Volunteer doctors and nurses are stationed in the main city of the country and do not want to serve in the rural areas due to the living conditions and the need for more specialized medical care.

The task of implementing and providing health services in rural areas is complicated due to the lack of infrastructure and trained personnel. The government has established programs to encourage medical professionals to work in these areas for a certain period of time, offering incentives such as higher salaries and educational opportunities.

However, these programs have been met with resistance from medical professionals, who argue that they are not compensated adequately for their efforts. Additionally, the high cost of living in rural areas can be a significant barrier to those who wish to work there.

Efforts have been made to improve the situation, such as providing better medical facilities and training opportunities, but these changes have been slow and inconsistent.

In summary, while there is recognition that rural areas have unique health care needs, the challenges in providing quality health care services are significant, and more needs to be done to address these issues.
nearly three decades. Most vaccines rely on pieces of dead or live pathogen to rouse an immune response. But Patarroyo synthesizes molecules that mimic proteins found in the malaria parasite instead. To test each molecule, he injects it into a group of five to 10 monkeys, then gives each a shot of 200,000 malaria parasites (roughly 200 times the number of parasites transmitted via a single mosquito bite). “If they get [malaria], the molecule doesn’t work,” he says.

Not everyone is happy with Manuel Patarroyo’s catch and release program.

In the late 1980s, Patarroyo stumbled across a combination of four molecules that seemed to provide protection against the parasite (Nature 328:629–32, 1987), but failed in larger clinical trials. “At that point, the field turned away from Patarroyo’s approach,” says an expert in malaria vaccine research who declined to be named. “He became marginalized.”

Patarroyo has hardly faded away, however—according to ISI, he has published more than 250 papers, which have gathered more than 5,000 citations, mostly within the last 10 years. Today, Patarroyo is following more or less the same approach, but this time he’s aiming for a vaccine composed of at least 60 molecules. The more molecules, the better he thinks the protection will be.

The researcher is wary of talking on the record about the number of primates that have passed through his lab. In March, his lab contained about 650 animals. The Colombian government has issued permits for at least 4,200 animals in total since 1994, and Patarroyo admits to “several thousand.” But Angela Maldonado, a conservationist at Oxford Brookes University in England who has been interviewing the collectors, says that the number captured recently could be as high as 4,000 a year.

It’s not yet clear what, if any, impact Patarroyo’s unconventional methods are having on local populations. (Owl monkeys aren’t endangered or even threatened.) Although the monkeys receive a dose of artequin to rid them of malaria before they are released, some Colombian scientists have expressed concern that they may be spreading diseases. Maldonado is worried that the liberated monkeys might be dying off. Eduardo Fernandez-Duque, a behavioral ecologist at the University of Pennsylvania who studies owl monkeys in Argentina, says that the animals are highly territorial. “If I were to release an owl monkey from the lab into a forest filled with owl monkeys,” he says, “I would be very concerned that other monkeys may just beat the animal to death.”

Camilo Pirajoín, the vet who oversees Patarroyo’s lab in Leticia, says that doesn’t happen. But his evidence is largely anecdotal. The monkeys that participate in Patarroyo’s experiments receive small tattoos. “We know that those animals can live in the jungle,” Pirajoín says, “because the collectors have recaptured them.”