



RABID BYTES

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The newsletter of The Global Alliance for Rabies Control

EDITORIAL

What makes a successful rabies prevention program? Up until five years ago, I thought I could answer that question in my sleep. Throughout my career, I had heard in innumerable rabies presentations and read in professional journal articles and book chapters the specific requirements needed to prevent human rabies deaths and eliminate endemic dog rabies. It all seemed so, well... standardized. What I had failed to truly understand was that although the tenets associated with rabies prevention are clear and have proven to be successful, the methods that each region, country, or province may ultimately choose to implement these "proven tenets" may and indeed are likely to differ from region to region.

This month, this fact became evident once more as I visited our collaborative dog rabies elimination project in Bohol Philippines. The dedicated professionals and volunteers associated with this project have made remarkable progress in changing the attitude of the citizens throughout the province regarding rabies control and responsible pet ownership. Rarely have I actually seen a practicable 'one health' model that has achieved so much in such a short amount of time. The Bohol project is headed at the provincial level by Governor Edgar Migrifño Chatto and lead by the provincial veterinarian Dr Stella Lapiz. By combining several strategies, including enforcement of existing legislation to improve dog registration, vaccination and control; launching an intensive educational awareness campaign; incorporating educational modules on rabies prevention and responsible pet ownership into the curriculum of elementary schools; increasing the number of anti-rabies clinics for post-exposure prophylaxis throughout the island; training professionals in both human and animal health and education; increasing surveillance; and involving more than 15,000 community volunteers to help implement the program, the number of human and animal deaths has been dramatically reduced.

Between July 12 – 14 this year, rabies experts and international guests were invited to listen to professionals and citizens on Bohol talk about their program; how it was coordinated at the national and provincial levels, how it was implemented at the local level and the continuing challenges that they are facing. The list of international visitors to Bohol included Jeanna Giese and her parents John and Ann. It was inspiring to hear Jeanna speak to the young students about her own battle, and her family's personal experiences with rabies and to watch the young faces totally concentrated on what Jeanna had to say to them. I came away from the three day trip to Bohol with a much deeper understanding of the 'required' intangible components of a successful rabies control program, beside vaccinating 70% of the dogs. It is clear that while the exact Bohol model may not work for every country in the world, there is a lot we all can learn from the Bohol citizens and public health professionals about the commitment necessary to make the daily threat of rabies disappear. Congratulations to everyone in Bohol Philippines for your remarkable progress!

Deborah J Briggs, Executive Director Global Alliance for Rabies Control

NEWS FROM GARC AND WRD

A Filipino Experience to Remember...

Jeanna Giese talks about her recent trip to the Bohol Rabies Program.

"Five days filled with mounds of rice, tons of culture, and a great new hope for rabies elimination. I shall never forget my experience on the island of Bohol, Philippines. I was thrust into a world I did not belong in, and yet I felt whole because we all experienced the same terror and had the same goal. Rabies. Suffering. Death. New hope.

I learned much about the effect that rabies once had on the island. Because of that, I could better see the pure dedication the people had to prevent more suffering. I saw so many people of different occupations and different ages putting all of their time and effort into making Bohol Rabies-Free.

First there is the government, veterinarians, doctors, and committees that all came together for one cause. I met a governor whom was 100% for rabies elimination and stray dog control. Veterinarians and doctors came together to register, vaccinate, and control the stray dog population. Many committees were formed to help register and vaccinate pets. They all agreed on one goal, and they all worked together to reach it.

Second there are the schools. The teachers in these schools realized the problem, and agreed to take action. They implemented a program that is changing the way the kids view animals, and opening them up to a new way of life with their pets.

I visited two schools during my visit to Bohol. In the first, I was able to share my experience with rabies. In the second, I was able to see the learning program and to witness its effectiveness. The program that is put into the many classes is something that I wish to see

Continued on page 2...



...JEANNA GIESE *continued from page 1.*

all over the world.

