Vesicular Diseases

Remember:

all vesicular diseases look alike
FMD: BASIC FUNDAMENTALS OF DIAGNOSIS, CONTROL AND ERADICATION

- ADEQUATE NUMBERS OF TRAINED STAFF. NAHERC- MILITARY
- NEED A FLEXIBLE, SIMPLE EMERGENCY MANAGEMENT SYSTEM. ICS. WHICH HAS DUAL BENEFIT DUAL USE.
- FADD
- TADs TRAINING SCHOOL.
- REQUIRE A SPECIFIC DESIGNATE UNIT FOR TADs.
- PEN SIDE TESTING.
- DRONES AND THEIR USE IN LIVESTOCK DISEASE MANAGEMENT
- VACCINATION
- OIE PVS
- REFERENCES
- CREDITS
Dr. Pedro Acha PAHO / WHO
Founder of One Medicine
FATHER OF ONE MEDICINE
IN MY OPINION

SADLY PEDRO WAS TAKEN FROM US WAY TO EARLY IN LIFE

- Biografía Pedro N. Acha, DVM, MPH, DrHC (1931 - 1988)

- Dr. Pedro N. Acha (1931-1988), a world-renowned public health veterinarian, spent nearly 30 years at PAHO. His contributions included building new links between the health and agriculture sectors and factoring economic and social considerations into public health. His Zoonoses and Communicable Diseases Common to Man and Animals (coauthored with Boris Szyfres) became the definitive text on the subject. Today PAHO presents an annual award in his name to encourage research in veterinary public health.
DONOR FATIGUE AND GLOBAL FMD

A REAL issue
With FMD expect the unexpected
Prepare for Murphy’s Law

- Anything that can go wrong, will go wrong
- Anything that can possibly go wrong, does.
- If anything can go wrong, it will
ONE SHOE SIZE DOES NOT FIT ALL FMD OUTBREAK RESPONSES

COW RETICULUM SHOES

REAL GOAT HOOF SHOES
FMD

The Billion-Dollar Disease

by Charles Strouth
Potential Effect of FAD Event

<table>
<thead>
<tr>
<th>Country</th>
<th>1996</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taiwan</td>
<td>266</td>
<td>0</td>
</tr>
<tr>
<td>United States</td>
<td>142</td>
<td>288</td>
</tr>
<tr>
<td>Denmark</td>
<td>119</td>
<td>231</td>
</tr>
<tr>
<td>Canada</td>
<td>39</td>
<td>195</td>
</tr>
</tbody>
</table>

Source: Calculations by USDA, Economic Research Service based on data from World Trade Atlas, GTIS, Inc.
PVS is being used globally

An instrument to conduct internal and/or external evaluations of VS in order to verify their compliance with OIE standards

I am not employed and have never been employed by OIE
OIE PVS

- A MAJOR CONTRIBUTION TO GLOBAL VETERINARY MEDICINE AND ONE HEALTH: IT HAS VERY GREAT POTENTIAL!
- We ALL NEED TO STAY THE COURSE AND COMPLETE THIS PVS MISSION!
## OIE PVS EVALUATION

<table>
<thead>
<tr>
<th>Region</th>
<th>To Do</th>
<th>Done</th>
<th>Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>53</td>
<td>51</td>
<td>40</td>
</tr>
<tr>
<td>Americas</td>
<td>25</td>
<td>51</td>
<td>18</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>23</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td>Europe</td>
<td>16</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>Middle East</td>
<td>13</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>130</strong></td>
<td><strong>120</strong></td>
<td><strong>86</strong></td>
</tr>
</tbody>
</table>
National, Regional and Local gaps in Veterinary Services (VS) administration exist.

Low level of VS remuneration.

Key VS regulations lacking.

Proper legislation lacking.

Improve National animal health data base.

Improvement in Veterinary education essential.
SURINAME SOUTH AMERICA
Suriname Veterinary
Infrastructure Development 1972
T.WILSON: GUYANA
REGIONAL EDUCATION PROGRAM FOR ANIMAL HEALTH ASSISTANTS-1975

Dr. Thurmond (left) Dr. Wilson (right)
PAHO / WHO vet tech training REPAHA
Georgetown, Guyana- 1976: A 2 YEAR TRAINING PROGRAM
PAHO WHO 1974-1983 BARBADOS VETERINARY PUBLIC HEALTH INFRASTRUCTURE DEVELOPMENT
BARBADOS 3300
PAHO / WHO REGIONAL PROJECT

