



# One Health Symposium

Chair: Dr. Gerardo Acosta-Jamett

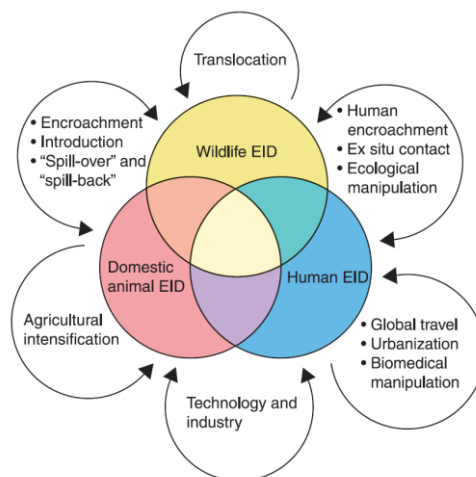
Instituto de Medicina Preventiva Veterinaria  
Programa de Investigación Aplicada en Fauna Silvestre  
Facultad de Ciencias Veterinarias  
Universidad Austral de Chile

## One Health





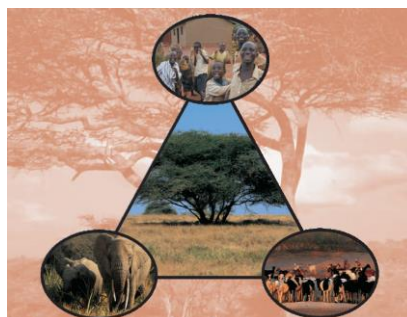
## Emerging Infectious Diseases



Daszak et al., 2000, Science

## Zoonoses and Public Health

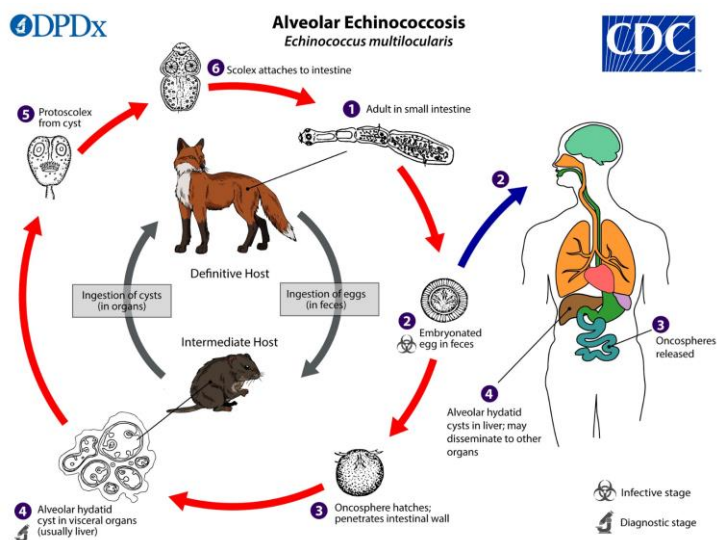
- More than half (58%) of human pathogens are zoonotic
- Most (73%) of emerging pathogens are zoonosis
- Almost half (44%) of human pathogens can jump to wildlife



Taylor et al., 2001, PTRSL-B  
Woolhouse and Gowtage-Sequeria, 2005, EID



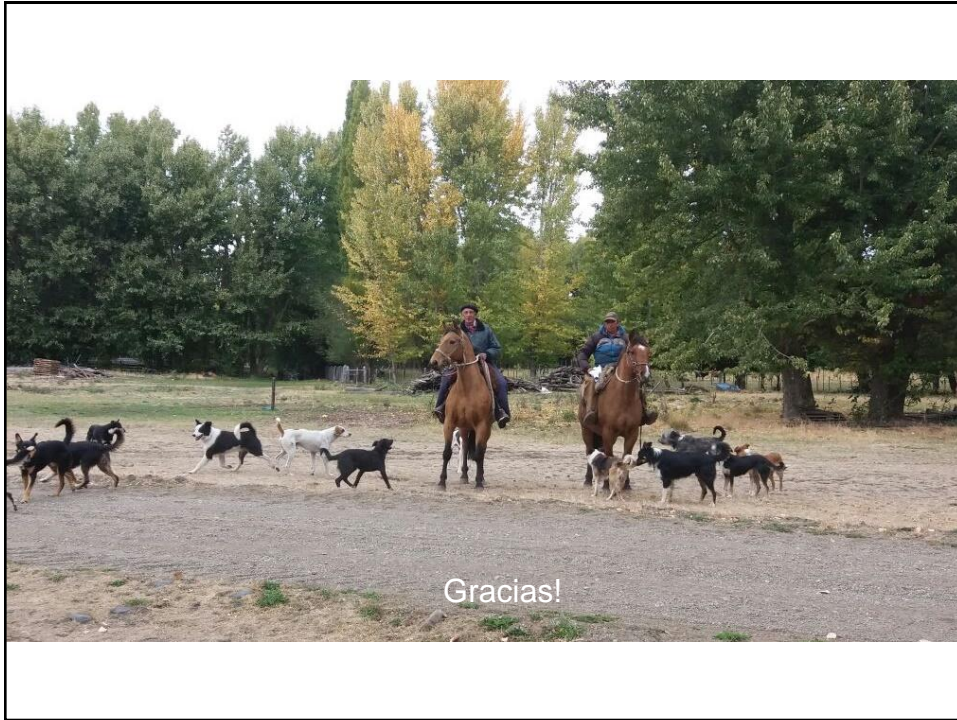
## Life cycle



## Symposium

- 1. Dr. Malika Kachani.** "One Health: the reality out there..."
- 2. Dr. Peter Deplazes.** Alveolar Echinococcosis in Europe: transmission ecology, diagnosis and control in a Swiss "One Health network".
- 3. Dr. David Jenkins.** One Health and the evolving epidemiology of *Echinococcus granulosus* in Australia.







