian influenza (LPAI) strains with the potential to mutate into a HPAI strain circulate the globe annually [2]. If HPAI was detected in Canada or Mexico IDALS may:

- Receive confirmation of an HPAI outbreak in North America (Canada or Mexico) from USDA and receive reports on trade status with the infected country.
- Notify internal staff of the potential threat and initiate frequent communication to ensure stand-by readiness to deploy if necessary.
- Confer with the Iowa Veterinary Diagnostic Laboratory to review submission procedures for the National Animal Health Laboratory Network (NAHLN), including the [National Veterinary Service Laboratory \(NVSL\)](#) in Ames, Iowa.
- Communicate the threat to stakeholders and the public. IDALS will explain the disease and its effect on avian species, provide a description of the current response, make recommendations on how producers should protect their flocks, explain how to report suspected cases or unusual disease, and provide resources to find more information. Complete details on communication pathways can be found in the *IDALS' Foreign Animal Disease Communications Plan*.
- The State Veterinarian may issue quarantine orders or special import rules/orders in cases where there is a potential HPAI threat to Iowa agriculture. Import rules may include:
 - Special import permits or requirements for avian species and products entering Iowa.
 - Negative results to diagnostic tests. Diagnostic tests may be utilized to the highest degree possible to demonstrate a lack of evidence of infection.
- Notify veterinary and other professional associations, licensed and accredited veterinarians, poultry and trade associations, poultry producers, transit companies, and others of any changes to import regulations.
- Conduct historic tracing and surveillance of avian species and products imported from the HPAI-affected country within a minimum of two incubation periods (30 days) prior to the date of onset (or best approximation) of the index case.

- 165 ○ Information may be gathered from a number of sources, including Certificates
166 of Veterinary Inspection (CVIs), entry permits, producer records, and poultry
167 market and slaughter facility records. These may include shipments from
168 high-risk areas such as the infected country, production systems associated
169 with the outbreak, or from other states with frequent movements from the
170 infected country (e.g., movements from Mexico into Texas).
- 171 ● Begin a more aggressive surveillance program to try to determine if HPAI has been
172 introduced into Iowa. Available diagnostic testing will be utilized to the highest
173 degree possible as a tool to help determine the HPAI status of individual birds or
174 flocks.
- 175 ○ Tests may be conducted on:
- 176 ■ Poultry based on epidemiological link(s);
- 177 ■ Poultry showing suspicious clinical signs;
- 178 ■ Recent samples submitted to the Veterinary Diagnostic Laboratory at
179 Iowa State University for diagnosis of illness (i.e. targeted samples);
180 and/or
- 181 ■ Samples collected from concentration points, such as slaughter
182 facilities, swap meets, etc.
- 183 ● If it is anticipated that the incident may require support beyond IDALS resources,
184 IDALS will notify the Governor's office and coordinate with Iowa Department of
185 Homeland Security and Emergency Management (HSEMD) to review needed
186 resources and purchasing procedures to support a response.
- 187 ● Continuously update the Governor's Office and HSEMD, and collectively anticipate
188 future needs and evaluate the need for a Declaration of Emergency.

189 **ii. Domestic: Confirmation of the first HPAI case in the U.S. but not in Iowa**

190
191 In addition to the activities and considerations listed for the Continental classification, if
192 HPAI is detected in the U.S. but not Iowa IDALS may:

- 193
- 194 ● Be in frequent communication with USDA to confirm:
- 195 ○ Situational awareness of the HPAI status of other states, including current
196 response strategy (stamping-out) and epidemiological links to Iowa and other
197 states;
- 198 ○ The identity of HPAI contacts that may have been transported to Iowa within
199 the last 30 days at a minimum;
- 200 ○ Status of trade with U.S.'s international trading partners;

