

One Health Newsletter

A quarterly newsletter highlighting the interconnectedness of animal and human health



Fall 2010

Volume 3 Issue 4

The One Health Newsletter is a collaborative effort by scientists and health professionals from the following organizations:

- Palm Beach County Health Department
- Florida Department of Health
- University of Florida
- Kahn/Kaplan/Monath/Woodall One Health Team



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This newsletter is dedicated to enhancing the integration of animal, human, and environmental health for the benefit of all by demonstrating One Health in practice.

An Innovative Approach to Graduate Public Health Education

Michael B. "Mike" Cates, DVM, MPH, DACVPM

The Master of Public Health Program at Kansas State University in Manhattan Kansas is not what one would normally expect from graduate public health education. While a few other Master of Public Health programs in the United States are aligned with a College of Veterinary Medicine, K-State's program is housed in one. And, four other colleges on the campus are partners to make it truly interdisciplinary.

Started in the fall semester of 2003, the Kansas State MPH Program was initiated as a collaboration of the Graduate School and the Colleges of Agriculture, Arts & Sciences, Human Ecology, and Veterinary Medicine, with the first interim director from Human Ecology. This innovative approach was both cost effective and efficient with its use of existing infrastructure, faculty and courses. Today, the college partners are still the same, and the program has its first full-time Director, Dr. Mike Cates, also a Professor in the College of Veterinary Medicine. Dr. Cates is the former Chief of the Army Veterinary Corps and the first veterinarian to serve as the Commanding General of the Army's main public health organization, the Center for Health Promotion and Preventive Medicine as well as the Surgeon General's primary senior executive on Preventive Medicine and Public Health.

The partnership, crossing traditional college boundaries at Kansas State University, has a definite advantage for students. There are over 55 different faculty members affiliated with the MPH Program, from 8 departments in the 4 participating academic colleges. This variety of disciplines and research interests opens a wealth of possibilities for students, who, despite the newness of the program and the relatively small size, can choose between four distinct areas of emphasis—Infectious Diseases and Zoonoses; Food Safety and Biosecurity; Public Health Nutrition; and Public Health Physical Activity. Dr. Cates noted "The faculty members here are extraordinary experts in many different areas which impact on animal, human and/or environmental health. You will probably not find such a unique blend anywhere else."

That uniqueness and breadth has led to significant growth in enrollment. When Dr. Cates arrived in January 2009, the program had an enrollment of 26 students; today, there are 75. One noticeable trait of the program is the high interest level of veterinarians, veterinary students and even pre-professional students to pursue the MPH degree or the Graduate Certificate in Public Health Core Concepts. Right now, over half of the MPH students fit into one of those veterinary-related categories. Overall, the program has attracted outstanding domestic and international students from over 15 disciplines, including medicine, nursing, dentistry, human nutrition, kinesiology, animal science, food science and several others, from 17 states and 11 different countries.

In This Issue

Articles:

An Innovative Approach to Graduate Public Health Education.....page 1

The One Health Initiative through a 50-Year Lenspage 2

Why the environment and environmental change matter to One Healthpage 5

One Health or... some health?page 7

Eco-epidemiology and control of Chagas disease in northern Argentinapage 8

One Health in South Asia, April 2010.....page 10

Composting of animal carcasses.....page 12

A study to map and measure disparities in welfare for cats across neighborhoods in Boston.....page 14

FAO in One Health: Business Unusual15

North Carolina Stakeholders Form the One Health Collaborative.....17

Coming Events:

.....page 20

Recent One Health Publications:

.....page 22

The future looks bright for even more opportunities for students and graduates of this program, with the arrival of two major federal laboratories—the National Bio and Agro-Defense Facility and the Arthropod Borne Animal Disease Research Unit—a continuing and growing culture of teamwork across the state. The program is exploring ways to collaborate with the University of Kansas' more traditional program, and the two universities already play active roles in the state's Public Health Systems Group, involving local and state governmental agencies along with foundations and other health-related stakeholders, and the Public Health Workforce Development Group. In another example, Kansas State MPH faculty and students help in public health outreach, education and research with the university's One Health Kansas and Pathways to Public Health initiatives, aiming to raise awareness and interest in public health, starting with children in kindergarten, and ultimately working to improve the numbers and quality of educated professionals in the public health workforce.

A crucial component of the tremendous growth of the K-State MPH Program is the interest, advocacy and support from the university's administrative leadership, particularly the college deans and the past and present university provosts and presidents. "Without the consistent and adequate support of the university and the college leaders, such an innovative interdisciplinary approach to education would not succeed," Dr. Cates noted. "We are very fortunate here to have visionaries who are willing to fund non-traditional approaches in a field where multidisciplinary methods really make the most sense. Prevention is the best way to health, and collaboration is key. Together, we must set a 'one health' example among all stakeholders, for improved community health throughout our state and beyond."

Dr. Mike Cates is Director of the Master of Public Health Program and Nichols Professor of Veterinary Public Health at Kansas State University.

The One Health Initiative through a 50-Year Lens

Robert E. Dedmon, MD MPH FACP FACOEM

'There are no passengers on spaceship Earth. We are all crew.'

- Marshall McLuhan

The '50-year lens' refers to my 50-plus years in medicine following graduation from medical school (Indiana U., 1956). Both veterinary and human medicine have undergone landmark transformation- from hi-touch to hi-tech, with many advances but some losses. Both physicians and veterinarians have increasingly specialized, but at a price. We physicians have lost some of our compassion and the ability to use a stethoscope or perform an adequate physical examination. Veterinary practice has become compartmentalized, with many graduates opting for 'small-animal-only' practice and a variety of specialties. I have also witnessed the erosion of physician professional values and integrity in research related in part to the financial/time pressures on professionals (the Medical-Industrial Complex-Relman NEJM 1980;303:963-970).

Yet, in spite of this dour perspective, other sea-changes are occurring that brighten our hope of improving the health of both humans and other animals on our planet. First is the recognition of the need for change in the way health professionals are educated. The old lecture/apprenticeship, 'see one-do one-teach one' approach has been overturned by the advent of information technology (Medline October, 1971 http://www.nlm.nih.gov/news/medline_35th_birthday.html) and the need for collaborative prac-

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...changes are occurring that brighten our hope of improving health of both humans and other animals on our planet.

tice (One model is a hospital physician/nurse/pharmacist team) . Last year' s lecture notes are out!

Second, 2010 marks the centennial of the Flexner report on medical education with a call to radically transform medical education (Irby et al, Academic Medicine Feb 2010; 85 (2) :220-227). As a current example, the Medical College of Wisconsin has a medical scientist-MD-PhD track, one of the original distance-learning Masters in Public Health (MPH) degrees offered to applicants with professional or undergraduate degrees, as well as several other advanced degree , community-public health outreach, collaborative, and translational research programs (http://www.mcw.edu/FileLibrary/Groups/publicaffairs/publications/2010_Facts.pdf).

I received my MPH from MCW in 1991, and am most grateful for that opportunity. The new medical school format is described as:

‘ An integrated curriculum aims to bring students beyond mere fact and concept acquisition to a level of scientific fluency, using a common language of medical science, with which they can begin to think creatively about medical problems. ’

Veterinary medical colleges have also been advancing/revising their curricula. Notable are those that offer MPH and PhD degrees in collaboration with other disciplines, in addition to the traditional DVM/VMD degrees. An AVMA report lists 16 veterinary colleges which offer MPH joint degrees in public health. (http://www.avma.org/onehealth/appendix_e.asp). All this requires a revised approach to faculty development as well. Who will train these 21st Century teachers and ensure a diverse faculty devoted to new thinking and practice? It means that a lot of us ‘ old-dogs ’ (I am 79, 80 in January) will have to learn new tricks. More importantly, we will have to learn from our students and younger faculty.

