A safety and immunogenicity field trial to evaluate a live recombinant human adenovirus (serotype 5)-rabies glycoprotein vaccine (ONRAB®) in raccoons and skunks was conducted in the U.S. in 2011. Approximately 80,000 Ultralite baits (Artemis Technologies, Guelph, ON, CAN) were distributed at 75 baits/km2 along 750m flight lines in 4, 127 km2 study areas in southeastern West Virginia, U.S. The bait was composed of a small blister pack that contained the ONRAB® vaccine with a waxy coating matrix of attractants impregnated with tetracycline biomarker, and camouflaged by a green dye. No phone calls from human or pet bait contacts were reported through a toll-free phone number provided on each bait. Low human population density may largely account for no reported bait contacts. No tissue abnormalities were observed in captive cottontail rabbits, opossums, fox squirrels, eastern wild turkeys, and woodrats at a 10x ONRAB® dose, and field histopathology results should be available in December 2012. Rabies virus neutralizing antibody (RVNA) was higher among raccoons (P<0.05) in post-ONRAB® samples (49.4%, n=296) than in naïve pre-ORV samples (9.6%, n=395). Biomarker was higher (P<0.05), among post-ONRAB® raccoons sampled, an indication of vaccine-induced RVNA's. The 49.4% RVNA population level in raccoons is the highest observed in the U.S. for a first time oral rabies vaccine distribution event. Skunk sample size was inadequate to assess ONRAB® effects. Field trial results warranted replication and expansion in 2012 to assess raccoon population immunity from a second ONRAB® trial in four more states, including Ohio urbansuburban habitats. These collaborative trials, which will continue to bring together multiple disciplines from county, state, federal and international jurisdictions in the spirit of One Health, should provide a basis to determine if ONRAB® is suited to achieve raccoon rabies management goals.

CO.57
PREFERENCES OF SELECT ATTRACTANTS IN THE COATING OF ONRAB VACCINE BAITS BY RABIES RESERVOIR SPECIES

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Rabies control managers and researchers in the United States are assessing how the Canadian vaccine ONRAB® may perform if integrated into the United States oral rabies vaccination (ORV) program. A measurement of success of any ORV program is bait uptake by target species. The attractant used in the bait matrix surrounding a vaccine influences bait uptake and vaccination rate. Our objective is to determine which flavor of attractant in the ONRAB® coating is the most preferred by rabies reservoir species in the field. In Texas (TX) we are evaluating four attractants (sweet, fish, egg, and cheese) in areas inhabited by raccoons (*Procyon lotor)*, skunks (*Mepthis mephitis*), foxes (*Urocyon cinereoargenteus)*, and coyotes (*Canis latrans*). In Puerto Rico (PR), we are comparing the preference of mongoose (*Herpestes auropuctatus)* for cheese, coconut, and fish attractants. We monitored bait stations with animal-activated cameras and regular checks of bait status (untouched, disturbed, and removed). In TX, we offered 540 baits of which 102 were removed, with cheese and fish most often removed (both 25%) followed by egg (21%) and then sweet (15%) and unflavored controls (14%). Image scoring from camera data is underway. In PR, mongoose removed baits on 38 of 343 occasions. Though all data are not yet fully analyzed, it appears mongoose prefer cheese, followed closely by fish. Findings in both TX and PR are suggesting that sweet flavors are least attractive to rabies reservoir species. To confidently state which attractants will likely perform the best, we need to complete the analyses of these data and do more extensive trials, especially in raccoon habitat in the eastern United States.

