

# Common Avian Diseases in a Pastured Poultry Environment

A photograph of two chickens in a grassy field. In the foreground, a black and white speckled chicken is facing left. Behind it, a white chicken is facing forward. The background is a lush green field.

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UC Davis School of Veterinary Medicine, Cooperative  
Extension  
Marin Pastured Poultry Workshop  
October, 29<sup>th</sup> 2013

# Questions?



# Background

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## Work Experience

Faculty Member: Cooperative Extension, UC Davis School of Veterinary Medicine

Veterinarian: California Department of Food and Agriculture

Science Fellow: California Council on Science and Technology, California State Senate (Energy Committee)

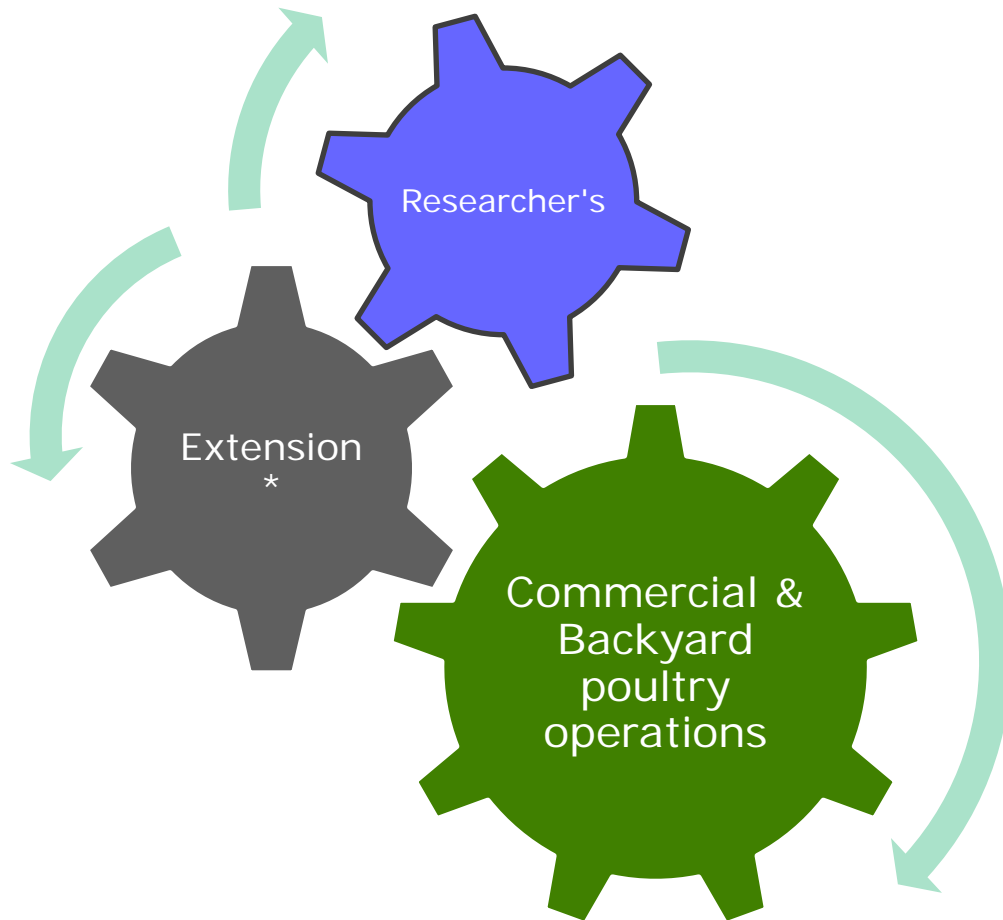
Staff Scientist: Lawrence Livermore National Laboratory (Chemical & Biological National Security Program)

## General Research Interests

- Application of classical & spatial epidemiology and statistical modeling in disease surveillance and food safety
- Food safety epidemiology
- Food safety applications of “Next-Gen” Sequencing
- “Sustainable” poultry production
- Science based policy



# What is Extension?



## Mission Statement:

Using UC Research capabilities to help deliver healthy food systems, environments and communities

- 200 locally based CE advisors and specialists
- 57 local offices
- 130 campus based CE specialists
- 9 research and extension centers
- 700 academic researchers

\* Extension specialists, researchers and Farm Advisors

<http://ucanr.edu/>

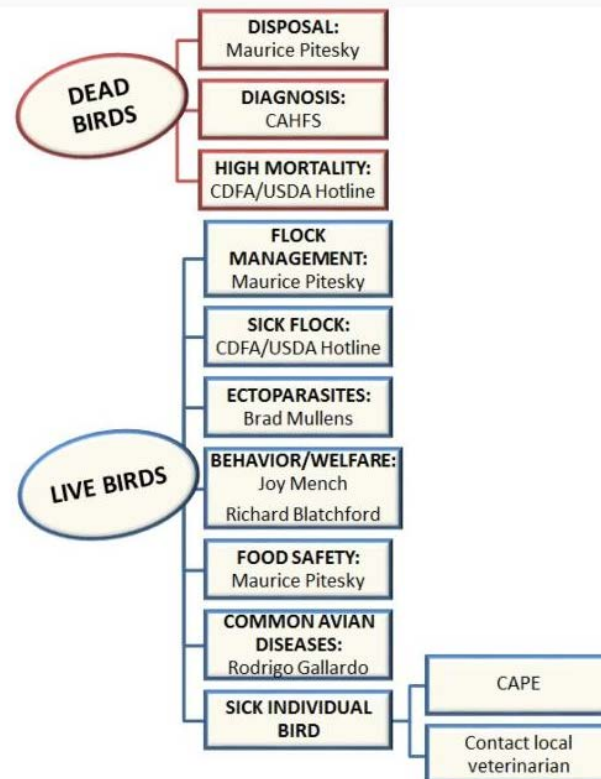
# New UCCE Poultry Website

The screenshot shows the UCCE Poultry website interface. At the top, there is a navigation bar with 'SHARE', 'EMAIL', 'PRINT', and 'SITE MAP' options. The main header features the UCCE logo and the text 'University of California Cooperative Extension Poultry'. A large image of a white chicken with a red comb is visible. Below the header, there are navigation tabs for 'About Us', 'Newsletters', and 'Who to Contact'. A sidebar on the left contains a 'Home' section with links to 'Production Type', 'Avian Diseases', 'Disease Prevention', 'Food Safety', and 'Additional Resources'. The main content area has a 'Welcome, poultry ent' heading and a paragraph stating 'This website is designed to help...'. Below this, there is a list of links: 'Backyard Poultry', '"Micro-Commercial" (Small-S', 'Commercial Production', 'Common Avian Diseases', and 'and more!'. At the bottom of the main content area, there is a small image showing eggs and a chicken. On the right side of the screenshot, there is a section titled 'Who to Contact in Case of Poultry Issues:' with a sub-heading '(See below flowchart for contact information.)'. The flowchart is a tree diagram with two main categories: 'DEAD BIRDS' and 'LIVE BIRDS'. 'DEAD BIRDS' branches into 'DISPOSAL: Maurice Pitesky', 'DIAGNOSIS: CAHFS', and 'HIGH MORTALITY: CDFA/USDA Hotline'. 'LIVE BIRDS' branches into 'FLOCK MANAGEMENT: Maurice Pitesky', 'SICK FLOCK: CDFA/USDA Hotline', 'ECTOPARASITES: Brad Mullens', 'BEHAVIOR/WELFARE: Joy Mench and Richard Blatchford', 'FOOD SAFETY: Maurice Pitesky', 'COMMON AVIAN DISEASES: Rodrigo Gallardo', and 'SICK INDIVIDUAL BIRD'. The 'SICK INDIVIDUAL BIRD' category further branches into 'CAPE' and 'Contact local veterinarian'.

