Contamination status of avian influenza virus in poultry markets in Guangzhou City, Southern China, 2017-2018

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Objective

Comprehensive coverage virology surveillance for avian influenza virus(AIV) was conducted, aiming at understanding the spatiotemporal distribution and the pollution status of AIV in the environment of poultry market.

Methods

A full coverage surveillance program for AIV has been conducted in 11 districts in Guangzhou since August 2017. Sampling sites for environmental specimens were randomly selected by a multi-stage sampling strategy. Real-time fluorescent quantitative RT-PCR method was used to detect AIV. The positive samples were further detected for AIV subtype H5, H7 and H9 nucleic acids. The results were statistically analyzed with Excel 2016 and SAS 9.4 software. ArcGIS 10.1 software was used to generate maps.

Results

Between 2017 and 2018, a total of 17,840 samples was collected and tested, and the overall positive rate of AIV was 26.52%, among which, the positive rates of H5,H7,H9 subtypes of AIV was 2.72%, 0.30%, 16.18%, respectively, H5 and H9 mixed type was 1.47%(Table1).

The trends of the temporal distributions of AIV and subtypes are shown in Fig1. The prevalence of AIV peaked in January 2018. The highest level of H5 occurred in December 2017. In addition, temporal distribution of H9 was similar to that of AIV.

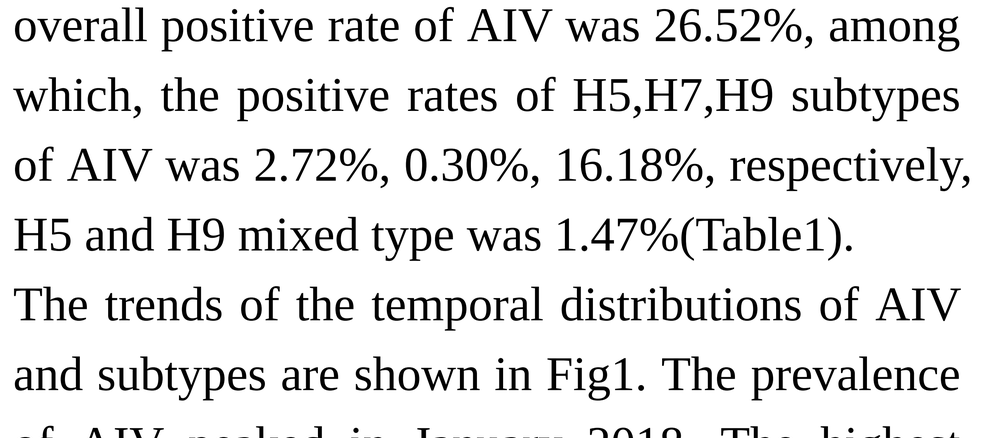

Fig1. Prevalence of AIV/subtypes (H5,H7,H9) of the viruses in poultry markets environmental samples from August 2017 to July 2018

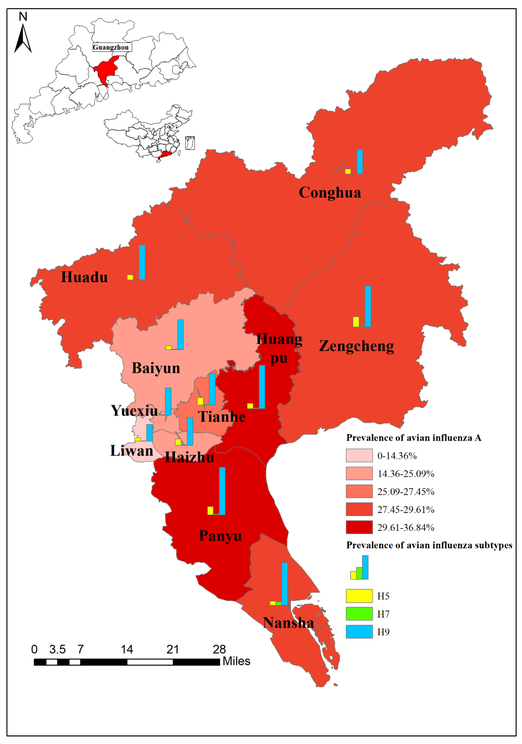

Fig2. Prevalence of AIV/subtypes (H5,H7,H9) of the viruses in different district in Guangzhou City from August 2017 to July 2018

The Fig2 show the spatial distribution of AIV and subtypes in poultry markets. The positive rate of AIV was overwhelmingly greater in Pangyu and Huadu than that in other districts as was also the case for H9 .Besides, in Zengcheng, Pangyu, Tianhe, H5 was the dominant subtype.