CO.58
EVALUATION OF NON-TARGET ANIMAL EXPOSURE TO HUMAN ADENOVIRUS RECOMBINANT ORAL RABIES VACCINE- OHIO 2012

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Oral Rabies Vaccination (ORV) is the primary management practice for controlling wildlife rabies in the United States, particularly among raccoons and foxes. Two ORV bait designs are primarily utilized for the distribution of vaccinia rabies glycoprotein (VRG) vaccine: a fish meal polymer block and a coated sachet. A primary public health concern related to ORV bait distribution is non-target contact between the ORV and humans and domestic pets. The VRG virus strain used in ORV is attenuated in mice, but human percutaneous exposure to ruptured sachets has resulted in localized vaccinia virus infection in very rare cases. Recently, a new recombinant human adenovirus ORV (AdRG) has been developed. This vaccine is incorporated in ultralight bait which has not previously been used in the United States. Surveillance for human contact is important, particularly among young children that may have contact with the bait, due to their lower prevalence of prior exposure and immunity to human adenoviruses. To evaluate potential differences in contact rates between the VRG and AdRG bait types CDC, the Ohio Department of Health, and USDA/WS will conduct an investigation during ORV baiting in Northeastern Ohio in August 2012. The focus of this investigation will be to ensure that public health programs are in place to capture events of human and domestic animal bait contact, ensure appropriate protocols are in place in case of a severe adverse event from a bait contact, and evaluate whether the AdRG vaccine bait matrix is associated with a different human detection rate compared to bait types used for distributing VRG. Updated guidelines related to appropriate management of potential contacts with AdRG baits during ORV activities may be developed based on findings from this investigation.

CO.59
MULTIDISCIPLINARY APPROACH TO EPIZOOTIOLOGY AND PATHOGENESIS OF BAT RABIES VIRUSES IN THE UNITED STATES

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Zoonotic disease surveillance is typically initiated after an animal pathogen has caused disease in humans. Early detection of potentially high-risk pathogens within animal hosts may facilitate medical interventions to cope with an emerging disease. To effectively spillover to a novel host, a pathogen may undergo genetic changes resulting in varying transmission potential in the new host and potentially to humans. *Rabies virus* (RABV) is one model pathogen to consider for studying the dynamics of emerging infectious diseases under both laboratory and field conditions. The evolutionary history of RABV is characterized by regularly documented spillover infections and a series of notable host-shifts. Within this context, enhanced field surveillance to improve detection of spillover infections will require validated techniques to non-invasively differentiate infected from non-infected individuals. In this

study we evaluate the use of infrared thermography to detect thermal changes associated with experimental RABV infection in big brown bats (*Eptesicus fuscus*) in a captive colony. Our results indicated that 62% of rabid bats had detectable facial temperature decreases (-4.6°C, SD ±2.5), compared to pre-inoculation baseline values. These data suggest potential utility for discriminating rabid bats in natural field settings. In addition, focusing upon RABV circulating in the United States between 2008 – 2012, we confirmed spillover events of bat RABV among carnivores and identified cross-species transmission events caused by four lineages of RABV associated with insectivorous bats. This study provides a glimpse into RABV pathobiology and spillover dynamics among and between bats and a variety of mesocarnivores.