<http://ucanr.edu/sites/poultry/>

## Who to Contact in Case of Poultry Issues:

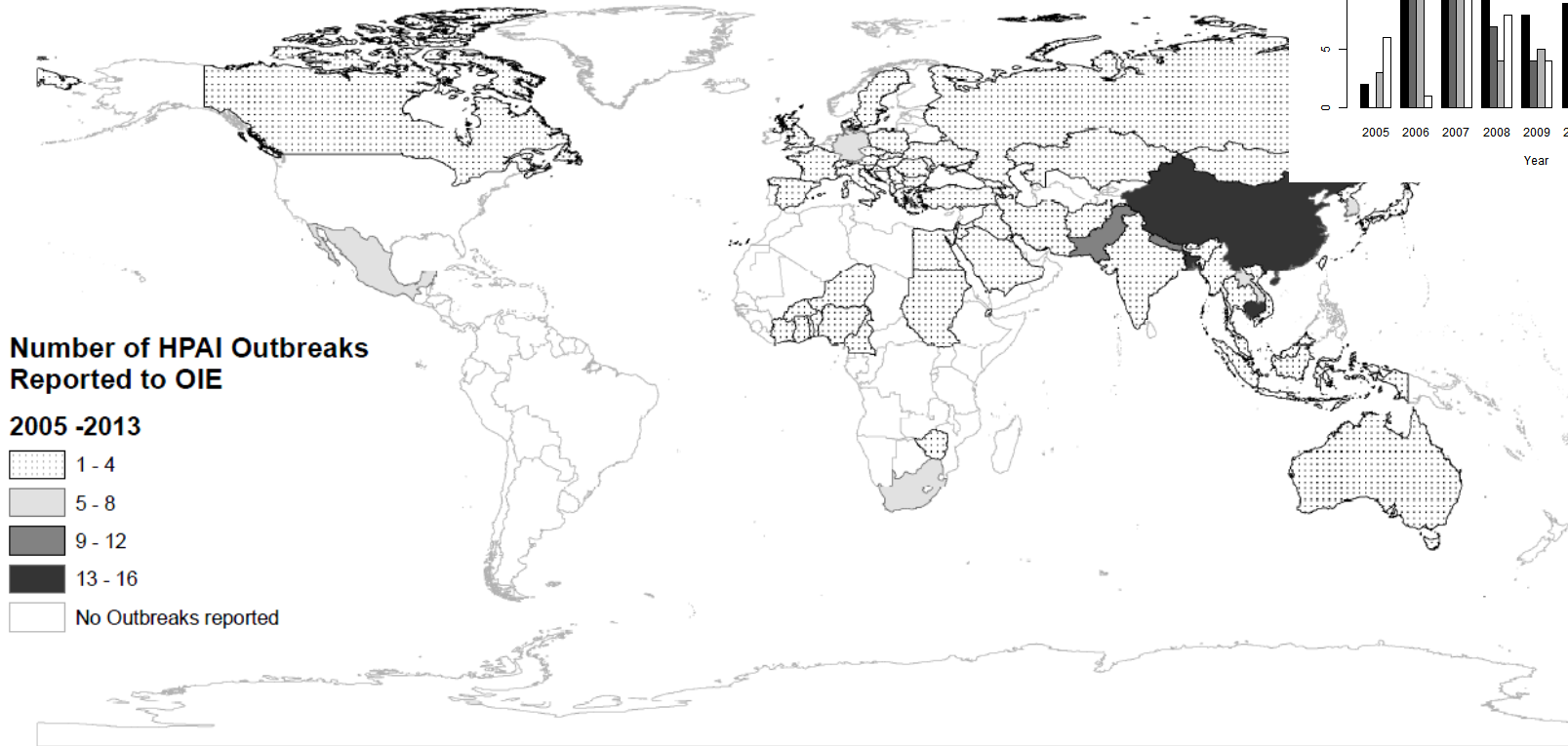
(See below flowchart for contact information.)



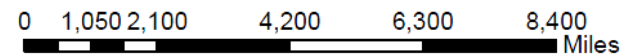
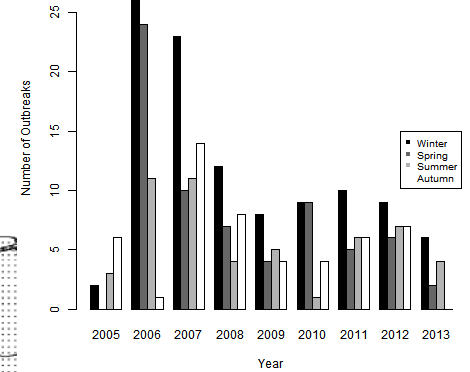
# Avian Influenza

