

Oral Rehydration Solution Re-formulated

A new and improved lifesaving solution

ORAL REHYDRATION SOLUTION: A FORGOTTEN TREATMENT

Despite the existence of a low-cost treatment, diarrheal disease continues to claim the lives of more than 600,000 children every year, making it the second highest cause of death in children under five. When oral rehydration solution (ORS) was first introduced in the 1970s as a simple, inexpensive, and highly effective means to reverse dehydration, the public health community was rightly convinced that the global burden of diarrheal disease would fall dramatically. Its simplicity and effectiveness made it one of the most important medical achievements of the last century. During the 1980s and 1990s, the use of ORS in treating acute diarrhea in children under age five, especially in resource-limited countries, resulted in a marked decrease in morbidity and mortality.

Despite the success, ORS coverage remains stubbornly low in most developing countries. Several reasons for this have been proposed, yet one has been receiving increased attention among researchers. ORS is a very reliable treatment for reversing dehydration; however, during treatment it does not reduce diarrheal symptoms or duration of illness.^{1,2,3} Mothers administer ORS and, witnessing no change in their child's diarrheal symptoms, are unconvinced of its effectiveness despite the successful reversal of dehydration. As a result, they often select other interventions, such as antibiotics, which do not rehydrate, have limited effectiveness, and contribute to the increasing problem of antibiotic resistance.

Together with its partners, PATH is working to address the shortcomings of ORS by exploring changes to the standard formulation with an added treatment agent, such as starch, which is partially resistant to digestion in the small intestine and, upon reaching the colon, promotes fluid uptake. This enhanced fluid absorption reduces diarrheal fluid loss and thereby encourages patient compliance with treatment. An

improved ORS that treats both dehydration and intestinal fluid loss will better meet consumer preferences, ultimately leading to a marked increase in ORS usage.



ORS exists in diverse forms from many different manufacturers, but currently none of these forms addresses diarrheal fluid loss.

PATH/Patrick McKern

ADDING A PREBIOTIC TO STIMULATE FLUID ABSORPTION

Over the last 15 years, researchers have studied the effects of adding a prebiotic to the ORS formulation; specifically, high amylose maize starch (HAMS). Prebiotics, like HAMS, are less digestible food additives that can help establish a supportive environment for beneficial bacteria metabolism, which in turn stimulates greater fluid uptake, thereby reducing diarrhea. Early-stage physiological and clinical evidence using HAMS in ORS has already been established. However, further studies are needed to definitively determine whether adding HAMS to ORS effectively reduces fluid loss in humans, especially children with diarrhea. PATH has initiated this project to pursue this goal.

VALIDATION TO INITIATE GLOBAL DISTRIBUTION

Building upon the results of preliminary testing in India, PATH is performing clinical trials—initially in Bangladesh, to be followed by trials in Africa, Asia, and Latin America—to determine the level of efficacy of the high amylose maize starch and high amylose maize starch acetate formulations. These clinical trials will determine if HAMS-ORS effectively diminishes diarrheal fluid loss and can treat

¹ UNICEF. *Management Practices for Childhood Diarrhea in India: Survey of 10 Districts*. New Delhi: UNICEF; 2009.

² Beria J, Damiani M, Lombardi C. Physicians' prescribing behaviour for diarrhoea in children: an ethno-epidemiological study in southern Brazil. *Social Science and Medicine*.1998;47(3):341–346.

³ Ellis A, Winch P, Daou Z, et al. Home management of childhood diarrhoea in southern Mali—implications for the introduction of zinc treatment. *Social Science and Medicine*.2007;64(3):701–712.

dehydration. Should this product prove successful, PATH and its partners will plan and implement the product development, regulatory standardization, commercialization, and distribution activities surrounding the development of an improved ORS formulation. The breadth of the vision will ultimately lead to global distribution and usage of a HAMS-ORS as a strengthened defense against diarrhea.

A GOAL THAT SAVES LIVES

Ultimately, PATH and its partners aim to determine the overall effectiveness of the new formulation of ORS to reduce morbidity and mortality associated with diarrheal disease. The ability of ORS to save lives is a proven fact. Its simplicity and affordability already make it a promising part of a solution to a leading global health problem. By adding a diarrheal treatment element to ORS—essentially making its efficacy readily perceivable by the end user—PATH hopes to increase the usage of ORS, and ultimately, help ensure that diarrheal disease drops off the list as a leading killer of children.



PATH/Heng Chivoan

ORS has been a life saver for millions of children. PATH is developing an improved formulation to help increase coverage in developing countries.

ABOUT OUR COLLABORATORS

- **International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B)**—In collaboration with academic and research institutions throughout the world, ICDDR,B conducts research, training and extension activities, as well as program-based activities,

to develop and share knowledge for global lifesaving solutions. ICDDR,B's decades of experience training health professionals and executing large-scale clinical trials make ICDDR,B an obvious and welcome partner for this effort. For more information about ICDDR,B, please visit their website (www.icddrb.org).

- **Renata Limited**—Renata Limited is one of the top pharmaceutical manufacturers in Bangladesh, mainly focusing on manufacturing and marketing of human pharmaceutical health and nutrition products. Renata Limited manufactures about 300 generic pharmaceutical products and maintains a vision of remaining one of the top innovators in generic drug production. This value of innovation positions Renata Limited as an optimal partner to manufacture the new ORS formulation that will be used throughout the clinical trials. For more information about Renata Limited, please visit their website (www.renata-ltd.com).

For more information about PATH, please visit www.path.org.

For more information about PATH's Drug Development program, please visit sites.path.org/drugdevelopment/.

For more information about PATH's work in diarrheal disease control, please visit www.defeatdd.org.



PATH is an international nonprofit organization that transforms global health through innovation. We take an entrepreneurial approach to developing and delivering high-impact, low-cost solutions, from lifesaving vaccines and devices to collaborative programs with communities. Through our work in more than 70 countries, PATH and our partners empower people to achieve their full potential.

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