

GEMP

GOOD EMERGENCY MANAGEMENT PRACTICE

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOPs



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INTRODUCTION

These standard operating procedures (SOPs) for responding to highly pathogenic avian influenza (HPAI) H5N1 build on the experience that FAO's Animal Production and Health Division and the Crisis Management Centre – Animal Health (CMC-AH) have acquired when responding to government requests for support in dealing with HPAI outbreaks. These SOPs may also be used for a range of other diseases. However, these SOPs are not all-inclusive; they address selected priority areas. As additional areas are identified, complementary SOPs may be required.

These SOPs are addressed to national animal health services and rapid response veterinary teams who may deal with avian influenza and other disease outbreaks on very short notice.

The information contained in the SOPs covers a wide range of situations, from a small flock of a few birds in a poor, rural setting to a highly industrialized, poultry production site. Therefore, veterinarians should use these SOPs as a canvas of best practices while adapting them to the context in which they need to intervene.

Following several workshops held in Eastern Europe and Central Asia to validate the SOPs for those regions, the SOPs were then reviewed to address HPAI response from a global perspective. A number of experts contributed to this process to ensure the SOP contents were easy to follow and illustrated an appropriate and practical way to deal with HPAI and other serious diseases.



The SOPs cover nine specific areas:

SOP 1: Provisional diagnosis and epidemiological tracing

SOP 2: Sampling

SOP 3: Disposal of sampled carcasses, sampling materials and equipment used while sampling

SOP 4: Control of disease using zones

SOP 5: Destruction of animals

SOP 6: Mass disposal of bird carcasses and potentially contaminated materials

SOP 7: Decontamination of an infected farm

SOP 8: Safe handling of hunted wildfowl

SOP 9: Personal protective equipment

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GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE



SOP 1: PROVISIONAL DETECTION AND EPIDEMIOLOGICAL TRACING



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GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOP 1: PROVISIONAL DETECTION AND EPIDEMIOLOGICAL TRACING

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TABLE OF CONTENTS

DEFINITIONS AND ACRONYMS	VI
PURPOSE AND SCOPE.....	1
1. RESPONSIBILITIES	1
2. GENERAL CONSIDERATIONS	2
3. PERSONAL SAFETY AND BIOSAFETY CONSIDERATIONS.....	2
4. MATERIALS	3
5. EQUIPMENT	3
6. PROCEDURES.....	3
REFERENCES	6
ANNEX: SAMPLE HISTORY RECORDING FORM	7

DEFINITIONS AND ACRONYMS

Definitions

Biosafety: The application of knowledge, techniques and equipment to prevent personal, laboratory and environmental exposure to potentially infectious agents or biohazards.¹

Biosecurity: The implementation of measures that reduce the risk of the introduction and spread of disease agents.

Competent veterinary authority: A qualified and knowledgeable veterinarian who officially is in charge of the avian influenza outbreak investigation and disease control.

Flock: A group of birds in recent contact with one another (direct or indirect).

GPS: Global positioning system used to identify the exact coordinates of the outbreak(s).

Acronyms

HPAI: Highly pathogenic avian influenza (see SOP 1)².

LPAI: Low pathogenic avian influenza (see SOP 1).

NAI: Notifiable avian influenza³.

RT-PCR: Reverse transcriptase-polymerase chain reaction.

SOP: Standard operating procedure.

PPE: Personal protective equipment (see SOP 9).

1 Definition copied from MedicineNet.com (2011).

2 Avian influenza is a highly contagious viral disease affecting several species of food producing birds (chickens, turkeys, quails, guinea fowl, etc.), as well as pet birds and wild birds. The avian influenza viruses are divided in two groups based on their ability to cause disease (pathogenicity). HPAI virus spreads rapidly, may cause serious disease and results in high mortality rates (up to 100% within 48 hours). The low pathogenic avian influenza (LPAI) virus can cause mild disease, that may be undetected or no symptoms at all, in some species of birds.*

3 For the purposes of international trade, avian influenza in its notifiable form (NAI) is defined as an infection of poultry caused by any influenza A virus of the H5 or H7 subtypes or by any avian influenza virus with an intravenous pathogenicity index greater than 1.2 (or as an alternative at least 75% mortality). NAI viruses can also be divided into highly pathogenic notifiable avian influenza and low pathogenic notifiable avian influenza.*

* [extracted from OIE website, accessed on 27 April 2011]

<http://www.oie.int/en/animal-health-in-the-world/web-portal-on-avian-influenza/about-ai>

http://www.oie.int/fileadmin/Home/eng/Health_standards/tahc/2010/en_chapitre_1.10.4.htm

GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOP 1: PROVISIONAL DETECTION AND EPIDEMIOLOGICAL TRACING

PURPOSE AND SCOPE

This standard operating procedure (SOP) describes the suggested process for field identification of highly pathogenic avian influenza (HPAI), to enable investigating animal health officials to decide prompt control options at the outbreak site. The investigating officer's provisional detection of an influenza A virus as a possible cause of poultry mortalities forms a basis for action prior to laboratory confirmation. This SOP includes an appendix providing a checklist of information to record (including disease tracking).

1. RESPONSIBILITIES

- 1.1 It is the responsibility of the competent veterinary authorities to oversee all investigations linked to suspicious cases of HPAI and clearly identify who does what and how. This includes who is supposed to use personal protective equipment (PPE), what type of protection is required, where and when.
- 1.2 It is the responsibility of the veterinary outbreak investigator to investigate the outbreak using epidemiological, clinical, and pathological skills, collect samples properly, oversee any onsite testing and interpretation of results.
- 1.3 The competent veterinary authority should ensure that the veterinary outbreak investigator is a professionally qualified and knowledgeable

veterinarian. It is recommended that he/she should have received training in communicating with communities and farmers in emergency situations and understand how to promote risk prevention and response measures that may also preserve people's livelihoods and health.

- 1.4 It is the responsibility of the competent veterinary authority to ensure preliminary movement restrictions on-site, when necessary, before obtaining laboratory confirmation.
- 1.5 It is the responsibility of the competent veterinary authority to communicate with the local officials (municipality, public health services, law enforcement) and clearly explain the purpose of the investigation and what immediate measures should be taken.
- 1.6 It is the responsibility of the local officials, in collaboration with the competent veterinary authority, to clearly communicate to the population: i) what has occurred; ii) the risks linked to the event; iii) the measures that will be implemented; iv) what they can do to minimize these risks; and v) what time frame is to be expected before lifting precautionary and response measures.

2. GENERAL CONSIDERATIONS

- 2.1 The prompt investigation and tentative diagnosis of HPAI is a prerequisite for the appropriate management of an outbreak.
- 2.2 All authorities (national, veterinary, municipality, public health services, law enforcement officials, etc.) should use a sensitive approach towards owners of farms/birds and take into account that they may be upset by the event and loss of their animals. This will be essential when requesting their cooperation. Professional, calm and patient manners will likely lead to obtaining better information and a better outcome.

3. PERSONAL SAFETY AND BIOSAFETY CONSIDERATIONS

All people potentially exposed to zoonotic agents should protect themselves by wearing PPE. People leaving a HPAI-suspected farm should discard PPE as described in SOP 9, 5.2, or by double-bagging, decontaminating and taking it off-site for disposal. Cleaning and disinfection of hands and other potentially exposed body surfaces must be completed on departure. Everyone who has taken part in the

collection of samples should shower promptly outside the site when possible and should only visit other premises after having taken a shower.

4. MATERIALS

- 4.1 PPE (see SOP 9).
- 4.2 Checklist for history-taking (see Appendix 1), pen and notebook.
- 4.3 Materials for sampling procedure (see SOP 2).
- 4.4 Materials for rapid test kits⁴ (see 6.7 and 6.8).
- 4.5 Blank quarantine notice or legal equivalent.

5. EQUIPMENT

The following equipment must be protected before being taken on-site, as they are difficult to decontaminate. One option is to seal them in clear plastic bags that can be disinfected and the bags discarded along with the PPE.

- 5.1 Digital camera.
- 5.2 Global positioning system (GPS) device.
- 5.3 Mobile communication – two-way radio, mobile phone, walkie-talkie, etc.

6. PROCEDURES

- 6.1 Obtain the assistance of the farmer and, if beneficial, a person respected by farmers to carry out investigations. Assistance provided by the farmer could include arranging field visits and communication with fellow farmers.
- 6.2 Enter the farm or village following all necessary biosecurity procedures and ensure personal safety.
- 6.3 Obtain and record a history (see Appendix 1) including clinical signs, pathological lesions, morbidity, and mortality.
- 6.4 Obtain epidemiological information regarding possible means of disease introduction, into and spread out of, the flock (see Appendix 1).

⁴ Relatively new influenza A rapid detection kits are commercially available and others are in development. FAO does not endorse one over another, as improvements to diagnostic sensitivities and specificities are changing and costs are variable.

- 6.5 Enter the poultry houses following biosecurity procedures and in-house requirements (many poultry farms have their own in-house requirements).
- 6.6 Assess the clinical signs and consider differential diagnoses. This may influence the need to pursue movement controls, trace back and trace forward, prioritize sample submission, initiate communication activities and conduct other immediate control measures.
- 6.7 Obtain appropriate samples and quickly forward to a laboratory with testing capability.
- If using an influenza A rapid detection test kit when samples cannot quickly reach the laboratory, it is essential that all actors involved, including professionals in the field and farmers, understand that the current kits are less sensitive than tests done in the diagnostic laboratory. Negative rapid test results do not prove 'no infection' and the final diagnosis can only be established once the laboratory results are known. Moreover, the relatively low sensitivity of the kits necessitates use of optimal clinical specimens only from sick or recently dead birds.
 - These assays should be followed up by confirmatory tests, such as virus isolation or reverse transcription polymerase chain reaction.

NOTE: The H5 subtype specific test kits are not recommended.

- 6.8 A provisional diagnosis of HPAI should be considered when:
- EITHER, the clinical signs or pathological findings and mortalities are consistent with HPAI; OR
 - There is known to be recent, confirmed HPAI in the area; AND
 - There is a positive result on an influenza A rapid test kit from a sick or recently dead bird (please refer to 6.7 on kit sensitivity).
- 6.9 It is important that possible sources of the infection are identified (trace back), as well as where the virus may have spread to, from the suspected premises (trace forward) – (see Appendix 1).
- 6.10 The following data should be collected:
- Movements to and from the suspected farm for three weeks prior to the first report of clinical signs and/or mortality. These should include:
- Movements of birds, eggs, poultry products, feed, litter, waste, equipment, visitors and possibly other animal species;

- Movements of all vehicles, regardless of their contact with animals;
 - All visitors to the farm.
- 6.11 Collect necessary samples for analysis by a designated laboratory for avian influenza testing (see SOP 2). [It is important to make contact with the laboratory before sampling, to obtain advice on what and how to sample.]
- 6.12 Discard PPE, GPS and camera protection materials, sampled carcasses and sampling materials, in an appropriate manner (see SOP 3).
- 6.13 Restrict movements on and off the site to the extent of the legal available powers. Adopt a positive communication strategy by clearly explaining to the population:
- That respecting movement restriction will reduce the risk of infection and disease spread, and therefore preserve their own poultry flocks and livelihoods;
 - What should be done, should their own flocks show signs of disease; and
 - How they should dispose of carcasses.
- 6.14 The suspected outbreak must be reported to appropriate veterinary authorities - if not already reported - who will in turn consider reporting to other stakeholders, including public health services, following local or national avian influenza contingency plans.
- 6.15 Before leaving the area, the investigating veterinary officer(s) should personally contact all local authorities (veterinary, municipality, public health services, school teachers and law enforcement officials) to inform them that an investigation is underway and that results will be communicated when available.

REFERENCES

SOP 2: Sampling.

SOP 3: Disposal of sampled carcasses, sampling materials and equipment.

SOP 5: Destruction of animals.

SOP 6: Mass disposal of bird carcasses and potentially contaminated materials.

SOP 7: Decontamination of infected farms.

ANNEX: SAMPLE HISTORY RECORDING FORM

1. Suspected place investigation details

Date: / /

Farmer's name, telephone no.:

Name of farm/holding:.....

Address:

GPS coordinates:.....

Date of first observed signs of disease:

Date most recent case seen in the farm or village:

Name of provider of information:.....

Number of dead birds in the three weeks prior to investigation:.....

How have carcasses been disposed of?

Where?.....

Number of birds alive at time of investigation:

Farming system

Commercial:

Backyard:

Family:

Other kind:

Number of poultry:

Number of poultry houses on farm:

Biosecurity (1-4): (1) good to excellent; (2) moderate; (3) poor; (4) very poor.

Affected and non-affected species

Species:	Type:	Sex	Age	Sick		Deaths		Vaccine status	Total birds in the farm or village (population at risk)	Number examined
				Number	%	Number	%			
Chicken (C)	Layer (L)	(L) (M)								
Duck (D)	Broiler (B)	or (F)								
Turkey (T)	Mixed (M)	(F)								
Other (O)	Parent (P)	(P)								
	Backyard (Y)	(Y)								

cont./..

Clinical and/or pathological findings

Were any of these findings seen in the sick birds? Check as appropriate.

