



**Veterinarians in
Federal and State Government:
Making a Difference in Public Health
Health**

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**And the Federal and State
Government Workforce Presentation Team**

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Public Health

“ is what we, as a society, do do collectively to assure the conditions in which people can be healthy.”

**Institute of Medicine, *The Future of Public Health*, 1988
1988**

10 Essential Public Health Services

◆ Assessment

- Monitor health status to identify community health problems
- Diagnose & investigate health problems & hazards in communities

◆ Policy Development

- Inform, educate, empower people about health issues
- Mobilize community partnerships to identify & solve health problems
- Develop policies & plans that support individual & community health efforts

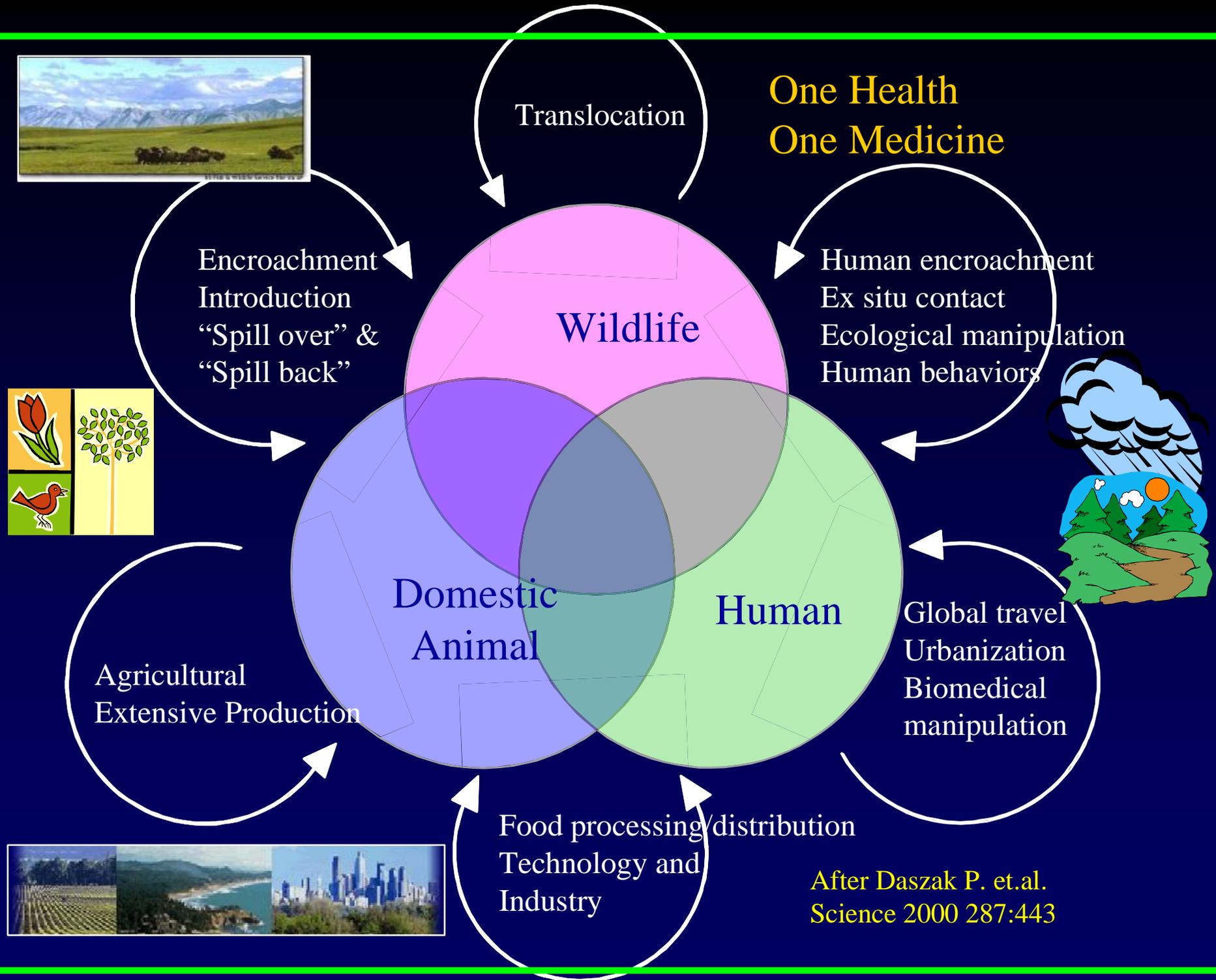
◆ Assurance

- Enforce laws and regulations that protect health and ensure safety
- Link people to needed personal health services; assure provision of health care when otherwise not available
- Assure a competent public health & personal health care workforce
- Evaluate effectiveness, accessibility, and quality of personal and population-based health services

◆ Serving all functions

- Research for new insights & innovative solutions to health problems

One Health One Medicine



Current “Hot” Issues

- ◆ One Health/One Medicine
- ◆ Threat of Pandemic Influenza
- ◆ Avian Influenza
- ◆ Transmissible Spongiform Encephalopathy (e.g., BSE)
- ◆ Natural / Intentional Emergencies
- ◆ Counter-terrorism; biologic, agricultural, nuclear
- ◆ Foodborne illness reduction
- ◆ Antimicrobial resistance
- ◆ Pet food contamination
- ◆ Shortage of food supply veterinarians
- ◆ Animal welfare, human slaughter and handling enforcement
- ◆ National Veterinary Medical Service Act
- ◆ Veterinary Workforce Expansion Act

Public Health Workforce

- ◆ Nurses
- ◆ Public health advisors
- ◆ Physicians
- ◆ Dentists
- ◆ PhDs
- ◆ MPHs
- ◆ Veterinarians
- ◆ Sanitary Engineers
- ◆ Industrial Hygienists
- ◆ Environmental Specialists
- ◆ Epidemiologists
- ◆ Laboratory Scientists
- ◆ Social Workers
- ◆ Health Educators
- ◆ Statisticians
- ◆ Information Technology
- ◆ Entomologists
- ◆ Lawyers
- ◆ Other

Current Professional Activity of U.S. Veterinarians



~ 3,000 Veterinarians Working in Public Health Health at the Federal and and State Levels

Veterinarians Working in Federal Government

Legislative Branch

Executive Branch

Legislative Branch

◆ Veterinarians who are Legislators

- Senator Wayne Allard, Colorado (current, retirement announced)
- Senator John Ensign, Nevada (current)
- Senator John Melcher, Montana (Retired)

◆ Veterinarians working on staff of representatives and senators

- AVMA and AAAS Congressional Science Fellows

U.S. Executive Branch Departments

Veterinarians Working in Public Health in Departments with Aqua Background

Health and
Human Services

State
USAID

Defense

Agriculture

Homeland Security

Interior

Justice

Energy

Environmental
Protection Agency

Labor

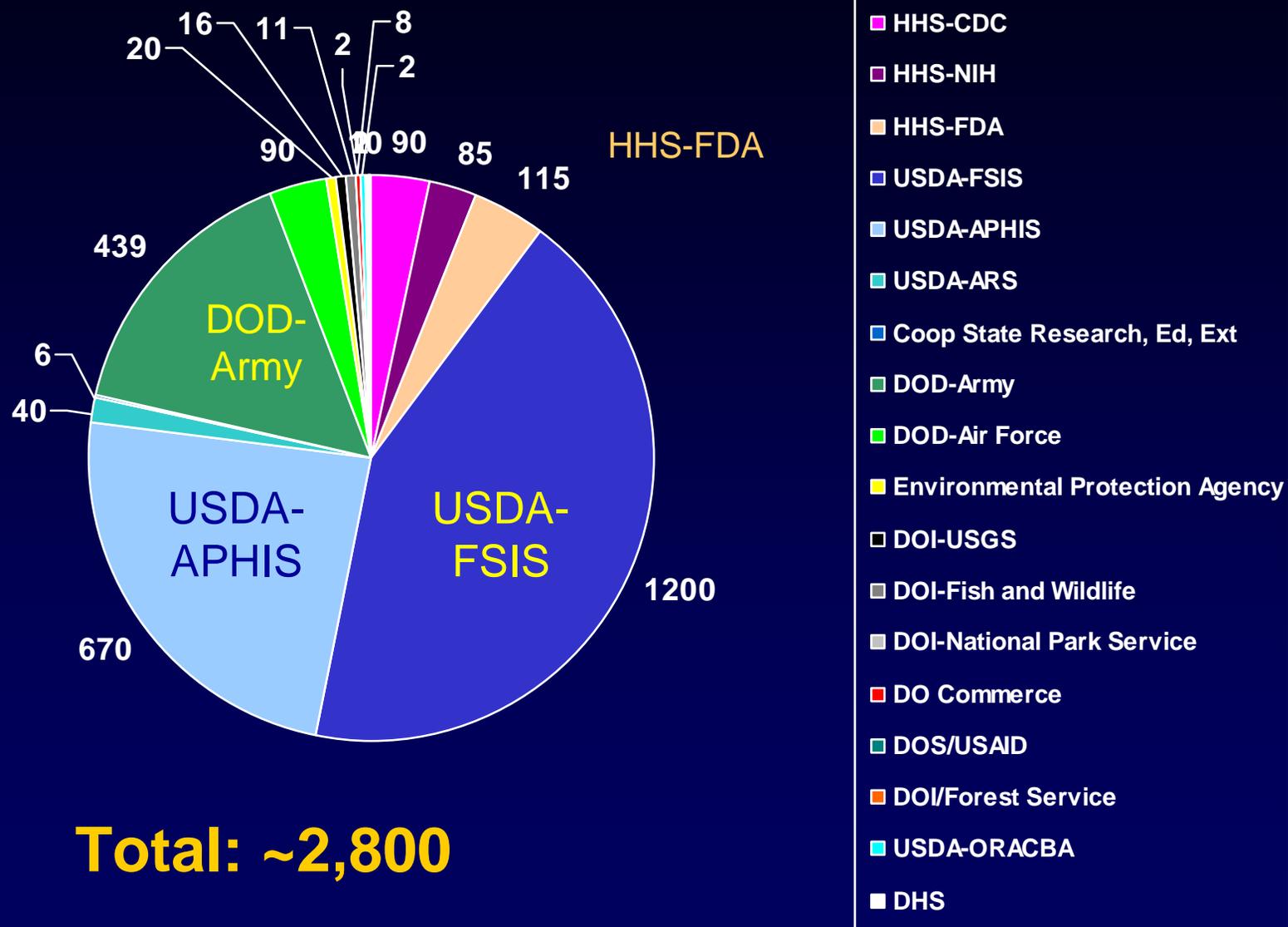
Transportation

Housing and Urban
Development

Commerce

Veterans Affairs

Public Health Veterinarians in the Federal Government



Roles and Responsibilities of Veterinarians Working in Public Health at Federal and State Levels

