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CLUSTER AND BUSINESS SUPPORT PROJECT

Poultry Disease Identification and Prevention Program and Diagnostic Laboratory

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The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

PURPOSE OF ASSIGNMENT

There is one laboratory located in the Veterinary Institute that is funded through the Ministry of Agriculture – Kosovo Veterinary Food Agency. They currently have equipment in place that was funded through the World Bank. The Kosovo Veterinary Food Agency is responsible for a variety of areas including border inspections, meat and poultry inspection and certification, disease prevention and control, certification of incoming live animals and maintenance of a diagnostics facility for multiple species.

There exists a need for a poultry disease identification program in order to prevent diseases from infecting the poultry flocks and jeopardizing the health of the Kosovo population. A laboratory specialist with knowledge in poultry disease, testing and treatment is needed who can assist the Kosovo Veterinary Institute to implement basic testing program for Newcastle Disease, Avian Influenza and Salmonella. The consultant would also test for anti-biotic drug residue.

BACKGROUND

There are approximately 200 commercial laying operations in Kosovo. With an estimated 450,000 – 550,000 hens lying at any one time, this amounts to an approximate average of 2,250 hens per commercial farm. However, some farms have as many as 160,000 hens, while others only have 1,000 or less. It is estimated that the Kosovo market could absorb the production of 850,000 to 1,000,000 layers.

At the moment there is no large-scale broiler (chicken meat) industry. Some small-scale farmers exist and they sell their chickens to open market; it is estimated that around 200,000 to 300,000 broilers are sold in those markets annually. Production prior to the war was about 15,000,000 to 18,000,000 annually. KCBS is assisting the industry to grow to this level.

A variety of support structures are needed to maintain a viable modern poultry industry. These include experts in production, nutrition, processing, and marketing. A critical component of this expertise is trained veterinarians and laboratory technicians that can do field diagnostics of poultry diseases as well as laboratory tests as needed for rapid diagnosis of a variety of diseases with follow up disease treatment. Routine testing of birds and programs for early disease prevention and rapid containment are critical to a healthy poultry industry. With the recent high pathogenic strain avian influenza outbreaks around the world that has been devastating to the poultry industries in several countries, this has also become an issue for human health as it appears that the virus also infect humans. Recently, there was an outbreak of Newcastle disease in the Balkan region which caused some major exporters to lose the ability to export.

EXECUTIVE SUMMARY

Inspection of poultry disease prevention system in Kosovo shows that the system for poultry health protection, as well as records about condition and movement of infectious diseases in Kosovo are rather superficial and unreliable. Poultry production in this country, in spite of good prewar tradition in poultry production, today is almost non-existent. In such circumstances, local farmers usually apply an **ad hoc** system of disease prevention.

There is no reproductive center for producing hatching eggs or any bigger slaughterhouse, which can organize farmers for the continuous production of poultry meat. Small numbers of incubation stations, which are mostly without expert supervision, incubate imported hatching eggs, which are bought in from various countries. Although there are prescribed quarantine measures for hatching eggs and live poultry, until now such measures have not been applied.

Since there are no domestic reproductive flocks, the hatching eggs or day-old chicks are imported from Albania, Italy, Serbia, Bulgaria, Turkey, Greece, Hungary, Germany, Spain and some other countries. This large number and different origin of the commercial poultry makes the epizootic situation in Kosovo complex. The health, i.e. diseases of domestic poultry and also the health of the people must be taken into consideration in justifying poultry disease prevention. Because of that, undertaking of any measures for poultry production stimulation is justifiable only after the verification of the poultry stock and determination of their health condition, which can be done by performing a section of the legally treated diseases – Newcastle disease (ND), highly pathogenic avian influenza (AI) and poultry salmonella (typhus and paratyphoid infection).

This assignment worked with the Ministry of Agriculture and the Veterinary Service to put in place a poultry disease control system and the disease testing laboratories to implement the system.

FIELD ACTIVITIES TO ACHIEVE PURPOSES

Health and technological control of poultry production process

Although Kosovo has long prewar tradition in intensive poultry production, especially in production of broiler meat, its realization and supervision are based on obsolete guidelines. A complete survey was undertaken by the consultant and KCBS of the poultry disease detection and prevention system in Kosovo. The system has completely broken down since the war and no system has been put back into place.