As an example, in 1956 when I graduated there were no defibrillators, MRI/CT, or practical electronic medical record systems. Now I use Skype, and I have a Netbook, laptop, Desktop, 3-in-one printer/scanner/fax, iPod, Kindle, and a Blackberry. To bridge this gargantuan gap, I went to night school at our local technical college, and took a lot of ‘ lessons ’ from our grandkids!

Third, our planet is undergoing radical change due to environmental encroachment such as depletion of our rain forests and increasing competition for space among plants, humans, and other animals (Dedmon, www.asianbiomed.org June 2008;4 (3) :497-498). International travel arrivals have approached the 1 billion mark (<http://en.wikipedia.org/wiki/Tourism>), and many travelers have undertaken ecotourism/adventure travel excursions, with attendant health risks.

Fourth, students travel widely for educational and experiential reasons. When I was in medical school, international clerkships weren' t even mentioned. When I was an internal medicine resident, I spent a year in London in a metabolic research environment (Profs. Max Rosenheim and Charles Dent), but this was a safe environment. Now students from most medical schools have international opportunities due to international collaborations, as well as church groups who provide charity medical care in needy areas.

Fifth, we have seen the burgeoning increase in zoonotic diseases (e.g. SARS, West Nile Virus, Dengue, and Q fever, along with re-emerging macacine herpes virus-1 (monkey-B virus). See www.cdc.gov/eid for other examples). Rabies continues to cause ~55,000 deaths annually and requires ongoing diligence in the U.S., as indicated by a recent imported rabies death in Virginia-ex India (www.cdc.gov/mmwr , Oct 1,

The old lecture and apprenticeship, 'see one-do one-teach one' approach has been overturned by the advent of information technology and the need for collaborative practice.

We have gradually come to understand the interdependence of animal and human health.

A recent text on human and animal health edited by a physician and a veterinarian underscores the importance of the One Health collaboration to the survival of 'Planet Earth'.

2010;59 (38) : 1236-1238) . We have gradually come to understand the interdependence of animal and human health. Veterinary colleges and organizations have taken the lead in the One Health initiative as an important educational/practice concept for multiple disciplines. The American Medical Association has also expressed support for these efforts through a champion for this cause, Ronald M. Davis MD, AMA Past President, deceased 2008. Also, a recent text on human and animal health edited by a physician and a veterinarian with chapter authors from multiple disciplines underscores the importance of the One Health collaboration to the survival of 'Planet Earth' . (Rabinowitz PM & Conti LA. (ed) . Human-Animal Medicine. Saunders/Elsevier 2010) .

One Health has entered the lexicon of a broader audience. I first learned about the concept during a rabies seminar at Kansas State University in September of 2009. Dr Michael Cates, director of the KSU MPH program described the work of the One Health Commission (www.onehealthcommission.org) and I had the opportunity to discuss this further with faculty and students. I subsequently wrote a short piece for Asian Biomedicine (referenced above) based on that experience.

Another major development ensued at a recent rabies seminar held in Boston with students and faculty from Tufts participating. It was very encouraging to hear these bright young students talk about One Health and their community service in vaccinating pet dogs of the elderly against rabies in housing complexes in the area.

The most encouraging activity in which I have participated occurred on September 28, 2010-the fourth World Rabies Day recognized by the AVMA, OIE, CDC, WHO, WSPA, and a variety of other organizations. This was a webinar with participants from 34 countries describing successes and ongoing challenges to rabies education and prevention. Notable among the presenters was Jack Woodall, PhD of the One Health Initiative (www.onehealthinitiative.com) . The entire series is freely available online: (<http://www.worldrabiesday.org/EN/Events/wrd-webinar.html>) .

Rabies: Perfect Example of how **One Health** is *essential*

- **Physicians** to vaccinate & treat victims
- **Veterinarians** to vaccinate & sterilize dogs & cats
- **Wildlife experts** to advise on oral vaccination
- **Ecologists** to tell responsible authorities why sterilization is better than culling
- **Sanitarians** to eliminate garbage that feeds strays
- **Educators** to teach people to vaccinate their pets
- **Media** to inform about risks & prevention, *e.g. bats*

*Dr. Woodall used rabies as an example of interdisciplinary collaboration, as shown in this table from the World Rabies Day webinar.

In summary, the increased erosion of available space needed for all animals and plants to survive has resulted in newly emerging health problems for humans and other species. To address new demands, veterinary and human medicine, nursing (DNP degree), pharmacy (PharmD degree), and other disciplines are all moving forward with new ideas and programs. Thus One Health is a paradigm which serves the needs of all and encourages a spirit of collaboration and scientific inquiry for the common good. Stay tuned! Welcome to the 'Crew' !

Dr. Dedmond is Clinical Professor Populatiopn Health-Public Health at the Medical college of Wisconsin in Milwaukee and a member of the Editorial Advisory Board, Asian Biomedicine, Chulalongkorn University, Bangkok.

Why the environment and environmental change matter to One Health

Meredith A. Barrett, Aaron H. Stoertz, and Timothy A. Bouley

Human medicine and veterinary medicine demonstrate a long history of collaboration dating back to the 19th century. Today, the One Health movement maintains this tradition, yet also increasingly incorporates environmental, public health, social science, public policy, and other non-medical scientific perspectives to address global health challenges. Despite this shift towards multidisciplinary, we feel that the emphasis on the environmental influences on human and animal health are not yet sufficiently represented in the movement. Though environmental issues are indeed finding a more prominent place in the One Health dialogue, they remain more on the fringes, likely as a result of the complexity in linking environmental changes to health. The following examples highlight the importance of the environment to One Health and illustrate how central One Health is and will be to global environmental change.

It is essential to consider the environment in order to achieve optimal health for people and animals. In fact, addressing environmental factors affecting health is essentially a public health-oriented disease prevention strategy. Here are a few reasons why:

- ◆ 24% of the global burden of disease originate from environmental causes (World Health Organization)
- ◆ The potential health impacts of climate change will be broad and significant, including: heat and cold effects; wind, storms and floods; drought, nutrition and food security; food safety and disease; water and disease; air quality and disease; allergens and disease; vector and rodent-borne disease; occupational health; and UV radiation (Intergovernmental Panel on Climate Change)
- ◆ More specifically, changes in temperature, precipitation and seasonality will influence infectious disease emergence, incidence and spread (e.g., dengue, malaria and cholera)
- ◆ Other environmental drivers, such as land use changes and deforestation, also contribute to the loss of biodiversity and the spread of infectious diseases, as has been seen with malaria and Lyme disease
- ◆ Human and animal well-being relies upon ecosystem services provided by the environment. Ecosystem services include supporting services (nutrient cycling, soil formation, primary production), regulating services (climate and flood regulation, disease buffering, water purification), provisioning services (food, water, fuel) and cultural services (aesthetic, spiritual, mental health) that make the persistence of human and animal life possible. (See Figure 1 from the Millennium Ecosystem Assessment)
- ◆ Many of these ecosystem services rely upon the maintenance of biodiversity (including species, ecosystems, populations and genes), which makes possible the growth of food, healthy diets, the development of new medicines, and the regulation of the emergence of infectious diseases

Human, animal, and ecosystem health are inextricably linked.

It is essential to consider the environment in order to achieve optimal health for people and animals.

The potential health impacts of climate change will be broad and significant...

Storms

Drought

Floods

Vector-borne disease

Other environmental drivers lead to land use changes, deforestation and loss of biodiversity, and consequently affect...