# **ONE HEALTH, THE REALITY OUT THERE**

## **Translating theory into practice?**

**Malika Kachani, DVM, PhD  
Maryam Othman, MD, MPH  
WESTERN UNIVERSITY OF HEALTH SCIENCES  
California, USA**

### **OUTLINE**

- **Challenges of the One Health Approach in the field**
- **My experience with OH**
- **Success stories**
  - **USA**
  - **Morocco**
  - **Kenya**
  - **Global level**



## **THEORY**

**The creation of One Health organizations at the international, national, regional, and local levels, with integrated missions to improve human, animal, and environmental health, would improve global health including the prevention and control of infectious diseases.**

**ESTABLISHED**

## **PRACTICE**

**Increasing communication and collaboration across disciplines might seem straightforward, but has proven difficult to achieve!!!**

**Condition sine qua non:**

**If One Health is to be achieved, the following systemic challenges must be addressed:**

- Institutions,
- Funding,
- Education,
- Jobs.



## **INSTITUTIONS**

- **Most nations do not have institutions whose primary missions are animal disease surveillance, control, and prevention.**
- **Veterinary Services are not always well equipped to conduct the expected tasks**
- **No institutions to bridge the gap between relevant sectors (VPH units, WHO)**

## **FUNDING**

- **No inter-sectoral funding**
- **Funding always scarce**
- **No governmental sources and commitment**
- **No sustainability**
- **Human health better funded than animal health**
- **Funding mainly provided by outside institutions, agencies, teams.**

**Undo previous structures**



## **EDUCATION**

- **Health professionals study in separate institutions (Meds, vets...)**
- **Research in silos**
- **When collaboration is fostered: challenges**
- **Lack of sustainability: funding for research**
- **Different priorities of institutions**
- **Some countries have minimal or no veterinary capacity**

## **JOBS**

- **Graduates: OH training**
- **One Health expertise: not valued**

**(USDA: One Health expertise included in job descriptions)**



**Veterinary Public Health 1975.  
1999, WHO Definition:**

**“The contributions to the  
physical, mental, and social  
well being of humans  
through an understanding,  
and application of  
veterinary science”**

**VPH Units**

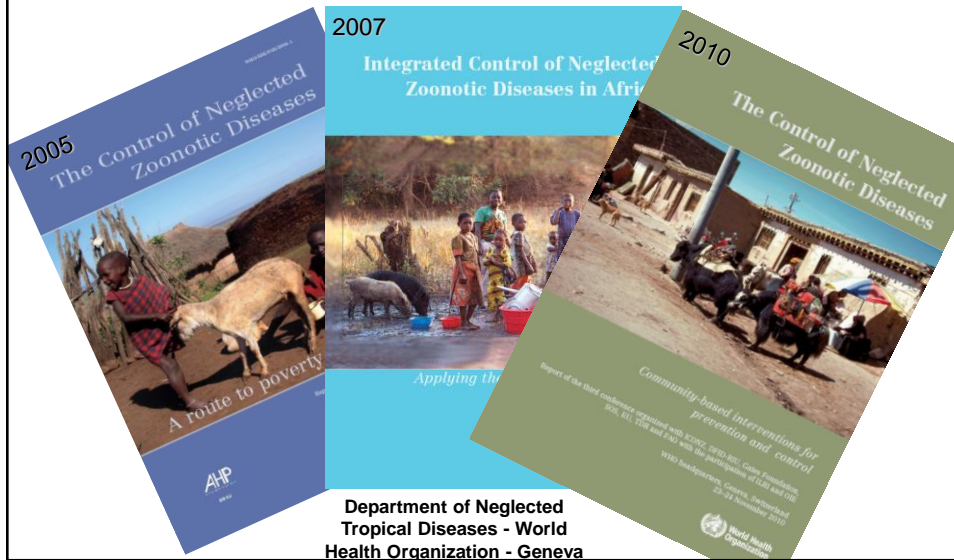
### **MOROCCO**

- **Inter-sectoral unit for the control of zoonotic diseases**
- **One Health and horizontal approach applied ... at the local level**
- **Hydatid disease pilot control project: physicians, vets, nurses, biologists...**
- **Assistance from the government and international agencies**
- **One Health Course including various health professionals (EU)**

**Not the Health and Agriculture Departments!**



## WHO initiative: Advocating for and promoting integrated control of NZDs



## Challenges facing Neglected Zoonotic Disease (NZDs) control

- Lack of legal framework
- Lack of policy frameworks
- Lack of institutional structures that bridge the gap
- Different priorities in disease control
- Lack of inter-sectoral funding
- Scarcity of human resources (jobs, training)
- Lack of educational institutions
- Lack of communication/collaboration
- Health issues addressed in silos, vertical approach

***Implementation of NZDs control strategies: neither priority health nor veterinary sectors***



# **OPERATIONALIZING ONE HEALTH**

**A policy perspective.  
Taking stock and shaping an  
implementation roadmap**

Stone Mountain, Georgia, USA, May 4-6, 2010.

**CDC**

**FAO, WHO, OIE**

## **Stone Mountain Meeting, 2010. GOAL**

- To identify clear concrete actions to move the concept of One Health from vision to implementation.
- Participants defined a 3-5 year vision of One Health encompassing four main areas:
  - culture change
  - increased visibility
  - political will / financial support
  - optimal coordinated efforts.

Specific activities were identified as critical steps in attaining the vision. Capacity building.



## SUCCESS STORIES AND CHALLENGES

- Inter Professional Education (IPE),  
Western University, 9 Health colleges.
- LA COUNTY (WHO, VPH)
- RESEARCH
- IRB
- KENYA
- GLOBAL LEVEL

### Interprofessional Education Western University of Health Sciences

Students from nine distinct health professions: Human Med, Vet Med, Pharm, Dental, Optometry, Podiatry, Nursing, Allied Health,

- learn how to work as a **cohesive health care team**.
- learn with, from, and about each other as a means of fostering **collaborative healthcare practices**.
- learn about the unique **roles and responsibilities** of the health professions: engage and interact to address real common health issues. Problem Based Learning.

