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AVIAN INFLUENZA PREVENTION IN THE UNITED ARAB EMIRATES

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KEY WORDS

Avian Influenza – Prevention – Surveillance - AI Action Plan - Screening plan - United Arab Emirates

ABSTRACT

The threat of Avian Influenza issue has reached the Middle East after the massive outbreaks in Asia. In order to prevent and to be prepared in case of an AIV outbreak in the United Arab Emirates, the Emirate of Abu Dhabi started to develop a comprehensive Avian Influenza Prevention Plan in August 2005. This was followed by an Avian Influenza screening plan including ways and means of laboratory testing and approval of FAO experts. Special training courses on AIV sampling and screening were held in the Abu Dhabi Falcon Hospital for veterinary staff of ministries and municipalities of the Abu Dhabi Emirate as well as the other emirates. These prevention and screening plans were translated into action by organizing sampling and screening teams. Moreover, these plans were adopted by other emirates and implemented nation-wide. So far, no Avian Influenza cases have been reported in the United Arab Emirates, however, the country is now very well prepared to tackle any outbreak in the future. The setting up of the Prevention and Screening Plan can serve as an example for other countries in the Middle East region.

1 INTRODUCTION

Avian Influenza is a viral infection caused by Influenzaviridae which occurs in two forms, namely the highly pathogenic form with a

mortality rate of almost 100% and the low pathogenic form. Due to the fact that the LPAI (=Low Pathogenic Avian Influenza) are well-known to be able to mutate to HPAI (=Highly Pathogenic Avian Influenza), they should be also considered in the compulsory surveillance and control measures for AIV. This virus is affecting mainly birds, but can be transmitted to humans, pigs and cats as well. This implicates that an action plan can not only take birds into consideration, but also humans and other animals. However, Avian Influenza virus is mainly a poultry disease. The spread of the virus mainly occurs through legal and illegal poultry trade (OIE 2006) as well as by fomites such as contaminated shoes, equipment and vehicles (FAO 2006). The virus can survive and spread in water and is often found in reservoirs strictly tied to water (e.g. ducks). Wild birds pose a reservoir for the AI virus, but are not a major transmission factor. However, raptors (e.g. falcons, hawks) can be infected by eating infected prey such as ducks thus leading to a secondary AI infection (FAO 2006). So far, the United Arab Emirates (UAE) have been spared the threat of Avian Influenza in domestic poultry and wild migratory birds. Nevertheless, this country was aware of the risk of an AIV outbreak and set up immediate measures for prevention starting from August 2005.

2 CURRENT SITUATION OF AVIAN INFLUENZA IN HUMANS AND BIRDS

2.1 Avian influenza cases in birds and humans worldwide

The number of humans with Avian Influenza virus started with 3 deaths in 2003 and 32 deaths out of 46 infected persons in 2004.

Table 1. Avian Influenza infections and deaths in humans

Region	2003		2004		2005		2006	
	cases	deaths	cases	deaths	cases	deaths	cases	deaths
Asia	3	3	46	32	89	37	58	48
Africa	0	0	0	0	0	0	1	0
Middle East	0	0	0	0	0	0	30	13
China/ Caucasus	1	1	0	0	8	5	20	13
Total	**4**	**4**	**46**	**32**	**97**	**42**	**109**	**74**

(WHO 2006a)

2.2 Avian influenza cases in birds and humans in Middle East and Arab region

By regarding wild migratory birds as a primary source for AI transmission, other more important factors will be neglected in the Middle East region. One important factor for a possible spread of AIV in the Middle East region is the illegal trade in wild/cage birds from places such as Mongolia and the Caucasus region. Other factors are uncontrolled import of poultry and poultry products, lack of adequate quarantine measures and routine screening measures as well as lack of consistent measures in case of an AI outbreak and lack of investigations in AI outbreaks. Unclear communication or non-reporting of suspected cases can also contribute to the disease spreading (OIE 2006). The AIV infection spread from Asia to Middle East and Europe (table 2).

