

UBC animal welfare program

Cow comfort assessments and their implications




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Our Mission

To develop practical solutions to improve the health, longevity, productivity and welfare of dairy cattle




The Science Behind the Dairy Cow



- ✓ Focus on nutrition/reproduction/genetics
- ✓ Metabolic profiling
- ✓ Despite tremendous advances the incidence of post calving disease (including lameness) remains high
- ✓ Cow comfort?

The Art (& Science) of Cow Comfort

- Careful observation combined with experience!



The Science of Cow Comfort


- Detailed analysis of behavior
- Measures of injury and disease




The Science of Cow Comfort

- Detailed analysis of behavior
- Measures of injury and disease
- Preference tests

I'll take this one, thanks!



The Science of Cow Comfort

- Detailed analysis of behavior
- Measures of injury and disease
- Preference tests
- Measures of usage



Designing suitable environments for the dairy cow



Standing areas (not feeding)



Feeding

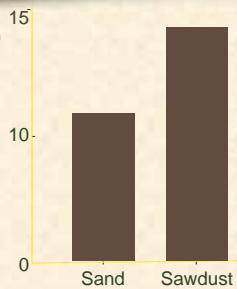


Lying

Design and management of the lying area: Bedding

Time lying (h/d)

Cows familiar with sawdust spend less time lying on sand...

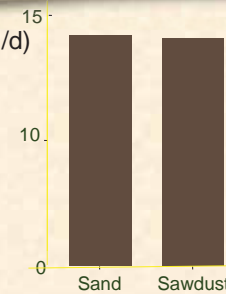


Tucker et al., 2003, J. Dairy Sci. 86:521-529

Design and management of the lying area: Bedding

Time lying (h/d)

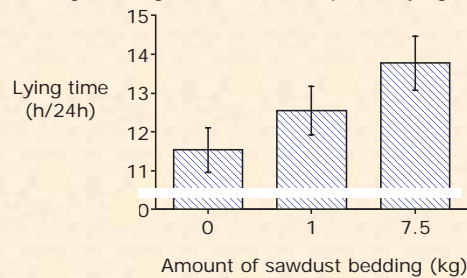
...but cows familiar with sand show adequate lying times on this surface.



Tucker et al., 2003, J. Dairy Sci. 86:521-529

Design and management of the lying area: Bedding

Adding bedding to mattresses improves lying times



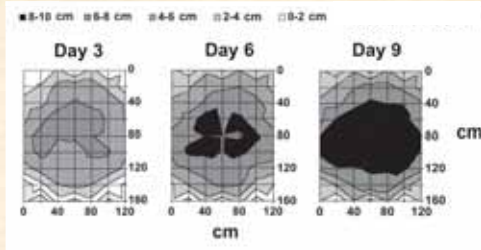
Tucker & Weary, 2004, J. Dairy Sci. 87: 2889-2895

Design and management of the lying area

Bedding in deep-bedded stalls



Design and management of the lying area: Bedding

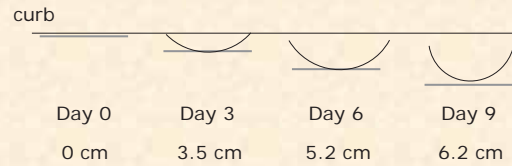


Days after sand bedding was added and leveled

Drissler et al., 2005, J. Dairy Sci. 88: 2381-2387

Design and management of the lying area: Bedding

Experimentally vary shape & depth

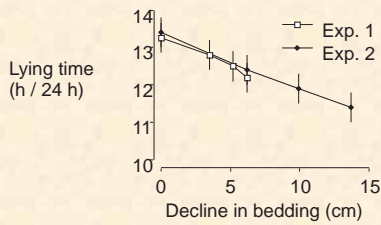


Drissler et al., 2005, J. Dairy Sci. 88: 2381-2387

Design and management of the lying area: Bedding



Cows spend less time lying down in stalls that have not been maintained



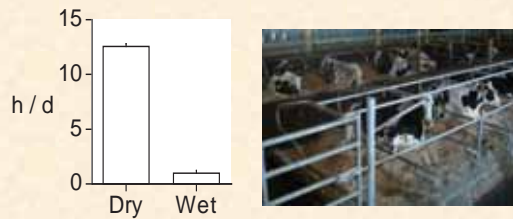
Drissler et al., 2005, J. Dairy Sci. 88: 2381-2387