# Highly Pathogenic Avian Influenza

## Number of HPAI Outbreaks reported to OIE

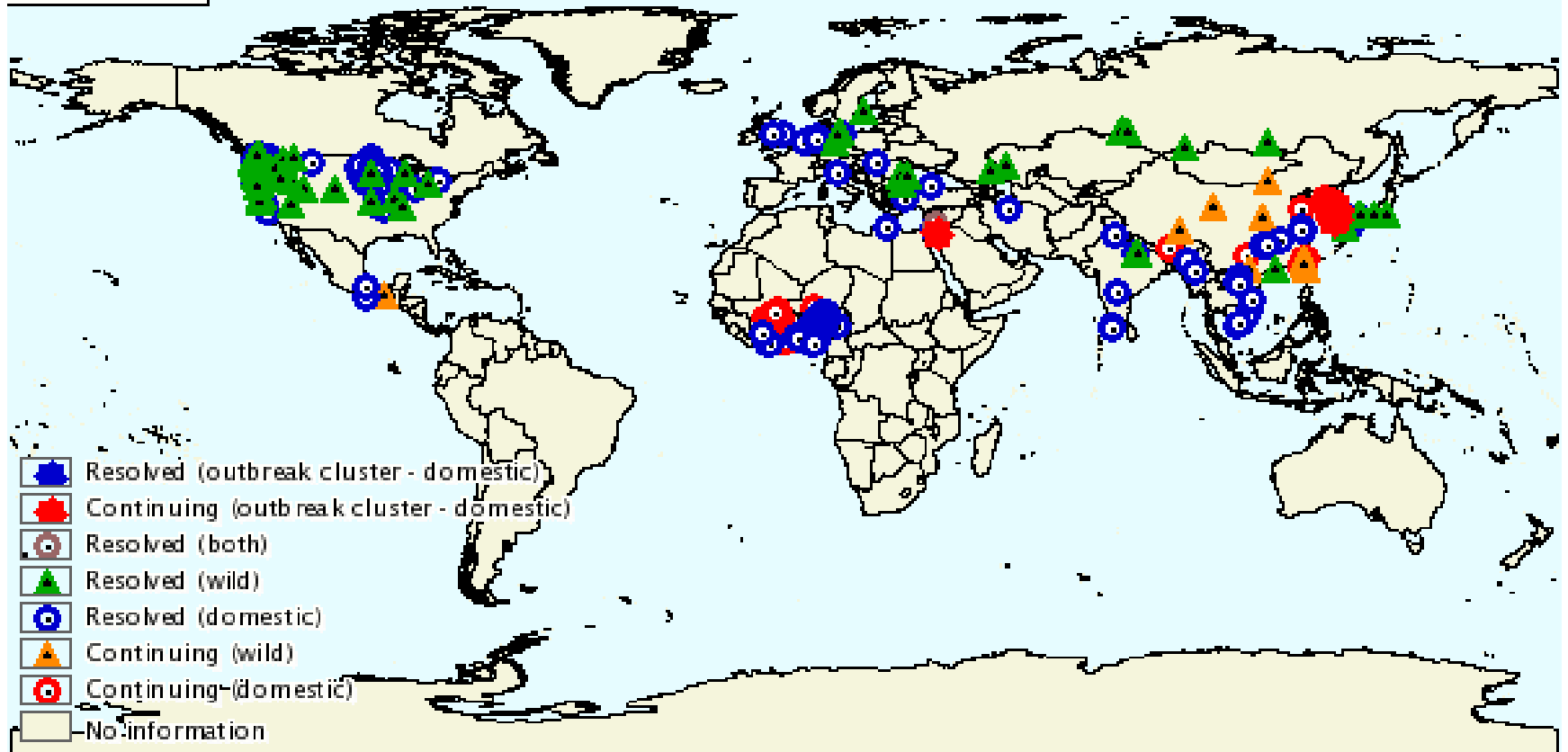


Number of HPAI outbreaks reported by OIE occurred seasonally in North Hemisphere 2005 - 2013



