

ZOO NOSES WATCH

TRACKING HUMAN-ANIMAL INTERFACE

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Message from the Chairperson, RCZI

Last three decades have witnessed high profile outbreaks of new viruses and pathogens, most emerging from wildlife. Conservation medicine recognises that modern science is fighting a new war that many are ill equipped to wage. Ongoing studies are uncovering new disease pathways and helping devise effective treatment.

While environmental causes of health problems continue to be complex, global and poorly understood, conservation medicine practitioners form multidisciplinary teams, to devise approaches to improve species' health.

PHFI hopes to play a catalytic role in stepping up awareness and advocacy on the subject and effect changes at policy and programmatic level through interdisciplinary capacity building and research.

Prof. K Srinath Reddy
President, PHFI & Chairperson, RCZI

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CONSERVATION MEDICINE Fundamental to Public Health

The H1N1 outbreak put the spotlight back on strengthening region-specific pandemic preparedness plans and expanded global surveillance strategies. According to experts, if first chains of human-to-human transmission in H1N1 were discovered, the pandemic could have been contained.

So what went wrong? With 75% of all emerging diseases being "zoonotic" (HIV, avian influenza, SARS), loss of animal habitat and increasing human incursion into wild areas only helped set up new points of contact. This got compounded with international trade in exotic species, climate change causing species migration and global travel leading to movement of jungle viruses into an unsuspecting modern world.

There is an emergent need to "get the vets out of the barn," said Mark Pokras of the Tufts University School of Veterinary Medicine. His conviction: "We need to change mindset of vets, physicians, scientists, conservation biologists and environmentalists and make them more broadminded and visionary." This became the genesis of a new approach to pandemic preparedness bringing together Human and Animal Medicine, Virology, Microbiology, Ecology and Social Sciences.

Analysing different farming strategies and how they foster pathogen spillover addressing people's perceptions of risk, disease and environment, it fuses Ecology and Health in what is now called Eco Health or Conservation Medicine. It is not as if there never was convergence between these fields. In 19th century, health care practitioners were expected to train in natural sciences. But specialisation in 20th century drove them apart. Conservation medicine brings back doctors, veterinarians and wildlife biologists on a common platform with a shared agenda.

As an emerging, interdisciplinary field, it integrates veterinary, medical, ecologic and other sciences and investigates causes of emergence; analyses underlying drivers; and defines common rules in human, wildlife and plant and Emerging Infectious Diseases. The aim is to develop risk analysis to predict emergence of known and unknown pathogens. By looking at environment and health as a continuum, conservation medicine can effect rapid change in public opinion on complex societal issues. ■



Hazards to ecosystems: Domesticated and wild animals grazing together due to human habitations close to forests

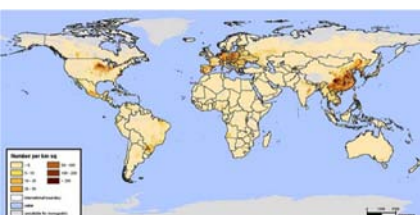
Source:

• A Call for "Smart Surveillance": Lesson Learned from H1N1: Peter Daszak, Wildlife Trust, New York, NY
• www.conservationmedicine.com

DISRUPTIVE DEVELOPMENT AND ECOSYSTEM Imbalance Leading to Disease Emergence



Global poultry distribution



Global swine distribution

Source:

- Leibler JH et al. Industrial food animal production and global health risks: exploring ecosystems and economics of avian influenza. *EcoHealth* 2009; 6: 58–70
- Junglen s et al. Examining landscape factors influencing relative distribution of mosquito genera and frequency of virus infection. *EcoHealth*. DOI:10.1007/s10393-009-0260-y

Within the 'Conservation Medicine' paradigm, human population and individual health depend on "integrity" of ecosystems and biodiversity. Human behaviours impose pressure on human-animal interface in domestic settings and through encroachment of natural niches where animals and their infectious agents coexist in harmonious balance. These disruptions lead to emergence and spread of zoonoses. Two recent studies examine impact of such disruptions.

Leibler et al examine changing livestock farming patterns in favour of industrial systems which increase animal and public health risks. Industrial food animal production generates ecosystems facilitating evolution of zoonotic pathogens and their transmission to humans. Changes in current patterns in human, pig and poultry inventories; associated practices; and international trade create opportunities demonstrating correlation with evolution and spread of zoonoses. Some of these pathogens overcome biosecurity and biocontainment

practices creating hazards for livestock, workers and populations. Recent examples studied included HPAI H5N1 and HPAI H7.

Junglen et al examine landscape factors influencing relative distribution of mosquito genera and frequency of virus infection. Mosquito distribution was analysed along a transect of West African Rain forest area (primary and secondary forest, plantations and human settlements). Mosquito abundance and presence of virus-positive mosquitoes was higher in disturbed habitats compared to undisturbed primary forests. Findings reveal impact of anthropogenic landscape changes on mosquito distribution and arbovirus infection.