One of the reasons for this is the lack of appropriate diagnostic laboratory. Since June 2005 the Veterinary Institute of Kosovo has had a laboratory but no disease testing program has been put in place. KCBS assisted in the laboratory staff training in order to get the laboratory functioning. A successful training of two experts in the corresponding Laboratory of Veterinary Faculty in Sarajevo (BiH) on diagnosis of three diseases (Newcastle diseases, Avian Influenza and Poultry Salmonella) was done in June 2005.

Poultry health protection

The consultant helped implement through MAFRD a complete system for the detection and prevention of poultry diseases in Kosovo. The consultant worked directly with the MAFRD

and commercial farmers to implement this system. A program for the collection and preparation of samples for diagnoses of Newcastle disease, Avian Influenza (AI) and poultry salmonella was undertaken. Consultations and practical trainings for authorized veterinarians and veterinary inspectors from the entire territory of Kosovo were held. The topics covered were the position, role and importance of the authorized field veterinary institutions in the recognition, monitoring and control of poultry diseases. After the introductory lectures about these three diseases with the review of the practical aspects of their control, individual training was done on the taking, selecting and storage of diagnostic samples, and coordination with the veterinary inspection service for their timely delivery of samples to the Kosovo Laboratory for the poultry disease diagnosis.

In cooperation with the regional veterinary inspectors and field veterinarians the complete diagnostic material for the monitoring of Newcastle disease, HPAI and poultry salmonella was collected from 17 flocks.

The sampling and laboratory tests were performed as a part of pilot research in Kosovo. The region selected was where in 2003 there was an outbreak of Newcastle disease. Complete material (blood serums, beddings, feces, feed, and water) was collected, processed and delivered to the laboratory according to World Organization for Animal Health [WOAH] procedures. After comprehensive preparations the laboratory of Veterinary Institute of Kosovo performed diagnostic testing of the immunological status of the chicken flocks for all three diseases using the serological test of inhibition haemagglutination (IHA test). The tests were performed in accordance to WOAHA rules by the laboratory experts - Beqir Huljaj and Betim Berisha, who previously completed the training in the laboratory of the Poultry Institute of Veterinary Faculty in Sarajevo, BiH.

The results of serological IHA tests of 540 layers blood serums from the territory of Djakovica showed that all individuals are immune, and that the antibodies are unusually high. This reaction indicates contact of individual chickens with the pathogenic that caused the Newcastle disease in 2003.

A number of trainings were held at the Veterinary Institute of Kosovo. The field veterinary inspectors were taught about the significance of determination, collection and timely delivery of diagnostic material from the quarantine facilities to the laboratory for testing. With these trainings the practical phase of implementation of laboratory testing and quarantine measures were implemented.

Results of the systematic poultry control of the three sanctioned diseases in Djakovica region

The results of the serological testing with IHA test in 17 production flocks (chickens and commercial egg layers) show that poultry in Skivijan are in an endangered epizootic area that has high antibodies against virus of Newcastle disease. High antibodies are probably the result of contacts with pathogenic wild virus which is still present in this area after the epizootic in 2003. In five of the 17 tested flocks, BSA test determined the presence of antibodies against causative agent of poultry typhus.

The consultant assisted the MAFRD to implement a complete monitoring and control measures for Newcastle disease and salmonella in all farms and yards in Skivijan area. The base for this can be found in the Law on Veterinary medicine and administrative resolution IV/2005. MAFRD performed a complete double disinfection of the facilities and equipment. A biological break of at least three (3) months has been put in place in this area. Prior to each disinfection, a complete mechanical cleaning and triple sanitary cleaning of the facilities and equipment with hot water under pressure and with the usage of detergents was

performed. During biological break perform complete eradication and disinfections in and around facilities in a farm.

Double vaccination of poultry (in spring and fall) is obligatory and will be performed without exception in all yards within epizootic endangered area. Vaccines prepared from the vaccine strain La Sota will be used. The vaccines will be in the form of spray, in drinking water or by instilling in eye or nose.

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE ACTIVITY

The following recommendations are made for future activities:

- Ensure continuous work of laboratory for the poultry disease diagnostics.
- Start process of certification of domestic egg and poultry meat producers.
- Strengthen the influence of poultry association for giving of the license for the import of live poultry, poultry products and animal feed.
- Ensure formal inspection of imported poultry and poultry products.