# HP AI in the world (11/2014 to 8/2015)

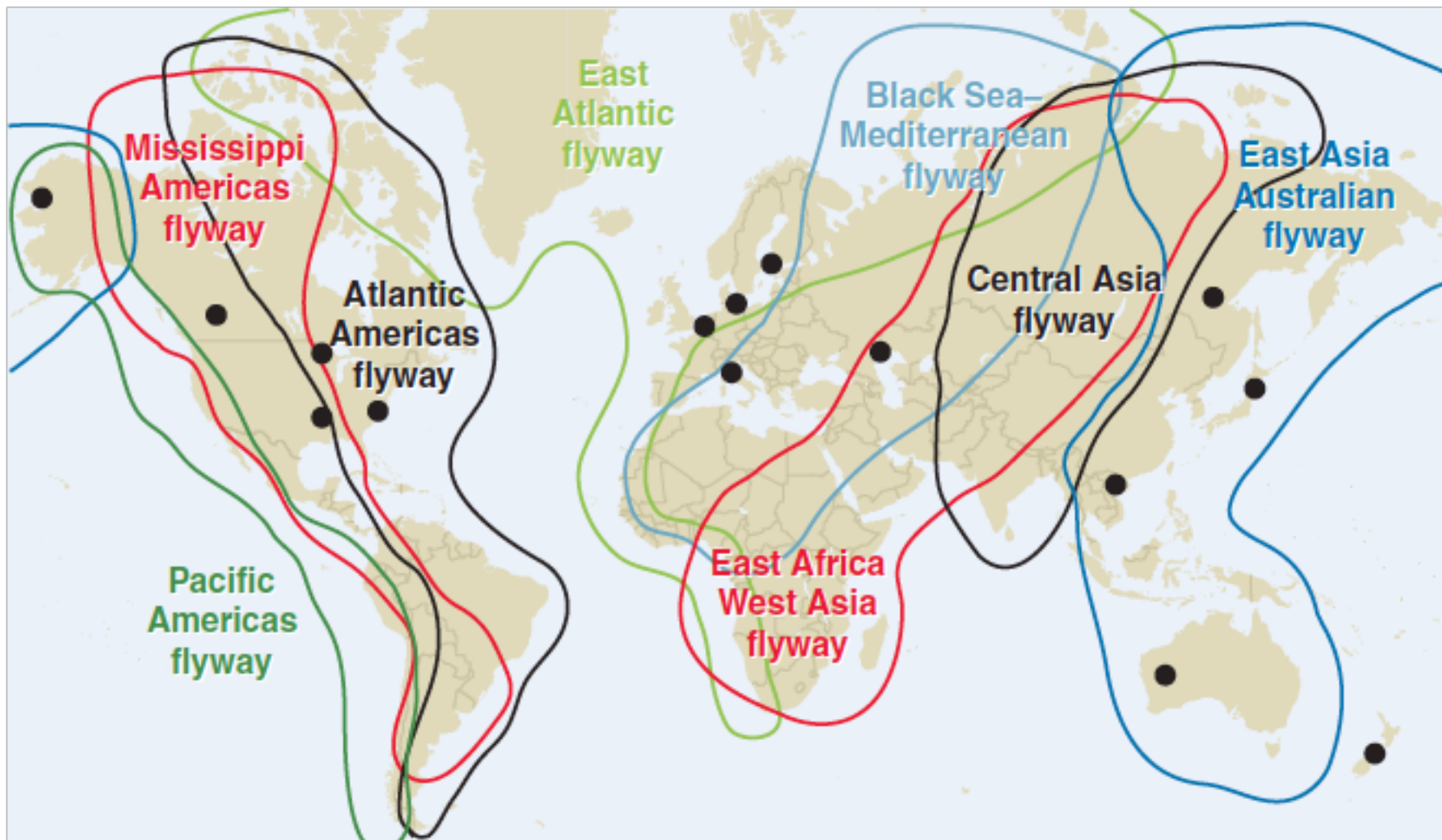
WAIHDOIE © 2015



Source: OIE



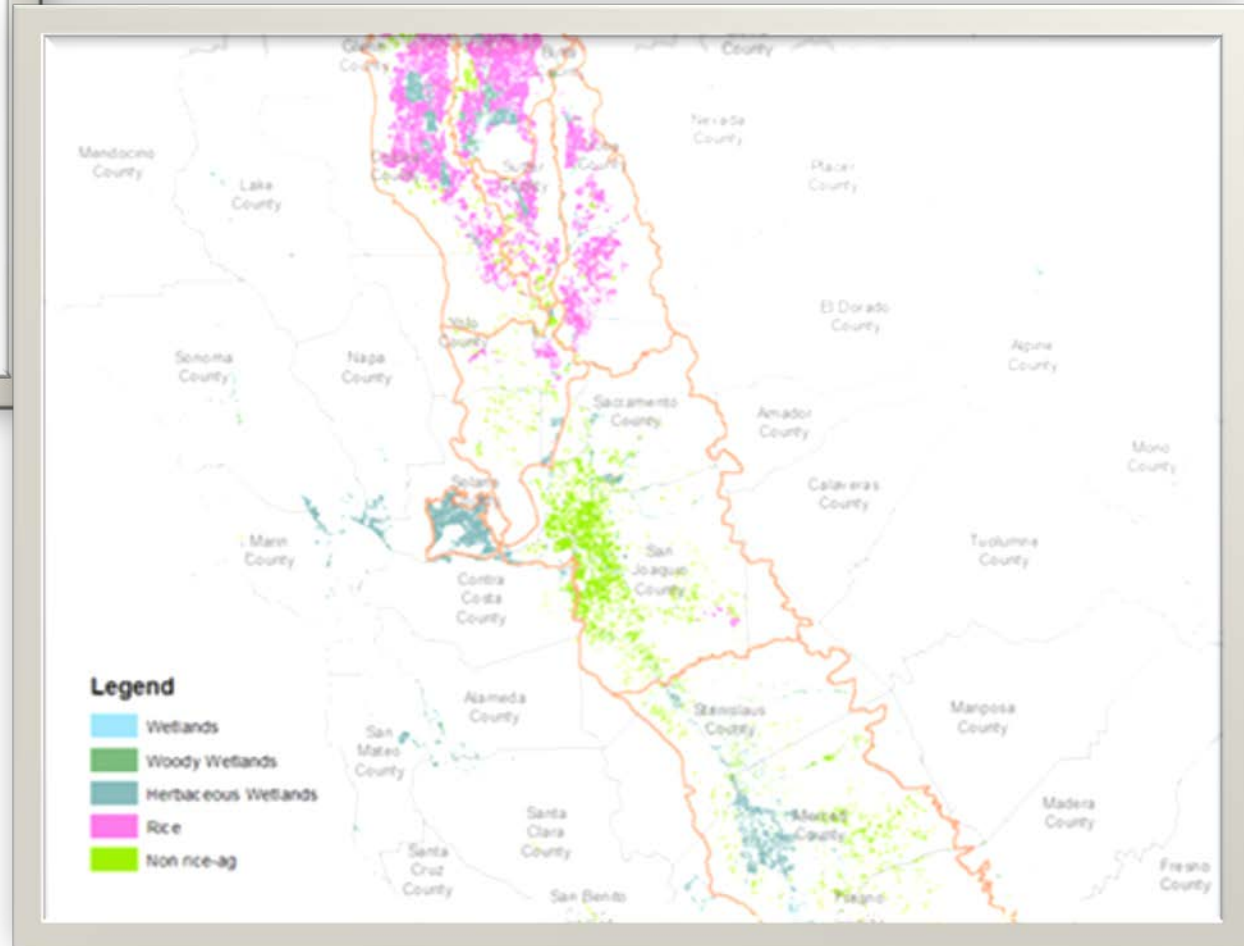
# Waterfowl and Avian Influenza: Global Perspective

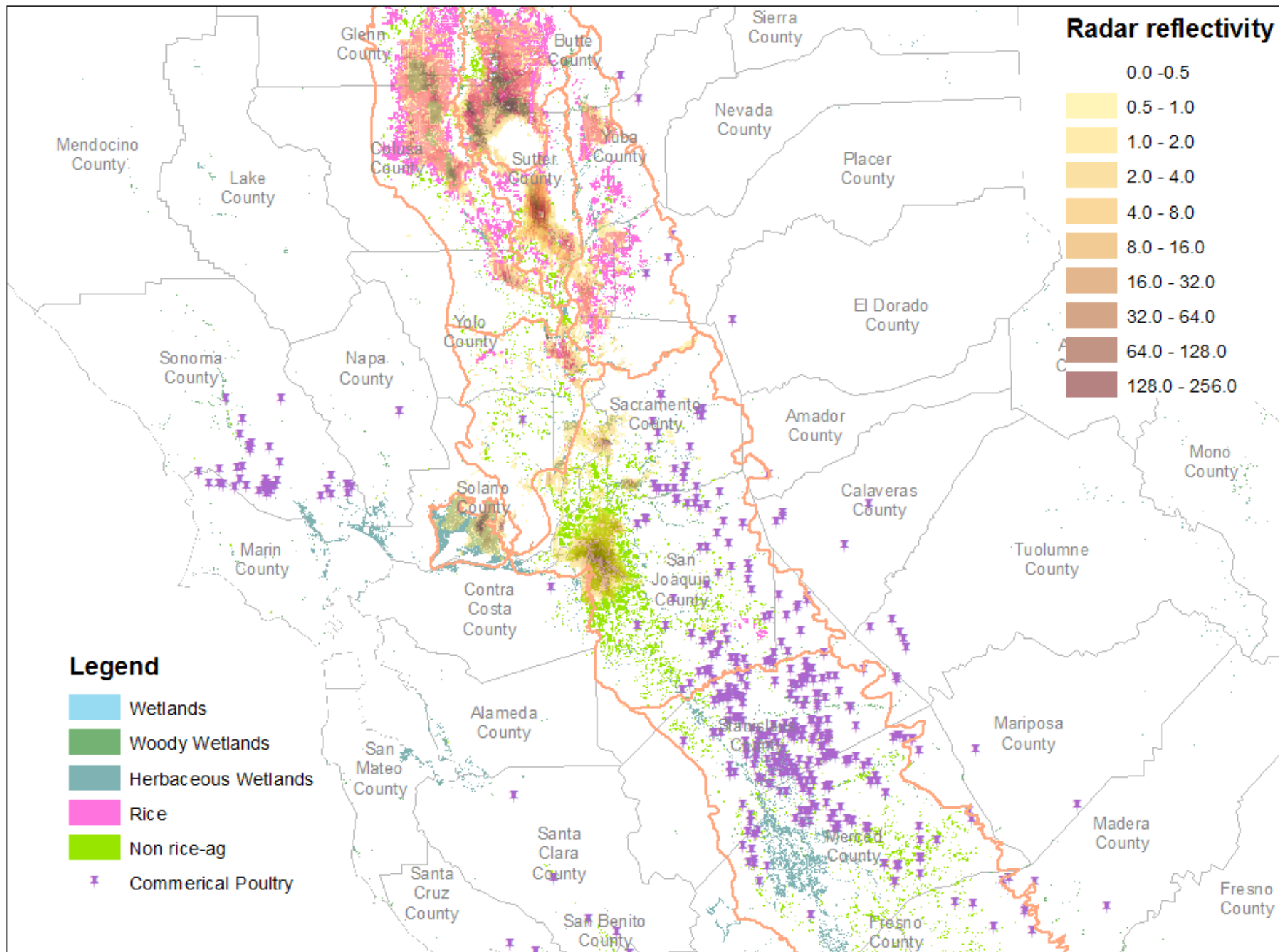


Björn Olsen et al., Global Patterns of Influenza A Virus in Wild Birds, *Science* 312, 384 (2006);

**Genetics of strain consistent with strains from the East Asia/Australia Flyway**

# Waterfowl and Avian Influenza: North American and California Perspective





# Major Conclusions/Recommendations

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Can't keep HPAI out of USA

Surveillance will tell us if HPAI becomes endemic

Biosecurity will never lower risk of introduction = 0

Biosecurity and rapid response key to reducing amplification in poultry and spill-back from poultry to wild birds

Speeding up depopulation efforts to reduce shedding

Make sure you have an AI Response Plan (13 responses representing 48 farms do not have one).