Food security

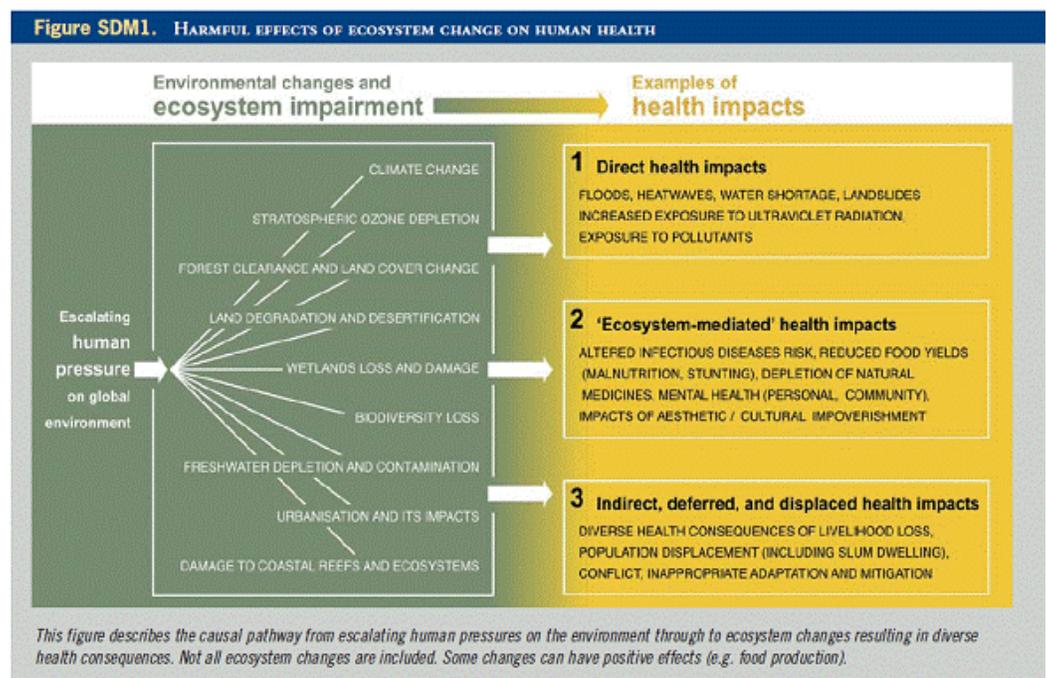
Food safety

Emergence of infectious diseases

Development of new medicines

We face increasing challenges to the maintenance of healthy ecosystems.

Figure 1. Harmful effects of ecosystem change on human health (from the Millennium Ecosystem Assessment "Ecosystems and Human Well-being: Health Synthesis;" <http://www.millenniumassessment.org/documents/document.357.aspx.pdf>)



[Permission granted to reproduce World Health Organization item/s September 23, 2010 by WHO, Dolores Campanario, Geneva, Switzerland.]

Despite the importance of the environment to the preservation of human and animal well-being, we face increasing challenges to the maintenance of healthy ecosystems. Rapidly shifting human pressures and global environmental change—including examples such as climate change, land use change, desertification and biodiversity loss—could severely compromise the future well-being of humans and animals. The global human population is estimated to reach 7 billion within the next few years and will increase its need for land, food and energy. However, currently 60% of the essential ecosystem services of the planet are degraded or are under increasing threat. This loss, combined with the potential increased frequency of heat waves, storm events, and droughts as a result of climate change, have the potential to contribute to global crop failures, soil erosion and, ultimately, injuries, malnutrition and other negative health outcomes.

Human, animal, and ecosystem health are inextricably connected. We see the One Health approach as an essential perspective to approaching these challenges. Collaboration among human health, animal health, public health and environmental science professionals will be necessary to address challenges, design collaborative solutions and create co-beneficial health and environmental policies for our rapidly changing world. The One Health Initiative can lead the way in further incorporating environmental programming into their mission and bringing more environmental professionals into the One Health movement.

The One Health Initiative www.onehealthinitiative.com website team are interested in increasing the presence of environmental professionals in One Health. We have begun to solicit new articles with an environmental focus for the One Health Newsletter <http://www.onehealthinitiative.com/newsletter.php>. If you work in health and the environment, please send us an email to see if you might be able to contribute an article to the One Health Initiative website kkm@onehealthinitiative.com and/or the quarterly newsletter c/o Editor Mary_Echols2@doh.state.fl.us. Help us spread knowledge about these ecosystem connections.

Professionals from the fields of human health, animal health, and environmental science will need to work together...

... to design collaborative solutions and create health and environmental policies for our rapidly changing world.

To learn more, the following websites hold a wealth of information:

- ◆ Millennium Ecosystem Assessment
<http://www.millenniumassessment.org/en/index.aspx>
- ◆ Center for Global Health and the Environment
<http://chge.med.harvard.edu/index.html>
- ◆ Center for Sustainability and the Global Environment
<http://www.sage.wisc.edu/>
- ◆ The World Health Organization
 - ◆ Climate Change and Human Health studies: <http://www.who.int/globalchange/en/>
 - ◆ Health and Environment Linkages project : <http://www.who.int/heli/en/>
 - ◆ Environmental burden of disease: http://www.who.int/quantifying_ehimpacts/publications/preventingdisease/en/index.html
- ◆ Intergovernmental Panel on Climate Change, Fourth Assessment Report, 2007, Human Health Chapter
http://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch8.html
- ◆ IUCN Ecosystems and Human Wellbeing
<http://www.iucn.org/what/tpas/livelihoods/>
- ◆ UNEP and WHO 's Libreville Declaration on Health and Environment collaboration
<http://www.unep.org/health-env/pdfs/libreville-declaration-eng.pdf>
- ◆ Cooperation on Health and Biodiversity (COHAB)
<http://www.cohabnet.org/>
- ◆ Convention on Biological Diversity (CBD)
<http://www.cbd.int/>
- ◆ Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)
<http://ipbes.net/>

Meredith A. Barrett Meredith.barrett@duke.edu, is a PhD candidate in the University Program in Ecology at the Nicholas School of Environment at Duke University, Durham, North Carolina (USA). She is working to identify health consequences of human development on lemur populations in Madagascar. Ms. Barrett, along with Aaron Stoertz, coordinate the Global Health Working Group, a student-run interdisciplinary forum at Duke University dedicated to educating students about global health issues.

Aaron Stoertz is pursuing his MSc in Global health at Duke Global Health Institute and has a certificate in epidemiology from the University of North Carolina's Gillings School of Global Public Health. Mr. Stoertz's current focus is human resources for health and health care distribution in underprivileged communities and nations.

Timothy Bouley is currently studying global health adaptation to climate change while pursuing degrees in medicine at Duke University and environmental change at Oxford University, United Kingdom.

An Opinion Piece: One Health or... some health?

Bruce Kaplan, DVM

The international One Health movement has expanded during the early 21st century. It even sports the name "One Health" in most circles instead of "One Medicine", the phrase promoted by the late Dr. Calvin Schwabe, the renowned public health veterinarian and parasitologist. Actually, the two are essentially synonymous unless you want to split hairs. One Health has been adopted by most to designate a wider collabora-

While One Health principles apply exceptionally well to protecting nations' public health, they apply equally well to clinical medicine and surgical research and hence in private practice.

So, what is in One Health for the practicing veterinarian or the physician in private practice?

A long-term collaborative One Health approach to the ecology, epidemiology, and suppression of Chagas disease

tive interdisciplinary inclusion.

