

Monitoring winter-seasonal acute gastroenteritis emergency department visits by age

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Objective

We describe the initial phase of the ISDS Distribute pilot for monitoring acute gastroenteritis (AGE) syndromic emergency department (ED) visits and present preliminary analysis of age-specific trends documenting a dramatic shift in AGE consistent with US rotavirus vaccine policy and use.

Introduction

Epidemic AGE is a major contributor to the global burden of morbidity and mortality. Rotavirus and norovirus epidemics present a significant burden annually, with their predominant impact in temperate climates occurring during winter periods. Annually, epidemic rotavirus causes an estimated 600,000 deaths worldwide and 70,000 hospitalizations in the United States, primarily among children younger than 5 years (1). The U.S. burden from norovirus is estimated at 71,000 hospitalizations annually, with the impact more generally across age groups (2). Changes in rotavirus vaccine use have significantly reduced the impact of epidemic rotavirus (3).

Methods

The Distribute project began in 2006 as a distributed, syndromic surveillance effort networking state and local health departments to share aggregate ED based influenza-like illness (ILI) syndrome data (4). The AGE pilot was conducted to assess the feasibility of generalizing the Distribute model from ILI trends to monitoring other syndromes. Distribute participating jurisdictions were asked to submit diarrheal and vomiting AGE syndrome ED data, following a commonly used syndrome definition. Of the 10 Distribute participating jurisdictions that submitted AGE data, 6 provided historical baseline data going back to January 2006 or earlier. Of these, 3 were state, 3 large city or county jurisdictions, located in Northeastern, Mid-Atlantic, Midwestern and Western U.S. surveillance regions. Syndrome time-series ratios [(weekly AGE syndrome count)/

(total ED visit count)] were assessed by jurisdiction and age group. To aid comparison of seasonal trends across jurisdictions, time-series were normalized around their baseline as a measure of relative increase [(weekly AGE ratio)/(weekly lower-quartile)]. Rotavirus vaccine 2006 pre- and postlicensure periods were compared.

Results

All jurisdictions submitting AGE data to Distribute presented seasonal trends with predominant winter peaks. Across the pilot jurisdictions, seasonal peaks from 2003/04 to 2005/06 occurred during Mar–Apr, while 2006/07 to 2009/10 seasonal trends peaked predominantly in Dec–Feb. Overall, epidemic timing was similar across age groups; however, the shifting pattern in impact after the 2006/07 season presented a greater drop among young children. (Fig. 1).

Conclusions

The results of the pilot suggest the Distribute model can be successfully generalized to monitoring AGE trends, specifically the age-specific timing and impact of winter-seasonal epidemic rotavirus and norovirus. The case study of 2006 rotavirus vaccine implementation and subsequent shift in timing and impact of AGE trends suggest that syndromic ED data can potentially provide a useful surveillance indicator of population-level vaccine effect.

Keywords

Gastroenteritis; norovirus; rotavirus; epidemiology; emergency department

References

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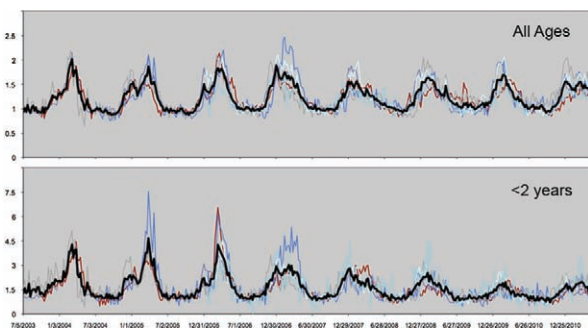


Fig. 1. Distribute jurisdiction AGE trends, July 2003 to May 2011, shown normalized as a measure of relative increase for 6 jurisdictions (thin lines) and as a composite mean ratio (thick black lines). The top graph shows relative increase for ED visits among all age groups. The bottom shows relative increase only for those aged younger than 2 years.

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