

# Behavioural changes in relation to risk perception and prevention of avian and human influenza in Hong Kong, 2006 to 2010

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## KEY MESSAGES

1. Declines in buying live poultry have not been matched with declines in touching when buying.
2. Continued buying of live poultry was associated with declines in perceived risk of influenza A/H5N1 infection.
3. Most food preparation and hand hygiene practices were endorsed by >95% of respondents.
4. Population levels of trust in government and media messages about influenza A/H5N1 were unchanged, but there was an apparent increase

in the degree of trust in informal sources of information, such as friends and peer opinion, and behaviour in dictating appropriate protective responses against influenza A/H5N1.

Hong Kong Med J 2014;20(Suppl 4):S26-8

RFCID project number: 09080732

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## Introduction

According to two population surveys of poultry exposure and risk perception in Hong Kong, live poultry exposures among the Hong Kong population through live poultry purchases decreased by >60% (1.1 million person-chicken exposures annually) between 2004 and 2006. This was due to the reduction of imports and, to a lesser extent, reduced touching during purchases, reflecting impacts of public health education messages.<sup>1,2</sup> Periodic isolation of avian influenza viruses from live chickens has prompted changes in policies such as a monthly rest day in local wet markets when all birds are sold or slaughtered and the market is emptied for disinfection (from 2001), an increase to two rest days per month (from 2003), and most recently no live poultry being kept overnight at retail outlets (since June 2008).<sup>3</sup> The plan to stop all direct sales of live poultry in wet markets and introduce central slaughtering for chickens appears to have been shelved.

Although policy can ameliorate environmental risk (defined as the external risk to individuals), risk perception is more important for motivating health behavioural change, which may reduce risks secondary to personal lifestyle choices.<sup>4</sup> Perceived risk may decline as minimising human-chicken contact decreases peoples' perceived need to take preventive action. This may lead to increased population risk (based on the law of unintended consequences) of other influenza and upper respiratory viruses due to reduction in preventive behaviours. Common preventive measures for avian influenza such as personal hygiene, social

distancing, and health services utilisation are also important preventive measures for other infectious diseases, including human influenza and other upper respiratory diseases.<sup>5</sup> Therefore, it is important to understand how policies impact on behaviour. We conducted a follow-up survey in 2010 and compared findings to those from our previous studies of avian influenza risk perception and live poultry exposure in 2006.<sup>1</sup>

## Methods

This study was conducted from December 2009 to August 2010. Telephone survey of 1613 of the 1760 respondents in the 2006 survey<sup>1</sup> who had agreed to be re-contacted was repeated. Respondents completed a telephone survey of mostly Likert-type categorical questions about perceived risk and worry about influenza A/H5N1, adequacy of government response and practice, effectiveness and need of personal hygiene behaviours, as well as household purchasing of live poultry and touching birds during buying. The prevalence of buying and touching in 2010 was compared with that in 2006, as were perceived risk, worry, and protective hygiene practices. Descriptive and multivariate statistics were used to compare the two datasets.

Outcome measures included: (1) live poultry exposure, which was assessed using a series of questions about personal and household buying of live poultry over the past 3 months, touching during purchase, and frequency of purchase<sup>1</sup>; (2) influenza risk perception, worry, and vaccination behaviour, which was assessed using nine questions,<sup>1</sup> which

were either binary (have you had vaccinations?) or in categorical Likert scales; (3) personal hygiene practices and their perceived effectiveness, which were indicated by their level of protective personal hygiene practice (covering mouth when sneezing; washing hands after sneezing, coughing, touching the nose; using liquid soap to wash hands; use of serving utensils; touching lift buttons with protection) using a 5-point Likert scale (from always to never). Eight more questions were asked about how effective respondents felt these practices were; (4) attitudes and knowledge about avian influenza and trust in media and government information, for which 27 statements were presented and respondents were asked to indicate their agreement using a five-point Likert scale (from strongly agree to strongly disagree)<sup>1</sup>; (5) attitudes towards government interventions to prevent avian influenza and their continuation, for which seven Likert-scaled questions (from strongly agree to strongly disagree) about government action to control avian influenza were asked, as were 11 about the need to continue or maintain these practices now; and (6) demographics of respondents, which were adopted from the 2006 survey<sup>1</sup> and supplemented by questions on the structure and health status of the household members.

