

### NEW AVIAN INFLUENZA A VIRUS IN DENMARK

Influenza A virus is divided into 15 HA subtypes and nine NA subtypes, on the basis of two surface proteins. The Department of Virology has identified a new avian influenza A virus (AIV) type called H5N7 in wild ducks. Because of disease among 12,000 wild ducks at a duck farm in Salling, ducks were submitted to Denmark's National Veterinary Institute (DVI), which isolated influenza A virus subtype H5 by traditional technology and RT-PCR in part of the HA gene. Wild birds are a known reservoir for AIV. All AIV highly pathogenic for birds have been of the H5 or H7 type, even though there also exist many mildly pathogenic H5 and H7 viruses. Pathogenicity depends on factors including the amino acid sequence in the HA protein's point of cleavage into HA1 and HA2. Based on an analysis of these few amino acids in the HA gene, the current AIV was assessed as mildly pathogenic. However, all H5 and H7 types have the potential to change virulence, and on occurrence in a large flock of birds, there is a risk of uncontrolled spread and thus point mutation to a highly pathogenic AIV. For this reason, the Danish Food Directorate decided on 10 September to destroy the flock and redevelop the property. A new genetic test at the Serum Institute, with sequencing of whole HA and NA genes directly on secretions, tissue specimens or cultured virus, identified the new AIV type H5N7. None of the persons who were in contact with the ducks contracted influenza. Direct transmission to people with AIV occurs and has the potential to be the source of a pandemic. Since 1997, there have been 14 outbreaks of H5 or H7 AIV strains among poultry worldwide, and three outbreaks have also involved humans. In 1997, six out of 18 patients died of a highly pathogenic H5N1 AIV in Hong Kong. The high mortality was due to one single mutation in another gene (the NS1 gene). In February 2003 (during the SARS epidemic), there were outbreaks of AIV H5N1 among patients travelling from the province of Guangdong to Hong Kong, and one patient died. During a major outbreak of AIV H7N7 in the Netherlands, Belgium and Germany, several hundred of those involved in combating the outbreak developed symptoms of conjunctivitis and/or influenza. In 86 patients, H7N7 virus

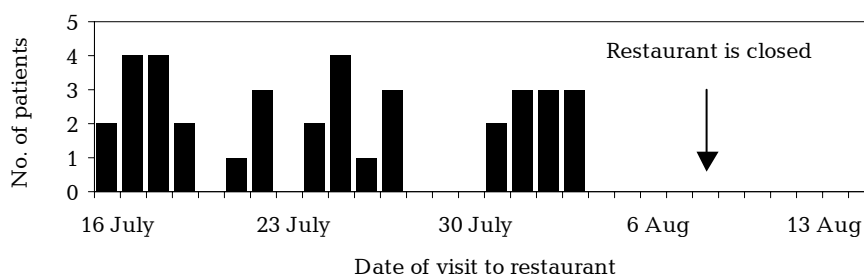
was isolated, and one patient died. The tracheal epithelium of pigs contains receptors for both human and avian influenza virus. Pigs are therefore a natural source of new human-pathogenic influenza types. The prevalence of both H1N1 and H3N2 in Danish pigs is very high (> 60%). To date, serological typing has only shown whether an influenza A virus isolate after culture is, for example, H3-like or H1-like, and it has not been possible to identify the N type. The new gene typing at the Serum Institute can identify all HA and NA types directly from specimens, which is of great importance in the monitoring of avian, pig and human influenza A virus.

(A. Fomsgaard, K. Bragstad, Dept. of Virology, P. Jørgensen, DVI, Aarhus)

### SALMONELLA OUTBREAK

In August 2003, an outbreak of multi-drug resistant *S. Typhimurium* was traced to restaurant A north of Copenhagen. A woman admitted with gastroenteritis suspected having been infected at restaurant A. The case was notified on 31 July to the Medical Office of Health in Roskilde County, who informed the North-East Zealand Regional Food Inspectorate. On a check-up visit and specimen-taking in the restaurant the same day, visible faults could not be found. In the same period, the Serum Institute recorded an increased number of *S. Typhimurium* strains resistant to ampicillin, streptomycin, sulphamethoxazole and tetracycline. On interview, the patients stated that they had eaten at restaurant A, and the Regional Food Inspectorate subsequently closed the restaurant. In the samples from the food, *S. Typhimurium* was found in cooked pasta and mixed salad from the buffet. *S. Typhimurium* was subsequently also found in a faeces specimen from a member of staff in the kitchen. The *S. Typhimurium* strains were DNA-typed at the SSI by PFGE.