#### Competencies:

- Communication
- Collaboration
- Teams and teamwork in health care
- Scope of practice
- **One Health**





## **LOS ANGELES COUNTY PUBLIC HEALTH DEPARTMENT**

- Physicians and veterinarians work together to address health issues
- Active collaboration at all levels
- One Health approach

**WHO VPH Units, model for other counties**

## **RESEARCH**

One Health **successfully** applied:

- sharing information
- conducting disease surveillance in human and animal populations
- monitoring the environment
- improving food safety and security
- communicating effectively to the public
- publishing



## INSTITUTIONAL REVIEW BOARD

### Ethical approval

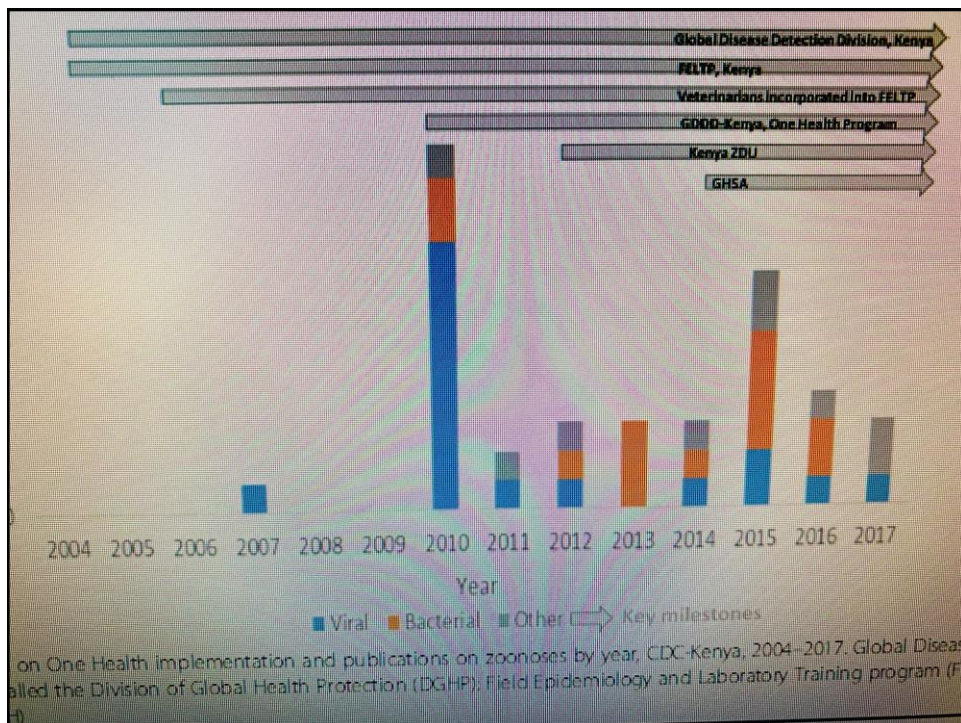
- Animal Health not represented
- Environment Health not represented
- IRB example Western University.
- Country that applied the WHO VPH Unit policy and University that implemented the interprofessional program... *Remove the animal part to clean the proposal...*

## KENYA:

### Implementation of the One Health Approach in Kenya

- 2004: US CDC in Kenya established the Global Disease Detection Division (GDDD) to support the OH Approach.
- 2006, H5N1, RVF outbreaks: CVC Kenya established a framework for multi-sectoral collaboration at national and county level and the Zoonotic Disease Unit (ZDU), a coordination office.
- ZDU: Institutional framework to highlight the public health importance of major zoonoses: improved outbreak response and data: reduce burden and enhance preparedness
- 2014: Global Health Security Agenda implemented through the CDC Kenya.
- **Kenya is a model for other countries in the region**
- However, significant gaps remain!





## Significant Gaps in the Implementation of the One Health Approach in Kenya

- Implementation at the local level, where diseases are highly prevalent and affect people and their animals.
- Sustainability
- Competing priorities
- Relying on external funding and agencies
- **Funding!!!**

**Peru!!!**



## **SUCCESS STORIES GLOBAL LEVEL**

- OIE: Veterinary Services program incorporates OH
- Global networks of qualified individuals working locally, regionally, nationally, and internationally
- Information exchange on the scientific and policy aspects that enable One Health to be operational
- Research: successful
- Increased publications.

## **Challenges in implementing the One Health approach**

- Projects implemented in a small scale and within a specific context.
- Changes in cultural, social and institutional practices, **at a systemic level**, not only local initiatives:
- Paradigm shift to solve global health problems, not only multidisciplinary team of experts.



## **Solutions for One Health? Main ingredient?**

**What do you think?**

## **Solutions for One Health? Main ingredient?**

- **Inter-sectoral funding (Finance Dept)**
- Change the culture
- Undo current structures and redo with new culture: paradigm shift!
- Ground level should be involved
- **Inter-sectoral funding!!!**



## References:

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- Dos S Ribeiro C, van de Burgwal LHM, Regeer BJ. Overcoming challenges for designing and implementing the One Health approach: A systematic review of the literature. *One Health.* 2019;7:100085. Published 2019 Mar 18. doi:10.1016/j.onehlt.2019.100085
- Gibbs, EPJ. (2014) The evolution of One Health: a decade of progress and challenges for the future *Veterinary Record* 174, 85-91.





