

Effort to cut AIDS a formula for disaster

Anti-breast-feeding measure backfires in Botswana, causing more despair

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NKANGE, Botswana - [Doctors](#) noticed two troubling things about the limp, sunken-eyed children who flooded pediatric wards across [Botswana](#) during the rainy season in early 2006: They were dying from diarrhea, a malady that is rarely fatal here. And few of their mothers were [breast-feeding](#), a practice once all but universal.

After the outbreak was over and at least 532 children had died -- 20 times the usual toll for diarrhea -- a team of U.S. investigators solved the terrible riddle.

A decade-long, global push to provide [infant formula](#) to mothers with the AIDS virus had backfired in Botswana, leaving children more vulnerable to other, more immediately lethal diseases, the U.S. team found after investigating the outbreak at the request of Botswana's government.

Benefits of milk outweigh risks

The findings joined a growing body of research suggesting that supplying formula to mothers with HIV -- an effort led by global health groups such as [UNICEF](#) -- has cost at least as many lives as it has saved. The nutrition and antibodies that breast milk provide are so crucial to young children that they outweigh the small risk of transmitting HIV, which researchers calculate at about 1 percent per month of breast-feeding.

"Everyone who has tried formula feeding . . . found that those who formula feed for the first six months really have problems," Hoosen Coovadia, a University of KwaZulu-Natal pediatrician and author of a recent study on formula feeding, said from [Durban](#), [South Africa](#). "They get diarrhea. They get pneumonia. They get malnutrition. And they die."

That's what happened in Nkange, a tiny village on the sandy northern edge of the Kalahari Desert. In a cluster of several dozen homes here, eight children under 2 died during the four-month-long diarrhea outbreak, according to interviews with families. Only two had ever been breast-fed, and only one was being breast-fed at the time of the outbreak.

Chandapiwa Mavundu, 28, a mother of three who has HIV, said she never breast-fed her son, Kabelo, because government nurses warned her not to.

When he died at 8 months, after two months of withering diarrhea and vomiting, she could not muster the strength for the long walk to the graveyard. Instead, Mavundu stayed behind, she said, weeping amid the thatch-roofed huts and the dust and the goats as a hastily assembled parade of relatives carried her son's shrunken body away in a tiny, cream-colored coffin.

"That was the only boy child I had," said Mavundu, who has sad, wide-set eyes and long braids that dangle past her shoulders. "I loved him very much."

Best intentions gone awry

The medical records kept by Mavundu and other families here echoed the finding of the U.S. investigators: Government clinics often ran out of cans of formula, forcing parents and grandparents to buy cow's milk or feed their children with diluted porridge or even flour and water.

Many of the babies had recurrent sicknesses and registered steep drops in their growth patterns during their final months. When the diarrhea struck, it was severe, prolonged and difficult for even doctors to cure. One child survived diarrhea only to die soon after from pneumonia, another disease that breast-feeding helps prevent.

"Since I was a girl, I can't remember a time when we lost so many kids," said Ntselang Swimbo, 66, whose 9-month-old grandson died during the outbreak. "Once a kid got diarrhea, you knew the chance of surviving was almost zero."

Promoting formula

The vast diamond reserves in this landlocked southern African nation have allowed Botswana's government to build a safety net unmatched on the continent, offering its 1.8 million citizens cradle-to-grave support for education and [health care](#). And though it has one of the world's highest rates of HIV, with one in four adults infected, it has some of [Africa](#)'s most celebrated programs to combat AIDS, including effective measures to prevent mothers from infecting their children during pregnancy and birth.

The country was also a pioneer in the international drive to protect babies at risk of becoming infected through breast-feeding. In 1997, the [United Nations](#) began urging new mothers with HIV to use formula wherever supplies could be provided safely and reliably. Botswana, with an extensive public water system, good roads and a legacy of competent governance, joined the UNICEF-led effort and agreed to pay for the program as a standard service to new mothers.

There were skeptics. Some international public health experts, including Coovadia, cautioned that few Africans had the means to prepare formula in a sanitary manner -- a process that requires access to clean water, utensils, formula powder and heat for sterilization.

And even for those who could make formula safely, some experts warned, breast-feeding's other health benefits could not easily be replaced. A study by Coovadia and other South African researchers published in the [medical journal](#) *Lancet* in August 1999 found that breast milk alone, when not mixed with other foods, was no more likely to infect children than formula.

‘We saw red!’

But Botswana's health officials were determined to begin the programs. In a recent interview, Health Minister Sheila D. Tlou angrily recalled a conference of international policymakers in [Montreal](#) a month after the Lancet article appeared. Some favored urging mothers with HIV in rich countries to use formula while telling those in poorer, less-developed ones to breast-feed.