Design and management of the lying area: Bedding



Strong preference for dry lying areas

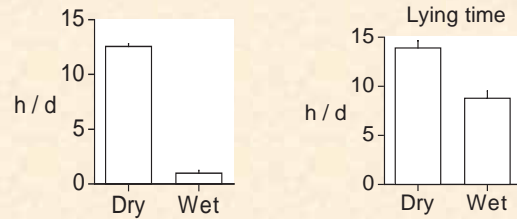


Fregenosi et al., 2007, J. Dairy Sci. 90: 5468-5472

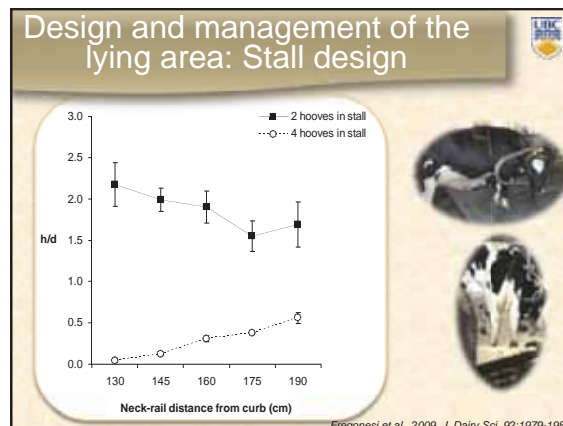
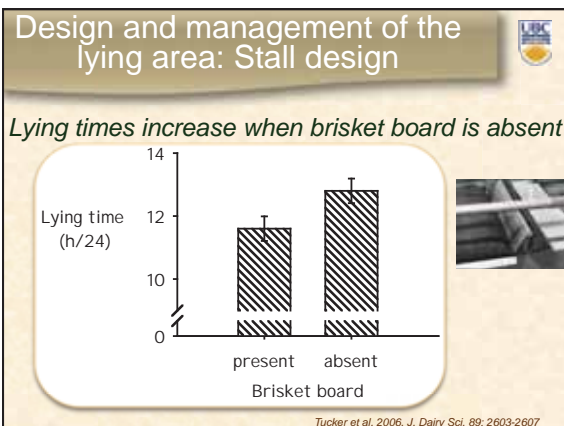
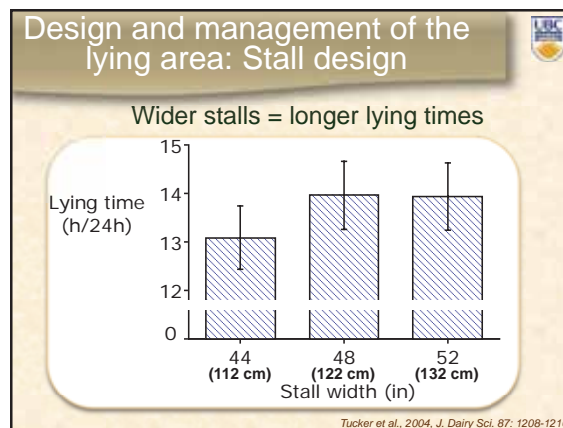
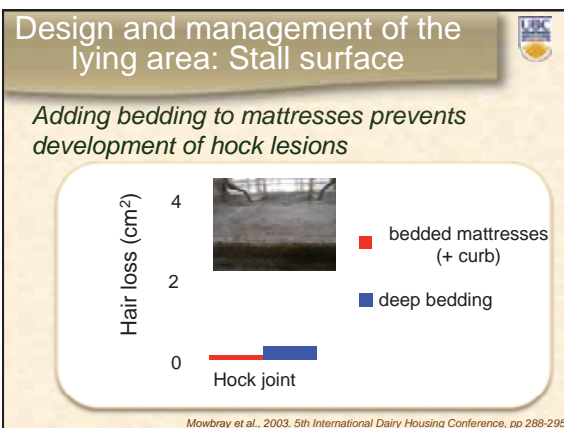
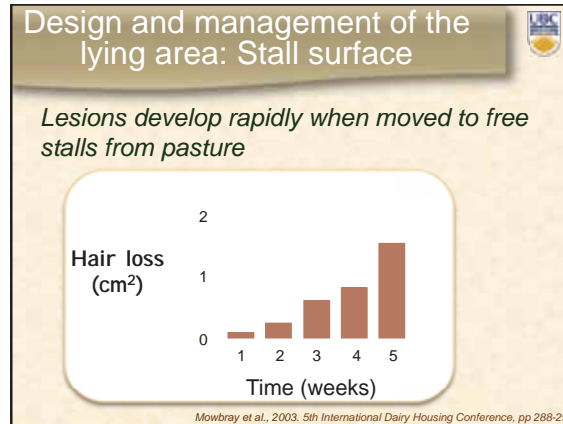
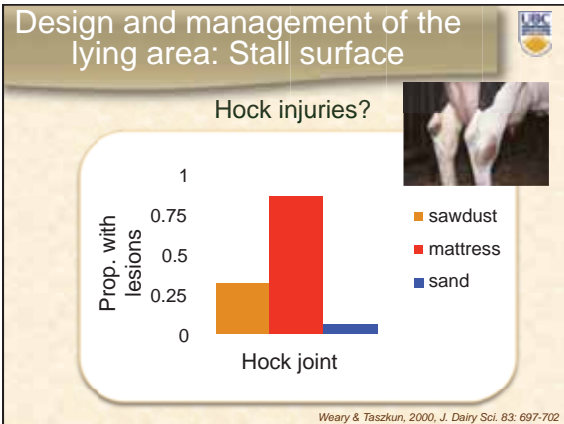
Design and management of the lying area: Bedding