High mortality in birds	Swollen and haemorrhagic areas of the heads or shanks
Neurological signs	Air sacculitis
Proventricular mucosal haemorrhage	Haemorrhagic internal organs
Ruffled feathers	Diarrhoea

Add any extra comments about signs of sickness seen in this farm, immediate surroundings or village:

2. Possible source of infection and spread of infection

Discuss with the farmer:

1. *Potential source of infection (trace back)*, that is, all movements of animals, people and materials ONTO the farm from three weeks before first clinical signs observed until now.
2. *Potential spread of infection (trace forward)*, that is, all movements of animals, people and materials OUT of the farm three weeks before clinical signs and until control measures were applied.

Have a conversation with the farmer (semi-structured interview⁵), including key points that cover possible sources of infection. Do the farmer's responses indicate any of the following possible sources of infection?

Potential source	Yes	No	Not known	Location of the source and date
Animal introduction				
Introduction of animal products				
Wildlife contact				
Fomites (vehicle of poultry traders, possibly contaminated material...)				
People (visitors, farmers...)				

Write down any additional comments about the possible source of the outbreak.

cont./..

5 A semi-structured interview encourages two-way communication. It is beneficial for interviewers to have an interview guide prepared, which has topics and questions that the interviewer can ask in different ways, depending on the situation. This process usually makes it easier to discuss sensitive issues. Often the information obtained will provide not just answers, but the reasons for the answers.

Potential spread	Yes	No	Not known	Likely location of the spread and date
Animal movements				
Movement of animal products				
Fomites (vehicle of poultry traders, possibly contaminated material...)				
People (visitors, farmers...)				

Write down any additional comments about the possible spread of the outbreak.

The Crisis Management Centre – Animal Health (CMC-AH) is a primary facility of the Food and Agriculture Organization of the United Nations (FAO) and World Organisation for Animal Health (OIE) for animal disease emergency response.

The CMC-AH assists countries threatened by animal disease emergencies with the generous support of the Governments of: Australia; Canada; the Federal Republic of Germany; the French Republic; the Kingdom of Sweden; the United Kingdom of Great Britain and Northern Ireland; and the United States of America.

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GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE



SOP 2: SAMPLING



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SOP 2: SAMPLING

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TABLE OF CONTENTS

DEFINITIONS AND ACRONYMS	VI
PURPOSE AND SCOPE	1
1. RESPONSIBILITIES	1
2. GENERAL CONSIDERATIONS	1
3. BIOSAFETY CONSIDERATIONS	4
4. MATERIALS AND EQUIPMENT	4
5. PROCEDURES.....	5
6. PREPARATION OF FIELD INVESTIGATION DOCUMENTS	8
REFERENCES	9

DEFINITIONS AND ACRONYMS

Definitions

Biosafety: The application of knowledge, techniques and equipment to prevent personal, laboratory and environmental exposure to potentially infectious agents or biohazards.¹

Flock: A group of birds in recent contact with one another (direct or indirect).

Acronyms

HPAI: Highly pathogenic avian influenza (see SOP 1).

IATA: International Air Transport Association.

LPAI: Low pathogenic avian influenza (see SOP 1).

RT-PCR: Reverse transcriptase-polymerase chain reaction.

SOP: Standard operating procedure.

PPE: Personal protective equipment (see SOP 9).

¹ Definition copied from MedicineNet.com (2011).

GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOP 2: SAMPLING

PURPOSE AND SCOPE

This standard operating procedure (SOP) describes: i) a recommended process for collecting samples from poultry suspected to be affected by highly pathogenic avian influenza (HPAI); and ii) packaging of the samples before shipment to laboratories.

Samples taken for avian influenza testing are:

- Oropharyngeal (tracheal) and cloacal swab samples from live and dead birds.
- Blood samples from live birds.
- Whole fresh carcasses.

1. RESPONSIBILITIES

- 1.1 It is the responsibility of the competent veterinary authority to ensure appropriate samples are taken and submitted with the relevant epidemiologic data, while preserving the safety and health of the people involved and preventing (or minimizing) environmental contamination/spread of virus.

2. GENERAL CONSIDERATIONS

- 2.1 The first priority in a suspected HPAI field investigation is prompt and correct identification of the causative agent. Although virus isolation

and characterization is the method of choice for HPAI confirmation, the inability to properly maintain (cooled) samples during transport could delay the diagnosis. In these cases, sampling for molecular diagnosis, (e.g. RT-PCR), is the preferred choice.

- 2.2 Establish communication with the testing laboratory ahead of time to prevent delays in testing and ensure that appropriate samples are obtained and submitted with all the required information; especially when forwarding samples to international referral laboratories for further characterization.
- 2.3 Personnel working in potentially contaminated area(s) should have the ability to communicate externally without leaving the area (mobile communication).
- 2.4 The quality of samples and accompanying epidemiologic data, proper sample storage, and timely receipt of samples at the laboratory are crucial for the rapid and accurate diagnosis of avian influenza. Check with the laboratory for the preferred type of sample for testing.
- 2.5 The aim of sampling is to identify the causative agent (i.e. biological or toxicological). The animals to be sampled should be selected in order to maximize the likelihood of detection. Sampling should include those birds and groups that are most probably infected. When dealing with large flocks, a minimum of 20 clinically ill birds sampled from each suspected flock/species, plus five recently dead carcasses, is suggested.
- 2.6 Duplicate samples are recommended whenever sufficient sampling resources allow.
- 2.7 Avoid pooling samples in the field whenever possible; where it is required for testing purposes, it is best done at the laboratory by combining a maximum of five similar samples per pool from the same sample source, species, and epidemiologic unit.
- 2.8 The following table summarizes recommended samples for HPAI diagnosis. As HPAI is readily diagnosed via swab samples, which can also be collected from whole fresh carcasses at the laboratory, field necropsy of HPAI-suspected birds is often not necessary.

SAMPLE TYPE	PRESERVATION / STORAGE	OBJECTIVE
Swab samples from clinically ill* or recently dead poultry by preference: <i>oropharyngeal > cloacal > fresh faeces</i> ^{2,3} *also from apparently healthy ducks	In viral transport medium chilled at 2-8 °C or frozen at -70 °C; avoid freeze/thaw cycles.	Virus detection/Confirmation of HPAI infection.
Whole fresh carcasses	At 2-8 °C for 24-48 hours; tissues at -70 °C; avoid freeze/thaw cycles.	Virus detection/Confirmation of HPAI infection.
Blood / serum from live birds	At 2-8 °C for whole blood, or -20 °C for separated serum; avoid freeze/thaw cycles.	<i>NOT</i> useful for disease diagnosis but can be used for post-vaccination surveillance screening for previous avian influenza circulation in poultry and wild fowl.

2.9 Disinfect the outer surfaces of the leak-proof primary containers; put all vials, small test tubes and tissue sample boxes (e.g. primary containers) in small sample boxes; double-bag and seal whole fresh carcasses.

2.10 All samples should be protected from UV light and immediately stored between 2 °C and 8 °C for up to 48–72 hours; then frozen at –70 °C when possible;

NOTE: storage at -20 °C is not recommended as viral viability is poor. Avoid freeze-thaw cycles, e.g. store samples between 2-8 °C, rather than repeat freeze and thaw.

2.11 The cooling needs for sample preservation and transport should be based upon the field situation; consider the available facility, and amount of time and distance between sample collection and arrival in laboratory (e.g. insulated boxes with sufficient ice packs to store and maintain cold chain during transport of the samples to the laboratory).

2 Suarez D., Das A., Ellis E. Review of Rapid Molecular Diagnostic Tools for Avian Influenza Virus, 2007. *Av Dis* 51:201–208.
 3 Kim JK, Seiler P, Forrest JL, et al. Pathogenicity and Vaccine Efficacy of Different Clades of Asian H5N1 Avian Influenza A Viruses in Domestic Ducks, 2008. *J Virol* 82:11374–11382; <http://jvi.asm.org/cgi/reprint/82/22/11374>

3. BIOSAFETY CONSIDERATIONS

- 3.1 Infected birds are a source of high concentrations of HPAI virus; minimum personal biosafety considerations in respect to sample collection are to protect mucous membranes (eyes, nose, mouth) and hands from contamination, as well as decontamination of personnel and equipment after sampling.

NOTE: Surgical masks do not provide adequate protection when working in high exposure levels of HPAI virus. Use of a filtering mask, such as a properly fitted N-95 or better, is recommended.

- 3.2 The health of any person who has been in contact with the birds (farmers, neighbours, etc.), including staff members involved in sampling, should be monitored and concerns should be promptly referred to a medical practitioner.

4. MATERIALS AND EQUIPMENT

- 4.1 Swabs by preference:

BEST	ADEQUATE	LEAST PREFERRED
Sterile Dacron swab with plastic shaft	Cotton swab with plastic shaft	Cotton swab with aluminium shaft

- Two sizes are available: small swabs for small birds (such as quails or poultry chicks) and standard swabs for adult poultry and larger birds.
- Swabs with calcium alginate or cotton tips and wooden shafts are not recommended⁴.

- 4.2 Sample tubes - either:

- 1.8-2.0 ml cryovials containing 1 ml of viral transport medium;
- OR
- small plastic test tubes (5 ml) containing 1 ml of viral transport medium.

- 4.3 Permanent adhesive labels sufficient for samples.

- 4.4 Indelible pens or pencils.

- 4.5 Sample submission forms.

⁴ Majury A., Ash J., Toye B., et al. Laboratory diagnosis of human infection with avian influenza, 2006. CMAJ 175(11):1371-1372.

- 4.6 Personal protective equipment (PPE) sufficient to protect at minimum eyes, nose, mouth and hands, from contamination.
- 4.7 Mobile communication (See SOP 1, 7. Equipment).
- 4.8 Portable cooler/container and frozen gel packs or ice.
- 4.9 Boxes of paper tissues.
- 4.10 Hand sprayers with 70 percent ethanol.
- 4.11 Scissors.
- 4.12 Plastic disposal bags (50 litre) (strong leakage-proof plastic bags, preferably autoclave resistant).
- 4.13 Sterile and water tight containers (plastic leakage-proof containers).
- 4.14 Flash-light.
- 4.15 Large roll of adhesive tape.

If taking blood samples:

- 4.16 Sterile syringes (3-5 ml), sufficient for samples.
- 4.17 Needles (22 gauge), 1½ inch or longer, sufficient for samples.
- 4.18 Serum tubes with rubber stoppers or lids, sufficient for samples.
- 4.19 Racks for sample tubes.

5. PROCEDURES

5.1 Sampling preparation

- 5.1.1 The sampling process should involve three trained persons with PPE, working together as a team:
- 5.1.2 The first person can catch, transfer birds to the sampling site, and hold birds in a suitable position;
- 5.1.3 The second person can collect the samples from the birds and/or carcasses;
- 5.1.4 The third person could prepare the sampling equipment, label and store the tubes and vials. In this manner, the chance for contamination of sampling equipment, cross-contamination

of samples, and personnel contact with the potentially contaminated material, is minimized;

- 5.1.5 Proper record keeping is critical at this stage as it will affect all sample identification and result interpretation.
- 5.1.6 Before starting the sampling, prepare the sampling team and define the duties of each person involved.
- 5.1.7 The sampling location should be preferably protected from wind, and all materials and equipment, such as tubes and boxes, must be placed on a dry and stable place (for example, a table), 2-3 metres from the birds and/or carcasses.
- 5.1.8 Arrange the sampling equipment for easy access. Make sure you have sufficient equipment for the number of samples you plan to collect. The vials/tubes should be labelled prior to sampling to avoid unnecessary delays.

5.2 Swab samples from live animals

- 5.2.1 When possible, it is recommended to preferentially swab live birds with clinical signs of disease.
- 5.2.2 Use one swab to obtain oropharyngeal samples and a separate swab to obtain cloacal samples, and place each in separate transport tubes.
- 5.2.3 Clearly label the tube/vial with the following information: identification number, species, type of sample, date and location; write directly on the tube or attach a label.
- 5.2.4 For collecting oropharyngeal samples from live birds, insert the swab through the mouth into the oropharynx. Rotate the swab gently around the oropharyngeal area.
- 5.2.5 For collecting cloacal samples in live or dead birds, insert a swab deeply into the vent and gently swab along the vent wall. The swab should be thoroughly stained with faecal material.
- 5.2.6 Fresh, wet, faecal material may be collected by inserting a swab into the centre of the faeces and rotating the swab, collecting at least 1-2 grams of faeces. The swab should be thoroughly stained with faecal material.

- 5.2.7 Swabs should be transported to the laboratory completely soaked in a virus transport medium. If there is no transport medium, options include using phosphate buffered saline or thoroughly moistening the swab with liquid sample material; do not use ethanol.
- 5.2.8 After taking the sample, put the tip of the swab directly into the labelled tube/vial avoiding any contact with the outer part of the vial; break or cut the shaft of the swab short enough to allow closing of the lid.
- 5.2.9 Put the vials in a rack in sequential order (from lowest number to the highest) and place the rack in an insulated container/cool box immediately.

5.3 Blood sampling

- 5.3.1 Clearly label the tube/vial with the following information: identification number, species, type of sample, date and location; write directly on the tube or attach a label.
- 5.3.2 Collect a minimum of 1 ml of blood using a new syringe and needle for each sample, but do not exceed 3 percent of the body mass of the animal. Use a new sterile syringe for each individual blood sample.
- 5.3.3 If samples arrive at the laboratory promptly (within 4-6 hours), send whole blood samples and allow the laboratory to extract the serum.
- 5.3.4 If sample arrival to the laboratory is delayed, place the tubes in a stable place (e.g. tube rack) and allow for clotting at room temperature.
 - Transfer the blood into an appropriate vial, preferably a serum separator tube. If separator tubes are not available, use normal clotting tubes (red top).
 - Remove the needle and empty the syringe by allowing the blood to run down the inner wall of the tube.
 - Then separate the serum and transfer it to a new pre-labelled tube.