I met and spent part of a morning and lunch with Dr. Schwabe at the home of his close friends, the family of the late noted public health figure, Oscar Sussman, DVM, MPH, LL.B in Princeton, New Jersey (USA) in the early 1960s. Schwabe was a brilliant, gentle, unpretentious person. He called the concept "One Medicine " and was himself more oriented towards the public health (epidemiological) applicability. Nonetheless, I am confident that if asked today, he would say something like, " whatever you call it, it needs to be implemented across the board in public health and clinical medicine for the benefit of human [and animal] health. "

While implementation still remains sometime in the future, the One Health movement has become and is becoming widely accepted worldwide, particularly in public health communities. Regrettably, although One Health principles apply exceptionally well to protecting nations ' public health, it also applies equally well to clinical medical and surgical research and hence in private practice, i.e. in the fields of cancer, cardiovascular disease, orthopedic conditions, obesity, and many others. By perusing the One Health Initiative website www.onehealthinitiative.com and this online quarterly One Health Newsletter, one can find numerous examples of One Health advances for both disciplines, viz. public health and clinical health.

Much more One Health activity is evident in public health academic communities than among clinical health academic circles. It is practically non-existent and for the most part unheard of within the practicing veterinary medical and human medical communities. Specifically, practicing veterinarians and physicians in private practices generally do not know about One Health and those that hear of it ask the legitimate question, " So, what is in it for us?"

If One Health activists continue to only stress public health to the exclusion of clinical medical/surgical research and neglect indoctrinating our practitioner colleagues into "What ' s in it for all of us " ... we will travel the path of " some health " and not ONE HEALTH. Protecting and saving untold millions of lives requires recognition and implementation of, by and for both disciplines.

Dr. Bruce Kaplan is a member of the One Health Initiative website team along with Laura H. Kahn, MD, MPH, MPP, Thomas P. Monath, MD, and Jack Woodall, PhD. He is also on the editorial board of the One Health Newsletter. Dr. Kaplan has published numerous One Health publications in collaboration with Drs. Kahn, Monath and Woodall and has been a frequent contributor to the One Health Newsletter .

Eco-epidemiology and control of Chagas disease in northern Argentina

A long-term collaborative effort of the University of Buenos Aires (led by Ricardo Gürtler, PhD), Rockefeller and Columbia University (Joel E. Cohen, PhD) and Emory University (Uriel Kitron, PhD, MPH) on the ecology, epidemiology and suppression of Chagas disease in the Argentinean Chaco.

A strength of the project is that it addresses all facets of transmission and risk, including the parasite *Trypanosoma cruzi* (which causes Chagas disease), the insect vectors, the wildlife and domestic reservoir hosts, humans, and the physical and biological environments. Among the major findings of the projects is the high degree of hetero-

Anthropogenic changes in the environment have had major impacts on wildlife, including suspected reservoir hosts such as opossums and skunks.

*Key study findings show that dogs are the preferred domestic blood-meal source of *T. infestans* and indicate their importance to the transmission of *T. cruzi* and to the surveillance of Chagas disease.*

geneity in all of these components of the transmission systems. Infestations are highly aggregated, with only a few premises harboring high-density bug colonies. Some peridomestic structures with particular physical attributes maintain residual bug colonies that can recover to pre-intervention numbers and propagate through the community by flight dispersal.

Among our main findings are the inter-connectedness between domestic, peridomestic and sylvatic populations of the main vector *Triatoma infestans* (Hemiptera: Reduviidae), the importance of super-spreader dogs and high-risk sites, the occurrence of unanticipated sylvatic foci of *Triatoma infestans*, and the economically optimal role for community action in sustainable Chagas disease intervention programs.

A key finding of the study is the importance of dogs to the transmission of *T. cruzi* and to the surveillance of Chagas disease. Dogs are the key reservoir for *T. cruzi* and the major source of infection for *Triatoma infestans*, the main vector of Chagas disease in the Chaco, with a force of infection that is 14 times higher than that of humans. Dogs, whose average lifespan in the rural Chaco is only 3.5 years, also fulfill all the criteria for an optimal sentinel for Chagas disease. *Trypanosoma cruzi* infection is aggregated at the household level along the “80-20 rule”, with a small fraction of the seropositive dog, and to a lesser extent cat and human populations, showing high capacity to infect bugs. Field and experimental evidence shows that dogs are the preferred domestic bloodmeal source of *T. infestans*.

At the district-wide level, high domestic infestation was clustered in high human-density areas with higher land surface temperature and more degraded landscapes. Anthropogenic changes in the environment, including deforestation, introduction of cash crops and changes in land ownership patterns have had major impacts on wildlife, including suspected reservoir hosts such as opossums and skunks.

In addition to over forty scientific papers that resulted from the project, there is a strong training component for undergraduate and graduate students, post-docs and veterinarians, and the project is based on and committed to community participation and sustainable improvement in public health.

Links to free access to key papers (all accessible through PubMed):

Ceballos 2009 - <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2782367/>

Gurtler, PNAS - <http://www.pnas.org/content/104/41/16194.long>

Vazquez-Prokopec, PLOS NTD - <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2613538/>

Gurtler, Parasitology - <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2669415/>

Cecere, EID - <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1853288/>

Cardinal 2009

http://www.sciencedirect.com/science?_ob=ArticleURL&udi=B6T7F-4SKB3H6-1&user=655046&coverDate=11%2F30%2F2008&rdoc=1&fmt=high&orig=search&sort=d&docanchor=&view=c&acct=C000034138&version=1&urlVersion=0&userid=655046&md5=ae152424e7353e5e6659ed8aeb08fdcc

Dr. Ricardo Gurtler is CONICET Scientific Investigator and Professor and Head of the Laboratory of Eco-Epidemiology, Faculty of Natural and Exact Sciences at the University of Buenos Aires, Argentina.

Dr. Joel E. Cohen is a professor of populations in the School of International and Public Affairs, the Department of Earth and Environmental Sciences, and the Center for Environmental Research and Conservation. He is also the Abby Rockefeller Mauzé Professor of Populations at the Rockefeller University, New York, and he heads the Laboratory of Populations at Rockefeller and Columbia Universities.

Dr. Uriel Kitron is Professor and Chair of the Department of Environmental Studies at Emory University in Atlanta, GA.

One Health in South Asia, April 2010

Carina Blackmore, DVM, PhD

Representatives from Council of State and Territorial Epidemiologists (CSTE) and Centers for Disease Control and Prevention (CDC) traveled to Dhaka Bangladesh in April 2010 to coordinate a One Health Forum (OHF) for public health and agriculture officials from South Asian Association for Regional Cooperation (SAARC) countries. The OHF was held at the Institute of Epidemiology and Disease Control Research (IECDR), Bangladesh's national communicable disease epidemiology program's headquarters on April 6-7, 2010.

The purpose of the forum was to discuss the current One Health efforts in South Asia, share the U.S. experience of One Health and to identify opportunities to strengthen cross-sector and cross border communication and collaboration on One Health issues. Twenty public health and agriculture officials from 5 countries (Bangladesh, Bhutan, India, Pakistan and Sri Lanka) and representatives from the Food and Agriculture Organization (FAO), the World Organization for Animal Health (OIE) and WHO took part in the discussions. Participants from the United States included Drs Timothy Jones, Tennessee Department of Health, Melinda Wilkins, Michigan Department of Community Health and Carina Blackmore, Florida Department of Health, all representing CSTE, Nabil Ahmed, Dana Schneider and Dr. Peter Bloland from the Coordinating Office for Global Health (OGH) within the Division of Global Public Health Capacity Development, CDC, Dr. David Blaney from the Bacterial Zoonoses Branch and Ed Chao and Jennifer Lemmings from CSTE.

Country and CSTE representatives shared good and not-so-good experiences with One Health collaborations and also provided some lessons learned to the group. One Health challenges are remarkably similar across the globe. We all work hard to sustain projects and partnerships as we move from responding to one disease to the next, have limited funding and share the challenges and barriers associated with coordinating agency or non-profit One Health teams with different cultures and priorities. It was also clear how cooperation and coordination depended on individuals rather than systems and could easily be lost as key personnel transfer out of their positions. Rabies, vector-borne disease and avian influenza among others were discussed as good model diseases to help build One Health partnerships in the region. Access to diagnostic laboratories using state-of-the-art technology was also identified as a joint priority. The SAARC member group worked together to create a list of action items for the future. Items on this list ranged from improving informal communications through email and sharing of best practices between countries to creating official MOUs and directives through SAARC.