Third, the children are a great group of citizens that contribute much to the Project. Kids of all ages are willing to learn the safe side and dangerous side to pet ownership. While observing a science class's rabies lesson, I saw firsthand how young children do not fully understand the terrible effects of the disease until it is shown to them. A documentary was shown to the class featuring victims of rabies. I remember half of the class quietly giggling as they watched adults and children lash out in terror as they succumbed to rabies. As the documentary moved forward, the giggles lessened until the room was filled with serious and concerned faces. I'm sure it was a new and unbelievable sight for them to see, but after time the message sank in, rabies is no joke.

I have heard many stories from veterinarians and doctors who have watched too many children and adults die of rabies. With having lived through the suffering, I know their pain. My hope, wish, and prayer is that one day these people never have to watch another child die of rabies."

GARC's new website now live

Following months of planning and work, we are delighted to present you our new website.

"This is really exciting" says Debbie Briggs, GARC's Executive Director. "Rabies control is gathering momentum worldwide and we need to move our work forward by attracting and talking to a wider audience"

Thanks to those of you who provided feedback on our old website. Through your comments we were able to identify what was good and what needed improving. Your comments have helped shape the new look.

The new site is designed to meet the needs of our existing audiences - scientists, vets, health workers and other people affected by, or working with, rabies - but also, to start a new dialogue with people who know nothing about this terrifying disease.

Our Resources section has extensive free materials suitable for everyone from the general public to research scientists looking for peer reviewed papers. Our News section has latest events in the fight against rabies and updates on our projects, as well as features on people affected by rabies and people working with GARC to combat it. Our newsletter too, has a new html format (although it is still available to download as a pdf, if you prefer).

Education is a key element of our mission and the next stage of the revamp is the development of comprehensive teaching materials. These ready-to-use lesson plans, activities and worksheets, will be age appropriate and available free of charge.

As well as improving the structure and content of the site, the new look also plays a part in boosting the profile of the disease. "We need to increase our donor base" says Debbie, "to fund new projects and get closer to our goal of a rabies free world". You can help with this by forwarding our web address or newsletter to friends and colleagues, following us on Twitter and 'liking' our Facebook page. These little things really do make a difference.

What do you think? Do you find it easy to use? Can you find what you're looking for? Do you have any suggestions? Please take a good look round the site and get in touch with any thoughts and comments.

Thank you.



EWCP celebrates WRD in the Bale Mountains, Ethiopia

Once a year, on September 28th, the schoolchildren and teachers of Dinsho, in the Bale Mountains of Southern Ethiopia, show their support for the fight against rabies by celebrating World Rabies Day. The event is aimed at raising awareness about the risks of rabies and the importance of prevention. Not only do people and their livestock suffer at the hands of this disease, but the endangered Ethiopian wolf has succumbed to repeated rabies outbreaks in the Bale Mountains.



World Rabies Day demonstrations on the Main Road in Dinsho

For the fourth year running, the Ethiopian Wolf Conservation Programme (EWCP) celebrated Rabies Day 2010 in Dinsho, with the help of the Dinsho woreda (district) administration, local NGOs, and the primary school pupils and teachers. The pupils and teachers, accompanied by EWCP staff, marched through the main street in town, carrying anti-rabies posters and chanting together to save the Ethiopian wolf and encourage vaccination of domestic dogs. The march was timed to coincide with market day in Dinsho, and the pupils handed out rabies awareness booklets to farmers and their families coming into town from the mountains. World Rabies Day stickers were given to all the pupils in the school, while many were also placed on the windows of local businesses.

Back at school, the Dinsho woreda vet gave a short speech about the dangers of the disease, stating that rabies prevention starts with the dog owner. He asked the assembled crowd to protect themselves, their animals and Ethiopia's wildlife by getting their dogs vaccinated when the EWCP vaccination team comes to their houses. He also reminded them of the actions they should take if bitten by a dog.

The audience was then treated to a play put on by some of the pupils, as well as poems, an art display and a quiz, all helping to raise awareness of the disease. In closing, the vet officer asked the crowd to all join hands, and "stand together to combat this terrible disease and save lives".