5.3.5 Store the serum in an insulated box or refrigerator between 2 °C and 8 °C.

5.4 Sampling from recently dead birds

Note: field necropsies are not necessary to collect adequate samples for diagnosis.

5.4.1 Whole fresh carcasses may be submitted to the laboratory, packed in double plastic bags with each one sealed. Label the outer bag with a tag (identification number, species, type of sample, date and location), also label the sample container, and store in cool box between 2 °C and 8 °C.

5.4.2 Recently dead birds could be swab sampled as if live (protocol listed above).

6. PREPARATION OF FIELD INVESTIGATION DOCUMENTS

6.1 Complete the appropriate field data sheets or case investigation forms, and the required laboratory request forms, using the same identification numbers as used on the tubes.

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FAO Guidelines for the submission of diagnostic samples to reference laboratories - avian; http://www.fao.org/ag/againfo/programmes/en/empres/documents/docs/gui_labsample/gui_labsample_en.htm

WHO Guidance on regulations for the Transport of Infectious Substances 2009–2010; http://www.who.int/csr/resources/publications/biosafety/WHO_HSE_EPR_2008_10/en/index.html

IATA Guidance Document Infectious Substances; http://www.iata.org/NR/rdonlyres/9C7E382B-2536-47CE-84B4-9A883ECFA040/0/Guidance_Doc62DGR_51.pdf

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GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE



SOP 3: DISPOSAL OF SAMPLED CARCASSES, SAMPLING MATERIALS AND EQUIPMENT



**GOOD
EMERGENCY
MANAGEMENT
PRACTICE**



GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOP 3: DISPOSAL OF SAMPLED CARCASSES, SAMPLING MATERIALS AND EQUIPMENT

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TABLE OF CONTENTS

DEFINITIONS AND ACRONYMS VI

PURPOSE AND SCOPE 1

1. RESPONSIBILITIES 1

2. GENERAL CONSIDERATIONS 1

3. BIOSAFETY CONSIDERATIONS 2

4. MATERIALS 2

5. INSTRUMENTS AND EQUIPMENT 3

6. PROCEDURES 3

REFERENCES 5

DEFINITIONS AND ACRONYMS

Definitions

Biosafety: The application of knowledge, techniques and equipment to prevent personal, laboratory and environmental exposure to potentially infectious agents or biohazards.¹

Biosecurity point: A designated area for putting on and removing PPE at the border between the clean and contaminated (dirty) areas, and near to the farm entrance/exit gate (see SOP 1, point 6 and SOP 7).

Competent veterinary authority: A qualified and knowledgeable veterinarian who officially is in charge of the avian influenza outbreak investigation and disease control.

GPS: Global positioning system used to identify the exact coordinates of the outbreak(s).

Potentially contaminated material: All disposable sampling materials with direct/indirect contact to infected birds.

Acronyms

HPAI: Highly pathogenic avian influenza (see SOP 1).

SOP: Standard operating procedure.

PPE: Personal protective equipment (see SOP 9).

¹ Definition copied from MedicineNet.com (2011).

GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOP 3: DISPOSAL OF SAMPLED CARCASSES, SAMPLING MATERIALS AND EQUIPMENT

PURPOSE AND SCOPE

After the collection of samples from birds suspected with highly pathogenic avian influenza (HPAI), the potential contamination of the environment needs to be minimized and the spread of the virus avoided. This standard operating procedure (SOP) describes the disposal of: i) carcasses after examination and sampling; ii) used personal protective equipment (PPE); iii) disposable sampling and testing equipment; and iv) other potentially contaminated materials.

1. RESPONSIBILITIES

- 1.1 It is the responsibility of the veterinary outbreak investigator to assure that the collected samples from HPAI suspected birds, used PPE, used rapid test kits and other used disposable equipment, are disposed of correctly based on this SOP.

2. GENERAL CONSIDERATIONS

- 2.1 In all cases where samples are taken, the proper disposal of all the potentially contaminated material needs to be ensured, even when the disease has not yet been confirmed.
- 2.2 Dead birds which have not been sampled can pose a risk and should be buried appropriately. The mass disposal of poultry is detailed in SOP 6.

- 2.3 Selection of the disposal area and the method used is influenced by the number of sampled birds and the amount of used material to be disposed of. The selection of the disposal area needs to be made in agreement with the owner of the premises and the local authorities. Authorities to be consulted might include municipalities, village chiefs, environmental department authorities, among others, depending on the context. If several households in the same village have been sampled, a common disposal area can be chosen by the veterinary outbreak investigator in coordination with these local authorities.
- 2.4 In general it is preferable to dispose on-site. The disposal site is best chosen within the potentially contaminated area. In many commercial farms a small disposal area can be found on the farm.
- 2.5 If an appropriate on-site disposal area cannot be identified, the veterinary outbreak investigator may decide to transport the potentially contaminated material to an appropriate disposal area (e.g. a rendering plant, an incinerator, a land-fill). The material must be packaged in a leak-proof container, which is then externally-disinfected before leaving the premises.
- 2.6 Proper cleaning and disinfection procedures need to be followed.

3. BIOSAFETY CONSIDERATIONS

- 3.1 The same personal biosafety measures considered for post-mortem examination of the birds and sampling (see SOP 2) is also obligatory during the disposal of the carcasses and should be extended to all people handling the materials.

4. MATERIALS

- 4.1 Strong leak-proof plastic bags (30-50 litres).
- 4.2 Appropriate detergent and disinfectant solutions (see SOP 7).

5. INSTRUMENTS AND EQUIPMENT

- 5.1 PPE (See SOP 9).
- 5.2 Digging equipment (if available), such as a spade/shovel.
- 5.3 Disinfecting instruments (e.g. sprayers).
- 5.4 Global positioning system (GPS) unit.
- 5.5 Mobile communication (See SOP 1, 5. Equipment).

6. PROCEDURES

- 6.1 Place all sampled carcasses in strong plastic bags and tie the bags.
- 6.2 Transport plastic bags to identified on-site disposal area.
- 6.3 If an appropriate disposal area is not available on-site, transportation outside of the area for proper disposal may be necessary. In these cases, the primary plastic bag should be placed in a second plastic bag (double-bagged) and the latter should be sprayed with disinfectant when leaving the area.
- 6.4 At the identified disposal area, a pit should be dug.
- 6.5 For the disposal of small amounts of potentially contaminated material, a minimum of 40 cm of soil to cover the material needs to be considered in order that scavenging animals may not disturb the disposed material.
- 6.6 Burial sites should be at least 100 meters away from water sources, but local environmental or health officers should be consulted.
- 6.7 With regard to ground water level, the bottom of the pit should be at least one metre above the ground water level.
- 6.8 Burning of contaminated combustible materials prior to burial is also an option. In addition, plastic, metal or glass materials should be either disinfected or destroyed to ensure that they may not be reused.
- 6.9 Always discard sharps (needles and disposable scalpel blades) in a safe manner. Specific containers designed for this purpose exist.
- 6.10 The contaminated material could be covered with a layer of calcium hydroxide, and covered with soil.

- 6.11 Mark the disposal area with a sign and record its position (on a map, and/or using GPS coordinates).
- 6.12 To avoid human interference it may be necessary to secure the disposal area for a few days by marking the area and posting signboards stating in the local language "DO NOT ENTER", with appropriate local symbols for people who are illiterate.
- 6.13 Personnel involved in these procedures should proceed to the biosecurity point to remove the potentially contaminated PPE (proceed as discussed in SOP 9).
- 6.14 Personnel working in the contaminated area(s) should have the ability to communicate externally without leaving the contaminated area (mobile communication).
- 6.15 All forms should be filled in by the veterinary outbreak investigator and signed by the owner, recording the number of animals sampled and disposed of, before leaving the premises.

REFERENCES

SOP 1: Provisional detection and epidemiological tracing.

SOP 2: Sampling.

SOP 6: Mass disposal of bird carcasses and potentially contaminated materials.

SOP 7: Decontamination of infected farms.

SOP 9: Personal Protective Equipment.

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GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE



SOP 4: CONTROL OF DISEASE USING ZONES



**GOOD
EMERGENCY
MANAGEMENT
PRACTICE**



GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOP 4: CONTROL OF DISEASE USING ZONES

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TABLE OF CONTENTS

DEFINITIONS AND ACRONYMS	VI
PURPOSE AND SCOPE.....	3
1. RESPONSIBILITIES	3
2. GENERAL CONSIDERATIONS	3
3. BIOSAFETY CONSIDERATIONS.....	4
4. MATERIALS, INSTRUMENTS AND EQUIPMENT	4
5. PROCEDURES.....	5
REFERENCES	11
ANNEX: Nomenclature used for response zones by countries/organizations in relation to those used in this SOP	12

DEFINITIONS AND ACRONYMS

Definitions

Biosafety: The application of knowledge, techniques and equipment to prevent personal, laboratory and environmental exposure to potentially infectious agents or biohazards.¹

Biosecurity: The implementation of measures that reduce the risk of the introduction and spread of disease agents.

Biosecurity point: A designated area for putting on and removing PPE at the border between the clean and contaminated (dirty) areas, and near to the farm entrance/exit gate (see SOP 1, point 6 and SOP 7).

Competent veterinary authority: A qualified and knowledgeable veterinarian who officially is in charge of the avian influenza outbreak investigation and disease control.

Contact premises: A declared defined area (e.g. village, farm) at risk of infection by HPAI either as a result of its location, the movement of persons, poultry or other captive birds, vehicles, or in any other epidemiologically-linked way.

Flock: A group of birds in recent contact with one another (direct or indirect).

GPS: Global positioning system used to identify the exact coordinates of the outbreak(s).

Infected premises: A declared defined area (e.g. village, farm) in which HPAI is confirmed.

Outbreak: The confirmed presence of disease or infection of one or more cases in a defined epidemiological unit (e.g. flock, herd, farm or village) and during a specified period of time.

Potentially contaminated material: All disposable sampling materials with direct/indirect contact to infected birds.

¹ Definition copied from MedicineNet.com (2011).

Stamping-out policy²: The killing of affected animals and those suspected of being affected in the flock or herd, carried out under the competent veterinary authority, on confirmation of a disease, or if determined, pre-emptively. To include where appropriate, those in other groups that have been exposed to infection by direct animal to animal contact or by indirect contact of a kind likely to cause the transmission of the causal pathogen. All susceptible animals, vaccinated or unvaccinated, on an infected premises should be killed and their carcasses destroyed.

Surveillance zone: A declared, defined and immediate area around the protection zone where heightened surveillance is implemented to protect the health status of animals in the declared Free Zone.

Suspected premises: A declared defined area (e.g. village, farm) containing birds that have possibly been exposed to HPAI or birds that show clinical signs compatible with HPAI.

Temporary control zone: A declared, defined and immediate area around suspected premises where control measures are applied during a specific period of time.

Acronyms

HPAI: Highly pathogenic avian influenza (see SOP 1).

IATA: International Air Transport Association.

LPAI: Low pathogenic avian influenza (see SOP 1).

PPE: Personal protective equipment (see SOP 9).

RT-PCR: Reverse transcriptase-polymerase chain reaction.

SOP: Standard operating procedure.

² Reference: OIE Terrestrial Animal Health Code Glossary (<http://www.oie.int/index.php?id=169&L=0&htmfile=glossaire.htm#sous-chapitre-2> - accessed 30 March 2011).

GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOP 4: CONTROL OF DISEASE USING ZONES

PURPOSE AND SCOPE

This standard operating procedure (SOP) describes the methods of establishing zones around a highly pathogenic avian influenza (HPAI) outbreak and the recommended containment measures that apply within these zones.

1. RESPONSIBILITIES

- 1.1 It is the responsibility of the competent veterinary authority to determine zoning around suspected or confirmed infected premises and implement all necessary tasks, guided by this SOP³ and the national contingency plan.

2. GENERAL CONSIDERATIONS

- 2.1 The definition and size of different zones could vary based on national contingency plans, geographical considerations, the epidemiological situation and any risk assessments.
- 2.2 The procedure described in this SOP may require adaptation according to local poultry health management systems and locally available resources.

³ This document applies to all Notifiable Avian Influenzas regardless of the type (i.e. H5 and H7).

- 2.3 Avian influenza viruses are relatively short-lived in most environments and readily inactivated by many chemicals. Carriage of live virus usually involves a live bird, carcass, manure, leftover feed and waste, or freshly contaminated fomites such as equipment, vehicles, clothes, and movement of personnel off the infected premises. These virus characteristics need to be taken into account when considering the size of zones and the disease management measures that are necessary within them.
- 2.4 Farm owners from all the concerned zones are encouraged to keep records. These include a list of every person visiting the farm, every delivery and every occasion when birds or products are marketed.
- 2.5 Personnel working in the contaminated area(s) should have the ability to communicate externally without leaving the area (mobile communication).

3. BIOSAFETY CONSIDERATIONS

- 3.1 All those involved in implementing control measures on suspected/infected premises should use personal protective equipment (PPE).

