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UNIVERSITY OF MINNESOTA

College of Veterinary Medicine

VETERINARY CONTINUING EDUCATION



ST. PAUL, MINNESOTA
UNITED STATES OF MINNESOTA

Rabies Emphasis on the Bovine Species

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Minnesota Board of Animal Health**

Rabies is an acute viral encephalomyelitis affecting all warm blooded animals. Rodents and opossums may become infected but are not significant hosts. Because rabies can be readily transmitted to humans and because it is nearly always fatal it is probably our most dreaded zoonosis.

INCIDENCE

Rabies today exists nearly world wide with some notable exceptions; great Britain, New Zealand, Australia, and a few isolated islands.

The United States is currently experiencing an epizootic of rabies in racoons in the Mid-Atlantic States and a drastic increase in rabies in skunks, coyotes, and domestic animals in the Central States. According to the Center for Disease Control (CDC) in Atlanta the number of reported cases nation wide increased 43% between 1990 and 1991.. They also indicate that over 30,000 people in the US are treated for possible exposure annually.

Minnesota cases have followed the national trend. This increase mirrors the increase in the skunk population which is the up-part of a 5 to 7 year cycle. There were 318 total cases of rabies in Minnesota in 1991, 48 of these in cattle. Minnesota in 1992 experienced 177 total cases with 24 bovine positives. Cattle are the most common domestic species affected in our state.

ETIOLOGY

The causative agent is a rhabdovirus and is truly neurotropic causing lesions only in nervous tissue. It is one of the larger viruses and is relatively fragile. It is susceptible to most standard disinfectants and dies in dried saliva in just a few hours.

TRANSMISSION

Most infections take place by the inoculation of the virus in the saliva when a victim is bitten by a rabid carrier. Rarely, rabies may be transmitted by viral contamination of fresh, already existing wounds. Public health officials define "fresh" as a wound less than 24 hours old. Saliva contamination of a wound older than 24 hours ordinarily does not constitute an exposure.

Rabies has also been transmitted to man by aerosol inhalation in the laboratory and in

bat infested caves. Oral ingestion of the virus has experimentally caused the disease in mice with the virus passing through the oral mucosa, the lung and the intestine and on to the brain. This movement accounts for the extremely variable incubation period which varies to a large extent with the site and severity of the wound. Bites on the head usually result in a shorter incubation period than bites on the extremities.

Once reaching the brain, the virus travels to the salivary gland via their nerve supply. Blood-borne spread can occur but is rare.

CLINICAL SIGNS

We will restrict the signs discussed here primarily to the bovine species. Veterinarians dealing with frequent rabies cases insist that the only thing typical about bovine rabies is that there are no "typical" signs as we know them in other disease conditions. Rabies continually challenges the expertise of even the most experienced clinician.

A partial listing of the possible symptoms follows:

- A change in behavior
- May appear depressed or may act "alert", "wide-eyed" and aggressive
- A preference for solitude
- Sudden drop in milk production
- Temperature usually normal but may be as high as 105 degrees early due to increased muscular activity.
- Anorexia (occasionally cattle will eat and drink well into the course of the condition)
- Drooling of saliva
- "Yawning" movements or the "voiceless bellow"
- Knuckling of the fetlocks
- Sagging or swaying while walking
- Flaccid tail
- Decreased sensation to touch
- Tenesmus
- Cattle may chase or butt ANY object
- Irritation or stimulation of the urogenital tract
 - Erection or "riding" in bulls
 - Prolapse or paralysis of penis
 - Estrus signs or "riding" in females
- Frequent, sometimes almost constant bellowing, very characteristic, loud, often hoarse
- As disease progresses, the bellowing will become less frequent, more hoarse, almost "bubbly"
- Progressive paralysis
- Occasional animal may be found down and unable to rise. Appears as spinal injury. These animals may seem to eat and drink normally.
- Death occurs in 1 to 9 days, usually 4 to 5 days

DIFFERENTIAL DIAGNOSIS

- Lead toxicity
- Spinal injury
- Hypocalcemia
- Listeriosis
- Ketosis
- Respiratory disease complex
- Polio & thrombo
- "Choke"
- Abomasal upsets/displacement
- Cystitis
- Grass tetany
- The list may be endless

DIAGNOSIS

A clinical diagnosis is rarely easy, especially early in the course of the disease. Veterinarians in endemic areas have an advantage because of experience and a valuable "awareness" that develops.

