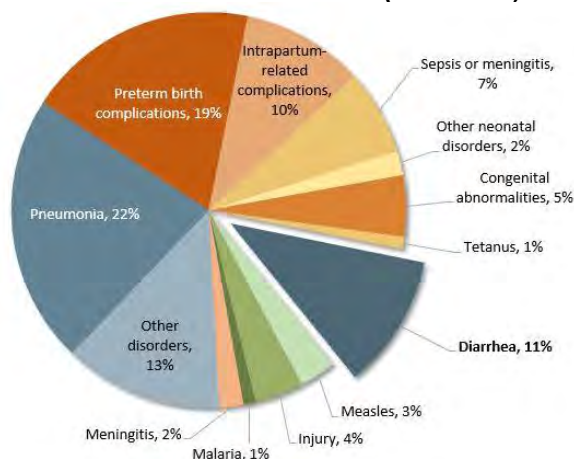


## Rotavirus disease and vaccines in Asia

### ROTAVIRUS IS THE LEADING CAUSE OF SEVERE DIARRHEA IN ASIAN CHILDREN <5 YEARS OLD

Diarrhea is a leading killer of children across Asia, causing approximately 11 percent of deaths in children under five years of age in the World Health Organization's Southeast Asia Region (WHO SEAR).<sup>1</sup> Rotavirus, the most common cause of severe diarrhea in young children worldwide, causes more than 450,000 deaths each year in children under five and is responsible for millions of hospitalizations and clinic visits.<sup>2-4</sup>

### Causes of death in Asian children <5 (WHO SEAR, 2010)<sup>1</sup>



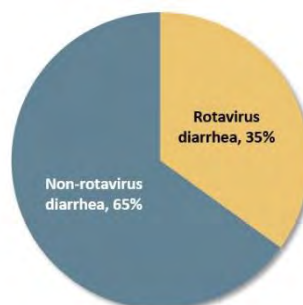
In Asia, rotavirus takes the lives of 188,000 children under five each year, accounting for more than 40 percent of the global total of rotavirus deaths.<sup>2</sup> It is estimated that approximately 35 percent of Asian children hospitalized with acute diarrheal illness are infected with rotavirus.<sup>5</sup> Studies in Asia show that rotavirus vaccines are safe and effective against severe rotavirus disease and are a cost-effective intervention.<sup>6-10</sup>

The high burden of rotavirus disease in Asian children, coupled with the power of rotavirus vaccines to prevent childhood deaths and hospitalizations, underscores the incredible potential for the introduction of rotavirus vaccines in Asian countries to save children's lives.

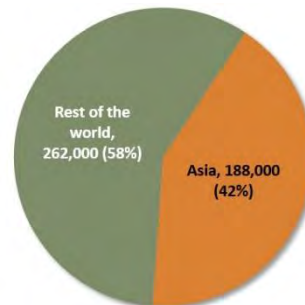
### ROTAVIRUS TREATMENT AND PREVENTION STRATEGIES

Rotavirus is highly contagious and spreads easily from person to person through contaminated hands and objects. It cannot be treated with antibiotics or other drugs. Mild

### Diarrhea hospitalizations in Asian children <5 (WHO SEAR 2014)<sup>4</sup>



### Global deaths from rotavirus in children <5 (2008)<sup>2</sup>



rotavirus infections can be treated effectively in the same manner as other forms of diarrhea, by providing fluids and salts (oral rehydration therapy). However, children with severe rotavirus diarrhea can become dehydrated and often need intravenous fluids or they risk dying. In developing countries, this type of urgent health care is often inaccessible or unavailable, making rotavirus prevention through vaccination critical to saving children's lives.

