



NYSCAP and Foot Health



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Today's agenda

- Brief discussion of NYSCAP
- Overview of foot anatomy, lesions and record keeping
- Lameness scoring systems and detection on-farm
- Determining risk factors contributing to lameness

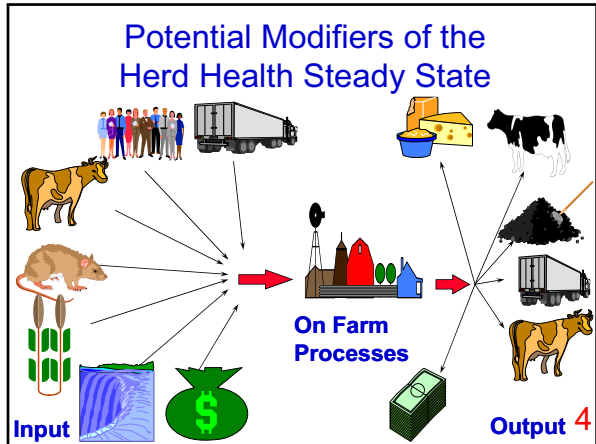
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NYSCAP – 1998



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NYSDAP Requirements and Incentives

- Incentives
 - Professional voucher
 - testing discounts – bulk tank, Johne's




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NYSCAP Modules

- Core
- BVD
- Salmonellosis
- Johne's Disease
- Mastitis
- Expansion Biosecurity
- Market Cow and Bull Quality
- Bovine leukosis virus
- Foot health

NOTES
 Voluntary
 Confidential
 Individual herd plan
 Continuation based on individual improvement

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Herd plan based on information collected and team discussion

- Goals
- ID
- Treatment records
- Incoming animals
- Milk production/quality
- Vaccination program
- Employee management
- Calving pen management
- Calf health
- Weaned heifer health
- Transition cows
- Repro
- Lameness
- culling
- Infectious disease
- Johne's disease

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NYSCAP Herd Plan			
Farm: _____		Date: 8/17/07	
Management Topic	Person Responsible	Frequency, system or completion goal	Quarterly assessment of progress (checked & date by extensionist)
Maintain a herd assessment inventory. Ensure that all employees are trained in biosecurity measures and understand the herd plan. Review plan with Dr. Johnson at least bi-annually and make any necessary changes.		Regular and herd meeting	
Reduce BVD infection at the finished farm: <ul style="list-style-type: none"> • Evaluate and monitor weekly meeting with Dr. Johnson • Focus on management decisions with BVD-free high SCC cows - make decisions regarding culling or culling status • Monitor herd cow health and consider using BVD-free • Train staff to identify clinical mastitis signs • Provide only water to drinking in other meeting meetings with Dr. Johnson 		Regular	
Control mastitis through herd-level action: <ul style="list-style-type: none"> • Work closely with Johnson to offer & follow that meets the needs for the herd for their individual herds • Work with Johnson on all other and looking for the best in mastitis herd & problems when entering the meeting herd • Consider purchasing a pasture for lactating 		Regular	
Work with Dr. Johnson: <ul style="list-style-type: none"> • Review the NYSCAP herd plan • Sign up on the system to track the collection 		When needed	
Control mastitis through herd-level action: <ul style="list-style-type: none"> • Review the herd plan and all cows when the herd does not have to enter the herd plan. Monitor any that may not happen and give have a different number. At that point, staff will have to update the plan. 		When needed	