Submitted by Anne-Marie Stewart. For more information about the activities of EWCP, please email her at ewcp@zoo.ox.ac.uk or visit www.ethiopianwolf.org.

WRD Webinar a rare opportunity to participate in global forum

Hundreds of people from over 60 different countries have so far signed up to the World Rabies Day webinar.

The webinar, September 21-22, 2011 brings together the world's leading authorities in rabies research, 'One Health' advocates, doctors, veterinarians, students and World Rabies Day event planners.

During the webinar, participants will hear peer-reviewed abstracts which cover:

- eliminating canine rabies
- monitoring of human rabies
- controlling rabies in wildlife
- information and education campaigns
- building sustainable rabies control programs



Each presentation will last 20 minutes, with 5 minutes for Q&A at the end.

The webinar creates a global forum for the multi-disciplinary dialogue that is necessary to tackle this deadly disease. Participants only need a computer and internet connection to get involved.

Attendance to the webinar is FREE but space is limited to 1000, so if you want to register do so now.

Day 1 (Sept 21) will focus on Asia, Middle East, Europe and Africa. [Register](#)

Day 2 (Sept 22) will focus on North and South America. [Register](#)

Full details and technical requirements are [here](#).

Songs to raise awareness

Dr Sergio Recuenco of the Centers for Disease Control and Prevention in the US recently visited Amazonian Peru as part of an investigation of a bat rabies outbreak. He reported encouraging news about an awareness campaign supported by the Alliance:



Anita Peña holding the teachers manual for the bat rabies awareness programme.

“ In Shushug (one of the villages of the outbreak), while waiting for the collected bats, a cloud of children had gathered in front of the medical post where we work. We talked to them and asked them to sing a local song for candy, and to my great surprise they sang about vampire bats and rabies in their local language (Awaajun). Later, more singers popped out and two more songs were sung about bats and bat bites. Intrigued but happy, we recorded some videos and took some pictures.

A couple of days later I told my story to our MINSA (the Peruvian Ministry of Health) collaborators while eating lunch and I was told Shushug was the location where Dr. Daza was doing the GARC project (a \$10,000 grant given for educating children in their native language to help educate their families at home about rabies). I could not be more excited about that. I had not had news from Dr. Daza for a long time, and I asked to talk to him. I was shown a teacher's manual and I was told there was also a CD recorded with the songs. After 2 days I got Dr. Daza on the phone, and encouraged him to finish a report on the project and obtain permission for me to get electronic copies of the materials. I persistently asked him to share this experience with the rest of the rabies community.

Our work on rabies is always very busy, sometimes is hard and frustrating, sometimes goes OK, but sometimes feels really awesome as when I heard the “bat” songs in the voices of those children in their own language. There is hope at the end of the road....”

Two Alliance Board Members Receive Awards

Ray Butcher, has become only the ninth person to receive the Dogs Trust's highest honour, the Phyllis Mayer Argus award. Dogs Trust said that it wanted to recognise Mr Butcher's achievements as a global ambassador for animals through his work to improve standards in animal welfare in 48 countries across the globe, advising vets and welfare workers. Mr Butcher, has been a partner at the Wylie Veterinary Centre in Upminster for more than 30 years, is a past-president of the British Small Animal Veterinary Association and of the Federation of European Companion Animal Veterinary Associations. He is a founder of the Blue Dog Trust, a programme developed to reduce the risk of children being bitten by dogs, a board member of the Alliance for Rabies Control and a veterinary adviser to the World Society for the Protection of Animals (WSPA).

Dr Deborah Briggs, Executive Director of the Alliance was also recently recognized by the Association for the Prevention and Control of Rabies in India for the contribution that she and the Alliance have made to improving advocacy for rabies prevention across the world. Dr Briggs was invited by the APCRI to present the Louis Pasteur Oration at the annual conference of APCRI in Chennai India. It is the first time that a rabies expert outside of the country of India has received the award for contributions in the field of rabies prevention.

The Alliance extends its congratulations to Mr Butcher and Dr Briggs on their awards and looks forward to future fruitful collaboration with them.