"We saw red!" Tlou said. She recalled asking other participants in the meeting: "Why are you sentencing all of our children to death? And why are you sentencing all of us to psychological damage in knowing that we were the ones who infected them?"

The program started slowly because few women were willing to be tested for a virus that at the time was a death sentence. But as Botswana expanded the availability of antiretroviral drugs, which can dramatically extend and improve lives, HIV testing gradually became routine for [pregnant women](#).

Those with the virus received a series of antiretroviral pills in the final weeks of their pregnancies, and their newborn children received a dose of syrup laced with another powerful anti-AIDS drug in their first hours of life.

Supply, sanitation problems

The rate of HIV among babies born to mothers with the virus fell from 40 percent in 2002 to 6 percent. Demand for the free government formula soared.

Among the beneficiaries was Mavundu. She didn't have reliably sterile utensils or a stove, as U.N. agencies envisioned in their policy statements. But she did have access to firewood for cooking. And the seemingly clean water that flowed from a communal tap was just an eight-minute walk from her compound, consisting of round, dirt-floor huts and a fenced yard that she shared with her family and its livestock, including packs of voracious chickens.

Unusually for rural Africa, there was also a government clinic nearby and, she was told, a reliable supply of Nan, a popular formula marketed by the international food group [Nestlé](#), to keep her playful, chubby-cheeked son strong and healthy.

But it was a promise, Mavundu soon discovered, that the government was unable to keep.

"Sometimes it was there," she recalled. "Sometimes it was not there."

A shifting consensus

The government later blamed hitches in its contracting system for the formula shortages. But supply was not the only problem uncovered by the investigators from the [U.S. Centers for Disease Control and Prevention](#), which announced its findings at a scientific conference in [Los Angeles](#) in February.

Testing of government water pipes in 26 villages in northeastern Botswana found contamination in every one, apparently caused by flooding during the heavy rainy season. Tests of the stool of

sick babies also found dangerous waterborne pathogens such as cryptosporidium and an especially virulent strain of E. coli.

Investigators determined that it was mainly the babies who were not breast-fed who got sick from the dirty water. Among a group of infants at one hospital, those admitted for diarrhea were 50 times more likely to be fed formula or cow's milk than those admitted for other ailments. Cow's milk is more difficult for babies to digest and lacks the antibodies found in breast milk.

In one village the team visited, 30 percent of the formula-fed babies had died; none of those being breast-fed had.

The report also reflected the shifting scientific consensus on breast-feeding. In the years since Botswana began its formula-feeding program, studies have increasingly shown that the risk of HIV transmission comes mainly from the combination of breast milk and other foods, such as formula and solids, that damage the lining of a baby's intestines, inviting infection.

In one study in Botswana, breast-fed babies contracted HIV at a slightly higher rate than those fed with formula, but formula-fed babies were more likely to die. By the time the children in the study reached 18 months, similar numbers from both groups were alive and free of HIV.

Pursuing alternatives

Putting a mother on an effective combination of antiretroviral drugs, which are widely available in Botswana and some other African nations, also dramatically cuts the risk of transmission through [breast-feeding](#) -- likely to less than 2 percent, Coovadia said.

"You can protect kids, and you can give them the benefits of breast-feeding," he said.

UNICEF, after distributing 365,000 packs of formula in eight African countries -- and providing training and technical assistance to the program in Botswana -- began phasing out its infant-feeding programs in 2002.

UNICEF officials also participated in an October 2006 conference that issued new guidelines reemphasizing the importance of breast-feeding and warning that formula can be dangerous in all but the most developed, reliably sanitary settings.

"There are very few places where those conditions exist," Alan Court, director of programs for UNICEF, said in an interview from [New York](#) .

Health officials in Botswana remained unconvinced. Tlou, the health minister, said the outbreak was a one-time occurrence that should not, by itself, dictate a new policy. Officials instead are focusing on making formula feeding safer by encouraging women to boil water and feed their babies using cups, which are easier to clean than bottles.

She also said the ministry will monitor emerging studies to determine if a change is warranted. "We are amenable to research, especially our own research," she said.

More danger ahead?

The debate, which has consumed global public health officials for years, has not reached the grieving mothers of Nkange village. None expressed any suspicions about water contamination or about the dangers of feeding formula rather than breast milk to babies.

"It was just an outbreak," Swimbo said.

Mavundu, who is pregnant again, has reached the same conclusion. Her new baby is due in October.

"I think it's a boy," she said, smiling, with her hand on her rounded belly.

Since the loss of Kabelo, Mavundu has also started on a combination of antiretroviral drugs that should control her AIDS symptoms and also make breast-feeding far safer. But no one has told her that.

When rainy season arrives in the first months of her new baby's life, she said, "I know that I will give the Nan."

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