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NYSCHAP Annual Evaluation

Project Name: _____
 Group Name (Dept): _____
 Date: _____

Intervention Goals:	Assessment:	Assessable Program:
<p>1. Increase the number of participants in the field of the expanding dairy operation. Be sure that all participants are trained in biosecurity, equipment and antibodies for BVD/Bluetongue. Review plans with the Department to meet best practices and under the economic changes.</p> <p>2. Increase the number of participants in the field of the expanding dairy operation. Be sure that all participants are trained in biosecurity, equipment and antibodies for BVD/Bluetongue. Review plans with the Department to meet best practices and under the economic changes.</p>	Direct	Yes
<p>3. Increase the number of participants in the field of the expanding dairy operation. Be sure that all participants are trained in biosecurity, equipment and antibodies for BVD/Bluetongue. Review plans with the Department to meet best practices and under the economic changes.</p>	Facilities to be used	Yes
<p>4. Increase the number of participants in the field of the expanding dairy operation. Be sure that all participants are trained in biosecurity, equipment and antibodies for BVD/Bluetongue. Review plans with the Department to meet best practices and under the economic changes.</p>	Lameness has not been a problem	Yes
<p>5. Increase the number of participants in the field of the expanding dairy operation. Be sure that all participants are trained in biosecurity, equipment and antibodies for BVD/Bluetongue. Review plans with the Department to meet best practices and under the economic changes.</p>	Facilities are in good condition. Good location for facility built 2012 in place	Yes
<p>6. Increase the number of participants in the field of the expanding dairy operation. Be sure that all participants are trained in biosecurity, equipment and antibodies for BVD/Bluetongue. Review plans with the Department to meet best practices and under the economic changes.</p>	Direct	Yes
<p>7. Increase the number of participants in the field of the expanding dairy operation. Be sure that all participants are trained in biosecurity, equipment and antibodies for BVD/Bluetongue. Review plans with the Department to meet best practices and under the economic changes.</p>	Direct	Yes

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NYSCHAP Foot health module

Why?

- Lameness major cause of financial loss from milk loss, delayed conception, treatment and culling
- NY herds average economic loss per case = \$350
- Studies find range of prevalence from 12-30%
- Cornell research ~30%

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Lameness effects on reproduction*

- Cows having a locomotion score of >2
- **2.8** time more likely to have increased days to first service
- **15.6** times more likely to have more days open
- **9.0** times more likely to have increased services/conception
- **8.4** times more likely to be culled

*Zinpro

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Lameness effects on milk yield*

- ⇒ Cows at **Score 2** can have up to **2%** milk loss
- ⇒ Cows at **Score 3** can have up to **4%** milk loss
- ⇒ Cows at **Score 4** can have up to **9%** milk loss
- ⇒ Cows at **Score 5** can have up to **15%** milk loss

*Zimpro

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How much does lameness cost?*

Management level	Score 1	Score 2	Score 3	Score 4	Score 5	Lost revenue per year
Good	50%	30%	15%	4%	1%	\$56,940
Average	40%	25%	22%	10%	3%	\$96,360
Poor	25%	25%	30%	15%	5%	\$131,400

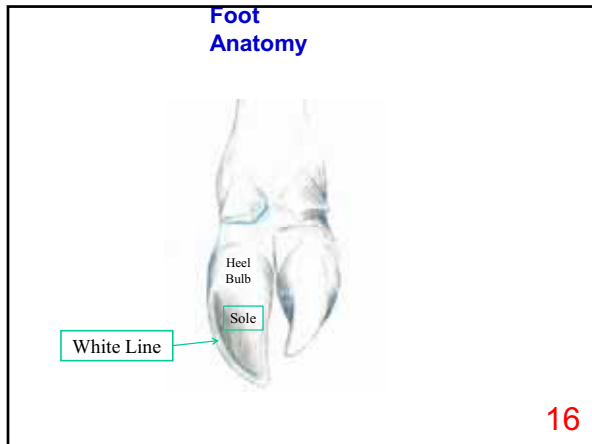
*Zimpro


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Foot Anatomy



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Main Causes of Lameness

- Two Categories
 - Non-infectious
 - ⇒ Laminitis and related lesions including:
 - White line disease
 - Sole ulcers
 - Infectious
 - ⇒ Digital dermatitis (heel warts)
 - ⇒ Interdigital dermatitis
 - ⇒ Foot rot

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Laminitis

- Many times this is an underlying problem and the classic acute lameness is not seen
- Two main areas to consider
 - Nutrition
 - ⇒ feeding management
 - ⇒ feeding behavior – slug feeding
 - ⇒ change in body condition score
 - Environment

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White line disease

- Lesion can present as:
 - Fissure
 - Hemorrhage
 - Abscess
- Outer claw of rear foot is most commonly affected



White Line Disease. Picture used with permission from Dr. Nigel Cook, University of Liverpool, Merseyside School of Veterinary Medicine.