Table 2. Avian Influenza infections and deaths in birds according to regions

Country	Year	Susceptible	Cases	Death	Destroyed
Asia	February - August 2006	181 902	7 832	6 543	1 284 914
Africa	February -June 2006	232 134	87 687	87 511	91 112
Middle East	February - August 2006	361 254	202 662	20 042	334 178
Russia / Caucasus	January - March 2006	532 000	1	1	828 000
Europe	February - June 2006	830 481	64 031	25 451	130 033
Total		**2 137 771**	**362 213**	**139 548**	**2 668 237**

3 PREVENTIVE MEASURES AND SURVEILLANCE OF AVIAN INFLUENZA

3.1. Preventive measures and surveillance of avian influenza worldwide

The most important factors for the management of the HPAI are surveillance, improved biosecurity and enhanced hygiene at production level in the poultry industry as well as reduced contact between wild and domestic birds. Moreover, rapid response to disease outbreaks is crucial. In this context, WHO (=World Health Organization), FAO (=Food and Agriculture Organization of the United Nations) and OIE (=The World Organization for Animal Health) have provided a strategic framework for countries to prevent and control the Avian Influenza threat (FAO and OIE 2005).

WHO had established an AIV diagnosis and surveillance manual (WHO 2002) and OIE has set up guidelines for the surveillance of Avian Influenza in their Terrestrial Animal Health Code (OIE 2005). This includes an early warning system, testing of animals, surveillance strategies including guidelines for clinical, virological and serological surveillance in non-vaccinated as well as vaccinated populations. Moreover, these guidelines provide information about the Avian Influenza free status as well as clearance after an outbreak. They also give information about the use and interpretation of Avian Influenza detection tests.

AIV monitoring and testing of clinically normal migratory birds revealed negative results for H5N1. In China more than 13,000 wild birds were tested and 6 were confirmed positive for AIV whereas 3% had antibodies to H5N1. More than 100,000 tests worldwide had been performed for AIV since the last decade. Thousands of migratory waterfowl tested in New Zealand, Australia, and Canada with negative results for H5N1. In Europe, a wild bird monitoring programme was conducted in, e.g. Switzerland.

3.2 Preventive measures and surveillance of avian influenza in Abu Dhabi and UAE

3.2.1 Political and financial support

Avian Influenza was not an issue in the UAE until August 2005 when a report about the potential threat of falcons and disease transmission to falconers in the Middle East was published (MULLER 2005). At the end of August, a surveillance and monitoring plan was drafted and submitted to the Environment Agency Abu Dhabi. This started off the establishment of the so-called "Avian Influenza Action Plan". By mid September 2005, this "Avian Influenza Action Plan" was prepared by representatives of the Environment Agency Abu Dhabi in consultation with key organisations from Abu Dhabi Emirate and Ministry of Agriculture and Fisheries (now Ministry of Environment and Water) representatives from Abu Dhabi, Dubai and Sharjah. The Avian Influenza Action Plan was reviewed by experts of FAO. The way for an active AIV prevention and preparedness was paved when on September 26th 2005 the Avian Influenza Action Plan was approved by the Abu Dhabi Executive Council. The council allocated AED 35 million for AIV prevention and preparedness and established the National Emergency Committee for Avian Influenza (NEC-AI). The responsibility of the NEC-AI was the implementation and coordination of the Avian Influenza Action Plan in each emirate as well as to discuss the possibility of a

regional cooperation through GCC (NEC-AI 2005). The Avian Influenza Action Plan was adopted by the other emirates after being implemented in Abu Dhabi Emirate. A complete structure was put in place to function efficiently in the case of AIV outbreaks in humans such as availability of isolated wards in hospitals, military areas and schools.

3.2.2 General preventive measures and surveillance

The precautions for tackling the threat for birds and humans through the Avian Influenza virus as well as other infectious diseases should go in two directions. Due to the imminent threat of a global Avian Influenza outbreak, immediate prevention measures had to be put in place in the Abu Dhabi Emirate and on a federal level plans for disease prevention, surveillance and emergency response. Moreover, due to the fact that infectious diseases of birds and other animals are on the rise, the establishment of a National Institute of Infections Diseases was suggested to act as a specialised center for all aspects of infectious diseases with international standards as a long-term goal.

3.2.2.1 General immediate measures

The first general measure was to set up a list of available avian veterinarians and veterinary staff as well as a list of all veterinary laboratories capable of performing screening tests. Moreover, it was required to establish a list of laboratory tests for routine screening (e.g. rapid tests, ELISA tests, PCR assay, etc) and the availability of stock in Abu Dhabi and UAE. The next requirement to tackle a possible Avian Influenza outbreak was the setting up of a routine screening protocol, disease control protocol and emergency response protocols for Avian Influenza. The existing quarantine facilities had to be reviewed, rearranged and expanded. Other measures to prevent the Avian Influenza disease in UAE were public awareness through posters and brochures as well as massive media coverage through newspapers, radio and TV. Moreover, a special AIV hotline was set up for the general public to ask questions or report birds found dead.