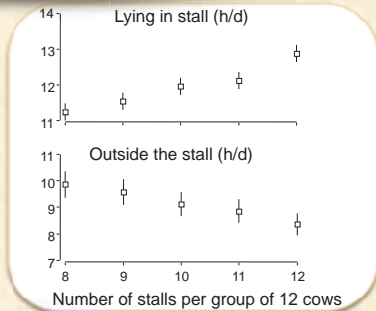
Dry lying areas = longer lying times



Fregenosi et al., 2007, J. Dairy Sci. 90: 5468-5472



Design and management of the lying area: Stall management

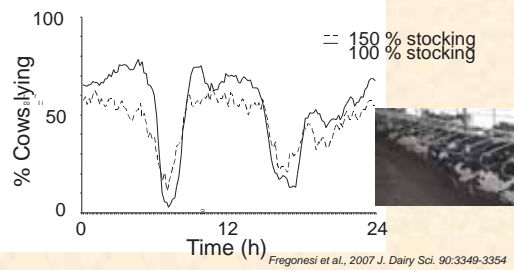


Fregonesi et al., 2007 J. Dairy Sci. 90:3349-3354

Design and management of the lying area: Stall management



Cows spend about half their time lying down - but this time is synchronized



Fregonesi et al., 2007 J. Dairy Sci. 90:3349-3354

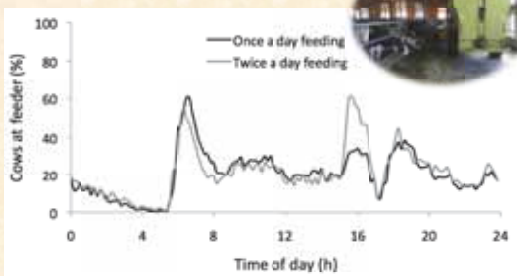
Design and management of the feeding area



Feeding management – once vs twice a day feed delivery?

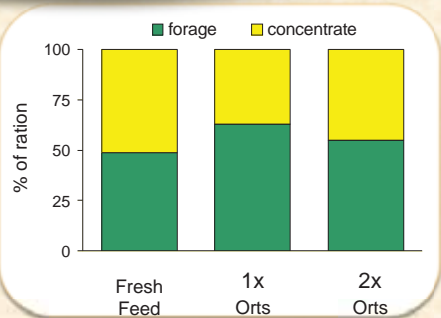


Feeding management – once vs twice a day feed delivery?

