

The Prevention of Avian Influenza in Hong Kong

OBSERVATIONS ON THE HKSAR GOVERNMENT'S CONSULTATION DOCUMENT

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Summary and key points

- We have considered the Government's consultation document from the viewpoint of a public health approach. The central feature of this is to ensure that the links between the *agent* (the avian influenza virus), the *vector* (the mode of transmission of virus to humans in Hong Kong) and the *host* (people who are susceptible to infection) are all interrupted or blocked, with the highest possible degree of certainty.
- We express strong general support for the HKSAR Government's proposals to reduce the risk of avian influenza outbreaks in both chickens and humans. This is a necessary and urgent measure to prevent a catastrophic epidemic of a new human form of a highly pathogenic influenza in the population.

The Government's aim of achieving "close to zero tolerance" must be supported and sustained as the over-riding principle.

- We agree that the risk of transmission of avian influenza is unacceptably high at present because of the relatively high level of contact between consumers and live poultry. We estimate from a recent population survey that there are currently about 3.5 million person-live bird contacts a year through the purchase of live chickens.

We must ensure that infections with avian influenza virus do not occur in humans because co-infection with both avian and human viruses can lead to new human transmissible forms. Mathematical modelling, reported independently in the journal *Science* this month (May 2004) by an overseas group, suggests that an epidemic of a new avian-human influenza could be initiated by co-infections (with avian and human influenza viruses) in as few as 45 individuals.

A conservative illustrative scenario of a new influenza epidemic in Hon Kong would include the development of 10,000 cases in the first three weeks. These infections would lead to 300 deaths, assuming a case fatality rate of only 3%, as in recent human H3N2 infections in other parts of the world. However in the recent Asian influenza outbreaks in neighbouring countries the case fatality reached 70%.

- We strongly support the Government's "Approach A" based on the concept of "cold chain" for all poultry meat for sale at retail outlets. This is the only proposal which has the potential to satisfy all the criteria for maximum possible risk reduction.
- We do not support any future permanent system of retailing based on the re-engineered "New Market Poultry Stalls". It may be a necessary short-term step but this proposal will predictably continue to expose workers, consumers and the general public to the risk of infection. Also any measures which are dependent on self-regulation are unacceptable given the seriousness of the hazard to health.
- Our population surveys indicate that there are still many misconceptions about the risk of transmission of avian influenza. There is an urgent need to continue public education on the nature and mode of transmission of the virus. On the other hand we find that the public expects Government to protect the public health and will, we believe, accept changes in marketing of chickens which are designed to achieve this.
- The way forward in the prevention of avian influenza and new variants of human influenza must be based on a firm public health approach to the protection of our urban environment, linked to high quality information systems, field epidemiology and advanced data analysis.

Avian Influenza: Response to the consultation

The risk of an Avian Influenza pandemic: *Not if, but when*

Pandemic disease outbreaks are part of human ecology and by their very nature matters of global concern. Influenza viruses are highly adaptive and rapidly evolving, some more aggressive and infectious than others. Virologists who have studied this area for decades regard another pandemic as inevitable.

Modern pandemics from an aggressive strain of influenza such as H5N1 (“Bird ‘flu”) that evolve to move from person-to-person would cause extremely high mortality (possibly up to 70%), and massive social, political and economic disruption that would make SARS look insignificant. We cannot necessarily prevent all outbreaks which may lead to pandemics, but we can take steps to reduce the chance of such outbreaks and mitigate their impact.

The Hong Kong outbreaks of human infection with Avian Influenza (H5N1) in 1997 stands as a critically important signal of the risk of a catastrophic pandemic in China and the Asia Pacific rim.

The following section numbers relate to individual paragraphs in the Government’s consultation document.