KOSOVO

CLUSTER AND BUSINESS SUPPORT PROJECT

Poultry Disease Identification and Prevention Program and Diagnostic Laboratory

Annexes

Annex 1 – Sampling Methods

Annex 2 – Forms for the Veterinary Service for poultry disease control

Ministry of Agriculture, Forestry and Rural Development

Town:
Record number:
Date:

Subject: **Report on health control of commercial egg layers**

We inform you that for a flock of (number) commercial egg layers of months, during sampling of diagnostic material, performed for the first, second, third, fourth (circle) control after the moving in facility, farm.....(name and surname of the owner, name of the farm or number of facility) from (place), you can use our health control certificate.

Explanation

Since you acted in accordance to mutually signed Agreement about certification of commercial egg layers health on 2005, and delivered diagnostic material from the above mentioned flock of months for the first, second, third, fourth (circle) control after the moving in the production facility, we could perform diagnostic tests provided by the Law, Regulation books and EU Directives. The results of tested delivered samples confirmed that the commercial egg poultry from the above mentioned flock:

- have active immunity against virus, a causative agent of **Newcastle disease** (fowl pest),
- is free from bacterial causative agents from the **Salmonella** genus, from: *S. enterica* subspecies *enterica* serovar *pullorum*, *S. enterica* subspecies *enterica* serovar *gallinarum*, *S. enterica* serotip *enteritidis*, *S. enterica* serotip *typhimurium*.

Note

This finding, as well as certificate considering the health control are valid only with the above quoted number and age of commercial egg poultry from the flock (name and surname of the owner, name of the farm, number of the facility – as in report preamble), and it cannot be used for any other flocks, regardless of the origin, location, number and age of laying poultry. **Any abuse presents a criminal offence and is subject to legal sanctions!**

Signature of the authorized person,

Ministry of Agriculture, Forestry and Rural Development

Certificate about permanent health and technological supervision and health control

Commercial egg layers from a farm.....are kept in accordance with appropriate production and technological standards. Management of the commercial eggs production process is performed by the highly educated skilled personnel under the supervision of the experts

Programs of preventive health care for the flock of laying poultry of this farm are prepared by the experts, and the organization and their realization is performed by the experts of their own veterinary and technological service.

Continuous control of preventive health measure implementation on appropriate diagnostic material in accordance with HACCP standards is performed in the laboratory for the poultry disease diagnostic of Kosovo Veterinary Institute.

Controlled live commercial egg poultry from a farm have satisfying active immunity against the causative virus of **Newcastle disease** (fowl pest) and are free free from bacterial causative agents from the **Salmonella** genus, from: *S. enterica* subspecies *enterica* serovar *pullorum*, *S. enterica* subspecies *enterica* serovar *gallinarum*, *S. enterica* serotip *enteritidis*, *S. enterica* serotip *typhimurium*.

Signature of the authorized person for certificate issuing

Ministry of Agriculture, Forestry and Rural Development

Town

Record number:

Date:

Subject: **Report on health control of broiler chickens**

We inform you that you can use our health control certificate during the sampling of diagnostic material for the broiler chickens 30 days old, which are currently fattened in the facility, farm..... (name and surname of the owner, name of the farm or number of facility) from (place).

Explanation

Since you acted in accordance to mutually signed Agreement about certification of broilers health on 2005, and delivered diagnostic material from the above mentioned flock of 30 days old broilers, we could perform diagnostic tests provided by the Law, Regulation books and EU Directives. The results of tested delivered samples confirmed that the broilers from the above mentioned flock:

- have active immunity against virus, a causative agent of **Newcastle disease** (fowl pest),
- are free from bacterial causative agents from the **Salmonella** genus, from: *S. enterica* subspecies *enterica* serovar *pullorum*, *S. enterica* subspecies *enterica* serovar *gallinarum*, *S. enterica* serotip *enteritidis*, *S. enterica* serotip *typhimurium*.

Note

This finding, as well as certificate considering the health control are valid only with the above quoted number and age of broiler chickens from the flock (name and surname of the owner, name of the farm, number of the facility – as in report preamble), and it cannot be used for any other flocks, regardless of the origin, location, number and age chickens. **Any abuse presents a criminal offence and is subject to legal sanctions!**

Signature of the authorized person,

Ministry of Agriculture, Forestry and Rural Development

Certificate about permanent health and technological supervision and health control

Broiler chickens from a farm.....are fattened in accordance to appropriate production and technological standards. Management of the commercial eggs production process is performed by the highly educated skilled personnel under the supervision of the experts

Programs of preventive health care for the fattening flocks of this farm are prepared by the experts, and the organization and their realization is performed by the experts of their own veterinary and technological service.

