Contagiousness of STEC
A Literature Review

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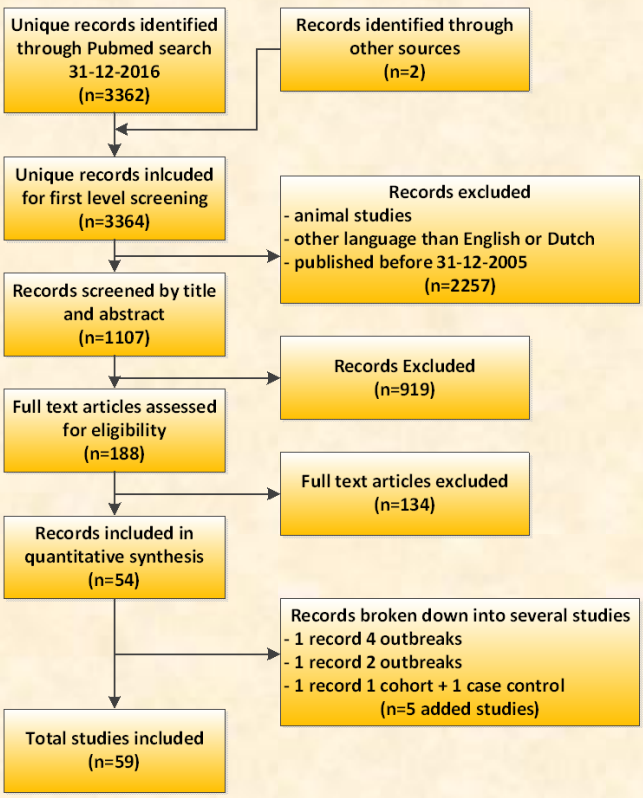
Introduction

Shiga toxin-producing *Escherichia coli* (STEC) cause gastroenteritis. The O157 and 'big six' serotypes are associated with outbreaks and hemolytic uremic syndrome (HUS). Secondary infections of STEC can occur by person-to-person transmission. To prevent secondary transmissions the Dutch Public Health Services have constituted guidelines for the exclusion of people infected with STEC from school or work. Current guidelines are based on literature published before February 2008. Meanwhile new diagnostic methods have come to a rise which may lead to new insights regarding infectiousness and infectious period of STEC in general or of certain serotypes. The main question of this review is: "What is the contagiousness and infectious period of a shiga toxin-producing *E. coli* infected person?".

METHODS

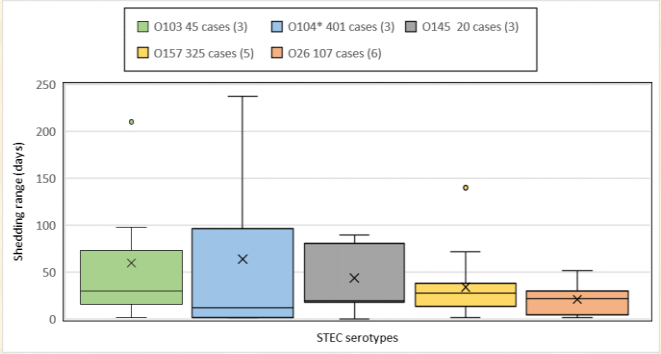
A review of literature published between 1 January 2006 and 31 December 2016 was performed in PubMed. Contagiousness and infectious period of STEC were assessed using secondary attack rate and shedding time as proxies.



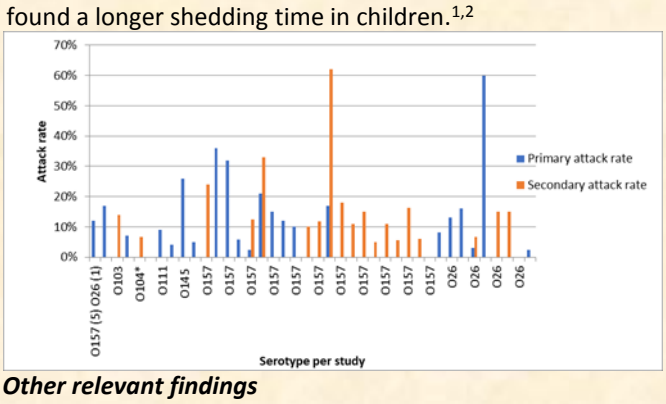
RESULTS

Primary findings

The most common STEC serotypes described were O157 (n=35 studies) and O26 (n=14). 22 studies provided data on shedding period. Shedding time ranged between 1 and 237 days. The median overall shedding time was 30 days. Two studies found an increased shedding time in children compared to adults. Four studies described intermittent shedding.



Secondary transmissions were discussed in 35 studies. Of 21 studies detailed data was available. The secondary attack rate ranged from 2% to 62% with a median of 12%. Secondary cases were overall younger than primary cases, and when primary cases were young children secondary cases were more likely to occur. Besides this, two studies found a longer shedding time in children.[1,2]



Other relevant findings

Two studies concerning serotype O104 describe a shorter shedding time after antibiotic treatment. Although the use of antibiotics during the acute phase of a STEC infection is generally discouraged due to the increased risk of HUS, no increased risk of HUS was found when antibiotics were administered after the acute phase, and the shedding range was significantly shortened ($p<0.001$).[2,3]

Limitations

- PubMed only used database, limited study period
- Virulence and severity factors not considered
- No data available on the coherence between shedding and secondary attack rate.
- Potential sampling bias

CONCLUSIONS

These findings reaffirm the current Dutch guidelines to exclude young children, infected with O157 and other known STEC pathotypes, from school or daycare. Children are spreading the pathogen for a longer period of time, and secondary cases seemed to occur more often in settings with young children. Though data did not allow analysis of association between shedding and secondary attack rate. Taking into account that young children practice poor hygiene, a higher chance of transmitting the pathogen to others is likely. Intermittent shedding underscores the need for consecutive negative stool samples. Given the inability of cultures to test for non-O157 STEC serotypes, the use of PCR is a necessary trend in order to be able to test for non-O157 serotypes as well. Finally, although the use of antibiotics after the acute phase is promising for reduction of shedding time, more research is needed on the effects of antibiotics in varying settings regarding varying serotypes before the use of antibiotics can be recommended in the guidelines.

REFERENCES

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