4 SCREENING MEASURES AND EMERGENCY PREPAREDNESS

4.1. Screening measures and emergency preparedness worldwide

In the affected Asian countries, comprehensive prevention programmes including public awareness regarding hygiene were put in place with help of WHO, FAO and OIE. This included safe preparation of food as well as hygienic keeping of poultry and pigs. Emergency preparedness plans were established e.g. in Australia with drill exercises to make the country ready for a possible AIV outbreak.

4.2. Screening measures and emergency preparedness in Abu Dhabi and UAE

4.2.1 Screening measures

In order to assess the current situation in Abu Dhabi and UAE, a profound knowledge about the possible presence of the Avian Influenza virus in the existing bird populations had to be gathered by first screening of poultry farms, breeding centers, private collections, falcons, companion birds, zoological gardens, bird markets and exhibitions after establishing the necessary capacities and scope of work. In this context, random sampling methods were established as well as number of birds for screening. The routine screening of above mentioned birds needed to be performed on a regular basis. Moreover, screening tests and methods had to be unified to ensure the same results to streamline and ensure the quality of the screening process. For this purpose a complete screening for Avian Influenza of all poultry farms, bird shops, backyard poultry, wild migratory birds and other bird collections in the Abu Dhabi Emirate was set up, reviewed and approved by FAO consultants.

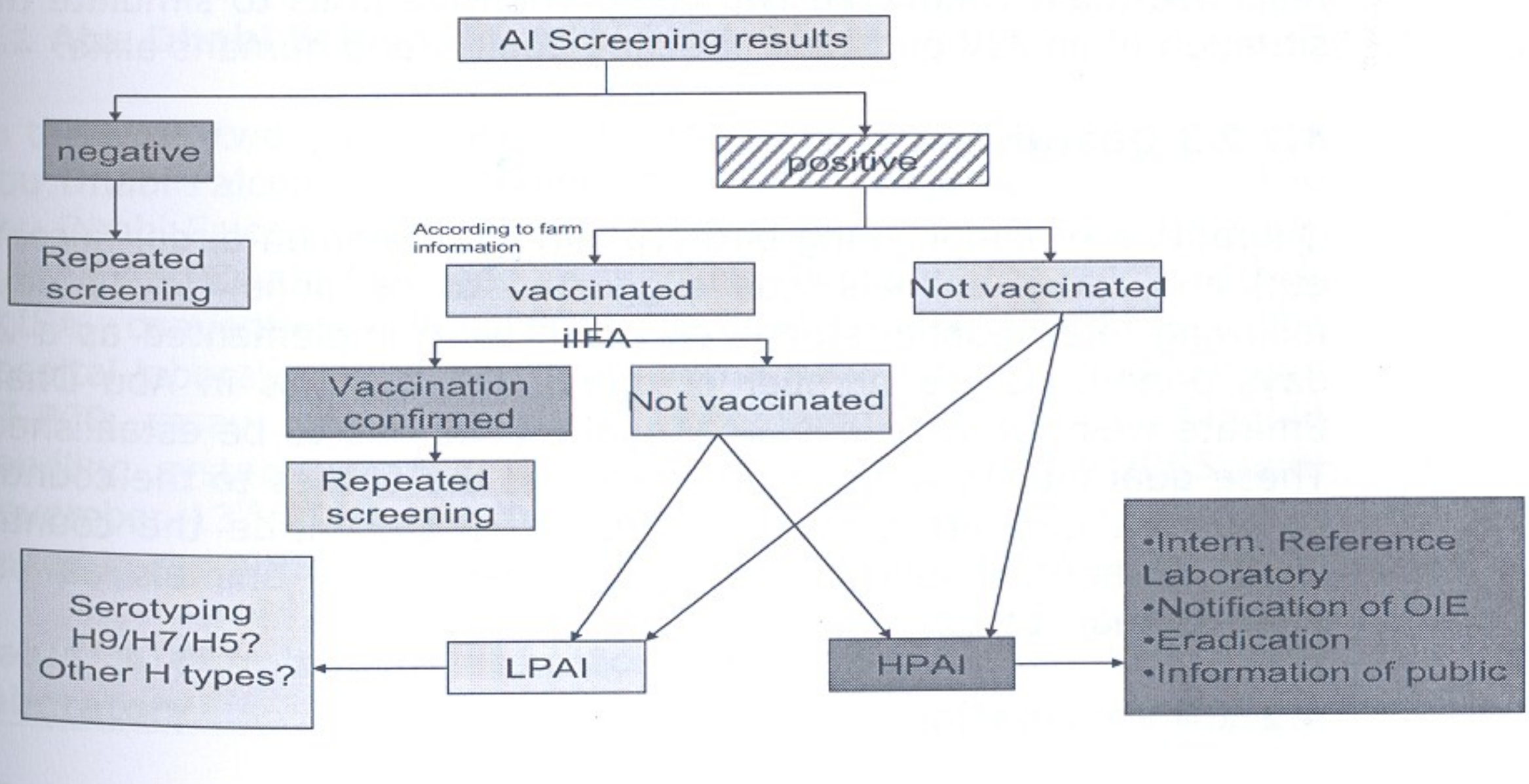
The aim of the screening plan was to evaluate the status of the presence of low pathogenic Avian Influenza (LPAI) and highly pathogenic Avian Influenza (HPAI) virus in the Abu Dhabi Emirate, to establish information about the vaccination status of poultry and to exam AIV infection status for wild migratory birds.

