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Liquid Life ORS:

A liquid pioneered at Hopkins has saved thousands of children.

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It was a quirk of fate and a window of opportunity that set an Indian from the ancient city of Madras on the road to the White Mountain Apache reservation in Arizona in 1980.

Along a twisting canyon road in the middle of the night, in what must have seemed like the middle of nowhere, Mathuram Santosham thought he had left Hopkins behind, following his residency, and would soon be returning to India. First, he wanted to make a brief stop on the reservation to convince the White Mountain Apache community that a Hopkins-developed therapy known as oral rehydration solution could save the lives of their children, many of whom were suffering severe diarrhea and unnecessarily dying of dehydration.

"I was looking for an opportunity to go back to India to do work on oral rehydration," recalls Santosham. "Then I found that Hopkins physicians had been working on an Indian reservation where people suffered from some of the same illnesses--and lived in similar conditions--as those in the developing world.

"I gave my presentation about oral rehydration therapy to the tribal council," recalls Santosham, who is now the director of the Center for American Indian and Alaska Native Health at the School of Public Health. "It must have been confusing to them. Here was a guy with a dark face, who doesn't look white--but claims he is--saying he's an Indian! They were very suspicious, especially the tribal chairman. After my presentation, he didn't ask any questions about oral rehydration. He looked me straight in the eye and said: 'Doc, are you going to be like all these white guys and take advantage of us?'

"And I said: 'Mr. Chairman, if Columbus had known his geography better, you'd be studying me, and I'd be living on a reservation!' "

Santosham successfully treated 300 White Mountain Apache children for diarrhea his first week on the reservation, situated about 200 miles from Phoenix.

"The infant mortality rate [in 1980] on the reservation was 60 per 1,000," Santosham says. "This was similar to the infant mortality rate in many developing countries. ORS reduced

that mortality rate substantially, especially when we demonstrated that a child could be fed after receiving ORS."

His point made, the work getting done, Santosham kept putting off his return to India. And he ended up staying six years with the White Mountain Apaches and returning to Hopkins to pursue ORS research.

November 14 marks the 25th anniversary of the successful implementation of ORS. To mark the occasion, the School of Public Health is sponsoring a two-day symposium titled "Oral Rehydration in the United States: A 25th Anniversary Celebration." The symposium launches a national effort to educate doctors and parents about the benefits of ORS, now readily available in pharmacies, supermarkets and convenience stores, where most American parents know it by commercial brands like Pedialyte.

Hopkins' connection to rehydration therapy extends back to the beginning. In the 1950s, the School of Public Health's H.E. Harrison created a rehydration solution of sodium, potassium, chloride, lactate and glucose and used it in the United States at a time when commercially prepared fluids had been used improperly. The result in many cases was hypernatremia--salt poisoning--which turned public and medical opinion away from the therapy.

With the blessing of the World Health Organization and other international agencies, ORS had been used in the developing world through the 1960s and into the 1970s to prevent infant deaths from severe diarrhea. In 1971, however, cholera broke out in India. Physicians at the Hopkins International Centers for Medical Research and Training, in Calcutta, became aware of the value of glucose and sodium, which reduced the cholera-related death rates significantly by accelerating the movement of fluids across the intestines. That same year, Hopkins entered into a partnership with the White Mountain Apache tribe to measure the effectiveness of an oral solution among their children.

"Because of the earlier experience with hypernatremia, it was a time when no other medical or lay community was willing to test the solution, given the alternative of high-tech--and high-cost--intravenous care," Santosham says. "The White Mountain Apaches had courage and foresight."

In the 1980s, with Santosham's help, ORS was just starting to make its mark in the United States, where severe diarrhea accounted for 20 percent of all pediatric hospital admissions.

"Child diarrhea also costs us \$500 million a year in hospitalizations," Santosham says. "This event will help to get the word out about the life-saving and money-saving benefits of ORS. Three hundred kids in the U.S. die every year from dehydration. All 300 deaths can be prevented. All of these deaths should be prevented."

While parents and doctors in the United States were slow to recognize the benefits of ORS, the American Academy of Pediatrics recommended in 1985 that ORS be the first line of defense against dehydration.

"For decades there persisted a belief that severe diarrhea should be treated by resting the gut. Doctors believed this, and so did parents," says Santosham. "So what often happened was that children with severe diarrhea, who might already be malnourished, become more so. But our studies showed that children with severe diarrhea could be fed immediately after taking ORS."

Studies using ORS among the White River Apache continue, and returning to the reservation every few months is especially rewarding for Santosham when he sees teen-agers who, without ORS, might have died in 1980.

"When you see a baby about to die and then, after receiving ORS, the same baby is sitting up and playing--it is a memorable event, one that has been repeated many times over," Santosham says.