4. MATERIALS, INSTRUMENTS AND EQUIPMENT

- 4.1 Map of the region (1:10 000-1:20 000).
- 4.2 Banners (signs to put on roads and paths, in and out of the zones, to inform the public about restrictions, including signboards stating in the local language "DO NOT ENTER" or other messages with appropriate local symbols for people who are illiterate).
- 4.3 Disinfectants, bucket, brush.
- 4.4 Note pad and pen.
- 4.5 Global positioning system (GPS) unit.
- 4.6 Mobile communication – two-way radio, mobile phone, walkie-talkie, etc.

5. PROCEDURES

5.1 Communicating with the general public in the area as a whole

Communication and raising public awareness is essential and includes advising inhabitants about the zones⁴, their boundaries and restrictions within them, clinical signs of HPAI in poultry, what the public should look for and to whom they should report. Recommend that people, especially children, keep a distance from poultry in the protection zone.

5.2 Temporary control zone

5.2.1 When HPAI is suspected, precautionary measures should be applied by immediately establishing movement restrictions from and around the suspected premises.

5.2.2 Immediate reporting of suspicious cases of HPAI to the appropriate veterinary authority should be required under legislation and encouraged.

5.2.3 The control measures that are established within the temporary control zone need to be undertaken according to the prevailing epidemiological situation (e.g. bird population and density, existing biosecurity measures and bird movements).

5.2.4 Measures to consider in this area include:

- Diagnostic investigation – investigate the suspected cases using standard protocols.
- Inventory of exposed animals – it is recommended to count, or estimate, the number of susceptible species exposed, including poultry and other captive birds, but also all domestic species of mammals. The use of existing records of the number of animals around and on the premises may be useful in establishing the inventory.
- Disease monitoring - sample collection and shipment to the designated laboratory/laboratories.

⁴ See table in the Annex depicting the nomenclature used by different countries and organizations when referring the zones listed in this SOP.

- Epidemiological investigation – trace-back likely sources of infection and trace-forward to locations where the virus may have spread due to movements of animals or fomites. If possible, use a GPS and record the coordinates of these premises and arrange follow-up tracing visits as necessary. Trace all poultry and poultry products that have left the premises during the last three weeks. Trace the “hatching” eggs collected from susceptible species during the last three weeks. Trace feed brought to, or taken, from the premises.
 - All non-contact poultry and poultry with no signs of disease on the premises should be kept indoors or confined in an isolated area.
 - Restrict all movements of poultry into and out of the affected premises.
 - People, animals, vehicles, poultry products (eggs, meat, feathers and manure), animal feed or other items capable of transmitting the avian influenza virus should not move to or from the premises, without the authorization of the competent veterinary authority.
 - Bio-security measures, such as placement of disinfection footbaths at entrances/exits of poultry houses and the premises itself, and disinfection of vehicles departing this area, should be implemented.
 - All live bird market activities within the zone should be temporarily prohibited.
 - The competent veterinary authority should consider immediate culling of all poultry in the suspected premises (i.e. “pre-emptive culling”), with fair market value compensation to the owner of the culled birds (SOP 5).
- 5.2.5 If the laboratory results of the tested samples are negative using validated and sensitive assays, the temporary control measures should be lifted by the competent veterinary authority.
- 5.2.6 When HPAI is confirmed on premises, the site should be declared as ‘infected premises’ and appropriate control zones should be established.

5.3 Infected premises

5.3.1 Once HPAI has been confirmed on premises, movement restrictions must be maintained, or promptly established if not previously applied.

5.3.2 Other measures to consider in an infected premises, further to those implemented in the temporary control zone, include:

- Assign a competent person to ensure bio-containment at the gate of the infected premises.
- All poultry on infected premises and their products, including eggs, must be destroyed and properly disposed of.
- Bedding and feed must be properly left untouched until the virus becomes inactivated, or disposed of, or otherwise treated until it is safe.
- Crates and housing material made of porous materials (that cannot be easily cleaned or disinfected) should be destroyed and properly disposed of (SOP 6).
- Meat produced on infected poultry farms must be traced and destroyed if produced or moved from the premises within the 21 days prior to first clinical signs of infection.
- Ensure that the owner or operator carries out appropriate cleaning and disinfection, and secures the entrance of the premises,
- The infected premises and vehicles used for transportation to and from the premises must be thoroughly cleaned and disinfected.
- Establish a period of time with no birds on infected premises (21 days).
- Public health concerns: As some HPAI viruses are zoonotic, personnel involved should wear personal protective equipment (PPE). Symptoms of influenza-like illness in operators should be reported to public health medical authorities and medical attention sought.

5.4 Protection zone (Red Zone)

- 5.4.1 This might include land within a radius of several kilometres⁵ around the infected premises. The necessary size and shape should be determined, considering landscape features that define the area, the nature of the disease, geography and risk elements of the vicinity. This area is considered to be the “protection zone”.
- 5.4.2 The boundary does not have to be circular. It depends on factors like natural barriers such as rivers or mountain ranges, as well as human and poultry populations based on risk assessment. The boundary of the area may vary depending on the epidemiological situation.
- 5.4.3 Control measures and actions to take in this zone include:
- Restrict the movement of all susceptible animals to or from all premises within the protection zone.
 - Promptly conduct a census of all the premises in the area.
 - All premises having susceptible animals within the zone must be regularly monitored by using a procedure that will not risk further disease spread. One suggested method is “dead bird pick-up”, where operators place daily mortalities in a container at the perimeter of each premises and animal health personnel collect and safely transport the carcasses to the laboratory for testing.
 - Place warning signs indicating “HPAI DISEASE CONTROL AREA - KEEP OUT”, with appropriate local symbols, on the roads leading to the protection zone.
 - Ensure that a sufficient number of check point stations with disinfection barriers are in place, covering all roads leading to the zone.
 - Before entering a farm wear PPE and inform the owner about your activities and time of arrival.
 - It is preferred that all poultry be housed indoors.

⁵ For HPAI, a distance of up to three kilometres has been previously applied depending on epidemiological circumstances.

- Restrict the movement of all poultry and poultry products (eggs, meat, feathers and manure), crates, cages, as well as vehicles that had been used to transport them.
- All domestic animals including dogs, cats, and other potential vectors, should be confined.
- Advise owners of adjacent premises to keep susceptible animals indoors.
- All free-range birds, including small farms, should also be included in control measures.
- Vehicles and equipment must be cleaned and disinfected prior to leaving the protection zone.
- Advise people (especially farmers) not to visit other premises where there are susceptible animals.
- Meat produced on poultry farms epidemiologically linked to the infected premises must be traced and destroyed if produced or moved from the premises within 21 days prior to first clinical signs of infection.
- Ensure that the facilities (i.e. poultry houses) within the premises are fully closed, and the manure and used bedding are buried deep enough, to prevent access by wild birds and other animals.

5.5 Surveillance zone

5.5.1 An area within a wider radius, typically 10 kilometres, around the protection zone is considered to be the surveillance zone.

5.5.2 The boundary of the area may vary depending on physical or geographic characterization of the area and progression of the outbreak (epidemiological situation).

5.5.3 Measures in this zone include:

- The movement of poultry, feed and poultry products (day-old chicks, eggs, meat, feathers and manure) should be restricted and only allowed when authorization is granted by the competent veterinary authority. Record the destination of exiting or in-transit vehicles at control points.

- Transiting through the surveillance zone by road or lane without unloading or stopping can be permitted under specified conditions.
- All premises having susceptible animals within the zone must be regularly monitored by “dead bird pick-up” at the perimeter of each premises, as described in the protection zone above, although it may occur less frequently.
- Movements of birds and their products may be permitted to designated slaughterhouse/processing or to disposal.
- Poultry farmers, farm workers and their families are recommended to avoid visits to other poultry farms. Poultry owners must be encouraged to apply biosecurity measures, including washing their hands and boots when entering/ leaving the poultry houses.
- All live bird market activities within the zone should be prohibited for a specified period.

5.6 Duration of the measures

- 5.6.1 The control measures shall be maintained for at least 21 days following the date of the completion of cleaning and disinfection of the last known infected premises. No restocking should take place until at least 21 days after the cleaning and disinfection has been completed and no new cases are identified in the area.
- 5.6.2 “Dead-bird pick-up” sampling of repopulated premises is the recommended method of surveillance, as described above. Sentinel birds (5-10 percent) may also be placed before complete restocking.
- 5.6.3 *Note: The OIE Animal Health Code specifies a period of three months subject to surveillance as the period of time after which freedom from HPAI can be applied for in a previously HPAI-free country.*

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FAO Avian Influenza Fact Sheet: Criteria for defining avian influenza infected areas and disease control zones (2007) http://www.fao.org/docs/eims/upload/224899/factsheet_infcontrol_en.pdf [Accessed 30 March 2011]

OIE Terrestrial Animal Health Code: <http://www.oie.int/en/international-standard-setting/terrestrial-code/access-online> [Accessed 30 March 2011]

ANNEX: Nomenclature used for response zones by countries/ organizations in relation to those used in this SOP

RISK LEVEL	DESCRIPTION OF RESPONSE ZONES	COUNTRIES/ORGANIZATIONS				
		Australia	E.U.	U.K.	U.S.A.	FAO (SOP 4)
High 	A declared, defined area (e.g. village, farm) in which disease is confirmed.	Infected Premises	Infected Premises	Infected Premises	Infected Premises	Infected Premises
	A declared, defined and immediate area around infected premises where restrictions and strict control measures are implemented to prevent the spread of disease.	Restricted Area	Protection Zone	Control Zone	Infected Zone	Protection Zone
	A declared, defined and immediate area around the protection zone where heightened surveillance is implemented to protect the health status of animals in the declared Free Zone.	Control Area	Surv. Zone	Protection Zone	Buffer Surv. Zone	Surv. Zone
	A declared, defined area in which the absence of disease has been demonstrated (may include a second area of increased surveillance).	Surv. Zone & Free Zone	Free Zone	Surv. Zone & Free Zone	Surv. Zone & Free Zone	Free Zone

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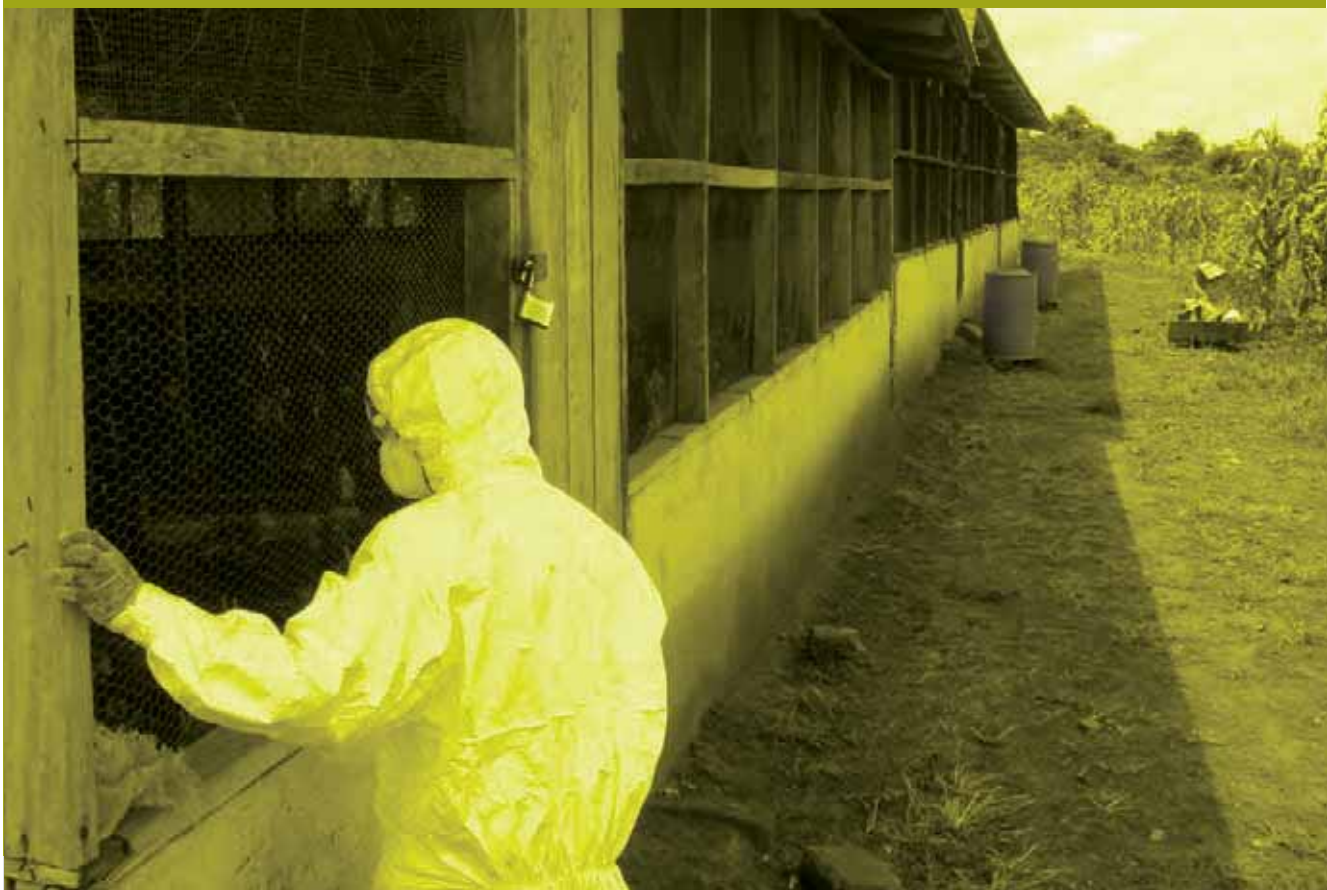
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GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE



SOP 5: DESTRUCTION OF ANIMALS



**GOOD
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GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOP 5: DESTRUCTION OF ANIMALS

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TABLE OF CONTENTS

DEFINITIONS AND ACRONYMS	VI
PURPOSE AND SCOPE.....	1
1. RESPONSIBILITIES	1
2. GENERAL CONSIDERATIONS	1
3. BIOSAFETY CONSIDERATIONS.....	2
4. MATERIALS AND EQUIPMENT	2
5. PROCEDURES.....	3
6. FINAL CONSIDERATIONS	5
REFERENCES	6

DEFINITIONS AND ACRONYMS

Definitions

Biosafety: The application of knowledge, techniques and equipment to prevent personal, laboratory and environmental exposure to potentially infectious agents or biohazards.¹

Biosecurity: The implementation of measures that reduce the risk of the introduction and spread of disease agents.