Partly summarised from an article in the [Veterinary Record](#), June 11th 2011.

NEWS FROM THE COMMUNITY

US military increases rabies awareness in Afghanistan

Dr Loren Adams, a private veterinarian from Iowa, relates his experiences of a recent US army mission to Afghanistan that increased rabies awareness and canine vaccination.

"America has been conducting military operations in Afghanistan for 10 years. In 2007 the Army National Guard fielded the first 'Agribusiness Development Team' (ADT) staffed with Soldiers from agricultural backgrounds. Their mission was to develop 1) agriculture sector jobs in Afghanistan, and 2) increase Afghans' confidence in their government. After training and preparation in the US, I began to work in Afghanistan's Kunar province in August 2010. I was the veterinarian in the group which also contained experts in agronomy, soils, and irrigation, along with a robust security force. Once in Afghanistan I worked closely with Kunar's Director of Agriculture, Irrigation, and Livestock (DAIL) - Haji Mohasal Khan, and Kunar's Director of Veterinary Services- Dr. Mohammed Ghalib. We developed a variety of projects designed to promote the businesses of local veterinarians. Our ADT used US federal funds to employ over 36 veterinarians in animal vaccination and worming projects that treated over 39,000 animals in 42 villages throughout the province.

Early on I began laying the groundwork for a rabies awareness and control project in Kunar's capital city of Asadabad. I felt it would be important to include the local veterinarians and government in planning and implementation of the program. Several online resources were helpful in the planning stages, including the Blueprint for Canine Rabies Control, and the World Rabies Day website which already had educational resources written in the local language of Pashtu.

We hosted a veterinary seminar in December for Kunar's veterinarians. Each veterinarian indicated he had seen cases of rabies in dogs and livestock, and Dr. Ghalib remarked that he had seen a child die from the disease. Laboratory testing for rabies is available in Kabul, but very few samples from outlying areas. Security is poor, postal systems are not effective, and many Afghans do not call for veterinary assistance when an animal is sick. In Afghanistan the reservoir for rabies is the dog population, so my project centered on increasing awareness of the population about rabies along with a canine vaccination program. Teaching children how to avoid dog bites, and educating the health care sector on proper bite wound management was also important. Security issues were complex and heavy armored personnel carriers were required for any meetings that could not be conducted at our camp. The language barrier was a problem, but we hired interpreters that were capable of bringing the message to the Afghans. My friend Dr. Ghalib also attended every meeting and was instrumental in presenting the messages correctly where cultural differences were often evident.

I wrote two public affairs pieces for radio broadcasts. Because throwing rocks at dogs and hitting them with sticks is common in Afghanistan, I wanted children to hear a message stressing the importance of treating dogs with kindness as part of dog bite prevention. Another message advertised the upcoming free dog vaccination program and encouraged vaccination of all dogs in the community whether they were owned or not.

In early discussions about the vaccination campaign, issues of killing stray dogs were debated, as this was part of the national rabies control program. I presented evidence arguing that vaccinating 70% of all dogs and avoiding euthanasia was the preferred method, and although cultural and ideological difference persisted, euthanasia was avoided in our project. Medical supplies and 2,000 doses of dog vaccine (costing approximately US\$0.61 per dose) were purchased through Afghan suppliers and I made dog catching poles in the camp. I was able to obtain human prophylaxis rabies vaccine to immunize seven local veterinarians. Finally in April 2011, these veterinarians vaccinated over 1,500 dogs over a three week period and issued rabies certificates. Much advice about rabies and vaccination was also given, and apprehensive owners were invited to watch neighbors' dogs being vaccinated to help convince them to have their own dogs vaccinated. All the veterinarians were pleased with the program that gave them work and put them in contact with locals where they could discuss their important role in preventing the spread of rabies.

Working with the Department of Women's Affairs in Kunar, educational training sessions for 3 groups of women livestock care workers were also conducted. We also provided training for 45 of Asadabad's hospital medical personnel. The staff was presented with fliers containing basic information on the risks of rabies and basic wound care, and wound care was demonstrated by camp medical personnel. We were frequently told rabies prophylaxis vaccine for patients was unavailable in Afghanistan.