- TB control
- Brucellosis control
- Leptospirosis
- Stray dog control
- Public Health
- Veterinary Public Health Officer in the Ministry of Health
- We had many ONE MEDICINE PAHO/WHO programs on going from 1971 - 1985.
- Veterinary Diagnostic Laboratory development.
- Training of animal health assistants.
- Improve meat inspection standards.
ANIMAL AND HUMAN HEALTH PROJECT 3300

- Veterinary Laboratory
- Meat Inspection
- Zoonoses control
- Stray dog control
- Veterinary Public Health
- Training

INITIALLY ALL SCIENCE BASED, THEN SWITCHED TO INFRASTRUCTURE / CAPACITY BUILDING
BAR 3300: OBJECTIVES

• TB
• Leptospirosis
• Brucellosis
• Tick fevers
• Stray dog control
• Rodent control
• Education

• Establish a veterinary diagnostic laboratory
• Train animal health technicians
• Develop a Veterinary Public Health Unit in the Ministry of Health
• Upgrade slaughter houses
• Train a Veterinary Pathologist
• Train meat inspectors
• Train stray dog control
• Train rodent control inspectors
• Establish a veterinary infrastructure
Ministry of Health Barbados

Establish a veterinary public health officer in this facility.
BARBADOS 3300 ANIMAL AND HUMAN HEALTH PROJECT
VETERINARY SERVICES
BARBADOS

IMPORTANT TO HAVE OUR OWN STAND ALONE VETERINARY SERVICES BUILDING SO WE BUILT ONE
BARBADOS- Veterinary Services Laboratory (BVDL)

Ministry of Agriculture and Rural Development
CLIENT BASE

- Poultry Industry (including Hatcheries)
- Livestock Farmers & Exporters
- The Pine Hill Dairy
- Private Veterinarians
- Pet Owners
- Abattoir & Meat Inspectors
- Ministry of Health (PHIs)
- The Police
- Racehorse Owners
- Veterinary Field Services
- B’dos Wildlife Reserve
- Meat Importers
- Meat Processors & Exporters
- International Agencies (IICA, CARDI, FAO)
- MAR (Other Sections)
This is a very busy section
Setting up cultures in the laminar flow cabinet
Biolog™ Data Base being used to confirm bacterial isolates
Food Safety: Antibiotic Residue Testing 2010

BARBADOS VETERINARY DIAGNOSTIC LABORATOR (BVDL)
BVDL-SEROLOGY

LOTS OF HEART WORM DIAGNOSTIC WORK, CATTLE TICK FEVER WORK
This is one of the busiest sections.

Tissues from a wide range of sources are processed here.
BARBADOS-Clinical Pathology

Animal Disease diagnosis by
- Haematology
- Biochemistry
- Cytology
- Urinalysis
BARBADOS-animal control

BRIDGETOWN, BARBADOS
Stray dogs: Bridgetown, Barbados

Circa 1975
Staff: stray dog control
Dog control facility: completed
A GOOD EXAMPLE OF NO TESTING. TB TESTING HAD BEEN SUSPENDED MANY YEARS PREVIOUSLY BUT IT PERSISTERED IN SOME MILK HERDS SUCH AS THIS ONE.

Multiple TB lesions in the lung

TB in pulmonary lymph node

CIRCA 1975
BVDL-June Roach: serology
BVDL-Parasitology

- **Internal Parasites**
  - Faecal Flotations
  - Gut Scrapings
  - Blood parasites

- **External Parasites**
  - Skin Scrapings
  - Gross and Microscopic Identification
In Barbados, Suriname, Guyana it quickly became apparent that infrastructure development was essential for scientific/technical growth. Such as permanent positions, competitive salaries and other job benefits.
THE CAUSES: HPAI TRAINING
BULGARIA

BULGARIA-VICTORY!
THE PROBLEM IS AS MUCH ABOUT Veterinary Infrastructure and CAPACITY as it is about FMD / BIRD FLU/ SARS/ Nipah/ Salmonella
MARKETING OF NATIONAL VETERINARY MEDICINE

VETERINARY MEDICINE IS VERY UNDER VALUED IN SOCIETY TODAY
EBOLA OUTBREAK: EXCELLENT EXAMPLE OF LACK OF MEDICAL INFRASTRUCTURE
FMD and Animal Feet
I BELIEVE IT IS IMPORTANT TO HAVE A STAND ALONE UNIT FOR EMERGENCY OPERATIONS
Assets: People: Bodies: Workers

- We all know we are going to require many.
2001 FMD: IN THE UK THE MILITARY WAS OF VERY GREAT HELP
ESPECIALLY FOR EPIDEMIOLOGY
FMD TAIWAN: 1997 USED MUCH MILITARY SUPPORT

• 50,000 + TROOPS
• 5,000 + MILITARY VEHICLES
What is NAHERC?

