

From the web ...

<http://www.conservationmedicine.org>

What Is Conservation Medicine?

Conservation medicine is an emerging field that focuses on the intersection of the environment, human and non-human hosts, and pathogens. At its core, conservation medicine champions the integration of techniques and partnering of scientists from diverse disciplines.

The problem

Conservation medicine evolved out of a crisis: unprecedented levels of disease and ill health in many species, driven by increasing burden of anthropogenic environmental change. We now have proof that diseases can deplete biodiversity locally, by leading to the removal of whole populations (e.g. rainforest amphibians and African wild dogs) and globally by causing extinctions (e.g. Polynesian tree snails and Australian amphibians). The consequences can be equally disastrous to humans (e.g. HIV and the Nipah virus outbreak). Climate change, chemical pollution, global trade, domestic animals, encroachment into wilderness areas, and the overuse of antibiotics are some of the primary mechanisms through which humans are rapidly transforming host-parasite ecology worldwide.

The solution

The environmental causes of health problems are complex, global, and poorly understood. Conservation medicine practitioners form multidisciplinary teams to tackle these issues. They can include microbiologists, pathologists, landscape analysts, marine biologists, toxicologists, epidemiologists, climate biologists, anthropologists, economists, and political scientists. Within the Consortium, these experts work with educators, policy makers, and conservation program managers to devise approaches that improve species' health.

Example -- Nipah Virus

Nipah virus first emerged in Malaysia in 1998, killing over 100 people in a single outbreak. This lethal virus (case fatality rate >40%) was first identified in pigs and pig farmers. It spread quickly as infected pigs were bought and sold, eventually infecting abattoir workers in Singapore. The Malaysian government was forced to stop pig exports and culled almost half of its pig population, costing the industry millions of dollars but arresting the outbreak.

Joint investigations by the University of Malaya, the Veterinary Research Institute of Malaysia, Australia's CSIRO, Queensland DPI, and the United States' CDC suggest a complex ecology for Nipah virus. There is evidence that dogs, cats, horses, and goats were also infected. The virus's sequence is closely related to that of Hendra virus, which emerged in Australia in 1994. Researchers found that the four Australian mainland species of fruit bats carried antibodies to Hendra virus, and

one carried virus in uterine tissue. Similar surveys of Malaysian bats have found Nipah virus antibodies in at least five species, including two that roosted near infected piggeries. Drs. Lam and Chua of the University of Malaya isolated the virus from the urine of one species, *Pteropus hypomelanus*, and also from some partially chewed fruit. Under a grant from the NIH Fogarty International Center's Emerging Infectious Disease Initiative, the Consortium has begun a major collaborative project on Nipah virus with researchers from the CDC, CSIRO, University of Malaya, Queensland DPI, Veterinary Research Institute, Princeton University, Harvard Medical School, and Institute of Zoology (London). The project's goal is to identify the proximate and ultimate factors responsible for Nipah virus's emergence. Particular aims include:

- ◆ To describe the current distribution of Nipah virus in Malaysian bat populations
- ◆ To identify how bat movement and migration patterns are affected by recent deforestation, habitat encroachment, mangrove destruction, hunting, and climatic events (e.g. the El Nino-Southern Oscillation contributed to the 1997 fires in Indonesia, which disrupted tree flowering and potentially bats' foraging)
- ◆ To identify by laboratory experiments the most probable routes of transmission between bat species and from bats to pigs
- ◆ To develop a predictive mathematical model and GIS overlaid database that can be used to assess spatial and temporal variations in the risk of bat-to-pig transmission and epidemics in piggeries

The findings will be of particular use to public health officials trying to minimize the incidence of spillovers and deter large outbreaks. By determining the actual risk of transmission from bats, the project will also help wildlife managers, pig farmers, and public health officials define their objectives in a broader, more accurate ecological and economic context.



Lesser Long Nosed Bat
artwork by Arnab Roy