Under the umbrella of the National Secretariat for Avian Influenza a database was set up for tested birds, poultry population and AIV disease status. Due to the highly infectious nature of the HPAI, special controls for eggs and poultry products for human consumption were put in place. Moreover, backyard poultry located

mainly in rural areas were especially taken into consideration due to their exposure to migrating wild birds. The falcon screening was coordinated by the Abu Dhabi Falcon Hospital as representative of the Environment Agency Abu Dhabi. At the Abu Dhabi borders, controls were increased to detect illegal birds and falcons esp. wild falcons from infected regions such as Kazakhstan, Russia, Pakistan by Ministry of Agriculture and Fisheries and CITES authorities.

In the screening plan, the required number of samples was fixed as follows: 40-50 blood samples per holding were required for ducks and geese. For wild birds, a random sampling of 60 birds was required per bird species. In contrast each falcon had to be sampled individually. Bird shops were also included in the sampling; however, the number of samples was established according to the species and number of birds. The sampling range included poultry farms, bird markets, falcons, and wild migratory birds as well as birds entering through airports or borders. The follow up of negative and positive samples were established according to the following diagram 1.

Diagram 1. Screening process in the Abu Dhabi Emirate screening plan



4.2.2 Emergency preparedness

4.2.2.1 Emergency plan for an avian influenza possible outbreak

In case of a positively tested bird, the first step should be immediate killing and disposal of infected and exposed birds

(culling) as well as disposal of eggs and poultry products. All contaminated feed, waste, manure or other contaminated substances had to be destroyed. Moreover, all other domestic birds or mammals can not leave or enter the holding. All pens, vehicles, equipment need to be cleaned and disinfected. Furthermore the establishment of a protection zone of 3 km around the holding with restricted access and disinfection measures was required followed by the establishment of a surveillance zone of 10 km around the holding with restricted access and disinfection measures. In case of an outbreak, the restocking of new birds, bird markets etc should be prohibited as well as the movement of live poultry and other birds within and between countries should be restricted. Despite the fact that the emergency preparedness plan had been put in place, it has not been recorded by WHO yet. WHO records all submitted National Influenza Pandemic plans and has put plans of 21 countries on the internet for easy access (WHO 2006b).

4.2.2.2 Emergency exercises

An emergency response team was formed following the implementation of the Avian Influenza Action Plan and the National Emergency Committee for Avian Influenza. This emergency response team conducted two comprehensive drills to simulate the situation of an AIV outbreak affecting poultry and humans alike.

4.2.2.3 Quarantine

Quarantine of all incoming birds (poultry, companion birds, falcons, etc) and other animals was suggested to be done for 40 days following international standards which were implemented as a 21 days period. As the number of quarantine facilities in Abu Dhabi Emirate was not sufficient, new quarantines had to be established. These quarantines were to be located at the entries to the country to prevent possible disease agents to spread inside the country itself. Owners should pay fees for quarantined animals as per international standard.

4.2.2.4 Vaccination

According to European Community standards, vaccination against Avian Influenza virus should not be performed on a routine basis in UAE. Emergency vaccination in poultry or other birds was considered in case of outbreaks or at a risk of spreading of Avian Influenza.