Biosecurity!!! USDA Epi Report showed sharing of equipment, employees moving between infected and non-infected flocks, lack of C&D of vehicles between farms and rodents and free-flying birds were correlated with high risk of HPAI infection



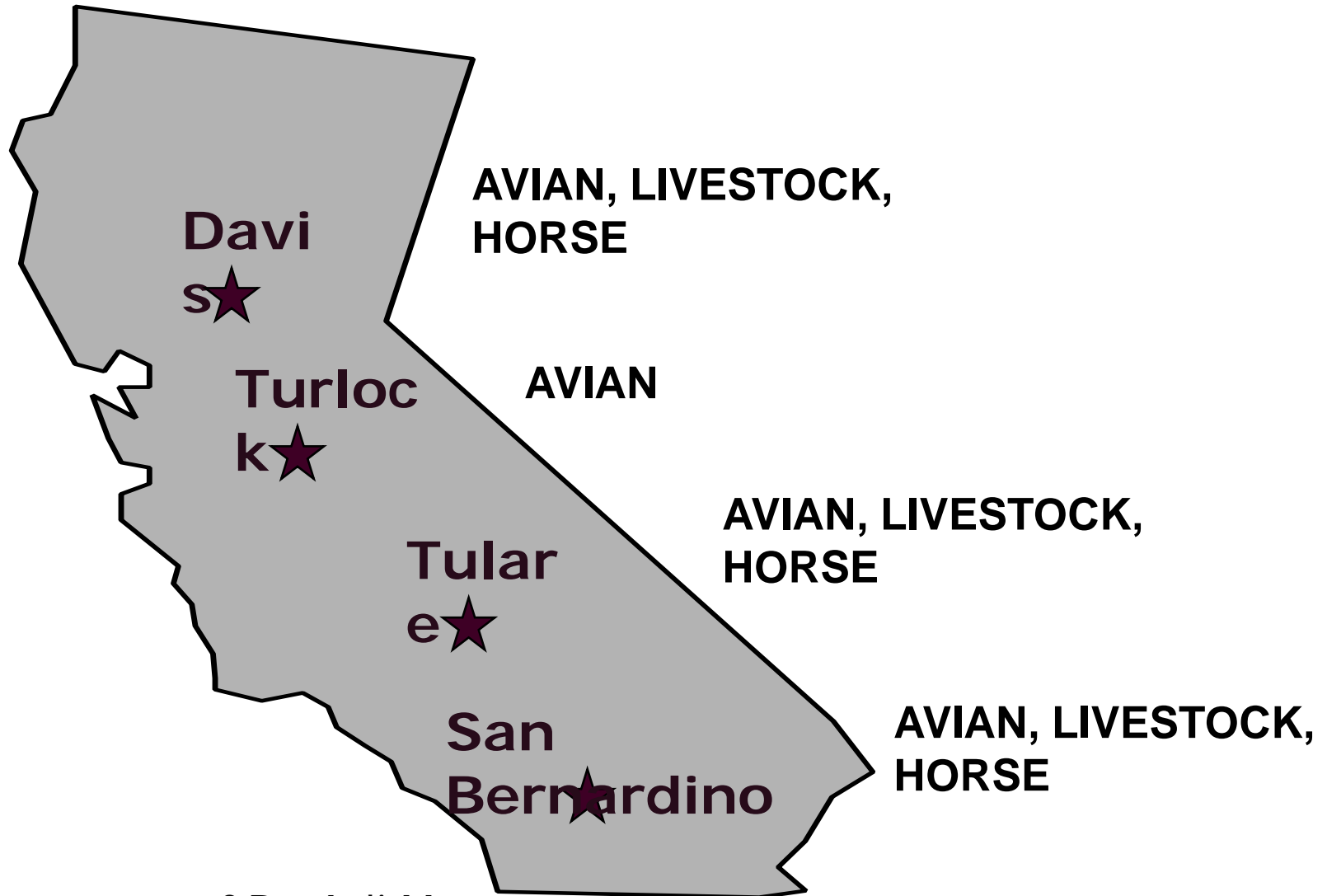
# Utilizing the California Animal Health and Food Safety Laboratory System (CAHFS)

Slides courtesy of Dr. Asli Mete: CAHFS





# CAHFS Locations & Services



Slides courtesy of Dr. Asli Mete:

# *Cost?*

# *Why?*

## Exotic Newcastle Disease (END)

## Avian Influenza (AI)



**In other words: Disease control, Public health, Health management**

Avian submissions:

Pet birds

Wildlife

Commercial

Backyard flock (chickens,  
turkeys, domestic geese, ducks)



# Testing Process

Dead and/or Live birds - General necropsy:

Pathology

Bacteriology

Virology

Immunology

Histopathology

Toxicology



# Submission Process




Available on the web:

<http://cahfs.ucdavis.edu>

or

Google - CAHFS

Slides courtesy of Dr. Asli Mete:



**California Animal Health & Food Safety Laboratory**  
 University of California, Davis  
<http://cahfs.ucdavis.edu>  
**Standard Submission Form**

*For Lab Use Only*

Accon #

Rec'd by: \_\_\_\_\_

Case Coordinator: \_\_\_\_\_

Accon Type \_\_\_\_\_

# of Samples \_\_\_\_\_

Date rec'd \_\_\_\_\_

Section \_\_\_\_\_

Bill to:  Vet  Clinic  Owner  Other

Carrier \_\_\_\_\_

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Veterinarian's Name \_\_\_\_\_ Owner's Name \_\_\_\_\_

Clinic Name \_\_\_\_\_ Ranch \_\_\_\_\_

Address \_\_\_\_\_ Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_ Phone \_\_\_\_\_

Your reference # \_\_\_\_\_  Export Sample \_\_\_\_\_

Date sample(s) taken \_\_\_\_\_ Date shipped \_\_\_\_\_ (Specify test methods below) Destination (Country) \_\_\_\_\_

FAX or  Email \_\_\_\_\_  Copy to \_\_\_\_\_

Cattle  Turkey Location of Animal(s) \_\_\_\_\_ (county, state)

Horse  Chicken Animal/Group ID(s) \_\_\_\_\_

Swine  Psittacine \_\_\_\_\_

Sheep  Ratite Production Class \_\_\_\_\_ (i.e. beef, dairy, calf ranch, etc.)

