

January 11, 2008

What is “One Health”?

- **Integrating Human and Veterinary Medicine in selected endeavors**
- **Collaborations/Coalitions/Communication (MDs, DOs, DVMs/VMDs, PhDs, etc.)**
- **Synergistic efforts lead to improved health for both humans and animals.**

Results of “One Health”

- Dramatic, rapid increase in scientific knowledge
- Improved medical education & clinical care
- Enhanced public health efficacy
- Accelerated biomedical research discoveries

One Health in the 18th Century

- Dr. Edward Jenner and Vaccination



“One Health” in the 19th Century

“Father of comparative medicine, cellular biology, and veterinary pathology”



- **Rudolf Virchow** (1821-1902), German physician- pathologist said, **“between animal and human medicine there are no dividing lines-- nor should there be.”**

Coined term “Zoonosis”

Sir William Osler

(1849-1919)

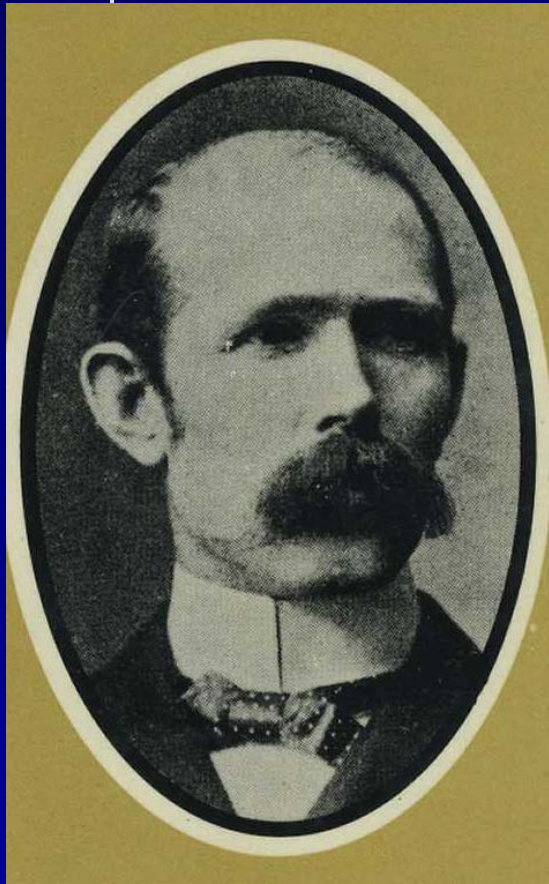
“Father of Modern Medicine”



- Studied in Berlin with Virchow
- Helped promote “One Health”; taught at Montreal Veterinary College in Canada
- Established **veterinary pathology** as an academic discipline in North America

Sir John McFadyean, Dip Vet, BM, MS (1853-1941)

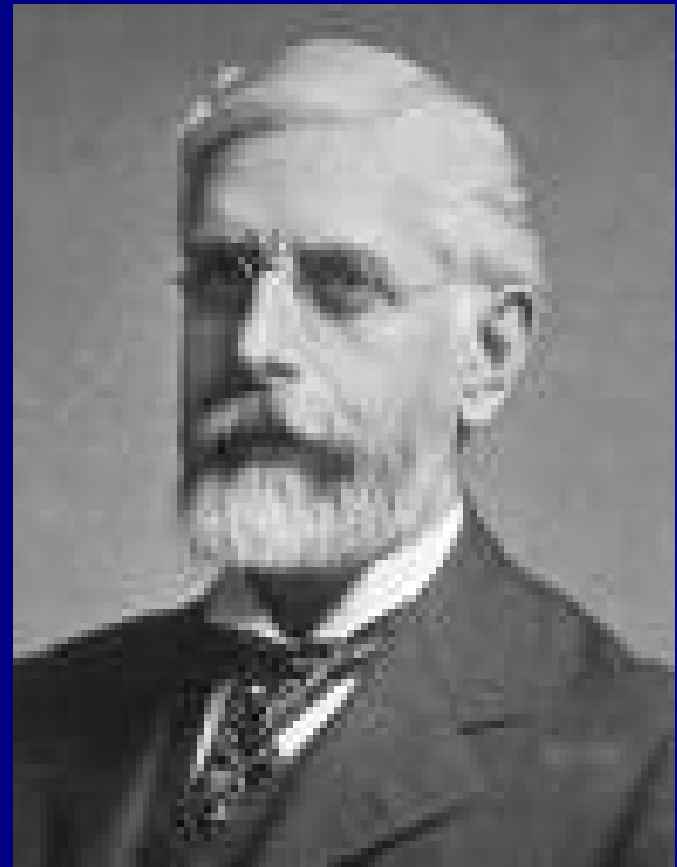
“Founder Modern Veterinary Research”



