

Rotavirus Gastroenteritis burden of disease among older adults: discussion based on a systematic literature review

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Background

- Rotavirus gastroenteritis (RVGE) and associated disease burden is well recognized in young children¹. Older adults are at high-risk for severe outcomes given acute gastroenteritis (AGE)². However, the disease burden of RVGE is less understood.
- Introduction of rotavirus (RV) vaccination in infants may indirectly avoid RV-related disease in older adults. Thus, in this review, we aimed to comprehensively assess RVGE burden and vaccination impact in older individuals.

Methods

- We performed a systematic literature review with PubMed and Scopus, from 2000 to 2019, using MESH and free-range terms.
- Our search terms included: (Gastroenteritis/epidemiology/virology[MeSH Subheading]) AND "adult" AND "rotavirus" (Pubmed); "elderly AND "incidence" AND "rotavirus" in Pubmed and Scopus; and "rotavirus AND "incidence" AND "adult" in Pubmed. We applied filters for language (English), and Subject (Human), and excluded items published before 2000.
- Studies reporting the incidence of AGE/RVGE, and/or RVGE vaccination impact, in adults aged 60 and above and using regional specific data-sources

Results

Systematic Literature Review results



Results

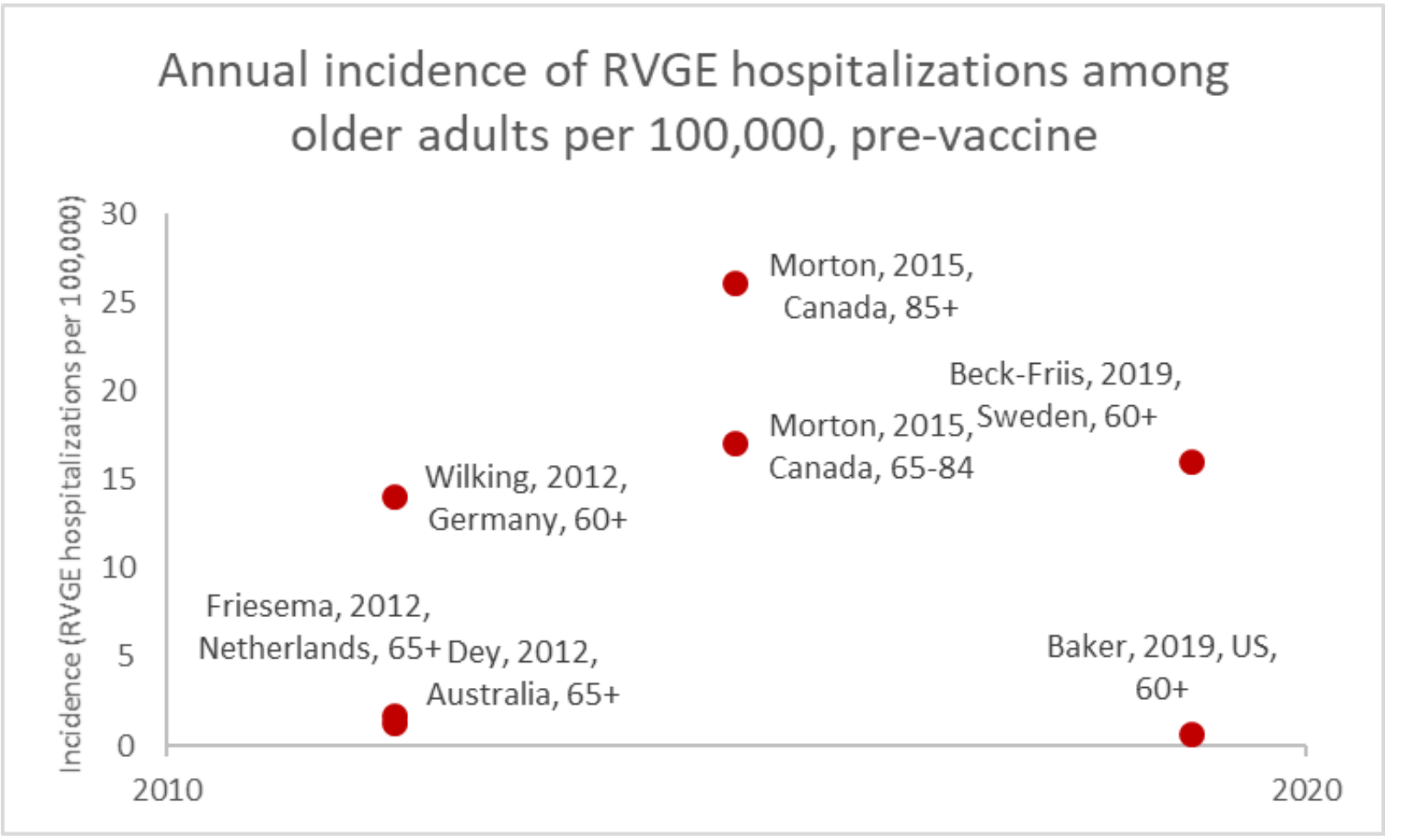


Figure 1: Pre-vaccine incidence of Rotavirus Gastroenteritis (RVGE)

Friesema and Baker et al results were estimated. Weidemann's modeling results were not shown, as they do not refer to hospitalizations; and Wilson's results are not shown as they were rounded up to zero in the original publication. Results from Morton et al. derive from modeling results; Beck-Friis results derive from a retrospective database analyses with testing for rotavirus, Wilking et al. estimates were derived from a laboratory confirmed dataset.

Table 1: Impact of vaccination, as analyzed via retrospective database analyses

Study	Population	Data source	IRR (95% CI)
Dey MJA 2012	Australian, 2001 - 2010	National Hospital Morbidity Database of the Australian Institute of Health and Welfare, an electronic collection of records of admissions to public and private hospitals	RVGE Hospitalization IRR, 65+: 2.73 (2.19–3.41) 1 year after vaccine introduction AGE Hospitalization IRR, 65+: 1.32 (1.31–1.33) 1 year after vaccine introduction