Intensive food animal production systems and associated value chains are important in developing countries. India's growing population, urbanisation and climate change patterns are harming ecosystems and biodiversity. Uncoordinated development must factor in such consequences for future generations. ■

UPDATE on RCZI'S Activities

Standing Committee on Zoonoses deliberates on research priorities & outlines blueprint of zoonoses surveillance in India

Third Meeting of the Standing Committee on Zoonoses was held in New Delhi on 25th Nov, 2009. Experts discussed emerging zoonotic infections, highlighting need for closer interaction between veterinary, health and other departments. A blueprint of zoonotic disease surveillance in India was presented and a core group under the leadership of Dte GHS formed for effective integration into current surveillance mechanisms. Members nominated include ICMR, PHFI, WHO, WII and IVRI.

Meeting in Jalpaiguri discusses how to prevent the next emerging zoonotic disease in South Asia

A study carried out by Wildlife Trust, New York found that India, Bangladesh and China were

prone to zoonotic diseases. To prevent them from taking epidemic shape, environmentalists held a seminar in Oct in Jalpaiguri where Wildlife Trust, New York, International Centre for Diarrhoeal Disease Research, Bangladesh, Indian Institute of Science, Bangalore and Rockefeller Foundation, USA participated.

Strategic Research Agenda for Zoonoses Control

Strategic Research Agenda (SRA) for zoonoses prevention and control in India is a step taken by RCZI towards promoting multisectoral collaborative research. Through a systematic approach, the SRA brings together the perspectives of stakeholders, researchers, academicians, practitioners and policy makers from different sectors on zoonoses and research options that merit priority in next five years. ■

ICMR, WHO, WII, IVRI and PHFI form part of a core group that will work towards effectively integrating zoonotic diseases into current surveillance mechanisms

INNOVATIONS HELP Balance Conservation Concerns

Nanda Devi National Park (NDNP) and Valley of Flowers National Park (VoFNP) are Natural World Heritage Sites sharing common buffer area in Nanda Devi Biosphere Reserve (NDBR) which has 47 villages. The ban in NDNP (2002) to preserve ecological conservation disturbed by eco and religious tourism and international mountaineering led to dissent amongst locals who lost jobs. They demanded early resolution that balanced livelihoods with protection of bio-diversity. The onus was on the new Uttarakhand government. They took a series of steps that are today viewed as "innovations."

Innovations in NDBR included building capacity of park staff; encouraging income generation activities based on agrarian and forest economy and resolving man-wild animal conflict; rejuvenating participatory role of local institutions by adopting environmentally sound livelihood practices; park authorities working with specially formed Village Forest Councils, Women Welfare Groups and Eco Development Committees; broadening livelihood options by developing new trek routes; creating participatory equity for economic growth by helping village institutions mobilise financial resources to support small entrepreneurs; and undertaking product development by growing and preserving medicinal plants, condiments and traditional crops.

Innovations in NDNP integrated equity in eco-tourism product development and conflict resolution helping NDNP open up for regulated tourism.

Innovations in VoFNP included park management evolving multi-stakeholder participatory approach to develop sustainable systems for responsible tourism through Eco Development Committees.

The innovations resulted in ending a 20-year acrimony between locals and park authority. The Government held back mountaineering activity inside NDNP and allowed it from outside thus overcoming resentment of locals while restoring employability. Complete zones got cleaned up and unorganised shops weeded out. Through a re-engineering process in governance at different levels, conservation was made socioeconomically self alleviating for the public. Simultaneously, institutional innovations evolved cost effective systems to conserve environment by keeping public centre-stage in resource building/sharing/handling with well strategised capacity-building and accountability processes through institutional policy support. ■

Reference:
Conservation of protected areas in Uttarakhand
<http://indiagovernance.gov.in/prac/uttarakhand.pdf>

"Bring Integrity into Ecosystems and Biodiversity"

Dr. Pradeep K. Malik, Professor, Wildlife Institute of India has developed wildlife health programmes to mitigate conflict between wildlife and livestock. He is a Member of International Wildlife Disease Association and Coordinator South-Asia, IUCN-VSG Species Survival Commission and Member of RCZI's Joint Working Group. Excerpts from an interview:



Q: Why is it important to focus on Conservation Medicine?

A: Human population depends on "integrity" of ecosystems and biodiversity. Disrupted environment contributes to disease emergence. Political and economic disruption impairs health care systems and their response to disease outbreak. Conservation Medicine focuses on changing environment, degradation and depletion of natural resources, biodiversity loss, climate change, increasing human population and global 'toxification'.

Q: Is India well informed on Conservation Medicine?