Further education to 400 students at a boys' high school and to 75 agriculture students at Jamaludeen Asadabad University was well received, but one planned for a girls' high school had to be abandoned, as we were not allowed to enter the school. An education official later reasoned that any class taught by a male outsider would be fuel for the Taliban to discourage teaching of girls further.

I am pleased with how much we accomplished in a community surrounded by an ongoing war. Our program dramatically increased rabies awareness for thousands of citizens and their provincial governmental leaders. I also recognize that more can be done to further the program, especially expanding it to smaller villages around the province. I have encouraged the government to continue with this program and a yearly vaccination campaign for two to three weeks each year."



MAJ Loren Adams, DVM and puppet "Meena" discussing rabies at Umarkhan Boy's School

Rabies Control Program for the Punjab

In June 2011, a series of significant steps were taken towards improved rabies control in the Punjab, Pakistan. Firstly, dog bite management workshops in Multan, Lahore and Islamabad were carried out, thanks to the cooperation of the Department of Health of the Punjab (DGHS Punjab), the World Health Organization (WHO) and the Government Bacteriologist of the Punjab. One focal person from each of the 36 district hospitals of Punjab, other private hospitals and Tertiary Care Hospitals attended. The workshops covered both theoretical and practical aspects of wound management, with opportunities to ask questions and to see a movie.

Next, WHO in collaboration with DGHS, Punjab held a meeting on 23rd June to develop a joint and comprehensive rabies control strategy for next two years. Also present were representatives of Local Government, Novartis, University of Veterinary Sciences, CDC and Bacteriologist Department.

The salient features of the strategy that evolved are:

1. Increased mass awareness of rabies transmission, prevention and self protection using cost effective means such as local government and community communication structures.
2. Establishment of rabies treatment centers at each District Headquarters Hospital where health care providers would be trained on management and treatment of dog bites with availability of anti rabies vaccine.
3. Ensuring the most cost effective and efficacious anti Rabies vaccines in designated Rabies treatment centers in all districts.
4. Enactment and enforcement of laws relating to vaccination of pet animals such as dogs and cats in order to decrease rabies incidence among them.
5. Mechanisms to decrease the stray dog population in the districts through the use of modern methods such as bait vaccination and dog elimination.
6. Developing a surveillance system to monitor dog bites, dog rabies and human rabies through the use of existing death reporting system under local government structures.
7. Close collaboration between the three Government departments in the control of Rabies.
8. Research on animal rabies and development of animal and human rabies vaccines by the University of Veterinary sciences, Lahore.

Finally on 24th June, a press conference in both English and Urdu was arranged at the Press Club, Lahore to publicise the strategy. Dr. Quaid Saeed of WHO, and Dr. Zarfshan Tahir of DGHS were joined by Dr. Babar Alam, Dr. Sajid, and Dr. Mubashir Malik and they started with a brief description of rabies in Pakistan.



The meeting to develop the new Punjab rabies control strategy

According to the National Health Management Information System 2010 report there were more than 97,000 recorded cases of dog bites reported by Basic Health Units in Pakistan. This does not include those managed by secondary and tertiary care facilities, nor the estimated 80% that are managed by private practitioners, spiritual healers and Hakims. In the Punjab, there is one dedicated dog bite treatment center in the Institute of Public Health, Lahore that receives more than 200 cases of dog bites daily, for wound management and anti-rabies vaccine at subsidized rates.

However, most of the population are unaware of the risk of rabies when they are bitten by dogs or do not seek the right treatment for its prevention. In 2004, WHO estimated 17 deaths per million in Pakistan due to rabies. Inadequate surveillance, poor access to modern vaccine and immunoglobulin, weak political support and resources and ineffective collaboration have until now limited effective rabies control.

The press were then presented with a summary of the strategy developed, and questions were answered. The benefits of ID administration of vaccine were detailed by Dr. Saeed and Dr. Malik also announced that the Government has procured an efficacious and WHO approved vaccine which will be available free of charge in all district hospitals.