**University of  
Zurich**<sup>UZH</sup>

Institute of Parasitology

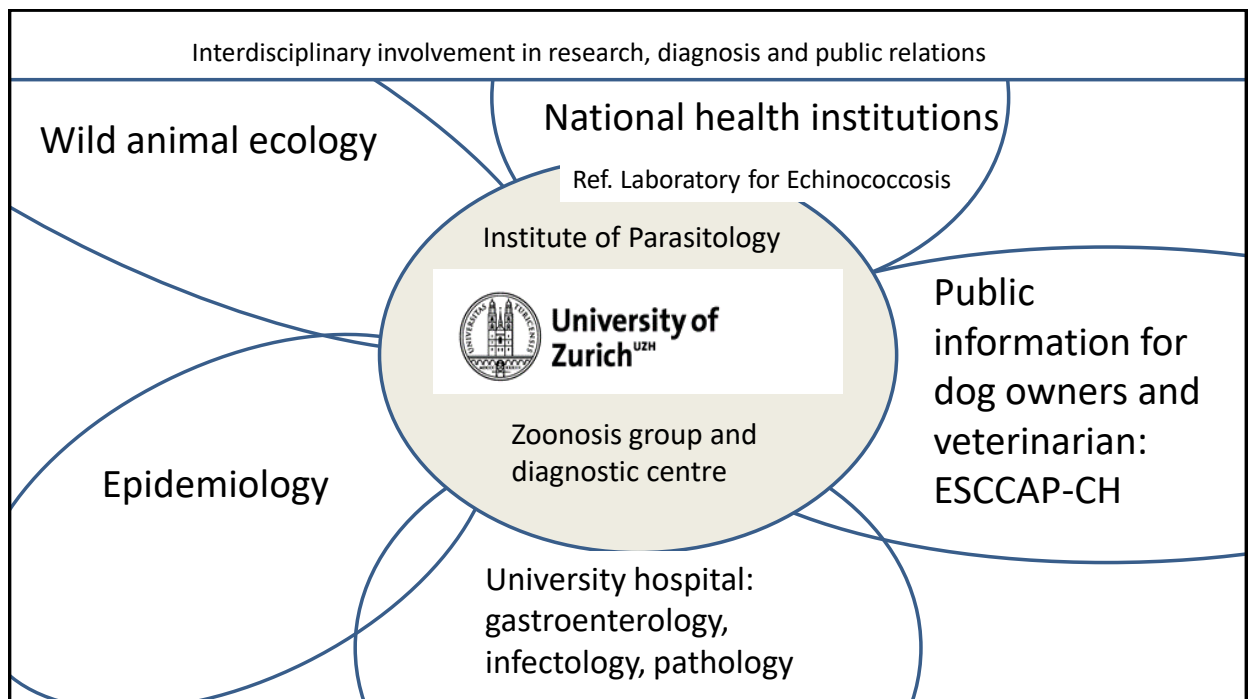
**Medical  
Faculty**

and

University of Bern | University of Zurich  
**vetsuisse-faculty**

# Echinococcosis in Europe: transmission ecology, diagnosis and control in a Swiss “One Health” network

Peter Deplazes





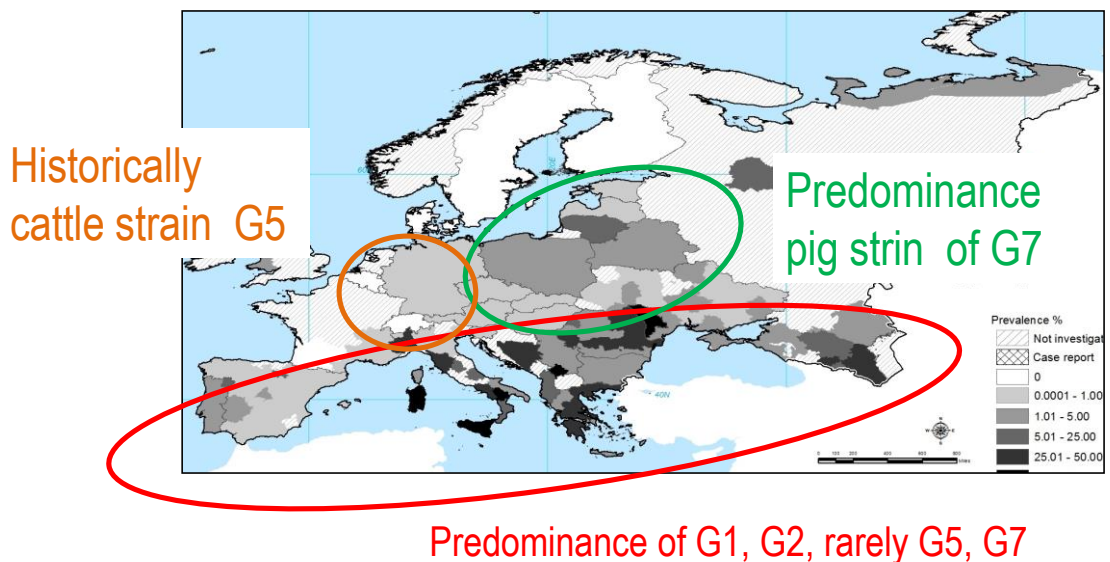
## Alveolar (AE) and cystic echinococcosis (CE) in Switzerland:

- No mandatory reporting of human cases, no national register established
- Reporting of animal infections is mandatory (definitive and intermediate hosts), but data are not representative

### Based on retrospective hospital records approximately:

- 20-30 new autochthonous AE cases per year
- Around 50 **imported** CE cases per year.

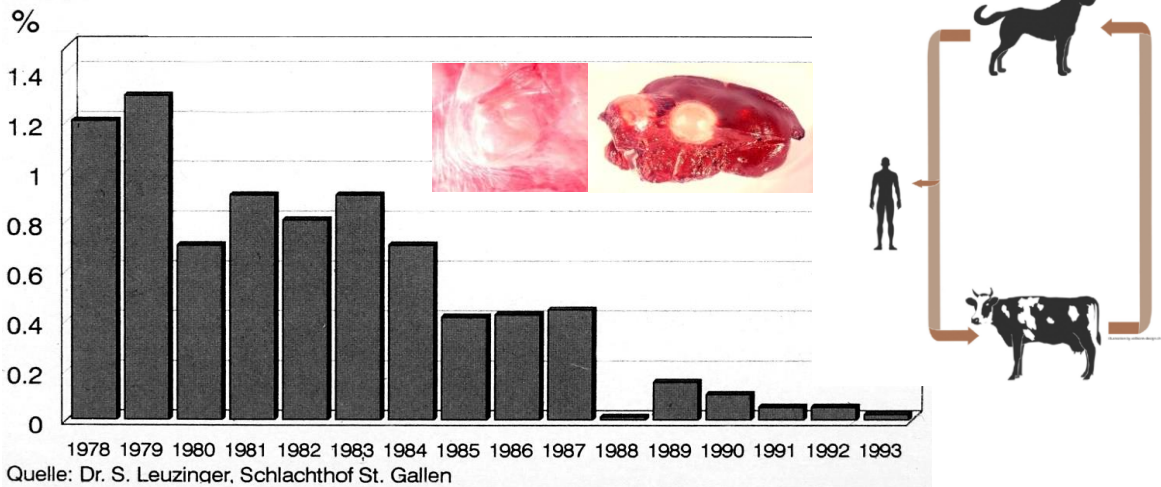
## Europe: Cystic echinococcosis in intermediate hosts