On the third day we participated in a one-day conference on One Health in South Asia held at the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR, B). Topics discussed included Japanese encephalitis, Nipah virus ecology and epidemiology, anthrax, infectious respiratory disease epidemiology and an update on the current status of avian influenza in Bangladesh. The presentations were all of excellent caliber and the discussion among participating physicians, veterinarians, animal health scientists, laboratory researchers, ecologists and anthropologists was lively and very interesting.

One of many examples of real "One Health moments" came during the anthrax

The purpose of the forum was to discuss current One Health efforts in South Asia and to identify opportunities to strengthen cross-sector and cross border communication and collaboration.

Most One Health challenges are remarkably similar across the globe.

It was clear how cooperation and coordination depend on individuals rather than systems.

The anthrax outbreak in Dhaka provided an excellent example of the need for a One Health approach.

Conference participants recognized the One Health opportunity presented to them to enhance the understanding of human anthrax through collaborations.

The One Health Forum provided important new best practices for conference participants to take home to their day-to-day work.

One of the most important reasons to practice One Health is that greater progress is achieved through partnerships.

presentation. The health authorities in Dhaka were notified of an anthrax outbreak in cattle in a rural Bangladesh village last year. The reporting veterinarian had been notified by local livestock inspector about the ongoing problem and about an associated rash illness in people. The investigation revealed that sick cattle had been slaughtered and the meat sold for a low cost for food and the remaining carcasses had been disposed of in the nearby river. People in the village, most of whom handled the meat or carcasses, had developed cutaneous anthrax that had gone undiagnosed by local medical providers and healers. Anthrax is not a reportable human disease in Bangladesh and not well known as a human health concern. However, anthrax is endemic in cattle in Bangladesh and outbreaks are seen regularly by practicing veterinarians and other livestock workers.

Local health care practitioners, veterinarians and other conference participants clearly recognized the One Health opportunity presented to them and the need for enhancing the understanding of human anthrax through collaborations among livestock officials, veterinarians, medical providers and public health officials across the country. This team approach is currently being used by ICDDR, B and IECDR researchers as they are investigating a recent anthrax outbreak with 26 suspect human cases in Sajhadpur in northern Bangladesh (www.icddrb.org).

Dr. Mark Pietroni, the Medical Director for ICDDR, B, provided the group with a tour of their world renowned hospital. The facility is frequented primarily by poor and very poor Dhaka residents living within 20 km of the hospital. The hospital sees about 110,000 diarrheal patients per year and successfully treats all but 200-300 of them for cholera, malnutrition and other complications. At the time of our visit, shortly before monsoon season, Dhaka experienced a large cholera outbreak and the hospital received more than one thousand patients per day. Two tents had been set up to handle the large patient load. Most of the ill were re-hydrated intravenously and orally and sent home within 24 hours. All patient data are managed by electronic medical records and resource needs and disease trends are monitored in real time.

A small HIV treatment unit has recently been started. HIV rates in Bangladesh are still low and infection is primarily seen among men who have sex with men and intravenous drug users. There is great stigma around the disease, cases are often diagnosed at a late stage and treatment is difficult to access. Infectious respiratory diseases, the current cause of most mortality in children < 5 is another recent focus of the center. For more information about ICDDR, B, please visit: www.icddrb.org.

We also had the opportunity to tour IECDR. The first-rate public health institution, led by Dr. Mahudur Rahman, works closely with ICDDR, B on a variety of surveillance and research projects across in the country including meningoencephalitis and respiratory disease surveillance (www.iedcr.org). Dr. Rahman was proudly showing us their new BSL-3 facility self-sustained with generators to provide electricity during the frequent power outages in Dhaka.

One of the most important reasons to practice One Health, from my perspective, is that greater progress is achieved through (new) partnerships. I believe the One Health Forum provided important new best practices for everyone involved to take home to their day-to-day work. I appreciate CSTE 's and CDC 's leadership and financial support.

Dr. Carina Blackmore is Florida's State Public Health Veterinarian. and State Environmental Epidemiologist in the Division of Environmental Health at the Florida Department of Health.

Composting of animal carcasses; a safe and environmentally sound approach to take care of animal mortalities

Anna Catharina B. Berge, DVM, MPVM, PhD and Thomas D. Glanville, PhD

There is a growing interest in using on-farm composting for the disposal of animal by-products and mortalities.

Carcass composting differs from composting other materials and presents some unique challenges.

The composting process depends on naturally present microorganisms to digest the organic components in the carcass...

...some of which are able to function and survive at temperatures high enough to kill mammalian and avian pathogens.

Animal carcass composting for both routine and emergency management of food animal mortalities is a safe method of carcass disposal.¹ It has been used to varying extent depending on region and regulations, from routine composting of poultry, swine, and cattle carcasses, composting of road kill, to emergency composting of poultry during avian influenza. There is a growing interest in using on-farm composting for the disposal of animal by-products and mortalities because the practice is relatively simple, effective, environmentally sound, and economical. The finished compost can be land applied and thereby provides an environmentally acceptable means of recycling nutrients and stabilized organic matter to the soil. Proper composting eliminates most pathogens and reduces spore-forming bacteria.

The principles and elements of carcass composting

Carcass composting differs from composting other materials such as manure and green waste and presents some unique challenges. Carcasses are typically composted whole and do not present uniformly chopped substrate for microbial action, nor are these compost piles turned as frequently (perhaps once or twice during carcass decomposition) as in municipal or industrial composting. Both of these factors contribute to a non-uniform compost composition at the end of the process.

The composting process depends on naturally present microorganisms to digest the organic components in the carcass. The carbon-based materials in the piles supply energy for the microbes while the carcass tissues and fluids supply nitrogenous materials for microbial protein synthesis. In intensively-managed industrial composting systems a carbon to nitrogen ratio (C/N ratio) of 25:1 to 30:1, moisture content of 50-60% and a temperature in the range 43-65°C are considered optimal for supporting the performance of the microorganisms that drive the composting process. In layered infrequently mixed on-farm mortality composting operations C:N ratios are typically lower than optimal, and moisture content higher, particularly in zones adjacent to the outer surface of large carcasses. This slows the rate of decomposition, but does not prevent it.² The target pH is neutral, although successful composting occurs at pH values between 5.5 to 9.0.³ Regular monitoring of the compost is essential. Temperature monitoring is a key indicator of a properly functioning compost pile

Heat, water, carbon dioxide, ammonia, and volatile organic compounds are by-products produced in the process. Most of the digestion at the carcass level is anaerobic, but the liquid and gaseous by-products of the anaerobic process diffuse away from the carcass and into progressively more aerobic layers of the compost envelope where aerobic degradation to carbon dioxide and water takes place.

The microbial flora responsible for the decomposition of organic matter comprises a complex mix of organisms some of which are able to function and survive at temperatures high enough to kill mammalian and avian pathogens.⁴ These complex microbial decomposer communities occur naturally in the environment and many of the mesophilic microbes are responsible for the continuous and normal decay of plant and animal tissues at ambient temperatures.

Composting systems are divided into 'open' and 'closed systems'. Open systems include windrows, static piles and bins and these are the most frequently used

Most mortality composting operations employ naturally ventilated static pile processes.

Temperature is a key indicator of a properly functioning compost pile.

Primary composting is recommended for all carcasses to minimize the spread of infection and allow for break-down of soft tissue.

Composting times vary depending on the size of the carcasses, ambient temperature, and other physiological factors.

methods for on-farm mortality composting. Closed, in-vessel systems are far less common on the farm, and typically are used for small species such as poultry, nursery pigs, etc.