Continuous control of preventive health measure implementation on appropriate diagnostic material in accordance with HACCP standards is performed in the laboratory for the poultry disease diagnostic of Kosovo Veterinary Institute.

Controlled live broiler chickens from a farm have satisfying active immunity against the causative virus of **Newcastle disease** (fowl pest) and are free free from bacterial causative agents from the **Salmonella** genus, from: *S. enterica* subspecies *enterica* serovar *pullorum*, *S. enterica* subspecies *enterica* serovar *gallinarum*, *S. enterica* serotip *enteritidis*, *S. enterica* serotip *typhimurium*.

Signature of the authorized person for certificate issuing

Ministry of Agriculture, Forestry and Rural Development

Quarantine – Day-old chicks /breeder flock/Day-old chicks/fattening and brooding/

Item 1

Quarantine duration 21 day and it counts from the last delivery arrival

Item 2

During the quarantine period of shipment /chickens died during the transportation, transportation boxes bedding (in total 5 samples per flock) /, death of the chickens during quarantine, runt chickens, it will be tested on the presence of:

- causative agents from *Salmonella* genus; *S.enterica subsp. enterica* serovar *pullorum* i *S.enterica subsp. enterica* serovar *gallinarum*, *S.enterica* serotype *enteritidis* i *S.enterica* serotype *typhimurium*.
- Blood serums of day-old chicks will be tested on the presence of antibodies of fowl pest/Newcastle disease/ poultry influenza / highly pathogenic avian influenza/, *Mycoplasma gallisepticum*, *Mycoplasma synoviae*.
- Samples of chickens swabs, nasal swabs, conjunctive/ on the causative agents from the genus *Chlamydophila* /*C.psittaci*/.

Ministry of Agriculture, Forestry and Rural Development

QUARANTENE – CHICKEN HATCHING EGGS

Quarantine duration 21 day and it counts from the last delivery arrival

During the quarantine period of shipment / fresh hatching eggs – 60 samples, samples of hatchery waste and culled chicken after hatchery /, it will be tested on the presence of:

- causative agents from *Salmonella* genus; *S.enterica subsp. enterica* serovar *pullorum* i *S.enterica subsp. enterica* serovar *gallinarum*, *S.enterica* serotype *enteritidis* i *S.enterica* serotype *typhimurium*.

- Blood serums of day-old chicks will be tested on the presence of antibodies of fowl pest/Newcastle disease/ poultry influenza / highly pathogenic avian influenza/,
Mycoplasma gallisepticum, *Mycoplasma synoviae*.

- Samples of chickens swabs, nasal swabs, conjunctive/ on the causative agents from the genus
Chlamydophila /C.psittaci/.

Ministry of Agriculture, Forestry and Rural Development

QUARANTENE - 18 weeks old chickens

Quarantine duration 21 day and it counts from the last delivery arrival

During the quarantine period of shipment /chickens died during the transportation, collective samples of poultry feces/, it will be tested on the presence of:

- causative agents from *Salmonella* genus; *S.enterica subsp. enterica* serovar *pullorum* i *S.enterica subsp. enterica* serovar *gallinarum*, *S.enterica* serotype *enteritidis* i *S.enterica* serotype *typhimurium*.

- Blood serums of day-old chicks will be tested on the presence of antibodies of fowl pest/Newcastle disease/ poultry influenza / highly pathogenic avian influenza/,
Mycoplasma gallisepticum, *Mycoplasma synoviae*.

Ministry of Agriculture, Forestry and Rural Development

Quarantine – Day old turkey chicks / breeder flock/Day-old turkey chicks /fattening turkey chicks /

Item 1

Quarantine duration 21 day and it counts from the last delivery arrival

Item 2

During the quarantine period of shipment /turkey chicks died during the transportation, transportation boxes bedding -in total 5 samples per flock, death of the turkey chicks during quarantine, runt turkey chicks/, it will be tested on the presence of:

- causative agents from *Salmonella* genus; *S.enterica subsp. enterica* serovar *pullorum* i *S.enterica subsp. enterica* serovar *gallinarum*, *S.enterica* serotype *enteritidis* i *S.enterica* serotype *typhimurium*.
- Blood serums of day-old turkey chicks will be tested on the presence of antibodies of fowl pest/Newcastle disease/ poultry influenza / highly pathogenic avian influenza/, *Mycoplasma gallisepticum*, *Mycoplasma synoviae*.
- Samples of turkey chickens swabs, nasal swabs, conjunctive/ on the causative agents from the genus *Chlamydophila* /*C.psittaci*/.

