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Smart Field Strategies in Rabies Control: How Veterinarians Are Making a Difference in a One Health World

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Abstract:

Rabies is a deadly disease that kills nearly 59,000 people each year, even though it can be completely prevented. The real problem isn't the lack of vaccines but the difficulty of making sure those vaccines reach the people and animals who need them. Veterinarians working in the field are vital—they connect scientific knowledge with everyday communities. They help by keeping an eye on rabies cases, vaccinating animals, teaching people about safety, and working with others across health sectors. Now, with new tools like AI for tracking animals, drones to deliver vaccines, and mobile apps to report bites, veterinarians are not just animal doctors—they have become modern disease managers. This article looks at how they are using smart strategies to fight rabies better, especially in places with limited resources, supporting the World Rabies Day theme "You – Me – Community: Act Now."

Keywords: Rabies control, Field veterinarians, One Health

Introduction:

While scientists and decision-makers plan how to eliminate rabies, it's the field veterinarians who bring these plans to life. They run vaccination campaigns in rural areas and educate people about what to do after an animal bite. These vets are often the unsung heroes in the fight against rabies.

But they face many challenges: too many stray dogs, low public knowledge about rabies, problems getting vaccines where they're needed, and poor reporting systems. To overcome these, vets are now using new technologies and community-focused solutions that didn't exist even 20 years ago.

This article explores some of these new ways veterinarians are working on the ground to stop rabies.

New Technologies Helping Veterinarians:

- **Drones to Deliver Vaccines and Baits:** In hard-to-reach places—like remote villages, forests, and islands—drones can drop vaccine baits for wild and stray animals like dogs, foxes, and bats.

Veterinarians supervise this to make sure it's done safely. For example, a project in rural China using drones to spread vaccine baits increased the number of vaccinated animals by 40% compared to manual delivery.

Key example: In rural China, using drones to deliver oral rabies vaccine baits in forest areas reached 40% more animals than doing it by hand (Wang et al., 2022). Drones can easily reach places that are hard to get to—like forests, islands, and flood-prone areas—where wild animals and stray dogs live. Veterinarians on the ground make sure the baits are placed safely, keep track of how many animals take the bait, and involve locals to help report what's happening.

- **Using AI to Count Stray Dogs:** Veterinarians now use smartphone apps with AI-based image recognition to count and track stray dogs. This information helps plan vaccination zones and find areas where many animals are still unvaccinated. In India, these kinds of apps are being tested to help cities plan rabies control better.

  Key examples: Mobile phone apps using AI and image recognition can count and track stray dogs automatically. In a pilot project in Jaipur, India (2021), AI helped get more accurate counts—30% better than counting by hand. Vets use this information to find places with many stray dogs and plan vaccination drives that focus on those hotspots.

- **Oral Rabies Vaccines for Free-Roaming Dogs:** Injecting every stray dog is tough, so vets use tasty oral vaccine baits that dogs eat voluntarily. These baits are often coated with attractants like chicken liver flavour. Oral vaccination helps vaccinate more than 70% of the dog population, the amount needed to stop the disease from spreading widely.

  Injecting vaccines into street dogs is hard because they are difficult to catch. A big breakthrough came with tasty vaccine baits coated with chicken liver flavour, tested in Goa, India. These baits helped vaccinate more than 70% of the dogs, which is enough to stop rabies from spreading (Wallace et al., 2020). Veterinarians oversee the process, making sure dogs eat the baits safely, checking for immune responses, and ensuring everything is done safely.

- **Mobile Apps for Reporting Bites and Guiding Treatment:** Community members can report animal bites using simple mobile apps. Vets get alerts immediately and help guide the bitten person to the nearest place where they can get treatment (called post-exposure prophylaxis or PEP). This quick response saves lives by making sure treatment isn't delayed.

  Key example: The "mHealth-Rabies" app in Kenya lets people report animal bites instantly and connects them to treatment centres quickly. This cut the delay in getting treatment by 45% (Hampson et al., 2021). Vets watch these reports closely, check if the cases look like rabies, and help victims find the closest place for treatment. This reduces cases being missed and helps ensure everyone gets care when they need it.

- **Smart Cold-Chain Systems**: Vaccines must be kept cold to stay effective. Portable solar-powered refrigerators and Bluetooth temperature sensors help vets keep vaccines at the right temperature even in areas without steady electricity. This prevents vaccine spoilage and builds trust in vaccination programs.
- **Blockchain and Smart Vaccine Storage:** Using blockchain technology for vaccine supply chains helps keep everything transparent and stops fake vaccines or stock shortages. Solar-powered coolers and Bluetooth temperature trackers help vets keep vaccines cold in rural areas without reliable electricity. In Tanzania, solar refrigerators helped reduce vaccine spoilage by 25% during 2022 campaigns.
- **Community Engagement: The Personal Connection:** Technology is important, but vets also work directly with communities. They organise street plays, local radio talks, and school campaigns to teach people about rabies prevention. Getting community volunteers involved—sometimes called "rabies champions"—has doubled vaccination rates in some African projects.

  Veterinarians also focus on educating people. Methods like school talks, street plays, and radio messages work well in rural India and Africa. In the Philippines, training local “Rabies Champions” doubled the number of people bringing dogs for vaccination within a year (Quiambao et al., 2020).
- **The One Health Approach in Action:** Field veterinarians connect the health of people, animals, and the environment. For humans: making sure people who are bitten get treatment quickly and know about rabies. Veterinarians help bite victims get the right treatment and teach them how to clean wounds properly.

  For animals: Vaccinating dogs and using oral baits for wildlife. They run mass dog vaccinations, distribute oral vaccines, and carry out dog sterilisation programs

  For the environment: reducing trash that feeds stray dog populations, helping control the spread of rabies. They advise local governments on waste management to control stray dog populations.

Veterinarians are the important link connecting communities, health services, and environmental care.

Looking Ahead: What’s Next for Field Veterinarians?

Using drones combined with AI to first map stray dogs before dropping vaccine baits. Blockchain technology to track vaccine distribution and make it transparent. GPS collars on vaccinated dogs to monitor how well vaccination programs cover an area. Using GPS collars on dogs to track who has been vaccinated in real time. Tele-veterinary services that let experts support rural vets during rabies emergencies remotely. Portable gene sequencing tools to identify rabies virus strains right at the bite site. Portable devices that can identify rabies virus types in the field within hours. Combining drones and AI so smart drones can find and vaccinate stray dogs automatically. Community-run digital networks to report

and track rabies cases. Combining rabies control with efforts against other animal diseases for a broader health impact.

Conclusion:

Stopping rabies doesn't just happen in labs but on the ground, where veterinarians work closely with communities. By combining scientific knowledge, technology, and compassion, field veterinarians are leading the way in rabies control. Innovations like drones, AI, and oral vaccines are changing how they work and giving hope for a rabies-free future.

Rabies won't be defeated in labs alone but in villages, forests, and cities where field veterinarians work every day. By using new technologies like drones, AI, mobile apps, and blockchain, along with strong community work, vets are changing how we fight rabies.

The message of "You, Me, Community: Act Now" fits perfectly with what vets do—individual effort, working together, and using the best tools available. Rabies is more than just a disease—it shows how we can all come together for One Health. With veterinarians empowered on the front lines, the goal of zero deaths by 2030 is within reach.

"If science is the brain behind this fight, then field veterinarians are the heart, keeping communities safe and healthy."

"The fight against rabies won't be decided in laboratories but in towns, neighbourhoods, and wild places—where field veterinarians stand as the first and last line of defence."

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