Competent veterinary authority: A qualified and knowledgeable veterinarian who officially is in charge of the avian influenza outbreak investigation and disease control.

GPS: Global positioning system used to identify the exact coordinates of the outbreak(s).

Acronyms

HPAI: Highly pathogenic avian influenza (see SOP 1).

SOP: Standard operating procedure.

PPE: Personal protective equipment (see SOP 9).

¹ Definition copied from MedicineNet.com (2011).

GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOP 5: DESTRUCTION OF ANIMALS

PURPOSE AND SCOPE

This standard operating procedure (SOP) describes the process of destroying highly pathogenic avian influenza (HPAI) infected or suspected flocks quickly and efficiently. Consideration should be given to animal welfare, biosecurity and biosafety concerns.

1. RESPONSIBILITIES

- 1.1 It is the responsibility of the competent veterinary authority to plan, implement and supervise the destruction, taking into consideration animal welfare, biosecurity and biosafety concerns.
- 1.2 On-site management of the destruction operations should be undertaken by the representative(s) of the competent veterinary authority

2. GENERAL CONSIDERATIONS

- 2.1 The destruction of birds may be necessary as one of the control measures to prevent spread of infection to other animals, farms, humans and the environment.
- 2.2 Destruction operations should be site-specific and address the species, numbers, age, housing type, the availability of equipment/facilities, cost and animal welfare issues.

- 2.3 Animal welfare concerns should include minimal handling to reduce stress, rapid loss of consciousness to minimize pain and suffering, followed by rapid death.
- 2.4 A sufficient number of trained staff is needed to avoid delay in destruction and overworking.
- 2.5 Destruction should be performed on-site, preferably in the infected shed/house, or as close as possible, to prevent further spread of infection.
- 2.6 Supervising personnel should ensure that enough personal protective equipment (PPE) sets are available to allow the destruction team to rest frequently enough and replace PPE after each rest.
- 2.7 The use of experienced poultry workers in a calm and systematic fashion will minimize adverse human and animal welfare consequences.
- 2.8 Personnel working in the contaminated area(s) should have the ability to communicate externally without leaving the area (mobile communication).

3. BIOSAFETY CONSIDERATIONS

- 3.1 Destruction of birds excreting virus is a high risk activity and should be conducted away from the public; all people on-site, including personnel, should wear full PPE.

4. MATERIALS AND EQUIPMENT

- 4.1 Gas (e.g. carbon dioxide - CO₂), medical solutions (drugs) and/or devices to contain, sedate, stun and destroy birds:
- 4.2 Disinfectant solution and sprayer.
- 4.3 PPE (See SOP 9).
- 4.4 Mobile communication (See SOP 1, 5. Equipment).
- 4.5 Artificial lights ("spot lights").
- 4.6 Metal bar or strong sticks.
- 4.7 Scissors.

5. PROCEDURES

Birds should be destroyed by methods that take into account animal welfare concerns and the safety of operations, preferably without moving them from the site.

5.1 Manual dislocation of the neck

This is a non-invasive destruction method and can be performed manually or mechanically in small numbers. The objective is to quickly and effectively disarticulate the skull from the spinal column. If done correctly, this procedure produces instantaneous loss of consciousness. The disadvantages are operator fatigue and difficulty to perform in large birds. Before starting, make sure all workers are trained and proficient in the technique. Assign duties of each staff, which may include: supervisor, catchers, those performing dislocation and collectors of the dead birds.

When available, burdizzos, bone cutters or secateurs may be used. Burdizzos are particularly useful when large numbers of poultry with strong necks (geese, ducks, etc.) are to be destroyed.

5.1.1 Methodology recommended for an adult chicken:

- Hold the birds' legs in one hand.
- Position the bird close to your hip.
- Have the ventral side of the bird's body on your thigh.
- Place the back of your fingers on the back of the bird's neck, passing the neck between your index and middle finger.
- Have your knuckles against the neck and the beak on your ring finger.
- Stretch the neck downwards, one quick pull and at the same time, press your knuckles into the neck to pull the head backwards.
- Check for signs that the bird is dead. Feel the neck for a gap in the vertebrae. Check the eye - there should be no response when the eye is touched and the pupil should be dilated.
- Consistent results require strong hands and skill; therefore personnel should rest regularly.

5.1.2 Methodology recommended for an adult goose or for a large duck:

- Requires two persons working together.
- The first person holds the birds' legs and wing tips (to prevent flapping), so the bird's head and neck are on the ground.
- The other person places a metal bar or strong sticks across the neck behind the head.
- The person holding the legs stands on the stick and immediately pulls the legs up using enough force to dislocate the neck.
- Check that the bird is dead. If not, repeat dislocation.

5.1.3 Methodology recommended for a small chick:

- Place the finger-hold ends of scissors around the neck of the chick and close the handles.
- This method mechanically separates the uppermost cervical vertebrae and spinal cord, without breaking the skin or causing bleeding.

5.2 Killing birds with carbon dioxide (CO₂)

Gassing with CO₂ is one of the most common methods of destruction on commercial and semi-commercial poultry farms. CO₂ is a colourless, odourless, non-flammable, non-explosive gas that is 50 percent heavier than air. When released into an undisturbed environment, the CO₂ will settle to the bottom and displace the surrounding air.

The advantages to using CO₂: it is readily available (often commercially sold in pressurized metal cylinders or tanker trucks), application methods are simple, and it may eliminate the need to manually catch/remove live birds.

To reliably ensure death in all birds, an estimated final concentration of 70 percent CO₂ in the chamber or house for 10 minutes is recommended.

If poultry can be gassed in the building in which they live, stressful

handling by humans and some hazards to human personnel can be avoided.

The relative air tightness of buildings and containers where CO₂ is used is critical and, for practical purposes, buildings may not be able to be sufficiently sealed. Tarps or heavy plastic has been used to seal buildings.

When using CO₂ in containers, only one layer of birds should be introduced at a time to avoid crushing and inhumane death.

5.3 Killing birds with intravenous injection of drugs

This method, useful for humane killing of individual pet birds or large species of birds (such as ostriches and other ratites), requires veterinary expertise in administration of the drugs.

Barbiturate solutions² such as sodium pentobarbital, are most commonly used.

There are hazards to be considered when using this method, including close handling of birds and accidental injection of drugs.

5.4 Destruction of poultry embryos by cooling

Embryos of fertilized eggs can be destroyed by cooling them to <4°C for four hours.

5.5 Destruction of birds by routine processing methods

Normal processing techniques (e.g. electrocution) could potentially be used for larger numbers of birds where it is safe and would not contribute to disease spread. Disposal of intact carcasses should immediately follow the destruction of birds.

6. FINAL CONSIDERATIONS

Dispose of the carcasses according to SOP 6.

² A controlled substance in most countries.

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GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE



SOP 6: MASS DISPOSAL OF BIRD CARCASSES AND
POTENTIALLY CONTAMINATED MATERIALS



**GOOD
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GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOP 6: MASS DISPOSAL OF BIRD CARCASSES AND POTENTIALLY CONTAMINATED MATERIALS

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TABLE OF CONTENTS

DEFINITIONS AND ACRONYMS	VI
PURPOSE AND SCOPE.....	1
1. RESPONSIBILITIES	1
2. GENERAL CONSIDERATIONS	1
3. BIOSAFETY CONSIDERATIONS.....	4
4. MATERIALS	4
5. EQUIPMENT	4
6. PROCEDURES.....	5
REFERENCES	9
ANNEX: BURIAL PIT DIMENSIONS.....	10

DEFINITIONS AND ACRONYMS

Definitions

Biosafety: The application of knowledge, techniques and equipment to prevent personal, laboratory and environmental exposure to potentially infectious agents or biohazards.¹

Biosecurity: The implementation of measures that reduce the risk of the introduction and spread of disease agents.

Carcass: The body of a dead animal.

Competent veterinary authority: A qualified and knowledgeable veterinarian who officially is in charge of the avian influenza outbreak investigation and disease control.

Composting: Natural process during which microorganisms decompose biological material in the presence of oxygen, transforming the infectious material into a safe and stable product

GPS: Global positioning system used to identify the exact coordinates of the outbreak(s).

Ground water: Water beneath the earth's surface.

Litter: Dry absorbent bedding material, such as straw or wood shavings, that is spread on the floor of poultry houses/barns to absorb manure/liquids.

Potentially contaminated material: All disposable sampling materials with direct/indirect contact to infected birds.

Acronyms

HPAI: Highly pathogenic avian influenza (see SOP 1).

RT-PCR: Reverse transcriptase-polymerase chain reaction.

SOP: Standard operating procedure.

PPE: Personal protective equipment (see SOP 9).

¹ Definition copied from MedicineNet.com (2011).

GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOP 6: MASS DISPOSAL OF BIRD CARCASSES AND POTENTIALLY CONTAMINATED MATERIALS

PURPOSE AND SCOPE

This standard operating procedure (SOP) describes the disposal of bird carcasses and contaminated feed, litter, eggs, egg cartoons, trays and other potentially contaminated materials that are not suitable for decontamination. Disposal should be carried out in a way that minimizes the contamination of the environment and spread of the disease (virus).

1. RESPONSIBILITIES

- 1.1 It is the responsibility of the competent veterinary authority to assure that all bird carcasses, potentially contaminated feed, eggs, litter and other materials are disposed of correctly, based on this SOP.

2. GENERAL CONSIDERATIONS

- 2.1 Planning for disposal should occur simultaneously with the planning of animal destruction (see SOP 5).
- 2.2 Liaison with other organizations such as local government, disposal or transport companies, and environmental authorities, should be required.
- 2.3 Personnel working in the contaminated area(s) should have the ability to communicate externally without leaving the area (mobile communication).

- 2.4 As a general rule, bird carcasses and all other potentially contaminated materials need to be destroyed promptly with minimal handling and movement to prevent further spread of the disease. This should include items not able to be decontaminated (e.g. disposable items, cardboard, and wooden crates).
- 2.5 The selection of the disposal methods and the location depends on cost, available facilities, and social and environmental factors.
- 2.6 For selection of methods such as burning or burial which impose environmental risks, collaboration with environmental authorities is necessary.
- 2.7 Avoid transporting over public roads. On-site management (e.g. on-site composting) minimizes biosecurity concerns involved in moving contaminated carcasses, animal products, and other materials off an affected premises.
- 2.8 The major factors determining the suitability of a waste disposal site are the soils (geology) and the water (hydrology), and biosafety and biosecurity considerations of the site.
- 2.9 The water-soluble compounds and pathogens from the waste can pose a risk to human and environmental health.
- 2.10 If on-site disposal is not possible, then great care should be taken during transport of contaminated materials in order to minimize further contamination and the spread of the disease. This may involve sealed containers and decontamination on-site before departure and after delivery.
- 2.11 Carcasses should be disposed of immediately, certainly no later than 48 hours after death.
- 2.12 Disposal of all feed on an infected premises may not be necessary. Feed that has been in direct contact with infected birds should be disposed of promptly. Extended storage of feed on premises having no known contact with infected birds will minimize any potential risk and may be salvaged.

Disposal options:

2.13 Open-air burning of carcasses:

- Yields a relatively benign waste (ash) that does not attract pests.
- Generates a significant volume of smoke.
- Poses additional clean-up challenges for groundwater and soil contamination caused by the hydrocarbons used as fuel.
- Can also pose a fire hazard, particularly in windy areas.

2.14 Burial requires great care in site selection. As carcasses decompose they release gas and organic materials, unrelated to the virus involved, but which can potentially pollute ground water. This is particularly important if large volumes are to be buried.

2.15 Aerobic composting is a valuable disposal method and offers several advantages, from a reduced environmental impact to the generation of a valuable by-product and the destruction of pathogens:

- Composting can be managed successfully on nearly any scale. It is advisable to compost the culled birds on-site, preferably within the poultry house or inside strong and large plastic bags opened at the ends allowing for airflow. Under these conditions, biosecurity hazards are simpler to control. It also reduces the risk of water and ground pollution/contamination. This method may be conducted with relatively low costs and is suitable for severe weather conditions (e.g. extreme cold or rain).
- Composting requires the proper mixing of carcasses (nitrogen source), carbon source (wood chips, straw or poultry litter), moisture and oxygen (air). Composting is an aerobic process requiring a constant supply of oxygen to maintain a proper temperature to breakdown the carcasses.
- If composting is done properly, the induced temperature of over 60 °C can be generated and maintained for weeks to months. In order for composting to work effectively, temperatures should be maintained between 57 °C and 63 °C. The heat will inactivate the pathogenic agents.