Laboratory diagnosis is essential with the FA (fluorescent antibody) test being the test of choice. It can establish a highly specific diagnosis within a few hours. Any possibility of human exposure mandates the effort requested to obtain laboratory confirmation, **WITHOUT DELAY!**

CASE REPORTS

I would like to include three actual rabies cases in the words of the veterinarian experiencing the case as I believe they demonstrate how difficult it can be to make an early diagnosis of bovine rabies.

Case 1: Dr. Larry Johnson; Red Lake Falls, MN

"Yearling steer, initially noticed he was ataxic, would fall a lot while walking. When aided to become sternal, the could rise nd walk away. Would place nose in water but would not drink. No bellowing. For the next 3 days he became more ataxic and eventually could not rise. Euthanized and rabies positive".

Case 2: Dr. Ken Learmont; Gonvick, MN

"A dairy cow that had calved the previous day, not eating and somewhat weak. Typical early milk fever? She was also passing frequent, small amounts of urine and acting like dysuria. Calving injury or cystitis? Temperature normal, rumen contractions normal, no vaginal tears. Initial treatment was Cal-phos IV and amoxicillin. The next day she was

still straining and passing small amounts of urine. Her appearance was not right. Rabies? Two days later she died and the autopsy showed no visible lesions. Lab exam: Rabies positive."

Case 3: Dr. Learmont

"Dairy cow, not eating, rumen contractions normal, temperature normal, 4 months pregnant. Treated with probiotic via stomach tube. She reacted wildly to the treatment and handling. Two days later she was not better but bright and alert with no new symptoms. Rabies was suspected; two days later she was in a convulsive state, was euthanized and was rabies positive."

"I begin to suspect rabies and question my original diagnosis when the appearance of the animal begins to seem extraordinary, something inconsistent with the standard behavior of the original diagnosis. When human exposure occurs, it is almost always associated with the treatment, or with the feeding of the animal."

TREATMENT

There is no treatment for rabies once symptoms have developed. Thorough washing of the fresh wound with an antibacterial-antiviral agent may be helpful following any biting incident.

PREVENTION

Prevention lies in two area:

- Reduce exposure

There may be little we can do to prevent exposure other than promote the regular vaccination of farm dogs and barn cats when possible. Spread from one domestic herbivore to another just does not seem to occur. Isolation of a clinical case is preferred but often impractical. Strong recommendations to the owner to guard against human exposure to saliva from feed, water, mangers, ropes and halters or utensils that have become contaminated are necessary.

- Vaccination

Routine vaccination of food animals is not common. With the advent of improved, killed rabies vaccines licensed for use in cattle, horses, and sheep, many veterinarians are routinely vaccinating herds in high-exposure areas. These vaccinated animals should be identified and the vaccination documented by the veterinarian administering the vaccine. Ear tags, names, pen or barn ID's and specific dates should be recorded. IN Minnesota these animals are handled differently if exposed than exposed non-vaccinates. They will be under owner observation for 990 days rather than

quarantined for the 90 day period.

Vaccines currently licensed for bovine use are:

- * Rabguard TC Smith Kline Beecham
 - cattle, sheep, horses icc annually with primary vaccination at 3 months
- * Defensor Smith Kline Beecham
 - cattle, sheep 2 cc annually with primary vaccination at 3 months
- * RM Imrab 3 Rhone-Merieux, Inc.
 - cattle, sheep, horses and ferrets 2 cc for cattle, horses & sheep. Annual boosters for cattle & horses. Triennial boosters for sheep. Initial vaccination at 3 months.

All have 21 day slaughter withdrawal.