- 201 ○ If USDA is considering a Secretarial Emergency Declaration for the affected
202 state(s).
- 203 ○ If USDA is recommending a national standstill order for poultry.
- 204 ● Conduct surveillance to provide the highest degree of confidence possible that animal
205 and/or animal product movements can occur to support business continuity without
206 spreading infection. This may include monitoring for clinical signs and testing of live
207 animals including, but not limited to, screening samples stored at the Iowa Veterinary
208 Diagnostic Laboratory and/or testing poultry at packing plants.
- 209 ● Carefully evaluate the risk of poultry and poultry products to be imported. Imports
210 that pose a high-risk of introducing HPAI will be prohibited from entering Iowa.
211 Imports from certain geographical areas, production systems associated with the
212 outbreak or other locations that may have epidemiological links to HPAI Infected
213 Premises will be carefully screened before being allowed to enter Iowa.
- 214 ● Consider implementation of all, or aspects of, the [*IDALS' General Standstill*](#)
215 [*Protocol*](#).
- 216 ● Investigate imports into Iowa within the last 30 days that may pose a risk to Iowa
217 poultry.
- 218 ● Continue the surveillance program for HPAI to determine any epidemiological links
219 to premises in Iowa.
- 220 ● Activate a Departmental Operations Center.
- 221 ● Ready the premises identification database to facilitate the identification of premises
222 that may be at-risk or infected.
- 223 ● Communicate with veterinary and other professional associations, licensed and
224 accredited veterinarians, poultry and trade associations, poultry producers, transit
225 companies, and others concerning the elevated threat, and provide information on
226 monitoring the health of poultry, and implementing enhanced biosecurity.
- 227 ● Re-evaluate the threat and take action to protect Iowa poultry. In addition to
228 movement controls, actions may include epidemiological investigations, reminders of
229 reporting requirements, and enhanced surveillance at poultry markets and slaughter
230 facilities, among other activities.
- 231 ● Confer with USDA to evaluate federal resources that may be available, if needed.
- 232 ● Request HSEMD to notify appropriate personnel from supporting local and state
233 agencies and alert local jurisdictions housing foamers to increase readiness.
- 234 ● Reassign and/or pre-position IDALS staff members to locations of anticipated need,

235 such as to the Departmental Operations Center (DOC), the State EOC, the Joint
236 Information Center (JIC), or an existing Incident Command Post.

237 • Coordinate with HSEMD to anticipate needed resources and purchasing procedures to
238 support a response to a potential outbreak.

239 • Request specific agencies provide support for response activities, which may include
240 implementing a call center to respond to questions from veterinarians, producers,
241 allied businesses, and the public, instituting Just-In-Time Training for response tasks,
242 providing outreach to a variety of audiences to keep them aware of the threat and
243 mitigation measures, and requesting supporting agencies send representatives to the
244 JIC to develop and distribute messages to appropriate stakeholders.

245 • Notify all producers, processors, and transit companies about the changes to Iowa's
246 import and movement criteria, and provide information about the permitting system
247 and requirements.

248 • Continue to monitor all states.

249 • Closely monitor any epidemiologically linked premises to determine what, if any,
250 additional actions need to occur on that premises to stop the outbreak. This would
251 designate a transition from the Continental to In-State classification.

252 **iii. In-State: Confirmation of HPAI in Iowa or Epidemiologic link of Iowa flock to infected** 253 **flock**

254
255 In the event of confirmation of HPAI in Iowa or the epidemiologic link of an Iowa flock to
256 an infected flock, IDALS is the lead agency for the emergency response to eradicate the
257 disease and initiate recovery. In addition to the activities and considerations listed for the
258 Continental and Domestic classifications, if HPAI is suspected or detected in Iowa IDALS
259 may:

260
261 • Receive notification of an epidemiological contact from an Infected Premises, or may
262 be notified of suspicious clinical signs in a susceptible animal in Iowa.

263 • Conduct epidemiological investigations (with or without the assistance of the USDA)
264 to identify Infected Premises and Contact Premises.

265 • Collaborate with USDA to dispatch a state or federal Foreign Animal Disease
266 Diagnostician (FADD) to conduct an investigation and collect diagnostic samples for
267 laboratory submission. Divided samples will be provided to the Iowa State University
268 Veterinary Diagnostic Laboratory in Ames, Iowa and to the USDA National
269 Veterinary Services Laboratory (NVSL) (also in Ames, Iowa) for confirmation and
270 virus isolation. An FADD investigation is conducted according to [*VS Guidance*](#)
271 [*Document 12001.2 - Policy for the Investigation of Potential Foreign Animal*](#)
272 [*Disease/Emerging Disease Incidents \(FAD/EDI\)*](#).