3. BIOSAFETY CONSIDERATIONS

- 3.1 People working in an affected premises, especially those handling carcasses and potentially contaminated materials, should wear personal protective equipment (PPE) and be disinfected properly before departing the premises.
- 3.2 Disinfection of all non-disposable instruments and equipment should be thoroughly carried out (see SOP 7) after completion of the mass disposal.
- 3.3 Spectators should be avoided. Should there be a need for certain people to attend the event, such as media or authorities, they should be fully equipped with PPE and kept at a safe distance.

4. MATERIALS

- 4.1 Disinfectant.
- 4.2 Burning materials: straw or hay, untreated timbers, kindling wood, coal, and matches or lighter.
- 4.3 Diesel or kerosene fuel (should be used as burning material only when employing open-air burning method).
- 4.4 Plastic bags or other suitable containers.
- 4.5 Posts and boundary tape or other means of visibly fencing off the site.

5. EQUIPMENT

- 5.1 PPE (including heavy duty gloves).
- 5.2 Spades and/or a mechanical digger/excavator for digging burial pits.
- 5.3 Trucks, trailers or wheelbarrows for moving carcasses.
- 5.4 Disinfecting instruments (e.g. sprayers).
- 5.5 Long-stem temperature sensor probe or metal bar (for composting).
- 5.6 Fire-extinguishing instruments and materials.
- 5.7 Mobile communication (See SOP 1, 5. Equipment).

6. PROCEDURES

The chosen destruction method should prevent animals or people from scavenging, which may not only harm them, but may also contribute to disease spread.

Communicate with local authorities and community leaders about choosing the site of destruction and disposal of the birds and materials.

6.1 Burning (incineration)

- 6.1.1 Place carcasses and potentially contaminated materials on top of sufficient combustible material (wood or fossil fuels) to conduct a complete burn.
- 6.1.2 Select calm, dry weather conditions for carcass burning.
- 6.1.3 Avoid downwind nuisance problems from smoke and odours.
- 6.1.4 Select the site for burning with sufficient distance from poultry houses, public roads or other facilities (consider driving hazards and setting nearby facilities on fire).
- 6.1.5 Ensure that enough fuel is prepared for a complete burning before the beginning of incineration.
- 6.1.6 Avoid using tyres, rubber, and plastic as accelerants because they generate considerable air pollution during burning.
- 6.1.7 Move all vehicles and other equipment to a safe distance.
- 6.1.8 Use dry kindling wood (low moisture content) and not green vegetation.
- 6.1.9 Place light-weight materials to be burned on the bottom and follow with heavier materials.
- 6.1.10 Ensure the arrangement of fuel and carcasses allows adequate air flow to enter the pyre from below.
- 6.1.11 Saturate the fire-bed and carcasses with diesel or heating oil (do not use petrol as it is too flammable and therefore dangerous. Moreover, it does not enable burning in a sustained and thorough manner.).
- 6.1.12 Prepare multiple ignition points along the length of the fire-bed, which can be made of rags soaked in kerosene.

- 6.1.13 Start the fire by walking into the wind and lighting the ignition points along the way.
- 6.1.14 Control and attend the fire at all times and re-fuel as necessary.
- 6.1.15 Ensure any carcasses or parts that fall out of the fire are replaced on the fire.
- 6.1.16 Cover the ashes with dirt or bury them after incineration is completed.
- 6.1.17 Restore the site as well as possible.
- 6.1.18 Consider a burning area outside of an infected place in situations where a number of infected foci are needed to be depopulated and decontaminated. The area should be in an appropriate place, as close as possible, and with ready access to all infected foci.
- 6.1.19 All equipment used in the incineration process (including vehicles) should be decontaminated before removing from the farm or contaminated area.

6.2 On-Site burial

- 6.2.1 Select the burial site such as not to cause contamination of water resources (consult with environmental authorities). Note locations of wells and ponds. Areas where the ground water level is less than three metres below the surface are not suitable for burial.
- 6.2.2 Minimize the amount of dust dispersal by wetting.
- 6.2.3 Assess the locations of underground pipes, electric cables and drains.
- 6.2.4 The officer-in-charge must ensure that only authorized personnel are allowed to enter the disposal site.
- 6.2.5 The pit should be at least two meters deep. A two meter deep, by two meter wide, by two meter long pit enables disposal of 450 birds of average size. Increase the length of the pit as necessary to accommodate larger numbers of carcasses. Do not increase the width unless you have appropriate equipment to be able to evenly distribute carcasses across the pit (see Annex).

- 6.2.6 Cover the carcasses with at least one meter of soil (fill the pit with carcasses up to no more than one meter from the surface).
- 6.2.7 The carcasses should be distributed evenly in the pit.
- 6.2.8 All potentially contaminated materials that cannot be disinfected (e.g. wood, paper, poultry manure, eggs, feed, egg containers, etc.) should also be promptly buried.
- 6.2.9 Fill the pit with soil on the top, but do not compact (decomposition reactions and gases need to be released), mounding the available soil.
- 6.2.10 Do not bury the birds in areas which might be a potential building site in the future.
- 6.2.11 Decontaminate all instruments and machines which have been used in the disposal process.
- 6.2.12 The position of the burial site should be recorded with a global positioning system (GPS) and checked at regular intervals (every two weeks) for up to three months to ensure it has not been violated.

6.3 Off-site burial

- 6.3.1 The selection of the area is important and all environmental, hydrological, geological and social factors should be considered. This place should be at a safe distance from poultry farms and public roads. The site should be under strict biosecurity and quarantine.
- 6.3.2 This method is only advisable for areas which have access to suitable transport vehicles.
- 6.3.3 Vehicles (trucks) used in the course of transport of carcasses and potentially contaminated materials have to be completely impermeable (including doors), sealed, water resistant and suitable for full disinfection. The load must be covered and sealed to prevent materials from falling/blowing out.
- 6.3.4 Birds should not be transported alive.
- 6.3.5 It is advisable to transport carcasses in small containers or strong plastic bags to prevent leakage of infected materials into the vehicles.

- 6.3.6 Avoid having the truck drivers exit from their vehicles.
- 6.3.7 Vehicles should be decontaminated before leaving contaminated premises (infected premises and disposal site).

6.4 Composting

- 6.4.1 Select a compost site that will not result in water resources being contaminated.
- 6.4.2 Maintain a level of 40-50 percent moisture content.
- 6.4.3 Construct compost row(s) to make a row of mixed carcasses and organic matter. Approximately 4 m wide and 1.5 m high. All carcasses should be at least 30 cm from the outside, the outer layer being organic matter. Carcasses are well mixed with approximately five times their weight of organic matter.
- 6.4.4 Management of the composting process: As composting takes place, the temperature rises. The temperature should be checked periodically. No influenza virus will survive in material that has uniformly reached 60 °C. This could be expected to require 2-14 days, depending on conditions. This material will now be safe to handle and could be disposed of through ordinary means.
- 6.4.5 The material could also be converted into a useful by-product by completing the composting process. This process requires expertise and additional work, i.e. frequent over-turning of the material.

6.5 Rendering

- 6.5.1 The rendering process mechanically crushes the whole carcass and cooks the tissue under steam, finally removing the moisture from the tissues to kill the pathogens.
- 6.5.2 This method requires transfer of carcasses from the farm to a rendering plant. Similar precautions listed under section 6.3 Off-site burial, should be implemented to minimize potential disease spread.
- 6.5.3 The complete decontamination of trucks is very important.

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ANNEX: BURIAL PIT DIMENSIONS

The dimensions of the pit depend on the quantity of poultry to be buried. The table below provides general guidance².

Dimensions of burial pit

QUANTITY (KG)	RECOMMENDED PIT DIMENSIONS (METRES)		
	Depth	Length	Width
1 000	1.5 – 2.0	1.5 – 2.0	1.5 – 2.0
5 000	1.5 – 2.0	5.0 – 6.0	2.0 – 3.0
10 000	2.0 – 2.5	6.0 – 7.0	2.5 – 3.0
20 000	2.0 – 2.5	12.0 – 14.0	2.5 – 3.0

The pit should not have wider dimensions than those that can be evenly filled with the equipment available on-site.

Note: Leave one long side of the pit clear from excavated earth to facilitate access.

² Source: FAO Consultant, Kit Button (FAO Viet Nam SOPs).

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GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE



SOP 7: DECONTAMINATION OF INFECTED FARMS



**GOOD
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GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOP 7: DECONTAMINATION OF INFECTED FARMS

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TABLE OF CONTENTS

DEFINITIONS AND ACRONYMS	VI
PURPOSE AND SCOPE.....	1
1. RESPONSIBILITIES	1
2. GENERAL CONSIDERATIONS AND RECOMMENDATIONS.....	2
3. REQUISITE SAFETY CONSIDERATIONS.....	2
4. MATERIALS AND EQUIPMENT	3
5. PROCEDURES.....	4
REFERENCES	8
ANNEX 1: Major groups of disinfectants	9
ANNEX 2: Example of a possible poultry house cleanliness inspection checklist....	10

DEFINITIONS AND ACRONYMS

Definitions

Biosafety: The application of knowledge, techniques and equipment to prevent personal, laboratory and environmental exposure to potentially infectious agents or biohazards.¹

Biosecurity: The implementation of measures that reduce the risk of the introduction and spread of disease agents.

Biosecurity point: A designated area for putting on and removing PPE at the border between the clean and contaminated (dirty) areas, and near to the farm entrance/exit gate (see SOP 1, point 6 and SOP 7).

Competent veterinary authority: A qualified and knowledgeable veterinarian who officially is in charge of the avian influenza outbreak investigation and disease control.

Disinfectant: An agent that destroys microorganisms on surfaces and objects.

Disinfection: The process of destroying microorganisms on surfaces and objects; the process may involve disinfectants or physical processes (e.g. high temperature treatment).

Decontamination: The process of cleaning and disinfection.

Potentially contaminated material: All disposable sampling materials with direct/indirect contact to infected birds.

Acronyms

HPAI: Highly pathogenic avian influenza (see SOP 1).

SOP: Standard operating procedure.

PPE: Personal protective equipment (see SOP 9).

¹ Definition copied from MedicineNet.com (2011).

GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOP 7: DECONTAMINATION OF INFECTED FARMS

PURPOSE AND SCOPE

This standard operating procedure (SOP) describes the steps for decontamination of a farm or premises known to be contaminated with the highly pathogenic avian influenza (HPAI) virus or other pathogens in order to eliminate the disease-causing organisms.

The scope of this procedure starts after the culling and disposal of the infected and potentially-exposed birds (see SOP 6).

1. RESPONSIBILITIES

- 1.1 It is the responsibility of the authority in charge (i.e. Biosecurity Officer) to supervise decontamination procedures and to appoint trained and knowledgeable personnel to perform the work.
- 1.2 The authority in charge will also ensure that everyone who enters the contaminated buildings wears personal protective equipment (PPE), and takes it off properly when leaving the farm.
- 1.3 It is the responsibility of everyone on-site to follow biosafety and biosecurity procedures.

2. GENERAL CONSIDERATIONS AND RECOMMENDATIONS

- 2.1 Humans can become infected with certain avian influenza viruses or mechanically spread the virus.
- 2.2 All people in contact with infected premises must understand that HPAI spreads easily. Body surfaces, people, clothing, shoes, tyres or other items can become contaminated, either directly from infected poultry or from contaminated materials. Thus, the virus can be carried to uninfected farms spreading it to new areas. However, the HPAI virus has a limited lifespan on inert matter.
- 2.3 Therefore, it is imperative that potentially contaminated premises and items remain secure. When it is not possible to keep the area secure from people, birds, and wild and domestic animals, prompt decontamination is important to remove any trace of the virus and prevent it from spreading.
- 2.4 Workers carrying out disinfection are exposed to pathogens and toxic chemicals and therefore should utilize PPE. High temperatures and humidity can cause discomfort and frequent rest breaks should be considered. Profuse sweating can cause breaches in the protective clothing, leading to absorption of chemicals.
- 2.5 Most disinfectants are quickly made ineffective by the presence of organic matter. Areas or objects to be disinfected should be thoroughly cleaned prior to applying the disinfectant. Disinfectant solutions should be replaced regularly if exposed to organic matter, e.g. footbaths should have disinfectant replaced when they appear dirty.

3. REQUISITE SAFETY CONSIDERATIONS

- 3.1 Some disinfectants can be corrosive or irritating to the skin and mucous membranes, or toxic if ingested, inhaled or absorbed. Always be aware of the potential hazard that disinfectants can pose to people and animals.
- 3.2 Do not eat, drink, or smoke while performing decontamination procedures.
- 3.3 Always mix disinfectants in accordance to the manufacturer's instructions while wearing protective outer clothing (such as water-

proof suits) and equipment (i.e. goggles, gloves and mask), and in a well ventilated area.

- 3.4 Eye protection should always be worn. If chemicals are splashed into the eyes, immediately rinse eyes repeatedly with clean water. Seek advice from a medical professional.
- 3.5 If the skin comes in contact with the disinfectant, wash it off immediately with plenty of water.
- 3.6 Appropriate PPE must be worn before entering contaminated areas.
- 3.7 After decontamination work has been completed, wash hands thoroughly with soap and water as a first step and then take a shower promptly.
- 3.8 Clothes worn when handling disinfectants should be changed and washed after use.