Chapter 1: Introduction and background

1.1 The Asian Flu outbreaks: a clear warning signal

The case fatality in the 1997 Hong Kong outbreak was 6/18 (33%); in the 2004 Asian bird flu outbreaks in Vietnam, Thailand, China and elsewhere the case fatality ratio (CFR) was apparently consistently 70%. There is still uncertainty about these outcomes but even if the CFR is much lower, we would still take the view that these events must be seen as portents of an epidemiological transition in communicable disease in our region. The actions taken to counter this emergent hazard must be based on sound scientific principles but also a precautionary public health approach designed to protect the whole community.

1.2 Government preventive and surveillance programme

We acknowledge the Government’s considerable efforts in this area, however we would have to emphasise that the programme is not “comprehensive”; on their own admission the Government has not so far been able to take steps to fully interrupt and disable the *agent, vector, host triangle*. The reasons for this need to be externalized and discussed. The hazard (and potential risk) is clearly delineated in this paragraph from the consultation document ie:

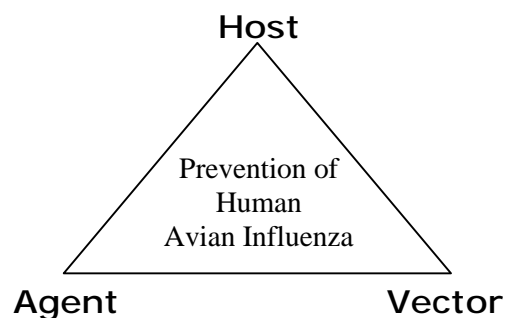
“...the daily exposure of the general population to about 100,000 live poultry during transportation and at wholesale and retail outlets remains a continuing risk for human health in view of the propensity of H5N1 avian influenza virus to mutate and reassort with genes of other species, and presence of other avian influenza viruses”

We fully agree with this statement and there must be acceptance of the fact by all parties that the mixing of people and potentially infected animals may lead to the rapid evolution of a new lethal virus strain capable of human-to-human transmission. Illustrative estimates of the consequences of this irreversible process in Hong Kong would include several million cases of influenza and tens of thousands of deaths. We provide, later in

this response, conservative estimates of the possible impact of avian influenza on human health and mortality in Hong Kong. Hong Kong's role as a travel and commercial hub in the Asia Pacific would facilitate the spread of human infection by the mutated virus on a global scale.

1.3 Conflicting viewpoints

The trade-off between the preference for eating the flesh of freshly slaughtered chicken and the risk to local, regional and global population health from avian influenza should be addressed directly, and in terms of a precautionary public health approach aimed at providing the greatest benefit to the maximum possible number of people. Our response to the consultation document is based on the classical basic epidemiological model of *agent*, *vector* and *host*.



The urgent task in Hong Kong, to prevent the development of a potentially catastrophic outbreak, is to

Agent : Identify and (if possible) suppress the agent at source and prevent the emergence of new strains which are highly pathogenic for both farmed animals and humans

Vector : Interrupt and prevent the mode(s) of transmission by one or more vectors which facilitate the passage of the virus from avian (and other species) species to humans

Host : Protect the human host by whatever methods and measures are available and effective, including

- (a) administrative/organisational mechanisms with legal enforcement
- (b) physical protective barriers
- (c) immunological and medical therapeutic methods

The views of the “live poultry trade” should be analyzed in depth in the light of the established or projected public health risks and the measures which are necessary to prevent them. Their argument that central slaughtering “will not in itself eliminate the occurrence of an avian influenza outbreak” is an obvious statement of fact, but it does not and cannot negate the weight of evidence in favour of a precautionary public health approach. Avian influenza outbreaks are *propagated* (as opposed to *initiated*) by intensive farming, housing and transportation of large numbers of poultry. These factors (which are *vectors* in terms of disease transmission) also increase the risk of bird-to-human transmission.

The use of avian vaccines in farmed bird flocks (see sections 3.2 and 3.3) may be a necessary measure and useful intervention, but questions remain about its efficacy.

