

Sample Size Estimation for Complex Random Effects Logistic Models. Yinmei Li<sup>1,2\*</sup>, Luis A. Escobar<sup>2</sup>, and Daniel T. Scholl<sup>1</sup>. <sup>1</sup>Dept. of Pathobiological Sciences, School of Veterinary Medicine. <sup>2</sup>Dept. of Experimental Statistics, Louisiana State University, Baton Rouge, LA.

Two approaches were explored for formulating sample size estimations for logistic regression of cohort studies with one confounder and non-random premature withdrawal: 1. when test power is of interest, and 2. when confidence interval width is of interest. As a starting point, a basic formulation for the fixed effects model was derived. Under large-sample assumptions and standard regularity conditions, covariance matrix for Maximum Likelihood (ML) parameter estimation was derived from Fisher's Information Matrix. Null and alternative hypotheses were defined, and a closed-form sample size formula for achieving a specified power was obtained. The formula was modified for achieving a specified confidence interval width. These straight forward formulations will form the basis for sample size estimators that take into account clustering, 1-factor confounding and non-random premature withdrawal. Approaches for extending the samples size formulae will be discussed and examples using the two simple formulae will be presented.

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Reliability of a telephone questionnaire measuring diet and activity level in cats. J. L. Harbison\*, M. R. Slater, L. M. Howe. Department of Veterinary Anatomy and Public Health, Texas A&M University, College Station TX 77843-4458.

A telephone questionnaire was developed to collect information on diet and activity level as part of a study examining long-term outcome of early age versus traditional age gonadectomy in cats. The objectives of this study were to measure the reliability of the questionnaire using the retest approach, to describe changes over time in diet and activity level, and to determine whether current diet and activity level interfere with ability to recall past information. A total of 100 previously interviewed cat owners completed the second administration of the questionnaire. The interval between the first and second questionnaire ranged from 6 months to 2.6 years (median 1.5 years). Owners answered questions related to activity level, appetite, body condition, diet type and brand, frequency of feeding, in/outdoor status, and time spent outdoors. All variables measured in the questionnaire were analyzed using kappa. Reliability was poor for questions referring to activity level, appetite, body condition, type and brand of treats, and table scraps. Reliability was moderate for questions referring to brand of dry and canned foods, frequency of feeding, and time spent outdoors. Reliability was high for questions referring to whether dry and canned foods were fed and in/outdoor status. Change over time was moderate to high for all variables with the exception of whether dry diet was fed and in/outdoor status. Recall of all variables, with the exception of body condition, was at least moderately influenced by current characteristics.

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Ohio Animal Care and Control Agencies: Combining Public Service and Animal Welfare H. J. Monke\* and T. E. Wittum. Department of Veterinary Preventive Medicine, Ohio State University, Columbus, OH.

Ohio animal care and control agencies serve the community by addressing the timely issue of animal overpopulation. The magnitude and temporal trends associated with animal intake, disposition, and care were assessed using annual mail surveys of Ohio county dog wardens, humane societies, and municipal officers from 1996 to 2000. Statewide response rates for all agencies in a given year ranged from 53% to 84% during the study period. Survey responses for each of the three types of shelters were extrapolated to serve as estimates for non-responding agencies of the same category across the state for the year. The subsequent yearly estimates for budget, per capita figures, animal intake and disposition, and utilization of veterinary services combined to yield five-year summary estimates. Over \$135,000,000 was budgeted for all animal care and control agencies within the state of Ohio during the study. The five-year per capita budget was \$11.96 per Ohio resident for all companion animals and wildlife cared for in shelters. Furthermore, for the study period only \$106.06 was budgeted per sheltered animal. According to the respondents, animal shelters handled over 840,000 dogs, 410,000 cats, 31,000 wild animals, and 5,000 other animals. The two primary categories of animals entering shelters were strays (67%) and those relinquished by owners (31%). To accommodate the sizable intake, the majority of animals were either adopted (28%) or euthanized (61%). Demand for veterinary services including spays/neuters, preventive medical treatments, and wellness exams remained constant over the five-year study. Temporal values reflect the fragility of the human animal bond and emphasize the continued need for further public education regarding pet ownership responsibilities.

Effect of Chemical Restraint Method on Recapture Rate in Raccoons [*Procyon lotor*]. L.L. Hungerford<sup>1\*</sup>, S.D. Gehrt<sup>2</sup>, S. Hatten<sup>3</sup>. <sup>1</sup>GPVEC, University of Nebraska, Clay Center, NE. <sup>2</sup>Max McGraw Wildlife Foundation, Dundee, IL, <sup>3</sup>Dept. of Fisheries and Wildlife, University of Missouri, Columbia, MO.