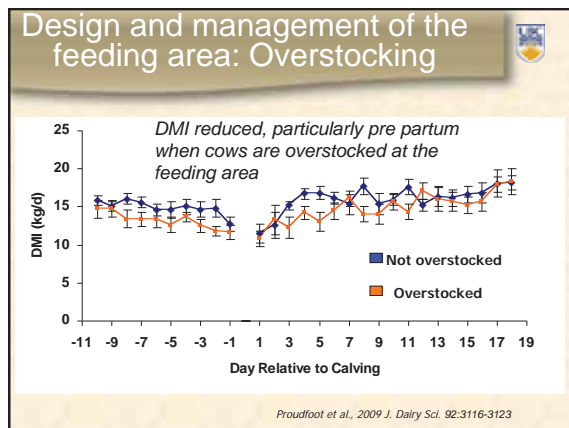
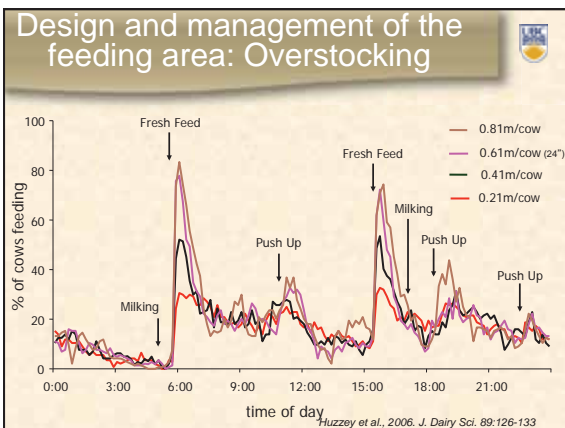
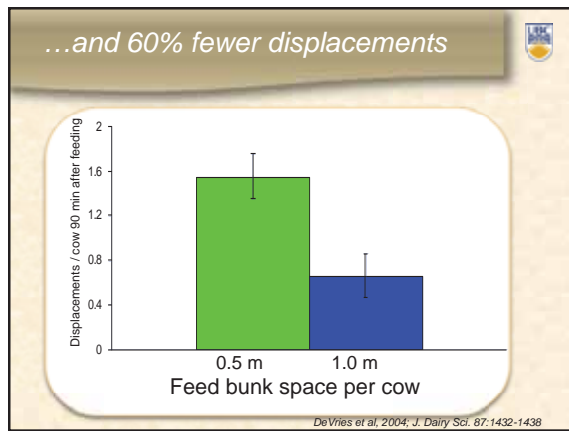
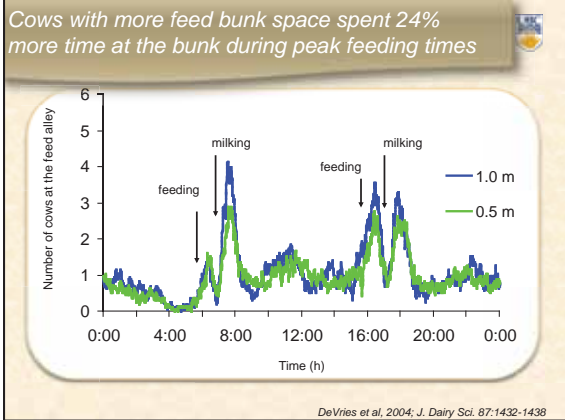


DeVries et al. 2005; J. Dairy Sci. 88: 3553-3562

Feeding management – once vs twice a day feed delivery?



von Keyserlingk and Weary, 2010. Can J. Anim. Sci. 90: 303-309



VD=0
Clear or no discharge

VD=1
Bloody or flecks of pus

VD=2
less than 50% pus + bad smell w/ or w/o fever

VD=3
more than 50% pus + bad smell

VD=4
Red/brown watery VD, rotting flesh + putrid smell + fever

Healthy (VD=0, 1)

Mild Metritis (VD=2, 3)