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Sole ulcers

- Usually on sole, although can be in the toe or heel
- Outer claw of rear foot is most commonly affected
- Caused by a disruption in normal horn-producing cells



Sole Ulceration. Picture used with permission from Dr. Ed Gerrard, College of Veterinary Medicine, University of Illinois - Urbana-Champaign.

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Infectious Causes

- Primary consideration is to keep all cow areas as clean and dry as possible



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Digital dermatitis (Heel warts)

- Infectious disease thought to be related to an infection from spirochete in the genus *Treponema*
- Most commonly presents on rear foot



Digital Dermatitis (Heel warts)
Photos used with permission from Dr. Ed Garrett, College of Veterinary Medicine, University of Illinois at Urbana-Champaign

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Interdigital dermatitis

- Very common chronic infectious disease of the skin around the claws and often presents as 'pitting' of the heels
- The primary causal agent is *Dichelobacter nodosus*
- Spreads from cow to cow through the environment and particularly through manure
- Often all four feet are involved

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Foot rot (Interdigital Phlegmon)

- Infectious disease caused primarily by two bacterial organisms (*Fusobacterium necrophorum* and *Bacteroides melaninogenicus*)
- Typically have symmetrical swelling above both claws and necrosis of the skin in the interdigital space



Foot Rot Picture used with permission from Dr. Ed Garrett, College of Veterinary Medicine, University of Illinois at Urbana-Champaign

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Claw Trimming

⇒ Keep records of trim events including:

- ⇒ Cow ID
- ⇒ Foot affected
- ⇒ Type of lesion
- ⇒ Treatment

⇒ Foot trimmers record sheet

- Does your trimmer have one?
- Consistent records
- Review on a periodic basis

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Claw Trimming

⇒ Is there someone to trim a lame cow the first day she is detected as lame?

⇒ If an outside trimmer is used do they have enough time to address both lame cows and routine trims?

⇒ How often are they on the farm?

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Lameness Detection

⇒ Who is responsible for lameness detection?

⇒ Are they properly trained to detect lame cows early?

- Locomotion Scoring
- Tiestall evaluation

⇒ How do they record this information and who is accountable for following up on these cows?

⇒ Free stall or tie stall – Doesn't matter, still important

⇒ Locomotion Score Recording sheet

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Process to score

1. Cows that were lying down were made to stand up (for at least 3 minutes)
2. Standing posture of the cow was evaluated for the 5 behavioral indicators
3. Cow was then made to move from side to side
4. Standing posture was re-evaluated
5. Any cow demonstrating at least 2 of the behavioral indicators at any point in the evaluation was scored as lame

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Risk Evaluation Process

- Examine all areas in the farm that will impact foot health using the risk evaluation form
- Identify areas of concern
- Team meeting to determine action items
 - Team may include producer, key managers, herd veterinarian, NYSCHAP veterinarian, nutritionist, hoof trimmer

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Time Budgets

Cows' daily chores include eating, ruminating, drinking, standing around, socializing, getting milked, and resting. Additional required chores – cleaning the barn and herd-health work – take time away from the cow. Resting time is the part of the cow's day that usually disrupts.

Time cows spend eating, drinking and socializing is about 8.5 hours. Cows also require 12-14 hours of rest. To allow the cow this time, producers are left with just 3.5 hours a day to fit in other management tasks.

