ONE HEALTH: INTEGRATING ANIMAL
HUMAN AND ENVIRONMENTAL
HEALTH

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ONE HEALTH

An old concept generating new interest

--Dr. Rudolf Virchow was the son of a butcher working in Germany in the mid- to late nineteenth century. His studies of trichinosis led to the first food inspections. He was one of the first proponents of One Health.

--One Medicine is a term coined by Dr. Calvin W. Schwabe, a veterinary scientist and epidemiologist at the University of California at Davis, in his 1964 book *Veterinary Medicine and Human Health.*
ONE HEALTH INITIATIVE
TASK FORCE

Convened by the American Veterinary Medical Association

April 14, 2007

“...to facilitate collaboration and cooperation among health science professions, academic institutions, governmental agencies, and industries to help with the assessment, treatment, and prevention of cross-species disease transmission and mutually prevalent, but non-transmitted, human and animal diseases, and medical conditions.”

What is One Health?

One Health is the collaborative effort of multiple disciplines – working locally, nationally, and globally – to attain optimal health for people, animals and our environment.

– American Veterinary Medical Association, 2008
One Health
The convergence of people, animals, and our environment has created a new dynamic in which the health of each group is inextricably interconnected.

--One Health Initiative Task Force, 2008
Blurring of the urban/suburban/rural interface

Increasing population causes destruction of animal habitats exposing humans to animals and their diseases.
Global Trade & Travel

Food, people and diseases travel more quickly around the world
One Health:
Understanding the connections between animal, human and environmental health is necessary in order to address future health concerns
Environmental health impacts human health

- Air quality
- Water quality
- Solid waste issues
- Agricultural BMP’s
Animal health impacts human health

- Human animal bond
- Pet vaccinations
- Zoonotic disease transmission
- Food animal health
One Health

- Human-animal bond
- Disaster response
- Zoonotic disease
- Foodborne illness
- Animal bites and prevention
- Environmental impacts
Animal-Human Bond

• Improved emotional health
• Increased physical activity
• Fewer doctor visits
• Lessons learned:
  – Hurricane Katrina
  – Greensburg
  – Kansas State Animal Response Team

www.kssart.org
Zoonotic diseases
Diseases that are transmitted between animals and humans

- Rabies
- West Nile Virus
- Rocky Mountain Spotted Fever
- Salmonella
- Giardia
What is the concern?

- Approximately 75% of recently emerging infectious diseases affecting humans are diseases of animal origin.
- Approximately 60% of all human pathogens are zoonotic.
Zoonotic disease transmission routes

- **Fecal-oral**
  - E. coli
- **Bites/scratches**
  - Rabies
- **Vectors** (mosquitoes, ticks, fleas)
  - West Nile Virus
- **Foodborne**
  - Salmonella, E. coli
- **Waterborne**
  - Leptospirosis, E. coli, giardia
Zoonotic Disease Prevention: Vector Control

Vectorborne illness
- West Nile Virus (mosquito)
- Rocky Mountain Spotted Fever (tick)
- Lyme Disease (tick)

- Study insect life cycle
- ID insect habitats
- Tip and Toss campaigns to remove standing water to prevent mosquito breeding grounds
- Apply insect repellent
Zoonotic Disease:
Foodborne Illness Statistics

The CDC estimates that
• roughly 1 in 6 Americans (or 48 million people) will become ill with foodborne illness each year
• 128,000 hospitalized
• 3,000 deaths each year

www.cdc.gov
Zoonotic Disease Prevention: Food Safety

Chill
• Refrigerate promptly

Clean
• Wash hands and surfaces often

Separate
• Don’t cross-contaminate

Cook
• Cook to proper temperatures

Follow foodborne illness outbreaks on the Barfblog:
www.barfblog.com

http://bites.ksu.edu
www.fightbac.org
Zoonotic Disease Prevention: Number One Prevention Measure

Wash hands
- Before eating or cooking
- After going to the bathroom
- After petting animals

Hand washing compliance research:
http://onehealthkansas.k-state.edu/infection-prevention/6/infection-prevention
Animal Bites and Prevention: One Health Kansas Dog Bite Prevention Project

• Surveyed animal and human health practitioners
• Developed education materials to be distributed to animal and human health providers
• Piloted materials in veterinary and pediatric clinics
Human-Environment Health Benefits

Outdoor activity improves

• Concentration
• Self-discipline
• Coordination, balance, agility
• Health
• Creativity
• Reasoning
• Sense of peace
• Positive feelings about each other
• Social interaction
• Independence & autonomy
• Sense of wonder

GROW: Girls Researching Our World
www.k-state.edu/GROW
Human health impacts
environmental health

Incidence of cholera in Haiti, 2010

- Cholera present in Nepal
- Nepalese troops come to aid of earthquake victims in Haiti
- Leaking septic system in encampment
- Infected feces enter riverway

UCLA School of Public Health:
http://www.ph.ucla.edu/epi/snow/origin_cholera_haiti_epilogue.html
Future Workforce Needs

- Public health
- Epidemiology
- Environmental management
- Animal health
- Food safety
- Urban planning
- Food chain logistics
- Agricultural research
Cross-disciplinary collaboration

• Approximately 80 – 90% of all cancers may be caused by environmental and lifestyle triggers\(^1\), as opposed to genetics. While many of these triggers are currently unknown they are being investigated by public health researchers and some of them, such as asbestos, are being eliminated as a result of public health initiatives.

www.thisispublichealth.org
Cross-disciplinary collaboration

Zoonotic diseases:
Collaboration between veterinarians and physicians enable rapid diagnosis of human illness
Pets serve as sentinels for zoonotic disease in humans or for environmental degradation that may eventually affect humans
Cross-disciplinary collaboration

- Urban planning
- Built environment
- Community gardens
- Physical activity
- Nutrition
Cross-disciplinary collaboration

Global Observation and Learning to Benefit the Environment
Teachers and students engage in research contributing to a data stream accessed by scientists

www.globe.gov
An Innovative Approach to Solving a Public Health Issue

- Dr. Rita Colwell, Johns Hopkins Bloomberg School of Public Health and former Director of the National Science Foundation
- Devised a simple method to reduce the incidence of cholera in village communities
- Local women were trained in the use of cloth saris to filter drinking water
- The sustainable method was still in use five years later (Huq, A., et al, May 2010)

http://en.wikipedia.org/wiki/Cloth_filter
• Olathe Northwest High School e-Communications Students
  Don’t Eat Poop: The Game
  http://ravensonline.net/donkeypoop/

• Cornell University Pathogen Tracker
  http://game.pathogentracker.net/Intro/introduction/frontpage.aspx

Both games are available at:  http://onehealthkansas.k-state.edu/outreach/52/k-12-education-and-public-outreach-resources
• Connecting people, animals and their environment through research-informed education
• Creating a pipeline of health professionals to meet the need
  – K-12 Education and Outreach
  – Pathways to Public Health
  – Workforce Development
  – Infection Prevention