Most mortality composting operations employ naturally ventilated static pile processes. Animal carcass composting piles are typically constructed in layers, starting with a thick absorptive layer of carbonaceous plant material. Whole carcasses are laid on top of the base and covered with additional absorptive organic material. Succeeding layers of mortalities are added on a daily basis until the bin is filled, or until an appropriate free-standing pile height is reached. Bins containing poultry or similar small carcasses may contain many layers. Mature sheep and swine may include two or three layers of carcasses, while mature cattle are usually composted in a single layer with two animals placed back to back.

The success of naturally ventilated static pile composting processes depends on the characteristics and thickness of the materials used to envelope the carcasses. Water-holding capacity, biodegradability (for heat production), gas permeability (for O₂ penetration), and mechanical strength (to prevent compaction and loss of gas permeability) are the most important envelope material parameters.^{5,6} Some common materials include: sawdust, woodchips, ground cornstalks, rice hulls, ground straw, corn silage, straw-manure mixtures, and poultry litter.

Composting times vary depending on the size of the carcasses, ambient temperature and other physiological factors. The estimated number of days for primary composting ranges from 10 days for fowl to 195 days for adult bovines.⁷ Primary composting is recommended for all carcasses to minimize the spread of infection, and allow for break-down of soft tissue. Following the primary composting period and cooling to 45-48°C the compost can be turned to stimulate the secondary compost heating phase in which bones will be degraded. Secondary composting is performed for an additional period of 10 to 65 days depending on carcass sizes.⁸

Microbial risks in composting of animal carcasses

Animal carcasses are microbiologically active material that may contain viruses, bacteria, protozoa, parasites, prions, toxins, drug residues and other chemicals. All of these biologically active materials need to be reduced to a safe level or eliminated to minimize their potential hazard. Temperatures of 55°C (130°F) for three consecutive days as is achieved in proper composting kill most pathogenic bacteria and parasites and inactivate viruses.

A wide variety of potential microbial pathogens may be found in animal carcasses and the microbial hazards of carcass composting was recently reviewed.¹ Most studies indicate that composting will efficiently eliminate viral agents. Bacterial pathogens, unlike viruses and parasites, can survive outside the host organism if composting temperatures are inadequate to destroy these organisms. An additional concern is the potential for regrowth of micro-organisms that were not completely eliminated if conditions subsequently become favorable. Bacterial pathogens potentially found in meat, food scraps, manure, sludge and other organic residuals are destroyed by exposure to the time-temperature regimens obtained in a well managed composting environment. However, the static compost pile coupled with the non-uniform composition of carcass compost presents special conditions that warrant additional research on the potential risks of spore-forming bacteria, materials handling, and the final disposition of the compost product.

Temperatures of 55°C (130°F) for three consecutive days as is achieved in proper composting kill most pathogenic bacteria, parasites, and inactive viruses.

Further studies are needed to determine the fate of spore-forming bacteria and prion agents in carcass composting.

The One Health concept was demonstrated in a unique study linking human and companion animal health in the same urban area.

There have been concerns about prion agents remaining in compost. A recent study of the degradation of prions during composting indicates that there may be degradation in composting, providing further safety to composting.⁹ Berge et al. concluded that carcass composting achieves adequate levels of microbial pathogen reduction. Further studies were encouraged to determine the fate of spore-forming bacteria and prion agents in carcass composting.¹

Environmental aspects of carcass composting

In a situation where one method of carcass disposal is evaluated for approval, it is necessary to estimate and compare the risks associated with alternate methods of carcass disposal that are currently approved, such as rendering and incineration. For example, when evaluating risks of on-farm composting, it has to be evaluated to not only rendering, but also with the transport and handling of carcasses to rendering. The transportation of fallen stock from the premise of origin to a site of further processing or disposal may entail risks for spread of contagious diseases.

Emission of green house gases (GHG) CO₂, CH₄, and N₂O is a consequence of this microbial-driven process of composting and it is dependent on several factors, including moisture content, C/N ratio, aeration method and the type of amendment used¹⁰. A study of adding calf mortalities concluded that even though the emissions of GHG increased when calf mortalities were added to manure during windrow composting, the quantities were relatively small, and they improved the final compost product. An evaluation of GHG gases in composting carcasses in relation to other rendering or carcass disposal practices should be done.

Conclusions

Carcass composting for routine and non-disease emergency food animal mortalities is a safe method of carcass disposal. The microbial hazards have been evaluated, and indicates that there viral, bacteriological and parasitical agents are effectively reduced or destroyed. Composting may be a good alternative to other forms of carcass disposal involving transport and rendering while avoiding the hazards and odors associated with these systems. Depending on the type of co-compost used, the resulting product can be used as a fertilizer and thereby nutrients are recirculated in the ecosystem.

References: http://www.doh.state.fl.us/Environment/medicine/One_Health/Composting_References.pdf

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In Brief: A Study to map and measure disparities in welfare for cats across neighborhoods in Boston

Gary J. Patronek, VMD, PhD

The One Health concept has recently been demonstrated in a unique study (Patronek, 2010), which was the first to link human and companion animal health in the same urban area. The study replicated an area-based analysis by the Harvard School of Public Health (Chen et al, 2006) to study prevalence and risk factors for health disparities, as measured by premature mortality, among people.

.Cat intakes and deaths were compared with human demographic data from the US census and mortality data.

Health disparities in cats were associated with the same combination of socio-economic factors that result in health disparities among people.

The increasing number of emerging infectious diseases at the animal-human interface has focused attention on the multidimensional linkages between wild animals, livestock production, and global public health.

GIS technology was used to map out shelter-associated cat mortality by neighborhood in the city of Boston, MA. A total of 17,587 cat intake records for a 5-year period (2004 through 2008) were reviewed. Geocoded addresses ($n = 15,285$) were spatially joined to neighborhood and census tract polygons. Cat intakes and deaths were calculated per capita for each neighborhood, and compared with human demographic data from the US census and mortality data from the Harvard study. Data from geocoded records indicated that annual rates of cat intakes and deaths ranged widely (0.85 to 10.3 and 0.27 to 3.9 cats/1,000 persons, respectively) within 16 neighborhoods of Boston. Cat deaths were significantly correlated with human premature deaths at the neighborhood level ($R^2 = 0.77$). Overall, annual per-capita city-wide shelter-associated mortality rate for cats (estimated at approx 2.6 cats/1,000 persons) was similar to rates in other progressive communities. By use of geospatial techniques, 14- to 40-fold gradients in cat deaths were detected across Boston neighborhoods. Cat deaths were associated with human premature deaths and socioeconomic indicators reflecting deprivation (eg, receiving public assistance, crowded housing, lack of high school diploma, families with children in poverty). The study demonstrated that health disparities in cats were associated with the same combination of socioeconomic factors that result in health disparities among people.

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[American Journal of Veterinary Research](#) February 2010, Vol. 71, No. 2, Pages 161-168

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FAO in One Health: Business Unusual

Sigfrido Burgos and Jan Slingenbergh

The number of emerging infectious diseases and pandemic threats at the animal-human interface is increasing. In recent past the world has witnessed the emergence of novel diseases such as Nipah virus in Malaysia, intercontinental spread of Severe Acute Respiratory Syndrome (SARS), Highly Pathogenic Avian Influenza virus H5N1 and Influenza H1N1 (2009). These disease events have heightened worldwide public awareness of the multidimensional linkages between wild animals, livestock production, and global public health. Human population pressures and the enhanced mobility of people, climate change, food and agricultural dynamics, and the progressive encroachment of forest and game reserves, are among the more frequently cited global factors amplifying emerging infectious diseases events.

