

# Clostridium tetani

**F**rançoise Gasse, MD, remembers the remote villages in Sudan well, for the worst of reasons. Residents in those villages saw as many as 10 to 20 of their newborn infants suffer agonizing deaths each year from neonatal tetanus—or, as they called it “the black bird disease.”

“They believe that when a newborn has tetanus, it means there was a crow, a black bird, sitting on the top of the house at the time of delivery,” Gasse explains.

A renowned expert on the disease—he’s known as “Dr. Tetanus” by his colleagues—Gasse was in Sudan as part of his impassioned mission to eliminate maternal and neonatal tetanus (MNT), initially doing extensive work with the World Health Organization and UNICEF and now as a freelance consultant. While rarely seen in Western society, MNT is shockingly common—and just as shockingly under-reported—in some of the

## Medical science has long known how to prevent tetanus; so why does it still kill nearly 60,000 babies every year?

world’s most remote regions, such as Southern and East Asia and Africa.

“India, Nigeria, Pakistan, Somalia, Chad, Angola, Laos to name a few, and many sub-Saharan countries are still at risk and neonatal tetanus is responsible for too many deaths,” Gasse adds.

MNT cases are rarely reported, but community mortality surveys—investigations of infant deaths and their causes in randomly selected villages and communities—and WHO model estimates have shown it actually kills 59,000 infants and a significant number of mothers annually.

Fortunately for the Sudanese villagers, they’re close to escaping from those painful statistics. Sudan, with the support of UNICEF, implemented a maternal vaccination campaign, a key component in the fight against MNT. Once a mother is properly vac-

By Julie Cope Saetre

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inated, not only is she protected, but she passes along immunization and protection to her newborn child for the first two months of life.

On a subsequent visit two years later, Gasse asked the villagers about the health of their newborns.

“They said, ‘Since the vaccinators have come, the black bird doesn’t come anymore.’”

Stories such as this are the force driving The Eliminate Project, a campaign of Kiwanis International in association with UNICEF to support the elimination of MNT from the globe. It will require reaching families who are figuratively, as Gasse puts it, “at the end of the road” so approximately 130 million women can be immunized to protect them and their future newborns against tetanus. It also means convincing entire communities to change harmful traditional birth and post-delivery practices. When successful, the project will put an end to a disease “as old as humanity,” Gasse says.

**T**etanus is caused when inert spores of the *Clostridium tetani* bacteria—found in the soil, animal feces, decaying material and human intestinal tracts—enter the body through an open, often deep and penetrating wound. The spores then grow and release a neurotoxin (basically, a poison) called tetanospasmin, which attacks the central nervous system. The result: Spasms, which typically begin in the jaw muscles (thus the “lock jaw” moniker), progress into painful, violent spasms in other muscle groups.

As tetanus grows more severe, even mild stimuli—light, touch,

noise—can trigger acute seizures and convulsions. Some are so violent they are capable of tearing muscles and fracturing the spine. And the suffering is just as cruel. Complications from tetanus lead to death, on average, in 70 percent of newborn cases in developing nations, Gasse says.

“Tetanus can cause one of the most painful deaths known to man,” he adds, recalling that the first neonatal tetanus patient he saw had a back so severely bent backward during a spasm that the head nearly touched the buttocks.

“The infant spasms were terrifying but in silence,” he recalls, “and the child died with the spasms two hours later in spite of efforts made to help him.”

When Sigrun Roesel, MD, WHO medical officer for the Western Pacific Region, received her medical training in Germany, neonatal tetanus was one of many vaccine-preventable diseases studied in the curriculum. A visit to Sabah, Malaysia, however, brought it all too vividly to life.

“When I saw my first ‘real’ case in a (Sabah) hospital, it continued haunting me,” she recalls. “Having to watch the terrible suffering of the little baby, without being able to do much, gave me so much pain that I became a fierce advocate for MNT elimination.”

In cases of newborn tetanus, infants often contract the disease through unhygienic birth practices, such as a birth attendant using unwashed hands or an unsterilized instrument to cut the umbilical cord. (Mothers may be infected in the same manner or by giving birth on the ground, on soiled linens or on other unhygienic surfaces.)

“Traditional birth attendants are working women in villages and have a lot of other work during the day,” Gasse explains, “They will rush from the field to assist a woman delivering in her home, often without cleaning their hands, which may contain many tetanus spores. Washing hands in those communities is not something you do systematically. Water is more for drinking than washing hands.”

**O**ther methods of neonatal tetanus contraction include the practice of treating the umbilical cord with a contaminated dressing or, in the tradition of some communities, applying any number of substances—from cow or donkey dung to rat feces, clay or earth—to stop the bleeding after cutting the cord.

“All of those substances contain tetanus spores and create an anaerobic environment, which allows the spores to develop and produce the neurotoxin that affects the newborn and, most of the time, kill him,” Gasse says.

Mothers also are at risk, Roesel stresses, pointing out that maternal tetanus contributes to an estimated 5 percent of maternal mortality in developing countries.

“MNT affects the most marginalized groups in society and is particularly an indicator of disparity and inequity for women,” she explains. “A maternal tetanus death not only kills a precious member of the family, but the loss of a key caregiver badly affects the health and wellbeing of left-behind infants and children.”

