



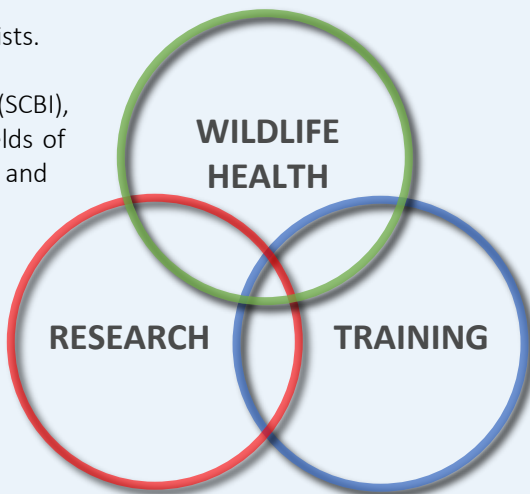
SMITHSONIAN GLOBAL HEALTH ANNUAL REPORT - 2016

WHO WE ARE:

We are conservationists. We are health professionals. We are research scientists.

Under the auspices of the Smithsonian Conservation Biology Institute (SCBI), Smithsonian Global Health (SGH) provides leadership and expertise in the fields of wildlife health and disease, zoonotic/emerging infectious disease research, and capacity building through training international partners and the next generation of home-grown professionals.

As stewards of the One Health concept, SGH recognizes that the health of humans is connected to the health of animals and the environment. By taking a One Health approach, SGH consists of a team of wildlife veterinarians, pathologists, physicians, and public health and research associates, equally committed to the health and conservation of all species.



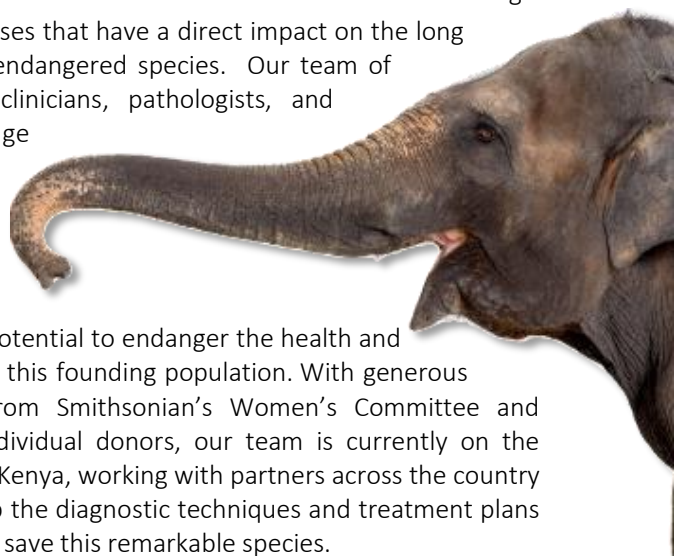
WILDLIFE HEALTH

With its roots at the National Zoo, SGH maintains a direct focus on animal conservation through the research, diagnosis, and treatment of diseases that have a direct impact on the long and short-term survival of the planet's most endangered species. Our team of veterinary medical professionals, including clinicians, pathologists, and technicians, provide expert care and knowledge while applying innovative technology to better understand the health and medical conditions of wild species.

SAVING BLACK RHINOS IN KENYA – With roughly 5,500 individuals remaining in the wild, these iconic African giants are critically endangered. In an effort to save these animals, the Kenyan Government, USFWS, Northern Rangelands Trust, Lewa Wildlife Conservancy, and a multitude of other NGO's and partners have created a new community-led rhinoceros reserve: Sera. This past year, twelve rhinoceros from around the country were translocated to this Northern Kenyan reserve by a team of wildlife experts. Upon evaluation, several of these rhinos were diagnosed with an as yet undescribed, novel

disease with the potential to endanger the health and survival of this founding population. With generous funding from Smithsonian's Women's Committee and several individual donors, our team is currently on the ground in Kenya, working with partners across the country to develop the diagnostic techniques and treatment plans needed to save this remarkable species.

NOVEL TREATMENT FOR EEHV IN ELEPHANT – The captive population of Asian elephants in North America is no longer self-sustaining, with only 141 individuals left within AZA institutions. Survival of this species is now threatened by a highly infectious disease known as Elephant Endotheliotropic Herpes Virus (EEHV). EEHV is a leading cause of death in young captive Asian elephants,





with most individuals succumbing to the devastating hemorrhagic effects of the illness within 24 hours of clinical onset. Our team is currently working with the International Elephant Foundation (IEF), Cellphire Inc, and AZA partners to develop a novel treatment for this deadly disease. With technology adapted from human medicine, we are developing species-specific elephant freeze-dried platelets that can be reconstituted at a moment's notice and utilized to provide this critical blood product to any elephant in need. This innovative and novel therapy will have the ability to save countless elephant lives.