1.4 Dense populations of birds and humans

We strongly agree with the caveats expressed by Government in this section of the consultation document. There is no question that the new emergent infectious diseases in Asia are the consequence at least in part of increasingly high density populations of both farmed animals and humans, and their juxtaposition in rural and urban areas.

Furthermore the intensive aggregation of animals and humans are likely to initiate “super spreading events” creating large outbreaks of disease.

1.5 An endemic highly pathogenic agent

The comments in the consultation document on the possible development of “highly pathogenic avian influenza” are appropriate and the demonstration that the virus jumped species in different populations, in different countries, at different times including 2004, is a clear indication of its propensity to become a human infection rather than simply one confined to animals.

1.6 The need for early decisions on an intervention

We agree that an early decision is required, but would caution that the choice of actions should not necessarily be based only on “public consensus”. Public perceptions of risks may not always be based on appropriate and complete information or its interpretation. We provide evidence for this in later sections. However, as we shall also show, there is strong public support for change to increase health protection and we believe the public expects Government to use the best scientific evidence on which to base its actions.

If an apparent community consensus is inappropriately biased by vested interests then the estimated public view may be a misrepresentation of their true preferences. *In any case the Government’s action should strictly follow a precautionary public approach, based on sound science, which should be paramount.*

Chapter 2: The Government’s long-term vision

2.1 Human contact with poultry and faeces

We regard this as a key statement in the Government’s proposal. It should be treated as an over-riding principle in any negotiations or trade-offs on the issue of slaughtering. However we emphasise at this point that simple physical barriers will not suffice as protectors against transmission of viral particles. The minimization of human contact with poultry and their faeces is clearly essential. The passage of the influenza virus in poultry faeces makes it inevitable that sales of live poultry will contaminate both vendors and consumers with faecal dust. During an outbreak of avian influenza this process will form a potent vector for the virus.

2.2 Concerns about change

We understand the concerns arising from the need to change. No one is arguing for change without sound underlying reasons. However there is no formal model or other proposal which demonstrates what would be the safest option for live poultry sales. The

question arises as to how much risk (and the uncertainty associated with its estimation) we are prepared to trade off against:

- gustatory preferences?
- the transitional problems arising from need to change poultry rearing and marketing practices?

No cogent arguments have been advanced so far which provide any serious basis for rejecting the plans for cessation of the live poultry trade.

In the transitional period live poultry trade workers should be fully compensated. The financial costs of this will be trivial compared with the value of lost productivity, premature deaths and damage to the regional economy from an avian influenza pandemic.

2.3 We must reduce the hazard

We agree reduction of any hazard which might lead to infection to the lowest possible level is an absolutely necessary goal. The proposal “to separate humans from live poultry” is dictated by the epidemiological model of *agent*, *vector* and *host*. We would however be deeply concerned if there were administrative delays or half-measures (eg brought about by inappropriate concessions) in restrictions on the live poultry trade.

2.4 The need for new epidemiologic science

The Government’s goals of achieving the full protection of public health must be short-term as well as long term. The hazard of avian influenza is a present danger and it will not necessarily wait until we have resolved our differences on these matters. The assessment of the health risks from avian influenza can be supported by new techniques in advanced data analysis and mathematical modelling. Investment and capacity building in these areas is now going ahead in Hong Kong. These numerical methods will aid projections of risk. *However the need for Government and legislators to handle uncertainty and use a precautionary approach will remain despite the application of the best science available.*

2.5 Separation of agent and host

The Government proposals for either “cold chain” or “freshly slaughtered chickens” should be implemented and evaluated. *A priori* they are the only viable options for interrupting the vector, ie the contamination of consumers with viral particles from faecal dust, feathers and other bird parts. This should be the current solution, rather than further debate.

2.6 Changes in the poultry trade

We strongly believe that a change in poultry trade practices is urgently required. Our view is that Government should input whatever resources are needed to make this proposal work effectively. In the longer term this will be a cost-effective approach with the benefits from prevention far outweighing the cost of a major outbreak of just avian influenza, let alone a human pandemic.