There are currently no vaccines licensed for post-exposure management of food producing animals available. Nor are there any post exposure regimens published or recommended by any biological manufacturer using existing vaccines. Any post-exposure vaccination efforts by a practitioner must carry with them appropriate warnings that they are not proven effective and the standard quarantines and management procedures are still in effect. There are no indications from any the biological firms that any work is being done to produce a post-exposure product due to the cost involved and the limited application. Pre-exposure vaccination and prevention is much preferred.

REGULATORY ASPECTS

Enclosed you will find a Rabies Exposure Flow Sheet you may find helpful to you and your staff. It contains information on quarantines and regulations used in Minnesota. These may vary from state to state.

Also please refer to the Annual Compendium of Animal Rabies Control published by the National Association of Public Health Veterinarians in each January issue of the Journal of the AVMA. It may also be provided to you by your State Board of Animal Health.

This publication contains the very latest information available on rabies control and standardizes procedures throughout the United States.

ACKNOWLEDGEMENTS

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The Merck Veterinary Manual, 5th Edition

Veterinary Medicine, Blood & Henderson, 4th Edition

Annual Compendium on Rabies Control, 1993 Edition

Minnesota Board of Animal Health

Smith Kline Beecham, Inc.

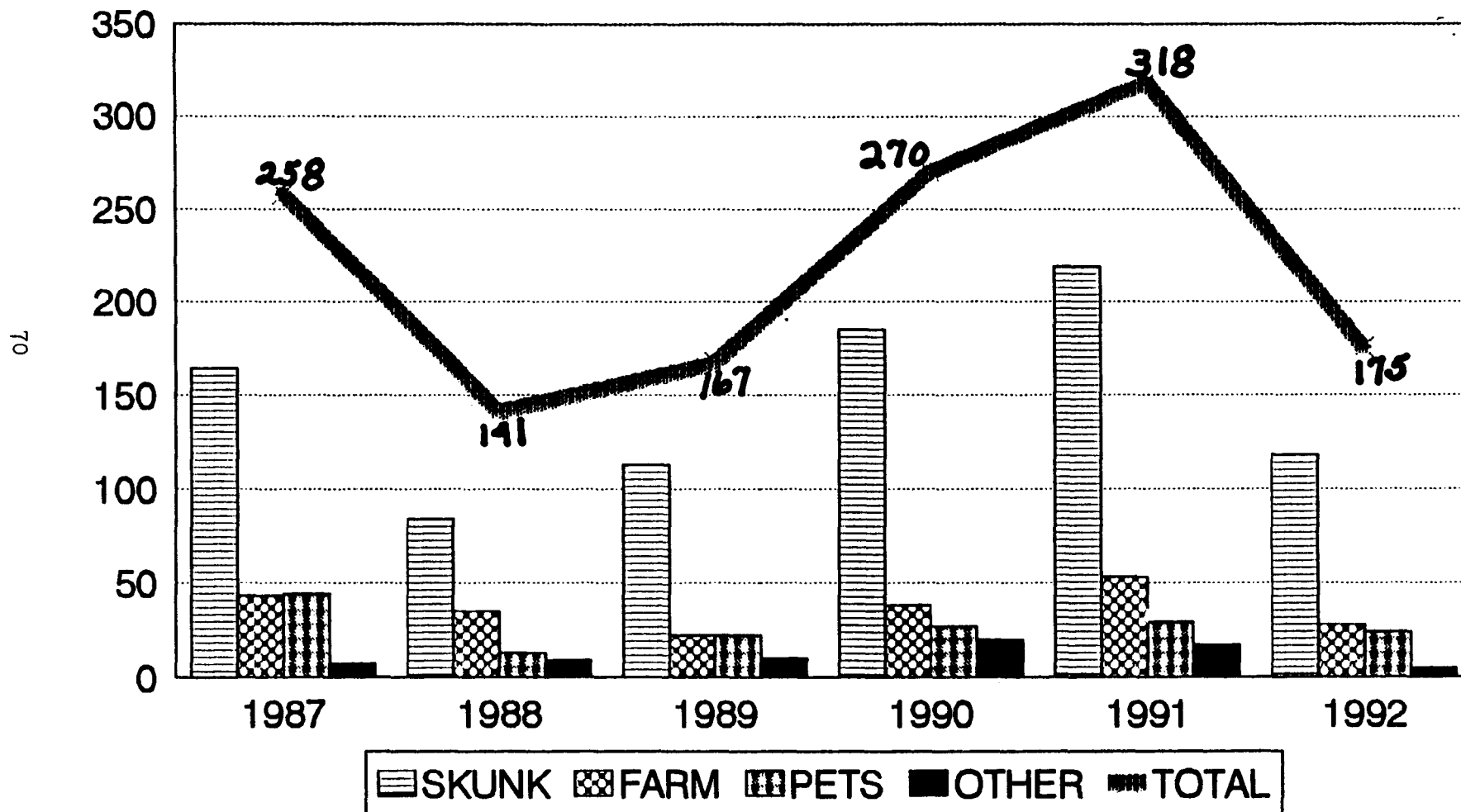
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Current Veterinary Therapy 2