5 AVIAN INFLUENZA WORK IN THE ABU DHABI FALCON HOSPITAL

Due to the close contact of falcons and humans and, therefore, the high potential danger of disease transmission from falcons to falconers (MULLER 2005), special emphasis was put on the AIV screening of falcons. A routine screening of all falcons when entering the UAE for the first time as well as screening after each hunting trip abroad was introduced. In order to attempt to eradicate infected quarry for the falcons, AIV screening of, especially, wild ducks used for training was performed as well. The Abu Dhabi Falcon Hospital furthermore advised its customers not to travel for hunting trips to Avian Influenza outbreak areas such as Kazakhstan, Russia, and Pakistan and to go instead to places with no reported AIV cases. Moreover, all falcons entering the hospital for routine examinations were screened for AIV on a routine basis. Despite the fact that all cases in the Abu Dhabi Falcon Hospital were negative, there was heightened alert as already cases of infected falcons existed in the neighboring Saudi Arabia (SAMOUR 2005). Due to the frequent traveling for hunting trip of Emirati falconers to Saudi-Arabia the risk of a disease transmission was considerably increased.

5.1 Abu Dhabi Falcon Hospital Laboratory

In the UAE, two main laboratories for Avian Influenza were set up: Abu Dhabi Falcon Hospital Laboratory and Sharjah Laboratory. The Abu Dhabi Falcon Hospital serves as the Avian Influenza Laboratory for the Abu Dhabi Emirate. This includes samples for rapid testing, ELISA, conventional PCR assay as well as RT-PCR assay. The hospital laboratory was equipped with a fully automated ELISA and RT-PCR assay system including automated extractor and liquid handling system to avoid contamination. From August 2005 until November 13th 2006, the total number of samples of 11,417 was tested in the Abu Dhabi Falcon Hospital laboratory (table 3).

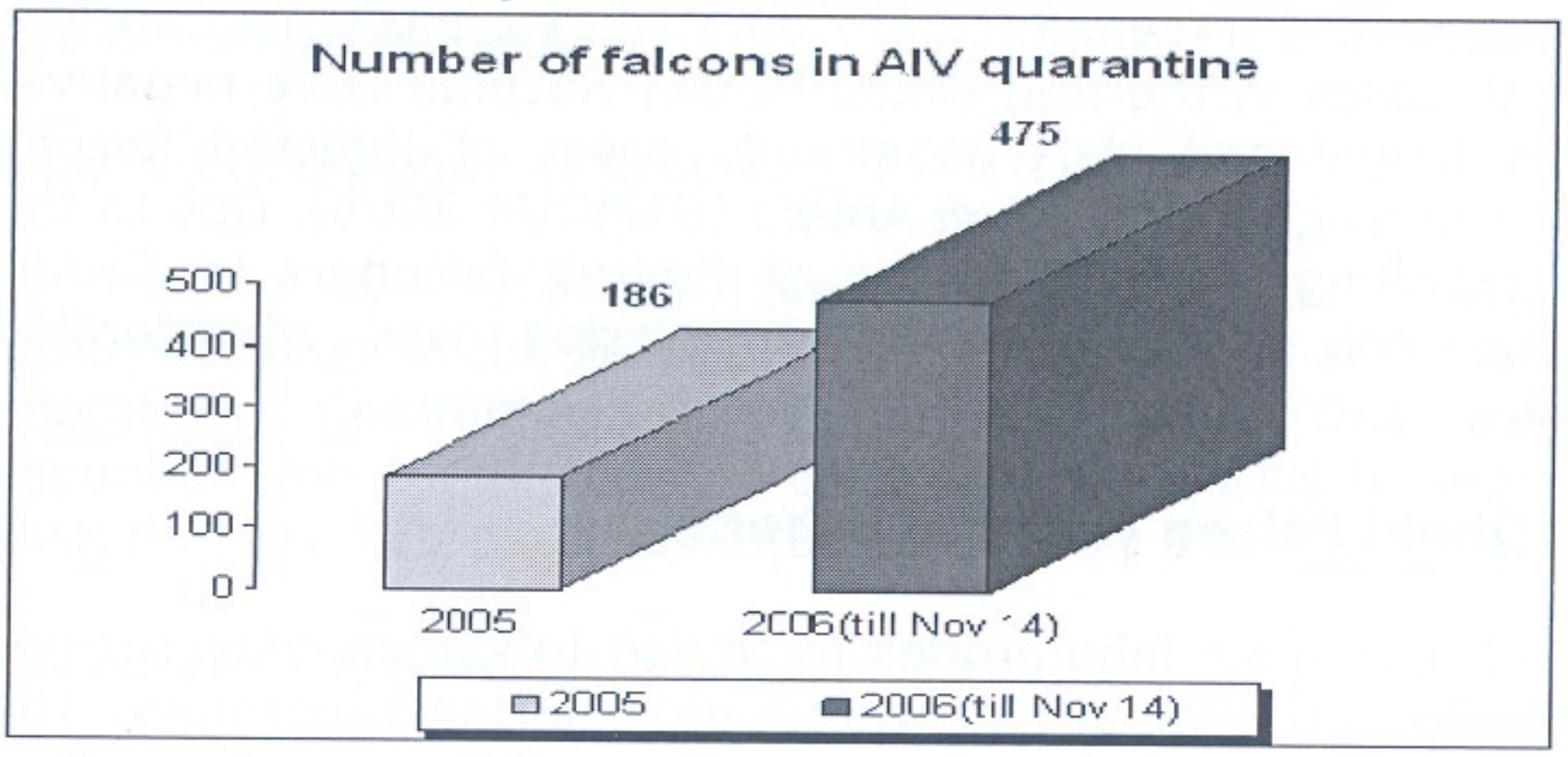
Table 3. Number of laboratory tests for AIV in the ADFH laboratory