Ministry of Agriculture, Forestry and Rural Development

QUARANTINE – TURKEY HATCHING EGGS

Quarantine duration 28 day and it counts from the last delivery arrival

During the quarantine period of shipment / fresh hatching eggs – 60 samples, samples of hatchery waste and culled turkey chicks after hatchery /, it will be tested on the presence of:

- causative agents from *Salmonella* genus; *S.enterica subsp. enterica* serovar *pullorum* i *S.enterica subsp. enterica* serovar *gallinarum*, *S.enterica* serotype *enteritidis* i *S.enterica* serotype *typhimurium*.
- Blood serums of day-old turkey chicks will be tested on the presence of antibodies of fowl pest/Newcastle disease/ poultry influenza / highly pathogenic avian influenza/,
Mycoplasmu gallisepticum, *Mycoplasmu synoviae*.
- Samples of turkey chickens swabs, nasal swabs, conjunctive/ on the causative agents from the genus
Chlamydophila /C.psittaci/

SAMPLING METHODS

Attachments

SAMPLING METHODS

⊙ Taking of a sample - starting point for the laboratory investigation of an animal disease,

Purposes

- disease diagnosis,
- disease surveillance,
- health certification or
- for monitoring the response to treatment or vaccination

● Collected samples should be:

- appropriate,
- adequate in number and amount,
- carefully packaged, labelled and
- transmitted to the lab by the fastest practicable method,

LETTER OR SUBMISSION FORM

All samples should be accompanied by a letter or submission form, which includes:

- name and address of owner/occupier where disease occurred, with telephone and fax numbers
- name, postal and e-mail address, telephone and fax numbers of the sender
- the relevant history, (should be placed in a plastic envelope on the outside of the shipping container)
- the species, breed, sex, age and identity of the animals sampled
- diseases suspected and tests requested
- list of samples submitted with transport media used

Marking instruments should be able to withstand the condition of use, i.e. being wet or frozen. Pencil has a tendency to rub off containers and labels attached to plastic will fall off when stored at -70°C .

COLLECTION OF SAMPLES

FROM LIVE BIRDS

- Blood, plasma or serum**
 - ✓ should be taken as cleanly as possible, by venipuncture or by heart puncture,
 - ✓ with anticoagulants (EDTA, heparin...) for direct examination of causal agents (gentle thorough mixing as soon as possible),
 - ✓ without anticoagulants (for serology, clotted sample),
 - ✓ sera may be stored up to 7 days at 4°C, for longer periods?

- Faeces**
 - ✓ at least 1 g of freshly voided faeces should be collected. An alternative and sometimes preferable method is to take swabs from the cloaca,
 - ✓ faeces are best stored and transported at 4°C.

- Skin and feather**
 - ✓ if possible collect 1 g of affected epithelial tissue (deep skin scrapings),
 - ✓ vesicular fluid should be sampled where unruptured vesicles are present,
 - ✓ feather tips (Marek's disease).

- Eggs**
 - ✓ at least 10 eggs per flock of birds (recommended 30 eggs per flock),
 - ✓ eggs (stored and room temperature up to 21 days).

FROM DEAD BIRDS

- Tissue (in general)***
 - ✓ lungs
 - ✓ air sacs
 - ✓ trachea
 - ✓ heart
 - ✓ liver
 - ✓ spleen
 - ✓ kidney
 - ✓ pancreas
 - ✓ proventriculus, intestine, caecal tonsil ..
 - ✓ other obviously affected organs,

ENVIRONMENTAL AND FEED SAMPLING

Reasons for sampling

- ✓ to monitor hygiene, or
- ✓ as part of a disease enquiry.

Environmental samples are commonly taken from

- litter or bedding (if possible, voided faeces or urine),
- the surface of ventilation ducts, and
- feed troughs and drains .