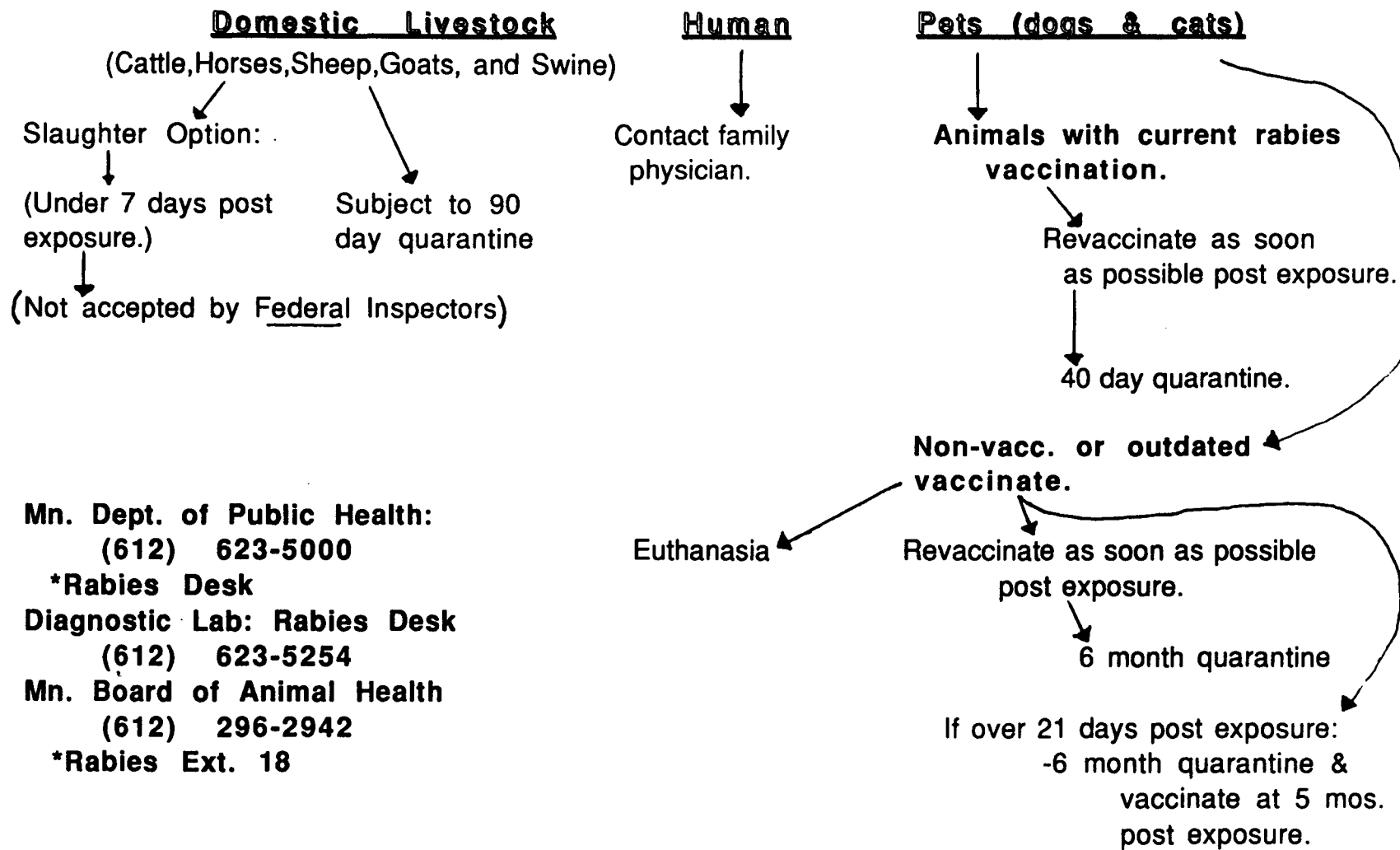
RABIES

1987-1992



RABIES EXPOSURE FLOW SHEET (MINNESOTA)