Goat  Plant or Feed Duration of illness \_\_\_\_\_ Date of death: \_\_\_\_\_ Euth?  Yes  No

Rabbit  Other \_\_\_\_\_

# in herd	# in group	# sick	# dead

History (clinical signs, nutrition, housing, vaccination, production level, etc. Use next page if more space is needed):  
 If this is an abortion, what is the fetal trimester?  1  2  3 What is the age of the dam? \_\_\_\_\_

(continue on next page if necessary)

Treatments: \_\_\_\_\_

Disease(s) or condition(s) suspected: \_\_\_\_\_

**Animal/Specimen Information**  
(continue on back if necessary)

Lab Use	Specimen ID	Breed	Sex (F/M)	Age	Qty	Specimen Type	Test(s) Requested

CAHFS, Davis  
University of California, Davis  
W. Health Sciences Dr  
Davis, CA 95616  
General Info: (530) 752-8700  
FAX (530) 752-6263

CAHFS, Turlock  
University of California, Davis  
1550 N. Soderquist  
Turlock, CA 95381  
General Info: (209) 634-5837  
FAX (209) 667-4261

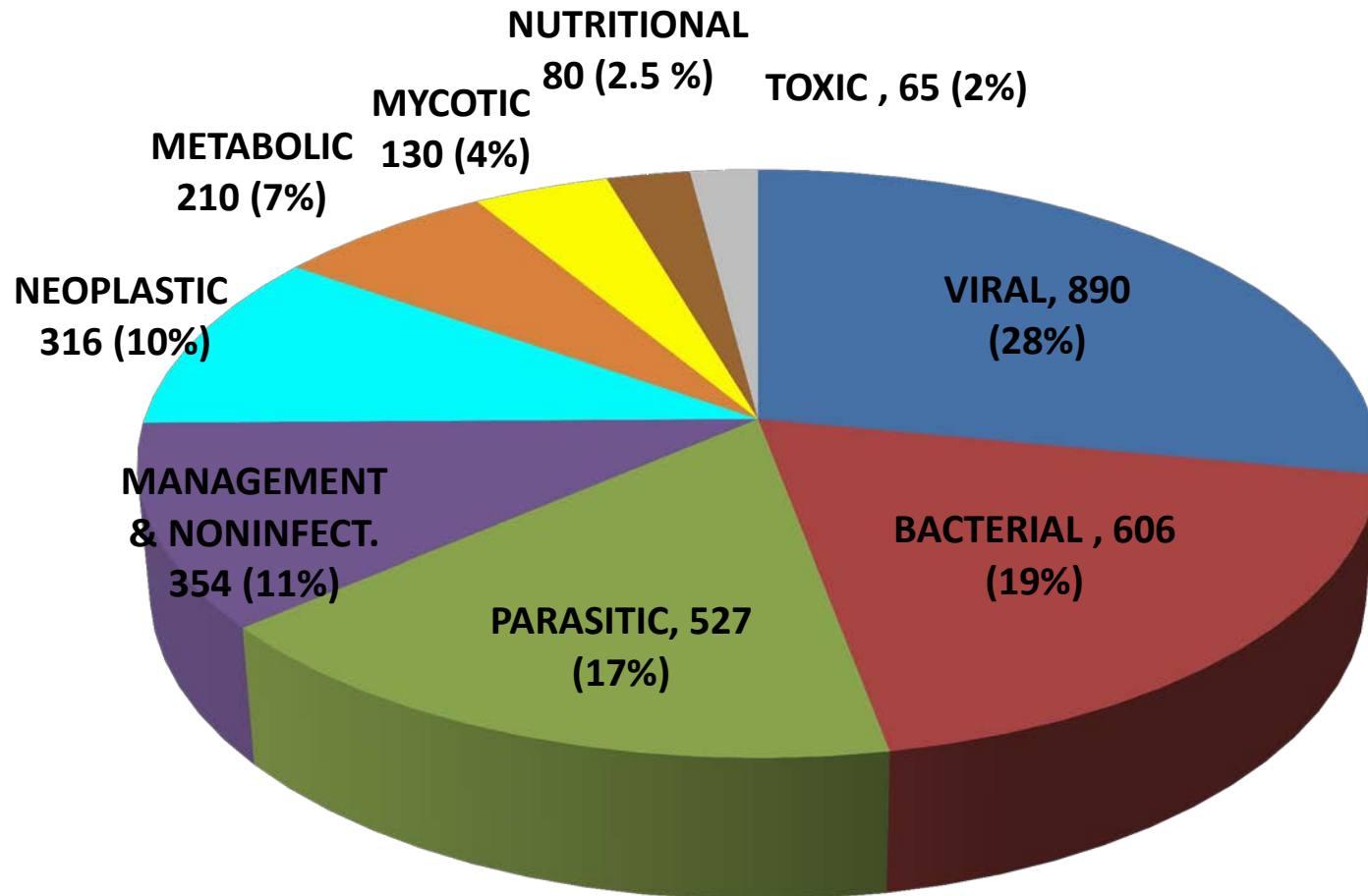
CAHFS, Tulare  
University of California, Davis  
18830 Road 112  
Tulare, CA 93274  
General Info: (559) 688-7543  
FAX (559) 686-4231

CAHFS, San Bernardino  
University of California, Davis  
105 West Central Avenue  
San Bernardino, CA 92405  
General Info: (909) 383-4387  
FAX (909) 884-5980