Vaccination is the best way to prevent severe rotavirus disease and the deadly, dehydrating diarrhea that it can cause. Improvements in water quality, hygiene, and sanitation stop bacteria and parasites that cause other forms of diarrhea but do not adequately prevent the spread of rotavirus. Lifesaving rotavirus vaccines should be introduced as part of a comprehensive approach to control diarrheal disease, along with other interventions including oral rehydration therapy, exclusive breastfeeding, zinc treatment, and improvements in water and sanitation.<sup>11</sup>

### TWO SAFE AND EFFECTIVE ROTAVIRUS VACCINES ARE SAVING LIVES TODAY

There are two orally administered rotavirus vaccines available on the global market today: Rotarix<sup>®</sup>, manufactured by GlaxoSmithKline, and RotaTeq<sup>®</sup>, manufactured by Merck & Co. Inc. Both vaccines are prequalified by WHO and have been shown to be safe and effective in large-scale clinical trials in Africa, Asia, Europe, Latin America, and the United States. Clinical trials in Asia (Bangladesh and Vietnam) found that rotavirus vaccines reduced severe rotavirus disease by more than 60 percent during the first year of life, when children are at greatest risk for severe rotavirus diarrhea.<sup>6</sup>

In June 2009, based in large part on the clinical trials in Asia and Africa that demonstrated vaccine efficacy in impoverished, high-mortality settings, WHO recommended that rotavirus vaccines be included in all countries' national immunization programs.<sup>11</sup>

Rotavirus vaccines are saving lives and improving health in countries where children have access to them. Swift and significant declines in hospitalization and deaths due to rotavirus and all-cause diarrhea have been observed in many of the countries that have introduced rotavirus vaccines into their national immunization programs.<sup>12</sup> Researchers have also found that use of rotavirus vaccines may protect unvaccinated children and adults by reducing transmission (an effect called herd immunity).<sup>12</sup>

### ROTAVIRUS VACCINES IN ASIA

In July 2012, the Philippines became the first country on the continent of Asia to introduce rotavirus vaccines into its national immunization program, focusing initially on immunizing children living in the poorest communities, which have the highest child morbidity and mortality rates from diarrheal disease. While some Asian countries offer rotavirus vaccines on the private market, only the Philippines has introduced rotavirus vaccines through its national immunization program, providing access to all children in need. Thailand introduced rotavirus vaccines in a pilot program in the Sukhothai Province in 2011.<sup>13</sup>

As of August 15, 2014, more than 65 countries have introduced rotavirus vaccines into their national immunization programs, including 32 with funding from Gavi, the Vaccine Alliance.<sup>14</sup> No Gavi-eligible Asian countries have applied for rotavirus vaccine support, but some are considering future applications.

### ROTAVIRUS VACCINES ARE COST-EFFECTIVE AND A WISE INVESTMENT

Rotavirus vaccines are cost-effective, and in GAVI-eligible countries, where 95 percent of deaths due to rotavirus occur, more than 2.4 million child deaths can be prevented by 2030 by accelerating access to lifesaving rotavirus vaccines.<sup>9</sup> If used in all Gavi-eligible countries, rotavirus vaccines could prevent an estimated 180,000 deaths and avert 6 million clinic and hospital visits each year, thereby saving US\$68 million annually in treatment costs.<sup>9</sup>

Accelerating access to rotavirus vaccines will not only save the lives of Asian children but also lessen the tremendous economic and health burden of rotavirus disease, thereby contributing to poverty reduction and economic growth. Gavi and its partners plan to support the introduction of lifesaving rotavirus vaccines in more than 30 of the world's poorest countries by 2015.

For more information on rotavirus disease and vaccines please visit <http://rotavirus.org>.