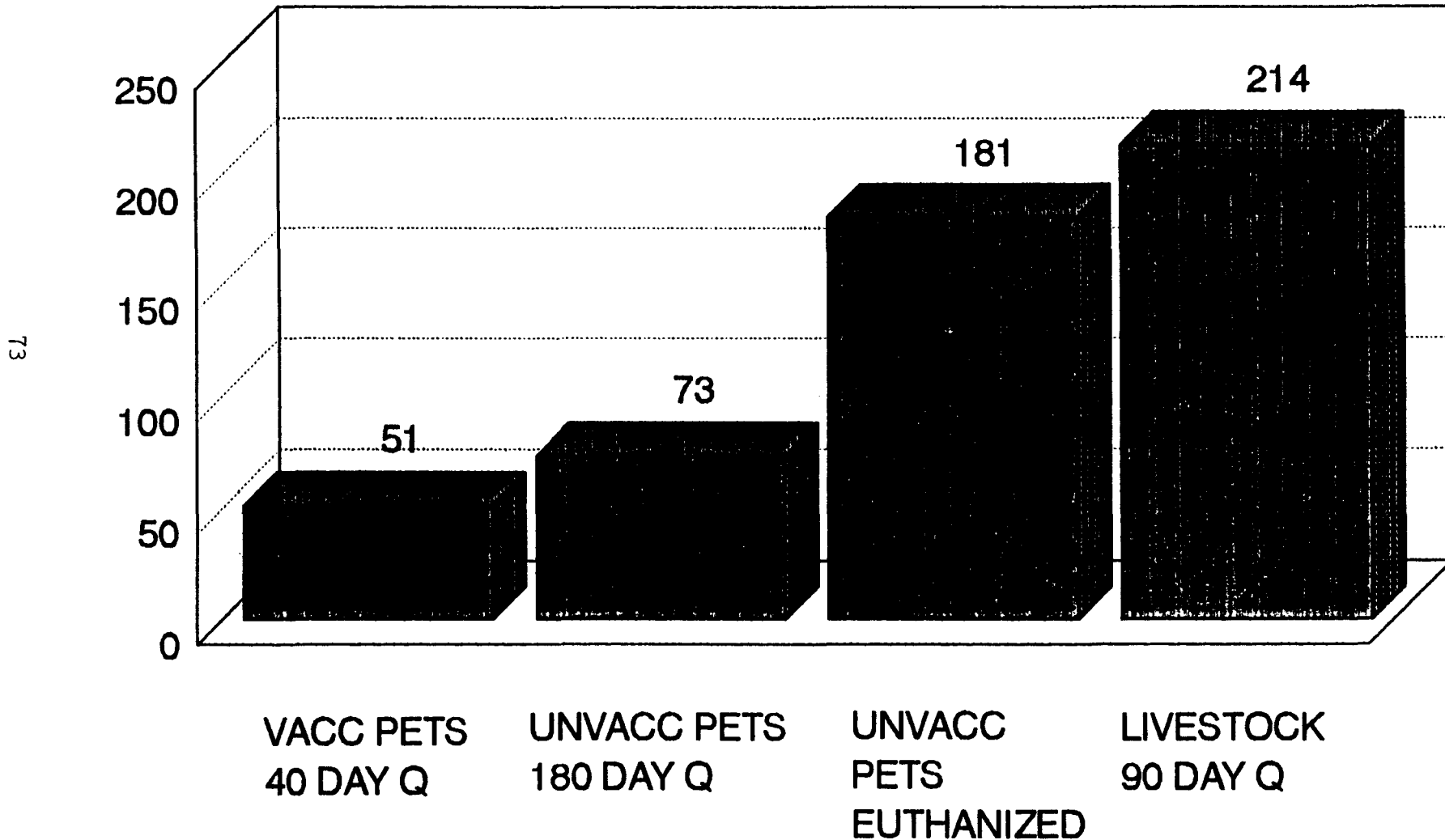
Use with known or probable rabies exposure.



