Estimation of burden of rotavirus infections in children <5 years old in Poland

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Introduction

- A burden of gastrointestinal illness study in Poland is currently performed.
  - » good quality data available
  - » rotavirus (RV): a vaccine-preventable infection as cause of social burden.
- The aim of the study was to estimate the annual incidence of rotavirus-caused diarrheal episodes in the population of children aged less than 5 years in Poland, in order to prepare evidence-based recommendations for future prophylactic interventions

Material and Methods

- Method: reconstruction of surveillance pyramid
- Assumptions were made based on local and international publications
  - » number of symptomatic acute gastroenteritis (AGE) cases visiting GPs was obtained from 2009 population-representative retrospective survey.
  - » probability of stool sample collection from AGE cases obtained from prospective health utilization survey performed in 19 health units in 2008-2009.
  - » probability of reporting RV-positive laboratory results was estimated by comparing data from hospital discharge records and surveillance notifications.
- Uncertainty in all variables was quantified using probability distributions.
- Monte Carlo simulations (50,000 iterations) were used to estimate the number of RV episodes in the community, visiting GPs, and hospitalized, separately for each birth cohort 0-4 years.

Results

- The mean number of rotavirus infections reported during 2005-2009 was:
  - » 336 cases consulting a GP (17.4 per 100,000 inhabitants)
  - » 14,415 hospitalized cases (746.9 per 100,000 inhabitants)
  - » Assumptions for the model are presented in Table 1.

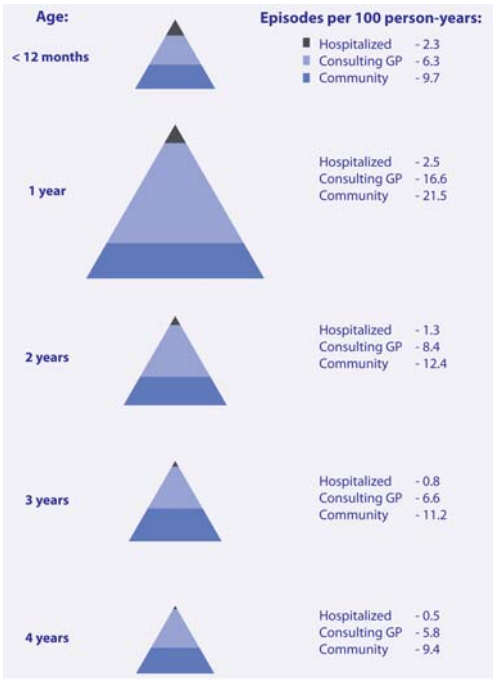
Table 1. *Age-specific general parameters for the model*

Age (years)	<1	1	2	3	4
1. Probability of GP consultation	90%	90%	80%	70%	70%
2. Probability of sample collection from patient					
a. GP consulation	*3%*	*3%*	*3%*	*3%*	*3%*
b. Hospital admission	*78%*	*79%*	*74%*	*78%*	*88%*
3. Probability of testing of submitted sample for RV					
a. GP consulation	*30%*	*30%*	*30%*	*30%*	*30%*
b. Hospital admission	*80%*	*80%*	*80%*	*80%*	*80%*
4. Sensitivity of RV test	87%	87%	87%	87%	87%
5. Probability of positive laboratory test result reporting					
a. GP consulation	*50%*	*50%*	*30%*	*30%*	*30%*
b. Hospital admission	*94%*	*52%*	*43%*	*51%*	*46%*

NOTE: Only assumptions 3 and 5a were based on expert opinion. The assumptions 1, 2 and 5b are based on data from population-based studies (2008-2009), surveillance data and hospital discharge data from Poland.

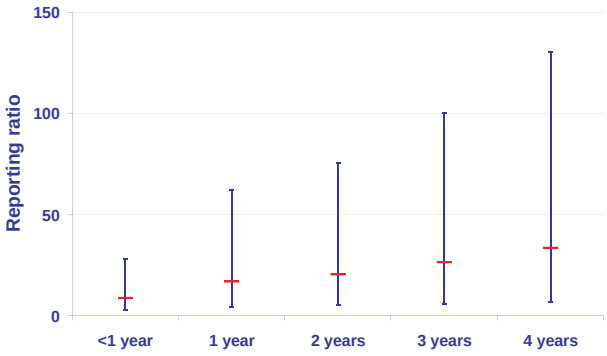
- We estimated the number of rotavirus infections in children under 5 years at 249,226 (12.9 episodes per 100 person-years), of which 170,509 (8.83) consulted a GP, and 29,085 (1.51) were hospitalized.

Figure 1. *Reconstruction of the surveillance pyramid for each birth cohort*



- For one reported case of RV infection, an estimated 17 episodes occurred in the community. The age-specific reporting ratios ranged from 9 for children aged <12 months to 33 for children aged 4 years (Figure 2).

Figure 2. *Age-specific reporting ratios (multipliers) with 95% confidence limits*



Conclusions

- The present study confirmed the high frequency of RV episodes in the youngest age groups in Poland, and important differences in age-specific RV surveillance sensitivity.
- The assumptions made in the current study need to be further validated by field studies and data from independent sources.