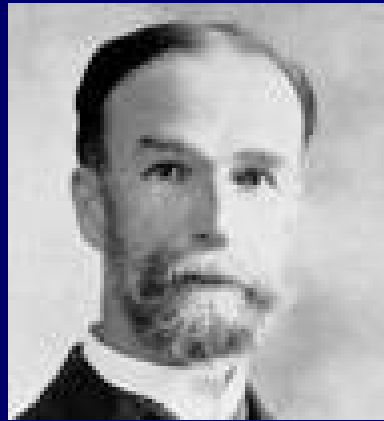
- Veterinarian and physician
- Brought veterinary profession in the UK into scientific era
- Expanded discipline of veterinary pathology
- Founded *Jour Comparative Pathology & Therapeutics*
- Built bridges across human and veterinary fields in infectious disease and comparative medicine

Daniel E. Salmon, DVM (1850-1914)

- Made a number of important discoveries:
 - while studying hog cholera with **Theobald Smith MD (1859-1934)**, discovered that pathogens killed by heat could immunize animals against live pathogens
 - Bovine tuberculosis spread to humans



Comparative Medicine Research



- **Theobald Smith, MD** (pictured) and **F.L. Kilbourne, DVM** discovered cause of cattle fever
- *Babesia bigemina* was transmitted by the cattle tick.
(<http://www.ars.usda.gov/is/timely/tick.htm>)

Dr. Calvin W. Schwabe (1927-2006)

“Father of Veterinary Epidemiology”



- DVM (Auburn Univ.) and DSc (Harvard) in parasitology and tropical public health in 1956.
- **Coined the term “One Medicine”**

Joint FAO/WHO Efforts

- Joint FAO/WHO Expert committee on zoonoses identified more than **150 zoonotic diseases in 1967.**
- **By 2000, more than 200 diseases** were occurring in humans and animals that were known to be transmitted mutually.
- Represents a recognition and/or emergence of **> 30 % increase of zoonotic diseases in the last third of the 20th century.**

“One Health” at the turn of the 21st century

- Outbreaks such as the West Nile Virus epidemic in NYC in 1999, bovine spongiform encephalopathy in the 1990s, SARS in 2003, and H5N1 avian influenza in 1997-present demonstrate that animal health profoundly impacts on human health.
- Five of top six bioterrorism agents are zoonotic per CDC including anthrax, plague, tularemia, viral hemorrhagic fevers, and botulism.
 - **60% of all human pathogens are zoonotic**
 - **80% of animal pathogens are multihost pathogens**

Current Status of “One Health”

- In the 20th century, human and animal diseases have been largely treated as separate entities.
- Physicians and veterinarians communicate and work together episodically.
- Ecology of microorganisms is generally not emphasized in medical schools while schools of veterinary medicine do.
- Medical students might not see the importance of zoonotic diseases and their impact on human and animal health.

“One Health” in the 21st Century

AVMA/AMA “One Health” Liaison

Some very encouraging signs ...



- June 2006, **Dr. Roger Mahr, President of AVMA** formed collaborative liaison with **Dr. Ron Davis, President-elect of AMA now President.**
- AVMA recently established 15 member task force to devise strategy for implementing “One Health.”
- **AMA passed a “One Health” resolution June 2007.**

AVMA “One Health” task force in progress today

- Strategy development for implementation
- Representatives from American Medical Assoc., Veterinary Medicine, American Public Health Assoc. et. al.
- 13 Cross-professional leaders brainstorming

Additional movement forward

- **CDC established a Center for Zoonotic, Vector Borne, and Enteric diseases in 2007 headed by a veterinarian, Dr. Lonnie J. King**
- **Society of Veterinary Tropical Medicine approved “One Health” resolution June 2007.**
- **Croatian Infectious Disease Society “One Health” Endorsement September 2007.**
- **American Society of Tropical Medicine and Hygiene Endorsement October 2007 & symposium November 2007.**
- **World Association of Veterinary Laboratory Diagnosticians Endorsement November 2007.**
- **Delta Society (Human-Animal bond) November 2007**
- **American Association of Veterinary Laboratory Diagnosticians**