A new approach has been devised to address the multiple factors influencing the emergence of infectious diseases: the 'One Health' approach. It can be best defined as a collaborative, international, cross-sectoral, multidisciplinary mechanism to address threats and reduce risks of detrimental infectious diseases at the animal-human-ecosystem interface. It strategically builds on the lessons learned from, and achievements of, the responses to the H5N1, HPAI, and H1N1 epizootics. This approach is acknowledged as a feasible and viable model to address the multidimensional challenges that are rapidly evolving in a changing world. Disease emergence can no longer be seen

Global factors that amplify emerging infectious diseases include:

- ◆ *Human population pressures*
- ◆ *Changes in land use*
- ◆ *Intensification of animal agriculture*
- ◆ *Progressive encroachment of forest and game reserves*

Attaining global health security is pivotal to achieve sustained economic growth, food security, and poverty alleviation.

There is increasing recognition that global health and food security form twin objectives.

in isolation but must now be viewed alongside a continuum of climatic changes, natural resource management, agricultural intensification, land utilisation patterns, trade globalization, and shifting farming, food distribution and marketing systems.

The current approach to disease prevention and control emphasizes *transmission disruption*; with early warning, early detection and early response mechanisms targeting also the new pathogens emerging. Whilst critically important, this approach in itself does not address the *root causes* of disease emergence. The only option to effectively deal with the latter is to tackle the *drivers* of new disease emergence. Changing the emerging disease dynamics at the driver level with the aim to counter the progressive flare-ups of diseases at the human-animal-environment interface requires reassessment of the global health security strategy, along with renovation of multiple aspects at the technical, social, and institutional levels.

First, at the technical level, we confront three sets of drivers corresponding broadly with three sets of disease (re-) emergence. One, globalization, land use and/or climate change are mostly implicated when diseases invade a novel territory or geographic area, often with identical host ecology and involving relatively minor changes in pathogen characteristics. Two, disease emergence is facilitated by the mass rearing of animals as seen during intensification of animal agriculture. The high numbers of animals per farms and per units, and the geographic clustering of industrial production plants provide fertile grounds for pathogens to turn more host-aggressive. In densely populated areas with both commercial pig and poultry production, and traditional smallholder systems, there is often a dynamic transmission of pathogens, enhancing both disease spread and persistence. Three, emergence associated with interspecies jumps of pathogens with pandemic potential. This often concerns wildlife, resulting from human and livestock encroachment of forests and game reserves, exploitation of wildlife for food and recreation, and degradation of rich ecosystems.

Second, at the social level, different stakeholders have different concerns regarding food safety, health, security and wellbeing. Poor people in developing countries are primarily concerned with existing disease burdens, which are considered far more important than pandemic risks. Disease impacts are complex and vary between stakeholders, including disruptions to financial, human, natural, physical and social assets. All of these affect achievement of the UN Millennium Development Goals.

Third, at the institutional level, broadening health management and the creation of safer, more disease-resilient landscapes goes beyond the remit of veterinary and medical services. The extension of efforts towards sustainable agriculture and rural development, environmental stewardship, gender inclusion, and socio-economic progress entails involvement of many professionals, requiring a major shift in terms of fostering alliances, partnerships, and communication schemes.

The 'One Health' approach aims to restore social and ecological resilience in global health security. It is well known that prevention is better than cure, both in the fight against existing and new emerging diseases. Redressing the current disease burden in humans and attaining global health security is pivotal to achieve sustained economic growth, food security, and poverty alleviation. Animal and human diseases represent tremendous economic and social burdens to governments, households and individuals alike. Regrettably, the current global investments to confront these challenges are imbalanced and not proportional to the tectonic weight of the economic and social burdens confronted, with negligible amounts being allocated to better understand disease emergence of animal origin.

One Health is a shared international public good that directly involves and engages the public at large.

The One Health approach aims to restore social and ecological resilience in global health security.

It is well known that prevention is better than cure!

Summer 2010 was a significant moment for One Health in North Carolina.

We believe that to reverse this trend it is necessary focus on a set of 5 principles:

- **Impact Assessment:** the multidimensional impacts of both old and new human and animal diseases require adequate measurement in terms of global costs and rankings by how these diseases affect global health security;
- **Drivers:** the core factors influencing disease emergence and pandemic risks await clarification in order to be able to restore responsible, sustainable and safer animal agriculture and associated feed and food supplies;
- **Wildlife:** The emergence of wildlife pathogens as hazards and threats to food safety and public health in general has to be confronted and redressed, at the ecosystem level, as a component of natural resource management;
- **Hazard Analysis Critical Control Points (HACCP):** These critical control points need to be established to enhance hygiene and biosecurity routines and practices in food value chains and agro-ecological landscape levels;
- **Partnerships:** Alliances and associated communication efforts are to be pursued, adequate to a broadening of the set of global health security measures, with strengthened collaborations between medical, veterinary, and environmental agencies with the concept of 'One Health' as a shared international public good that directly involves and engages the public at large.

The Food and Agriculture Organization of the United Nations (FAO) based in Rome, Italy, is teaming up with the World Health Organization (WHO) and the World Organisation for Animal Health (OIE) to jointly pursue the 'One Health' approach. Whilst FAO plays a critical role in raising the levels of nutrition, improving agricultural productivity, bettering the lives of rural populations, and contributing to the growth of the world economy, there is increasingly recognition that global health and food security form twin objectives.

Dr. Sifrido Burgos and Dr. Jan Slingenbergh are officers at the Animal Health Service, Animal Production and Health Division, UN Food and Agriculture Organization.

North Carolina Stakeholders Form the One Health Collaborative

Cheryl Stroud, DVM, PhD and Barrett Slanning, MS, DVM, MPVM

Summer 2010 was an important moment in North Carolina's One Health history: it was when a group of health-related professionals created a local framework in which to work more closely across disciplines -- the One Health Collaborative.

North Carolina's One Health History

Anyone familiar with North Carolina's intellectual and research environment understands why such a framework was needed here. The region is one of the USA's top biotechnology clusters, and holds four human medical schools, a veterinary medical college, and multiple public and environmental health institutes. The Research Triangle Park, anchored by NC State University (NCSU), Duke University, and the University of North Carolina at Chapel Hill (UNC-CH), houses nearly 60 public, private and governmental life science/environmental research organizations, plus approximately 20 scientific associations and institutes. Therefore, the area has a diverse knowledge economy to support One Health.

North Carolina's efforts in One Health began at least 20 years ago when then Assistant State Veterinarian Thomas McGinn championed a statewide geographic information system to address domestic animal health issues.

North Carolina promotes One Health beyond its borders, annually sponsoring the "One Medicine" Symposium.

This year's Symposium "Reality Bites: a One Health Approach to Vector-borne Diseases" is scheduled for December 8th in Durham, NC.

The state's efforts in One Health began at least 20 years ago. In the early 1990's, then Assistant State Veterinarian Thomas McGinn (now with the Office of Health Affairs, US Department of Homeland Security) championed a statewide geographic information system to address domestic animal health issues. This health-oriented information structure evolved into the NC Multi-Hazard Threat Database <www.ncagr.gov/oep/MHTD/index.htm>, in which state agencies collaborate to protect environmental safety and health across animals and humans. As another NC One Health example, following hurricanes Fran (1996) and Floyd (1999), emergency management and health professionals established the State Animal Response Team (SART) to assist with human and animal protection and movement during a disaster. Soon afterwards, NC SART became a national FEMA model for other states' efforts. This culture for One Health activities drives new innovations across the region.

North Carolina promotes One Health beyond its borders. By 2000, increasing recognition of the ties between human, animal, and environmental health led to the first annual North Carolina symposium focused on these issues. Co-sponsored by leaders in state government and academia, in 2003 it grew into the NC One Medicine Symposium <www.onemedicinenc.org>. Every December this international meeting consistently attracts over 300 participants, including health workers, public safety professionals, and policy makers, all working at the intersection of animal-, human-, and environmental health. This year's One Medicine Symposium addresses vector-borne diseases. <www.onemedicinenc.org>.

