

A microscopic image of rotavirus particles, which are spherical and covered in numerous spikes. The central particle is the largest and most prominent, showing a clear arrangement of spikes. Other smaller particles are scattered around it. The background is black, making the yellow and blue-tinted particles stand out.

QA: Rotavirus Vaccine

Jane Ostlie

Rotavirus Infection

- * Causes gastroenteritis and subsequent dehydration.
 - * Illness usually lasts 3-7 days
 - * Fecal-oral spread, including through fomites
 - * Winter seasonal peak
 - * Clinically significant cases are usually in children.
 - * 80% of kids will get rotavirus gastroenteritis before age 5
 - * Initial infection protects against subsequent severe infection.
- Most U.S. adults are immune.

Annual impact (On kids < 5 yrs old)

- * Deaths: 20-60
- * Hospitalizations: 55,000 – 70,000
- * Rotavirus causes only 5-10% of all gastroenteritis
- * But ~40% of hospitalizations for gastroenteritis
- * ER visits: 205,000 – 272,000
- * Clinic visits: 410,000
- * Costs estimated at \$1 billion
- * Direct and indirect
- * Median cost of RG hospitalization = ~\$2,300*

Rotavirus Vaccines

Since 2006, recommended by ACIP as part of routine childhood vaccination schedule

Rotashield was recommended by the CDC in 1998, but withdrawn within one year. Associated with intussusception.

RotaTeq (RV5)

- Contains RNA from 5 rotaviruses
- 3 oral doses, at 2, 4, and 6 months

Efficacy:

- One phase III trial of 68,000+ infants in 2005: decreased ED visits by 94% and hospitalizations by 96%.
- Other phase III trials have been done with similar results.

RotaRix (RV1)

- Contains RNA from 1 rotavirus
- Similar efficacy to RotaTeq
- Dosing different: 2 oral doses, at 2 and 4 months

Recent MMWR (2/6/09) from the ACIP: No preference for RV5 over RV1. Kids should have one or the other.

Adverse effects

- * Intussusception- no increased risk
- * Serious events and death- no increased risk
- * Statistically significant increase in:
 - Diarrhea (3% greater rate)
 - Vomiting (2%)

Have we seen benefit in our community?

Pediatric gastroenteritis admissions at Altru Hospital

Pediatric gastroenteritis admissions at Altru Hospital

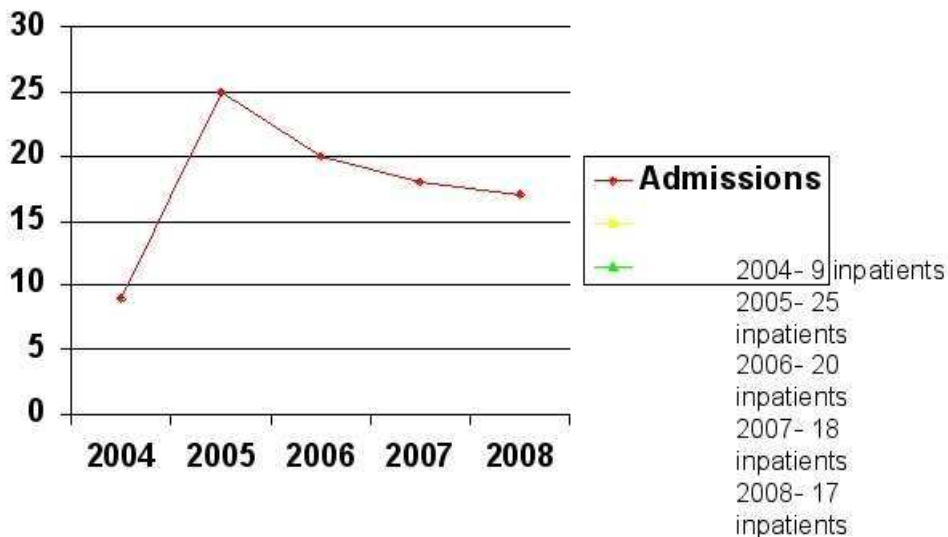


Chart review

* Inpatient admissions, using diagnostic codes for “Rotavirus” or “viral enteritis”

* Pediatric gastroenteritis admissions at Altru Hospital

Rotavirus vaccination at FMR clinic:

Chart review

* Vaccination records of 80 children reviewed (for 2-6 month well-child checks) in 2007 and 2008.

Received complete series: $25 / 80, = 31.25\%$

Received partial series: $7 / 80 = 8.75\%$

Received no Rotavirus vaccine: $48 / 80 = 60\%$

Why aren't we using the Rotavirus vaccine more?

- * Parent choice- refuse either for health concerns or for financial reasons
- * But at least it's not another shot!
- * We don't think it works?
- * We don't think it's an illness worth preventing?
- * Concerns about side effects?
- * We forget to recommend it?
- * Cost-effectiveness of vaccine

ACIP's 2006 analysis, based on hypothetical national vaccination program using 3 doses of RV5 vaccine.

Direct costs:

* Vaccination is cost-saving as long as the cost is $< \$143 / \text{child}$

Indirect costs:

* Vaccination is cost-saving as long as the cost is $< \$156 / \text{child}$

* Manufacturer's price: $\$62.50 / \text{dose (2006)} = \$187.50 \text{ per series}$

* Rotavirus vaccination is not cost-saving.

Cost-effectiveness compared to other vaccines

Cost-effectiveness compared to other vaccines

	Annual deaths prevented	Cost per life-year gained
Hepatitis B	900,000	\$1,500
Hib	400,000	-
PCV	-	\$80,000
Rotavirus	30	\$197,000

My recommendations:

- * Physicians should talk with concerned parents about the efficacy, risk, and benefit of the vaccine.
- * In my opinion, the strongest objection to vaccination is the financial cost.
- * Most kids should get Rotavirus vaccine with the other standard vaccines.
- * Rotavirus gastroenteritis causes significant suffering in the U.S., which can be prevented with a painless vaccination.
- * 70% vaccination rate at FMR by 2011

References

- ACIP, MMWR Recommendations and Reports. "Prevention of Rotavirus Gastroenteritis Among Infants and Children Recommendations of the Advisory Committee on Immunization Practices (ACIP)." August 11, 2006 / 55(RR12); 1-13.
- ACIP, MMWR Recommendations and Reports. "Prevention of Rotavirus Gastroenteritis Among Infants and Children Recommendations of the Advisory Committee on Immunization Practices (ACIP)." February 6, 2009 / 58(RR02);1-25.
- Fischer TK, et al., "Hospitalizations and deaths from diarrhea and rotavirus among children <5 years of age in the United States, 1993-2003", J. Infect Dis, 2007 Apr 15;195(8):1117-25.
- Zimmerman CM, et al. "Cost of diarrhea-associated hospitalizations and outpatient visits in an insured population of young children in the United States." *Pediatr Infect Dis J*, 2001 Jan;20(1):14.
- Armstrong, EP. "Economic benefits and costs associated with target vaccinations". *J Manag Care Pharm*. 2007 Sep;13(7 SupplB):S12-5.
- Tucker AW, Haddix AC, Bresee JS, Holman RC, Parashar UD, Glass RI. Cost-effectiveness analysis of a rotavirus immunization program for the United States. *JAMA* 1998;279:1371--6.