- ◆ **Elected Officials and Other Policymakers**
- ◆ **Program managers**
 - **Disease surveillance, disease and injury prevention and control, research, outbreak investigation, emergency preparedness, response, etc.**
- ◆ **Researchers, Research Coordinators**
- ◆ **Scientific advisors**
- ◆ **Epidemiologists**
- ◆ **Laboratory scientists (Microbiologists, pathologists, etc.)**
- ◆ **Risk assessment analysts**
- ◆ **Toxicologists, Biologists**
- ◆ **Foreign animal disease diagnosticians, response**
- ◆ **Other**

Areas of Responsibility for Veterinarians Working in Public Health at Federal and State Levels

- ◆ Food safety and defense
- ◆ Food animal disease control
- ◆ Emerging diseases/zoonoses prevention and control
 - Human health programs
 - Environment, Wildlife health, Domestic animal health, Human Interface
- ◆ Immunization programs
- ◆ Environmental/ecosystem health
 - Toxicology, Contaminants, Wildlife Health
- ◆ Emergency response (human and animal)
- ◆ Bio and Agro Terrorism
- ◆ Outbreak Investigation
- ◆ Health promotion
- ◆ Injuries
- ◆ Occupational Health
- ◆ Drug effectiveness and safety
- ◆ Research and research animal care
- ◆ Domestic and global health
- ◆ More

Skill Sets Required

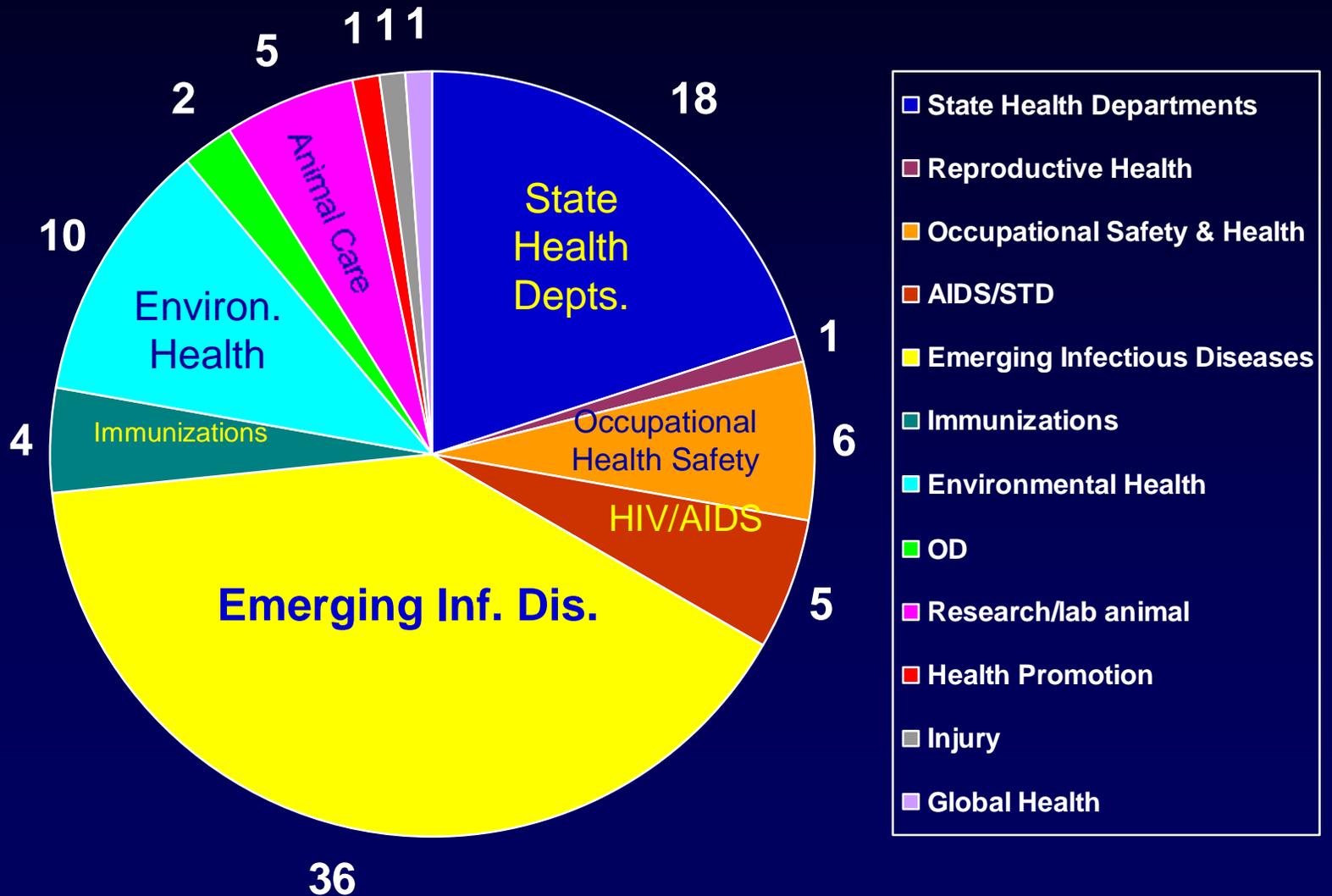
- ◆ Leadership, management skills
- ◆ Working successfully as part of a team
- ◆ Technical competence – subjects vary with topic/agency
 - Epidemiology, public health, (risk) assessment, evaluation, toxicology, environmental health, food safety, emerging infectious diseases and zoonoses, animal emergency response, clinical experience, pathology, biological and chemical preparedness and defense, laboratory animal medicine, information technology, research methods, more
- ◆ Additional degrees and/or board certification
 - MPH, MS, MPVM, PhD, Dr.PH, other
 - Preventive Medicine, Laboratory Animal Medicine, Toxicology
- ◆ Public speaking and writing
- ◆ Interpersonal skills
- ◆ Getting the job done

Personnel Systems

- ◆ **Civil Service**
- ◆ **Commissioned Corps of US Public Health Service**
- ◆ **Military Services**
- ◆ **Fellows**
- ◆ **Contractors**

Special Issue: Low pay that undervalues veterinarian knowledge and expertise

Veterinarians at CDC (April, 2007)



Total: ~90

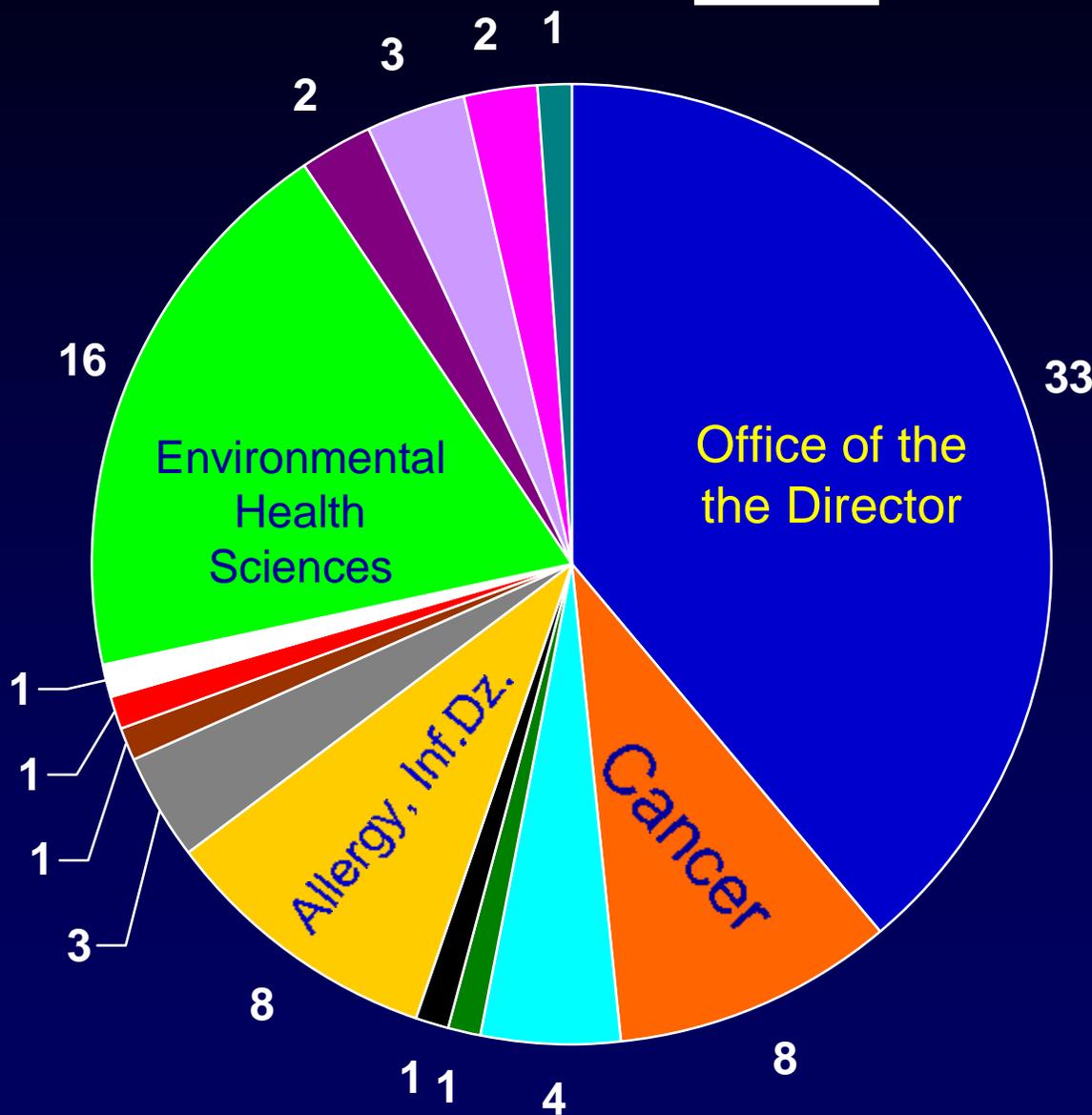
Veterinarians in Health and Human Services - CDC