• In 2001, APHIS established NAHERC to respond to exotic disease outbreaks and other disasters that affect livestock, poultry, companion animals, wildlife, and food defense.

• More veterinarians and animal health technicians are urgently needed to assure a decisive response to any potential animal health crisis (all-hazard) or food defense action.

• NAHERC is a salaried emergency response agency

• When an animal health emergency occurs APHIS will look to NAHERC to help meet critical staffing surge & sustainment needs during such an emergency.
What is the National Animal Health Emergency Response Corps (NAHERC)?

When an animal health emergency occurs, an immediate response is necessary to protect both animals and people. The United States Department of Agriculture’s (USDA’s) Animal and Plant Health Inspection Service (APHIS) will look to many sources to obtain the veterinary personnel needed to help meet the critical staffing needs of such an emergency.

In 2001, APHIS established the NAHERC to respond to exotic disease outbreaks and other disasters which affect livestock, poultry, companion animals, and wildlife. More volunteers are urgently needed to assure a decisive response to any potential animal health crises.
NAHERC Members
2007-2012

<table>
<thead>
<tr>
<th>Year</th>
<th>VMO</th>
<th>AHT</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>160</td>
<td>185</td>
<td>345</td>
</tr>
<tr>
<td>2008</td>
<td>280</td>
<td>375</td>
<td>655</td>
</tr>
<tr>
<td>2009</td>
<td>394</td>
<td>524</td>
<td>918</td>
</tr>
<tr>
<td>2010</td>
<td>536</td>
<td>789</td>
<td>1328</td>
</tr>
<tr>
<td>2011</td>
<td>777</td>
<td>955</td>
<td>1732</td>
</tr>
<tr>
<td>2012</td>
<td>929</td>
<td>2740</td>
<td>3669</td>
</tr>
</tbody>
</table>
How Long are Tours?

Generally between 21 and 30 days.
Will I Be Paid?

• Yes, you will become a temporary USDA APHIS employee. You also have the right to refuse assignments.

• Travel, lodging, overtime, and workman’s compensation provided.

• AHTs qualified at the highest level receive GS-7, Step 1.

• For more salary details visit the U.S. Office of Personnel Management GS salary table.
To learn more or to apply:

To learn more go to:

http://naherc.aphis.usda.gov

To apply go to:

www.usajobs.gov

• Click on: “Search Jobs”

• Insert “NAHERC” in “Keyword search” box

• Follow the instructions on the announcement
How do we get organized, mobilize & respond quickly to any kind of incident? *The Incident Command System (ICS)*
ICS Development

**FIRESCOPE**

Originally developed as a consequence of major wildland urban interface fires that consumed large portions of Southern California.
THE FIRES THAT CREATED THE ICS

- 19,500 professional fire fighters on duty
- From 500 separate fire departments
- Thousands of other emergency responders on duty
THE FIRES THAT CREATED THE ICS IN THE USA

- Sept. 22- October 4: 1970
- 576,508 acres burned
- 722 houses destroyed
- 16 people killed
- 733 individual fires
- Control costs in 1970 = $ US 233 million
- Control costs today = $ 3 billion US
Analysis of Fire Fighters Response

- Adequate numbers of staff available.
- Adequately trained FIRE staff available
- Proper equipment available.
- Adequate amount of equipment available.

**COMPLETLY DSFUNCTIONAL COMMAND STRUCTURE.**
USDA FIRE BOSS HIRED TO TRAIN USDA VETERINARIANS IN ICS

In the past few years and approximately 35-40 countries have been trained in ICS. At least 16 countries in Africa.
ICS Overview

With any type of event, whether emergency or non-emergency, the ones that are handled most effectively and efficiently are those that operate under a pre-defined structure.
Overview of the Incident Command System
Farmers were throwing dead FMD pigs into river
Because of lack of proper compensation
A very sensitive issue
Organization Duplicated in each prefecture

JAPAN FMD

**************
GLOBAL ICS USE

- UNITED KINGDOM
- UNITED NATIONS
- FAO
- CANADA
- NEW ZEALAND
- AUSTRALIA
- BRAZIL
- FAO: GEMP

FMD-UK-9 COUNTRIES IN THIS ROOM
FAO: GOOD EMERGENCY MANAGEMENT PRACTICES

GEMP
ICS REFERENCE BOOK
NIMS: Incident Command System Field Guide
INTRODUCTION TO INCIDENT COMMAND
Identify emergencies: ICS useful

Floods
Hurricanes
Drought
Ice / snow
Diseases
Electrical / power outages
Fire
A Foreign Animal Disease Diagnostician (FADD) is a Federal / State employed veterinarian who has successfully completed specialized TAD / FAD training at the National Veterinary Services Laboratories Foreign Animal Disease Diagnostic Laboratory facility at Plum Island, NY; as well as any other specialized training and continuing education as required and administered by the USDA.