GENETIC & HEALTH STUDIES IN LIONS & CHEETAHS

– Our team is helping to investigate lion and cheetah genetics, population health, and conservation management in the Maasai Mara region of Kenya. Partnering with the Kenya Wildlife Trust and Kenya Wildlife Services, we were able to collect more than 75 genetic samples using a novel, non-invasive darting technique. Small, hollow darts were utilized to collect skin plugs from wide-awake and free-ranging carnivores. These samples are currently being analyzed in the laboratory. Results of this study will provide information on pride dispersal as well as preliminary health data.

In a separate study investigating health and disease in the captive lion population, our team recently completed a morbidity and mortality survey. Results of this study will help quantify and assess the leading challenges to lion survival, inform on healthcare and management changes, and ultimately assist the Lion Species Survival Plan (SSP) veterinarians and keepers in addressing important health and welfare concerns of lions in captivity.



REVOLUTIONARY TREATMENT IN GIANT PANDAS

– An exciting new antibiotic with long-acting properties has been developed with some reports showing appropriate levels lasting greater than 4 weeks in some species. Following a preliminary study, the drug, cefovecin (Convenia®, Pfizer), was shown to last over 10 days in giant pandas. This is exciting news as these results are expected to revolutionize the ways in which both captive and free-ranging pandas are treated. We are currently working to include additional panda holding facilities within the USA and then expand these studies in collaboration with our Chinese partners

CARDIAC DISEASE: THE LEADING KILLER OF GORILLAS

– Cardiovascular disease is the primary cause of mortality among captive great apes, but until very recently has been a poorly understood area of veterinary care. In human medicine, brain natriuretic peptide (BNP), a naturally occurring protein, has been utilized to diagnose and monitor cardiac disease. Our team has recently completed a 5-year study in conjunction with the Great Ape Heart Project, to evaluate the use of BNP measurement in saving the lives of gorillas. The findings are currently being incorporated into a manuscript for publication.



PANGOLINS IN PERIL – Classified as the most trafficked mammal in the world, pangolins are in peril stemming from an increasing demand for consumption and traditional medicine. In September 2016, all eight species of pangolin were given the highest level of protection with a listing of CITES Appendix I, forcing a total ban on international trade. Despite the mass trafficking and dramatic declines in the wild population, very little is known about the species regarding medical health as well as their impact on human health. To better understand this elusive and fragile creature, we



are undertaking a countrywide evaluation of pangolins throughout Myanmar. Dr. Marc Valitutto, the George E. Burch Fellow, will study this increasingly imperiled species with the assistance of the SCBI Country Coordinator, Mr. Aung Myo Chit, and Cornell University veterinary student, Arianna Brown. Focus will be on the animal value chain and sample collection for general health assessments, zoonotic disease surveillance, and genetic evaluation.

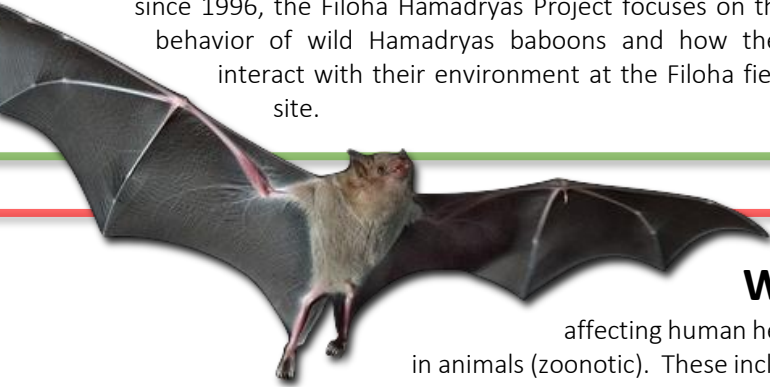


Assisting with field operations through veterinary consultations and primate anesthesia, SGH wildlife veterinarians, Dr. Dawn Zimmerman and Dr. Carlos Sanchez, have provided their expertise for this ongoing and highly successful study.

LENDING A HAND FOR BABOONS

– A world-renowned and long-term field study in Ethiopia since 1996, the Filoha Hamadryas Project focuses on the behavior of wild Hamadryas baboons and how they interact with their environment at the Filoha field site.

Wildlife Service, our team has recently completed a study of normal biochemistry values in wild olive baboons sampled at Mpala Research Center, Kenya. This manuscript has been submitted for publication and represents one of the first collaborative efforts between our teams.



Worldwide, an estimated 75% of diseases affecting human health are caused by pathogens originating in animals (zoonotic). These include HIV/AIDS, Ebola, Influenza, SARS and MERS Coronaviruses, to name a few. Pathogens shared by humans and animals can be devastating to many species, leading to the paradigm of One Health, which recognizes that human, animal, and environmental health are inseparably linked. SGH works both independently as well as with international partners to combat threats to human, wildlife, and ecosystem health and survival by addressing these diseases at their source: the human-wildlife interface.