This kind of sampling is particularly important in hatcheries and slaughterhouses

- animal feed (eg. in troughs or bulk containers)
- water (eg. in troughs, drinkers, header tanks or from the natural or artificial supply)

SAMPLE SIZE

For clinical disease collected samples should be representative

For developing a programme of surveillance and monitoring for animal health - use some general statistical sampling methods or by the use of a program (FreeCalc) available off the internet:

http://www.ausvet.com.au/content.php?page=res_software#freecalc

SALMONELLOSIS

OIE - Salmonellosis is an infectious disease of humans and animals caused by organisms of the two species of Salmonella (Salmonella enterica and S. bongori).

- Legal basis council Directive 92/117/EEC concerning protection measures against certain zoonoses and zoonotic agents**
 - samples for bacteriological tests should be collected as aseptically as possible and before any antibiotic treatment has commenced.**
 - preferably samples should be collected during the acute phase of the disease or as soon as possible after death.**
 - in the case of intensively housed poultry flocks, environmental samples, such as litter and dust or drag or boot swabs from floor surfaces, may be the most cost-effective way to identify infected flocks.**
 - representative number of sick or recently dead birds to the lab, if that is possible**
 - avoid cross-contamination of samples during transit and at the lab**
-
- The samples to be taken must comprise:**
 - day-old chicks, samples from the internal linings of the boxes in which the chicks were delivered to a holding and from the carcasses of chicks found to be dead on arrival,**
 - pullets at four weeks of age or two weeks prior to entering the laying phase, pooled faeces samples made up of separate samples of fresh faeces each weighing not less than 1 g,**
 - adult breeding flocks, must be sampled at least every two weeks during the laying period. The samples to be taken shall consist of:**
 - a pooled faeces sample made up of separate faeces samples, each weighing not less than 1 g,**
 - from the hatchery - pooled samples of meconium taken from 250 chicks hatched from eggs supplied to the hatchery from each breeding flock, or samples of carcasses of 50 chicks which are dead in the shells of eggs or which have been hatched from eggs supplied to the hatchery from each breeding flock.**

AVIAN INFLUENZA

Legal basis

Council Directive 92/40/EEC

- 'Avian influenza' means an infection of poultry caused by any influenza A virus which has an intravenous pathogenicity index in six-week-old chickens greater than 1.2 or any infection with influenza A viruses of H5 or H7 subtype for which nucleotide sequencing has demonstrated the presence of multiple basic amino acids at the cleavage site of the haemagglutinin**

☞ **Sample**

- from live birds - should include both tracheal and cloacal swabs, or the collection of fresh faeces may serve as an adequate alternative.**
- from dead birds - should include intestinal contents (faeces) or cloacal swabs and oro-nasal swabs, samples from lungs trachea, air sacs, intestine, spleen, kidney, brain, liver and heart may also be collected and processed either separately or as a pool.**
- blood samples should be taken from all birds if the flock size is less than 20 and from 20 birds from larger flocks,**
- the blood should be allowed to clot and serum removed for testing**

NEWCASTLE DISEASE

Legal basis

Council Directive 92/66/EEC:

- ' Newcastle disease ' means an infection of poultry caused by any avian strain of the paramyxovirus 1 with an intracerebral pathogenicity index (ICPI) in day-old chicks greater than 0,7.
- Samples

From sick birds:

- Cloacal swabs (or faeces), and
- tracheal swabs ,

From recently dead birds:

- faeces or intestinal contents,
- brain tissue, trachea, lungs, liver, spleen, and
- other obviously affected organs,

LINKS

- × http://www.oie.int/eng/normes/mcode/en_chapitre_2.1.1.htm (CHAPTER 2.1.1. CRITERIA FOR LISTING DISEASES)û
- × http://www.oie.int/eng/normes/mcode/en_chapitre_2.7.5.htm (CHAPTER 2.7.5. FOWL TYPHOID AND PULLORUM DISEASE)
- × http://www.oie.int/eng/normes/mmanual/A_00011.htm (CHAPTER I.1.1. SAMPLING METHODS)
- × http://www.oie.int/eng/normes/mcode/en_chapitre_3.4.1.htm#chapitre_3.4.1. (HYGIENE AND DISEASE SECURITY PROCEDURES IN POULTRY BREEDING FLOCKS AND HATCHERIES)
- × http://www.who.int/csr/disease/avian_influenza/en/
- × <http://www.who.int/csr/disease/influenza/influenzanetwork/en/>
- × <http://www.wpro.who.int/wr/chn/>
- × http://www.oie.int/eng/en_index.htm