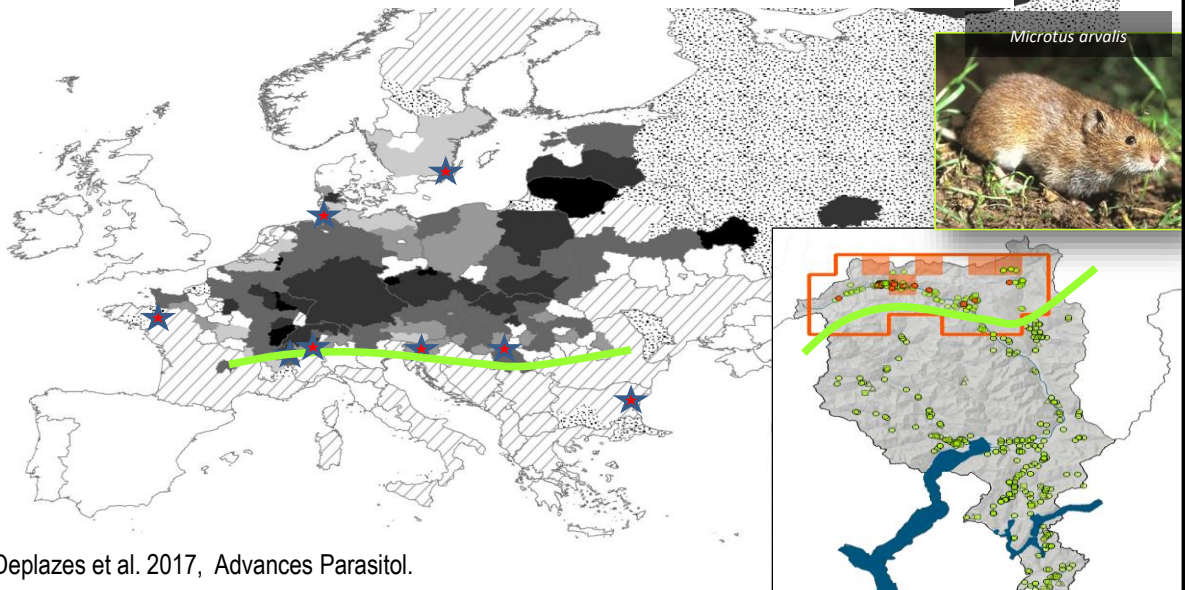


*Echinococcus ortleppi* occurrence in cattle  
(data from a slaughterhouse in St. Gallen, Switzerland)

**“no documented reports since 2000 in cattle”**



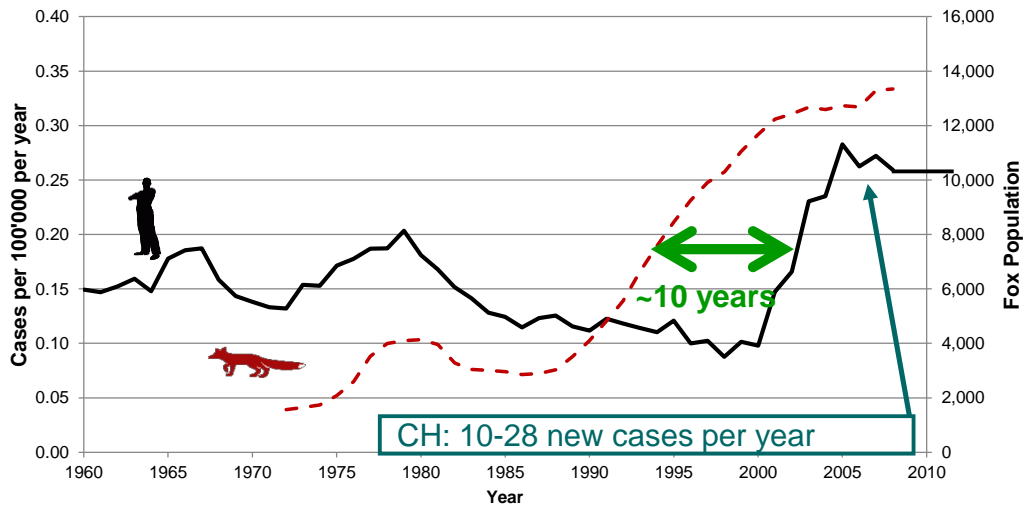
Distribution of *E. multilocularis* in foxes in Europe: 2018





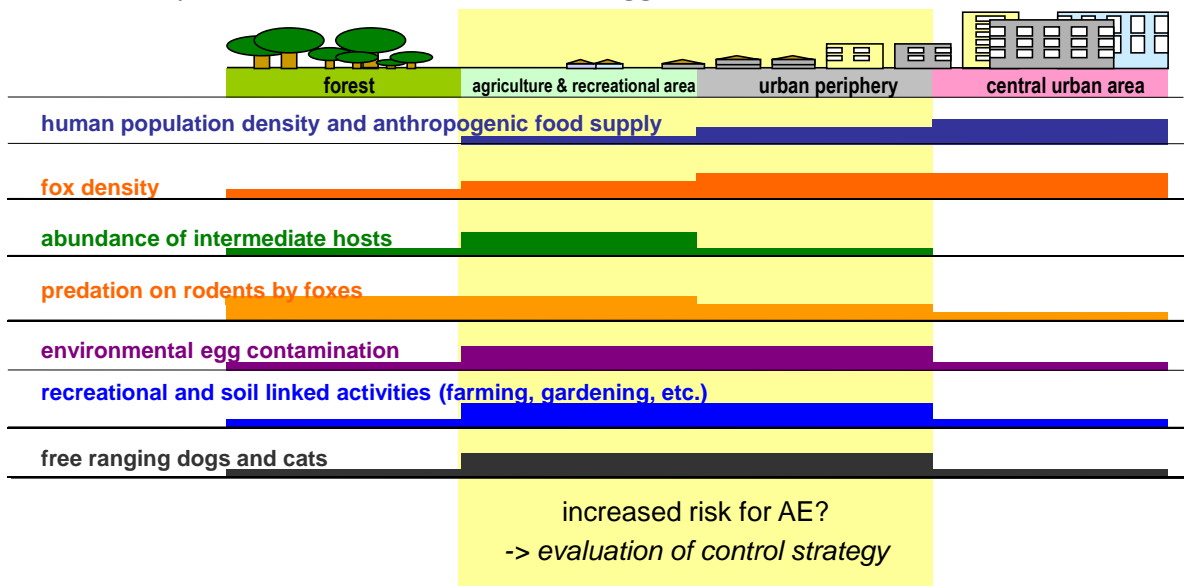
## AE in Switzerland (1960-2012)