The short term cost of reducing resting time may be 2 to 3 lb milk per hour of rest lost. Longer term costs may include increased lameness and decreased reproductive performance. Overcrowding and excessive parlor hold times are two of the main impositions.

Look for ways to reduce "imposition time" by splitting groups at milking, enhancing parlor routines and cow flow, judiciously using lock-ups, and reducing overcrowding.

Stall Usage Indexes

Stall usage indexes provide an indicator of stall acceptance. An index that has been associated with herd-mean standing time and increased levels of lameness is the **Stall Standing Index**, or **SSI**. This is the proportion of cows touching a stall (i.e., lying or standing) that are standing. Because lying behavior changes during the day, it is important to make this observation approximately 2 hours before milking.

Target goal for SSI 2 hours before milking is less than 0.20, or 20%. Anything greater indicates the group's average standing time is abnormally long.

Rumination

Rumination enhances saliva flow, providing buffers that act to raise rumen pH. This, in turn, reduces the risk of rumen acidosis and laminitis, and enhances ruminal digestion.

On average throughout the day, you should expect to see 50 to 60% of cows ruminating while lying in the stall. There are times throughout the day when this percentage will be higher or lower. Observe at least 20 cows that are neither eating nor sleeping.

Lameness & Hocks

You can most easily score lameness when cows are moving, such as walking to the parlor. The prevalence of lameness is influenced by a number of variables – the major ones being stall usage, standing time on concrete, the ration, control of infectious diseases, and hoof trimming programs.

You can best score hocks when cows are standing or lying down. Generally one hock per cow is scored. Inadequately bedded stalls often create hock problems. Cows kept in stalls deeply bedded with sand or manure solids typically have good hock scores, while those with a stable surface (e.g. mat or mattress) and minimal bedding will produce elevated scores.

Evaluate lameness and hock scores in your herd at different times of the year and use the targets provided on the chart.

Herd Bunching

Cows will bunch together when stable flies are biting and when they are heat stressed.

Determine if flies are causing the bunching by looking for twishing tails or tail stubs, stamping legs, or the occasional fly on the lower part of the legs.

Heat Stress

In barns with inadequate cow cooling, respiratory rates increase about 1.5 beats per minute (bpm) per deg. F. as temperatures move above the upper limit of a cow's thermoneutral zone, which is approximately 68 deg. F., depending on humidity. Cows will exhibit increased standing as their rectal temperature exceeds 102 deg. F.

Target goals to control heat stress are:

- Maximum respiratory rates of 70 bpm
- Rectal temperatures below 102 deg. F.

Ventilation Management

Adequate air exchange reduces airborne bacterial numbers, humidity levels, noxious ammonia, and excess heat.

Use the following guidelines for naturally ventilated barns with minimal or no insulation:

- Winter: Barn air temperature within 5-10 deg. F. of ambient temperature.
- Spring, Summer, Fall: Barn air temperature equal to ambient air
- You need more ventilation if ammonia or other odors are evident.

Floors

Injuries can easily occur when housing floors are too slippery, and hoofs can wear thin when floors are too rough.

Grooves in concrete should be 0.5 in. deep and wide. Parallel grooves should be spaced 2-3 in. on center; grooves in a diamond pattern should be spaced 4-6 in. Concrete surfaces should be smooth, while the grooves should be cut at right angles and not have rough edges.

Soft rubber or well-grooved rubber belting can be used to improve the floor surface.

Resource List

General Dairy Facilities Resources:

Navigate these web sites to find information on all areas of cow comfort, including stalls, flooring, ventilation, heat stress, and foot and leg health.