- ◆ **Center Director**
- ◆ **Center, Division, Branch Assoc. Directors/Chiefs**
- ◆ **Epidemiologists**
- ◆ **Laboratory scientists**
- ◆ **Liaisons from USDA (APHIS, FSIS) stationed at CDC**
- ◆ **EIS Officers**
- ◆ **Fellows**
- ◆ **Laboratory Animal Care Veterinarians**

Activities of Veterinarians at CDC

- ◆ Program leadership and management
- ◆ Policy development
- ◆ Disease and injury prevention, control, elimination, eradication – domestic and international
- ◆ Outbreak investigations
- ◆ Environmental risk assessment
- ◆ Epidemiologic studies / public health research
- ◆ Bio-, chemical terrorism, emergency public health preparedness
- ◆ Infection control
- ◆ Program evaluation
- ◆ Laboratory science
- ◆ Training
- ◆ Laboratory animal medicine, animal care

Veterinarians at NIH 2004



- Office of Director
- Cancer
- Heart, Lung, Blood
- Aging
- Alcohol Abuse
- Allergy & Infectious Diseases
- Child Health & Human Development
- Eye
- Arthritis, Musculoskeletal, Skin Dz
- Dental, Craniofacial research
- Environmental Health Sciences
- Mental Health
- Neurological Disorders & Stroke
- Human Genome Research
- Diabetes, Digestive, Kidney Diseases

Total: ~ 85

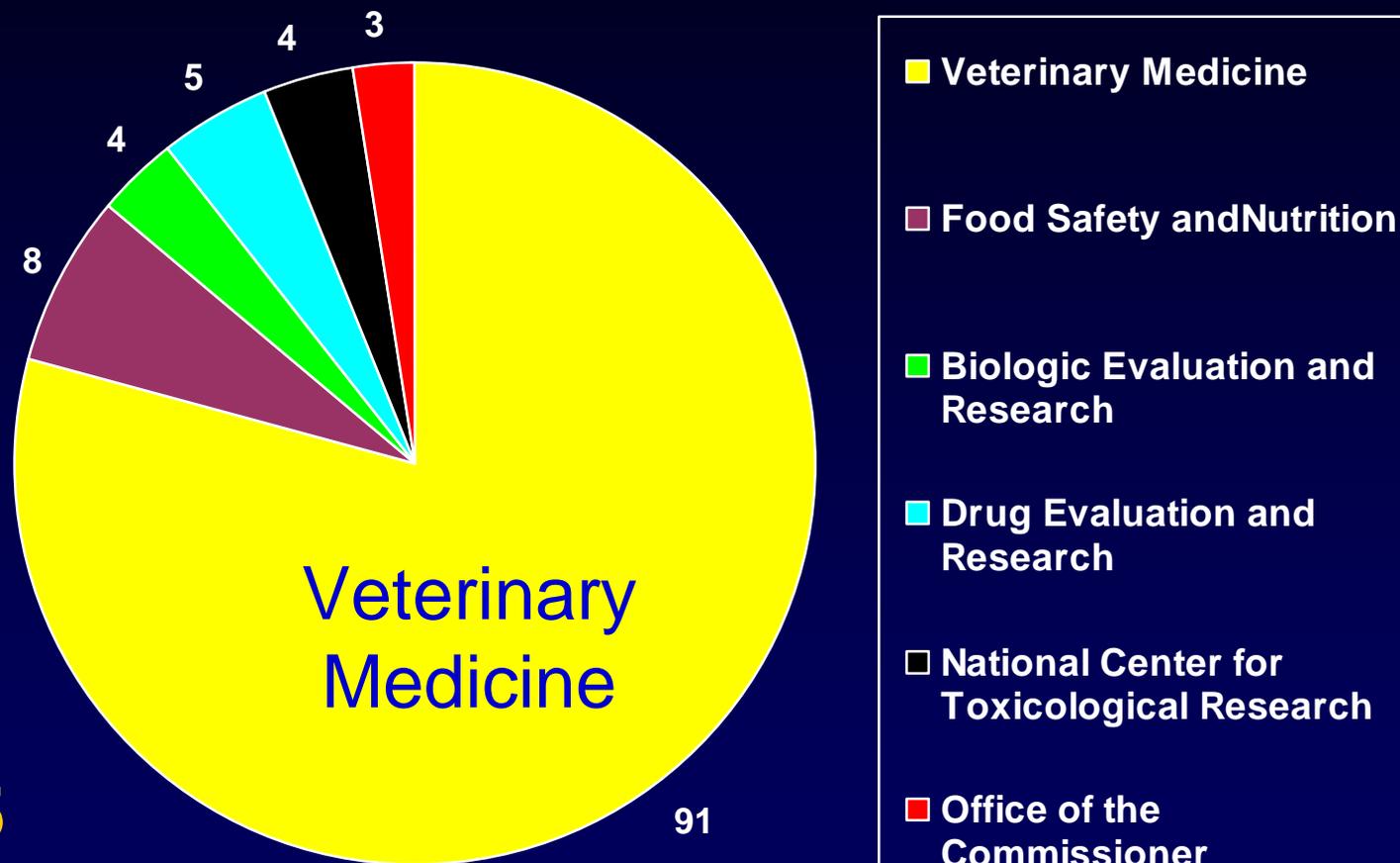
Veterinarians in Health and Human Services - NIH



- ◆ Research animal care
- ◆ Animal care and use, animal welfare
- ◆ Laboratory animal medicine and surgery
- ◆ Epidemiologists/program directors
- ◆ Toxicology
- ◆ Veterinary/comparative pathology

Veterinarians at FDA

April, 2007



Total: 115



U.S. Food and Drug Administration



Veterinarians in Health and Human Services - FDA

- ◆ Policy, planning, budgeting
- ◆ New animal drug review/approval
- ◆ Surveillance for animal health/adverse drug reactions; antibiotic resistance
- ◆ Veterinary pathologists, epidemiologists
- ◆ Laboratory animal medicine



U.S. Food and Drug Administration

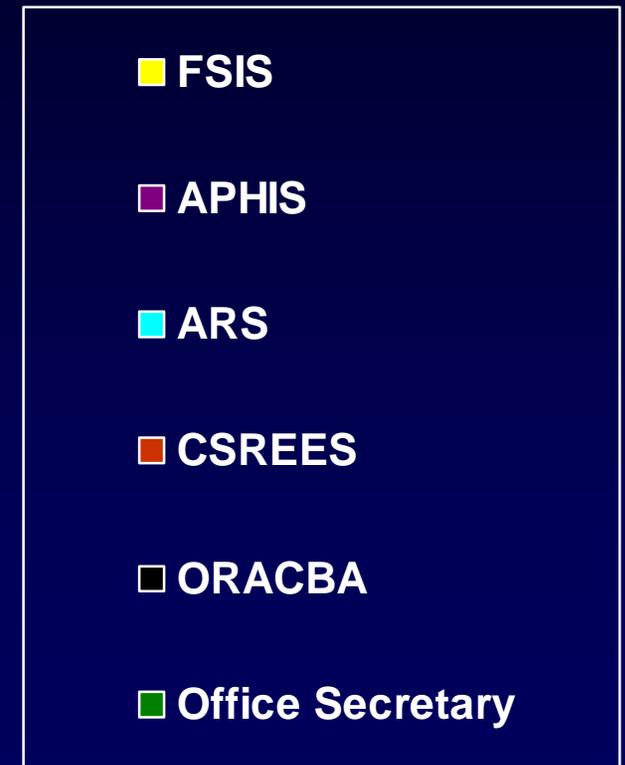
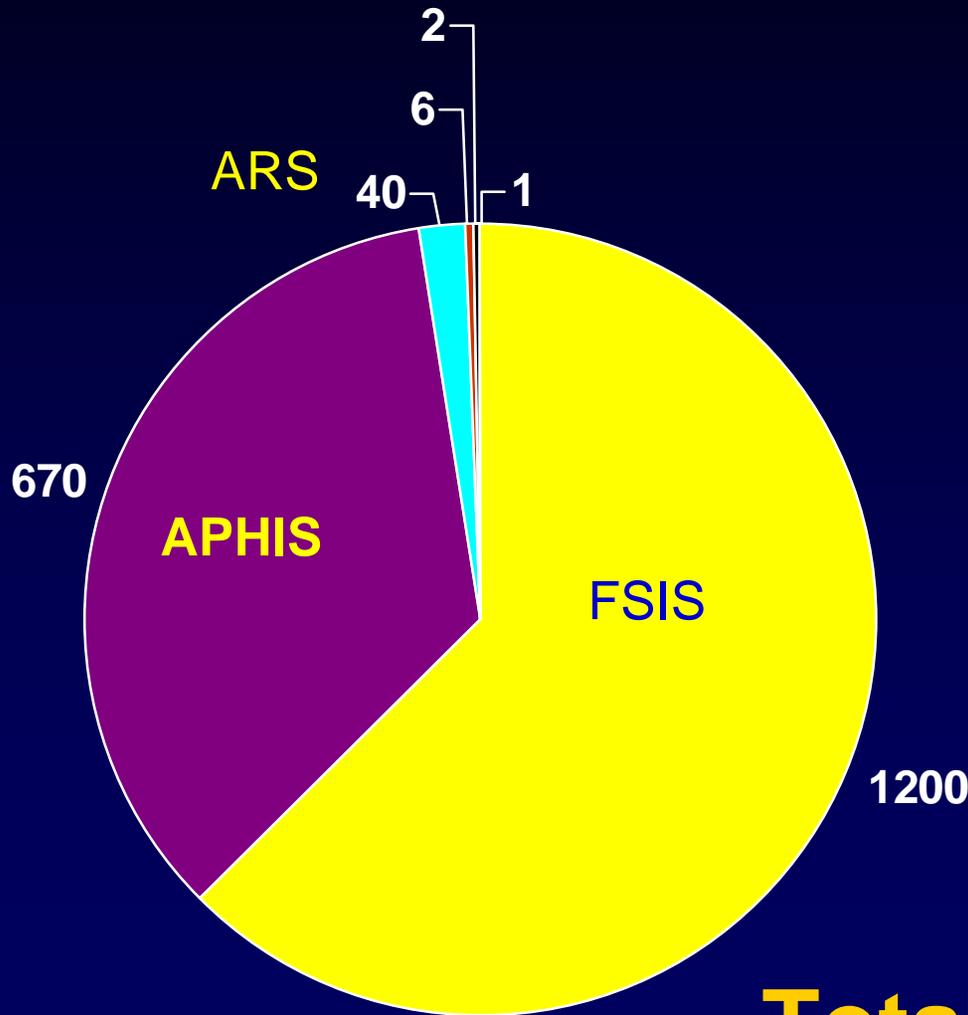