RESEARCH

ZIKA VIRUS – The recent emergence of Zika virus in the Americas has led to a surge in funding and a global search for improved surveillance techniques in order to predict and prevent the spread of this potentially dangerous and evolving mosquito-borne disease. In an effort to develop low cost, more effective and accurate surveillance methods, Dr. Devin Tunseth, the Judy & John W. McCarter, Jr. Intern, is currently studying and developing novel surveillance and testing protocols.



MERS CORONAVIRUS DETECTION IN CAMELS & ARTHROPOD VECTORS – Well-known viral pandemics have included SARS (Severe Acute Respiratory Syndrome) and MERS (Middle Eastern Respiratory Syndrome) coronaviruses, which have resulted in over 1000 global deaths and billions of dollars in financial loss. Camels carry the MERS virus and may be a source for humans. As part of a global effort to predict and stop the next pandemic threat, our team is partnering with Mpala Research Center, and the Institute of Primate Research, et. al. to help define and evaluate the range and extent of this deadly virus. Critical to the success of this project is training and capacity building – two of the major pillars of our program. This program is conducted in large part through the USAID funded PREDICT-2 program led by partners UC Davis.





While SGH maintains many independent and collaborative research studies both nationally and internationally, one of the priorities remains our involvement as a founding implementing partner of the USAID Emerging Pandemic Threats (EPT) Program: PREDICT. Other implementing partners include USAID, UC Davis One Health Institute, Wildlife Conservation Society, EcoHealth Alliance, and Metabiota. Now in its second term, PREDICT-2 is conducting global surveillance to detect and prevent spillover of pathogens of pandemic potential that can move between wildlife and people. Zoonotic virus surveillance is conducted in both humans and wildlife and involves a substantial amount of local capacity building in laboratories, medical hospitals, and field service members.

PREDICT-2/ MYANMAR

This year has been marked with significant progress within Myanmar in part due to the establishment of agreements made with two partner government laboratories, field training, wildlife sample collection, and the start of our market surveillance. Collaborations continue to be built with local partners including the USAID mission, FAO, CDC, WHO, Malaria Consortium, Myanmar Medical Association, Myanmar Health Network Organization and the Myanmar Health and Development Consortium.

Following several visits by SGH veterinary and public health team members, as

well as the stationing of one of our wildlife veterinarians in-country, we continue to facilitate collaborative ties, further along government relationships, scope appropriate field sites, provide training in biosafety, and commence sample collection.

With over 200 samples already collected, we are continuing to actively sample wildlife at the human-wildlife interface while engaging and training local veterinarians and university students for their long-term assistance.

Taking advantage of our presence in-country, we are performing joint PREDICT related projects evaluating the health and zoonotic diseases of pangolins throughout the country. Pangolins are critically

endangered and the most trafficked mammals in the world.



PREDICT-2/ KENYA

PREDICT/Kenya continues to work in tandem with EPT partners and other Kenyan stakeholders to prioritize achieving Global Health Security Agenda (GHS) milestones. This includes enhancing disease surveillance and reporting, building One Health capacity and workforce, coordinating emergency operations programs, strengthening laboratories for detection of priority diseases, and implementing sustainable biosafety and biosecurity training and practices.

To further establish the role of PREDICT in Kenya, the team held a successful stakeholder meeting, engaging representatives from USAID, FAO, CDC, Mpala Research Center, as well as many other government ministries and agencies and other local partners. Attended by SGH Program Director, Dr. Suzan Murray, collaborative ties are now in place to expand research opportunities for emerging infectious disease surveillance and general animal health.



Finally, our PREDICT in-country staff continues to sample wildlife in accordance with PREDICT protocols. Priority species include camels, non-human primates, rodents, and bats at Mpala Ranch in Laikipia with samples

analyzed for zoonotic viruses at the Institute of Primate Research. Preparations are also being made to conduct longitudinal human zoonotic virus surveillance from community members and individuals admitted to nearby hospitals with undiagnosed febrile and respiratory illnesses.

By working alongside our country partners, and conducting trainings in PPE & safe non-invasive disease monitoring, we continue to invest in both human and wildlife health care in Myanmar and Kenya



As one of our founding principles, capacity building and training is a part of the very fabric of SGH. The SGH team is made up of professionals in wildlife, public, human and environmental health, and thus has a responsibility to share the knowledge with future generations as well as to ensure their work is sustainable through the training of local international partners. Some missions are purely based on training, while other missions incorporate it into larger goals.

Regardless, SGH remains committed to the training of individuals on multiple levels as a long-term investment in the future of our world and the health of humans, animals and the environment.

