

ROTAVIRUS IN AFRICA

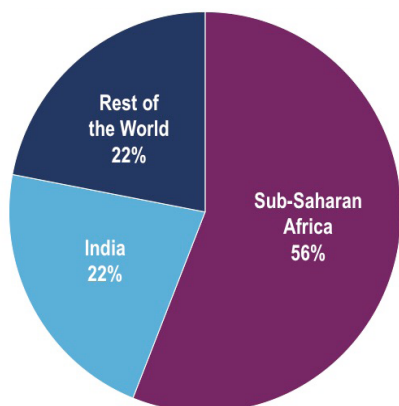


Rotavirus is a leading cause of child death and hospitalization in Africa

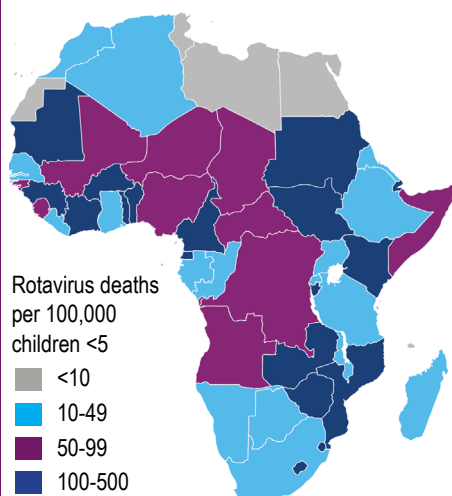
Diarrheal disease is one of the world's leading killers of children, and rotavirus is the most common cause of severe diarrhea. Each year, nearly a quarter of a million children under the age of five die from rotavirus and hundreds of thousands more are hospitalized [1,2]. Five countries, including Nigeria and the Democratic Republic of the Congo (DRC), account for half of the rotavirus deaths in the world [3].

On average, rotavirus kills more than 330 African children under age five every day and causes a significant proportion of diarrheal disease hospitalizations [3]. In 2010, rotavirus accounted for 42% of all diarrheal disease hospitalizations in sub-Saharan Africa [4].

Rotavirus deaths among children <5 years of age, 2013



Rotavirus mortality rate among African children <5 years of age, by country, 2013



Adapted from Tate JE, Burton AH, Boschi-Pinto C, Parashar UD; World Health Organization-Coordinated Global Rotavirus Surveillance Network. Global, regional, and national estimates of rotavirus mortality in children <5 years of age, 2000-2013. *Clin Infect Dis.* 2016; 62 Suppl 2: S96-S105

The World Health Organization (WHO) recommends that all countries introduce rotavirus vaccines into their national immunization programs.

Safe and effective rotavirus vaccines are available today

Two WHO prequalified, orally administered rotavirus vaccines are available today: Rotarix® (GlaxoSmithKline) and RotaTeq® (Merck & Co., Inc.). Both vaccines have been shown to be safe and effective in large-scale clinical studies in Asia, Africa, the Americas, and Europe [5-20].

Rotavirus vaccines provide broad protection, even against virus strains not included in the vaccine. They have also been shown to reduce rotavirus-related hospitalizations among children and adults who are too old to be vaccinated, demonstrating herd immunity [5-8, 21].

33 African countries have introduced rotavirus vaccines into their national immunization programs to date, but many of the countries with the highest rotavirus mortality rates—like the Central African Republic, Chad, the Democratic Republic of the Congo, Nigeria, and Somalia—have yet to introduce rotavirus vaccines.

Rotavirus takes an economic toll on families and health systems

In Uganda, in-patient admission for one episode of severe rotavirus diarrhea costs 10% of the average family's monthly income [22].

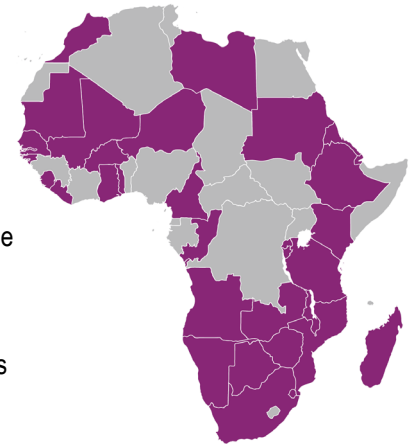
Recent studies show that national rotavirus vaccination programs will be highly cost-effective and also reduce healthcare costs due to rotavirus-related illness [22-25].