- 273 • Collaborate with the U.S. Department of Homeland Security (DHS) and Federal
274 Bureau of Investigation (FBI) to determine if HPAI was intentionally introduced into
275 Iowa.
- 276 • Initiate containment activities on the Infected (or Suspect) Premises. Initially, in most
277 cases this will include quarantine, setting up premises biocontainment, and a review
278 of producer records to trace recent animal movements into and out of the flock (*see*
279 *Appendix 3: Mitigation, subsection ii. Quarantine*).
- 280 • Discuss the advantages and disadvantages of vaccination strategies with USDA
281 APHIS (*see Appendix 3: Mitigation, subsection vii. Vaccination*).
- 282 • Form a Unified Command with USDA to exercise state and federal authority to
283 protect animal health. Initially, local USDA representatives will participate. Positions
284 may rotate to other USDA representatives over time and as more assistance is
285 requested.
- 286 • Assign personnel to Incident Command System positions to manage the emergency
287 response activities with the help of supporting agencies.
- 288 • Prompted by a positive laboratory result confirming HPAI, establish a Control Area
289 around the Infected Premises, and institute movement controls (*see Appendix 3:*
290 *Mitigation, subsection ii. Quarantine and subsection iii. Permitting*), as well as
291 epidemiological tracing (*see Appendix 2: Epidemiological Investigation and*
292 *Surveillance*).
- 293 • Through HSEMD, request supporting agency representatives to report to the SEOC
294 with knowledge of available capabilities and resources.
- 295 • Continue disease surveillance to detect other Infected Premises or potential spread of
296 HPAI.
- 297 • Communicate through HSEMD with local emergency managers and officials of the
298 affected areas to determine local resource needs and availability.
- 299 • Request HSEMD starts to mobilize foamers staged throughout Iowa for potential
300 operations.
- 301 • Based on a stamping-out strategy dependent on the size of the flock, implement a
302 depopulation plan with greatest probability of depopulating the flock in a timely
303 manner (*see Appendix 3: Mitigation, subsection v. Mass Depopulation*).
- 304 • Collaborate with Iowa’s Department of Natural Resources (DNR) to approve the
305 animal owner’s disposal plan for carcasses and other associated materials (*see*
306 *Appendix 3: Mitigation, subsection vi. Carcass Disposal*).

- 307
- 308
- Require biocontainment protocols to prevent spread of HPAI from Infected Premises (see *Appendix 3: Mitigation, subsection iv. Biocontainment*).
- 309
- 310
- 311
- If not already instituted, implement a system of permitted movement to approve and document movements into, within, and out of the Control Area (see *Appendix 3: Mitigation, subsection iii. Permitting*).
- 312
- 313
- 314
- Develop protocols for cleaning and disinfection to decontaminate buildings, areas and articles on the premises after infected animals have been removed. Protocols will be guided by [FAD PReP Guidelines: Cleaning and Disinfection](#).
- 315
- 316
- 317
- Decide the method of releasing a Control Area and restrictions imposed on movements into, out of, and within the Control Area. The Control Area may be released as a whole or in parts to gradually reduce the size. Considerations include:
 - Premises due to be released do not appear to pose a risk for further spread of HPAI;
 - Results of epidemiological surveillance and confirmed/suspected cases in the vicinity;
 - Disease status of other neighboring premises;
 - Progress of the eradication effort and current response approach; and/or
 - Reasonable confidence that the non-infected premises due to be released will not be vulnerable to re-exposure (see *Appendix 3: Mitigation, subsection iii. Permitting*).
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- 326
- Allow repopulation once infected/contagious poultry have been removed and the environment of a premises is no longer a risk to spread HPAI (through cleaning and disinfection or a fallow period - see *Appendix 3: Mitigation, subsection vi. Cleaning and Disinfection*). Conditions for repopulation may change if the response strategy transitions from stamping-out.
- 327
- 328
- 329
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- 333
- Continue disease surveillance to detect new infections, and also to collect data to prove HPAI freedom if possible.
- 334
- 335
- Initiate regular briefings for the media and for information release to the general public through the JIC.
- 336

381 **Passive surveillance** will occur from veterinarian and producer reporting of
 382 suspicious clinical signs and mortalities noted in poultry. IDALS will widely
 383 communicate that anyone suspecting a possible HPAI introduction into Iowa
 384 reports it immediately to IDALS and/or the USDA. At which time either an
 385 IDALS or USDA FADD will be dispatched to the premises to conduct an
 386 investigation.