PRO-DAIRY: <http://www.ansci.cornell.edu/prodairy/> (Click on “Dairy Facilities Engineering”)

Penn State Ag & Bioengineering Plans: <http://www.age.psu.edu/extension/ip/ipindex.html#DairyPlans>

University of Wisconsin, Food Animal Production Medicine: http://www.vetmed.wisc.edu/dms/fapm/forms_info.htm

Ontario Ministry of Agriculture, Food & Rural Affairs: <http://www.omafra.gov.on.ca/english/livestock/dairy/herd/house/index.html>

Supplemental Resources in Specific Areas:

Cow Comfort Evaluation:

“Score 7 Areas of Cow Comfort”: <http://www.ansci.cornell.edu/prodairy/manager/2006pdf/feb15.pdf>

“Using Indices of Cow Comfort to Predict Stall Use and Lameness”:

http://www.vetmed.wisc.edu/dms/fapm/publications/research_abs/Indicesand%20Comfort.pdf

Ventilation:

<http://www.vetmed.wisc.edu/dms/fapm/fapmtools/ventilation.htm>

Flooring Surfaces:

New Concrete: <http://www.bae.umn.edu/extens/ennotes/enwin98/dairycow.html>

Lameness:

<http://www.vetmed.wisc.edu/dms/fapm/fapmtools/lameness.htm>

Time Budgets:

Time Budget Evaluator: <http://www.whminer.com/Outreach/Time%20Budget%20Evaluator%20Institute%20v3.0.xls>

Stable Fly Control:

<http://www.ianrpubs.unl.edu/epublic/pages/publicationD.jsp?publicationId=547>

<http://www.nysipm.cornell.edu/factsheets/dairy/barnflies/barnflies.asp>



Use of Locomotion Scoring as a Management Tool

Locomotion Scoring System
 (Sprecher, et. Al, Theriogenology 47:1179, 1997)

Lameness Score	Clinical Description	Assessment
1	Normal	The cow stands and walks with a level-back posture. Her gait is normal.
2	Mildly lame	The cows stands with a level-back posture but develops an arched-back posture when walking. Her gait remains normal.
3	Moderately lame	An arched-back posture is evident both while standing and walking. Her gait is affected and is best described as short-striding with one or more limbs.
4	Lame	An arched-back posture is always evident and gait is best described as one deliberate step at a time. The cow favors one or more limbs/feet.
5	Severely lame	The cow additionally demonstrates an inability or extreme reluctance to bear weight on one or more of her limbs/feet.

Using locomotion scoring as a management tool:

- Goal—no more than 15% of each animal management group (lactating cows, dry cows, heifers) locomotion score >2.
- Be sure to have a regular hoof trimming program.
- One person on the farm should be designated as the point person for the lameness program. This person should be trained to identify lame cows and have the ability to make prompt decisions regarding these animals. It is recommended that all cows be scored weekly; record any animal with a score greater than 1.
- All farm personnel working with the cattle should be trained to recognize early signs of lameness on a daily basis.
- Use the definitions above and the Zinpro locomotion scoring chart to determine the locomotion scores of the cows. Be certain to score cows in an area where they can walk in a straight line at a comfortable pace on a flat surface with good footing.
- Those cows that score a 3, 4 or 5 need prompt treatment according to farm protocols. Inspect the foot to determine the problem and appropriate treatment. Contact the veterinarian as needed.
- Cows with a locomotion score of 2 should be noted. Determine if there are other health reasons that the cow might be walking with an arched back. If not, examine the feet. If nothing obvious is found monitor the cow several times a day for the next week.

