



Monday, Aug. 17, 2009

## Diarrhea: The Great Zinc Breakthrough

By Vivienne Walt / Sogola

The first signs of illness in Suleiman Djarra appeared during a heavy rainstorm. The 2 year-old suddenly stopped eating and then developed severe diarrhea, which continued for days, draining him of energy. On the third day, Suleiman's mother Aiseta Traoré carried his listless body to the road outside their village in southern Mali and hitchhiked to the nearest hospital about 9 miles (14 km) away. There, she says, a doctor gave her a pack of vitamins and advised her to take the boy home to recover. Hours after Traoré and Suleiman reached their village, though, the boy died.

Generations of Sogola residents have watched their children fall ill each rainy season, laid low by diarrhea, a disease which kills an astonishing 1.6 million children under 5 every year, according to the World Health Organization (WHO). "Death is roaming here," says Traoré, 28. "It seems the children who have died are more than the children who live." ([See pictures of how zinc is saving lives in Mali.](#))

It is hard to grasp the impact diarrhea has on people's lives across Africa and Asia. The disease kills more children than either malaria or AIDS, stunts growth, and forces millions — adults and children alike — to spend weeks at a time off work or school, which hits both a country's economy and its citizens' chances of a better future. In countless villages like Sogola, where people have long drawn water from unreliable wells, diarrhea kills so many that there is a general sense of resignation, as if watching children die is simply one of life's inevitable tragedies. One morning I ask Djene-Sira Diakité how many children she has. "God gave me 10 children, and took five of them back," she says with a shrug.

But now a quiet revolution is under way. Over the past few years, a handful of aid organizations and governments — including the Bill and Melinda Gates Foundation and the U.S. Agency for International Development — have begun distributing zinc supplements to villagers in Bangladesh, India, Mali and Pakistan. Several other groups are working with governments in Africa to introduce zinc, which comes both in tablet form and as a syrup. In Mali, Save the Children U.S. used \$680,000 from a 2007 charity concert of *American Idol*

to distribute zinc tablets to a handful of villages in the south of the country. ([Read TIME's Persons of the Year cover story on Bill and Melinda Gates.](#))

So far, the small programs have drawn little attention. But their impact has been dramatic. Zinc pills appear to halt diarrhea in its tracks. "Before, we were terrified when children's stomachs began running, because we knew some of them would die," says Sata Djialla in the Malian village of Morola. "Now our children are not dying of diarrhea."

In Sogola, the packets of tablets provided by Save the Children are kept in a rickety, but locked, wooden closet in a mud building — the closest thing the town has to a pharmacy. There Moussa Traoré, 48, a thin, wan man who's one of two residents entrusted with the closet key, dispenses drugs with a studied seriousness. Since last year he has prescribed children suffering from diarrhea with 20 mg of zinc daily for about two weeks. Throw in oral-rehydration therapy (ORT), which has been the main weapon against diarrhea for the past few decades, and a treatment costs less than \$0.30 — affordable even to Sogola's desperately poor families.

Traoré shows me a weathered school exercise book, in which he lists deaths. There are several diarrhea deaths for previous years — but none in 2008 or 2009. "Since zinc arrived we have had no deaths from diarrhea," Traoré says. Cradling her 10-month-old son outside, Maimouna Bakayogo, 32, says she panicked when her baby developed stomach pains, diarrhea and fever. "I was really afraid," she says. "Then I remembered Moussa saying there was zinc in the village. I went to get some from him, and within one day I saw a big difference. The baby looked much better."

[Read: "Healing: The Unexpected Properties of Zinc."](#)

[See the Cartoons of the Week.](#)

### **A "Real" Treatment**

Exactly how zinc stops diarrhea is not entirely clear. Olivier Fontaine, a diarrhea specialist for the WHO, believes that since the mineral is an essential ingredient in about 300 enzymes, boosting zinc levels strengthens the body's immunity, thus preventing diarrhea from turning deadly. A single course apparently also staves off further bouts of diarrhea for about three months — long enough to see a community through the deadly rainy seasons. Contrast that with ORT, which is extremely effective in replacing fluids and nutrients but offers no quick end to the diarrhea itself. ORT has another drawback: crucially in cultures where seeing is believing, it offers no quick

evidence that a patient is recovering.