Canary database project, Director

**Peter M. Rabinowitz, MD, MPH, Associate Professor of Medicine
Yale University School of Medicine
Yale Occupational and Environmental Medicine Program**

- Can animals - like canaries in coal mines - warn humans about chemical, infectious, and physical environmental hazards?
- Yes...they can and do for arbovirus infections in humans and others
- Dr. Rabinowitz and Dr. Lisa Conti, a veterinarian are currently writing “One Health” book: tentatively titled “A Manual for Human and Veterinary Health Care Providers”

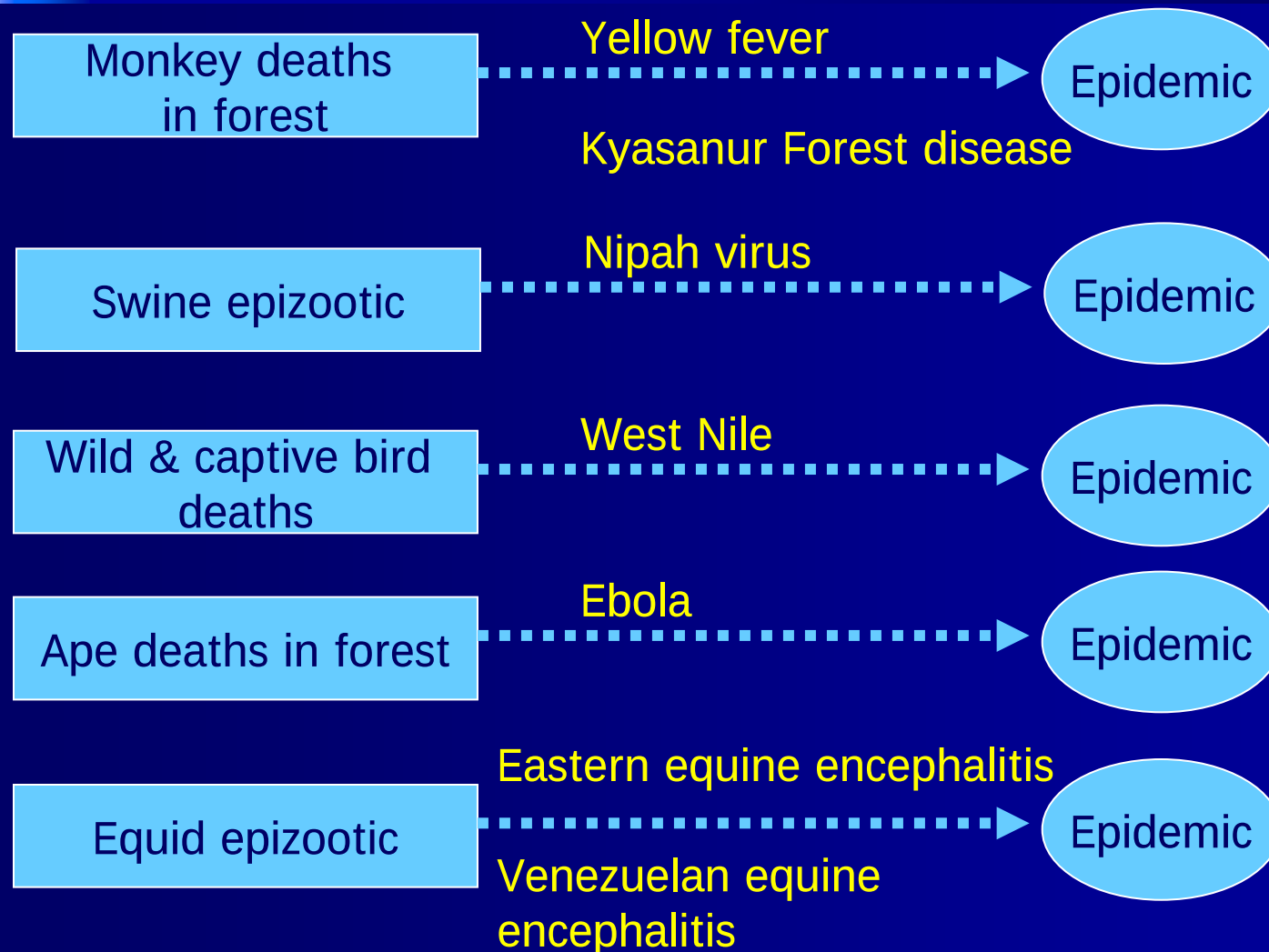
(Lisa Conti, DVM, MPH, Dipl. ACVPM, CEHP, Director, Division of Environmental Health, Florida State Health Department)