TRAINING

INTERNATIONAL VETERINARY TRAINING PROGRAM

— Animals everywhere are in trouble. We are currently in the midst of a massive extinction due to a host of factors that include habitat destruction and climate change. Increased interaction between humans, wildlife, and domestic animals has the potential to lead to serious disease outbreaks. SGH recognizes the importance of the veterinarians who respond to these threats to health and conservation, particularly in developing countries. The International Veterinary Training Program (IVTP) seeks to provide training and expertise to veterinarians globally. SGH is a driving force behind IVTP, and our talented staff provide comprehensive, hands-on, and cutting-edge training to our veterinary partners in the field. In addition, SGH offers skill-specific lectures/courses and our team members present at prestigious academic conferences around the world in an effort to reach out to our international vet colleagues and spread awareness of our training programs.

GLOBAL HEALTH EXCHANGE PROGRAM

— In February 2016, SGH welcomed its first International Research Fellow, Dr. Mathew Mutinda, a veterinarian with the Kenya Wildlife Service. After

spending 3 weeks learning advanced diagnostic techniques, and training with Zoo and SCBI experts, Dr. Mutinda is applying his knowledge to his colleagues in Kenya while building surveillance capacity. He is also participating in research with SGH team members concerning baboons, lions, and rhinos.

TRAINING INDIA'S ZOO VETS

— As a part of Smithsonian's mission to increase and diffuse knowledge, SGH is a contributor to the partnership between the Smithsonian National Zoological Park and India's Central Zoo Authority. This collaboration aims to share vital information in best zoo practices, veterinary medicine, and diagnostics with zoos in India, which are rapidly growing and improving their standards of animal care. A team of four SCBI delegates was chosen to provide evaluation and feedback for five zoological organizations in India. Dr. Kali Holder, a veterinary pathologist and Morris Animal Foundation Global Health Fellow, represented SGH's expertise in international training and infectious disease diagnostics.

USAID PREDICT TRAININGS

— As a part of the PREDICT and SGH mission, capacity building for self-sustainment is built into the program for current international staff and their selected assistants. Each PREDICT country staff

SGH US TRAINING PROGRAM:

FELLOWSHIPS:

Morris Animal Foundation/ SGH

- Kali Holder, DVM, DACVP

George E. Burch in Theoretic Medicine

- Marc Valitutto, VMD

Mpala Fellow

- Adam Ferguson, MS, PhD

INTERNSHIPS:

Judy & John W. McCarter, Jr. Global Health

- Devin Tunseth, DVM

EXTERNSHIPS – VETERINARY STUDENTS:

Cornell University

College of Veterinary Medicine

- Arianna Brown Hendry

EXTERNSHIPS – MASTERS STUDENTS:

University of South Florida,

College of Public Health

- Margaret Child

EXTERNSHIPS – UNDERGRAD STUDENTS:

Holy Cross University

- David Ozuna

Amherst College

- Andrew Orozco

EXTERNSHIPS – HIGH SCHOOL STUDENTS:

Netherlands – Local High School

- Willemijn Kuenen

Washington, DC – Local High School

- Grant Murray

VOLUNTEER:

- Alexandra Badley





member has completed their critical trainings for USAID PREDICT program which includes: biomedical research, animal care and use, PREDICT policies and plans, bio-safety and personal protective equipment (PPE), basic lab safety, emergency preparedness, implementing cold chain and safe sample transport, packing and shipping biological samples, and safe animal capture and sampling (including modules for non-human primates, bats, rodents, and livestock).

In Myanmar, our capacity building training was offered to students and professors from Yangon and Pyay Universities. PREDICT staff trained these individuals in proper PPE use, emergency preparedness, and non-invasive sample techniques for bats. PREDICT/ Kenya's Lab Technician contributed to a joint laboratory training with partners working on MERS-CoV detection and response in Kenya. The training, held at the International Livestock Research Institute (ILRI) included representatives from the institute, PREDICT, & the Food and Agriculture Office of the United Nations (FAO). FAO participants were trained in serological testing using samples jointly collected by FAO and PREDICT during prior field training exercises. Participants were shown how to extract RNA and conduct qPCR with FAO methods that share principals with PREDICT protocols. All participants received training in biosafety and the

handling of

animal samples and other potentially biohazardous materials.

The PREDICT/ Kenya team participated in joint field training in Namanga, Kenya. PREDICT/ Kenya's Field Veterinarian demonstrated animal handling and sample collection techniques using project protocols and participants collected biological specimens from camels that were later used in a laboratory analytics training. FAO handling and sampling protocols were also shared and reviewed.

The Africa and Asia Regional PREDICT Jamborees were attended by SGH Country Coordinators from PREDICT/ Kenya and PREDICT/ Myanmar, respectively, to present our Year-3 plans for human and animal viral surveillance through PREDICT in those countries.

INTERNAL STAFF TRAINING –

All new staff completed Smithsonian trainings in the following disciplines:

“Research Involving Human Subjects” – interactive lecture and exam outlining the ethical considerations, rules, and regulations for performing human research.

“Institutional Animal Care and Use Committee (IACUC)” – interactive lecture and exam detailing the policies of Smithsonian's IACUC review process.

“Prevention of Workplace Harassment” – lecture designed to prevent common workplace issues and foster teambuilding.