2.7 Public support

We believe public support for change already exists and will strengthen if the hazard is clearly explained together with the possible consequences of ineffective action. In general we can show that the public expects the Government to ensure that safe working practices are adopted and enforced.

Chapter 3: Measures adopted in Hong Kong against avian influenza since 1998

3.1 Risk reduction

The Government's stated policy of reducing the risk of a highly pathogenic avian influenza outbreak through a focus on the supply chain (farms, markets and retail outlets and transportation between them) is a direct recognition of the importance of breaking the links in the *agent, vector, host* triangle. We need both "upstream" and "downstream" interventions. In the short term the most urgent, and practicable effective interventions are those downstream where contact between infected birds, vendors and the public create the potential for an outbreak and the possible evolution of a novel human transmissible virus.

3.2 Vaccination of chickens – not a panacea

The AFCD vaccination programme and the adoption of vaccination by the Mainland can be regarded as a necessary and useful intervention. However we agree it should not be regarded as a panacea, let alone a failsafe measure. The following issues should be borne in mind:

- There are many possible outcomes, both short and long term, of a vaccination policy. They include continuing circulation of H5 (as well as H6 and H9) viruses in farmed flocks with subclinical infection.
- It is important that "vaccination" does not lead to a false sense of security among the public.
- Vaccination should not be used as an argument for more permissive arrangements in markets or retail stalls.

3.3 Evaluating vaccination

The vaccine is directed at H5 strains of avian influenza virus. It will not protect against H6 and H9 strains. Although these are not currently of prime concern they may play a role in future reassortment of influenza strains between different species.

3.4 The health of Mainland chicken farms

Measures to improve the health protection of Mainland chickens in their farms are obviously of paramount importance. In the longer term there must be radical improvements in the animal husbandry practices used in chicken farms across all of the Asia Pacific region. We assume that seroprevalence of H5 antibodies is low in the farms. However the supply chain, including markets and retail outlets are amplifiers of virus circulation, so testing at farm level does not necessarily represent the risk "downstream".

In the meantime the public has no access to the data generated from "antibody testing of imported chickens, dead and sick poultry ... for H5 virus". We suggest that this data should be in the public domain.

3.5 Chickens are also natural carriers

The statement that "as waterfowl are natural carriers of avian influenza viruses, all waterfowl in Hong Kong must be centrally slaughtered..." reflects an important principle in the containment and interruption of the vector. This principle must now be applied to chickens as the most numerous natural carriers of avian influenza viruses. Although wild fowl are the main host species, outbreaks in Asia this year indicate an emergent role for farmed chicken as a primary host.

3.6 Rest days and hygiene measures

There can be no argument against the implementation of stringent hygiene measures, and data from monitoring of its effects demonstrate its potential importance. However, again, the limitations of this approach in the protection of the population from influenza must be recognized.

Rest days and other hygiene measures reduce seroprevalence of some avian influenza strains by about 40% (eg from approximately 10% to 6%). However there are many uncertainties about the impact of hygiene regulations on prevention. For example:

- The effect on the transmissibility of the virus is not known.
- Hygiene measures directed at poultry will not prevent bird-to-human transmission if poultry continues to be in close proximity to humans.

3.7 The value of influenza surveillance

The Government's influenza surveillance programme is an important investment and an essential component of Hong Kong's new public health infrastructure. It is equally important that this system should not be compromised by permissive, irrational and arbitrary arrangements at the point of sale of chickens.

However the role of surveillance must not be misrepresented. We do not agree that surveillance will "guard against" mutation or reassortment of influenza viruses. It may provide early evidence and warning about critically significant events, but it will not prevent them. As suggested by Ferguson et al (2004) there could be a reappraisal of how surveillance data are reported, analyzed and interpreted by public health agencies. There should be a renewed focus on the random beginnings of a possible emerging epidemic through rapid case ascertainment, virological testing and contact tracing, where the data should be processed through mathematical modelling.