4. MATERIALS AND EQUIPMENT

- 4.1 Map of farm buildings (if not available, prepare a rough map by hand).
- 4.2 Signboards stating in the local language "DO NOT ENTER", with appropriate local symbols for people who are illiterate.
- 4.3 Disinfectant and their labels/data sheets.
- 4.4 Detergent/soap.
- 4.5 Water and buckets to mix disinfectant.
- 4.6 PPE, including mobile communication (See SOP 9).
- 4.7 Eye protection, gloves and mask², to be worn when mixing and preparing disinfectant.
- 4.8 Sprayer.
- 4.9 High-pressure washer (where available).
- 4.10 Steamer/foaming machines (whenever appropriate and available).
- 4.11 Mobile communication (See SOP 1, 5. Equipment).

² The mask should protect against the chemicals being used.

5. PROCEDURES

5.1 Planning and preparation

- 5.1.1 Designate a “biosecurity officer” (officer in charge of decontamination).
- 5.1.2 The team should be comprised of one or more persons exclusively in charge of mixing and preparing the disinfectant solution in the “clean” area (wearing protective clothing, including gloves and goggles). They should bring a change of clean clothes and change into them after having showered, once the procedure is completed. The rest of the team wearing PPEs should carry out the cleaning and disinfection in the “contaminated” area.
- 5.1.3 Start with surveying the infected site and designate a specific area for the biosecurity point (see section 5.1.10 below).
- 5.1.4 Draw a sketch map of the area to be decontaminated.
- 5.1.5 Define the boundary of the “dirty” (contaminated) side and the “clean” (uncontaminated) side for the purposes of entry and exit from the premises.
- 5.1.6 Identify all potential contaminated objects and areas that need to be decontaminated. Consider cages, feeding troughs, water bowls, vehicles, perches, laying boxes and soiled cement surfaces.
- 5.1.7 Consider the need to clean materials and surfaces as a first priority prior to applying disinfectant.
- 5.1.8 Select locations in the site for the following specific purposes:
 - Decontamination location for Humans, equipment and materials (e.g. “biosecurity point”).
 - Unloading area.
 - Rest area for workers.
- 5.1.9 The biosecurity point has the following characteristics:
 - This is the area where people change into PPE (i.e. clean side) before entering the contaminated area (i.e. dirty

side), and where they decontaminate before leaving the contaminated area.

- It is preferably located close to the farm entrance/exit, just outside the farm boundary.
- The biosecurity point has an imaginary boundary between the clean and dirty sides, which should be demarcated.
- Workers exiting the contaminated premises enter the biosecurity point from the dirty side, and, after removal of their contaminated PPE, to wash and decontaminate, and exit through the clean side .
- It provides disposal bags for contaminated PPE.

5.1.10 The unloading area must be outside the contaminated area (i.e. on the clean side).

5.1.11 Facilities (toilets) should be available near to the work area, but the workers' longer-term rest and eating area must be on the clean side, i.e. outside the infected premises, and should provide shade and a place to sit, eat, and drink.

5.1.12 Ensure that all people understand the designated areas and their purposes and how to behave in them.

5.1.13 Clearly define the limits of the 'dirty' side and control it:

- Use local language signboards stating "DO NOT ENTER", with appropriate local symbols for people who are illiterate, at the entrance to the farm.
- Brief those responsible for security to not allow anyone to cross this boundary unless they are authorized to enter.
- Place footbaths or boot-washing facilities (e.g. bucket of detergent solution and brush, disinfectant sprayer) at the boundary entrance/exit, whenever possible in the shade. Ensure that everyone crossing the line takes proper precautions to disinfect footwear and wash hands before leaving the farm.
- Personnel working in the contaminated area(s) should have the ability to communicate externally without leaving the contaminated area (mobile communication).

5.2 Cleaning

- 5.2.1 Ensure that the electrical supply to the building is turned off prior to cleaning, if it exists.
- 5.2.2 Take all moveable equipment out of the poultry-house (drinkers, feeders and feed hoppers, nest boxes, egg containers), wash them with detergent or soapy water, and leave them out in the sun to dry. When dry, rinse/spray the equipment with disinfectant solution.
- 5.2.3 When HPAI is suspected or confirmed, dry-cleaning by brushing or rubbing surfaces should not be allowed. This process may aerosolize the virus and increase the exposure to personnel working in this environment.
- 5.2.4 Steam is an effective disinfectant. Pressurized steam cleaners are useful for cleaning and disinfecting poultry houses.
- 5.2.5 Wash down all contaminated surfaces with a detergent solution or soapy water. Use a high pressure washer if available. Start with the ceiling, continue down the walls and poles, then the floor. Ensure that ledges, fan boxes and pipes are properly washed. The recommended detergent solution application rate is 500 ml/m².
- 5.2.6 Inspect all parts of the house and its fittings to ensure that all parts have been properly cleaned, i.e. all organic material has been removed from all surfaces. Use a checklist to be sure no part is forgotten (see Appendix 2).

5.3 Disinfection

- 5.3.1 Follow label directions as provided by the manufacturer when preparing the disinfectant. The product label should be provided with the disinfectant and be in the national language(s).
- 5.3.2 Motorized sprayers are preferred, if available. When using backpack sprayers, it is recommended to use several backpack sprayers, with one worker followed by a second, spraying the same surface.

- 5.3.3 Allow the disinfectant to be in contact with the treated surfaces for at least the period indicated by the label directions, including the watering system, if one exists.
- 5.3.4 Once completed, install disinfectant footbaths at the entrances.
- 5.3.5 Do not store diluted chemical as it may lose its efficacy, unless specified by manufacturer in the label directions.
- 5.3.6 Chemicals from partly-used containers should be kept in their original, labelled container.
- 5.3.7 Rinse empty containers several times with water.
- 5.3.8 Wash hands and face with soapy water after completion.

REFERENCES

Birnbaum, N.G., and O'Brien, B. (2008) Methods for inactivation of influenza virus in the environment. In: Avian Influenza. Blackwell Publishing Asia.

Beato, M.S., deBenedictis, P. (2009) General rules for decontamination following an outbreak of avian influenza or Newcastle disease. In: Avian influenza and Newcastle disease. Springer.

ANNEX 1: Major groups of disinfectants

CHEMICAL GROUP	ADVANTAGES	DISADVANTAGES
Oxidizing agents Examples: <ul style="list-style-type: none"> hydrogen peroxide sodium hypochlorite 	<ol style="list-style-type: none"> Break peptide bonds in viruses to destroy them. Good for surface cleaning of equipment with cloth. 	<ol style="list-style-type: none"> Corrosive (do not use on metal surfaces). Do not work well in presence of organic matter. Poor residual activity.
Alcohols (used mainly for labs and lab equipment) Examples: <ul style="list-style-type: none"> ethanol 	<ol style="list-style-type: none"> Broad spectrum. Low cost. Readily available. Low toxicity. 	<ol style="list-style-type: none"> Require long contact time. Evaporates quickly. Flammable.
Halogens Examples: <ul style="list-style-type: none"> iodophors 	<ol style="list-style-type: none"> Wide range of applications (e.g. water, skin, other surfaces). Low cost. 	<ol style="list-style-type: none"> Moderately corrosive. Inactivated by sunlight. Poor residual activity. Do not work well in presence of organic matter. Not suitable for footbaths.
Phenolics Example: <ul style="list-style-type: none"> phenol 	<ol style="list-style-type: none"> Good residual action. Moderate to high effect in presence of organic matter. Requires relatively short contact time (10 minutes). 	<ol style="list-style-type: none"> High concentrations can irritate skin, eyes and lungs. Do not kill all bacteria and viruses.
Quaternary ammonium compounds Example: <ul style="list-style-type: none"> household bleach 	<ol style="list-style-type: none"> Effective against most bacteria and viruses. Cleans and disinfects simultaneously (detergent component helps remove organic matter). Requires relatively short contact time (10 minutes). 	<ol style="list-style-type: none"> Expensive. Do not kill fungi and fungal spores.
Aldehydes Example: <ul style="list-style-type: none"> glutaraldehyde 	<ol style="list-style-type: none"> Wide spectrum of activity. Moderate efficiency in presence of organic matter. Slight residual activity. 	<ol style="list-style-type: none"> Moderately toxic. Moderate to high cost.
Aldehydes Example: <ul style="list-style-type: none"> formaldehyde 	<ol style="list-style-type: none"> Very effective against all pathogens. In gaseous form, used in closed spaces such as hatcheries, etc. 	<ol style="list-style-type: none"> Requires careful control of time, humidity, concentration and distribution. VERY TOXIC!

ANNEX 2: Example³ of a possible poultry house cleanliness inspection checklist⁴

Date: _____ Inspection performed by: _____

- Walk around the poultry house and inspect the inside and outside for the presence of left over birds or litter.
- Assess the quality of cleaning and washing of the poultry house and its equipment.
- No visible organic matter (droppings, feathers, etc) should be present.

SITE BEING INSPECTED	PRESENT		COMMENTS
	Yes	No	
Poultry in or around the house			
Piles of litter less than 50 metres from the house			
Wild birds or pets inside the house			
Rodents or their droppings inside or around the house			

SITE BEING INSPECTED	CLEAN		COMMENTS
	Yes	No	
Wall inside 1			
Wall inside 2			
Wall inside 3			
Wall inside 4			
Curtain inside 1			
Curtain inside 2			
Curtain inside 3			
Curtain inside 4			
Curtain outside 1			
Curtain outside 2			
Floor 1			
Floor 2			

cont./..

3 The approach to cleaning before disinfection needs to take account of the survival time of pathogens. For example, avian influenza viruses may not survive for longer than the time taken to restock and therefore, complete cleaning and disinfection may not be necessary.

4 Source: This example checklist is provided by Yonatan Segal, FAO.

SITE BEING INSPECTED	CLEAN		COMMENTS
	Yes	No	
Floor 3			
Floor 4			
Fan box 1			
Fan box 2			
Fan box 3			
Fan box 4			
Fan shaft 1			
Fan shaft 2			
Fan shaft 3			
Fan shaft 4			
Fan 1			
Fan 2			
Fan 3			
Fan 4			
Tops of beam 1			
Tops of beam 2			
Tops of beam 3			
Water pipe 1			
Water pipe 2			
Water tank			
Air inlet 1			
Air inlet 2			
Air inlet 3			
Gutter 1			
Gutter 2			
Gutter 3			
Drain 1			
Drain 2			
Drain 3			
Feed silo			
Feed hopper			
Feed pan 1			
Feed pan 2			

cont./..

SITE BEING INSPECTED	CLEAN		COMMENTS
	Yes	No	
Feed pan 3			
Feed pan 4			
Feed line 1			
Feed line 2			
Feed line 3			
Feed line 4			
Drinker 1			
Drinker 2			
Drinker 3			
Drinker 4			
Nest box 1			
Nest box 2			
Nest box 3			
Concrete pathway			

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GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE



SOP 8: SAFE HANDLING OF HUNTED WILDFOWL



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GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOP 8: SAFE HANDLING OF HUNTED WILDFOWL

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TABLE OF CONTENTS

DEFINITIONS AND ACRONYMS	VI
PURPOSE AND SCOPE	1
1. RESPONSIBILITIES	1
2. GENERAL CONSIDERATIONS	1
3. BIOSAFETY CONSIDERATIONS	2
4. MATERIALS AND EQUIPMENT	2
5. PROCEDURES WHEN HANDLING WILDFOWL	2

DEFINITIONS AND ACRONYMS

Definitions

Biosafety: The application of knowledge, techniques and equipment to prevent personal, laboratory and environmental exposure to potentially infectious agents or biohazards.¹

H5N1: Influenza viruses are divided into subtypes based on the two proteins, haemagglutinin (H) and neuraminidase (N), that they have on their surfaces. Only two types of avian influenza viruses, H5 and H7, are known to include highly pathogenic viruses. Not all H5 and H7 influenza viruses are highly pathogenic, but H5N1 is.

Acronyms

HPAI: Highly pathogenic avian influenza (see SOP 1).

LPAI: Low pathogenic avian influenza (see SOP 1).

SOP: Standard operating procedure.

PPE: Personal protective equipment (see SOP 9).

¹ Definition copied from MedicineNet.com (2011).

GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOP 8: SAFE HANDLING OF HUNTED WILDFOWL

PURPOSE AND SCOPE

This standard operating procedure (SOP) describes the recommendations for hunters to reduce the risk of influenza (including highly pathogenic avian influenza [HPAI]) virus transmission to hunters, a hunter's family, domestic poultry and other animals.

1. RESPONSIBILITIES

- 1.1 This SOP applies to those involved in handling hunted wild birds.

2. GENERAL CONSIDERATIONS

- 2.1 Wild waterfowl are natural reservoirs of a wide range of influenza viruses. These infections can be symptomatic or asymptomatic. Periodically these viruses can spread to domestic poultry and to people under certain circumstances. Low pathogenic avian influenza (LPAI) viruses have the capacity to become highly pathogenic.
- 2.2 Handling of ducks or other wild birds potentially exposes hunters to influenza viruses. Carcass cleaning may also represent a risk to those involved.
- 2.3 If H5N1 HPAI has been confirmed by veterinary authorities in the area, measures to prevent transmission to humans should be implemented.
- 2.4 Do not consume wildfowl found ill or dead.