Submitted by Dr. Zarfshan Tahir (DGHS Punjab). A newspaper article resulting from the press conference is available [here](#).

A Third US Rabies Survivor

A third person in the United States has survived clinical rabies without having antiviral inoculations immediately after becoming infected. The 8 year old girl, from California was treated at the University of California Davis Children's Hospital.

The girl was probably infected in April 2011 after a scratch from a feral cat near her elementary school in Humboldt County, North California. Not knowing about the risks, post exposure prophylaxis was not sought, and the animal was never traced.

Symptoms started out with stomachaches, and back and neck pain, and at first flu or appendicitis was suspected. However, she rapidly developed severe muscle weakness and collapsed. She was flown to the University of California Davis Medical Center where, almost a week later, doctors determined that she had contracted rabies. Rabies was confirmed by the Centers for Disease Control on May 6th.

Nurses at the hospital thought her chances were slim when she arrived at the pediatric intensive care unit, giving her a 5 percent chance to live. However, from the very beginning, she had a very rapid, robust immune response to her infection, thought to be a significant contributing factor to her survival.

She was treated according to the Milwaukee protocol, placed in a drug-induced coma as she received anti-viral medications. She spent two weeks in intensive care undergoing the treatments, is now recovering in the hospital's general pediatric unit and is expected to go home soon.

Summarised by Louise Taylor from news reports in [The Huffington Post](#), [CBS news](#), and [The Journal, Humboldt County](#).

Helping to stop rabies in Uganda

Rabies in Uganda is still a problem that affects people every year, infection usually occurring after a dog bite. As only a few people are able to pay for the treatment (available in Rwanda or Kenya for US\$200), most of them die after terrible suffering. Rabies does not only affect people, but also Ugandan livestock and wildlife (lions and jackals or mountain gorillas, for example).

In January and February 2011, a cooperative project was carried out in West Uganda, for the second time. The project was started last year by Dr. Jesus Muro, a veterinary officer in the Andorran Government. This time three other veterinarians, Dr. Ignasi Marco, Dr. Javier Millán and Dr. Andrea Chirife, from Servei d'Ecopatologia de Fauna Salvatge (SEFaS), Universitat Autònoma de Barcelona, and a veterinary student, Victòria Ticó, also took part. SEFaS is a wildlife diseases research group from Spain. The 2011 project also involved people from local organizations such as Conservation Through Public Health and M'Gahinga Community Development Organization, and was addressed to stockbreeders next to three protected areas: the Bwindi Impenetrable Forest, the Queen Elizabeth National Park (QENP) and the M'Gahinga National Park.

Conservation Through Public Health (CTPH) is an NGO that promotes gorilla conservation by enabling people, wildlife and livestock to coexist through improving their primary health care in and around Africa's protected areas. CTPH provides veterinary services and builds capacity of the government and local communities, including the community animal health workers. M'Gahinga Community Development Organisation (MCDO) is an umbrella group comprising several groups, associations and educational facilities, united by a common goal of improving the lives of the people in M'Gahinga. MCDO supports the development of sustainable projects that result in an harmonious and positive coexistence between the M'Gahinga community and their surrounding environments. That will benefit the community economically and will preserve local environments and species. Thanks to funds from the Andorra Cooperació program, Dr. Jesus Muro was also able to get back in Uganda this year.



Dr Muro and Ms Ticó performing surgery in the field

The project included rabies vaccination of dogs older than 3 months. The vaccines were donated by Laboratorios Ovejero, León, Spain, by Prosan Lleida, Spain and Intervet-ScheringPlough. In total, there were 25 vaccinated dogs in QENP, 157 in Bwindi and 32 in Kisoro, next to the M'Gahinga Park. Unfortunately, the total population size in these areas is unknown. As rabies is transmitted by biting, the project tries to reduce aggressiveness in dogs by sterilization in both sexes. The pre-scrotal technique was performed in males, and the ovariohysterectomy technique in females. A total of 35 animals were spayed. The dogs' welfare was also improved by deworming them with an oral dose of praziquantel (244 animals) and a subcutaneous dose of ivermectin. The dogs were identified with red vinyl collars, in the way that Global Alliance for Rabies Control advises in their Blueprint. This allows them to be seen from more than 30 meters and makes it easier to count them.