Only an FADD can conduct a TADs investigation!
FADD IN USA

• COMPOSED of STATE, FED, PRIVATE, ACADEMIC, MILITARY VETERINARIANS

• FADD ROSTERS MAINTAINED BY REGION, STATE.

SOME STATES HAVE 1 FADD. MOST HAVE SEVERAL.

FADD training school at Plum Island.
TAD  FAD VETERINARY FIELD KIT

DR. BRAD LeaMaster : STATE VETERINARIAN:
OREGON: USA
FOREIGN ANIMAL DISEASE DIAGNOSTICIAN'S KIT

List of Equipment
(REvised July 1996)

The following items are included in your FAD kit. For replacements of any of the items, purchase locally. The listed items are unavailable at present time and will be supplied to you at a later date.

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastic case</td>
<td>2</td>
</tr>
<tr>
<td>Curved scissors</td>
<td>200</td>
</tr>
<tr>
<td>Straight scissors</td>
<td>200</td>
</tr>
<tr>
<td>Mosquito, entoparasites</td>
<td>200</td>
</tr>
<tr>
<td>Yeoman tonsil biopsy forceps</td>
<td>200</td>
</tr>
<tr>
<td>Tissue forceps - rat tooth</td>
<td>200</td>
</tr>
<tr>
<td>Forceps - serrated thumb dressing</td>
<td>200</td>
</tr>
<tr>
<td>No. 3 surgical handle</td>
<td>200</td>
</tr>
<tr>
<td>Surgical blade #10</td>
<td>200</td>
</tr>
<tr>
<td>Surgical blade #11</td>
<td>200</td>
</tr>
<tr>
<td>Surgical blade #22</td>
<td>200</td>
</tr>
<tr>
<td>Surgical blade #23</td>
<td>200</td>
</tr>
<tr>
<td>No. 4 surgical handle</td>
<td>200</td>
</tr>
<tr>
<td>Hemostats</td>
<td>200</td>
</tr>
<tr>
<td>Iowa hog holder/cable attached</td>
<td>200</td>
</tr>
<tr>
<td>Butcher saw</td>
<td>50</td>
</tr>
<tr>
<td>Extra blade for saw</td>
<td>200</td>
</tr>
<tr>
<td>Bone chisel</td>
<td>200</td>
</tr>
<tr>
<td>Knife, 5&quot; boning</td>
<td>200</td>
</tr>
<tr>
<td>Knife, 5&quot; Skinner</td>
<td>200</td>
</tr>
<tr>
<td>Steel, 10&quot; w/guard</td>
<td>200</td>
</tr>
<tr>
<td>Plastic syringes, 10 cc</td>
<td>200</td>
</tr>
<tr>
<td>Vacutainer tubes, plain</td>
<td>200</td>
</tr>
<tr>
<td>Vacutainer tubes w/separator</td>
<td>200</td>
</tr>
<tr>
<td>Vacutainer holders w/adapter</td>
<td>200</td>
</tr>
<tr>
<td>20-ga. 2&quot; needles</td>
<td>200</td>
</tr>
<tr>
<td>17-gauge 3&quot; needles</td>
<td>200</td>
</tr>
<tr>
<td>17-gauge 3-1/2&quot; needles</td>
<td>200</td>
</tr>
<tr>
<td>Box microscope slides</td>
<td>200</td>
</tr>
<tr>
<td>Proband, large (calf 1-1/4&quot;)</td>
<td>200</td>
</tr>
<tr>
<td>Proband, large (calf 1&quot;)</td>
<td>200</td>
</tr>
<tr>
<td>Proband, medium (calf)</td>
<td>200</td>
</tr>
<tr>
<td>Proband, small (sheep)</td>
<td>200</td>
</tr>
<tr>
<td>Cork stoppers</td>
<td>200</td>
</tr>
</tbody>
</table>

The following should be purchased locally:

- Towels, hand, plain
- Plastic bucket
- Lariat rope
- Heavy gloves for post mortem, e.g., playtex rubber gloves
FADD BY STATE

CALIFORNIA = 27 FADD
TEXAS = 40 FADD
NEVADA = 1 FADD
TAD /FAD Training

- FAD Schools
  - 5-6 schools/yr
  - 30 students/school
- International Visitors
- Off-island training
  - Country-USDA Labs in Mexico, Panama and Colombia
  - State Emergency Veterinary Corps
  - SCWDS
  - International Seminars
SE ASIA REGIONAL TADs TRAINING SCHOOL: recommendation

- HANDS ON WET LABORATORY COURSE: VETERINARIANS.
- LECTURE COURSE: VETERINARIANS.
- ON LINE LEARNING COURSE.
- LABORATORY COURSE.
- VETERINARY PATHOLOGY COURSE.
TADS / FAD TRAINING FOR VETERINARY PATHOLOGISTS
THREE EXCELLENT FADD
OUR VERY BEST: Vesicular Stomatitis Virus OUTBREAK 1995

IN THIS PHOTO WE HAVE OVER 75 YEARS OF TADs FIELD EXPERIENCE
THE OLD: WE HOPE!