FDA's Center for Veterinary Medicine

◆ “Using science and law to protect public and animal health”

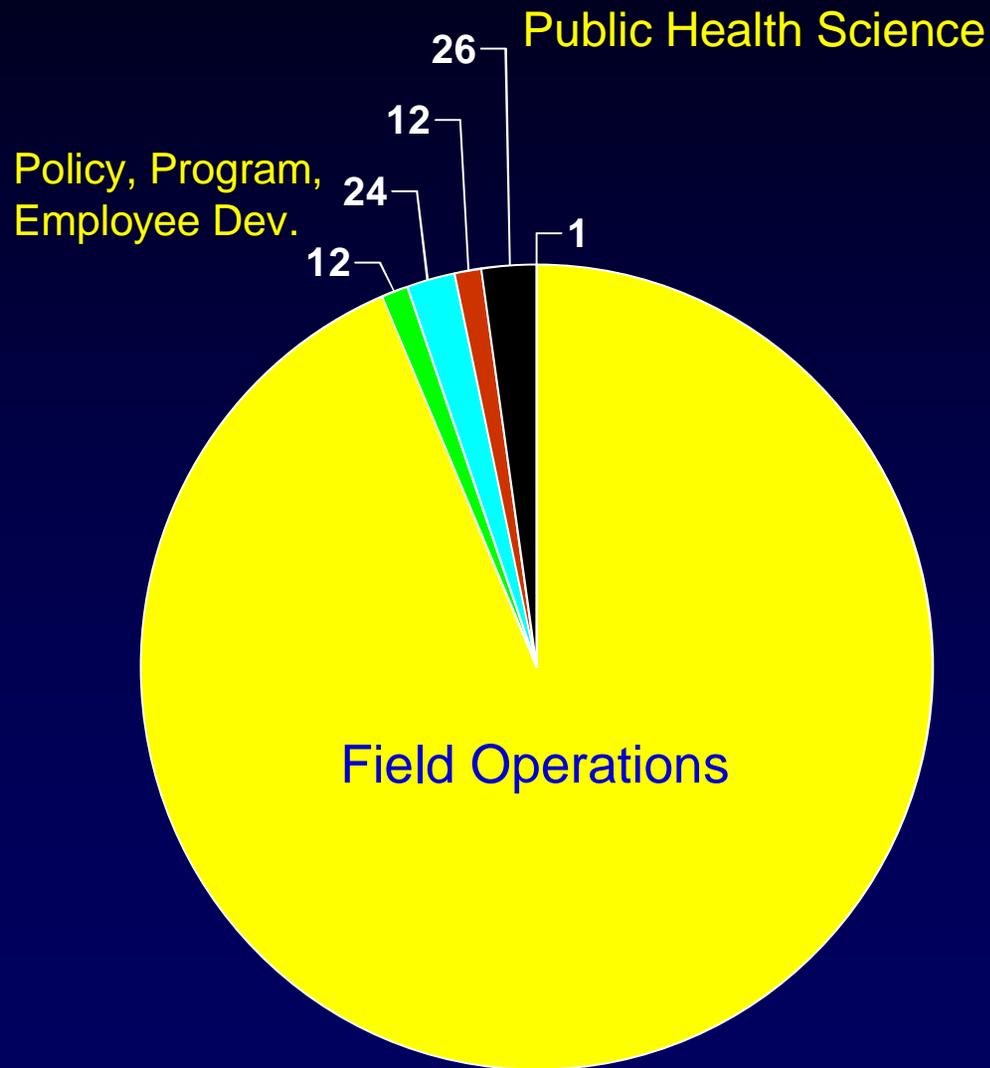
- Approves safe and effective products for animals
- Enforces applicable provisions of the Federal Food, Drug, and Cosmetic Act & other authorities
- Animal drug review, compliance-related actions, post-approval monitoring, animal feed safety
- Surveillance for antibiotic resistance of food borne bacteria
- Guidance for preventing antimicrobial resistance resulting from use of antimicrobial drugs in animals
- Development of screening tests for drug residues in meat and milk
- Research to support animal drug approvals

Veterinarians in USDA (April, 2007)



Total: ~ 1,900

Veterinarians in USDA- FSIS (April, 2007)



- Field Operations
- International Affairs
- Policy, Program, Employee Development
- Program Evaluation, enforcement, review
- Public Health Science
- Public Affairs, Education, Outreach

Total: ~ 1,200

Public Health Veterinarians in USDA- FSIS

“Protecting public health through food safety and defense”

- ✦ Ensures meat, poultry, and egg products are safe, wholesome, unadulterated, properly labeled & packaged
- ✦ Field Opportunities
 - Regulatory oversight /front-line supervision in slaughter & processing plants; District office managers, technical; Humane handling & slaughter specialists; Trainers; Laboratory services
- ✦ International Public Health Assessment and Policy
 - International food safety coordination; Participation in Codex Alimentarius
- ✦ Scientific public health policy, assessment/technical support
 - Oversee, monitor, evaluate meat, poultry, egg product public health hazards from farm-to-table
 - Trace-back, laboratory, environmental, & food safety assessments assessments in support of foodborne illness / outbreak investigations

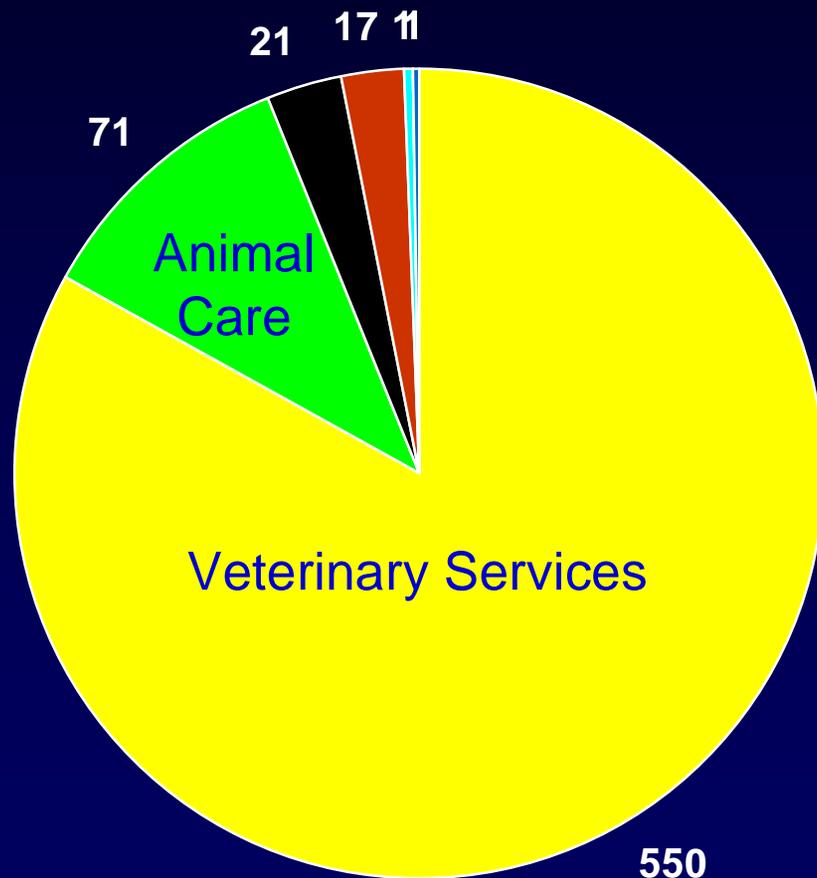


USDA- FSIS

- ◆ **Field public health veterinarians, epidemiologists, supervisors and program managers, risk analysts, toxicologists, biologists, scientific advisors, research coordinators, and more**

- ◆ **Expanded public health assurance duties**
 - **Assess food safety systems in plants**
 - **Identify & evaluate production system safeguards affecting chemical, physical, & microbiological hazards**
 - **Conduct residue sampling & testing for violative drugs & other chemical hazards**
 - **Analyze data to determine adequacy of food safety system controls & prevent adulteration with pathogens**
 - **Assist with recalls of adulterated meat & poultry products**
 - **Oversee & enforce requirements for humane handling and slaughter of livestock & GMPs for poultry**
 - **Outreach to educate public, producers, & regulated industry**

Veterinarians in USDA- APHIS (April, 2007)



Total: ~670



Veterinarians in USDA – APHIS

Protects and promotes US agricultural health, administers the Animal Welfare Act, carries out wildlife damage management activities

Veterinary Services: Protects and improves the health, quality, marketability of US animals, animal products, and veterinary biologics by

- Preventing, controlling, and/or eliminating zoonotic and animal diseases
- Directing national programs to eradicate selected animal diseases
- Coordinating national animal health emergency preparedness and management
- Ensuring the safe import of animals, animal products, biologics
- Certifying animals, animal products, veterinary biologics for export
- Diagnosing foreign and domestic animal diseases
- Monitoring animal health and conducting surveillance for animal diseases of US livestock and poultry
- Managing key activities in laboratory network



Veterinarians in USDA – APHIS

- ◆ **Biotechnology Regulatory Services Unit:** Develops appropriate regulatory policies, to address today's biotechnology issues and challenges
- ◆ **Animal Care:** Provides leadership in establishing acceptable standards of humane animal care and treatment; monitors and promotes compliance with Animal Welfare Act
 - Inspections of laboratories housing research animals; dog breeding facilities, zoos, horse shows, amusement parks
 - Education and cooperative efforts
- ◆ **Wildlife Services:** Provides Federal leadership in managing problems caused by wildlife



