

# Labor Awareness to Virus A (H5N1) in Hong Kong's Livestock Industry

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## Abstract

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**Keywords:** Pathogenic in uenza; Anti-H5 antibodies; Sick poultry; Micro neutralization

## Introduction

Hong Kong residents reported 18 instances of avian influenza A (H5N1) infection in 1997; all of the case patients required hospitalization, and six of them passed away [1]. The epidemic happened concurrently with outbreaks of highly pathogenic avian influenza (HPAI) H5N1 among chickens on 3 Hong Kong farms from March through May (1 human case), and among chickens in wholesale and retail markets from November through December (17 human cases). This was the first instance where a subtype of avian influenza A virus was linked to human respiratory illnesses.

According to gene sequence data, the avian H5N1 viruses that were recovered from chickens and people in Hong Kong in 1997 had genomes that were closely related to one another and had a multibasic amino acid motif with HPAI at the location where the HA1 and HA2 genes cleave. A case-control study carried out in January 1998 suggested that the main risk factor for human H5N1 infection was exposure to chicken in retail markets [2]. The genetic and epidemiologic evidence taken together suggested that the human H5N1 infections were caused by numerous, separate poultry-to-human H5N1 viral transmissions [3, 4]. The Hong Kong government recruited staff from a number of agencies to help with the slaughter of chickens and other poultry across the entire territory of Hong Kong due to the possibility of increased human-to-poultry H5N1 virus transmission in the poultry markets. A total of 1.5 million chickens and many hundred thousand additional domestic birds were killed during this 4-day operation that started on December 29. Following the slaughter of the birds, no new human H5N1 cases were found [1].

Prior to the depopulation of poultry, surveillance in Hong Kong's live bird markets revealed that 20% of hens tested from those markets was H5N1 virus positive [5]. However, among poultry workers (PWs),

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**Received:** 15 October 2014; **Accepted:** 20 October 2014; **Editor assigned:** 25 October 2014; **Reviewed:** 30 October 2014; **Revised:** 5 November 2014; **Published:** 10 November 2014

**Citation:** Corman K, et al. (2014) Labor Awareness to Virus A (H5N1) in Hong Kong's Livestock Industry. *Journal of Animal Health and Welfare* 1: 1-10.

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Kong Department of Health, serum samples were examined using the micro neutralization assay using a nonpathogenic avian H5N3 virus A/Duck/Singapore/-Q/F119-3/97 (Duck/Singapore). By using the micro neutralization technique, serum samples were deemed to be positive if anti-H5 titers of less than 80 were obtained.

At the Centers for Disease Control and Prevention (CDC), blood samples that tested positive in the micro neutralization assay underwent a confirmatory Western blot assay [7]. In order to identify IgG antibodies in serum diluted 1:100, this experiment utilized a highly pure baculovirus-expressed HA protein from the A/Hong Kong/156/97 virus (kindly donated by Bethanie Wilkinson, Protein Sciences, Meriden, CT). Anti-H5 antibody was thought to be present in serum samples that tested positive in the micro neutralization assay and Western blot [6].

### **Statistical analysis**

Not all PW serum samples that were positive in the micro neutralization testing at the CDC could be examined by Western blot due to a lack of resources. So, a random sample of micro neutralization-positive serum from the 15–29, 30–44, and 45–59 age groups was chosen for Western blot analysis. We used a nested unmatched case control

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H5N1 viruses, the HI test is less accurate than the micro neutralization assay [6]. When looking for antibodies in additional mammalian species infected with an avian H2N2 virus [13] obtained a similar finding.

Experimentally infected hens succumbed to a quickly progressing, lethal sickness brought on by the H5N1 HPAI viruses that were isolated from both humans and chickens in Hong Kong [2]. The heart's myocytes, myeloid inflammatory cells, and vascular endothelial cells are where the HPAI H5N1 viruses reproduce most frequently.

Findings of our study, which discovered a connection between harboring anti-H5 antibodies and slaughtering and preparing poultry for restaurants, tasks that require very close contact with poultry, are supported by the pathophysiology of HPAI.

The PW study had the drawback of just having one serum sample taken. This means that the exact moment of H5 virus infection cannot be predicted. It's probable that past exposure to a related H5 virus led to the anti-H5 antibody found in at least some PWs. Prior to the depopulation of poultry, viral surveillance in retail markets detected H5N1 viruses from 20% of chickens tested and from 2.4% and 2.5% of ducks and geese, respectively [5]. The possibility still exists that PWs may have been shielded from subsequent infection or severe disease with the HPAI H5N1 virus during the 1997–1998 pandemic by an earlier subclinical or undetected H5 virus infection.

The investigation of GWs gave researchers a rare chance to look into a group that had experienced brief but extensive exposure to birds affected with the H5N1 virus. One person had a seroconversion that was recorded. First serum samples from eight additional GWs had anti-H5 antibody results that were favourable. After the first day of the chicken depopulation, 8 to 11 loss of price

