

An Integrated Approach to Confronting Diarrheal Disease

A solution is within reach to stop the second-leading cause of deaths in young children. Yet while the answer is affordable, accessible, and proven, it is lately overlooked because of attention to complex emerging diseases and resilient familiar threats.

Unlike other childhood killers for which interventions are around the corner or even years away, the tools are in hand to combat diarrheal disease and the fatal dehydration it can cause. Better access to sanitation, clean water, and oral rehydration therapy (ORT), a treatment staple, have already achieved a significant impact—cutting diarrhea-related deaths by nearly half in the 1980s and 1990s. But interest has waned, and mortality reductions have stagnated and even reversed in several developing countries. Controlling diarrheal disease is no longer a leading global priority.

Renewing the commitment

In addition to established interventions that include ORT, breastfeeding, and hygiene, new tools bring new opportunities to re-invigorate interest and catalyze investments in diarrheal disease control. Zinc treatment and rotavirus vaccines are increasingly available in developing countries, and they have the potential to significantly reduce childhood deaths.

In fact, introducing an integrated package could lead to faster uptake of interventions than would use of each tool alone.¹ For decision-makers faced with limited resources and a growing portfolio of health needs and solutions, an integrated package may also be cost-effective. Yet surveys have shown that awareness of these interventions among donors, decision-makers, medical advisors, and health workers is low.²

A renewed commitment is vital. Never before has such a variety of simple and successful tools—both treatment and prevention—been available to the most vulnerable populations, but the burden lies with global stakeholders, country officials, and international donors to lead the charge. In countries such as Nicaragua, Kenya, Vietnam, and Cambodia, national leaders are setting the example, adopting comprehensive approaches to managing diarrheal disease that emphasize the scale-up of new

interventions and revitalization of proven mechanisms. Their commitment is fueled by forward-thinking donors and local child survival advocates.

But more voices are needed to extend the reach of this approach. Building momentum and renewing interest—particularly among global stakeholders, country officials, and international donors—is key to ensuring that all children have access to these tools.



Meeting the Millennium Development Goals

The United Nations Millennium Development Goals (MDGs) have helped galvanize efforts to meet the needs of the world's poorest populations. As the global health community reaches the halfway mark toward the 2015 goalpost, however, much remains to be done. Investment is needed in approaches that will have the greatest impact as rapidly as possible.

Diarrhea is the second-leading cause of death in children under five, making diarrheal disease control an essential and effective investment in reaching MDG #4 (Reduce child mortality) and supportive of efforts to achieve other MDGs. For example, sanitation improvements and greater access to clean water in impoverished settings could stem the spread of diarrhea-causing agents and yield progress on MDG #7 (Ensure environmental stability).

Applying the tools

Oral rehydration therapy/solution is the cornerstone of diarrheal disease control in both rich and poor countries. According to UNICEF, however, use of ORS and ORT has stagnated or even decreased over the last 10 years.³

Access to clinical care is often limited in the developing world, so an ORS formulation that can be prepared and administered in the home is a caregiver's most important tool. In 2004, the World Health Organization (WHO) and UNICEF recommended a low-osmolarity ORS formula for use in the home that allows greater efficacy, lowers stool volume, and reduces vomiting. The availability of this new and improved ORS provides an important opportunity to boost awareness and coverage.

Joining forces in Nicaragua

Nicaragua's strategy for diarrheal disease control illustrates how an integrated approach can strengthen efforts and achieve benefits throughout the health system.

To reduce the burden of diarrheal disease, several ministry of health departments formed a dedicated alliance in 2004, with experts on hygiene, epidemiology, nutrition, information, and child health. In less than two years, a team of representatives from the ministry—along with NicaSalud (a local coalition of nongovernmental organizations), PATH, UNICEF, and others—brought public-sector clinics on board and trained health care workers to provide zinc and new, low-osmolarity ORS throughout the country. A parallel demonstration project by Merck and the ministry offered the opportunity to integrate rotavirus vaccine as well, with more than 85 percent of vaccine-eligible children reached in the project's first year.

Citing the cross-disciplinary cooperation as fundamental to the program's achievements, the ministry has credited the alliance with building awareness of zinc, ORT, and rotavirus vaccines. The approach is informing similar strategies throughout the region and the world.

Zinc treatment can reduce the severity and duration of diarrheal episodes when taken in a 10- to 14-day course. It may also prevent future diarrheal episodes for up to three months. In one study in Bangladesh, advocacy for zinc therapy not only broadened its use for diarrheal disease control but also increased use of ORS and decreased the administration of unnecessary antibiotics.⁴

Rotavirus vaccines have the potential to save nearly 2.5 million lives over the next 20 years,⁵ and their availability in the developing world will dramatically improve as the GAVI Alliance begins to subsidize purchase of the vaccines in eligible countries.

Rotavirus is the most common cause of diarrheal deaths and accounts for up to 65 percent of hospitalizations for severe gastroenteritis among children. The virus strikes nearly every child in the world by the age of three years, but it causes a disproportionate number of deaths in poor countries, where access to emergency care for severe cases can be limited.

Exclusive breastfeeding provides essential nutrients and antibodies and is an important intervention for reducing infant mortality due to diarrhea. Breastfeeding also promotes quicker recovery from diarrheal infections. WHO recommends exclusive breastfeeding for the first six months of a baby's life, followed by continued breastfeeding with complementary foods for up to or beyond two years of age.