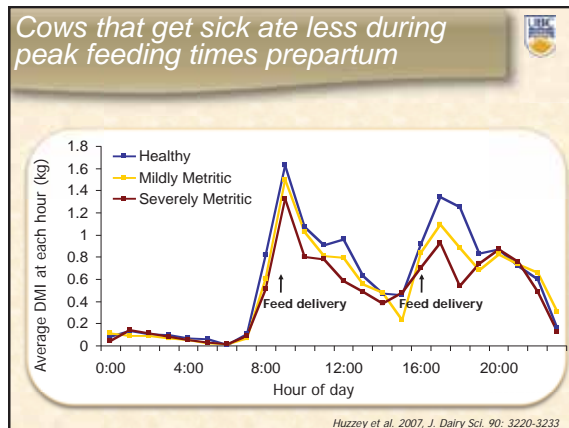
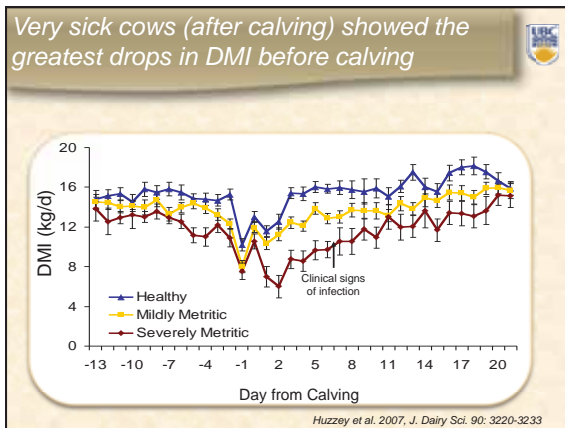
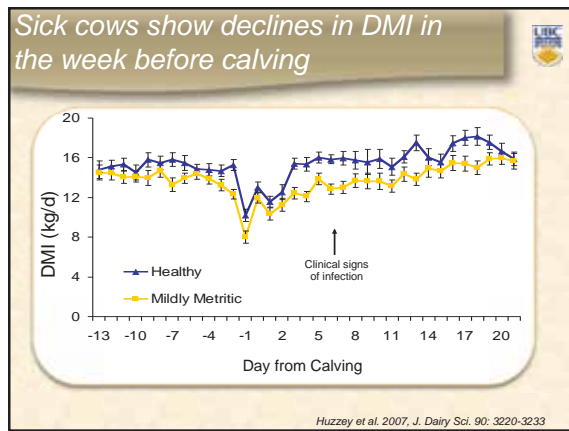
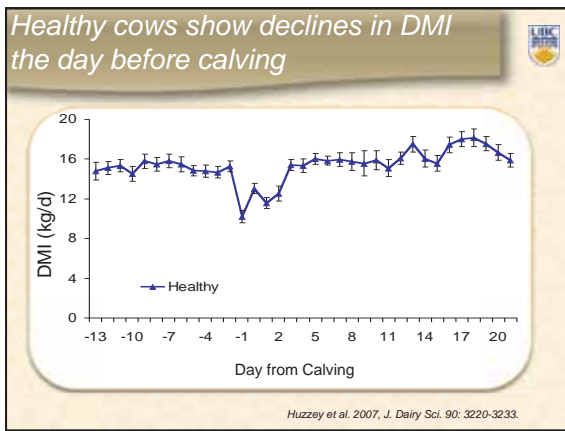
Severe Metritis (VD=4)

Identifying cows at risk for metritis

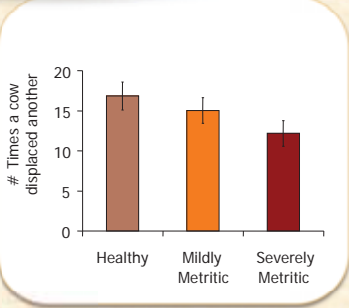
Assignment of cows to illness categories

- Healthy (n = 23)
- Mildly metritic (n = 27)
- Severely metritic (n = 12)

- No evidence of any other disease.
- Cows assigned to treatment and then behaviors looked at retrospectively.



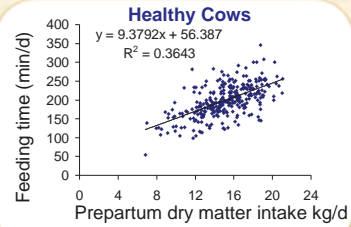
Healthy cows tended to displace other cows more often



Huzzey et al. 2007, J. Dairy Sci. 90: 3220-3233

Identifying cows at risk for metritis!