ORT has been the main treatment — in many places the only treatment — since the early 1970s, when U.N. officials first distributed sachets of sugar and salt to refugees in South Asia in an attempt to reduce cholera deaths. Today rehydration salts mixed with clean water are given to millions of poor across Africa and Asia. It works: the glucose in the water slows the exit of fluids from the body, allowing electrolytes to be absorbed through the intestinal walls and thus halting potentially deadly dehydration. ([See pictures of the politics of water in Central Asia.](#))

But to the intense frustration of aid groups and government officials, only about 35% of families in diarrhea-stricken countries use ORT — less than half the WHO's target. Until zinc arrived in Sogola, only about one in 10 village residents used the sachets when they or their children became ill. That number has soared since Traoré added zinc tablets to the prescription. "Mothers don't see ORT as real treatment," says Eric Swedberg, senior director of child health and nutrition at Save the Children U.S. in Westport, Conn. "But when you add the zinc you really see the effects. This is quite dramatic."

Scientists first hit on zinc's effectiveness in the early 1990s, when researchers from the Johns Hopkins School of Hygiene and Public Health in Baltimore, Md., gave children in New Delhi a daily dose of syrup containing 20 mg of zinc. The rate of diarrhea dropped dramatically. "Nobody believed the results," Fontaine says. "No one had an explanation why zinc worked." Because ORT had already proved effective in the fight against diarrhea, though, aid organizations and researchers shifted their focus elsewhere — particularly to the disastrous spread of AIDS. The delay, the WHO's Fontaine says, cost the effort "at least 10 years."

Diarrhea has been ignored for decades. For many people outside Africa, the continent's calamitous health problems are largely defined by two epidemics: AIDS and malaria. There is a World AIDS Day and a World Malaria Day, and countless medical researchers work to combat the two diseases. In 2008 about 60% of the world's funding for research into major epidemics went to AIDS and malaria; diarrhea received a tiny fraction in comparison. Just 4% of all U.S. funding for research into major developing-world epidemics in 2007 went to diarrhea. The European Commission has given about \$1.33 billion to the Global Fund to Fight AIDS, Tuberculosis and Malaria since it was created in 2002. No specific funds are dedicated to diarrhea programs, though the Commission funds health services in poor countries and helps upgrade water and sanitation services. The International Centre for Diarrhoeal Disease Research in Bangladesh is at the cutting edge of the disease and treats 150,000 patients a year. Its annual budget: just \$20 million. ([See pictures of Africa's AIDS crisis.](#))

Aid experts say the huge disparity is because most diarrhea victims are poor children — invisible to politicians — and because diarrhea itself makes people squeamish. [As TIME pointed out in an international cover story three years ago](#), celebrities don't hold concerts for diarrhea. "Compared with malaria and AIDS, we are totally underfunded," says Fontaine. "This is truly a neglected disease."

[See pictures of the world water crisis.](#)

[See TIME's Pictures of the Week.](#)

### **New Hope**

Zinc could change that. Earlier this year, pilot zinc-treatment programs began in parts of Ethiopia and Tanzania, and several African governments are now looking at zinc programs. The treatment is already stirring interest among rich-country donors and drug companies: about 20 firms in countries from France to India have begun manufacturing zinc tablets during the past few years. "The private sector was never really interested in ORT," Fontaine says. "But zinc has totally taken off. It looks like real medicine and is not given out for free." ([See pictures of Ethiopia's harvest of hunger.](#))

WHO officials such as Fontaine hope that zinc becomes so standard that it will be "like having Band-Aids at home." A second medical breakthrough should also help. At least one-third of all diarrhea deaths among young children are caused by the rotavirus, which infects the cells lining the small intestine and causes gastroenteritis. In June, the WHO approved the first rotavirus vaccine for global use. The vaccine, which in trials in Latin America, Europe and the U.S. cut rotavirus infections by 85%, could someday be part of routine vaccination programs for children, along with those for polio, measles and other diseases whose death rates have plummeted in recent years.

There are still hurdles. In Mali, where more than one in five children never see their fifth birthday, the government has finally added zinc to its annual list of 100 essential drugs, clearing the way for much wider distribution of the tablets. But only a few villages have received zinc tablets so far — and those have all come through the Save the Children U.S. program, whose funding expires next year, according to Tom McCormack, the organization's representative in Mali. Even though it has virtually no money to train health workers, Mali's government remains deeply reluctant to allow uneducated villagers like Moussa Traoré to distribute zinc. Frustrated, McCormack says some government officials don't trust villagers who have no formal health training. "There is a lot of ego involved," he says.