(Schweiger et al. 2007, unpublished data)



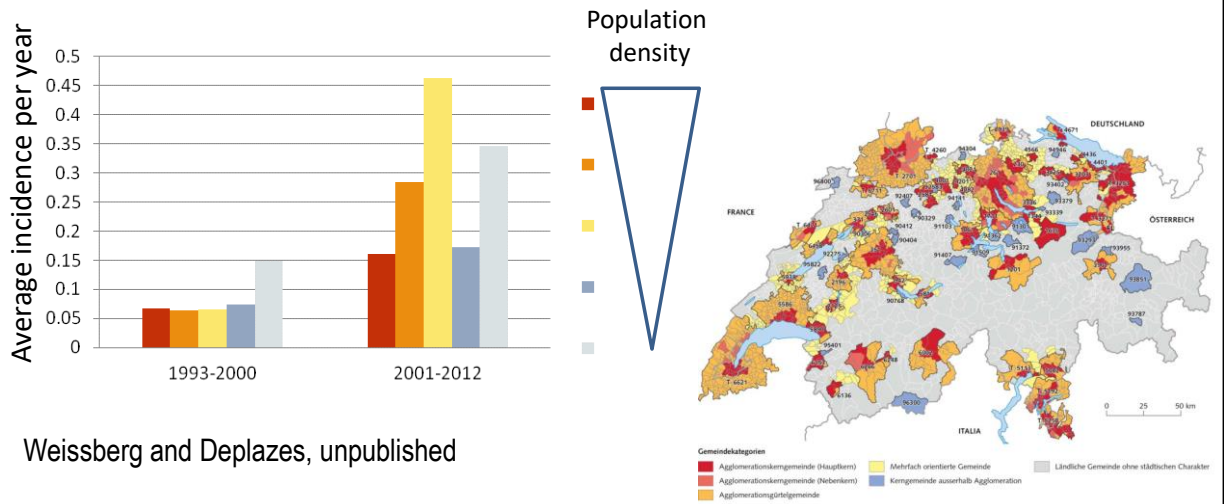
Factors affecting the urban cycle of *E. multilocularis* and the infection pressure with *E. multilocularis* eggs

Deplazes et al., Trends in Parasitology, 2004





## Average annual incidences of alveolar echinococcosis in urban, periurban and rural areas in Switzerland



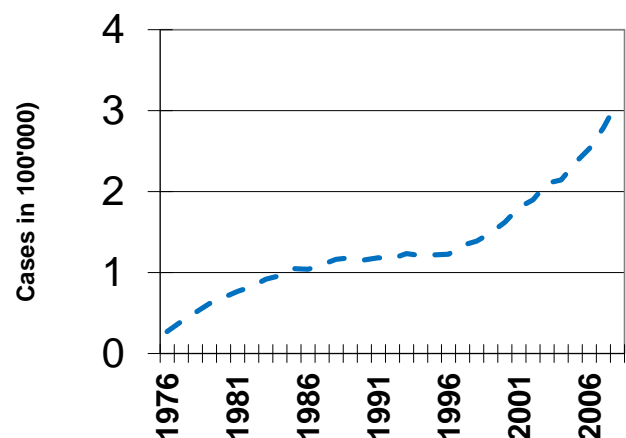
## Costs of Alveolar Echinococcosis in Switzerland

**Treatment costs per patient\***  
€ 103'000 (CIs 90'000-118'000)

**Loss of income per patient\***  
€ 78'500 (45'500-125'500)

**Total costs Switzerland**  
€ 2.0 Millionen (0.9-3.5 Millionen)

\*Median, n = 155

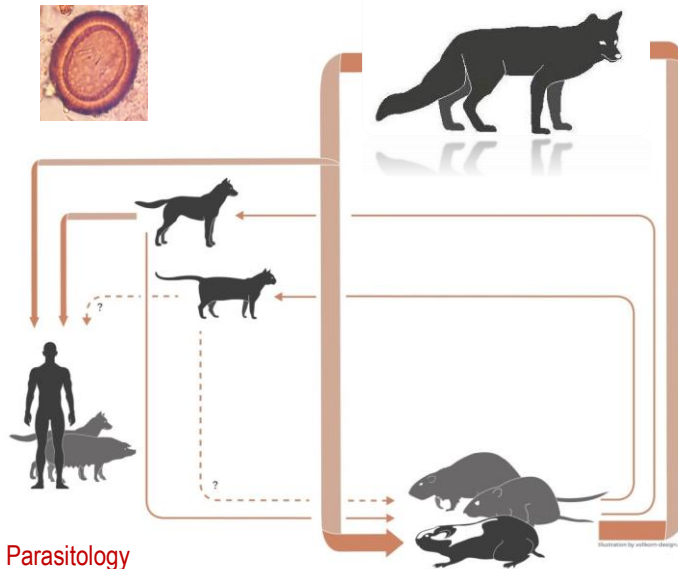


Torgerson et al., J Hepatol 2008



## *Echinococcus multilocularis*: ways of transmission

Alveolar echinococcosis:



Romig et al. 2017, Advances in Parasitology



*E. multilocularis* prevalences in dogs: Mean prevalences 0.2-0.3% (1'000 infected dogs in CH 10'000 in GER)

(Dyachenko et al. 2008), Deplazes et al. 2011)

Dogs with free access to rodent habitats: 3-7%

(Gottstein et al. (2001), Nagy et al. 2008)

Risk factors of human AE identified in case-control studies in Germany: dog **ownership**, free ranging dogs, infrequent deworming

(Kern et al. 2004, EID)





**ESCCAP**  
EUROPEAN SCIENTIFIC COUNSEL COMPANION ANIMAL PARASITES

- Home
- Why ESCCAP?
- Members
- Contacts
- Guidelines**
- English
- Italiano
- Español
- Français
- Deutsch
- Nederlands
- Schweiz
- Therapies
- Podcasts
- Events



[www.ESCCAP.org](http://www.ESCCAP.org)



Bekämpfung von Würmern  
(Helminthen)  
bei Hunden und Katzen  
Deutsche Adaption der ESCCAP-Empfehlung, Oktober 2008