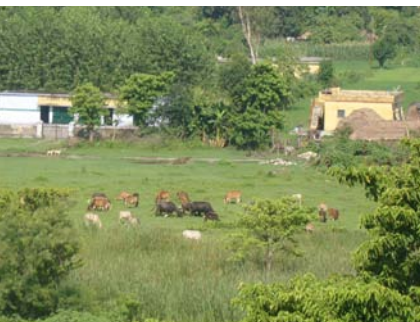
A: Knowledge on biodiversity, ecosystems and their relationship with emerging diseases is non-existent in India. Select organisations are only now building awareness and capacity.

Q: How can we strengthen our role and involvement?

- A:** Health scientists and practitioners must go beyond classic approach to disease control and prevention and:
- Build synergies between functioning of public health experts, human and veterinary medicine, ecology, conservation biology, disease modelling and forecasting to identify factors that allow diseases to cross species barrier and improve surveillance
 - Promote multidisciplinary research to examine links between disruption of environment, changing weather patterns and emergence of zoonoses
 - Strengthen capacities and recognise emerging zoonoses

Q4. How can RCZI align itself with Conservation Medicine?

A: It should foster stronger political will, multidisciplinary partnerships and advocacy; build national and trans-boundary regional framework to address environmental conservation; engage with communities; develop curricula/training materials; and strengthen surveillance and investigation of diseases at human, wildlife and livestock interface. ■



Unplanned settlements on outskirts of forests - risk to ecosystem health

Reference:

- Mittal S et al. *Development Strategy for Hill Districts of Uttarakhand. Working Paper No. 217. Indian Council for Research on International Economic Relations, 2008*
- Patz JA et al. *Unhealthy Landscapes: Policy Recommendations on Land Use Change and Infectious Disease Emergence. doi:10.1289/ehp.6877 http://dx.doi.org/*

BRINGING LAND Use into Public Health Policy

Habitat fragmentation and current patterns of land use have impacted human and wildlife health and ecosystem through emergence and spread of infectious diseases. Unfinished rehabilitation of forest tribes in Uttarakhand led to unplanned settlements on outskirts of forests with potential of spreading infectious agents at human-animal-wildlife interface.

Conservationists failed to spot the connect with public health; and clinical approach of health sector has been oblivious to environmental conservation as an attribute of human health and therefore public health planning and policies. Eco-development Councils for forest tribes in Uttarakhand are

an example of environment conservation through sustainable development.

Decisions on land-use policy can be enhanced with better understanding of costs and benefits to health and environmental decision-makers. Policy frameworks must strengthen human development and trade-offs in environment decisions and align responses from local to global levels.

Agencies like Indian Council of Forestry Research and Education, Centre of Environment Education, Wildlife Trust of India, Bombay Natural History Society and Wildlife Institute of India can interface with public health planning and policy making and influence inclusive and sustainable development. ■

INFO CORNER

CONSERVATION MEDICINE: FAQs

What is conservation medicine?

It is an emerging, interdisciplinary field that studies the relationship between human and animal health and environmental conditions.

Does it deal with environmental conservation alone?

No, it goes beyond environmental conservation to incorporate science of human/wildlife/ecosystem health in the context of wildlife, people and development.

Why is it relevant to human health?

Over 30 infectious diseases affecting humans have emerged since 80's, many from wildlife and as a result of human interference with ecosystems. Links have been noticed between illness in humans and wildlife and ecosystem impacts including toxic emissions, land clearing, international travel and climate change. From human health perspective, conservation of ecosystems is a survival issue.

Who are some of the stakeholders?

Physicians, veterinarians, researchers, clinicians,

microbiologists, pathologists, marine biologists, toxicologists, epidemiologists, anthropologists, economists, parasitologists, political scientists and public health professionals.

Is global climate change within the purview of conservation medicine paradigm?

Yes. In the past six decades, pace of pathogens jumping from animals into humans has quickened, resulting in 'cascade of events' bringing bats, apes, vectors and humans together, aggravated partly by unique climatic conditions.

What should the focus be for developing nations?

For developing countries, where most biodiversity exists, focus should be on politico-economic context of health and conservation. Despite all that science tells us about health and environmental problems caused by destruction of rainforests, coral reefs and other key ecosystems, destruction continues unabated. This must stop. ■

WEB RESOURCES ON CONSERVATION MEDICINE

Wildlife Trust of India
Provides information on news, activities and programmes on wildlife conservation in India.
<http://www.wildlifetrustofindia.org/>

The Bombay Natural History Society
Dedicated website with information on research, book reviews and publications on nature conservation in the Indian sub-continent.
<http://www.bnhs.org/>

Tufts Center for Conservation Medicine
Provides information on latest developments in research, education and training in ecosystem health.
<http://www.tufts.edu/vet/ccm/WildlifeTrust>

Wildlife Trust
Wildlife Trust's microsite on Conservation Medicine has details on its programmes, projects and publications.
http://wildlifetrust.org/conservation_medicine/

Consortium for Conservation Medicine
Repository of news, web resources, latest developments in research and peer reviewed publications on conservation medicine.
<http://www.conservationmedicine.org/>



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