## Results

Of 1630 respondents agreed to be re-contacted, only 680 (42%) could be traced, of whom 461 agreed to complete the repeat questionnaire. Compared with the 2006 survey, in the 2010 survey, 18-to-34-year-old respondents were more likely to have declining perceived risk of influenza A/H5N1 infection (odds ratio [OR]=2.30, 95% confidence interval

[CI]=1.25-4.24) and less H5N1 worry, (OR=2.01, 95% CI=1.10-3.66). Moreover, more educated respondents (OR=1.90, 95% CI=1.09-3.31) and those who were middle-aged (34-to-54-year-old) had less perceived risk from buying live poultry (OR=2.31, 95% CI=1.33-4.01). About 33%, 11%, and 21% of respondents respectively reported perceiving an increased likelihood of H5N1 infection, H5N1 worry, and perceived buying risk. The remaining respondents reported either unchanged risk (28%, 49%, 46%) or declining risk (38%, 40%, 32%). Household buying of live poultry had declined from 73% to 41%, with households buying on average 11.4 chickens/household/year, compared to 14.4 in 2006, and perceptions of increased risk from buying were associated with not buying live poultry (OR=0.34, 95% CI=0.19-0.60). However, touching during buying remained unchanged at ~5%. The mean exposure to live poultry per household per year decreased 38% from 0.72 in 2006 to 0.57 in 2010 (P=0.011).

The prevalence of most personal hygiene practices remained high, except for covering mouth when sneezing/coughing and hand washing frequency; males were less likely to cover the mouth when sneezing/coughing or to use liquid soap for hand washing. These hygiene declines were associated with declining worry about H5N1 (OR=1.61, 95% CI=1.04-2.47).

More than 90% of respondents agreed recommended preventive practices were somewhat or very necessary, except for wearing face masks in wet markets (32%), avoiding crowded places (43%), and using bleach solution in drains daily (33%). After adjustment for demographic factors, associations between direction of change of perceived risk and

TABLE. Association between direction of risk perception changes and protective hygiene practices

Risk perception change	OR (95% CI) [not necessary vs necessary]		
	Need of wearing face mask when visiting wet markets	Need of avoiding crowded places	Need of using 1:99 bleach solution in sink and drain every day
Perceived likelihood			
Increased	0.95 (0.58-1.55)	1.11 (0.66-1.88)	1.11 (0.66-1.87)
Unchanged	1.00	1.00	1.00
Declined	0.79 (0.49-1.28)	1.00 (0.60-1.66)	1.23 (0.74-2.04)
Perceived worry			
Increased	0.57 (0.29-1.12)	0.45 (0.21-0.98)*	0.40 (0.17-0.91)*
Unchanged	1.00	1.00	1.00
Declined	0.86 (0.57-1.29)	0.70 (0.45-1.08)	1.10 (0.72-1.68)
Perceived buying risk			
Increased	0.41 (0.24-0.71)*	0.55 (0.31-0.98)*	0.78 (0.45-1.34)
Unchanged	1.00	1.00	1.00
Declined	0.93 (0.60-1.44)	0.94 (0.60-1.48)	0.93 (0.59-1.47)

\* P<0.05

perceptions of hygiene practices indicated that increases in perceived worry were associated with greater perceived need to avoid crowded places and use of bleach for drains, whereas the perceived risk from buying increased with greater perceived need to wear masks and avoidance of crowded places (Table).

There were no significant differences in perceived degree of trustworthiness of government or media messages about influenza A/H5N1, but there were increases in the trustworthiness of informal sources of information from friends, peers and family ( $P < 0.001$ , Wilcoxon's test). More respondents reported understanding how influenza A/H5N1 infection was caused and knowing how to protect against avian influenza in 2010 than in 2006 (both  $P < 0.001$ ). There were significant declines in the perceived effectiveness of hygiene practices regarding hand washing before touching the face or food and after going out in 2010 than in 2006 (both  $P < 0.001$ ). After adjusting for age and gender, only a history of seasonal influenza vaccination (OR=6.2, 95% CI=2.89-13.28) and perceived likelihood of becoming ill (OR=2.20, 95% CI=1.03-4.72) predicted intention to have seasonal vaccination.

## Discussion

There were continuing declines in exposure of the population to influenza A/H5N1 risk from live poultry. Although fewer households bought live poultry, the rate of touching remained the same (5%), which indicates that the exposure risk remains high among those persisting in buying live poultry who were also more likely to report higher odds of perceived declines in influenza A/H5N1 risk. There was a significant proportion of respondents who perceived declining risks and worry from influenza A/H5N1, and those that did so were more likely to reduce their preventive behaviours, particularly wearing face masks and washing hands. These individuals were more often younger or middle-aged and male. Public trust in government messages remained unchanged, but people put more weight on what their friends and peers think and do about preventing influenza A/H5N1, which was a surprising

finding. In other studies, we hypothesised that high levels of informal information trustworthiness were likely when there was a dearth of formal information or when uncertainty was high.<sup>6,7</sup> The results in the current study argued against such an hypothesis and forced us to rethink the dynamics of information trust in influenzas.

Regrettably, we did not obtain a large enough sample to derive the planned structural equation model and so could not test the fully adjusted models as we had planned. Nonetheless, data of this and earlier studies contributed to the first longitudinal description of a population response to a major epidemic, but results should be interpreted carefully, as the proportion of respondents was small.

## Acknowledgement

This study was supported by the Research Fund for the Control of Infectious Diseases, Food and Health Bureau, Hong Kong SAR Government (#09080732).

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