387
 388 **Active surveillance** will occur through screening diagnostic samples that are
 389 collected on a regular basis. This would include any samples from poultry
 390 submitted to the Iowa Veterinary Diagnostic Laboratory, for any purpose, as well
 391 as samples retained at the Laboratory from the previous 60 days. Samples may be
 392 screened with the following diagnostic tests:
 393

Test	Sample Types
AGID (Agar Gel Immunodiffusion)	Serum (2mL Red Top Tube)
HI/NI (Hemagglutinin-Neuraminidase)++	Serum (1mL Red Top Tube)
IVPI (Intravenous Pathogenicity Index)**	Virus
rRT-PCR (real-time Reverse Transcriptase Polymerase Chain Reaction)*+	Swab
VI (Virus Isolation)*	Tissue, Swab (dry swabs are not a valid sample)

394 *Run simultaneously when HPAI is suspected but not confirmed and when a case is
 395 suspected outside of the control area when a case has been confirmed

396 **Run after rRT-PCR and VI confirm HPAI

397 +Run for any suspect cases within the control area during a HPAI outbreak

398 ++Attempted after positive rRT-PCR to determine subtype/pathotype
 399

400 At the onset of the surveillance program any sample that screens positive would
 401 be sent to the [National Veterinary Service Laboratory \(NVSL\)](#) in Ames, Iowa for
 402 confirmatory testing. This would continue until testing became decentralized and
 403 more widely available at other laboratories.
 404

405 Any sample that tests and is then confirmed positive, regardless of the sample
 406 type, would prompt an epidemiologic investigation to determine where the
 407 infected animal originated and where it could have potentially exposed other
 408 avian species.
 409

Appendix 3: Mitigation

i. Quarantine

Any premises with confirmed HPAI or that is epidemiologically linked to a confirmed HPAI case will likely be placed under a quarantine as established in the [IDALS's General Quarantine Protocol](#). If a positive or linked premises is part of a large system that recently moved live birds, eggs, or egg products to other locations within the system, those locations, may or may not be temporarily placed under a quarantine while the epidemiologic investigation of that system is ongoing or the locations prove negative status through a series of tests.

ii. Control Area

During an HPAI outbreak a Control Area will be established to contain the infection, target stamping-out activities, and control animal movements. The function and minimum size of the Control Area is explained in the [IDALS General Control and Monitoring Zones Protocol](#).

iii. Permitting

Premises inside the Control Area may be allowed permitted movements based on protocols established in the [IDALS General Animal Permitting Protocol](#). This will include egg and egg products moving on and off a premises. Special considerations may be made for systems and facilities within a Control Area that are recognized and validated by the USDA as a compartment.

iv. Mass Depopulation

To maximize biocontainment procedures and reduce the overall viral burden of an infected premises the goal is to have all infected and exposed premises depopulated as soon as possible, preferably within 24 hours, after the confirmed diagnosis [8]. If a producer wishes to seek indemnity for depopulated poultry, USDA APHIS must preapprove the method. Poultry that dies prior to depopulation will not qualify for indemnity.

The following is a list of some depopulation methods in alphabetical order IDALS may chose during an HPAI outbreak:

- Carbon dioxide and other gasses,
- Injectable euthanasia,
- Ventilation shutdown, and
- Water based foam.

Potential depopulation methods:

- *Carbon Dioxide and Other Gasses*: Carbon dioxide (CO₂) has been used commercially in harvesting poultry and swine to stun the animal prior to exsanguination. Asphyxiates such as carbon dioxide, nitrogen, argon, and carbon monoxide exclude oxygen. An animal exposed to an atmosphere which is completely devoid of oxygen will lose consciousness very rapidly. The AVMA

456 has categorized the use of CO₂ as a “preferred method” for the depopulation of
457 poultry (for both large flocks, small backyard flocks, and individual birds) [9].
458

459 Personnel involved in the procedure must be trained. Safety procedures along
460 with appropriate safety equipment must be utilized according to guidelines
461 reviewed or established by the Safety Officer.
462

463 Refer to [FAD PRoP/NAHEMS Guidelines: Mass Depopulation and Euthanasia](#)
464 for additional information on the use of CO₂ gas in poultry.
465

- 466 • *Injectable euthanasia*: The use of chemical methods to euthanize large poultry
467 flocks during an animal health crisis is not practical due to the logistics of
468 carrying out the protocol and because of the residue potential if carcasses must be
469 rendered, composted, or buried. However, this may be the preferred method for
470 small backyard flocks or individual birds
471

472 The AVMA has categorized the use of injectable euthanasia as a “preferred
473 method” for depopulation of individual birds [9].
474