Veterinarians in USDA – APHIS

- ✦ **International Services:** Reduces threats to US agriculture
 - Cooperates in major surveillance, disease eradication, and control programs in foreign countries
 - Stationed in 27 countries on 6 continents to ensure safe entry of animals and animal products into the US & assist with US agricultural product exports
- ✦ **Plant Protection and Quarantine:** Safeguards agricultural and natural resources from risks with entry, establishment, or spread of animal and plant pests and noxious weeds.
 - Work in ports to screen products for diseases/pests that could put US agriculture at risk



Veterinarians in USDA – APHIS

✦ Skills and experience of staff

- Clinical experience, exams, diagnosis, necropsy, sample collection
- Foreign Animal Diseases
- Epidemiology
- Investigation methods
- Threat and risk assessment
- Disease surveillance
- Disease control
- Leadership



Veterinarians in USDA – ARS

- ◆ **U.S. Scientific research agency for solving agricultural problems of national importance**
 - **National Programs in Food Animal Production, Animal health, Arthropod Pests of Animals and Humans, Aquaculture, Human Human Nutrition, Food Safety**
 - **Program Components: Pathogen detection, microbial genomics, epidemiology of disease, host pathogen interactions, genetic resistance to disease, disease control strategies, animal immunology, mechanisms of disease**
 - **Initiatives: biodefense, zoonotic disease, respiratory diseases, reproductive/neonatal disease, enteric diseases, parasitic diseases, TSEs**
 - **8,100 people; 2,100 scientists (~40 veterinarians = ~ 1.9% of 1.9% of scientists)**

USDA - CSREES, ORACBA

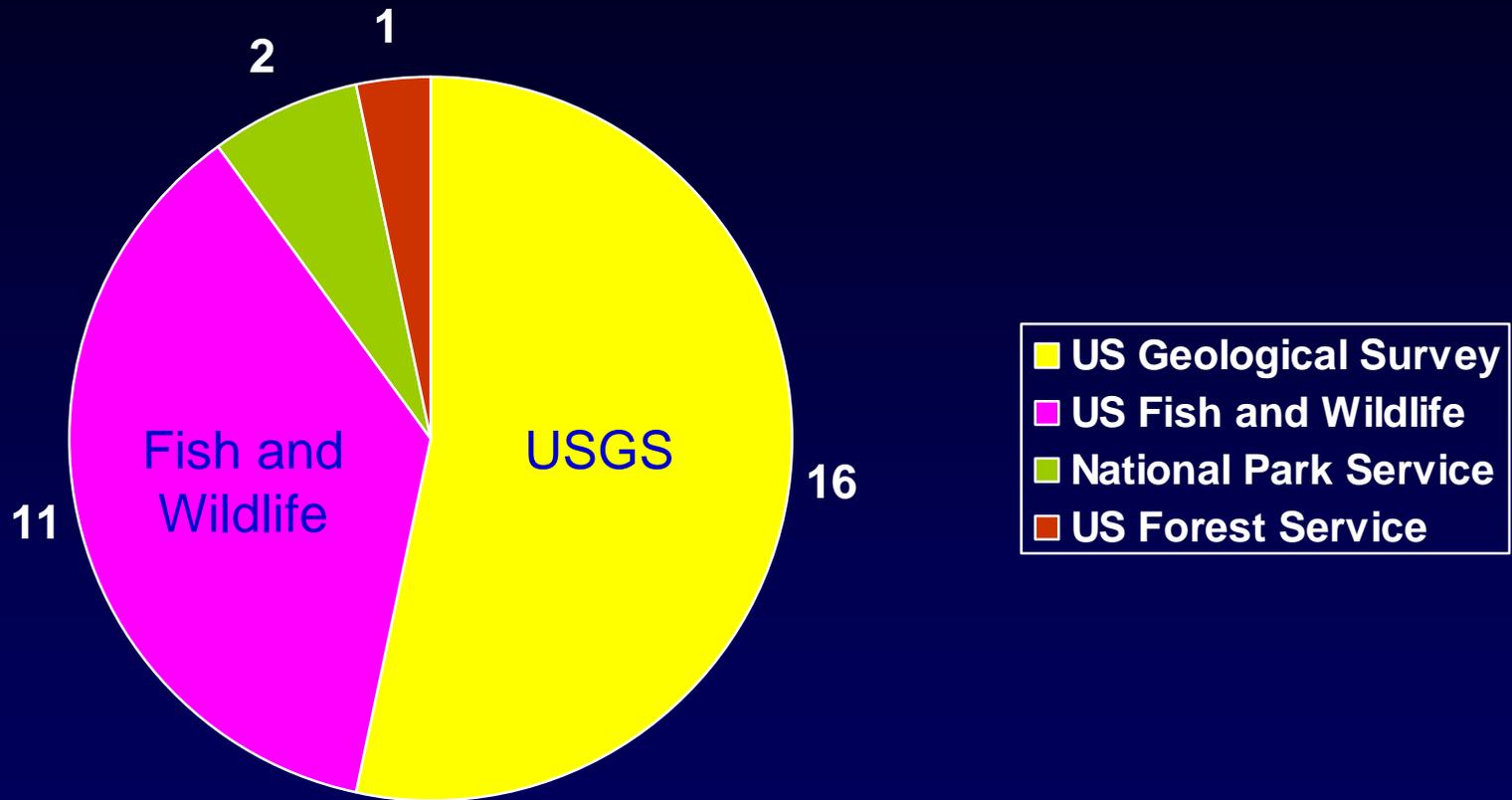


✦ **Cooperative State Research, Education, Extension Service (CSREES) – 4**

- **Supports research, education, extension in Land Grant Universities and partners**
- Agricultural & Food Biosecurity
- Agricultural Systems
- Animals & Animal Products
- Biotechnology & Genomics
- Economics & Commerce
- Families, Youth & Communities
- Food, Nutrition & Health
- Natural Resources & Environment
- Pest Management
- Plants & Plant Products
- Technology & Engineering

✦ **Office of Risk Assessment and Cost Benefit Analysis (Economics) - 2**

Veterinarians in the Department of Interior (April 2007)



Total: 30

Veterinarians in the Department of Interior: US Geological Survey -- National Wildlife Health Center

**Assesses the impact of disease on wildlife and
the role of pathogens in contributing to wildlife losses**

- ◆ **Wildlife policy**
- ◆ **Wildlife health assessments**
- ◆ **Wildlife mortality investigations (including laboratory diagnosis)**
- ◆ **Infectious and zoonotic disease research**
- ◆ **Studies of diseases endangered species**
- ◆ **Assessment of interactions between environmental contaminants and agents**
- ◆ **Wildlife disease surveillance**
- ◆ **Wildlife Disease Information Node**
- ◆ **Wildlife Vaccine Development**
- ◆ **DOI liaison to DHS**
- ◆ **Legal cases for FWS Law Enforcement, Forensics, Endangered Species Reintroduction and Recovery**

Skill Sets of Veterinarians in the USGS, National Wildlife Health Center

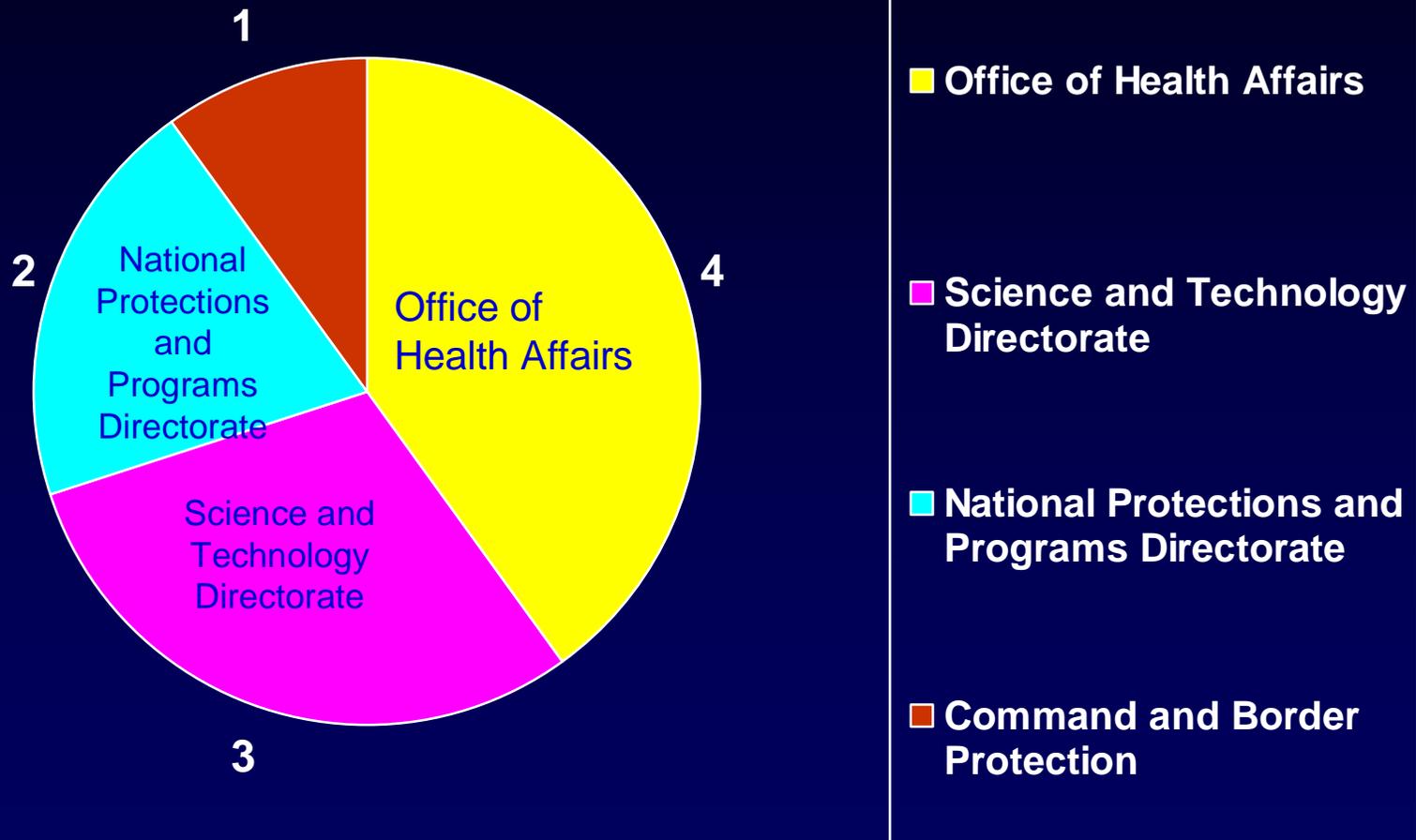
- ✦ **Clinical expertise – diseases of wildlife**
- ✦ **Pathology**
- ✦ **Ecology, environmental health**
- ✦ **Epidemiology**
- ✦ **Assessment, evaluation**
- ✦ **Research methods**
- ✦ **Information Technology**
- ✦ **Laboratory sciences**
- ✦ **Leadership, management**
- ✦ **Other**

Veterinarians in the Department of Interior: US Fish and Wildlife Service

Conserves, protects, and enhances fish and wildlife and their habitats for the continuing benefit of the American people.