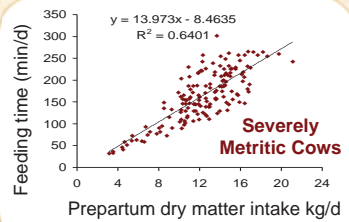
Healthy cows spend time at the bunk eating but also standing and not eating



Huzzey et al. 2007, J. Dairy Sci. 90: 3220-3233

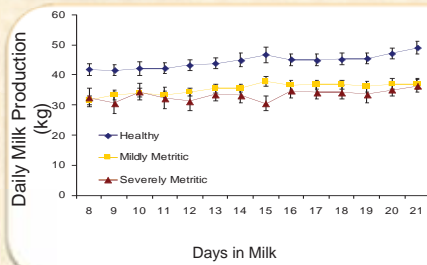
Identifying cows at risk for metritis!

...but when sick cows come to the feed bunk they spend most of their time eating



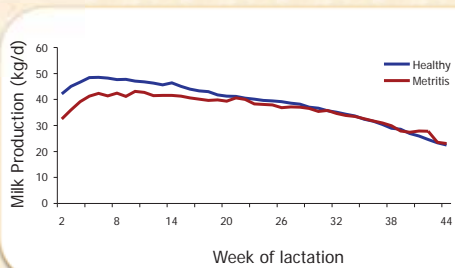
Huzzey et al. 2007, J. Dairy Sci. 90: 3220-3233

Sick cows produce less milk!



Huzzey et al. 2007, J. Dairy Sci. 90: 3220-3233

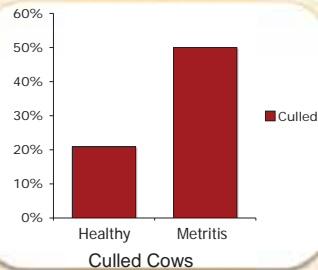
...and continue to produce less!



Adapted from Wittrock et al. 2011, J. Dairy Sci. 94: 2408-2412

Long term consequences of metritis!

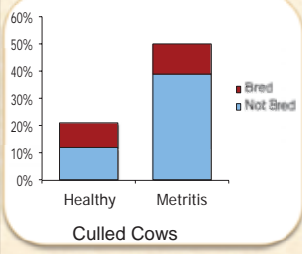
Cows with metritis are more likely to be culled...



Adapted from Wittrock et al. 2011, J. Dairy Sci. 94: 2408-2412

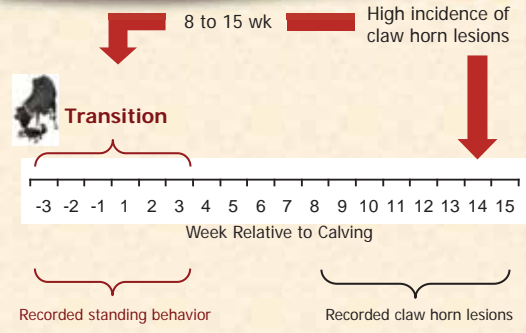
Long term consequences of metritis!

..likely because they produce less milk and are not pregnant

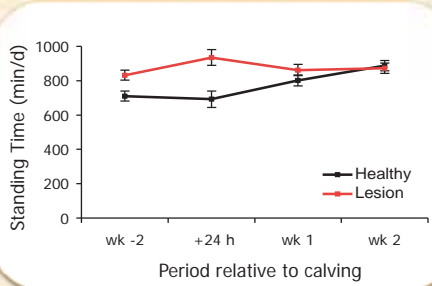


Adapted from Wittrock et al., 2011, J. Dairy Sci. 94: 2408-2412

Standing behavior and lameness

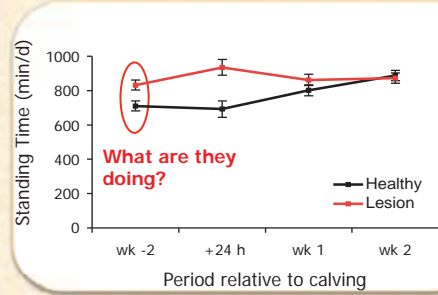


Cows diagnosed with hoof lesions (at peak lactation) stood long during transition



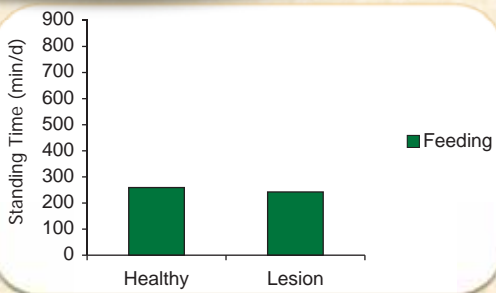
Proudfoot et al., 2010, J. Dairy Sci. 93:3970-3978