Bringing NC's One Health efforts into 2010, the NC Bio-Preparedness Collaborative (NCB-Prepared; a partnership of UNC-CH, NCSU, SAS Institute, NC Public Health, and others) was launched this year. This integrative technology effort responds to needs for faster recognition and response to biological threats. It enhances human and animal bio-surveillance for timely information integration, decision making, and dissemination. NCB-Prepared <<http://ncb-prepared.org>> is intended for eventual implementation on a regional/national level.

The North Carolina One Health Collaborative

Also in 2010, One Health stakeholders from both public and private organizations established themselves under the umbrella of (TGHC) as the TGHC One Health Collaborative. The TGHC <<http://triangleglobalhealth.ning.com>> is an interdisciplinary partnership from across the Research Triangle region. It engages academic, governmental, business and nonprofit groups in research, training, advocacy and business activities dedicated to improving the health of the world's communities.

For the new Collaborative, TGHC serves as a central information sharing and networking system for professionals interested in learning about and following One Health. The mission of the new TGHC One Health Collaborative is to promote and improve the health and well-being of all species by enhancing communication, cooperation and collaboration between physicians, veterinarians, environmental workers, and related professionals. To accomplish this, members create and enhance synergies within the community and augment educational programs within the Triangle.

Sharing Education in One Health

Regional academic leadership in One Health is strong. The NCSU College of Veterinary Medicine (CVM), for example, houses a graduate concentration in Population Medicine, and offers a Master's Degree in Veterinary Public Health. The CVM is also the only USA veterinary institution where every student achieves federal first responder credentialing by graduation. Additionally, programs marrying veterinary and human

The mission of TGHC One Health Collaborative is to promote and improve the health and well-being of all species by enhancing communication, cooperation, and collaboration.

Students have also significantly helped shape One Health in North Carolina.

North Carolina's Multi-Hazard Threat Database and SART are models for combining expertise and data from animal, human, and environmental health to better protect all three spheres.

health education across the CVM and UNC-CH have been ongoing since the early 1990s. Rounding out academic One Health activities, both UNC-CH and Duke have large public health institutes with multiple graduate programs in many aspects of human health, translational medicine, and environmental health.

Students have also significantly helped shape One Health in the state. In 2008 four public health-minded veterinary students developed an informal interdisciplinary forum bringing together like-minded medical, veterinary and graduate students from Duke University, NCSU, and UNC-CH. With faculty support they formed the One Health Intellectual Exchange Group (IEG). They meet monthly to interact with established academic, governmental, and private sector professionals and researchers from diverse disciplines, discussing the interface of their many health-related efforts.

This summer, the TGHC One Health Collaborative adopted the IEG as its official discussion forum, and opted to develop it into a course cross-listed between the three founding universities. Starting in January 2011, this course will function as the original IEG (i.e., open to the public), but participating students will gain 2 credits and will complete group tasks on current cross-discipline issues. In this way, the cooperating universities will augment training for the next generation of One Health professionals. Additionally, the course will enhance local networking opportunities for organizations and future professionals.

Summary

One Health, as a concept and a way of doing business, has a long and productive history in North Carolina. Products from these efforts, such as the Multi-Hazard Threat Database and SART, have become national and international models for combining expertise and data from animal, human, and environmental health to better protect all three spheres. The formation of the new TGHC One Health Collaborative brings stronger cross-discipline leadership and interactions to the already richly diverse arenas of One Health research, education, and practice in the region.

Summer 2010 was, indeed, a significant moment for One Health in North Carolina.

Dr. Cheryl Stroud is Chair of the Triangle Global Health Consortium One Health Collaborative and the One Health Intellectual Exchange Group.

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One Health Newsletter

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Continued.....

The One Health Newsletter is interested in publishing articles from a variety of view points and perspectives and any opinions and statements made in the Newsletter articles belong to the author (s), not the Editor, Editorial Board or Newsletter Contributors.

Coming Events:

One Health Initiative Symposium: Vaccination of Animals for Prevention and Control of Zoonotic Diseases

**American Society for Tropical Medicine and Hygiene– 59th Annual
Meeting**

Atlanta, Georgia (USA)

November 3-7, 2010

<http://www.astmh.org/Home.htm>

United States Animal Health Association 114th Annual Meeting American Association of Veterinary Laboratory Diagnosticians (AAVLD) 53rd Annual Conference

*USAHA/AAVLD Joint Plenary Session - One Health: One Way Street
Or Are There Opportunities for Animal Agriculture?*

[USAHA/AAVLD Joint Plenary Session: One Health: One-Way Street or Are There Opportunities for Animal Agriculture?](http://www.usaha.org/meetings/2010/)

Minneapolis, Minnesota

November 11-17, 2010

<http://www.usaha.org/meetings/2010/>

Eighth Annual “One Medicine” Symposium

Reality Bites: A One Medicine Approach to Vector-borne Diseases

Sheraton Imperial Hotel and Convention Center

Durham, North Carolina

December 8, 2010

<http://www.onemedicinenc.net/>

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North American Veterinary Conference (NAVC) 2011

“One Health” Session

Orlando, Florida (USA)

January 15-19, 2011

<http://tnavc.org/>

IMED 2011 (International Meeting on Emerging Diseases & Surveillance)

Organized by the International Society for infectious Diseases

Vienna, Austria

February 4 - 7, 2011

<http://imed.isid.org/>

One Health 2011 Congress Melbourne Convention Centre

Victoria, Australia

February 14-16, 2011

<http://onehealth2011.com/>

13th ISVEE Conference, 2012 The International Society for Veterinary Epidemiology and Economics

“Building Bridges - Crossing Borders”

Maastricht, Netherlands

August 20-24, 2012

<http://isvee13.org/>

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Recent One Health Publications:

- ◆ **One Health Approach to Influenza: Assessment of Critical Issues and Options**, Thomas F. Powdrill, Terry L. Nipp, and Jennifer L. Rinderknecht, EID, Volume 16, Number 8–August 2010

<http://www.cdc.gov/eid/content/16/8/e1.htm>

- ◆ **Biological and Structural Characterization of a Host-Adapting Amino Acid in Influenza Virus**, Yamada S, Hatta M, Staker BL, Watanabe S, Imai M, et al. (2010), PLoS Pathog 6(8): e1001034. doi:10.1371/journal.ppat.1001034

<http://www.plospathogens.org/article/info%3Adoi%2F10.1371%2Fjournal.ppat.1001034>

- ◆ **One Health - Two-legged, four-legged, six-legged or eight-tentacled ... we're all in this together.** By David Ollier Weber, Hospitals & Health Networks, Saturday, July 24, 2010.

http://www.hhnmag.com/hhnmag_app/jsp/articledisplay.jsp?dcrpath=HHNMAG/Article/data/01JAN2010/100125HHN_Weekly_Weber&domain=HHNMAG

- ◆ **A good One Health idea for Veterinary Medicine borrowed from human medical research? Viral inhibitors: an additional tool to control classical swine fever, Vetsweb.com - 24 Aug 2010**

<http://www.vetsweb.com/background/viral-inhibitors-an-additional-tool-to-control-classical-swine-fever-1384.html>

- ◆ **New measures to control bovine TB in badgers**, Proposals for additional measures to help control bovine tuberculosis in cattle were **published for public consultation** by Agriculture Minister Jim Paice. DEFRA <http://ww2.defra.gov.uk/2010/09/15/control-bovine-tb/>

BOVINE TUBERCULOSIS - UK (03): NEW CONTROL PROGRAM
ProMED-mail post <http://www.promedmail.org>
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