- ◆ **Natural Resources, Conservation, planning, policy**
- ◆ **Migratory Bird Management, Habitat Conservation**
- ◆ **Fish and Wildlife Management and Habitat Restoration**
- ◆ **Endangered Species – classification, conservation**
- ◆ **International Affairs**
- ◆ **Law Enforcement**
- ◆ **National, Regional, State Offices**

Veterinarians in the Department of Homeland Security



Total: 9 (CBP recruiting as of June 2007)

Veterinarians in the Environmental Protection Agency (EPA)



- Research and Development
- Pesticide Programs
- Pollution Prevention and Toxic Substances
- Air, Standards, and Quality
- Environmental Response Team
- Ecosystems Protection, Remediation, Region 8
- Environmental Assessment, Region 10
- Other Environmental Programs

Total: 20 (As of June 2004)

Veterinarians in EPA

◆ Risk assessment and evaluation

- Superfund sites, Eco-toxicological (metals, antimicrobials, sludge borne, water and food borne pathogens)

◆ Policy analysis, development

◆ Emergency response

- CCRF, environmental contamination

◆ Research into adverse health effects of air, drinking water water and terrestrial pollution

◆ Research animal care

◆ Zoonotic diseases and associated public health risks

- Concentrated Animal Feeding Operations, prions, expert witnesses

◆ Methods development

Veterinarians in Department of Commerce

- ✦ Program Director for Marine Animal Health and Stranding Response Program**
- ✦ Co-Director Cooperative Center for Marine Animal Health Health**
- ✦ Clinical veterinarians for Woods Hole Aquarium**
- ✦ Pathology of sea turtle diseases, seabirds, marine mammals**
- ✦ Event response, stranding network**
- ✦ Arctic monitoring and assessment, hypoxia and harmful algal blooms, outbreak investigation, epidemiology, policy and regulatory, congressional Marine Mammal Protection Act, biotoxins, chemical contaminants, pollution, emerging infectious/zoonotic diseases**

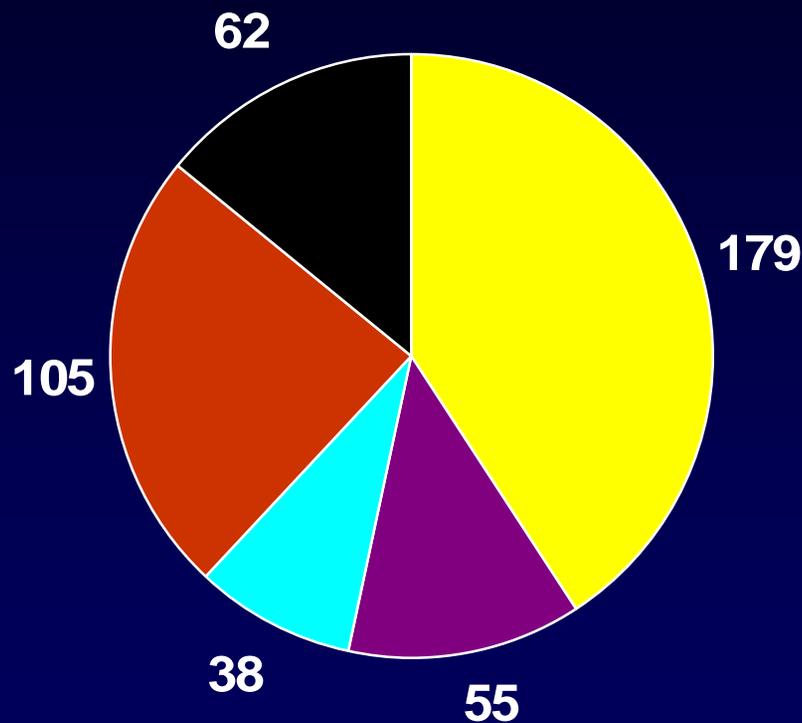
Veterinarians in the Air Force



- ✦ ~ 90 veterinarians
- ✦ Deputy Command Surgeon for the US Southern Command. Policymaker for all US military forces in Central and South America, re humanitarian missions, pandemic flu preparedness, mass casualty response, etc.
- ✦ Public health officers
- ✦ Traditional public health functions
- ✦ Medical intelligence, deployment health support, decontamination of chemical/biological/radiological casualties, food safety
- ✦ Additional training offered/recommended—epidemiology, toxicology, food safety
- ✦ MPH important

Veterinarians in the Army

Total: 439 active duty (As of July 2006)
2006)



- Veterinary Positions
- Staff Positions
- Command Positions
- Research and Development
- AMEDD Student Detachment/ Military Schools

Veterinarians in the Army

(439 active duty, 167 Army Reserve, 13 National Guard)

✚ Veterinary Positions

- Veterinary laboratories
- DoD Military Working Dog Center
- Veterinary Treatment Facilities
- Caisson Horses (Fort Myers)
- Deployable/overseas units
- Special Forces Units



Veterinarians in the Army



✦ Research and Development

- AFIP
- AFRRRI
- Air Force
- CIS
- IDC
- MMRC
- Navy
- NRL
- USAMRIID
- USUHS
- WRAIR

✦ Army Medical Department Student Detachment/Military Schools

- Residencies
- Fellowships
- Advanced Civilian and Military Schooling

Department of State

(Past– Currently none in 2007)

- ✦ **One veterinarian, Entry through AAAS Fellowship**
- ✦ **Biodiversity and Foreign Affairs Officer, Oceans and International Environmental and Scientific Affairs, Office of Ecology and Terrestrial Conservation**
- ✦ **DVM, MS in Natural Resources Ecology**
- ✦ **Coordinator, Convention on Biological Diversity (CBD)**
- ✦ **Developed U.S. positions in international for CBD**
- ✦ **Lead action officer for invasive species, liaison to the National Invasive Species Council**
- ✦ **Raised awareness, promoted international collaboration through workshops**
- ✦ **Worked on bush meat, wildlife trafficking, and interface between wildlife disease and public health**

Veterinarians Working at the State Level

Governor

State Public Health Veterinarians

State Veterinarians

State Wildlife Veterinarians

Laboratory Animal Veterinarians

State Public Health Veterinarians

Veterinarians



- ✦ 37 designated state public health veterinarians
 - Many more working in state health departments
- ✦ Main link between human, agriculture, wildlife health
- ✦ Surveillance, prevention, control of zoonotic diseases
- ✦ Disease outbreak investigation
- ✦ Bioterrorism, emergency response

State Public Health Veterinarians

✦ 37 designated State Public Health Veterinarians

- States Without: AL; CO; DE; IA; MD; ME; MT; NV; SD; RI; RI; UT; WA; WY

✦ ~75 Employed by State Public Health Departments

✦ States with Veterinarians in Health Departments

- Texas (6)
- California (5)
- New York (4) One with NYC
- GA; NC; SC; VA (3)
- ID; IN; MI; MN; NJ; WI; CO; FL; NJ, WA (2)
- AK; AZ; AR; CT; HI; IL; KS; LA; MD; MA; MO; NE; NH; NM; NM; OH; OK; OR; PA; TN; VT; WV; WY (1)

Other Veterinarians Working in State Health Departments

- ◆ State Epidemiologist
- ◆ Deputy State Epidemiologist
- ◆ Chief, Division of Communicable Disease Control
- ◆ Assistant State Public Health Veterinarian
- ◆ Assistant State Epidemiologist Supervisor, Foodborne, Vectorborne, and Zoonotic Diseases Unit
- ◆ Deputy State Public Health Veterinary Director, Division of Environmental Health
- ◆ Laboratory Animal Medicine, Laboratory Research

What State Veterinarians Do--

- ✦ Provide leadership on animal health issues
- ✦ Manage animal health program development and implementation
- ✦ Coordinate with USDA APHIS Veterinary Services to implement national animal health programs
- ✦ Communicate to public and others on animal health issues
- ✦ Have supervisory authority
- ✦ Build / maintains partnerships
- ✦ Establish and maintain relationships with key legislators

Guidelines and Publications: National Association of State Public Health Veterinarians (see at www.nasphv.org)

- ◆ *Compendium of Animal Rabies Prevention and Control, Control, 2007*
- ◆ *Compendium of Veterinary Standard Precautions: Zoonotic Disease Prevention in Veterinary Personnel, Personnel, 2006*
- ◆ *Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, 2006*
- ◆ *Compendium of Measures To Control Chlamydophila Chlamydophila psittaci Infection Among Humans (Psittacosis) and Pet Birds (Avian Chlamydiosis), 2006*
2006