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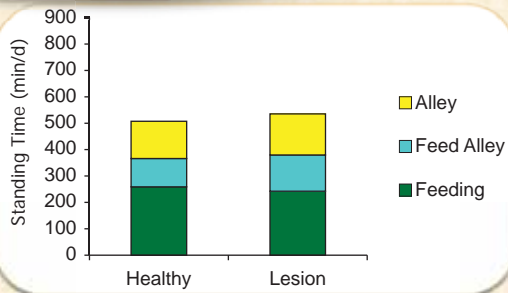
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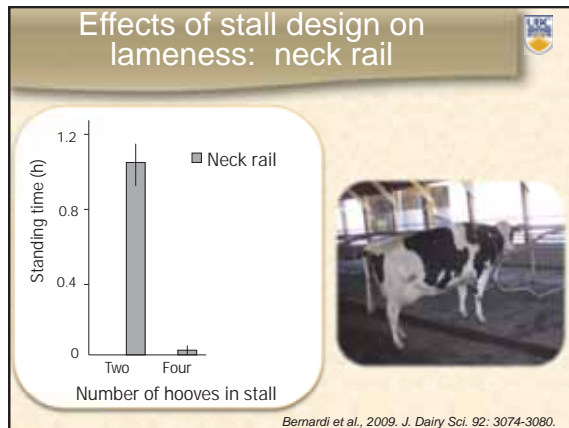
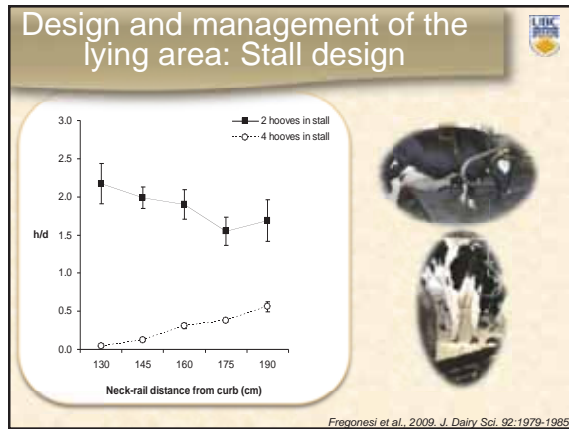
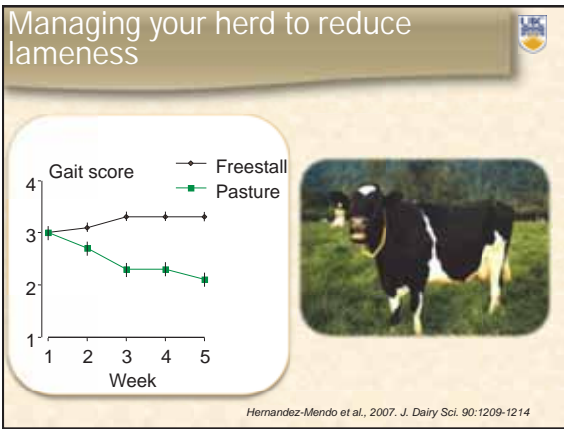
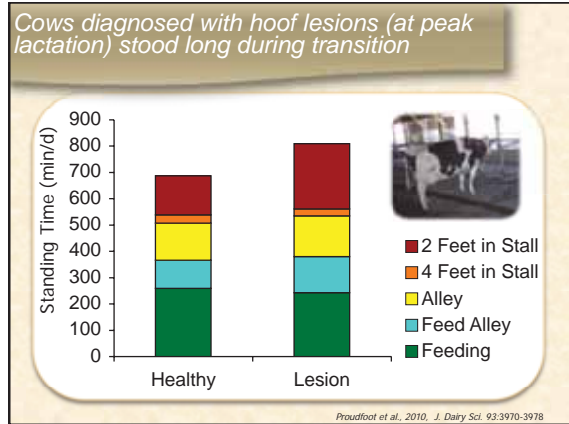
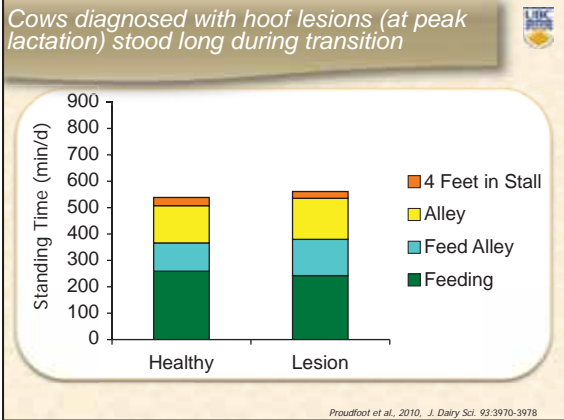