- NOT PRACTICAL IN AN FMD OUTBREAK
DRONES AND VETERINARY MEDICINE

- A developing field.
DRONES AND VETERINARY MEDICINE
MULTIPLE APPLICATIONS

- Monitoring Vital Signs
- Monitoring Livestock Movement
- Monitoring Quarantines
- Monitoring Infected Premises
- Assisting Specimen Delivery
- Mapping
- Disinfectant Application
- Other Applications
"Drones have great potential for mapping and assessing the health of crops and livestock so that producers can know how quickly they need to devote attention to those areas."

"We're behind the eight ball when it comes to places like Japan and Australia, which have been using drones in agriculture since the 1980s," said R.J. Karney, director of congressional relations for the American Farm Bureau.
Locating cattle / sheep with unmanned aerial vehicles (UAV)

CSIRO is working to develop, test and demonstrate thermal remote sensing technology on an Unmanned Aerial Vehicle to identify the location of livestock in extensive rangelands. By using a UAV platform, cattle can be located across very broad areas to assist producers in improving the efficiency, and reducing the cost, of mustering often done by helicopter at great expense.
A DRONE CAN DO THIS
In 1983, Yamaha Motor Company received a request to develop an unmanned helicopter for crop dusting purposes from the Ministry of Agriculture, Forestry and Fishery of Japan. That began initial research and development efforts that led to the completion of the Industrial-use Unmanned Helicopter “R-50” in 1987.

Whilst research and development efforts in the field of industrial-use unmanned helicopters was being carried out around the world, the Yamaha R-50 with its payload of 20 kg was the first practical-use unmanned helicopter for crop dusting.
MERGE THE OLD AND THE NEW VETERINARY EPIDEMIOLOGY

- Old fashioned animal disease detective work
- MODERN IT SUPPORT
There has to be a better way
Eventually the first thing I
Looked for on the sheep farm was a dog

FMD UK 2001 sheep surveillance

I COULD HAVE USED A DRONE HERE
Dr. T. Wilson UK FMD 2001
farm visits

ON FARM SURVEILLANCE:
NEEDS TO BE A BETTER WAY
I RODE IN THE MANURE BUCKET
HOW TO CONDUCT A TAD / FAD FIELD INVESTIGATION: THE TWELVE (12) STEPS
FAD TAD INVESTIGATION Objectives

• Provide a veterinary medical assessment that consists of the following:
  • Differential diagnosis;
  • Classification of investigation, which is necessary to rank and prioritize the differential diagnosis in terms of the magnitude of suspicion for a TAD / foreign animal disease, in relation to the magnitude of suspicion for an endemic disease or condition;
  • Designation of diagnostic sample priority, which is necessary to rank and prioritize the speed at which diagnostic samples are to be collected, transported, and tested; FADD, AVIC, SAHO must agree on sample priority.
Personal Protective Equipment (PPE)

You are Responsible for:

1. Taking Precautions to Prevent Disease Transmission
2. Determining the Likelihood of Zoonotic Disease
3. Use of Appropriate PPE
Personal Protective Equipment
Decision Tree

What is level of zoonotic risk to individual and community?

Category I Risk: Limited
- Respiratory protection (can range from none to N-95)
- Coveralls & boots
- Gloves
- Disinfectant

Examples
- ASF
- FMD
- RCV

Category IIA Risk: Moderate
- N-95 to PAPR
- Coveralls & boots
- Gloves
- Eye protection
- Disinfectant

Examples
- Anthrax
- BSE
- Encephalitis
- Glanders
- Hantavirus
- HPAI
- WNV
- Unknown Zoonosis (??)