Type of tests	2005	till Nov 13th 2006
Rapid AIV test	420	97
PCR-AIV	705	2 937
AIV-Elisa	3 010	2 243
Total	**6 140**	**5 277**

5.2 Abu Dhabi Falcon Hospital Quarantine

The Abu Dhabi Falcon Hospital has a separate quarantine area with veterinary clinic. This hospital quarantine area was used for falcons entering the borders of the emirate by air and by land. The falcons were referred to the quarantine by the ministry staff and stayed in quarantine for Avian Influenza testing as well as the entire quarantine period. This led to 661 quarantined falcons so far (chart 1). Furthermore, the Abu Dhabi Falcon Hospital staff advised several private falcons and bird collections in the establishment of their own quarantines as well as the respective quarantine procedures.

Chart 1. Number of falcons in the AIV quarantine of the Abu Dhabi Falcon Hospital



Abu Dhabi Falcon Hospital Sampling and Screening Training Courses

In order to ensure the same standard and identical method of safety procedures, sample taking and therefore the quality of the samples and their storage, a unified training for all sampling teams was required. Therefore the Abu Dhabi Falcon Hospital as representative of the Environment Agency Abu Dhabi conducted special "Avian Influenza Sampling and Screening Training Courses" for veterinarians and veterinary staff from municipalities and ministries from Abu Dhabi, Dubai, Ras Al Khaimah.

This full day training covered a Power Point presentation with theoretical introduction and explanations about protection measures and sampling techniques. Moreover, special emphasis was placed on practical training with poultry species e.g. chicken, pigeons and quails on protection measures for the sampling team, handling of different bird species, sample taking (blood, swabs) as well as correct sample labeling and storage. Those courses were

established to provide a "train the trainer" effect to reach out to a vast range of veterinary staff in UAE.

6 CONCLUSIONS

The well-planned but very fast-paced method of the UAE to prepare and implement the Avian Influenza surveillance and control can be regarded as an example for other countries in the Middle East region. It has not only implemented surveillance and emergency preparedness for any possible Avian Influenza threat, but also given the political support and backup for this task being a major factor in successful AIV prevention. The plans put in place covered the whole range of issues from surveillance, prevention to emergency response and human health issues. This approach can be implemented by other Middle East countries in a similar way without reinventing the wheel.

However, despite the well-intentioned ideas behind measures such as raising public awareness, the massive media coverage led to panic among the population thus creating massive economic losses for the UAE poultry industry which is in line with the economic poultry situation worldwide. The most important issue in the Avian Influenza prevention is the careful information to the general public in order to prevent backfiring. Furthermore, it is vital to remain alert for any disease symptoms even if an outbreak is not evident in the country or region. The establishment of a National Institute for Infectious Diseases has not been done yet in UAE, but remains an important goal for the future to prevent not only AIV, but other infectious diseases and zoonoses as well.

7 ACKNOWLEDGEMENT

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