“Basic Security Awareness” – lecture detailing Smithsonian security policies and teaching prevention of behaviors risky to security.

“High Threat Security Overseas Seminar” to prepare and plan for possible dangerous situations while researching and traveling abroad.

CONFERENCES & WORKSHOPS –

AMERICAN SOCIETY OF TROPICAL MEDICINE AND HYGIENE (ASTMH) – Philadelphia, PA, USA. Attended by Ben Norton, BS, in October 2015. The 64th annual meeting of ASTMH focused on malaria surveillance, recounting the efforts and challenges of the 2014 Western Africa Ebola outbreak, and addressing the emerging threat of Zika virus.

GEORGETOWN UNIVERSITY PUBLIC HEALTH SYMPOSIUM – Washington, DC, USA. Attended by Ben Norton, BS, and Kali Holder, DVM, DACVP. Title of the November 2015 symposium was: “MERS/Ebola/One Health, and the Global Health Security Agenda (GHSA),” which focused on the evolving relationship between One Health and GHSA.

ANASTASIA MOSQUITO CONTROL DISTRICT (AMCD) ARBOVIRUS SURVEILLANCE AND MOSQUITO CONTROL WORKSHOP – St. Augustine, FL, USA. Attended by Devin Tunseth, DVM, in March 2016. The conference featured a number of talks by experts in the fields of epidemiology and entomology regarding current issues and new technology in emerging disease surveillance, genetic sequencing, and mosquito capture and control.

GRANT/ CONTRACT FINANCIAL MANAGEMENT TRAINING – OSP, Washington, DC, USA. Attended by Dawn Zimmerman, DVM, MS, in May 2016. This course provided a basic overview of federal and Smithsonian sponsored projects, project management tips, and critical areas to avoid audit findings.

NORTHEAST VETERINARY PATHOLOGY CONFERENCE – Gaithersburg, MD, USA. Attended by Kali Holder, DVM, DACVP, in May 2016. This conference featured interesting pathology case presentations and slide review by anatomic and clinical pathology trainees and pathologists followed by directed question and answer sessions for each.

ASSOCIATION OF ZOO VETERINARY TECHNICIANS (AZVT) – Tulsa, OK, USA. Attended by Sherri Divband, LVT, in September 2016. Topics included elephant reproductive tract anatomy and physiology, ultrasound exam, elephant conservation, zoo medicine, treatment of various species in a zoo hospital setting, and roles of veterinary technicians in field anesthesia.





PUBLICATIONS

PUBLISHED:

SANDER, S. J., HOPE, K.L., MCNEILL, C.J., ROBERTS, J.F., BOEDEKER, N.C., **MURRAY, S.Z.** (2015). Metronomic chemotherapy for myxosarcoma treatment in a kori bustard (*Ardeotis kori*). *Journal of Avian Medicine and Surgery*, 29(3): 210-215.

SANDER, S. J., SIEGAL-WILLOTT, J. L., ZIEGLER, J., LEE, E., TELL, L., **MURRAY, S.** (2016). Pharmacokinetics of a single dose of metronidazole after rectal administration in captive Asian elephants (*Elephas maximus*). *Journal of Zoo and Wildlife Medicine*, 47(1): 1-5.

STRANDBURG-PESHKIN, A., FARINE, D.R., COUZIN, I. D., **CROFOOT, M.C.** (2015). Shared decision-making drives collective movement in wild baboons. *Science*, 348(6241): 1358-1361.

SANDER, S.J., SIEGAL-WILLOTT, J., ZIEGLER, J., LEE, E., TELL, L., **MURRAY, S.** (2016). Pharmacokinetics of a single dose of metronidazole after rectal administration in captive asian elephants (elephas maximus). *Journal of Zoo and Wildlife Medicine*, 47(1): 1-5.

HAYHURST, S.E., ENGEL, J.D., WALSH, T., GORDON, S., **MURRAY, S.** AND BOEDEKER, N. (2015). What is your diagnosis? *Journal of the American Veterinary Medical Association*, 246(8): 839-841.

MARROW, J.C., WOC-COLBURN, M., HAYEK, L.C., MARKER, L., **MURRAY, S.** (2015). Comparison of Two α_2 -Adrenergic Agonists on urine contamination of semen collected by Electroejaculation in Captive and Semi-Free-Ranging Cheetah (*Acinonyx Jubatus*). *Journal of Zoo and Wildlife Medicine*, 46(2): 417-420.

SANDER, S.J., HOPE, K.L., MCNEILL, C.J., ROBERTS, J.F., BOEDEKER, N.C., **MURRAY, S.Z.** (2015). Metronomic Chemotherapy for Myxosarcoma Treatment in a Kori Bustard (*Ardeotis kori*). *Journal of Avian Medicine and Surgery*, 29(3): 210-215.