Improvements to sanitation and hygiene, such as access to clean water and proper hand-washing practices, are also essential. Yet, according to the World Bank, 1 billion people still lack access to an improved water supply, and 2.6 billion people have no form of improved sanitation services.



Nicaragua's then-President Enrique Bolaños administers the country's first dose of Merck's rotavirus vaccine



PATH/Julie Jacobson

Strengthening the system

By tapping a variety of health care specialties—child health, nutrition, immunization, environment—an integrated approach to diarrheal disease control can strengthen a country's public health system as a whole. Zinc procurement and distribution can provide valuable lessons in developing partnerships between the public and private sectors. New vaccine introduction can strengthen the logistics of transportation and cold chain maintenance. Training health workers can build human resource capacity and foster empowerment. The benefits of this integration can then move beyond a disease-specific impact and into a system-wide approach.

Securing the investment

Despite constrained resources and competing priorities, many governments remain concerned about childhood deaths from diarrheal disease. New tools have set the global stage for revitalizing diarrheal disease control programs and building on the success of traditional interventions. Today's landscape presents an unprecedented opportunity to bring together innovation, lessons learned, leadership from low-resource countries, and donor commitments to combat an all-too-common killer and save millions of children's lives.

1 Baqui AH, Black RE, El Arifeen S, Yunus M, Zaman K, Begum N, Roess AA, Santosham M. Zinc therapy for diarrhoea increased the use of oral rehydration therapy and reduced the use of antibiotics in Bangladeshi children. *Journal of Health Population and Nutrition*. 2004 Dec;22(4):440-442.

2 Simpson E, et al. Use of formative research in developing a knowledge translation approach to rotavirus vaccine introduction in developing countries. *BMC Public Health*. 2007;7(1):281.

3 Forsberg, BC. Diarrhoea case management in low- and middle-income countries—an unfinished agenda. *Bulletin of the World Health Organization*. 2007;85:42-48. Available online: <http://www.who.int/bulletin/volumes/85/1/06-030866.pdf>.

4 Zinc Investigators' Collaborative Group: Bhutta ZA, Black RE, Brown KH, et al. Prevention of diarrhea and pneumonia by zinc supplementation in children in developing countries: pooled analysis of randomized controlled trials. *Journal of Pediatrics*. 1999;135:689-697.

5 Rheingans, et al. Healthcare costs of rotavirus gastroenteritis and cost-effectiveness of vaccination in developing countries. 2008; (unpublished data).

New prevention options in the works

Two rotavirus vaccines are available now, and emerging manufacturers in India, China, and other countries are developing promising new rotavirus vaccine candidates. While current manufacturers play an important role in meeting the global demand for the existing vaccines, additional vaccine options and manufacturers, including those in the developing world, are critical to ensuring a sustainable supply of rotavirus vaccines. The new vaccines in development are also expected to protect children against the rotavirus strains most prevalent in Asia and Africa, and will be essential additions to the global rotavirus immunization effort.

Work is also under way on vaccines that could prevent the leading bacterial causes of diarrheal disease: *Shigella* and enterotoxigenic *Escherichia coli* (EPEC). The growing evidence of antibiotic resistance further underscores the need for these vaccines. A number of vaccine candidates for *Shigella* and EPEC are moving through rigorous preclinical and clinical studies in an effort to make safe, effective, and affordable vaccines available in the world's poorest countries as quickly as possible.

These new vaccines have the potential to significantly decrease the incidence of diarrheal disease in developing countries and save the lives of more than one million young children each year.

For more information

For more information on diarrheal disease interventions, please visit the following resources:

Websites

- PATH's Vaccine Resource Library: <http://www.path.org/vaccineresources>.
- PATH's Diarrheal Disease Control Website: www.defeatDD.org.
- Controlling Diarrheal Disease: <http://www.path.org/diarrheal-disease.php>.

Fact sheets

- Developing New Vaccines Against Diarrheal Disease: <http://www.path.org/publications/details.php?i=1541>.
- Oral Rehydration Therapy/Oral Rehydration Solution: <http://www.path.org/publications/details.php?i=1552>.
- Breastfeeding and Diarrhea: <http://www.path.org/publications/details.php?i=1551>.
- Rotavirus Vaccines: <http://www.path.org/publications/details.php?i=1550>.
- Zinc Treatment for Diarrhea: <http://www.path.org/publications/details.php?i=1549>.
- PATH's Safe Water Project: <http://www.path.org/publications/details.php?i=1437>.

E-newsletters

- Rotavirus Update and RotaFlash: <http://www.path.org/publications/details.php?i=1498>.
- Vaccines for the Future: <http://www.path.org/publications/details.php?i=1540>.

For more information on vaccines and immunization, please visit the following resources:

Fact sheets

- Global Access to Lifesaving Vaccines: <http://www.path.org/publications/details.php?i=1546>.
- A History of Vaccines: <http://www.path.org/publications/details.php?i=1481>.
- Investing in Vaccines for the Developing World: <http://www.path.org/publications/details.php?i=1482>.
- Understanding Vaccines: <http://www.path.org/publications/details.php?i=1485>.
- Lifesaving Vaccines on the Horizon: <http://www.path.org/publications/details.php?i=1487>.



PATH is an international nonprofit organization that creates sustainable, culturally relevant solutions, enabling communities worldwide to break longstanding cycles of poor health. By collaborating with diverse public- and private-sector partners, PATH helps provide appropriate health technologies and vital strategies that change the way people think and act. PATH's work improves global health and well-being.

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