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The epidemic characteristics of infectious diarrheal pathogens of China during 2010 to 2014

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Background: Infectious diarrhea is a major concern for public health worldwide and the primary cause of morbidity and mortality among children in developing countries. Etiology surveys of infectious diarrhea in China are limited, especially for detecting virus and bacteria simultaneously.

Material/methods: A cross-sectional surveillance was conducted among 17 provinces of China from 2010 to 2014. The acute diarrhea outpatients were collected from clinics or hospitals. A questionnaire was used to survey demographics and clinical features. The feces samples were taken for laboratory detection of 5 virus and 17 bacteria. The etiology of diarrhea cases was analyzed.

Results: A total of 28704 outpatients were enrolled from 17 provinces of China during Jan 2010 to Dec 2014. Virus positive rate was 36.61%. Rotavirus (15.92) and Norovirus (14.44%) were the most prevalent. The overall bacterial isolation rate was 15.80%. The isolation rate of diarrheogenic *Escherichia coli* (DEC) was the highest (7.13%). The isolation rates of *Salmonella* (4.63%) and *Shigella* (3.89%) ranked following and the rates of other species of bacteria were less than 1%. There were obvious different symptoms between virus and bacterial infection. The common clinical symptoms of viral diarrhea were characterized by watery stool, vomiting and without white blood cells (WBC) and red blood cells (RBC) in stool. However, the common symptoms of bacterial diarrhea were characterized by mucus or bloody stool, with WBC or RBC in stool, and vomiting rarely. It's worthy to note that, the symptoms of *Vibrio* infection looked like viral diarrhea. The symptoms of *Salmonella* and *Shigella* infection were very similar and it's impossible to distinguish just by symptoms only. The infection risks of Rotavirus, Norovirus, Adenovirus, EAggEC, STEC and *Salmonella* were higher in children than in adults. But the risks of ETEC, EIEC, *Vibrio* and *P. shigelloides* were higher in adults than in children. The proportions of *Shigella* serogroups showed no obvious differences between childhood cases, while the diversity of DEC classes was observed between the two groups. The

infection rates of Shigella and A.hydrophila in rural areas were significantly higher than large cities. The infection risks of Shigella reduced with the urbanization development. S.Flexneri was the dominant serogroup of Shigella in rural regions and S.sonnei was the main serogroup in urban regions. However, the risks of Salmonella didn't have the significant differences between rural areas and large cities. the classes of DEC were similar between rural areas and large cities.

Conclusions: The etiology of Chinese large cities resembled developed countries and the etiology of Chinese economically depressed areas are similar to developing countries worldwide. Shigella and A. hydrophila are the major differently-infected pathogens between the developed and developing areas. A.hydrophila is inferred to be an important diarrheogenic bacterium but was ignored.