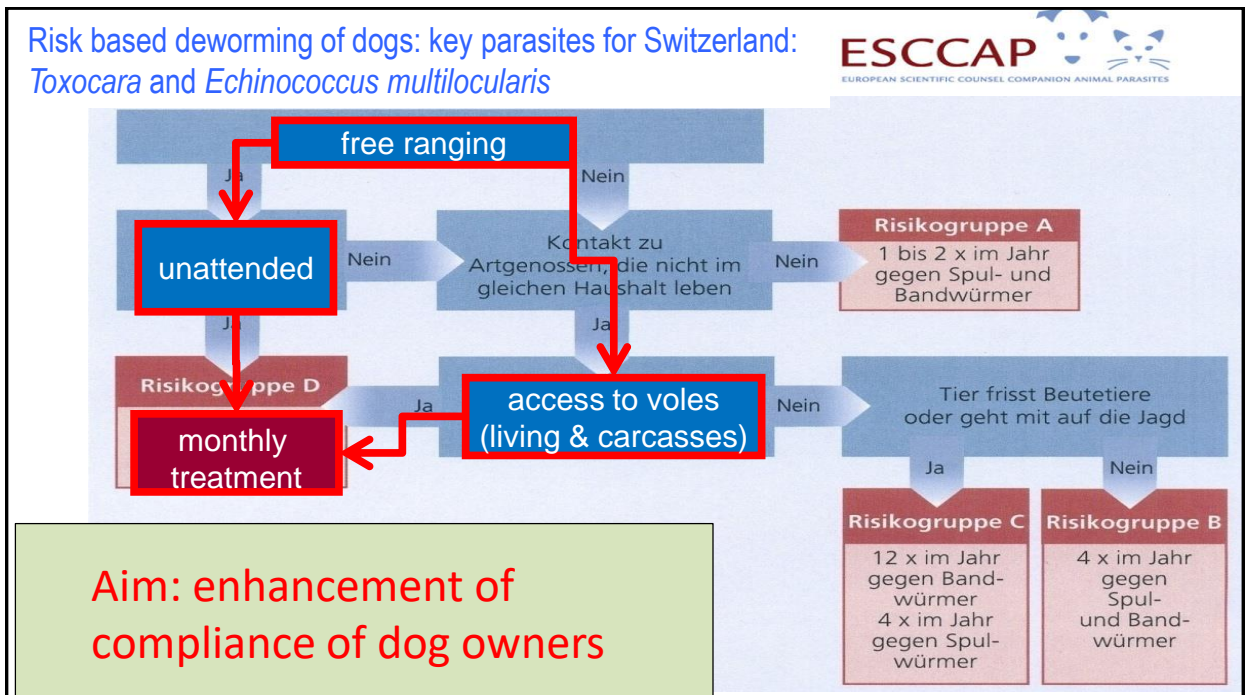


**ESCCAP Guidelines**

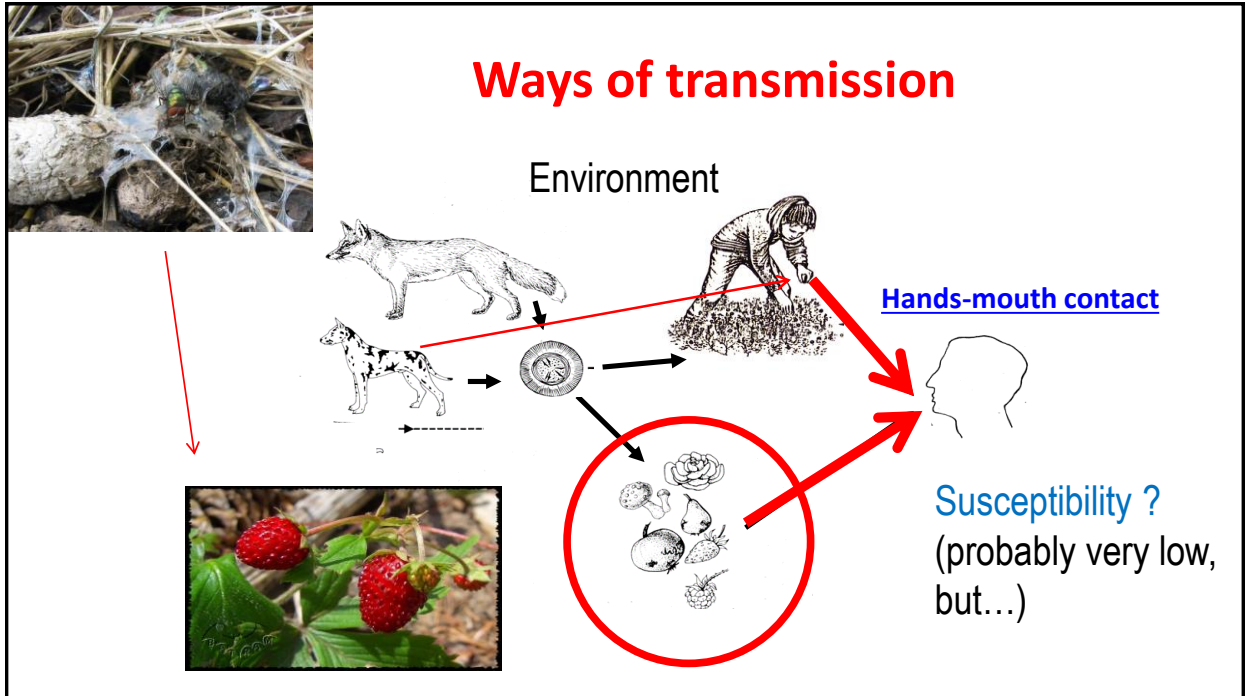
ESCCAP (European Scientific Counsel Companion Animal Parasites) is an independent non-profit making organization whose role is to develop guidelines for the treatment and control of parasites in pet animals. The guidelines are developed to protect the health of pets, enhance the safety of the public and preserve the bond between pets and people.