<http://canarydatabase.org/>

Some specific major potential outcomes of “One Health”

- Integrated surveillance: improved early recognition and control of zoonoses with Syndrome Reporting Surveillance System (SYRIS)
- Integrated vaccination campaigns: improved coverage rates in third world nations
- Integrated biomedical research: improved development of diagnostics, therapeutics, devices

Examples of diseases that regularly emerge as animal pathogens in advance of human outbreaks



EPI

Emerging Pathogens Institute

University of Florida

- **Plants Diseases** e.g. Citrus Canker, etc.
- **Human Diseases** e.g. Arboviruses, etc.
- **Animal Disease** e.g. Avian Influenza, etc.
- **Food Safety** e.g. *E. coli* 0157:H7

J. Glenn Morris, Jr., MD, MPH & TM

Director, Emerging Pathogens Institute

University of Florida

P.O. Box 1000009

Gainesville, FL 32610-0009

www.epi.ufl.edu

***January 2008**

News:

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Florida Department of Health

1st Issue-'One Health Newsletter'

Mary Echols, DVM, MPH, Editor

www.doh.state.fl.us/Environment/community/One_Health/OneHealth.html

More Movement ...

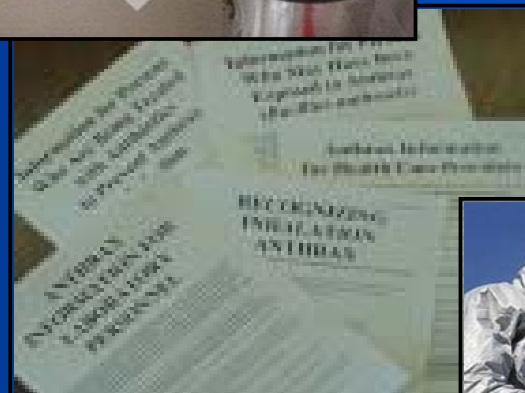
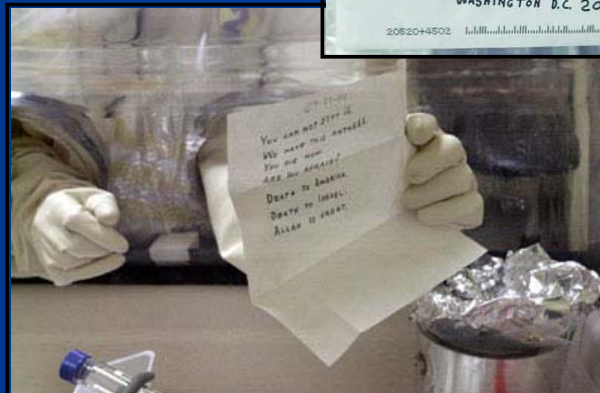
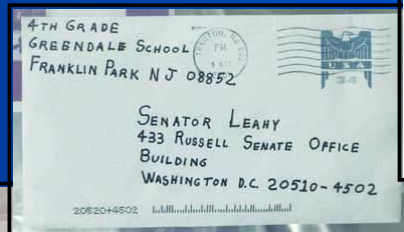
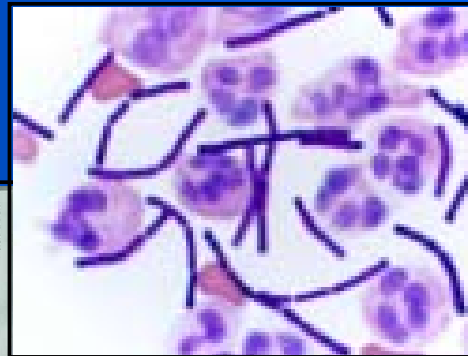
- 270 prominent physicians, veterinarians and other medical health scientist supporters from the U.S. and 18 other countries (see 'Kahn-Kaplan-Monath' supporter list)
- Three contemporary Nobel laureates' endorsements: Prof. Rolf M. Zinkernagel, MD, PhD; Peter C. Doherty, DVM, PhD; and Joshua Lederberg, PhD.
- Eight national and international organization endorsements
- 400 individuals on 'Kahn-Kaplan-Monath' international e-mail distribution list in the U.S. and 20 other countries

Enhanced Zoonotic Disease Protection with Veterinary Medical collaboration

- Medical School & Veterinary Medical School curricula closely coincide -- basic sciences, medicine, surgery etc.
- Colleges of Veterinary Medicine and Veterinarians have traditionally concentrated clinical teaching and research activities toward zoonoses along with other animal diseases



... a multidisciplinary strategy to prevent, control, and, where possible, eliminate infectious diseases within a larger ecological context that includes humans, animals, and plants interacting in a complex, ever-changing natural environment.