Urban district of Guangzhou is composed of Haizhu, Tianhe, Liwang,Yuexiu,Pangyu and Baiyun; the rest of the districts belong to suburban district.

Fig3 is a heat map showing the distribution of the rate of AIV and subtypes in the different types of environmental Samples in poultry markets. The contamination of AIV was most severe in the environmental samples of the inner wall of depilator, as was also the case for subtypes H9.

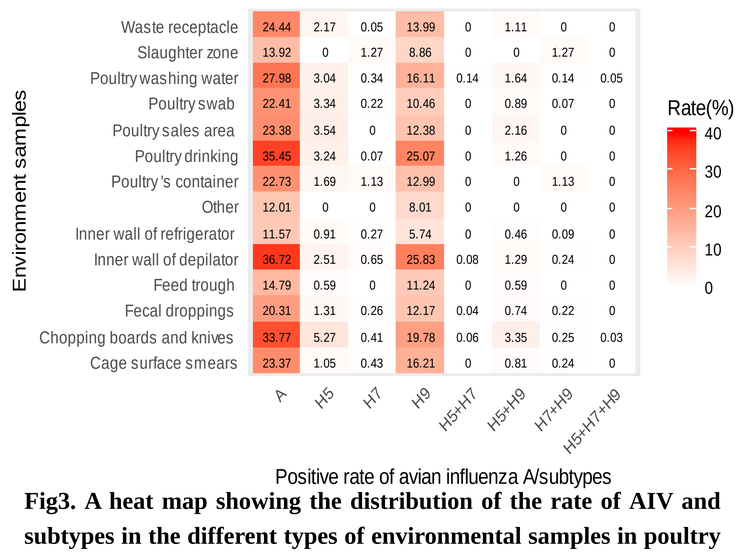

Fig3. A heat map showing the distribution of the rate of AIV and subtypes in the different types of environmental samples in poultry markets from August 2017 to July 2018

Table1. Results of the full coverage surveillance for AIV in poultry markets in Guangzhou, Southern China, August 2017–July 2018.

Item	N	Prevalence(%)							
		A	H5	H7	H9	H5+H7	H5+H9	H7+H9	H5+H7+H9
Districts									
Urban district	11235	2753(24.50)	280(2.49)	26(0.23)	1658(14.76)	3(0.03)	142(1.26)	17(0.15)	2(0.02)
Suburban district	6605	1979(29.96)	205(3.10)	28(0.42)	1229(18.61)	4(0.06)	120(1.82)	12(0.18)	0(0)
χ^2		63.59	5.88	5.11	45.45	1.16	8.79	0.24	–
P		<0.01	0.02	0.02	<0.01	0.44*	<0.01	0.63	–
Restrictive area of live poultry business									
Yes	6290	1326(21.08)	143(2.27)	11(0.17)	707(11.24)	1(0.02)	63(1.00)	4(0.06)	0(0)
No	11550	3406(29.49)	342(2.96)	43(0.37)	2180(18.87)	6(0.05)	199(1.72)	25(0.22)	2(0.02)
χ^2		147.72	7.28	5.26	174.99	1.34	14.64	5.86*	
P		<0.01	<0.01	0.02	<0.01	0.43	<0.01	0.02	
Total	17840	4732(26.52)	485(2.72)	54(0.30)	2887(16.18)	7(0.04)	262(1.47)	29(0.16)	2(0.01)

Note:* Fisher exact probability method.

Conclusions

AIV, H5/H9 subtype and mixed type have been circulating in the environments, especially in suburban district and in nonrestrictive area of live poultry business sites. The contamination of AIV subtypes was most severe in January 2018 and in the environmental samples of the inner wall of depilator. Epidemiology, especially etiological surveillance, needs to be strengthened.

Acknowledgements

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