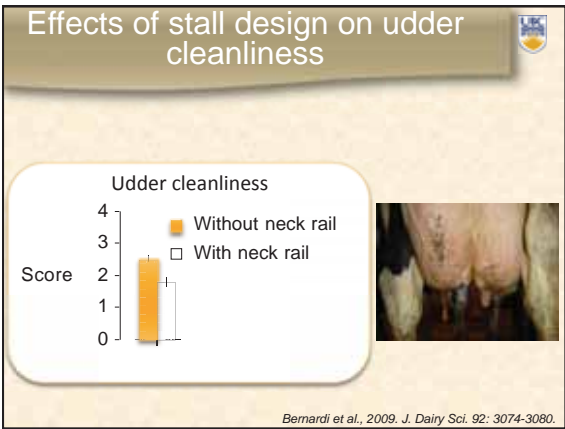
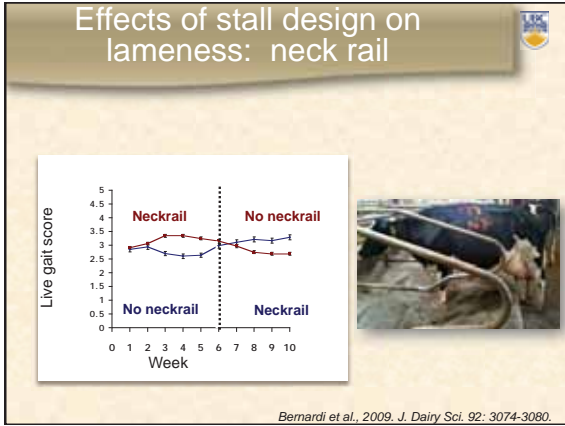
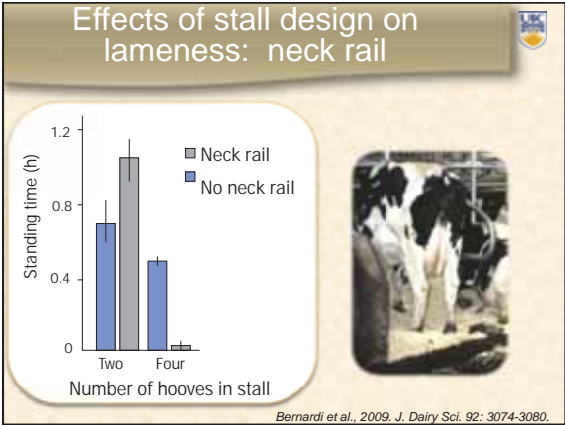
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Proudfoot et al., 2010, J. Dairy Sci. 93:3970-3978





Effects of stall design on lameness vs. udder health

| New cases of disease | neck rail | no neck rail | P Value |
|----------------------|-----------|--------------|---------|
| Lameness | 11 | 2 | 0.01 |
| Mastitis | 0 | 0 | N.S. |
| SCC>100,000 cells/ml | 2 | 1 | N.S. |

Bernardi et al., 2009. J. Dairy Sci. 92: 3074-3080.

- ### Take Home Messages
- ✓ For stalls, use more bedding and less hardware
 - ✓ In stalls and at the feed bunk, lower stocking densities will increase usage and reduce competition.
 - ✓ Softer, drier flooring reduces hoof injuries leading to lameness
 - ✓ Solutions should be win-win (e.g. increased welfare and profit) and practical.
 - ✓ If you don't measure it you can't manage it!
 - ✓ Good science helps lead to change.