3.8 Additional precautionary measures

We support the past introduction of additional surveillance and screening of both birds and humans and protection of farmed birds from infection transmitted by wild birds.

The next steps in the prevention of avian influenza must be to reduce the complexity and uncertainty associated with the supply chain.

3.9 H5N1 is endemic in this region

We agree with the statements of intent in this section. Our view is that H5N1 should be regarded as endemic in the region. The present absence of outbreaks does not negate this view.

We strongly suggest that supply chains should be curtailed in whatever ways are possible. The importation of live chickens should only be to supply central slaughtering facilities.

Chapter 4: The potential threat of Avian Influenza

4.1 A real and present danger

Sections 4.1 to 4.4 set out clearly the biology of this new phase of emergent strains of viruses which have the potential to cause a massive pandemic of influenza. This could have similar consequences to the 1918 influenza (“Spanish Flu”) pandemic which is estimated to have killed upwards of 50 million people worldwide.

If avian-human contact led to a human-to-human transmissible strain then even a relatively small number of cases of a highly pathogenic strain could result in the evolution of a major outbreak.

There is considerable uncertainty in estimating the possible scale and severity of an epidemic caused by a new and highly pathogenic strain of human influenza. However even a conservative view suggests that the event would be catastrophic. For example:

In the initial stages of the outbreak each case would generate 4 new cases. If the average time between generations of disease was three days, then there would be 10,000 cases in the first three weeks (S Riley: personal communication).

Due to a substantial amount of pre-symptomatic or asymptomatic transmission and the short time between generations of disease, it is unlikely that the public health control measures which worked well against SARS would succeed against influenza.

What would be the likely case fatality rate from a pandemic? It is of course not possible to say with certainty but recent data from influenza epidemics provide indicators of the likely number of deaths. For example Nicholson et al (2003) report that in 2002 an epidemic in Madagascar attributable to an H3N2 virus led to 22,646 cases and 3% (679) case fatality ratio. In the Democratic Republic of Congo in 2002 an epidemic of H3N2 influenza was associated with 3.5% deaths in children and 3.2% in people over 65.

Therefore among the projected number of cases (10,000) in the first three weeks of an epidemic in Hong Kong we might conservatively expect about 300 deaths.

We believe such figures are realistic and conservative. If the case fatality ratio was closer to that reported in the recent Asian outbreaks (60-70%) then the number of deaths would be very much higher by an order of magnitude.

4.5 The 2004 Asia Pacific epidemic

This is an important statement because it clearly describes the massive scale on which this emergent avian disease can occur and its potential to affect humans. While the assessment of the case fatality ratio is difficult with relatively small numbers of cases, the large proportion of deaths, including children, clearly indicate the lethality of the avian influenza strains. It is likely that some deaths in older people are under-reported. The failure to contain the avian infections when they first occurred in November 2003 in Thailand can be attributed to procrastination, concealment and lack of communication and agreement between government departments responsible for agriculture and health respectively. The aim was the protection of the poultry industry,

but the result was its devastation, many avoidable deaths and long term damage to the economy.

4.6 **The consequences of weak infrastructures**

We agree that the failures to prevent or quickly deal with outbreaks in several Asia-Pacific countries have been due to weak health infrastructures. However these problems do not only relate to clinical and laboratory services but also to the lack of internal cohesion in the administrations. Hong Kong must avoid these problems by clear policy decision-making now, which should not be compromised by misguided vested interests.

4.7 **“The system is not fool-proof”**

The Government’s intervention so far can certainly be regarded as *necessary*. However they cannot be accepted as *sufficient* and we strongly endorse the statement in this section of the consultation document that “We cannot completely rule out the possibility of an outbreak”.