Chemical restraint is commonly used in wildlife research, especially for seroprevalence studies. Although short-term physiologic responses have been well described for many drugs, potential effects of these chemicals on post-release behavior have received little attention. During a live-trapping study, we compared recapture success for raccoons immobilized with either Telazol® (TL) or ketamine-acpromazine (KA). A total of 344 raccoons were pair-matched by age, sex, site and initial capture date. KA or TL was randomly assigned within each pair. An additional 263 raccoons were randomly assigned a drug but had no pairmate. Recapture rates were compared during the initial trapping season and cumulatively across the entire study using the Slade method, rate ratios (RR), and Poisson regression. Among pairs, cumulative recaptures were greater for TL than for KA (RR=1.4, P=0.01) with this pattern repeated, but not reaching statistical significance, within trapping periods (RR=1.3, P=0.11). For all raccoons randomly assigned an immobilant, total recaptures were 40% higher for TL than KA within trapping periods and 25% higher for cumulative recaptures (P<0.02 for both), controlling for site and season. These consistent patterns suggest that drug-specific effects on raccoon behavior should be considered when chemical restraint and recaptures are used to derive estimates of population structure and animal survival.

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Seroprevalence of a Hantaviral Strain in Rodents in the Great Smoky Mountains National Park. S.L. Lewis\*, J.C. New, Jr., S.A. Kania. Dept. of Comparative and Experimental Medicine, University of Tennessee College of Veterinary Medicine, Knoxville, TN.

We conducted a serosurvey in the Great Smoky Mountains National Park (GSMNP), the most visited national park in the country, to identify areas in the park that may bring visitors and park staff in contact with hantavirus infected rodents. In 1994, the Centers for Disease Control conducted a serosurvey of rodent populations associated with Hantavirus Pulmonary Syndrome (HPS) in national parks throughout the contiguous United States including GSMNP in Tennessee and North Carolina. The GSMNP survey found 2 seropositive mice out of 50 rodents tested (4%). Between September 13, 2000 and December 2, 2000, we conducted 20 trapnights at 10 different locations throughout GSMNP. Sites were characterized as having low, moderate, or high human visitation. We captured 156 rodents and insectivores and were able to collect blood and tissue samples from most animals. Enzyme-linked immunosorbent assays were performed on 115 serum samples and 8 (7%) were found to be positive for hantavirus antibodies. Preliminary results of reverse transcriptase polymerase chain reaction performed on some of the seropositive samples revealed a sequence encoding the G2 region of the M segment, a structural glycoprotein. This sequence had the closest homology to pathogenic strains of Sin Nombre virus as determined by BLAST software. Hantaviruses represent a serious zoonosis in many parts of the world and HPS in the United States has a case fatality rate of approximately 43-52%. HPS is characterized by a rapid onset of febrile illness followed by respiratory failure. As of February 23, 2001, the CDC had reported 286 cases in 31 states.

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Spatial distribution of *Mycobacterium bovis* infection in free-ranging white-tailed deer (*Odocoileus virginianus*) in Michigan. R. Miller<sup>1\*</sup>, J.B. Kaneene<sup>2</sup>, S.M. Schmitt<sup>2</sup>, S.D. Fitzgerald<sup>3</sup>. <sup>1</sup>Population Medicine Center, College of Veterinary Medicine, Michigan State University, East Lansing, MI. <sup>2</sup>Michigan Department of Natural Resources, East Lansing, MI. <sup>3</sup>Animal Health Diagnostic Laboratory, College of Veterinary Medicine, Michigan State University, East Lansing, MI.

A retrospective study was designed to evaluate the spatial distribution of bovine tuberculosis (TB) in free-ranging white-tailed deer in northeastern Michigan. The objectives of this study were to: 1) determine whether there were statistically significant spatial patterns in the distribution of TB cases in white-tailed deer; and 2) identify environmental factors associated with the distribution of TB cases in white-tailed deer. Data for the study were generated from TB surveillance data for 3,741 deer from 1995 to 1999 within a five-county 'high risk' area, based on square mile blocks within the area. Environmental conditions were divided into six general vegetation type categories, and were measured as the percent of total acreage within the square mile block. Spatial patterns of TB in white-tailed deer were assessed with both spatial and spatial-temporal scan statistics. Once distinct areas of high TB prevalence were identified, differences in environmental conditions were assessed using the Wilcoxon Rank-Sum test. Three distinct geographic areas of higher TB prevalence were found, and the location of these areas remained consistent when controlling the spatial scan statistic for environmental conditions and when the temporal component was added to the spatial analysis. These three areas differed from the overall region in having higher levels of hardwood forests (p < .0001), and lower levels of undeveloped open/shrub land (p < .0001) and agricultural land use (p = .0045). Implications of these findings for the control of TB in wild white-tailed deer will be discussed.