- 475 • *Ventilation Shutdown (VSD)*: While AVMA preferred methods will first be
476 considered in an HPAI response, VSD may be considered if these methods will
477 not achieve depopulation of infected herds (based on the presumptive positive
478 result) within a timely manner or be accomplished in a way that assures human
479 safety. VSD is an adjunct method that may be considered by IDALS for
480 depopulation of infected poultry based on the defined policy and considered on a
481 premises-by-premises basis. However, VSD should be used only after a full
482 consideration of the epidemiologic threat posed concludes that no other method
483 can be completed in a timely manner to minimize the chance of the virus
484 spreading. Timely implementation would significantly reduce virus amplification
485 and the risk of ongoing transmission while also protecting nearby and
486 epidemiologically linked production facilities [10]. However, depending on
487 weather conditions and facility design, VSD may require supplement heating for
488 buildings during colder seasons and/or an added source of CO₂ gas. The AVMA
489 has categorized the use of VSD with the addition of CO₂ gas as “permitted in
490 constrained circumstances” for depopulation of for floor-reared and cage-housed
491 poultry [9].
492

- 493 • *Water Based Foam*: Water-based foam, as well as other foam types, have been used
494 for mass depopulation of poultry during avian influenza outbreaks. Poultry die from
495 physical asphyxiation versus chemical asphyxiation as seen with CO₂ euthanasia.
496 Studies have shown that asphyxiation by foam occurs more quickly than CO₂ tenting
497 [11]. Other advantages include greatly increased speed of depopulation when
498 compared to other methods; decreased labor because fewer personnel are needed for
499 preparation and to execute this approach; and little or no bird handling. In addition,
500 foam decreases dust and therefore airborne pathogens [8]. The AVMA has
501 categorized the use of water based foam as a “preferred” method for depopulation of

502 for floor-reared poultry and “not recommended” for cage-housed poultry [9].

503
504 Refer to [Water Based-Foam Depopulation: For Poultry during Animal Health](#)
505 [Emergencies](#) for additional information on the use of water based foam in poultry.

506 507 **v. Carcass Disposal**

508 In most cases during an HPAI outbreak IDALS will require on-site disposal of animal
509 carcasses and other associated materials. On-site disposal eliminates the need to move
510 carcasses great distances and eliminates potentially moving live virus off the premises.
511 During an HPAI outbreak in most cases IDALS will require the animal owner to utilize
512 one of the following on-site disposal methods:

- 513
- 514 • above ground burial,
- 515 • composting, or
- 516 • in-barn composting.
- 517

518 Explanations on disposing of carcasses using burial, burning, composting, and
519 incineration can be found in the [NAHEMS Guidelines: Disposal](#) and [Iowa DNR Mass](#)
520 [Animal Mortality Plan](#).

521 522 **vi. Cleaning and Disinfection**

523 Cleaning and Disinfection (C&D) protocols for HPAI should follow the basic principles
524 outlined in the [IDALS's General Cleaning and Disinfection Protocol](#). Influenza viruses in
525 general are easily killed in the environment by most disinfectants. The following are a
526 select few disinfectants currently approved for avian influenza in farm settings [12]:

- 527
- 528 • Acetic acid
- 529 • Aseptrol S10-TAB
- 530 • Citric acid
- 531 • Lonza
- 532 • Lysol brand disinfectant direct multi-purpose cleaner
- 533 • Maquat
- 534 • Oxonia
- 535 • Sodium hypochlorite
- 536 • Virkon S
- 537

538 The complete list of potential disinfectants can be located in the USDA document
539 *Potential Disinfectants to Use Against Avian Influenza Virus in Farm Settings*
540 ([https://www.aphis.usda.gov/animal_health/emergency_management/downloads/ai-virus-](https://www.aphis.usda.gov/animal_health/emergency_management/downloads/ai-virus-table.pdf)
541 [table.pdf](https://www.aphis.usda.gov/animal_health/emergency_management/downloads/ai-virus-table.pdf)).

543 **vii. Vaccination**

544 While vaccines against HPAI exist, USDA APHIS has not approved of their use in the
545 U.S. as of the drafting of this document. Since 2015 USDA APHIS has maintained some
546 avian influenza vaccines in the National Veterinary Stockpile (NVS). However, before
547 APHIS deployed emergency vaccinations the following would be considered:

- 548 • extent and rate of spread of the outbreak,
- 549 • type of poultry operations affected,
- 550 • potential impact on domestic and international supplies/markets,
- 551 • potential impact on U.S. producers' ability to export poultry products overseas,
- 552 and
- 553 • effectiveness and availability of vaccine [4] [5].