Foot Baths – Key Points

1. Locate the foot bath in an area regularly traveled by cattle. The exit lanes from milking parlors work well.
2. Foot baths should be 8 to 10 feet long and approximately 3 feet wide with a depth of 6 inches. Locate foot baths on a level surface.
3. If practical, locate a foot bath containing water (pre-bath) preceding the treatment foot bath. This will help to clean cows feet prior to entering the treatment foot bath.
4. There should be a gap of 6 to 8 feet between the treatment and water (pre-bath) foot baths. Cows tend to defecate when entering foot baths. The 6 to 8 foot gap between foot baths allows cows to complete defecation prior to entering the treatment foot bath.
5. Foot bath solutions should be 4 to 6 inches deep to ensure adequate coverage of the foot area.
6. Change foot bath solutions after every 150 to 200 cows^a. This will vary due to reasons such as cow cleanliness, use of a pre-bath, type and concentration of medication used, and weather conditions.
7. Thoroughly drain foot bath and rinse with water before mixing a new batch of solution.
8. Alternate times for replenishing foot baths with fresh solution so each group of cows has access to fresh solution.
9. Cows should enter a clean dry area after passing through the foot bath.
10. Foot baths are most effective for treating diseases of the interdigital skin such as interdigital dermatitis and foot rot.
11. It is recommended that foot baths be used at least 3 to 4 days per week.
12. In arid regions, evaporation will concentrate active ingredients.
13. Formalin is not effective at temperatures below 45°F.



Picture courtesy J. K. Shearer, University of Florida

^a Manure deactivates the chemicals used in a foot bath; therefore, foot baths must be managed properly to achieve maximum effectiveness. A poorly managed foot bath can actually become a vector for certain infectious diseases of the foot.

Foot Bath Options

Maintenance Foot Bath Solutions

Product	Mix with water to achieve
Copper sulfate ^{ab}	5% - 10% solution
Zinc sulfate ^b	5% - 10% solution
Formalin ^c	3% - 5% solution
Mild soap	1 quart to 25 gallons water

Medicated Foot Bath Solutions

Product	Mix with water to achieve
Tetracycline ^d	0.1% solution (1 gram/liter)
Oxytetracycline ^d	0.1% solution (1 gram/liter)
Lincomycin ^d	0.01% solution (0.1 gram/liter)

^a Hot water will help dissolve copper sulfate. If using hard water, adding some vinegar will help dissolve solution.

^b Due to amount of trace minerals added, dairy producers should consult with their agronomist to determine potential implications of applying manure containing high levels of trace minerals. Some success has been reported using 15 to 20% zinc sulfate foot baths. However, producers may have trouble dissolving this amount of zinc sulfate and impact on zinc content of manure will be substantial.

^c 3 to 5 gallons of a 36% formaldehyde solution added per 100 gallons of footbath solution. In some areas, formaldehyde use is prohibited. Caution must be exercised when using formaldehyde as fumes are harmful to both cattle and humans. Use in a well-ventilated area and always wear protective eye wear. Furthermore, formaldehyde is a suspected carcinogen.

^d This represents extra-label use of these products. Dairy men must consult with their veterinarian for proper labeling and further instruction.

Foot Bath Calculations

To Determine Capacity of a Foot Bath

Multiply:

Length (ft) x width (ft) x depth (ft) x 7.46 =
Number of gallons

To Convert Gallons to Pounds

Multiply:

Number of gallons x 8.33 = Pounds of water

To Determine How Many Pounds of Dry Material to Add to Achieve the Desired Solution

Multiply:

Pounds of water x percent solution desired =
Pounds of dry product to add

Example: To achieve a 5% copper sulfate solution in a foot bath that measures 10 ft long, 3 ft wide, and 6 in deep.

$10 \times 3 \times 0.5 \times 7.46 = 111.9$ gallons

$111.9 \text{ gallons} \times 8.33 = 932.1$ lbs of water

932.1×0.05 (5% solution) = 46.6 lbs copper sulfate



Livestock Welfare Issues



Kathy Finnerty
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Nothing new...

- Upton Sinclair – *The Jungle*, written in 1906
 - Intended to expose "the inferno of exploitation [of the typical American factory worker at the turn of the 20th Century],"
 - Also highlighted animal treatment and food safety issues
 - Lead to Meat Inspection Act

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28 Hour Law

- Passed in 1873
- Repealed and reenacted in **1906** in amended form with no substantial changes
- May not confine animals in a vehicle or vessel for more than 28 consecutive hours without unloading in a humane manner for feeding, water and rest for at least 5 consecutive hours

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