**Fig. 1. Date of visit to restaurant A for 37 Danish patients with Salmonella Typhimurium infection**



A total of 43 patients turned out to have been infected with the outbreak strain. Forty patients were interviewed, of whom 37 had eaten at restaurant A, [fig. 1](#). The outbreak type was identical with the bacteria isolated from the food and the restaurant employee. In addition to the Danish patients, 29 Swedish patients were recorded with *S. Typhimurium* acquired at restaurant A. However, the total number of infected persons may be assumed to be much greater, as only a fraction of patients with Salmonella infections seek medical advice.

### Cause of the outbreak

The question of how the bacterium contaminated the buffet remains. The patients became ill over several weeks, which may be explained by: (1) one batch of contaminated food being used throughout the whole period, (2) poor hygiene, with persistent cross-contamination, or (3) one or more employees secreting the bacterium and thus contaminating the food. The finding of the outbreak strain in a faeces sample from an employee working in the kitchen indicates the last possibility. Hygiene was in all probability good. The food was prepared fresh every day, and remnants were scrapped daily. Samples were also taken from raw ingredients, without finding salmonella in these. Experience from this outbreak emphasises the importance of personal hygiene, particularly frequent and thorough hand-washing when working with foodstuffs. The outbreak could have been discovered earlier if some cases had already been notified on suspicion of food-borne infection, cf. statutory order concerning doctors' notification of infectious diseases.

(S. Ethelberg, M. Helms, Dept. of G-I Infections, B. Borck, Danish Zoonosis Centre, M. Lisby, North-East Zealand Regional Food Inspectorate)

15 October 2003

## Patients with laboratory-diagnosed RSV and rotavirus infections

3rd quarter of 2003 compared with the corresponding period in 2002

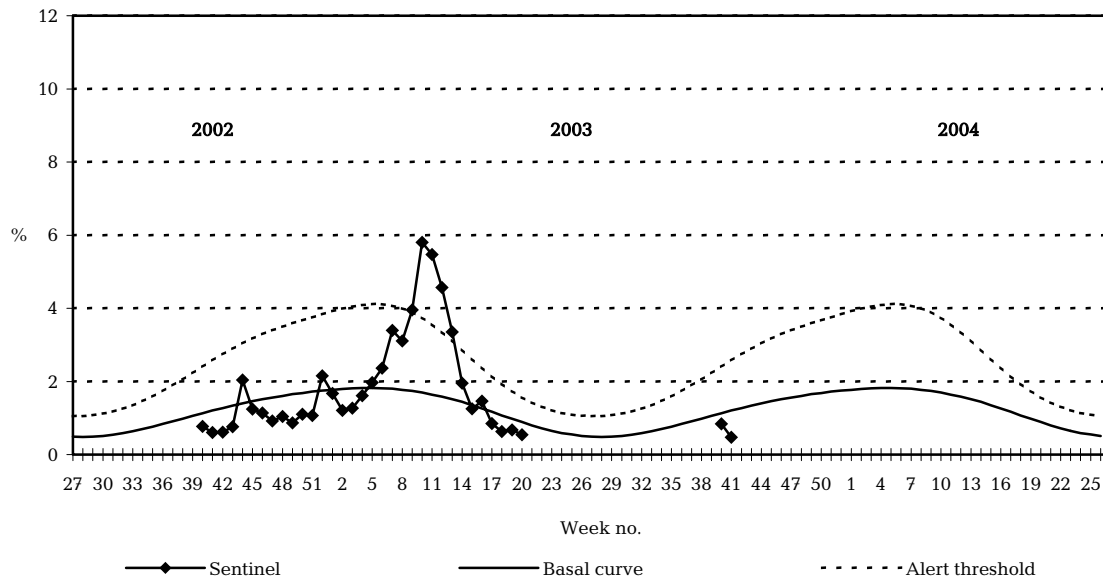
	RSV		Rotavirus	
	2003	2002	2003	2002
July	0	3	31	6
August	0	1	16	7
September	1	2	31	5
<b>Total</b>	<b>1</b>	<b>6</b>	<b>78</b>	<b>18</b>

Reported from the following Clinical Microbiology departments:

Aalborg Hospital (South), Aarhus Municipal Hospital, Herning Central Hospital, Hvidovre Hospital, Odense University Hospital, Slagelse Central Hospital, Viborg Hospital, Dept. of Virology, SSI.

## Sentinel surveillance of influenza activity

Weekly percentage of consultations, 2002/2003/2004



- Sentinel:** Influenza consultations as percentage of total consultations  
**Basal curve:** Expected frequency of influenza consultations under non-epidemic conditions  
**Alert threshold:** Possible incipient epidemic

(Dept. of Epidemiology)