Dr Millán and Dr Chirife taking samples from dogs in the Bwindi Area

The vaccine guidelines advise that dogs older than 3 months old must be vaccinated, then revaccinated one year later and again three years later. That could be enough with the estimated maximum life expectancy (five years old) estimated for those dogs. This vaccination campaign was located in the same area as in 2010 and serum samples were taken to know the immunological status of previously vaccinated dogs. In 2012, serum samples will also be taken to know the status of the dogs vaccinated in this campaign.

Rabies is still a problem, but prophylactic vaccination is feasible and it is the best way to fight it. By promoting vaccination programs and educating people about this disease we can reduce rabies. But the only way of making this possible is by getting funds, donations and, most important, with people actively involved and mobilized to do the field work.

Submitted by Dr. Jesus Muro, DVM Msc, from the Andorran Government.

A "heads up" for young veterinarians in rabies endemic areas

Dr. Mahfoud Brahimi, Institut Pasteur d'Algérie, and a member of AfroREB shares some of his veterinary experience with rabies.

"In the course of my career, I have had to deal with dog owners who came to me to have their dog vaccinated against rabies but in rather suspicious circumstances. What alerted me was the way they introduced themselves and how they treated the dog that they dragged behind them on a rough chain. The dog obviously lacked basic health care and was underfed. More often than not, it was a mangy dog, thin and afraid, and covered in ticks and fleas. It pulled against the chain: it had done something wrong, had been punished and mistreated, and was trying to escape from the vet. Generally speaking, such a dog roams around a neighborhood or a farm and is fed by one or more families.

This is the type of behavior that should alert the veterinarian and encourage him to question the owner of the dog: Is the dog sick? No. Then why are you here? To vaccinate him against rabies. Where is his record of vaccinations? He doesn't have one. And the other vaccinations against Carré's disease, leptospirosis, parvovirus? No, he doesn't need those. He's fine; he's never sick. Did he bite someone? No. Are you sure? I swear I'm telling the truth, Doctor. You know what? I'm going to visit the neighborhood, and if I find out that someone had a problem with your dog, you are going to be in a lot of trouble. Finally he sits down and explains: Doctor, believe me, he hardly even scratched this little kid who just wouldn't stop teasing him.

The dog had bitten a child, and threatened by the child's father, the "potential owner" had decided to vaccinate the dog and then show the certificate to the father to calm him down and make him forget about the incident.

I decide not to vaccinate the dog (that only "licked" the child) against rabies, but to put it under observation. I also insist on seeing both the child who has been bitten and his father, and explain to him that as rabies is fatal, he must take his child to the antirabies

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...DR BRAHIMI *continued from page 6.*

center for treatment. It's also important to identify any other people bitten by the dog and inform them as to what they should do.

What would have happened if the dog had been simply vaccinated as his "owner" wanted? The child and the other people who had been bitten by the dog would not have come to the antirabies center, which would have had life-threatening consequences if the dog had had rabies. The antirabies vaccination might have slowed down the symptoms of disease if this animal had been infected by the rabies virus when he had been presented at the clinic. The owner could brag about his dog being vaccinated against rabies and pretend that it presented no risk at all. The dog would then have continued to play with the children, putting them at risk of being bitten, while their parents would not be aware of the potential risk the dog presented. If, at the end of the observation period, the dog is still healthy, he should then be vaccinated against rabies.

If the veterinarian had not sensed that something was wrong, and had vaccinated the dog that had bitten the child, then they should a) find the dog and its "owner"; b) confiscate the vaccination record; c) put the dog under observation; and d) find the people who had been in contact with the dog and send them to the nearest antirabies center. If at the end of the period of observation, the animal was in good health, the vaccination record could then be given back to the owner."