554
555 The two currently proposed purposes of emergency vaccination are vaccination-to-kill
556 and vaccination-to-live [8] [13].

557
558 However, vaccination use could also affect international trade relationships, with some
559 trading partners suspending imports from areas of the U.S. where vaccination was
560 utilized, or even the entire U.S. Furthermore, once poultry were vaccinated against HPAI,
561 APHIS would have to track all vaccinates until death to ensure that they are removed
562 from the U.S. flock before declaring the country HPAI free. Potentially further delaying
563 resumption of normal trade [4] [5].

564
565 For these reasons IDALS would not consider deploying an emergency HPAI vaccination
566 strategy without the recommendation of AHPIS. If APHIS ever recommends an
567 emergency vaccination strategy it would likely be limited to injectable-type vaccines
568 administered to hatching eggs or day old chicks. Turkeys would likely need at least one
569 additional dose and layer chickens one or two additional doses. Due to the short lifespan
570 for broiler chickens (40 days) they would likely not receive vaccinations. Once
571 vaccinated, it would take approximately 21 days for immunity to develop [4].

572

Bibliography

- [1] CDC, "Information on Avian Influenza," 19 3 2019. [Online]. Available: <https://www.cdc.gov/flu/avianflu/index.htm>.
- [2] A. R. Spicker, "Highly Pathogenic Avian Influenza," 2016.
- [3] P. Paarlberg, A. Seitzinger and J. Lee, "Economic impacts of regionalization of a highly pathogenic avian influenza outbreak in the United States," *Journal of Agricultural and Applied Economics*, vol. 39, no. 2, pp. 325-333, 2007.
- [4] USDA APHIS, "HPAI and Vaccine Use," December 2015. [Online]. Available: https://www.aphis.usda.gov/publications/animal_health/2015/fs-hpai-vaccine-use.pdf.
- [5] USDA APHIS, "USDA Adds Avian Influenza Vaccine Doses to the National Veterinary Stockpile," 18 November 2019. [Online]. Available: https://www.aphis.usda.gov/aphis/newsroom/stakeholder-info/sa_by_date/sa_2015/sa_10/ct_ai_vaccines.
- [6] Center for Food Security and Public Health (CFSPH), "NAHEMS Guidelines: Biosecurity," June 2016. [Online]. Available: <http://www.cfsph.iastate.edu/pdf/fad-prep-nahems-guidelines-biosecurity>.
- [7] USDA VS, "Final Report for the 2017 Outbreak of Highly Pathogenic Avian Influenza (HPAI)/Low Pathogenicity Avian Influenza (LPAI) in the Southeastern United States," 8 8 2017. [Online]. Available: https://www.aphis.usda.gov/animal_health/emergency_management/downloads/hpai/h7-hpai-lpai-finalreport.pdf.
- [8] USDA, "Highly Pathogenic Avian Influenza Response Plan: the Red Book," May 2017. [Online]. Available: https://www.aphis.usda.gov/animal_health/emergency_management/downloads/hpai_response_plan.pdf.
- [9] American Veterinary Medical Association (AVMA), "AVMA Guidelines for the Depopulation of Animals: 2019 Edition," AVMA, Schaumburg, 2019.
- [10] USDA, "HPAI Outbreak 2014-2015: Ventilation Shutdown Evidence and Policy," 18 September 2015. [Online]. Available: https://www.aphis.usda.gov/animal_health/emergency_management/downloads/hpai/ventilationshutdownpolicy.pdf. [Accessed 12 December 2018].
- [11] E. Benson, G. W. Malone, R. L. Alphin, M. D. Dawson, C. R. Pope and G. L. Van Wicklen, "Foam-based mass emergency depopulation of floor-reared meat-type poultry operations," *Poultry Science*, vol. 86, no. 2, pp. 219-224, 2007.
- [12] USDA APHIS, "Potential Disinfectants to use Against Avian Influenza Virus in Farm Settings," 12 12 2018. [Online]. Available: https://www.aphis.usda.gov/animal_health/emergency_management/downloads/ai-virus-table.pdf. [Accessed 2020].
- [13] USDA, "NAHEMS Guidelines: Vaccination for Contagious Diseases: Appedix C: Vaccination for High Pathogenicity Avian Influenza," August 2015. [Online]. Available: https://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/nahems_appendixc.pdf.