Category IIB Risk: Serious
- PAPR or SCBA
- Double gloving
- Water-resistant, washable, or disposable coveralls and boots
- Cut resistant gloves
- Tape
- Apron (cut resistant)
- Disinfectant

Examples
- Hendra
- Nipah
- Q-lever
- RVF
How do you determine PPE

- Suspected Disease Agent
- Mode of Transmission; Airborne, Parenteral, Ingestion, etc.
- Availability of Vaccine / Treatment
- Infectious Dose
- Use of PPE Decision Tree to Determine Proper PPE
- In an outbreak situation this will be determined by the safety officer
PPE

- Latex Gloves
- Thick Rubber Gloves
- Cut Resistant Gloves
- Waterproof Coveralls, Hood, Hair Cover
- Respirator, Powered Air Purifying Respirator (PAPR)
- Goggles, Face Masks
- Rubber Boots, Boot Covers
- Cut Resistant Apron
- Ear Plugs
Clinical Comparisons: Snouts
Accurate, timely sampling is always required

- Swine Vesicular Disease
- Foot and Mouth Disease
- Vesicular Stomatitis
- Vesicular Exanthema
PLATE 32: SWINE VESICULAR DISEASE DERMATITIS

The several pale, slightly raised plaque like lesions on the udder proper and the teats are areas of epithelial degeneration and necrosis. Several have a brownish red, cratered center of ulceration remaining after the epithelium had sloughed. This was a natural case of swine vesicular disease. One has to differentiate this lesion from other viral diseases making similar lesions such as foot-and-mouth disease, vesicular exanthema and vesicular stomatitis.
PLATE 31: SWINE VESICULAR DISEASE DERMATITIS

These two opaque plaque like vesicles on one side of the snout are the early lesions of degeneration and necrosis in the epithelium caused by the virus. Similar lesions may be seen on the udder and in the interdigital spaces. With time, they will slough centrally leaving a central reddened ulcer and a peripheral zone of opaque, swollen epithelium. A nonsuppurative encephalitis with a fairly characteristic partial wall necrotizing vasculitis with many neutrophils is commonly observed and was seen in this natural case of swine vesicular disease.
Differentials for Vesicular Diseases in Cattle

- Foot and Mouth Disease
- Vesicular Stomatitis Virus
- Infectious Bovine Rhinotracheitis
- Bovine Virus Diarrhea
- Malignant Catarrhal Fever
- Epizootic Hemorrhagic Disease
- Trauma
- Papular Stomatitis
- Bovine Mammilitis

- Primary Thermal Injury – Sun Burn
- Photosensitization Dermatitis – secondary thermal injury (Mold Toxicities, Lantana Poisoning, Clovers, etc)
- Chemical Burns
- Rinderpest
- Bluetongue Virus
- Foot Rot
- Trauma
Vesicular Diseases

Remember:
all vesicular diseases look alike
YOU MUST SAMPLE

Repeat: you must sample

If you can read this YOU MUST SAMPLE
SAMPLES: BETTER TO HAVE MORE THAN LESS

- The lab can always hold, later discard
TAIWAN FMD SAMPLES SENT TO PLUM ISLAND

- CHINA AIR
- CHINA AIR CUSTOMS
- SENT BY ME
- 25-35 SAMPLES
- ABOUT 10 SAMPLES HAD NO VIABLE VIRUS.
- I WAS SHOCKED
ON ARRIVAL AT PLUM ISLAND
ABOUT 10/35 SPECIMENS WERE NONVIVABLE.
Sample Collection

- Collect Proper Samples!
- Collect the Appropriate Number, Type of Samples for each Lab - Virology, Bacteriology, Toxicology, Pathobiology*
Submission for a multisystemic disease investigation

Liver
Lung
Kidney
Spleen
Colon
ileum
Heart with pericarditis
Improperly Shipped Lab Samples

YES: THE LAB WANTS SAMPLES. OK. Let’s send them a little bit of everything in ONE BAG! We must be sure not to forget a sample. The more the better! Put it in one bag so it does not get lost!
Improperly Shipped Lab Samples: ONTARIO Veterinary College necropsy room: circa 1970
Improperly Shipped Lab Samples
Specimen collection: constant, important process throughout disease investigation.
DIGITAL PHOTOS CAN ASSIST POLICY MAKERS

- DIGITAL PHOTOS OF HIGH PRIORITY CASES CAN BE ELECTRONICALLY SENT TO LAB AND ADMINISTRATION STAFF.
ENCOURAGE TAD SUSPECT CASES DIGITAL PHOTOS

ABOUT 50% OF THE SUSPECT FIELD TAD INVESTIGATIONS NOW HAVE DIGITAL IMAGES INCLUDED

DIGITAL IMAGES STRONGLY ENCOURAGED
CANADA TAD  FAD
INVESTIGATION

MULTIPLE EROSIONS,
ULCERS ON THE NOSE PAD
CANADA: CALF: HISTORY

- 2 WEEK OLD
- 2 CALVES OUT OF 40 AFFECTED
- ONLY ORAL LESIONS
- NORMAL TEMPERATURES
- EATING NORMALLY
- DRINKING NORMALLY
- Not lame: no hoof lesions
CANADA: CALF SPECIMENS COLLECTED:

- Scrapings from oral lesions: submitted in Vesicular Transport Media
- Clotted Blood: Serum Red Top tube
- Blood-Unclotted: Purple Top (EDTA)
CANADA TAD FAD INVESTIGATION

DIAGNOSIS

- CHEMICAL
- TRAUMA
- DERMATITIS
- FARM HAD A ROBOTIC FEEDER AND USED PHOSPHORIC ACID TO CLEAN LINES. A VALVE HAD STUCK OPEN AND PHOSPHORIC ACID WAS IN THE FEEDER NIPPLE
PEN SIDE TESTING with appropriate back up laboratory testing maybe useful
UK 2001 FIELD SURVEILLANCE
NEED A BETTER METHOD

ON CLEAR DAYS USE A DRONE?

THE FIRST THING I LOOKED FOR WAS A DOG TO RUN THE SHEEP

JAPAN: 2010

DI SINFECTION
THERMAL IMAGING
Techniques for Investigating Outbreaks of Livestock Disease

Robert F. Kohrs, DVM, PhD

Veterinarians in private or public practice are frequently asked to investigate outbreaks of livestock disease that appear unusual or that cannot be diagnosed readily. Frequently such investigations are requested after standard diagnostic or therapeutic procedures have failed to provide a satisfactory solution to the problem. Consequently, investigators may be required to reconstruct events after opportunities for necropsy, serologic tests, or agent identification have passed, and conclusions may be based on circumstantial evidence collected retrospectively.

In spite of these drawbacks, careful systematic investigation frequently provides information on which control measures can be instituted.

Objectives of Outbreak Investigations

The objectives of an investigation must be considered prior to its initiation. The objectives are to determine the cause (specific etiologic diagnosis), the source (how the animals were exposed), and the extent of the problem and then to take immediate corrective actions and make recommendations to prevent recurrences.

These objectives are best achieved by systematically delineating the characteristics of affected and unaffected animals within the premise. This analysis must be correlated with thorough physical examination and necropsy findings from representative patients.

Procedures for Outbreak Investigations

The steps in an investigation are described herein. It begins with an interview with the owner or manager and the veterinarian. This is followed by an examination of the premises, examination of affected and unaffected animals, then examination and necropsy of affected animals. The investigator must determine the attributes to be tabulated. These are traits attributable to disease, i.e., disease-dependent variables. Attributes may be clinical signs, lesions, positive test results, events (such as abortion or death), or carefully defined syndromes. The attributes selected must be easily identified because the tabulations require that each animal on the premises be distinguishable as possessing or lacking each attribute. When the size or inaccessibility of the study population prohibits direct observation and complete tabulation of the attributes of each animal, a more accessible (but indirect) indicator of disease may be used. Thus, the impact and distribution of disease in large populations can sometimes be estimated from records of body weight gain, milk production, reproductive performance, drug and biologic use, hospital admissions, or "scratches" at race tracks.

The interview is best conducted with partially pre-coded questionnaires designed for the species involved. A single form is not ideal for all situations, but there are basic questions that must be asked, and blank space can accommodate other questions.

During the interview, the episode is oriented in time and space by establishing the location and identification of the first case (index case). The day when it was first recognized (index date), and the time and place of subsequent onsets. The source of replacement stock, vaccination programs, feeding programs, methods of crop or pasture fertilization, irrigation, insecticide applications, any changes in employees, and other possible exposure factors and their temporal relationship to the onset of disease must be recorded. The interviewer should inquire about illness among employees and their families and about similar diseases reported in the area.

The interview may last several hours. When possible, it yields a list of all animals on the farm. This is sometimes called a line listing, and ideally it should include age, sex, breed, use, origin, location, feeding, and breeding status of each animal.

Examination of Premises—After the interview, the premises should be examined carefully. This should be done before the final diagnosis is determined, to prevent biased searching for factors substantiating the diagnosis. Examination of the premises involves examination of water supplies, pastures, and storage areas, the mass storage of equipment, lubricants, chemicals, and fertilizers. It should include an evaluation of local geography, flow direction of streams, and location of well and location of adjacent properties. Information about adjacent properties should be obtained.

During examination of premises, subtle questioning should reveal what type of managerial practices are conducted and what changes, if any, have been instituted.