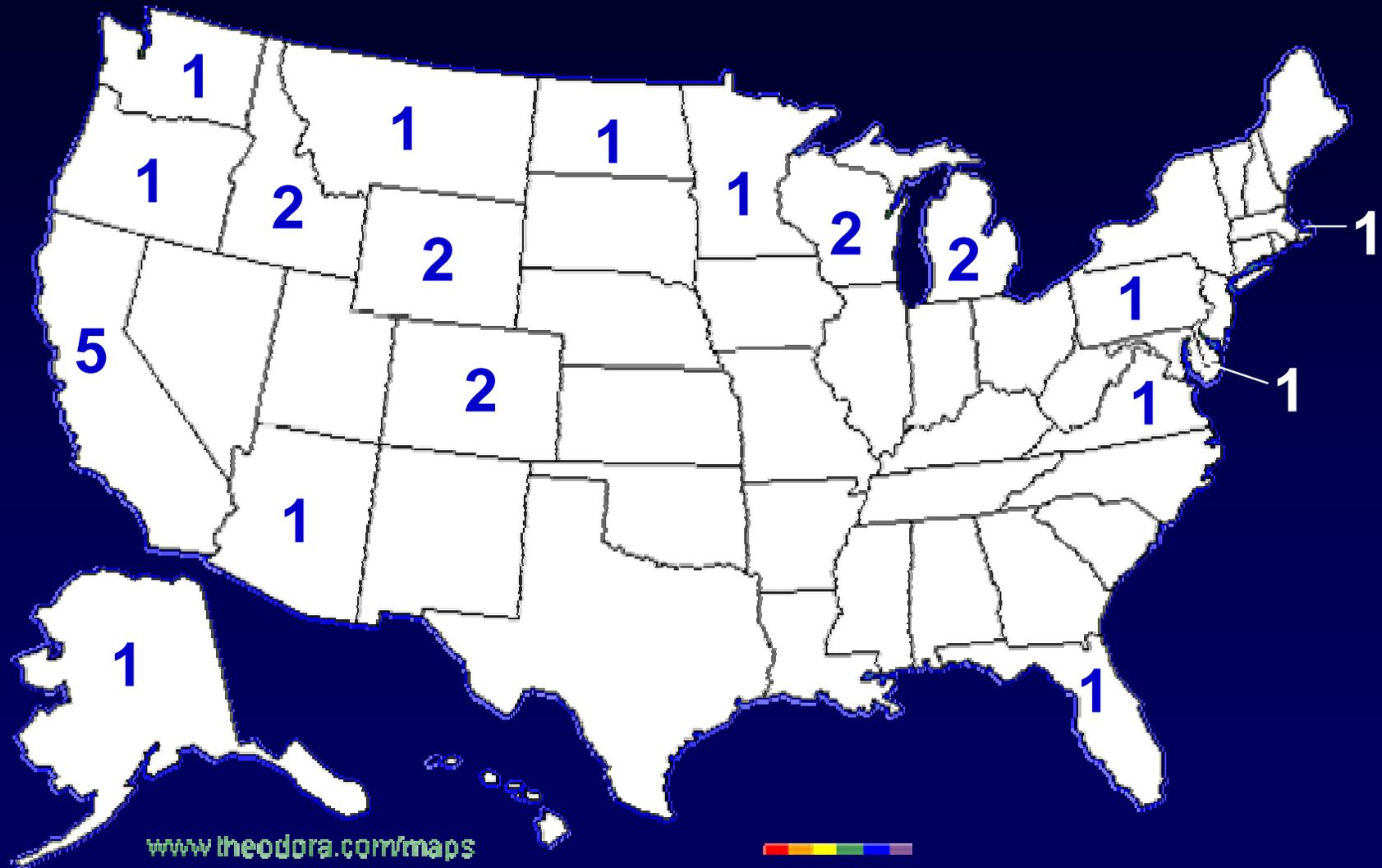
State Veterinarians (Chief state agricultural animal health officer)

- ◆ Provide leadership on animal health issues
 - Disease eradication
 - Animal health
 - Emergency preparedness, response and recovery
 - Emerging diseases
 - Food safety
 - Public health
 - Animal welfare
 - International trade
- ◆ Coordinate with USDA APHIS Veterinary Services to implement national animal health programs
- ◆ Communicate to public & others on animal health issues
- ◆ Establish and maintain relationships with key legislators

Wildlife Veterinarians

- ✦ **17 States with Wildlife Veterinarian**
 - 27 Full-time State Employees
 - 20-25 contract veterinarians
 - ~100 total working for both State and Federal government (More if (More if count academia)
- ✦ **Provide leadership on wildlife health issues**
- ✦ **Conduct disease surveillance at livestock-wildlife-human interface**
 - CWD, vector borne diseases, bacterial, viral and parasitic diseases, and nutritional deficiencies, etc.
- ✦ **Institute population-based wildlife disease interventions**
- ✦ **Design and conduct wildlife health studies**
- ✦ **Provide science-based recommendations on wildlife and disease issues and policies to agency decision-**

State Employee Wildlife Veterinarians 2006



Experience Required – Wildlife Veterinarians

- ✦ **Experience in livestock production and/or management and disease ecology and epidemiology of wildlife.**
- ✦ **Familiarity with the most significant domestic and foreign animal diseases of poultry and livestock and knowledge of the potential role that wildlife might play in the epidemiology of such diseases.**
- ✦ **Communication skills**
- ✦ **Undergraduate or graduate training in wildlife ecology and management would be preferred.**
- ✦ **Experience in animal capture and chemical is preferred but not mandatory.**
- ✦ **Experience with training, community outreach, livestock industry, public**

Veterinarians working in public health at the Local Level

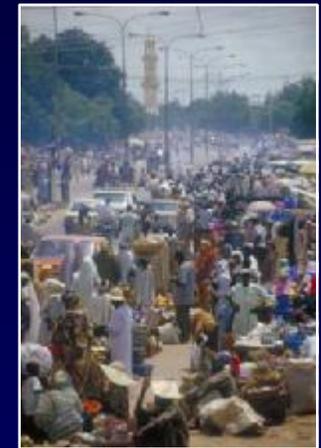
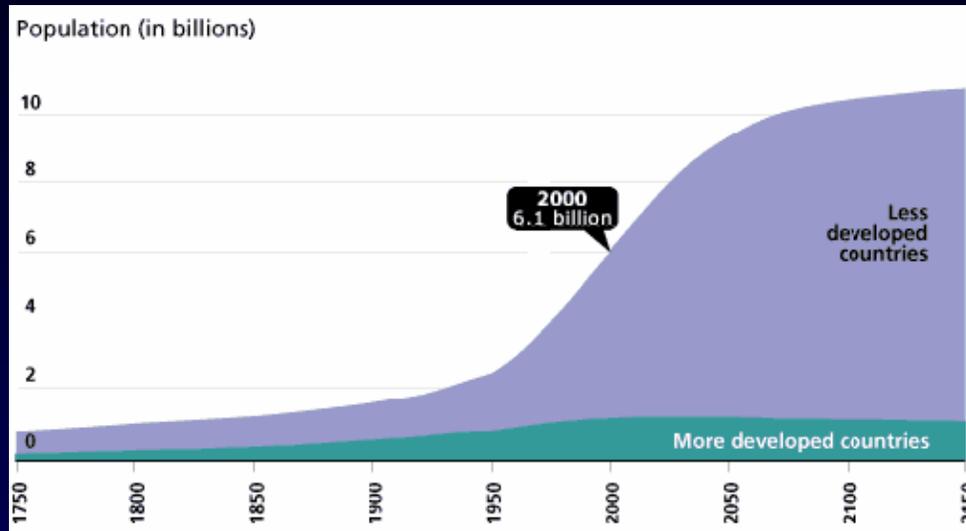
✚ Practitioners

- Zoonotic disease and animal bite prevention, diagnosis, treatment, counseling**
- Early detection of unusual disease events (natural occurrence, bioterrorism, agroterrorism)**
- Disease surveillance**
- Animal health emergency readiness, response**
- Surge capacity for human emergency response (expertise, facilities, laboratory)**
- Client education**
- Risk communication**

**What About the Future
for One Health??**

Increasing and Urbanizing Human Population

Source: United Nations, *World Population Prospects, The 1998 Revision*; and estimates by the Population Reference Bureau.



- ◆ 6.1 Billion people in 2000
- ◆ ~9.4 to 11.2 Billion in 2050
- ◆ Urbanization: 47% 2000; 60% 2003

Encroachment on Animal Habitat



**“By Leaps and
Bounds,
Monkeys
Overrun Japan”**
Story by James
Brooke, NY Times,
April 12, 2002

- ✦ Human population expanding into changing and overlapping wildlife habitat
- ✦ Increasing human interaction with domestic and wild/exotic animals

Changing Lifestyles



- ✦ With increased urbanization, changing family relationships, increased reliance on pet cats, dogs, dogs, birds, etc. for companionship

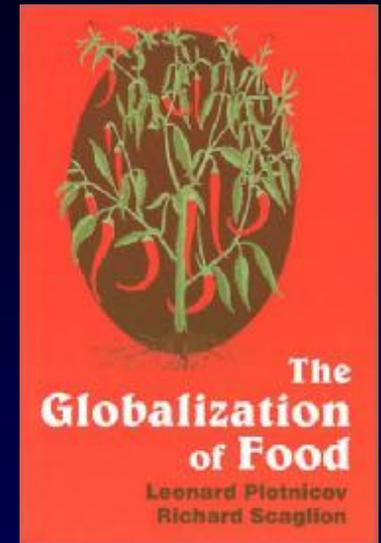
Changing Climates and Ecosystems

Increasing Vector/Host Populations



- ◆ Changing climates and ecosystems
- ◆ Deforestation; reforestation; drought
- ◆ Dam building, irrigation
- ◆ Contaminated surface water
- ◆ Increases /changes in arthropod vector populations and their resistance to insecticides
- ◆ Increases in rodents and rodent contact

Globalization of the Food Supply



- ◆ Changes in livestock management (intensification, antibiotic use, rendering changes, conditions ↑ rodents)
- ◆ Free-trade agreements
- ◆ Centralized processing of food

More and Faster Global Travel

Displaced Human and Animal Populations

- ✦ Increasing international travel and trade, civil wars, political unrest, famines, human-made and natural disasters
- ✦ Increasing movement of people and animals



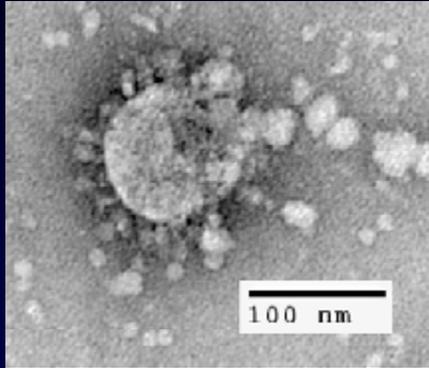
Human Behavior



✦ Human behaviors

- Consumption of bush meat/wildlife
- Wild animal game ranches
- Exotic wildlife as pets
- Translocation of wildlife