There is great diversity in the parasites and their importance across Europe. ESCCAP guidelines summarise the different situations within Europe, highlighting important differences between parasites and between different parts of Europe where

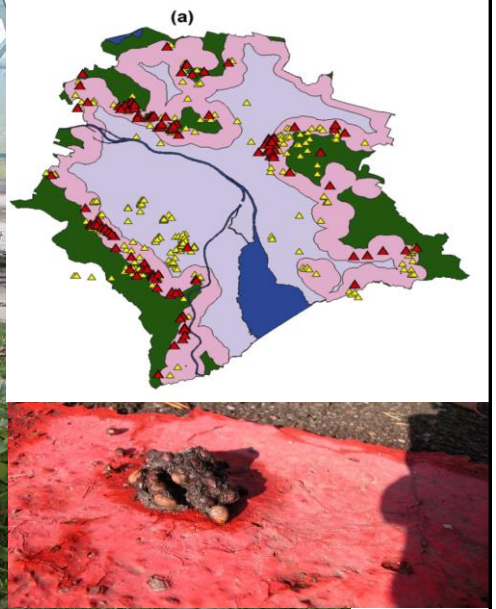
- Provide vets and pet owners the best possible information for controlling pet parasite infections, infestations and zoonoses
- Create independent guidelines & educational materials for optimal pet parasite control
- National activities are focused on local situations







Environmental contamination with eggs



Fox excrement



# Food investigation



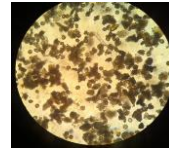
→  
n=40



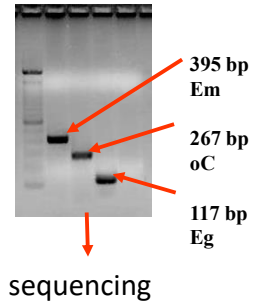
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n=9



PET bottle sieving system



PCR



Federer et al., 2016

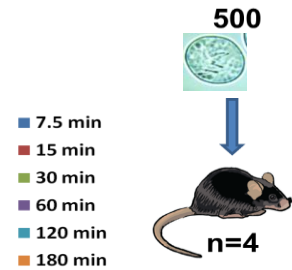
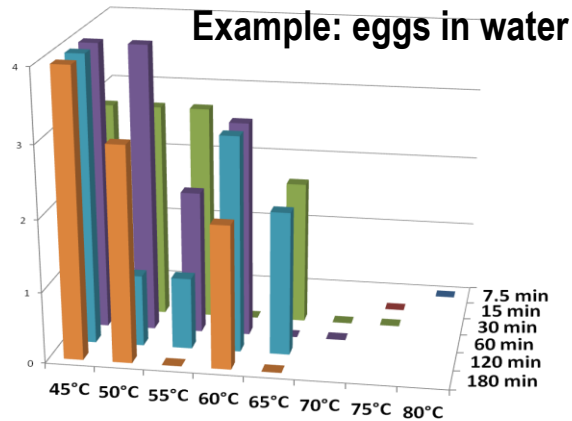
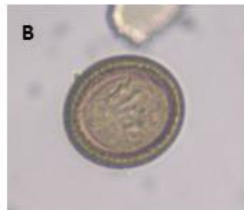
Guggisberger et al., in preparation

Vegetables: Salades	Taeniid species	Number of positive samples	definitive host
Region of collection/season	<i>T. hydatigena</i> , <i>T. ovis</i>	7 (7.3%)	dog
	<i>T. polyacantha</i>	2 (2.1%)	fox
	<i>T. taeniaeformis</i>	5 (5.3%)	cat
Collection from European countries including Switzerland  Spring (n= 46)  (one n includes 40 salad heads)	<i>T. hydatigena</i> , <i>T. multiceps</i> / <i>T. serialis</i>	4 (8.7%)	dog
	<i>T. saginata</i>	1 (2.1%)	human
	<i>T. crassiceps</i>	1 (2.1%)	fox
	<i>T. taeniaeformis</i>	5 (10.9%)	cat
	<i>Echinococcus granulosus</i>	2 (4.3%)	dog
Collection from Switzerland (Zurich) in summer 2019  (n = 120)  (one n includes 9 salad heads)	<i>T. martis</i>	1 (0.8%)	martens
	<i>T. polyacantha</i>	2 (1.6%)	fox
	<i>T. taeniaeformis</i>	2 (1.6%)	cat
	<i>Toxocara cati</i>	4 (3.4%)	cat



## In vivo viability test for *E. multilocularis* eggs

inoculation of oncospheres was used for further viability tests.



Federer et al., 2015

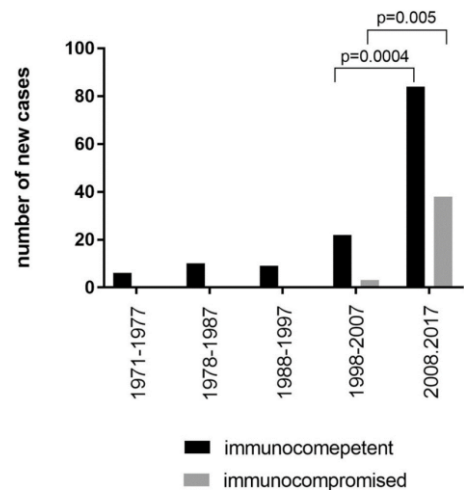
## Susceptibility of humans for AE

100 cases of oral egg uptake

- 1 AE case
- 99 resistant
  - 75 without liver lesions
  - 24 with «abortive» liver lesions

Gottstein et al. 2015, pers. communication)

risk of oral uptake  
risk of infection (invasion)  
risk of establishment in the liver  
risk of disease



Lachenmayer et al. 2019

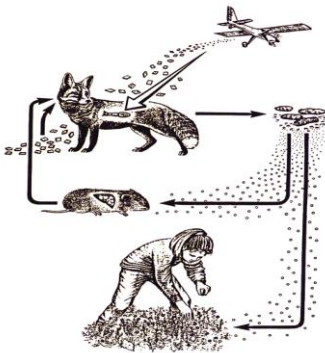


## Control options for alveolar echinococcosis



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## Baiting of foxes with praziquantel



Prof. Frank, T. Romig et al.,  
Universität Hohenheim,  
Stuttgart, D



**Droncit-Bait** (50 mg Praziquantel),  
50 baits/km<sup>2</sup>, monthly, distributed by hand  
in the city of Zurich

Significant decrease of the egg  
contamination in the urban  
environment