CO.60
KNOWLEDGE, ATTITUDES AND PRACTICES AMONG POPULATIONS EXPOSED TO BATS IN SOUTHERN NIGERIA

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Among the currently recognized species in the Lyssavirus genus worldwide, all but one (Mokola virus) has been identified in bats. Recent discovery of emerging pathogens of zoonotic importance in bats raises concerns about health risks of populations that directly or indirectly come in contact with these diverse mammals. Idanre, an ancient city situated in Southwest Nigeria, conducts a unique bat festival twice annually, where the populations have traditional practices that involve capturing and consuming bats. These activities bring them into direct contact with bats that are important not only because of potential exposure to lyssaviruses, but also to other emerging pathogens. A knowledge, attitude and practices survey was developed and administered to investigate the potential risk of exposure to emerging diseases among these populations living around bat caves, as well as those who participate in the bat festival. Serum samples were collected from humans and bats in the study area, and were analyzed for lyssaviruses and other potential microorganisms. Participants (n=142) were recruited from 90 households in 5 different communities (4 rural and 1 urban). Participant ages ranged between 9 – 83 years. Twenty-one (28%) participants claimed to have participated in the bat festival and 15 (71%) participated twice a year. Of those that participated in the festival, 14 (67%) were involved in multiple activities: 14 (67%) reported involvement in bat preparation/consumption, 12 (75%) hunted bats, 4 (19%) sold bats, and 5 (24%) watched the events. Thirty (26%) study participants claimed to have entered a bat cave and 53 (50%) touched a live bat. Eighteen (18%) participants who reported direct contact with bats also reported scratches and 14 (15%) reported bat bites. Ninety-three participants (92%) made no attempt to protect their families from bat bites, while 5 (5%) prevented bats from entering the home, and 1 (1%) reported destroying bats entering the home. Only 10 (15%) participants claimed to have an extensive knowledge of rabies. However, 33 (53%) would do nothing if bitten or scratched by a bat. A total of 102 blood samples were collected from humans. Neutralization against rabies virus was detected in 3 (3%). There was no evidence of neutralization against non-rabies lyssaviruses. Among the 145 bat sera, seroprevalence of Lagos Bat Virus (LBV) antibodies was observed in *Rousettus aegyptiacus* (51%) and *Eidolon helvum* (24%) species. Some of the LBVpositive samples additionally neutralized Shimoni bat virus (SHIBV). Our results indicate an insufficient knowledge about rabies among the study population and an increased exposure through practices and attitudes towards bats, that maybe harboring unknown zoonotic pathogens. This calls for plans to provide continuous surveillance of important pathogens of risk to human health, and the need to have preventive measures and response strategies in place to safe-guard human health.

CO.61
SPACE-TIME DYNAMICS OF ATTACKS BY HEMATOPHAGOUS BATS AND GEOGRAPHIC ACCESS TO HEALTH CARE IN A REGION OF MEXICO.

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The objective of this study was to estimate the spatial patterns in rates of aggression by vampire bats (*Desmodus rotundus*) and identify human populations with limited geographic access to medical service with post-exposure prophylaxis. METHOD: A set of points georeferenced with case reports of aggression by bats in humans was used to model the rates-adjusted of aggression against residents of local communities in the south of the State of Mexico. A continuous prediction area was constructed based on the rates of aggression from events during the year 2000 (outbreak of rabies cases in animals, and attacks to humans) and during the period 2001 to 2009 (stability in the frequency of cases) using a spatial interpolation method (Poisson- Kriging). The coverage areas of health services were calculated through a network analysis, estimating travel times (30 to 60 minutes) to the nearest hospital unit. Both estimates were integrated with risk maps. RESULTS: Two thousand one hundred ninety people of different sexes and ages were attacked by vampire bats in the region; 94.8% of attacks were recorded in the municipalities of Tejupilco and Luvianos. In 2000, there was an outbreak of rabies in animals, with an increase of 74.4% in the number of attacks (1629 recorded). During 2001-2009, the rate of aggression by gender showed a significant increase in women (58.6%) in contrast to men (41.4%). By age group, the highest percentage of attacks was from ages 1 to 19. By anatomical region more attacks were recorded in the upper extremities with 784 cases. Seasonal aggression was observed, with greater frequency in the months of April to August. Mapping was developed for both Poisson-Kriging model designs, a trend toward a higher rate of aggressions being observed in both models in the north-west, in the municipality of Luvianos. This distribution and seasonality is related to several factors such as: high production and marketing of livestock in the municipality, the physical and geographical conditions in the region that favor the survival of hematophagous bat, and socio-economic conditions with high level of social vulnerability and limited access to health services of basic levels. CONCLUSION: The Geographic Information Systems in Health provide a tool for geostatistical analysis, management and planning which is essential because it is possible to address the risk of aggression toward humans by vampire bats from a perspective which is spatial, systemic, multi-causal and interdisciplinary. Acknowledgements The authors wish to acknowledge to María Eugenia Jaimes from Comite de Fomento y Protección Pecuaria del Estado de México. Facultad de Geografía-UAEMex for his assistance with the creation of cartography. MD Gabriel O'shea Cuevas from Instituto de Salud del Estado de México.