A poster designed by Dr Brahimi's son, Rostom Jamil, chosen by his teachers to educate the class about rabies.

Understanding the dynamics of bat rabies

Our understanding of rabies dynamics in bats has lagged behind that in other hosts, and long-term datasets on natural bat infections are rare. Now a new study by Dylan George from Colorado State University and other US colleagues has suggested that bat hibernation is vital to the persistence of the rabies virus in these hosts.

In the US, rabies cases in bats show seasonal variations, peaking in spring and particularly autumn each year. Bats can develop symptomatic and ultimately fatal viral infections, or abortive infections where immunity prevents symptoms and transmission. The team used data from a 5 year study on a Colorado population of big brown bats (*Eptesicus fuscus*). These bats tend to roost in the same places from year to year, do not migrate long distances, and rabies variants are usually confined to single species of bats, constituting an approximately closed system for disease dynamics.

In the spring and summer, female bats form large maternity roosts where they give birth. Under these crowded conditions, often in buildings near humans, the main peak of rabies transmission occurs. By mid October these roost are empty and the bats leave to hibernate in rock crevices at higher altitudes. After 6 months, in early spring, the bats emerge and early transmission occurs as partial hibernation persists and the maternity roosts are established. Key aspects of the host and virus dynamics, such as bat mortality, bat reproduction and the virus incubation period vary across these three different periods, and the team used experimental and field derived data to assess these parameters for each season. For example, during bat hibernation, body temperature falls close to ambient temperature and viral replication is dramatically reduced.

A mathematical model, composed of a sub-model for each season was designed to estimate the number of bats in each of 4 classes (susceptible, exposed, infectious and resistant) through time. It was validated by evaluating how well it fitted data on bat population size, the proportion of bats that were infectious, and the seasonal peaks of rabies infections. The model accurately predicted more infectious adult females early in the year, and more infectious juveniles in the late summer. Over the long term, the model predicted coexistence of bats and virus.

By altering the parameters away from those observed from the data, the importance of various parameters could be investigated. Bat and viral persistence were most heavily influenced by (i) the case fatality rate; (ii) the natural mortality rate of juveniles during the transmission season and (iii) the incubation period of the disease.

Models that did not include a hibernation period repeatedly predicted bat extinction, demonstrating that low mortality during the winter is vital to maintain the bat population until the newborns are born in spring. A viable bat population is necessary for viral persistence, but does not guarantee persistence. The model also suggests that the viral incubation period has a strong impact on viral maintenance. Fast developing infections kill their hosts too quickly to ensure sufficient spread between hosts before hibernation occurs. Cold temperatures during hibernation ensure that viral replication cannot kill too many bats before spring. The study also showed that the observed case fatality rate of the infections fell between extremes where too few infections would be produced to maintain the virus, or where so many bats died that the bats and the virus both became extinct.

Overall, the study demonstrated that hibernation maintains a reservoir of infected individuals, allowing the virus to persist until the next transmission season. It also provides a framework for further exploration of rabies and other important viral diseases transmitted by bats.

Summarised by Louise Taylor from DB George et al. (2011) *Host and viral ecology determine bat rabies seasonality and maintenance.* [PNAS June 21, 2011 vol. 108 p10208-10213.](https://doi.org/10.1073/pnas.1020810108)

Upcoming Conferences

- The OIE's "Global conference on rabies control: Towards sustainable prevention at the source" will be held 7-9 September 2011 in Seoul, Korea. Further information is available [here](#).
- The Rabies in the Americas (RITA) 2011 meeting will be from October 16-21 in San Juan, Puerto Rico. The website is www.ritaxxii.org
- The International Congress on Canine Practice will be held in Bikaner, Rajasthan, India in February 2012. Further details can be obtained from Dr Anil Ahuja at isacp2012@mail.com.

The editor of the Alliance newsletter is Louise Taylor, layout is by Pete Else. If you have news items or information of interest to the rabies community please contact louise.taylor@rabiescontrol.net. For further information on GARC see www.rabiescontrol.net.