

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.

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. The positive rates of pathogens were showed in Table 1.

The pathogen infection of children and adults: The positive rates of Rotavirus, Norovirus, Adenovirus, Sapovirus, *Salmonella*, EAggEC and STEC were higher in children than adults. But the rates of *Shigella*, ETEC, EIEC, *Vibrio* and *P. shigelloides* were higher in adults (Fig 1).

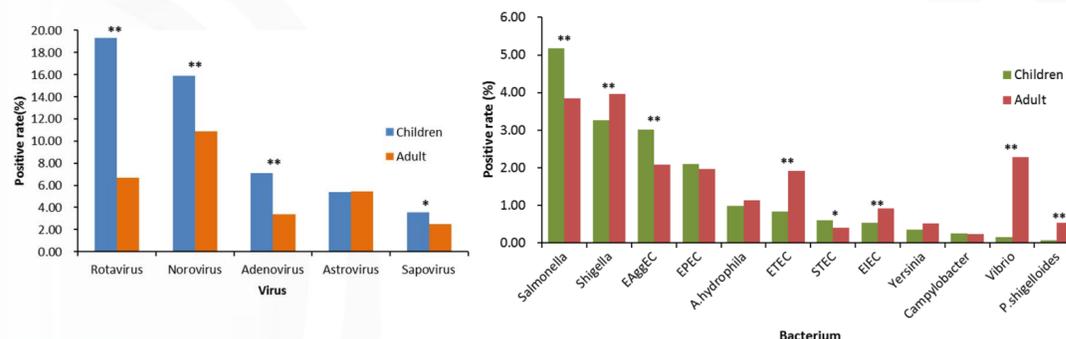


Figure 1 The comparison of positive rates between children and adults

The pathogen infection of the population in rural areas and large cities: The infection rates of *Shigella* and *A. hydrophila* in rural areas were significantly higher than large cities (Fig 2). The DEC and *Salmonella* were the main bacteria of infection in large cities. While the proportion of *Shigella* infection rose sharply with the reduce of urbanization development (Fig 2). And *S. flexneri* was the dominant serogroup of *Shigella* in rural areas and *S. sonnei* was the main serogroup in large cities. The children's infection risk of *S. flexneri* was 11.304 times higher than adults' (OR=11.304, CI:[8.018-15.93], P<0.001).

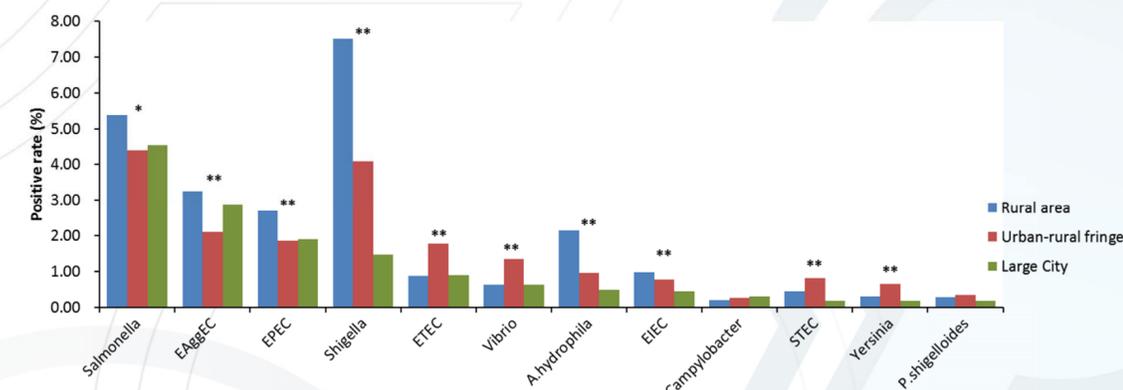


Figure 2 The comparison of bacterial positive rates among rural areas, urban-rural fringes and large cities

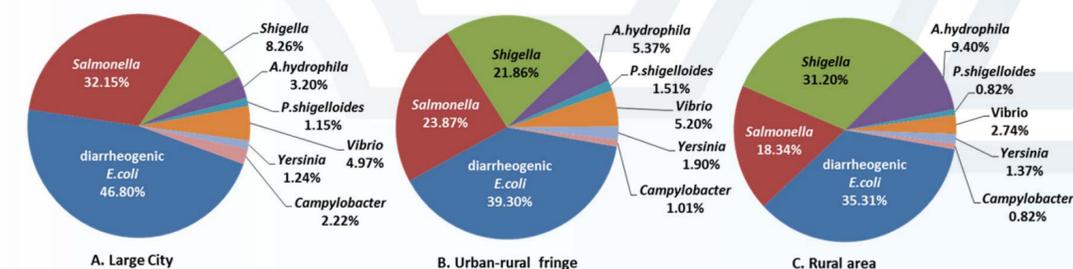


Figure 3 The comparison of bacterial spectrums among rural areas, urban-rural fringes and large cities

Conclusion: 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.

Table 1 The positive rates of pathogens

Pathogen	Positive rate(%)	Pathogen	Positive rate(%)
Bacteria	15.80	Virus	36.61
<i>Salmonella</i>	4.63	Rotavirus	15.90
<i>Shigella</i>	3.89	Norovirus	14.44
<i>S. flexneri</i>	2.61	Sapovirus	6.14
<i>S. Sonnei</i>	1.15	Astrovirus	5.44
<i>S. dysenteriae</i>	0.09	Adenovirus	3.30
<i>S. boydii</i>	0.05		
Diarrheogenic <i>E. coli</i>	7.13		
EAggEC	2.61	<i>A. hydrophila</i>	1.02
EPEC	2.04	<i>Vibrio</i>	0.98
ETEC	1.28	<i>Yersinia</i>	0.42
EIEC	0.70	<i>P. shigelloides</i>	0.26
STEC	0.51	<i>Campylobacter</i>	0.26