Signature of Submitter: \_\_\_\_\_ Date: \_\_\_\_\_



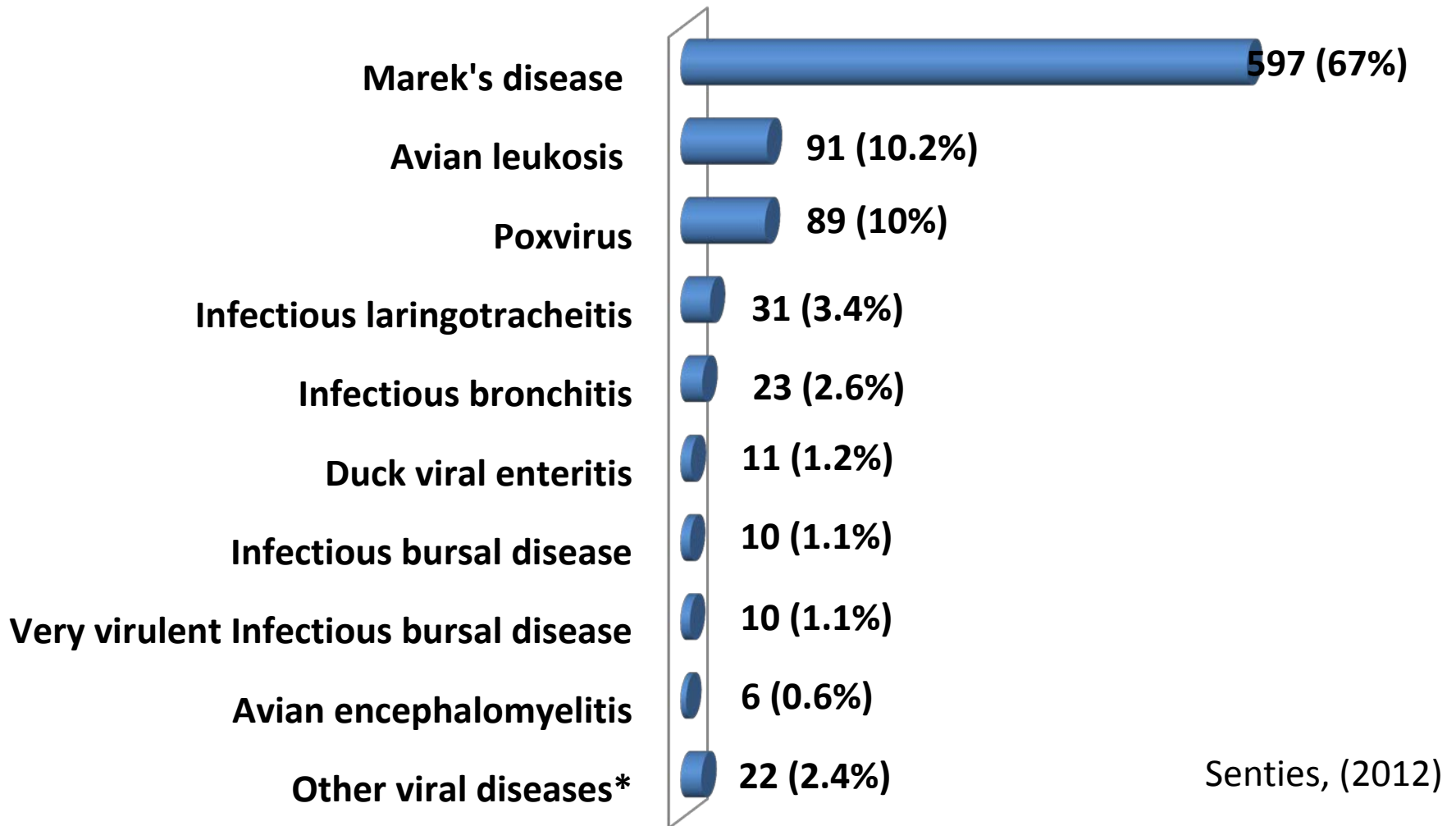
# 2001-2011 Frequencies and Percentages of Diagnoses by Etiological Types



TOTAL = 3178 DIAGNOSES

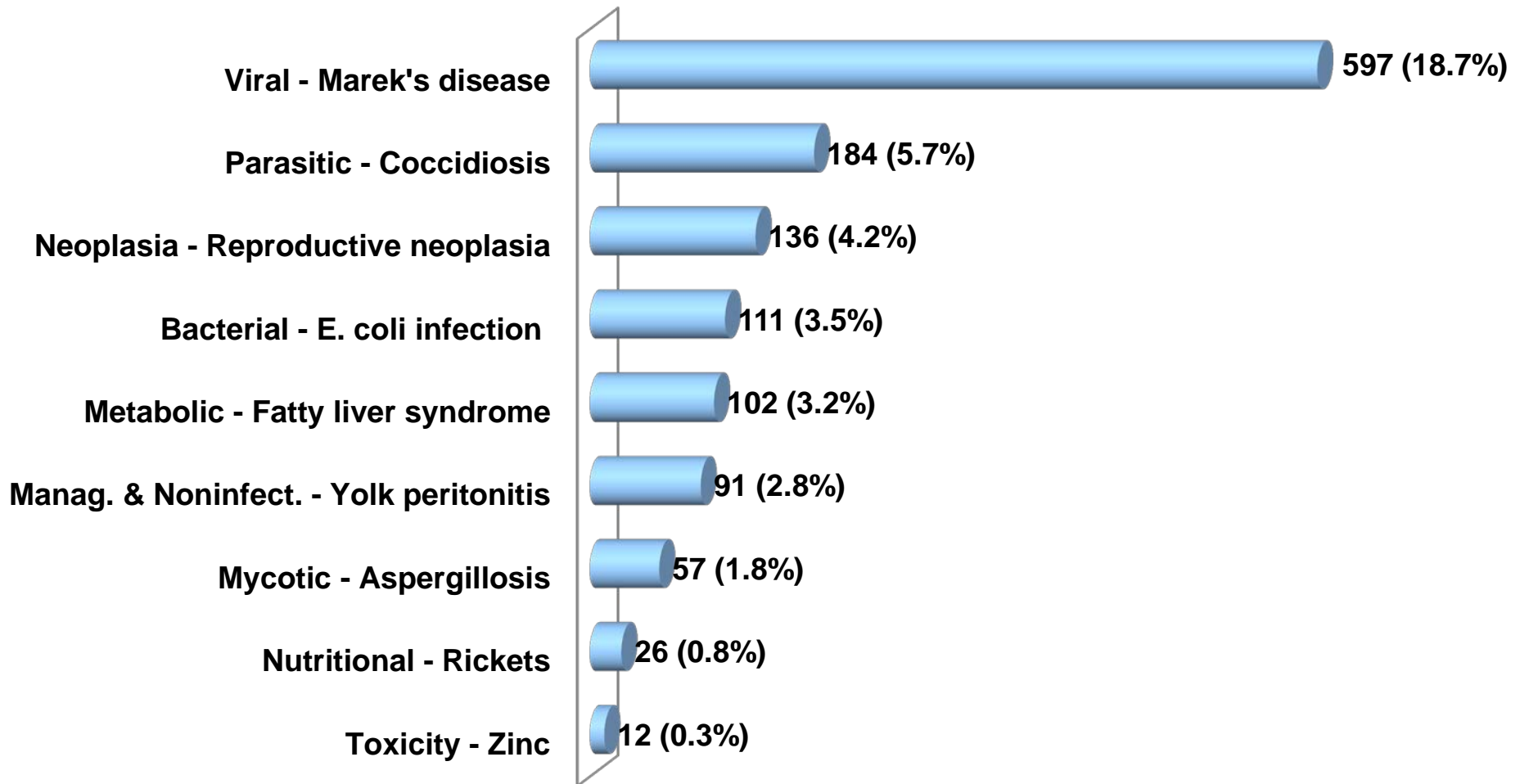
Senties, (2012)

# Viral Diseases (890 Diagnoses)



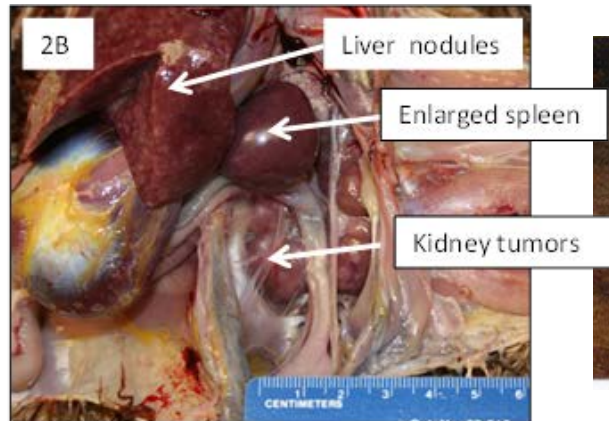
\*Most of the 2002-2003 exotic Newcastle disease diagnoses were not included since regulatory diagnoses are not considered "backyard" in LIS.