We suggest that we adopt zero tolerance towards any suggestions or attempts to downgrade health protective measures.

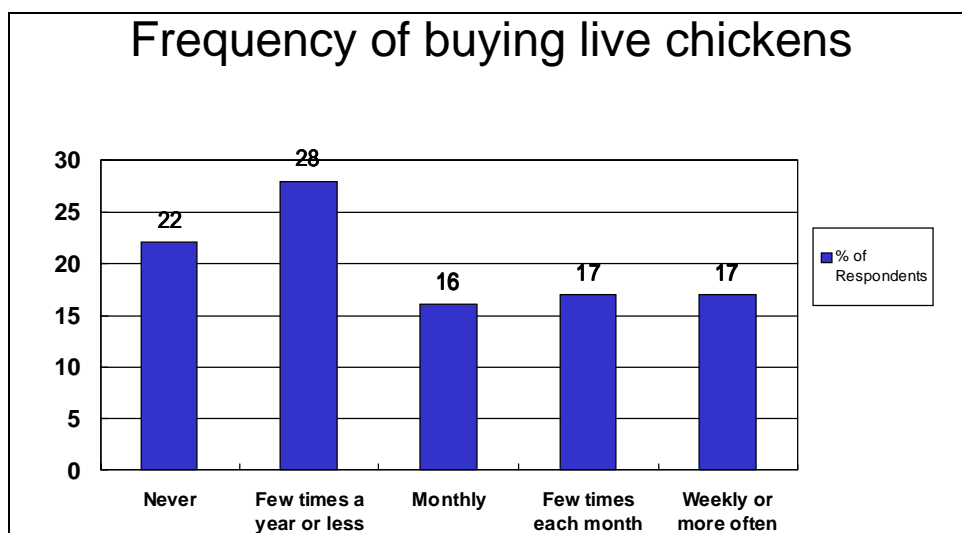
4.8 **The efficacy of vaccination**

We note the relatively low vaccination efficacy rate of 70-80%. We would pose the question what is the *effective* coverage rate in order to achieve flock immunity? There is clearly a need for further research on modelling of vaccine efficacy in the setting of local and Mainland chicken farms.

We would strongly emphasise the statement on the potential human health hazard from poultry which despite vaccination remain unprotected by vaccine against H5 virus and the continuing circulation of other avian viruses listed in section 4.9.

4.11 **Close contacts between poultry and people**

This statement is one of the most important in the consultation document. The current preventive and surveillance programme has not and *cannot* address the concern of poultry-to-human contact and possible transmission of virus. Radical new interventions are required to deal with this critical step in the transmission chain.



4.12 What is the scale of the risk of infection from present chicken retailing practices?

We conducted a survey (Fielding et al 2004) this year between March and April 2004 on the use of live animal markets and perceptions of risk among 990 women and men drawn randomly from the general population.

Only 17% bought live chickens “weekly or more often”; in addition 61% bought chickens less frequently and 22% never bought chickens. Twelve percent of the 78% (ie 9.36%) who buy chickens touch the bird before buying. We calculated the person exposures to live chickens in the population as follows:

$$\begin{aligned} & \text{Average number of live chickens purchased per household per year} \times \text{no. of} \\ & \text{HKSAR households} \times \text{proportion who touch chickens before buying} \\ & = 18.12 \times 2,051,890 \times 0.0936 = 3.48 \text{ million/year} \end{aligned}$$

Each year therefore there are 3.48 million contacts during the purchase of live poultry which may be regarded as significant exposures to the possible transmission of avian influenza viruses. These data should be regarded as the minimum number of exposures in the population because additional contacts with birds or their faeces may occur in several different settings.

In Hong Kong we have two influenza seasons a year and circulation of the virus during other periods. If 10% of the population are infected with human influenza annually during the flu seasons, and 1.34 million bird contacts occur during the two 10-week influenza periods (3.48M per year \times 2 flu seasons \times 10/52 weeks), then 134,000 of these bird contacts have the potential for co-infection.