Mn. Dept. of Public Health:
(612) 623-5000
*Rabies Desk
Diagnostic Lab: Rabies Desk
(612) 623-5254
Mn. Board of Animal Health
(612) 296-2942
*Rabies Ext. 18

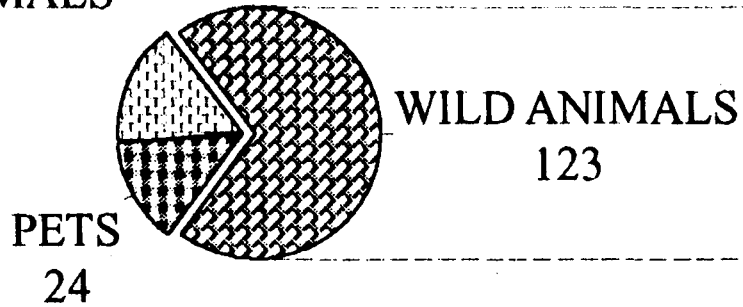
INVESTIGATION RESULTS - 1992

ANIMALS QUARANTINED OR EUTHANIZED



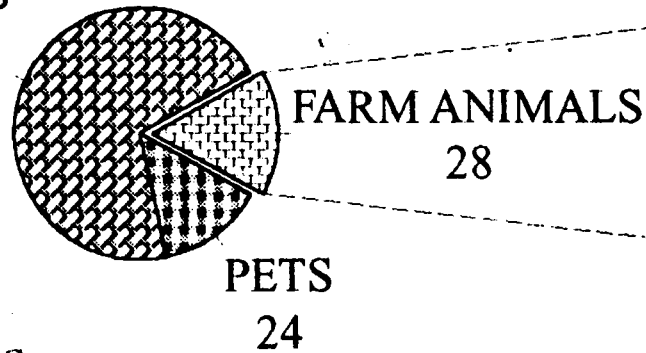
RABIES - 1992

FARM ANIMALS
28



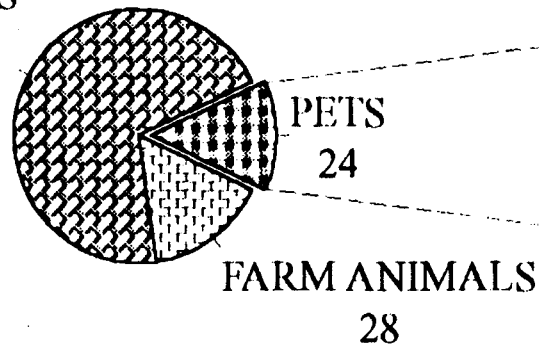
OTHER
2
SKUNKS
118
BATS
3

WILD ANIMALS
123



GOAT
1
BOVINE
22
EQUINE
5

WILD ANIMALS
123



CATS
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DOGS
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