“One Health” Webinar

The theory and practice of

“One Health”

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Who we are.....
Multidisciplinary research unit within the Department of Epidemiology and Public health at the **Swiss Tropical and Public Health Institute** ([www.swisstph.ch](http://www.swisstph.ch)) with partnerships in eight countries in Africa and Central Asia.

**Focus:**
Health systems for mobile pastoralists
Control of zoonoses (diseases transmissible between animals and humans in developing countries) Bovine tuberculosis, Rabies, Brucellosis, Anthrax, Avian Influenza
National Centres for Competence of Research North-South
www.nccr-north-south.unibe.ch

7 Swiss Institutions: NRM, Conflict, Governance, Sanitation, Livelihood, Health, Urban planning together with their South partners Funded by Swiss National Science Foundation and Swiss Development Cooperation

EU FP7 Integrated control of neglected zoonoses
www.iconzafrica.org
Overview

1. From «One Medicine» to «One Health»
2. «One Health» necessary and sufficient components
3. Human-animal linkages in micronutrients and food security among mobile pastoralists.
4. Joint health service-delivery for mobile pastoralists
5. Added value of «One Health» in zoonoses control
6. Beyond «One Health»: Ecosystem health
The „One Medicine“ by Calvin Schwabe’s has its origins in his work with Dinka pastoralists in Sudan in the 1960s.

„There is no difference of paradigm between human and veterinary medicine. Both sciences share a common body of knowledge in anatomy, physiology, pathology, on the origines of diseases in all species."

„One Health“ requirements

Necessary (but not sufficient) requirements:
– Recognition of intextricable linkage of human, livestock, companion animals and wildlife

Sufficient requirements:
– Added value of health and wellbeing of humans and animals and/or financial savings from closer cooperation of human and animal health.
Health of mobile pastoralists
„For animals we are in charge, for the children it is God“
Retinol Assessment Among Women and Children in Sahelian Mobile Pastoralists

M. Bechir,1,2,3 E. Schelling,2,3 K. Kraemer,4 F. Schweigert,5 B. Bonfoh,6 L. Crump,2,3 M. Tanner,2,3 and J. Zinsstag2,3

Ecohealth 2012

Human mother’s milk retinol (µmol/L)
Food security depends on the seasonal availability of cereals and dairy products.

Figure 3: Yearly food price variation in the market of Gredaya: Diamonds: 1 litre of fermented milk, Squares: 100g of Butter, Triangle: 1 kg of Corn. Prices in FCFA.
Mixed teams integrating human and animal health for nomadic people in Chad
Joint human and animal vaccinations improve access to health care for pastoralists

Costing study: public health sector could save up to 15% of infrastructure, cold chain and staff costs

Private veterinarians’ interest in capitalising on transportation infrastructure
Is it profitable to control rabies by dog mass vaccination in African city?
Endemic stable dog-human rabies transmission in N’Djamena
Simplified deterministic model of rabies transmission between dogs and humans

- **S** = susceptible dogs
- **L** = latent infected dogs
- **I** = rabid dogs
- **R** = vaccinated dogs
- **X** = susceptible humans
- **Y** = exposed humans
- **Z** = rabid humans

Symbols:
- $\beta IS$ for the transmission rate from dogs to humans
- $\lambda$ for the rate of infection in dogs
- $\delta$ for the rate of transition from latent to vaccinated in dogs
- $\mu_2$ for the natural death rate in both dogs and humans
- $\sigma$ for the rate of removal from the latent state in dogs
- $\rho$ for the rate of transmission from infected dogs to humans
- $\alpha I X$ for the rate of infection in humans
- $\pi$ for the rate of vaccination

The diagram shows the flow of infection between dogs and humans, with various transition rates and rates of removal.
Effect of different control strategies on the transmission of rabies

![Graph showing effect of different control strategies on rabies transmission](image)

- **no intervention**
- **vaccination campaign 70% coverage**
- **vaccination campaign coverage 50%**
- **shooting campaign twice 10%**
- **shooting campaign twice 5%**
Comparative profitability of rabies control in N‘Djaména
(Zinsstag et al. PNAS 2009, 106(35) 14996–15001)

Dog and human vaccination

Human vaccination alone
Synoptic view of benefits and costs of animal brucellosis mass vaccination in Mongolia
One Health
The Theory and Practice of Integrated Health Approaches

Edited by Jakob Zinsstag, Esther Schelling, David Waltner-Toews, Maxine Whittaker and Marcel Tanner

The One Health concept of combined veterinary and human health continues to gain momentum. It is becoming clear that a closer cooperation between human and animal health and related disciplines results in a better level of health, faster detection of new diseases and financial savings.

This book examines the origins of One Health before discussing practical aspects such as methodological tools, data gathering, monitoring techniques, study designs, and mathematical models. It covers the legal aspects of the human-animal relationship, wildlife conservation, social sciences and joint health service provision. Zoonotic diseases, with discussions of diseases of wildlife, farm animals, domestic pets and humans, and real-world issues such as sanitation, economics, food security and evaluating the success of vaccination programmes are also covered in detail. This book reviews how to put policies into practice to address the future challenges of sustaining health of humans, animals and the ecosystems they live in. With case studies throughout, it draws on the experiences of over twenty authors from around the world to combine research and practice in one broad-ranging volume for veterinarians, medics and academics.

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