Microbial Adaptation and Change



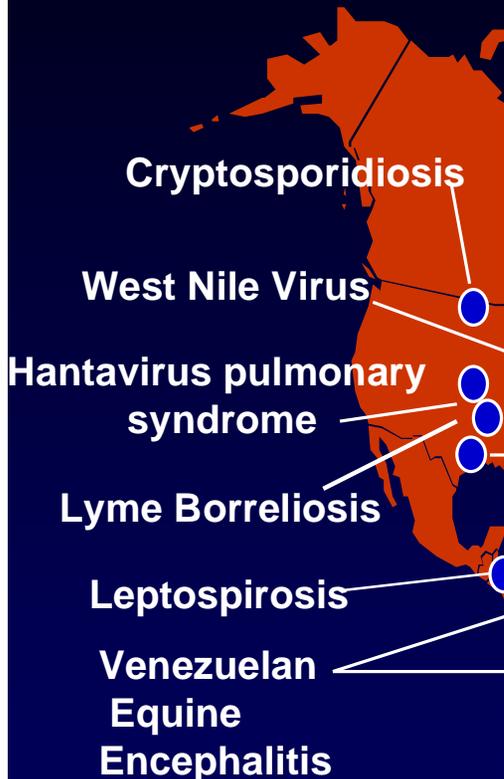
Coronavirus
Particle



Influenza Virus

- ✦ Survival strategies
- ✦ Selection, mutation, recombination

Emerging and re-emerging zoonoses, 1996–2006 (Source: WHO)



Recent outbreaks

Influenza / Madagascar

CCHF / Afghanistan, Iran

Tularemia / USA, Kosovo

Yellow fever / Ivory Coast

Brucellosis / Mongolia

E. coli 0157 / Canada

Hantavirus / US

BSE-vCJD/ UK

Nipah virus / Malaysia/Bangladesh

Avian Influenza / Hong Kong

West Nile / USA, Canada

Ebola / Gabon, Congo

BSE /Canada

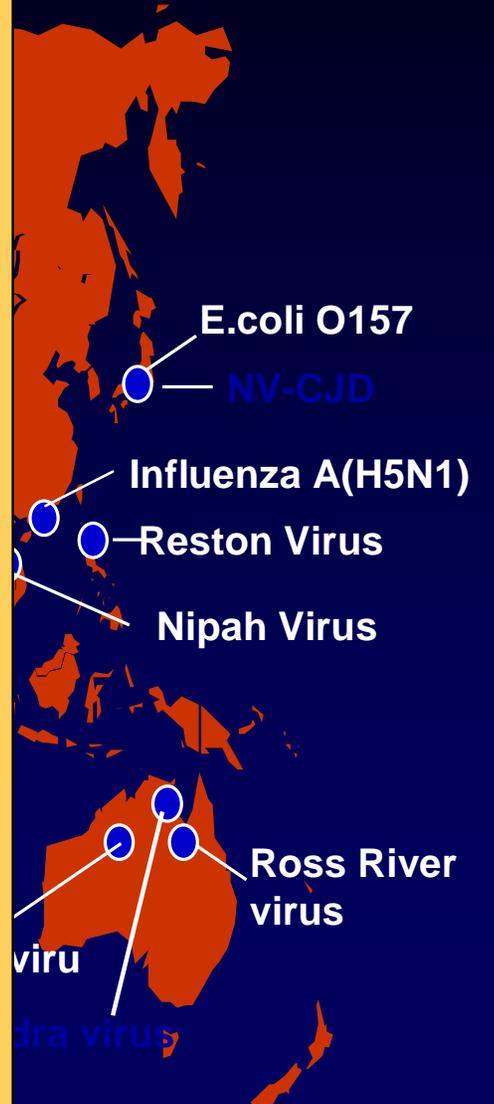
Monkeypox / DRC/ US

SARS / Global

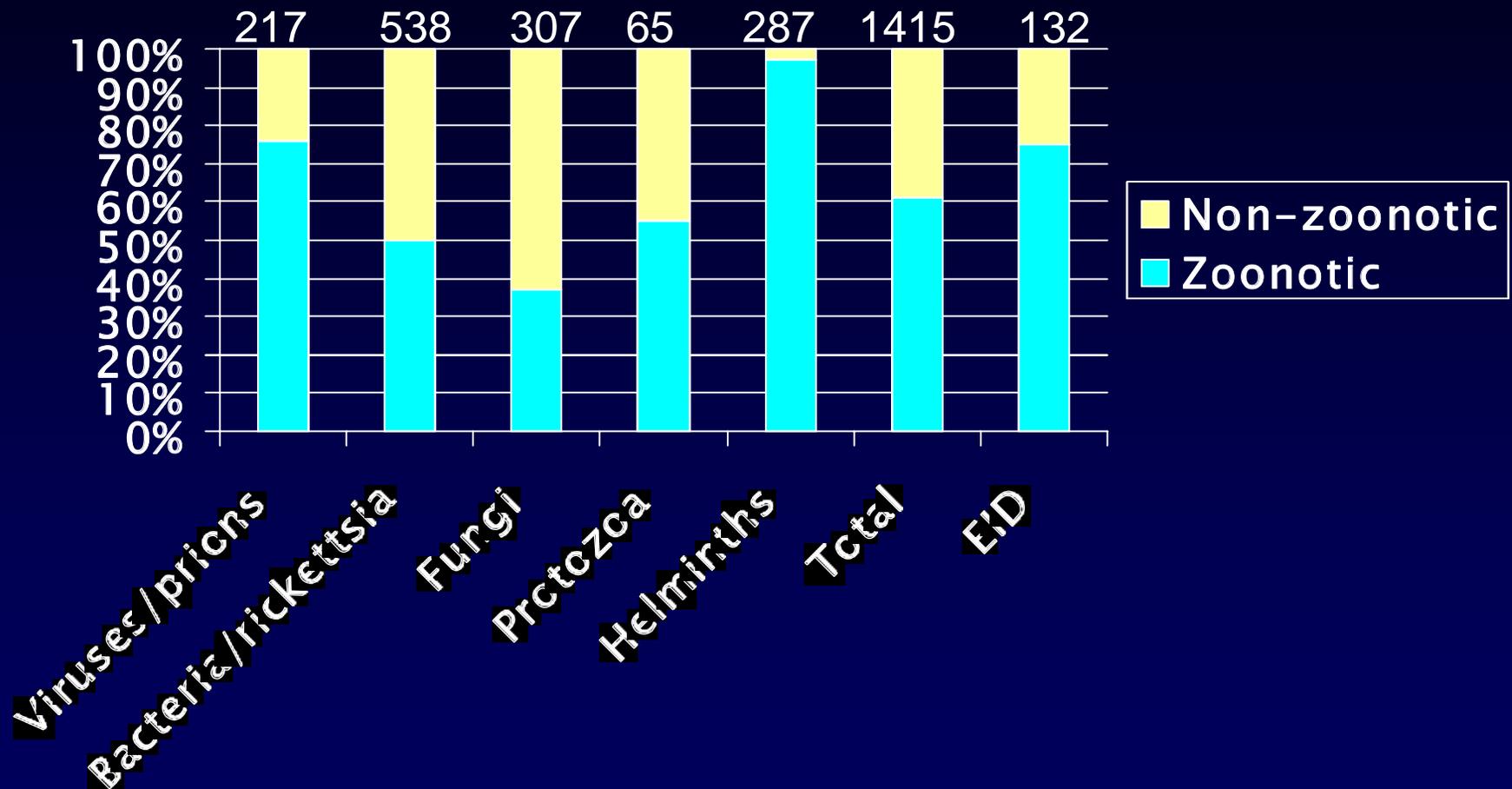
Avian Influenza H5N1/Asia

Strep suis type 2/China

Japanese Encephalitis/India



Infectious Organisms Pathogenic to Humans and Percent Zoonotic



Source, Taylor LH et al. 2001; *Phil. Trans. R. Soc. Lond. B.* Vol. 356:983-989

Agents of Bioterrorism

Category	Bacteria, Rickettsia, Toxins	Viruses	Total (% Zoonotic)
A	Anthrax; Botulism; Plague; Tularemia	Smallpox Viral Hemorrhagic Fevers	6 (83%)
B	Brucellosis; Epsilon toxin of <i>C. perfringens</i> ; Glanders; <i>Staphylococcus</i> , enterotoxin B; Q Fever		5 (80%)
C	Multidrug-resistant tuberculosis	Hantaviruses; Nipah virus; Tickborne encephalitis viruses; Yellow Fever	4 (80%)

A Strong Future for One Health

- ✦ Changing climates and ecosystems, with increasing vector populations
- ✦ Encroachment on animal habitat
- ✦ Changing human lifestyles with animals
 - Human behaviors
- ✦ Globalization of the food supply; threat of agro-terrorism
- ✦ More and faster global travel
- ✦ Civil unrest/war – displaced people and animals
- ✦ Microbial adaptation and change (Influenza!)
- ✦ >80% of bio-threat agents of concern are zoonotic

Summary

- ◆ Shortages in veterinarians working in public health exist at all levels (State, Federal, International) across all areas
- ◆ Exciting career opportunities exist across the health spectrum at Federal, State, Local levels
- ◆ Veterinarians currently comprise ~ 0.5% of U.S. public health workforce
- ◆ Veterinarians working in public health surpass the number labeled “public health veterinarians”
- ◆ Veterinarians work in public health positions not exclusively designated for veterinarians
- ◆ The shortage of veterinarians in the public health workforce is acute and growing given trends
- ◆ More veterinarians are needed!
 - Replace gaps left by retirements
 - New opportunities

Summary, Continued

- ✦ Training of veterinarians must emphasize leadership, communication, the spectrum of public health and the roles of veterinary medicine and other disciplines, working on teams, interpersonal skills, *in addition to technical competencies*
- ✦ Entry to or advancement in the workforce often requires advanced education (i.e., MPH, MPVM) and/or board certification in a specialty
- ✦ FSIS, USDA, CDC offer training programs that are important entry points
 - New Hire Training at FSIS
 - Veterinary Services Career Program at VS/APHIS
 - EIS Program at CDC
- ✦ **Low pay that undervalues veterinarians working in public health must be addressed**

The ASPH – AAVMC Partnership

“ Public health is what we, as a society, do collectively to assure the conditions in which people can be healthy.”

Institute of Medicine, The Future of Public Health, 1988

“Human health provides the most logical unifying or unifying or apical cause in veterinary medicine’s medicine’s hierarchy of values”

Dr. Calvin Schwabe, Veterinary Medicine and Human Health, 1984, Visionary and Proponent of One Medicine