How can the data from our survey, with the finding of a large number of possible exposures, be assessed in terms of the quantification of the risk of emergence of a pandemic strain of avian influenza? Some useful insights are provided by Ferguson et al in the journal *Science* on 14 May 2004. They state that “at any time point the risk of a reassortment event (ie between avian and human influenza viruses) is proportional to the number of people who are co-infected with human and avian strains”. If 10% of the population are infected with human influenza over 12 weeks of a typical influenza season and there is a 1-day window in early infection where co-infection with an avian strain is possible then 0.12% (10%/84 days) are susceptible to co-infection with an avian strain at any one point in time.

The probability of a reassortment event having occurred (if reassortment is 100% certain following co-infection), after n cases of human avian influenza, is $1-(1-0.0012)^n$.

Ferguson et al estimate that 600 human infections would be required for a 50% chance of reassortment but only 45 for a relatively high chance of 5%. The probability of these events would fall (ie the numbers of co-infections would have to rise markedly) if various factors reduce the chance of reassortment during co-infection.

Therefore it is critical that the risk of human avian contact is minimized, especially in southern China where avian influenza viruses are endemic.

We believe that the report by Ferguson et al has important additional implications for the Hong Kong SAR. They emphasise the value of quantifying the *transmissibility* (R_0)

of avian influenza virus in human populations. This underscores the importance of *field epidemiology* and *contact tracing* in estimating avian –to-human and human-to-human transmitted cases. In the case of avian influenza it would be possible, given good quality data, to rapidly calculate the threshold (number of human avian influenza cases) above which a reassortment is likely to have occurred.

4.13 **The avoidable costs of outbreaks**

The Government expenditure to date incurred by timely but crisis orientated management of outbreaks is an important indicator of the potential damage to our economy which may occur by unnecessary risk taking through the adoption of half measures. Scarce resources needed for new developments in preventive health care directed against infectious disease should not continue to be drained annually through unproductive fire-fighting and compensation.

This section of the consultation document gives ample warning of the threat (and cost implications) to tourism, transportation and many aspects of business and commerce.

4.14 **The risk can be reduced**

Our data from the survey of the public use of markets and the analyses by Ferguson et al clearly indicate that the Government can both estimate the current risk *and* introduce measures to substantially reduce it.

We strongly agree with the Government’s position on a “close to zero tolerance level”. Data on current public patterns of preferences and purchasing of live chickens together with mathematical simulations of avian influenza outbreaks provide strong backing for a precautionary public health approach.

The adoption of radical precautionary approaches is now accepted as a necessary and inevitable step to prevent or interrupt the emergence of disease. The slaughtering of millions of cattle in the UK bovine spongiform encephalopathy (BSE) outbreak and of millions of chickens in Hong Kong’s avian influenza outbreaks are recent examples. General public health and hygiene measures to prevent SARS are continuing together with reinforced advisories in Hong Kong and Asia generally.

4.15 **The costs are minimal**

The costs of necessary and timely changes now, including a once-and-for-all change in the way we market chickens will be minimal compared with the costs of any further outbreaks of avian influenza, especially if they lead to human infections.

Chapter 5: Immediate and medium term measures

5.1 The future of the poultry trade

We strongly agree that the present mode of operation of the poultry trade cannot continue at all in its present form.

We believe there is strong public recognition of the *need for change* and that there will be a high level of acceptance of *implemented changes*.

5.2 Immediate improvement measures

5.3 While we strongly support the immediate improvement measures to minimize contact with poultry it is very important that this is not seen as a definitive step. There is no evidence that the use of minimum distances between chicken cages and public, or installation of acrylic panels will prevent transmission of a virus.

At the farm level it is not clear how standards can be maintained and enforced and whether the ultimate goal, that is interrupting the transmission of virus between birds and humans, can be achieved. Uncertainty relating to transmission of infection and reliability of the protective measures are major issues.

