Case control study of rotavirus vaccine effectiveness in Portugal after six years of private market use

Robin Marlow, Muriel Ferreira, Adam Finn, Fernanda Rodrigues

Early Career Researcher I&I Away Day
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Rotavirus Vaccine in schedules
Rotavirus Vaccine in schedules


2007
2008
2009

12
Rotavirus Vaccine in schedules
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Rotavirus background
Vaccine effectiveness against admission

61-98%


90%
(95% CI: 81-95)
Vaccine effectiveness against admission

Vaccine effectiveness against admission

92.1% (95% CI: 50.0-98.7)
Rotavirus vaccine coverage (2010)

Hospital Pediátrico de Coimbra

Serves population ≈330,000 children

Gastroenteritis surveillance since 2006

Jan – July
All children <36m with gastroenteritis symptoms (≥3 watery or looser than normal stools within a 24 h period with or without vomiting)

RV testing by immunoassay
Objectives

• primary
  – assess the effectiveness of at least one dose of either vaccine (intention to vaccinate) against attendance with rotavirus gastroenteritis.

• secondary
  – to estimate effectiveness against admission with rotavirus gastroenteritis
  – compare effectiveness between vaccines

using matched test negative case control design
Rotavirus positive cases
Rotavirus positive cases

Controls
Rotavirus positive cases

Controls
Vaccinated rotavirus positive cases

Vaccinated controls

Unvaccinated rotavirus positive cases

Unvaccinated controls
Vaccine effectiveness = 1 – Odds ratio of vaccination
Vaccine effectiveness = 1 - \left( \frac{a}{c} \bigg/ \frac{b}{d} \right)
Vaccine effectiveness = $1 - \left( \frac{\text{disease vaccinated}}{\text{disease unvaccinated}} / \frac{\text{healthy vaccinated}}{\text{healthy unvaccinated}} \right)$
Vaccine effectiveness = 1 – \( \frac{\text{disease vaccinated}}{\text{disease unvaccinated}} \times \frac{\text{healthy vaccinated}}{\text{healthy unvaccinated}} \)
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Vaccine effectiveness = 1 – \(\frac{2/8}{7/3}\)
Vaccine effectiveness = 90%
Attendances (n=5216)
<36m with gastroenteritis, born after 01/04/2006
aged > 8 weeks at attendance

stool samples
(34% n=1798)

Cases (n=542)
testing RV+ve

Controls (n=874)
testing RV-ve, age matched attendance +/- 30 days

Rotavirus vaccination status
(public health)

Year of attendance
Home district

Conditional logistic regression

Results
Attendances (n=5216)
<36m with gastroenteritis, born after 01/04/2006
aged > 8 weeks at attendance

stool samples
(34% n=1798)

Cases (n=542)
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Year of attendance
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Conditional logistic regression

Results
Matching

• Cases/Controls:
  median age difference 0 days (IQR -1 to 1 day).
  5% of cases / 21 % controls vaccinated.

Vaccine used:
  62:38 RotaTeq:Rotarix

Completed the course:
  82:84 RotaTeq:Rotarix (p=0.7)
Results

preventing attendance with rotavirus
  – 83.7 (95% CI 73.9-89.8) effective
  – Sub-analysis by vaccine
    • Rotarix  81.3(67.4-89.3)
    • RotaTeq  86.6(72.0-93.6) (p=0.59)

Preventing admission with rotavirus
  – 96.1% (95% CI 83.8-99.1) effective
  – Sub-analysis by vaccine
    • Rotarix  96.1(71.2-99.5)
    • RotaTeq  96.0(69.8-99.5) (p=0.99)
Limitations

- Stool sampling percentage
- Data linkage difficult
- Quality of vaccination recording
Summary

- Despite low coverage, in Portugal:
  - RV excellent personal protection against RVGE
  - No significant difference between RV1 / RV5
Any Questions?
Comparison with other studies

• Spain (2008)
  – 35% coverage
  – RV1:RV5 56:44
  – 95.6% protection admission

• Spain (2011)
  – 17% coverage
  – RV1:RV5 1:1
  – 83% protection admission

• Germany (2011)
  – 28% coverage
  – RV1:RV5 45:55
  – 80% protection against admission