# 2001-2011 Top Backyard Poultry Diseases



# Marek's Disease

- Highly contagious epizootic herpesvirus  
#1 cause of BY poultry mortality in California
- Endemic in the global poultry environment
- Virus causes lesions/lymphomas in peripheral nerves and other tissues ('Classic' clinical sign is paralysis).
- Immunosuppression



# Transmission and Vaccination

MDV infects cells of the feather follicle and can remain viable in feather dander for several months



UGA, 2014

Viable virus can be inhaled by susceptible chickens from house dust associated with feather follicles



# Vaccination

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- Vaccination against MD represents an outstanding example of successful diseases control in commercial poultry
- Cell associated vaccines are better than lyophilized (HVT vaccines). The HVT vaccines are less effective against virulent strains of the Herpes virus
- Because the virus is ubiquitous in nature, the vaccine is most efficaciously given in ovo or at day-1 of age

- Ask your hatchery if, how and when they vaccinate

# Regardless of Vaccine Status...

it is essential to place day old chicks in houses which have been thoroughly decontaminated to allow vaccinated birds time to develop immunity. Immunity typically develops in two weeks

## **IF you hatch your own eggs**

give the lyophilized (i.e. Rispen's) vaccine at day one of age

**No treatment and no proven efficacy of vaccination post day-1 of age**

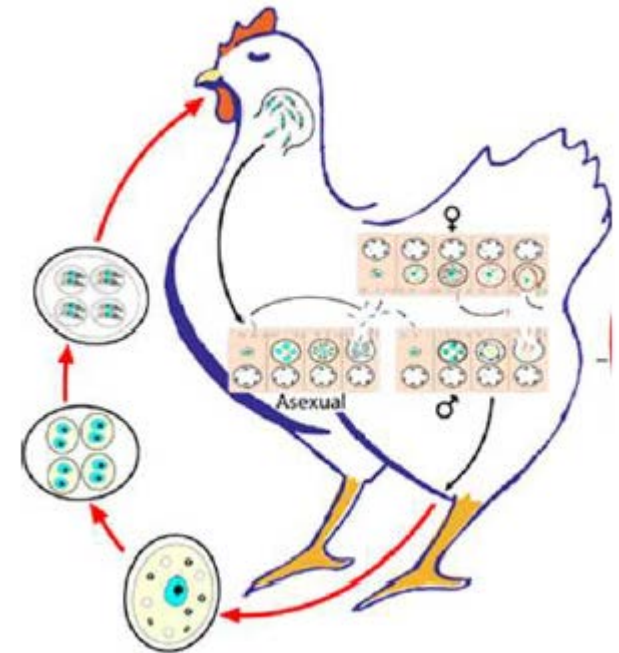
# Eimeria (i.e. Coccidia)

Caused by single celled coccidia that attack different parts of the intestinal tract preventing absorption of food

In minor outbreaks the birds are “droopy, ruffled feathers and lose weight”

Egg production in older birds decreases

Severity of the disease depends on the number of coccidia present and on which type of coccidia your chickens have



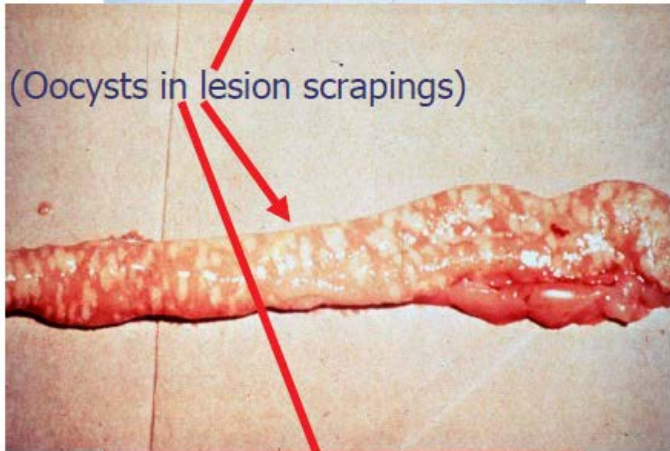
ALL poultry house litter contains coccidia. To keep the coccidia load low it is important to keep litter dry and purchase feed that contains a coccidiostat

# Examples of Chicken Coccidia Host Specificity

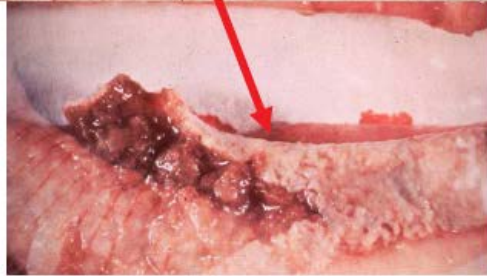
**Eimeria mivati**  
Upper intestines  
Very low mortality



**Eimeria acervulina**  
Upper intestines  
Very low mortality  
Very common  
(poor weight gain)



**Eimeria brunetti**  
Lower intestines  
Moderate mortality



Pictures courtesy  
of Dr. Mark Bland

Infection with one species of Coccidia stimulates an immune response only to that one species. The host still remains susceptible to other strains of Coccidia!

# Coccidiosis

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Occurs anywhere poultry are 'grown'

Infection rate high but rate of clinical disease is low

Host and site specific

Seen primarily in young birds (3-6 weeks)

Diarrhea (mucoïd or bloody)

Dehydration, ruffled feathers, listlessness and weakness

Characterized by diarrhea and enteritis

Occurs under conditions of warmth and humidity (e.g. wet litter)

Oocyst very resistant (can survive 18 mo in the environment)

oocysts sporulate after being pooped out and may become infective in several days

one sporulated oocyst can produce thousands of offspring and can become infective



# Prevention of Coccidia

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- 2-4 weeks of down-time
- Reduce litter moisture
- Develop “Natural” Immunization: Develop active immunity
  - Exposure to moderate number of oocysts
  - Good litter management
- Coccidia is hard to control via sanitation practices alone: Therefore, use of anticoccidial’s in chicks and pullet feed is recommended:
  - coccidostats (ex. Monensin, lasalocid, amprolium, salinomycin)
- Good biosecurity. Coccidia can be spread by fomites

## Diagnosis

Necropsy

Fecal exam

What's the point of a necropsy?



## Treatment

Not very satisfactory

Amprolium – water soluble

Sulfa (Agribon) – water

Vit A and K – water and feed

Medicated feeds are static and are not considered a treatment

# Current Vaccine Program at the UC Davis Demo Coop

## Day of age

HVT+IBD (Vaxxitek)

Rispens

Coccidia

## 3, 6, 8, 15 Weeks

IBV Mass+Conn

## 10 weeks

Pox + Avian Encephalomyelitis



After administration takes  
~ 1-2 weeks to get an  
immune response.

# Thank you!



Cartoon by Dr. Evan Adler (veterinarian and amateur cartoonist).