Examination of Healthy Animals—The examination of healthy animals should precede examination of sick animals, to avoid risk of spread of infection and to help avoid any procedures that may develop after the investigator decides on a clinical diagnosis. Frequently the "healthy" animals are also sick, but if they are not, it should be...
Center for Food Security and Public Health
Foot and Mouth Disease Information

• FMD Response
• http://www.cfsph.iastate.edu/emergency-response.php
  – Phases & Types of an FMD Outbreak
  – FMD Vaccine Surge Capacity for Emergency Use in the US
  – The FMD Red Book
  – NAHEMS Guidelines on Continuity of Business
  – Appendix A – Vaccination for FMD
  – Inactivation of FMD Virus in Milk Products
  – FMD in Pigs- Progression of Lesions
Emerging and Exotic Diseases of Animals

- Web based course used at all US colleges of veterinary medicine
- Part of the USDA Initial Accreditation Program for veterinarians
- Each student receives a copy of a textbook of the same name
- Course and Textbook are available in Spanish and being used in Central America
- Future goal: Obtain funding to develop an OIE Day 1 Competencies web based course
The newest Edition has been updated and expanded. Includes information on disease response and disease management for both the U.S. and Canada. Chapter 1 takes a global approach to the veterinarian’s role in disease management. The 75 animal disease fact sheets have been updated. The book contains 260 annotated images for 59 diseases.
REFERENCES


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LESSONS LEARNED

- An experienced, trained, well equipped FAD / Emergency program staff at the Federal, State and local levels is critical to containing, controlling, eradicating an FAD.

- The support of private practitioners and US Military veterinarians is critical to this response.
LESSONS LEARNED

Determining with any confidence the transboundary movement of an animal or zoonotic disease is very difficult.

OIE is critical to worldwide animal disease surveillance and does an outstanding job

The means of introduction of many TAD animal diseases is undetermined

Human vesicular stomatitis lesions
LESSONS LEARNED

- Several of these diseases are significant zoonotic diseases.
  - HPAI (H5N1), West Nile Virus, Screwworms, and Monkey Pox (END mild conjunctivitis)

- These diseases will require an enhanced “One Medicine” approach; with sharing of medical surveillance information as well as outbreak characteristics.
LESSONS LEARNED

- In cattle presenting with a vesicular disease there are several important differential diagnoses.
- They are all clinically similar
- Require rapid FAD investigation and lab confirmation
LESSONS LEARNED

- 1987-2007: Approximately 10 major FAD /EID entered the USA - 32 individual disease FAD events. Few have been traced to origin.

VSV: Colorado 1996
LESSONS LEARNED

- The historical partnership:
  - USDA
  - US Military
  - other US Government Agencies
  - State Animal Health Officials
  - Universities
  - Private veterinarians / Industry
  - “One Medicine” approach: ESSENTIAL!
WITH FMD EXPECT THE UNEXPECTED.
YOU DO NOT NEED A SLEDGE HAMMER TO DRIVE A TACK
use appropriate measures to complete the task at hand

GLOBAL FMD CONTROL
Simultaneous Event??

Foot and Mouth Disease

Vesicular Stomatitis Virus

Bluetongue
A VACCINE IS JUST ONE TOOL IN A TOOL BOX

There's only one way to kill poverty

The Silver Bullet

Fred Harrison
■ Vaccine: availability, amount, price.
■ Assets: vaccination crews
■ Record keeping
■ I am still looking for the 1995/1996 VSV USDA vaccination records.
Vaccination program requirements

- Need a well serviced animal health program
- Will require assets - bodies
- Training
- Vaccination protocol
- You may need a more organized VS in a vaccination program than in a cull program.
MARKETING OF NATIONAL VETERINARY MEDICINE
CONTACT INFORMATION

- Terrance M Wilson DVM, PhD, ACVP
- Veterinary Pathologist
- Animal Disease Detective- FMD Consultant-Emergency Response -Medical Intelligence
- Visiting Scientist : University of Miyazaki, Veterinary Faculty-Center for Animal Disease Control, Section for International Cooperation & Education, Japan
- amish234@comcast.net
Credits

- Tim Allen, Timothy: BS, MLS: USDA
- Amass, Sandra: DSVM, PhD: Purdue University
- Apicelli, Katherine: USDA/ DHS
- Ashford, David: DVM, PhD: USDA
- Brown, Corrie: DVM, PhD, University of Georgia
- Dussault, Clement: DVM- USDA
- Paula Cowen, USDA, APHIS, VS
- Lea Master, Bradley DVM, PhD: USDA
- Teachman, Mark: DVM, USDA
- Thurmond, Mark: DVM, PhD- UC Davis
- White, William: DVM, MPH: USDA
- Joseph Annelli, USDA, APHIS, VS
- Jon Zack, USDA, APHIS, VS
My sincere apologizes if I have overlooked anyone in the Credits.
THE END: ANY QUESTIONS