Gastañaduy JAMA 2013	United States, 2000 -2010	Nationwide Inpatient Sample, a nationally representative database of US hospital inpatient stays	RVGE Hospitalization IRR, 65+: 0.86 (0.53-1.40) AGE Hospitalization IRR, 65+: 0.99 (0.92-1.10)
Wilson, PloS one, 2016	Canada, 2005 - 2013	Canadian Institutes for Health Information and the National Ambulatory Care Reporting System	RVGE Hospitalization IRR, 65+: 0.57 (0.10–3.15) AGE Hospitalization IRR, 65+: 0.80 (0.72–0.90)
Thomas, Vaccine, 2017	UK, 2008-2015	Database of primary care medical records from a representative 7% sample of the UK population	AGE GP IRR, 65+: 0.94 (0.90-1.00)
Hungerford, BMC ID, 2018	UK:2008-2016 metropolitan area of Merseyside (population:1.4 million)	Comprehensive health-care provider datasets from Merseyside	% reduction in AGE outcomes, 65+, after vaccine introduction: hospitalization - 25%; ED Attendance - 21%; Walk in center - 47%; GP Consultations – 36%
Baker, CID, 2019	United States, 2000-2013	Healthcare Cost and Utilization Project State Inpatient Databases	Monthly RVGE Hospitalization IRR, 60+: 0.76 (.61–.96)

• AGE: Acute Gastroenteritis; RVGE: Rotavirus Gastroenteritis; IRR: Incident Rate Ratio;
 • ED: Emergency Department; GP: General Practice

Results

- 11 studies reviewed included retrospective database (6) (Table 1) and modeling studies (5) in populations from Australia (1), Sweden (1), Netherlands (1), Canada (2), Germany (2), UK (2), and the US (2).
- Yearly inpatient RVGE incidence varied between 1.6 per 100,000 in Australia for those 65+ (retrospective database analyses, pre-vaccine); and 26 per 100,000 for those 85+ in Canada (modeling estimates for 2006-10, pre-vaccine) (Fig. 1).
- Post-vaccination Incident Rate Reductions (IRR) of RVGE and AGE among 60+ were reported in several countries, with the lowest IRR, corresponding to highest reduction (0.56) being reported for Canada, (Table 1).

Discussion

- Few studies reported burden of RVGE in older adults. Variation in findings may denote lack of testing and reporting in most database analyses;
- Given herd immunity, introduction of rotavirus vaccines in vaccination programs has the potential to reduce burden of rotavirus gastroenteritis across all ages. Such reductions should be considered when analyzing the benefits of rotavirus vaccine in vaccination programs.
- Studies to further assess burden of RVGE diseases and impact of vaccination in older adults are warranted

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