3. BIOSAFETY CONSIDERATIONS

- 3.1 It is recommended that birds that are easy to catch, and/or are showing unusual behaviour, should not be hunted nor handled.
- 3.2 Consider that influenza viruses are shed by respiratory discharges and faeces, therefore avoid direct contact with these materials.
- 3.3 Hunters should change their clothes if they have become soiled. Promptly wash soiled clothes.
- 3.4 Do not eat, drink, smoke or use a phone while handling birds.
- 3.5 Wash hands thoroughly with soap and water or disinfectant wipes immediately after handling the birds, and before eating or smoking.
- 3.6 Cook the meat thoroughly and never consume raw or improperly cooked meat.
- 3.7 Do not allow domestic animals access to hunted birds, or internal organs of the hunted birds, (for example, dogs can also become infected with influenza viruses).

4. MATERIALS AND EQUIPMENT

- 4.1 Disposal bags (strong leakage-proof plastic bags):

5. PROCEDURES WHEN HANDLING WILDFOWL

- 5.1 Prepare an appropriate number of disposal bags to allow double bagging of all discarded material (i.e. two 30 litre bags per 5-8 mid-size birds).
- 5.2 Prepare a separate clean bag or leak proof container (plastic box) for the dressed carcass (meat).
- 5.3 Transfer the hunted birds to cleaning area. It is strongly recommended not to clean hunted birds at home or in a kitchen.
- 5.4 Remove all viscera, and the complete skin along with feathers. Avoid plucking feathers as this could be a likely source of infection.
- 5.5 Collect and pack all meat in clean plastic bags or leak-proof containers.
- 5.6 Discard all waste into the disposal bags.

- 5.7 Close the disposal bags tightly and discard by burial or burning.
- 5.8 Wash all knives, utensils, and cutting boards, and thoroughly clean all surfaces with hot (if available), soapy water after cleaning of birds is completed. Clean and disinfect hands.

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GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE



SOP 9: PERSONAL PROTECTIVE EQUIPMENT



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GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOP 9: PERSONAL PROTECTIVE EQUIPMENT

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TABLE OF CONTENTS

DEFINITIONS AND ACRONYMS	VI
PURPOSE AND SCOPE.....	1
1. RESPONSIBILITIES	1
2. GENERAL CONSIDERATIONS	2
3. MATERIALS	4
4. EQUIPMENT	4
5. PROCEDURES.....	4
REFERENCES	8
ANNEX: EXAMPLE OF CONTENTS OF A PPE KIT.....	9

DEFINITIONS AND ACRONYMS

Definitions

Biosafety: The application of knowledge, techniques and equipment to prevent personal, laboratory and environmental exposure to potentially infectious agents or biohazards.¹

Biosecurity point: A designated area for putting on and removing PPE at the border between the clean and contaminated (dirty) areas, and near to the farm entrance/exit gate (see SOP 1, point 6 and SOP 7).

Competent veterinary authority: A qualified and knowledgeable veterinarian who officially is in charge of the avian influenza outbreak investigation and disease control.

N-95 mask (respirator): This mask is a lightweight, nose-and-mouth respirator that can provide some level of protection for the wearer from viruses, including HPAI. The N-95 designation is an efficiency rating that means that when properly worn, the mask blocks about 95 percent of particles that are 0.3 microns in size or larger.

Potentially contaminated material: All disposable sampling materials with direct/indirect contact to infected birds.

PPE: Personal protective clothing and equipment worn by anyone coming into contact with potentially infected animals and contaminated locations

Acronyms

HPAI: Highly pathogenic avian influenza (see SOP 1).

SOP: Standard operating procedure.

PPE: Personal protective equipment (see SOP 9).

¹ Definition copied from MedicineNet.com (2011).

GOOD EMERGENCY MANAGEMENT PRACTICE:

STANDARD OPERATING PROCEDURES FOR HPAI RESPONSE

SOP 2: PERSONAL PROTECTIVE EQUIPMENT

PURPOSE AND SCOPE

This standard operating procedure (SOP) describes the use of personnel protective clothing and equipment (PPE): i) when working with potentially infectious materials or being in a potentially contaminated environment where human health could be endangered; and ii) to prevent further environmental dissemination of potentially infectious materials, including highly pathogenic avian influenza (HPAI).

1. RESPONSIBILITIES

- 1.1 It is the responsibility of the competent veterinary authorities to ensure that all personnel who are in contact with potentially infected birds or materials use the PPE correctly, based on this procedure. This includes the people who are required to use protection, what type of protection is required, and where and when it is required.
- 1.2 It is also the responsibility of the competent veterinary authorities to ensure that staff members have been previously trained on the correct use and disposal of the PPE and that any additional refresher training be given when needed.
- 1.3 It is the individual's responsibility to follow directions and wear, remove and dispose of the PPE as instructed.

2. GENERAL CONSIDERATIONS

- 2.1 The order and technique with which the PPE is put on and taken off are important to avoid exposing operators to virus particles and to avoid mechanical virus transmission to other locations (farms) or people.
- 2.2 It is important to provide sufficient PPE for all personnel involved; therefore, the recommended number of complete sets of PPEs is at least three times the number of staff deployed per day.
- 2.3 All people exposed to risk – that is coming into contact with potentially infected poultry or material – should wear PPE, including farmers, farm workers and family members.
- 2.4 Additional masks, gloves and shoe covers (e.g. 10 extra per day/person) should be provided, depending on the type of work and the working conditions.
- 2.5 A designated area for putting on PPEs should be identified outside of the contaminated area and all personnel should use this area to put on their PPE. The place should be away from birds or any other potentially contaminated equipment. This place should be at the border between the “clean” (uncontaminated) and “dirty” (contaminated) areas, and near to the farm entrance/exit, preferably just outside the farm boundary. This area could be called the ‘biosecurity point’.
- 2.6 A different designated area for the removal of PPE should also be identified and all personnel should use this area to remove their PPE. This area is close to the clean biosecurity point, but closer to the potentially contaminated site.
- 2.7 For a big farm more than one biosecurity point may need to be designated.
- 2.8 All PPE must be removed and discarded before taking breaks outside of the potentially contaminated area. A new set of PPE should be put on prior to re-entering a potentially contaminated area.
- 2.9 Used PPE must be discarded immediately in an approved manner (see SOP 3).
- 2.10 Nose and mouth protection, such as N-95 masks, must be well fitted to the user’s face to function effectively. These masks cannot be worn effectively with beards and lose their protective properties and must be

changed when they become wet from saliva, respiration or if splashed. The masks should be discarded and replaced after 4-6 hours of use.

- 2.11 The rest of the PPE can remain on for the duration of the activities in the same area on the same day, but must be promptly replaced if damaged.
- 2.12 Whenever possible, use contact lenses instead of glasses.
- 2.13 When not wearing rubber boots, wear flat-soled and comfortable shoes. Shoe covers may be easily damaged by heeled shoes. Prior to entering the potentially contaminated area, one person should be appointed for emergency communication (it is recommended that this person does not enter the potentially contaminated area or if entering the potentially contaminated area will limit their activities to reduce the risk of contamination).
- 2.14 Using mobile phones, while wearing PPE, is not recommended, but if it is unavoidable, they should be previously inserted in small sealable disposal bags to facilitate later decontamination.
- 2.15 Select the appropriate size(s) of PPE (S, M, L, XL, XXL, XXXL)²
- 2.16 If a larger team will be using PPE, it is recommended to indicate the name and/or the function of the person on the back of the coverall with a permanent marker, for easy identification.
- 2.17 It is important to minimize further contamination by limiting surfaces and items touched with contaminated gloves.
- 2.18 Eating, drinking and smoking is forbidden while wearing PPE.
- 2.19 Personnel working in the contaminated area(s) should have the ability to communicate externally without leaving the contaminated area (mobile communication).

² Choose one or two sizes larger than one's normal size for a comfortable fit that will allow ease of movement (i.e. if the person is size M, use size L or XL).

3. MATERIALS

- 3.1 1 pair coverall (per person).
- 3.2 1 pair rubber boots (or shoe covers, if boots unavailable) (per person).
- 3.3 2 pairs plastic gloves (one thin and one thick) (per person).
- 3.4 1 plastic/vinyl apron (per person).
- 3.5 1 mask (e.g. N-95 respirator) (per person).
- 3.6 1 goggles or face shield (per person).
- 3.7 Alcohol wipes.
- 3.8 Sanitary virucidal wipes.
- 3.9 Biohazard waste bags (red, strong plastic, leakage-proof).
- 3.10 Clothes to wear under the PPE (depending on the outside temperature).
- 3.11 Buckets and brushes (for washing and disinfecting the boots).
- 3.12 Disinfectant.
- 3.13 Silicon spray (for goggles) – optional.
- 3.14 Permanent markers.

4. EQUIPMENT

- 4.1 Hand sprayer (for disinfectant).
- 4.2 Mobile communication (See SOP 1, 5. Equipment).

5. PROCEDURES

5.1 Putting on PPE

- 5.1.1 Find a clean area for putting on your PPE.
- 5.1.2 Put on coveralls first.
- 5.1.3 If rubber boots are available, remove shoes and change into boots.
- 5.1.4 If rubber boots are not available, put on shoe covers over footwear.

- 5.1.5 Put the mask under the chin with the metal bar on top of the nose. Pull the bottom strap over the head, and place it around the neck below the ears. Then pull the top strap over the head and rest it high at the top back of the head.
- 5.1.6 Place your fingertips from both hands at the top of the metal nosepiece. Using two hands mold the nose area to the shape of the nose by pushing inward while moving the fingertips down both sides of the nosepiece.
- 5.1.7 Put on the goggles. Goggles are adjustable and should fit closely over and around the eyes. Use both hands to pull the strap over the head and adjust the strap.
- 5.1.8 If you wear personal eye glasses, the goggles should be placed over your eye glasses.
- 5.1.9 A silicon spray can be used to spray the inside of the goggles to avoid fogging.
- 5.1.10 Pull coverall hood over the head. Make sure the uncovered parts of the face are completely covered with the hood.
- 5.1.11 Aprons fit over the coveralls. Place the apron over the head and then tie at the back.
- 5.1.12 Put on the first (inner) thin pair of gloves. Place them under the sleeves of the coverall.
- 5.1.13 Put on the second (outer) thick pair of gloves. Pull the edge of the outer gloves over the cuff of the coveralls or gown.

5.2 Removing PPE

- 5.2.1 Before you begin the process of removing your PPE, you should find an area that is not contaminated with blood, soil, faeces or other waste. This place should be on the border between the contaminated and clean areas (biosecurity point).
- 5.2.2 Use brush and disinfectant to clean and decontaminate your boots. If outer shoe covers were used, remove and dispose of them in the disposal bag.

- 5.2.3 Remove your outer gloves next. Using one gloved hand, grasp the outside of the opposite outer glove near the wrist. Pull and peel the outer glove away from the hand. The outer glove should now be turned inside-out, with the contaminated side now on the inside. Place the removed outer glove into the disposal bag. Remove the outer glove from the other hand by sliding fingers between inner and outer gloves of the other hand and peeling the outer glove. Do not remove the inner gloves until you have removed all other PPE.
- 5.2.4 The apron and coverall are next in the sequence, followed by the goggles and mask.
- 5.2.5 Remove the apron and place it in the disposal bag.
- 5.2.6 Unfasten zipper of coverall. Peel coverall away from the neck and shoulder. From the top, roll down the coverall. Turn contaminated outside toward the inside. Fold or roll into a bundle going down the body. Discard in the disposal bag.
- 5.2.7 Remove your goggles by pulling them up over your head. You should handle them by the headband or ear pieces. If goggle or face shield are reusable, place them in a designated container for subsequent decontamination. Otherwise, discard them in the disposal bag.
- 5.2.8 For removing the mask (respirator), the bottom elastic should be lifted over the head first. Then remove the top elastic strap. This should be done slowly to prevent the respirator from “snapping” off the face. Put the mask into the disposal bag.
- 5.2.9 Remove and discard the inner gloves in the same way as the outer gloves.
- 5.2.10 Close and seal the disposal bag tightly. Spray the outside of the disposal bag with disinfectant and place in a second disposal bag. Close and seal the outer disposal bag.
- 5.2.11 The disposal bag should be burned, buried or taken off-site for appropriate disposal.
- 5.2.12 Wash your hands with soap.
- 5.2.13 Disinfect your hands.

- 5.2.14 If there is a showering facility on the site, take a shower before leaving the site (establishment of a showering facility on the site is highly recommended). Otherwise all personnel should take shower as soon as possible after finishing the operation.
- 5.2.15 Change from the work clothes into clean (private) clothing as soon as possible and before visiting any other premises.

REFERENCES

Avian Influenza Commodities Training Guide (United States Agency for International Development [USAID] training material).

ANNEX: EXAMPLE OF CONTENTS OF A PPE KIT (SUPPLIED BY USAID)

- 1 pair Tyvek coverall.
- 1 pair boot covers³.
- 2 pair nitrile gloves.
- 1 plastic apron⁴.
- 1 N-95 mask (respirator).
- 1 goggles.
- 4 alcohol wipes.
- 1 PDI sanitary virocidal wipe.
- Infectious waste bag (red).

3 Rubber boots preferred when available.

4 Heavier plastic or vinyl apron preferred when available.

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