Bioterrorism Biodefense Agroterrorism

Bioterrorism

Agents / Diseases

Most are Zoonoses

CDC Category A (Highest Priority)

- **Anthrax**
- **Botulism**
- **Plague**
- **Tularemia**
- **Viral Hemorrhagic Fevers**
- **Smallpox**

CDC Category B (2nd Highest)

- **Brucellosis**
- **Glanders**
- **Melioidosis**
- **Psittacosis**
- **Q Fever**
- **Typhus Fever**
- **Viral Encephalitis**
- **Toxins (Ricin, *C. perfringens*, *Staph. Aureus*)**
- **Others**

CDC Category C (3rd Highest)

- **Nipah**
- **Hantavirus**
- **West Nile Fever**
- **Hendra**
- **Rift Valley Fever**

Division of Vector-Borne Infectious Diseases

■ Mosquito-borne diseases

- West Nile virus
- Equine encephalitides
- Dengue fever
- Yellow fever
- Japanese encephalitis
- Chikungunya



■ Flea-borne diseases

- Plague



■ Tick-borne diseases

- Lyme disease
- Tularemia
- Relapsing fever
- Encephalitis



Division of Viral & Rickettsial Diseases

- **Special Pathogens**
 - Hantaviruses, Viral Hemorrhagic Fever and other high hazard viral pathogens
- **Prion disease, including CJD**
- **Poxvirus and Rabies**
 - Monkeypox, Smallpox, Rabies, Lyssaviruses



Tip of the iceberg!

- Cancer research...sharks rarely get it, spontaneous cancers (dogs etc.)



- Obesity in dogs...may shed light on human obesity problems
- Second hand smoke...animal exposures may advance knowledge of human exposure (AMA President quote)
- Others?

1996 Nobel Prize

Physiology or Medicine

Rolf M. Zinkernagel, MD, PhD and Peter C. Doherty, DVM, PhD

Knowledge / Basic Science Answers:

Discovered how the body's immune system distinguishes normal cells from virus-infected cells.

Combine Physician & Veterinarian
Immunologists: **Collaboration!**

Nobel Laureate Testimonial

Biomedical Research / Knowledge

March 23, 2007

Dear Dr. Kaplan,

I thank you for your kind e-mail of 13 March. You probably know that I am not a DVM but only an MD. Of course what you formulate in your letter is and has been always my conviction. Nevertheless I will first contact Peter Doherty [DVM, PhD] and ask him how we should proceed.

With best regards

Sincerely yours

Rolf Zinkernagel, [MD, PhD]

OTHERS: Smallpox Eradication Legend, D.A. Henderson, MD — AMA President, Ron Davis, MD, MS — CDC Director, Julie Gerberding, MD, MPH — Former U.S. Senate Majority Leader, Bill Frist, MD

Present & Former Surgeons General

Supporters of “One Health”

- General Gale S. Pollock, Acting Surgeon General of the U.S. Army
- Richard H. Carmona, MD, MPH, FACS
USPHS Surgeon General 2002-2006
- C. Everett Koop, MD, ScD
USPHS Surgeon General 1981-1989

Conclusions:

- The concept of “One Health,One Medicine” has been around for several centuries.
- Collaboration was considerable in the 18th and 19th centuries. It languished in the 20th century.
- The challenges of the 21st century demand that the different professions work together so we can reinvigorate “One Health”.
- **Implementation will protect and/or save untold millions of lives during our generation and in future generations!**

Please join us...



Contact:

Laura H. Kahn, MD, MPH, MPP

Bruce Kaplan, DVM

Thomas P. Monath, MD

bkapdvm@verizon.net

Laura H. Kahn, MD, MPH, MPP - Bruce Kaplan, DVM - Thomas P. Monath, MD



Laura H. Kahn, MD, MPH, MPP



Bruce Kaplan, DVM



Thomas P. Monath, MD