SIEGAL-WILLOTT, J., JENSEN, N., KIM, D., TALIAFERRO, D., BLANKENSHIP, T., MALINSKY, B., **MURRAY, S.**, EIDEN, M.V., XU, W. (2015). Evaluation of Captive Gibbons (*Hylobates* spp., *Nomascus* spp., *Symphalangus* spp.) in North American Zoological Institutions for Gibbon Ape Leukemia Virus (GALV). *Journal of Zoo and Wildlife Medicine*, 46(1): 27-33.

IN-PRESS:

SCHIAFFINO, F., SANDER, S.J., PERIERA, M.E., KIUPEL, M., **MURRAY, S.** (2016). Cerebellar and Mesencephalon Neoplasia in a Nile Hippopotamus (*Hippopotamus amphibius*). *Journal of Zoo and Wildlife Medicine*.

WITTE, C., LAMBERSKI, N., RIDEOUT, B., VAIDA, F., CITINO, S., BARRIE, M., HAEFELE, H., JUNGE, R., **MURRAY, S.**, HUNGERFORD, L. (2016). Epidemiology of feline herpesvirus (FHV) in zoo cheetahs (*Acinonyx jubatus*). *Journal of the American Veterinary Medical Association*.

WOC-COLBURN, A.M., **MURRAY, S.**, HAYEK, L.C., MARKER, L., **SANCHEZ, C.** (2016). Cardiorespiratory effects of a fully reversible anesthetic protocol: dexmedetomidine-butorphanol-midazolam (DBM) in cheetahs (*Acinonyx jubatus*). *Journal of Zoo and Wildlife Medicine*.

SUBMITTED:

MUTINDA, M., **TUNSETH, D.A.**, CROFOOT, M.C. HAYEK, L.C., **MURRAY, S.** Biochemical reference intervals for free-ranging olive baboons (*Papio anubis*) in Kenya. *Journal of Medical Primatology*, submitted 2016.

TUNSETH, D.A., LUNG, N.P., HOPE, K., **MURRAY, S.** Biochemical/hematological reference intervals, health assessments of free-ranging San Salvador iguanas (*Cyclura r. rileyi*) in a translocation program. *Journal of Herpetological Medicine and Surgery*, submitted 2016.

VALITUTTO, M.T., **ZIMMERMAN, D.**, OBER, J., **HOLDER, K.**, HOWARD, L., SCHMITT, D., **SANCHEZ, C.**, **MURRAY, S.** Indications for lyophilized platelet products as a prospective treatment option for hemorrhagic disease and wound healing in wild animal species. *Platelets*, submitted 2016.

ROBERTS, J.F., **MURRAY, S.**, WALSH, T.F., HALE, S., HANSON, M., LOVE, D. Necrotizing hepatopathy and evaluation of pulmonary development in three neonate giant pandas (*Ailuropoda melanoleuca*). *Veterinary Pathology*, submitted 2016.





PRESENTATIONS

PRESENTER	PRESENTATION	EVENT/ VENUE	LOCATION
Murray, S.	KEYNOTE PRESENTATION	National Human Genome Research Institute Symposium, National Institutes of Health	Bethesda, MD, USA
Murray, S.	Invited Speaker	Celebrating International Day of the Girl at Chevy Chase High School	Bethesda, MD, USA
Murray, S.	Honored Guest	Irish Embassy Dinner for Smithsonian's Global Health Initiative	Washington, DC, USA
Murray, S.	KEYNOTE PRESENTATION: Trans-Species, Trans-boundaries exploring worldwide impacts of diseases in animals and humans.	American Academy of Facial Plastic and Reconstructive Surgery	Dallas, TX, USA
Norton, B.	Outbreak! Public Health Threats in Clinical Dermatology	American Academy of Dermatology's annual conference	Washington, DC, USA
Holder, K.	Importance of bats in emerging infectious disease investigations and surveillance	Yangon University, Department of Zoology	Yangon, Myanmar
Holder, K.	USAID-PREDICT program	Myanmar Veterinary Medical Association	Yangon, Myanmar
Smiley-Evans, T.	On the Frontlines of One Health	Consortium of Universities for Global Health	Uganda
Murray, S.	Guest Speaker: Smithsonian Global Health's achievements and ongoing PREDICT-2 activities	Smithsonian's People>Passion>Purpose	Atlanta, GA, USA
Holder, K.	Smithsonian Global Health: Emerging Infectious Diseases, One Health Veterinarians, and Zoonotic Surveillance	SCBI Friday seminar series	Front Royal, VA, USA
Holder, K.	POSTER: Investigation into an emerging disease in critically endangered black rhinoceros in East Africa	SCBI Student Symposium	Front Royal, VA, USA
Tunseth, D.	POSTER: Optimization of coronavirus and Zika virus xenosurveillance in Kenyan domestic camels (<i>Camelus dromedarius</i>)	SCBI Student Symposium	Front Royal, VA, USA
Valitutto, M.	Smithsonian Global Health; a One Health Institute.	Smithsonian-Mason School of Conservation (SMSC) short course	Front Royal, VA, USA
Tunseth, D.	Xenosurveillance: Using mosquitoes to detect diseases in camels and wildlife	Mpala Research Center	Laikipia, Kenya
Schmitt, D.	Development of freeze-dried platelet-derived hemostatic agents as a novel treatment for elephant endotheliotropic herpesvirus hemorrhagic disease	AAZV/EAZWV/IZW Joint Conference	Atlanta, GA, USA
Murray, S., Zimmerman, D., Vodzak, M.	SGH & Current Projects	SCBI – Center for Species Survival	Front Royal, VA, USA
Valitutto, M.	SGH and USAID PREDICT Program	Myanmar Health & Development Consortium	Yangon, Myanmar



