Introducing avian influenza (AI) transmission between poultry workers and industrial poultry workforce is an important risk factor for human infection with AI, both following outbreaks in poultry [3] and independent of reported outbreaks [4]. While outbreaks of low pathogenic AI (LPAI) occur periodically in the US, little is known about AI exposure or seroconversion among poultry workers in the United States.

The Delmarva Peninsula is one of the densest regions of poultry production in the United States, with five counties among the top 50 in the country for sales in 2007 and home to the county with the highest production in the US, Sussex County, DE. Four major integrators (Perdue, Tyson, Mountaire and Allied Family Foods) operate 10 processing plants in Delmarva and contract with over 1,500 growers. Market value of poultry produced in Delmarva exceeds $2.7 billion in 2007 (USDA Census of Agriculture).

### Methods

**Study design:** This study was a convenience sample of poultry workers and community residents in the Eastern Shore region of Maryland and Virginia in 2003 and 2005. Self-identified poultry workers completed a face-to-face questionnaire about the nature of poultry work [5].

**Serology:** Hemagglutination inhibition assays were used to analyze serum samples for antibodies to human influenza A viruses A/Nebraska/20/99 (H1N1) and A/Panama/2007/99 (H3N2). Microneutralization assays adapted from Rowe et al. (1999) [6] were used to detect antibodies to AI strains believed to be representative of those circulating in poultry the US. A/Duck/CZ/156/94 (H4N6), A/Chuck/N1/14591-7/98 (H5N2), A/Turkey/MA65 (H6N2), A/Turkey/VI/4529/02 (H7N2), and A/Turkey/MN/38391-69/5 (H9N2). Fertilized eggs were used to grow AI viruses for microneutralization assays. Sera were screened at a dilution of 1:10, under the expectation of low titers.

### Results

No evidence of seroconversion among poultry workers or community residents to the AI subtypes included in our study was observed. No individual within our sample had titers to any of the AI subtypes at dilutions greater than 1:10, implying a lack of infection with these viruses.

We observed high rates of seroconversion to human influenza subtypes in both the poultry workers and community residents with no differences in seroconversion rates to the human influenza viruses between these subgroups (Table 1).

### Discussion

Our findings indicate that poultry workers and community residents in the Maryland and Virginia areas of the Delmarva Peninsula were not infected with AI viruses prior to our sample collections in 2003 and 2005. The most likely explanations for our results are that the workers in our study were either not exposed to AI viruses because none were present in their occupational environments, or that the viruses to which they were exposed were incapable of infecting humans.

It is feasible that the workers were not exposed to AI viruses because there was no AI virus present in the poultry houses prior to serum collection. Our knowledge of AI outbreaks before 2006 is limited due to weak reporting requirements in the US, so we are unable to document the presence of virus in poultry houses at times preceding our study.

Due to low levels of reported use of protective equipment, it is improbable that the use of safety equipment prevented infection following exposure.

It is possible that slight antigenic differences between the AI viruses used in the HAI assay and the viruses circulating in the poultry (antigenic drift variants) could result in false negative readings, although this explanation is unlikely.

Greater and continued attention to the serological status of poultry workers is vital for protective. Prospective studies of industrial poultry worker populations are required to monitor this critical animal/human interface in the United States, and therefore should be a central component of pandemic prevention strategies.