Projected health and economic impact of rotavirus vaccine implementation [22-25]

Country	Cases averted	Deaths averted	Healthcare costs averted	Date range
Kenya	1.2 million	61,000	US\$30 million	2014-2033
Malawi	1 million	4,313	US\$8 million	2014-2033
Uganda	4 million	70,000	US\$10 million	2014-2035

Rotavirus vaccines demonstrate substantial impact in Africa

Since South Africa became the first African country to introduce rotavirus vaccines in 2009, **33 countries in Africa** (shaded purple at right) have introduced rotavirus vaccines into their national immunization programs [26].



- After **Rwanda** became the first low-income country in the world to introduce the pentavalent rotavirus vaccine in 2012, hospital admissions for acute gastroenteritis decreased by about half [33]. Researchers also noted a decrease in rotavirus diarrhea hospitalizations in almost every age group, suggesting herd immunity [33].
- Within two years of vaccine introduction, **Zambia** experienced 51% and 31% reductions in rotavirus hospitalizations for infants and one-year olds, respectively [32].
- In **Botswana**, there has been a 43% and 48% reduction in gastroenteritis-related hospitalizations and deaths in infants during the rotavirus season, respectively [27].
- In **Malawi**, a low-income country where health expenditures have substantially increased in the last decade, rotavirus vaccine is highly cost-effective [25].
- **Togo's** June 2014 introduction of monovalent rotavirus vaccine has already demonstrated impressive results in the first rotavirus season post-introduction: 43% reduction in rotavirus hospitalizations for infants [34].
- In the first two years following introduction in **South Africa**, all-cause diarrhea hospitalizations declined by one-third for children under five [34]; a recent study in urban Soweto observed a 34-57% reduction in the overall incidence of all-cause diarrhea hospitalizations in children under five [31]. The vaccine has been effective in reducing the incidence of diarrhea for both HIV-infected and uninfected children [31].

Over 20 years, implementing the rotavirus vaccine in Malawi's national immunization program will avert US\$8 to US\$9 million in health care costs [25].

Country	Year of national rotavirus vaccine introduction	Data time period		Reduction in rotavirus diarrhea hospitalizations among children <5 years following introduction
		Pre-vaccine	Post-vaccine	
Ghana [28]	2012	Jan 09 - Mar 12	Apr 12 - Dec 14	49%
Rwanda [33]	2012	Jan 09 - Dec 11	Jan 12 - Dec 14	61-70%
South Africa [34]	2009	May - Dec 09	May - Dec 10; May - Dec 11	54-58%
Togo [35]	2014	Jul 08 - Jun 14	Jul 14 - Jun 15	32%

Country	Year of national rotavirus vaccine introduction	Data time period		Reduction in all-cause diarrhea hospitalizations among children <12 months following introduction
		Pre-vaccine	Post-vaccine	
Botswana [27]	2012	Jan 09 - Dec 12	Jan 13 - Dec 14	43%*
Ghana [28]	2012	Jan 09 - Mar 12	Apr 12 - Dec 14	52%
Malawi [29]	2012	Jan 12 - Jun 12	Jan 13 - Jun 15	48.2%
Rwanda [30]	2012	Jan 09 - Dec 11	Jan 12 - Dec 14	51-55%
South Africa [31]	2009	Jan 06 - 2008	Jan 10 - Dec 14	44.9-65.4%
Zambia [32]	2013	Jan 09 - Dec 11	Jan 13 - Dec 14**	18-29%

Study methodologies differ, so the studies are not directly comparable. RotaTeq used in Rwanda; all others used Rotarix.

* During rotavirus season; ** 2012 excluded as transition year



Rotavirus vaccines are essential to a comprehensive approach to fighting childhood diarrheal disease, and the ROTA Council strongly endorses the recommendation by WHO that all countries introduce rotavirus vaccines as soon as possible.

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