VISIBILITY & OUTREACH

GUIDED TOURS WITH SGH TEAM

MR. AND MRS. JOHN W. MCCARTER, JR.

RITA AND JOHN CANNING

CONGRESSMAN, RICHARD NEAL - STAFFERS
Massachusetts Congressman

MR. D. N. SINGH
Member Secretary of Central Zoo Authority,
India
Received tour of both SCBI and NZP

THE WHITLATCH FAMILY
Jefferson Lab Engineers of VA.

**UNIVERSITY OF HOUSTON GRAND CHALLENGE
EXTERNS**
Undergraduate Students

SANDII LWIN
Founder and Managing Director of Myanmar
Health and Development Consortium

MARION K. KOCHI AND FAMILY

DR. JOHN REDDINGTON
CEO of Morris Animal Foundation

DR. JANDOUWE VILLINGER
Researcher for Kenyan collaborator ICIPE

MR. AUNG MYO CHIT
SCBI Country Coordinator, Myanmar

politics, and science to demonstrate entrepreneurship in the global public interest while upholding the highest standards of governance, morality, and intellectual integrity in improving the state of the world. SGH was fortunate enough to take place in this grand exchange of ideas at the Annual Meeting of New Champions in Tianjin, China. Program Director Dr. Suzan Murray represented SGH as a panel expert in a session on: "Pandemics and Big Data: Disrupting Transmissible Diseases." SGH's involvement in such a prestigious gathering of top minds not only positions us at the forefront of solving issues in emerging disease, and human, animal, and environmental health, but establishes us as a global force for One Health.

OFFICE OF SCIENCE AND TECHNOLOGY POLICY –

The Office of Science and Technology Policy (OSTP) was created by congress in 1976 to serve as the president's chief advisory branch regarding the effects of science and technology on domestic and international affairs. SGH has been well represented at these White House discussions through participation in panels on Pandemic Prediction and Forecasting Science and Technology (PPFST) and Foreign Animal Disease Threats (FADT). SGH has also been participating in the Zika Task Force to combat the growing threat of this emerging and evolving zoonotic disease.

NATIONAL MUSEUM OF NATURAL HISTORY: OUTBREAK EXHIBIT –

Owing to our diverse team of specialists, we are often called upon to serve as

leaders and content experts for disease and wildlife related educational projects both within and outside of Smithsonian. SGH is currently advising Smithsonian's National Museum of Natural History (NMNH) as a founding member of the steering committee in designing materials for their upcoming 2018 exhibit Outbreak: Epidemics in a Connected World – an interactive learning experience that takes visitors through the steps of solving and responding to a disease outbreak. Dr. Suzan Murray and Megan Vodzak have been instrumental in shaping this immersive experience.



OUTREACH: KENYA –

In addition to research, SGH is highly involved in local outreach in Kenyan communities. Dr. Suzan Murray has worked hard to promote equality and improve living conditions for women in Kenya. This has led to SGH's participation in the Future Leaders Girls Literacy



program, an organization that strives to provide books and supplies to girls primary schools throughout Kenya in an attempt to foster learning and raise a new generation of women scientists.



WORLD ECONOMIC FORUM: ANNUAL MEETING OF THE NEW CHAMPIONS –

The World Economic Forum is the premier "International Organization for Public-Private Cooperation," bringing together the rising stars of business,



GRANT AWARDS & FUNDING

MORRIS ANIMAL FOUNDATION/ SMITHSONIAN GLOBAL HEALTH FELLOWSHIP –

The Morris Animal Foundation (MAF) is a worldwide leader in supporting veterinary medical research. In conjunction with the Smithsonian Institution, MAF has created a fellowship that provides a development opportunity for an interdisciplinary veterinarian to engage in research, response, and education in emerging infectious diseases. The current MAF Global Health Fellow is Dr. Kali Holder. Her research tackles emerging infectious diseases of conservation and public health significance, with a special emphasis on rhinos and bats.