The first step in MNT prevention begins with immunizing women of child-bearing age. The tetanus toxoid (TT) vaccine contains a detoxified

version of tetanospasmin, the toxin that causes the disease. This in turn induces specific antitoxins that “neutralize” the tetanus toxin, making it inoffensive and protecting the mother. She passes that protection to her infant for the first two months of life.

Ideally, a five-dose protocol providing lifetime coverage is recommended, according to WHO. But in the 39 countries where MNT remains a threat, regular access poses serious challenges. Thus, for those regions, the goal is three properly spaced doses, through a campaign-like approach that protects a woman during the most common child-bearing years.

“The more doses she receives, the longer the protection lasts,” Gasse explains. “One dose may provide very little, if any, protection, but any dose counts. The real protection starts after the second dose. The second dose may give her about three years of protection, but the third dose will give her at least five years of protection and in many cases more than 10 years of protection.”

Illiteracy and restricted access to education can pose an equally challenging barrier to change.

“It’s not always easy for mothers-to-be to understand that vaccinations received way before they get pregnant will protect their future unborn babies, and these young ladies may shy away from the pain of injection,” Roesel says.

Gasse says some women also fear wrongly that the vaccine might actually cause a health problem, prevent pregnancies or force a woman’s pregnancy to terminate.

“The TT vaccine has been misperceived in many communities as a disguised family-planning injection, pushed by foreigners,” he says, “because (some women and communities believe) the Western world is worried about the population growth in developing countries.”

Successful vaccinations and the second step in the fight against MNT—

instilling hygienic delivery and cord care practices—often involve overcoming deeply ingrained cultural traditions. And it’s not just mothers who should be targeted.

“For cultural acceptability, it’s very important to also convince the decision makers in families and communities,” Roesel says. “Patience, respect and repeated health education are required to influence long-standing traditions.”

**T**hat’s why solutions must be personalized for the needs of individual villages and areas.

In Uganda, Gasse says, a native medical doctor agreed to be publicly immunized to promote the campaign. “She was a young woman of child-bearing age, beautiful, educated ... and it was reported in villages everywhere,” he explains. “And every young woman wanted an immunization so she could become like (the doctor).”

Educational efforts need to reach larger audiences as well, both experts say, to ensure that MNT receives the concern it warrants. In a world where MNT deaths are so under-reported, childhood fatalities from high-visibility killers such as malaria, pneumonia and diarrhea often grab the headlines—and the resources.

“Newborn tetanus carries no political weight because it’s a non-conta-

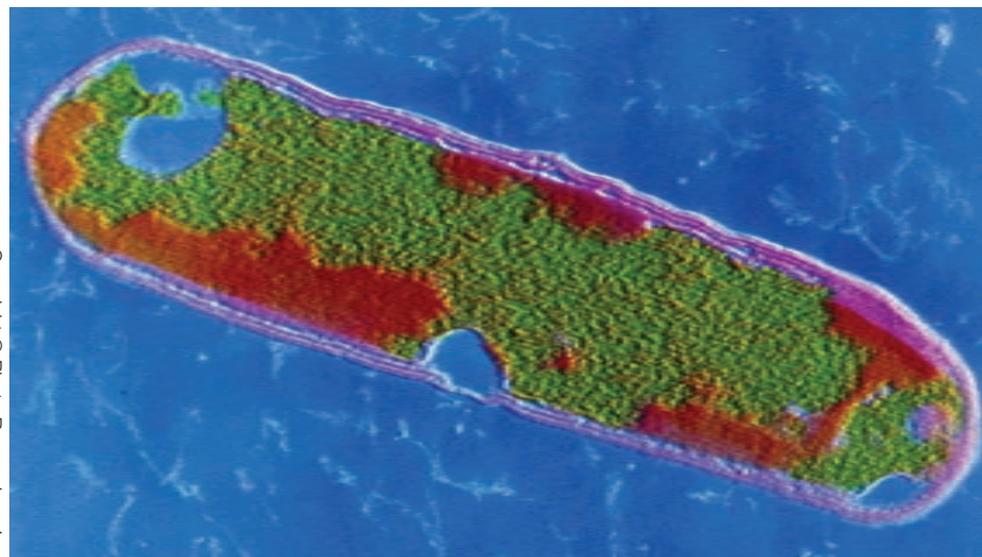
gious disease,” Gasse says. “It affects silently, and it kills in silence. It affects remote, rural zones with limited access, limited communication. It’s never a scandal. It’s part of life. Malaria and meningitis make the news, not newborn tetanus! ... MNT is an issue of equity and not of numbers.”

Therefore, the fight against MNT will not only help countries eliminate this tragic disease, but also will help bring much-needed access to social, health and nutrition services for women and children in these communities.

“MNT elimination efforts put on the map the underserved populations in affected countries,” Gasse says. “Where neonatal tetanus occurs, there are no health services. These populations should become a focus for the delivery of life-saving interventions such as vitamin A, the pneumonia vaccine, mosquito nets, education to rehydrate children suffering from diarrhea and the malaria vaccine hopefully one day.”

The bottom line, of course, comes back to the simple act of a happy, healthy birth experience, which so many in Western societies take for granted.

As Roesel succinctly puts it, “A baby coming to this world should be a moment of joy, not grief, for the family and community.” **KM**



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