### REFERENCES

- <sup>1</sup>Liu L, Johnson HL, Cousens S, et al. Global, regional, and national causes of child mortality: An updated systematic analysis for 2010 with time trends since 2000. *The Lancet*. 2012;379(9832):2151–2161. [N.B. WHO's South-East Asia region does not include all countries on the Asian continent. For example, the Philippines is part of WHO's Western Pacific Region].
- <sup>2</sup>Tate JE, Burton AH, Boschi-Pinto C, et al. 2008 estimate of worldwide rotavirus-associated mortality in children younger than 5 years before the introduction of universal rotavirus vaccination programmes: A systematic review and meta-analysis. *The Lancet Infectious Diseases*. 2012;12(2):136–141.
- <sup>3</sup>Parashar UD, Hummelman EG, Bresee JS, Miller MA, Glass RI. Global illness and deaths caused by rotavirus disease in children. *Emerging Infectious Diseases*. 2003;9(5):565–572.
- <sup>4</sup>World Health Organization. 2008 rotavirus deaths, under 5 years of age, as of 31 January 2012. Available at: [www.who.int/entity/immunization/monitoring\\_surveillance/burden/estimates/rotavirus/ChildRota2008.xls?ua=1](http://www.who.int/entity/immunization/monitoring_surveillance/burden/estimates/rotavirus/ChildRota2008.xls?ua=1) Accessed August 15, 2014.
- <sup>5</sup>World Health Organization. *Global Rotavirus Information and Surveillance Bulletin*. Vol 9. Geneva, Switzerland: WHO; 2014. Available at: [http://www.who.int/immunization/monitoring\\_surveillance/resources/global\\_rv\\_surv\\_bulletin\\_july\\_2014\\_final.pdf?ua=1](http://www.who.int/immunization/monitoring_surveillance/resources/global_rv_surv_bulletin_july_2014_final.pdf?ua=1). Accessed August 15, 2014. [N.B. Asian regional data is available for SEARO].
- <sup>6</sup>Zaman K, Dang DA, Victor JC, et al. Efficacy of pentavalent rotavirus vaccine against severe rotavirus gastroenteritis in infants in developing countries in Asia: A randomised, double-blind, placebo-controlled trial. *The Lancet*. 2010; 376(9741):615–623.
- <sup>7</sup>Phua KB, Lim FS, Lau YL, et al. Safety and efficacy of human rotavirus vaccine during the first 2 years of life in Asian infants: Randomised, double-blind, controlled study. *Vaccine*. 2009;27(43):5936–5941.
- <sup>8</sup>Podewils LJ, Antil L, Hummelman E, Bresee J, Parashar UD, Rheingans R. Projected cost-effectiveness of rotavirus vaccination for children in Asia. *Journal of Infectious Disease*. 2005;192(Suppl 1):S133–S145.
- <sup>9</sup>Atherly DE, Lewis KDC, Tate J, Parashar UD, Rheingans, RD. Projected health and economic impact of rotavirus vaccination in GAVI-eligible countries: 2011–2030. *Vaccine*. 2012;30(Suppl 1):A7–A14.
- <sup>10</sup>Bhandari N, Rongsen-Chandola T, Bavdekar A, et al. Efficacy of a monovalent human-bovine (116E) rotavirus vaccine in Indian infants: A randomised, double-blind, placebo-controlled trial. *The Lancet*. 2014;383(9935):2136–2143.
- <sup>11</sup>Rotavirus vaccines: WHO position paper. *Weekly Epidemiological Record*. 2013;88(5):49–64. Available at: [www.who.int/wer/2013/wer8805.pdf?ua=1](http://www.who.int/wer/2013/wer8805.pdf?ua=1)
- <sup>12</sup>Tables page | Rotavirus vaccine impact. PATH website. Available at: <http://sites.path.org/rotavirusvaccine/rotavirus-advocacy-and-communications-toolkit/rotavirus-vaccine-impact-tables/>. Accessed August 17, 2014.
- <sup>13</sup>WHO SEARO. EPI Fact Sheet, Thailand 2012. August 30, 2012. Available at: [www.searo.who.int/entity/immunization/data/EPI\\_Factsheet-Thailand\\_2012.pdf](http://www.searo.who.int/entity/immunization/data/EPI_Factsheet-Thailand_2012.pdf). Accessed August 20, 2014.
- <sup>14</sup>Country introductions of rotavirus vaccines | Maps and list. PATH website. Available at: <http://sites.path.org/rotavirusvaccine/rotavirus-advocacy-and-communications-toolkit/country-introductions-maps-and-list/>. Accessed August 17, 2014.



PATH is an international organization that drives transformative innovation to save lives and improve health, especially among women and children. We accelerate innovation across five platforms—vaccines, drugs, diagnostics, devices, and system and service innovations—that harness our entrepreneurial insight, scientific and public health expertise, and passion for health equity. By mobilizing partners around the world, we take innovation to scale, working alongside countries primarily in Africa and Asia to tackle their greatest health needs. Together, we deliver measurable results that disrupt the cycle of poor health.

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