GEORGE E. BURCH FELLOWSHIP IN THEORETIC MEDICINE –

Dr. Marc Valitutto is the recipient of the 2016 Burch Fellowship; a prestigious Smithsonian award designed for “distinguished scholars” whose research directly benefits health and medicine. The fellowship will allow him to focus on research aligned with SGH initiatives and the One Health platform. Dr. Valitutto's experiences in field wildlife medicine and surveillance, as well as extensive independent travel experience in Southeast Asia, make him an asset to SGH. His research focus is on the health assessment and zoonotic disease surveillance of pangolins, as well as their role as the most trafficked animal in illegal markets.

SMITHSONIAN AND MPALA POSTDOCTORAL FELLOWSHIP –

Smithsonian has a close collaborative relationship with the Mpala Research Center in Nanyuki, Kenya. The Mpala Fellowship is awarded to distinguished postdoctoral researchers at Smithsonian who study the biological, environmental, and social sciences in a way that will benefit both organizations. SGH research associate

Dr. Adam Ferguson is the 2016 Mpala Fellow. His research on small carnivores will bring insight to SGH regarding the ecological interactions of these animals and the disease risk they may pose to humans and other animals.

JUDY AND JOHN W. MCCARTER, JR GLOBAL HEALTH INTERNSHIP PROGRAM –

The Judy and John W. McCarter, Jr. Global Health Program is a one-year internship for veterinarians interested in pursuing careers in wildlife and conservation medicine, global health outreach, and emerging zoonotic disease surveillance. McCarter Interns participate closely with USAID PREDICT through SGH and learn how to plan, conduct, and lead sampling missions internationally while collaborating with foreign agencies to develop improved surveillance models in response to wildlife disease outbreaks. Interns also lend veterinary expertise to international disease projects and provide education outreach to scientists around the world. The current McCarter intern is Dr. Devin Tunseth. His research focus is on the detection and surveillance of emerging infectious diseases, such as Zika virus and MERS CoV, by analyzing the blood meals of mosquitoes and ticks.

SMITHSONIAN WOMEN'S COMMITTEE –

SGH is the current recipient of a grant to fund research and investigation into an emerging disease of black rhinoceros in Kenya. Funding is used for diagnostic sample collection and analysis including molecular diagnostics, blood chemistry, and histopathology. By identifying the cause of this disease, SGH will provide valuable options for our Kenyan colleagues to treat these rare animals and save them from extinction.

KENYA WILDLIFE PARTNER COLLABORATION –

SGH is developing partnerships between Kenya Wildlife Trust (KWT), Kenya Wildlife Service (KWS), Smithsonian Institution, and local stakeholders for the purpose of conservation in the Maasai Mara region. We provide expert scientific guidance and assistance in investigating carnivore genetics, population health, and conservation management. Our goals are to establish a strong foundation of physical infrastructure, leadership, and technical skills needed for Kenyan wildlife and conservation personnel to more effectively manage and sustain healthy and viable populations of large carnivores in the Maasai Mara region.

INTERNATIONAL ELEPHANT FOUNDATION (IEF) –

SGH maintains a partnership with Cellphire (a Maryland-based biotechnology company) and zoos across the nation to combat the widespread and deadly Elephant Endotheliotropic Herpes Virus (EEHV). This project has made enormous advances in developing a potential treatment for this fatal hemorrhagic disease that targets young elephants. Platelets isolated from elephant whole blood are freeze-dried using Cellphire proprietary techniques to turn them into a shelf-stable product that can potentially save baby elephants from an uncontrolled bleeding crisis.

PROPOSED:

SMITHSONIAN WOMEN'S COMMITTEE –

“Satellite tracking of bats in Myanmar” – Proposes to evaluate flight ranges of bats native to Myanmar and analyze flight data in light of other research being conducted by SGH on viral diseases carried and potentially shed by these animals.



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Morris Animal Foundation

Smithsonian Women's Committee

International Elephant Foundation

CellPhire, Inc.

USAID

BAND Foundation

Public Welfare Foundation

The Bhutan Foundation

PHOTO CREDITS & DESCRIPTIONS

P1

Bottom Left: Dr. Suzan Murray and Dr. Mathew Mutinda with black rhinoceros in Kenya; PC: S. Murray

P3

Top: Dr. Carlos Sanchez and field technician transport baboon for exam
Bottom Left: Bactrian camel with child in Mongolia; PC: S. Osofsky.

P4

Mid-Left: Boats in Myanmar, PC: AT Toe.
Mid-Right: Camel jugular venipuncture; PC: S. Obaka
Background-Left: Cave scoping for bats in Myanmar w/ students and Megan Vodzak; PC: AT Toe

P5

Top: Deer necropsy w. Dr. Kali Holder; PC: S. Sarro
Bottom: Matthew Mutinda w/ Abaxis; PC: S. Murray

P6

University students in Myanmar train for PPE fit testing; PC: M. Vodzak

P9

Top: NMNH foyer; PC: Prayitno Photography
Bottom: Kenyan schoolgirls; PC: S. Murray

P11

Baby African elephant; PC: S. Murray

For more information, please contact: Program Director, Suzan Murray – MurrayS@si.edu