5.4 Medium term measures

These proposals can only be regarded as a necessary but temporary and grossly inadequate measure against infection by avian viruses.

We feel that there will be pressure from the trade and their representatives to adopt these changes as a final solution to the prevent of avian influenza. Our objections include the following:

- In a scientific microbiological setting, scientists would now be required to use a special laboratory with state-of-the-art biosecurity (a “P3 laboratory”) in order to handle a virus such as H5N1.
- The re-engineered market stalls will provide no protection whatsoever to workers and doubtful protection to customers.
- The design includes extractors which will vent air (with dust particles) from the stalls into the general ambient air. This is a totally unacceptable arrangement.

5.9 Arbitrary arrangements are unacceptable

5.10 & The proposal that stall holders would liaise with landlords to re-configure stalls is likely to lead to conflict. The changes for public health protection should be clear and prescriptive and not subject to unobservable and uncontrolled procedures. This particularly applies to the proposed reliance on “the strict self-discipline and good practices of the poultry traders”.

There should of course be in place now the most stringent possible hygiene practices in all poultry handling areas. However there are no grounds for considering this as an alternative to the proposals in Chapter 6 of the consultation document. Given the seriousness of the threat from avian influenza there is no case for the community to be dependent for its protection on self-regulation by the poultry trade.

Chapter 6: Strategy to reduce contact between the public and live poultry

6.1 The public good must take precedence

Our recent survey (Fielding et al 2004) of a population sample confirms the Government's assertion in the consultation document of "the great exposure of our densely populated community to a large amount of live poultry". We support the proposal for pre-emptive measures as the only rational approach to this threat.

6.2 Public support for change already exists and will strengthen

& We agree that public support is essential, not least because a precautionary policy will dictate a change in eating habits. However we believe there is already a very high level of support in the community and that this will grow when the aims of the policy are fully understood.

We support **Approach A** (the "cold chain") as the method which best matches the public health criteria for interrupting potential pathways for transmission of the virus. In our recent survey this approach was already supported by 41% of respondents.

We would also support "**Approach B**" as a second preference alternative providing that the plan is not mixed with arrangements to provide "a smaller number of retail outlets selling live chickens". The latter would be a clear departure from the public health approach and apart from the risk of virus transmission it would likely lead to ambiguity and conflicts in the support for the central or regional slaughtering approaches.

We agree with the Government view that **Approach B** is potentially a less effective means of preventing virus transmission because of the need to transport live poultry. In our survey, support for **Approach B** was 65%. However 68% said they would be encouraged to change their habits of buying (live) chicken if others did the same.

We believe there is considerable scope for change. Although many respondents to our survey said that they preferred fresh to chilled meat, over 50% either had no strong feeling or regularly buy chilled birds. Their main reason for retaining live bird sales was "freshness". The concept that chilled birds are fresh (and that the process does not damage the meat) needs further explanation and reinforcement by Government.

Although those people polled expressed the desire to see live bird sales continued some also felt that market hygiene and live bird sales posed health risks. However, there are large gaps in the public perception of risk. In our survey only 24% of those interviewed had worries about catching disease from live chickens; 62% thought the risk "unlikely", "very unlikely" or "never".

Ninety six percent of respondents believed the Government had the responsibility to take action to protect the community and 88% trusted the Government to do this, but at a personal level there were mistaken ideas that food preparation measures intended to prevent bacterial infection (eg cooking food thoroughly) were also adequate to prevent avian influenza. "Thorough cooking" was agreed to be the best protection against bird flu by 96%.

We suggest that further rounds of public information programmes are required which provide clear detailed explanations, in the vernacular, of

- the *need* for change,
- the high level of risk reduction and protection afforded by the new measures (**Approach A**) and
- the unacceptably high level of risk to our health if action is not taken now.

Acknowledgement

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