



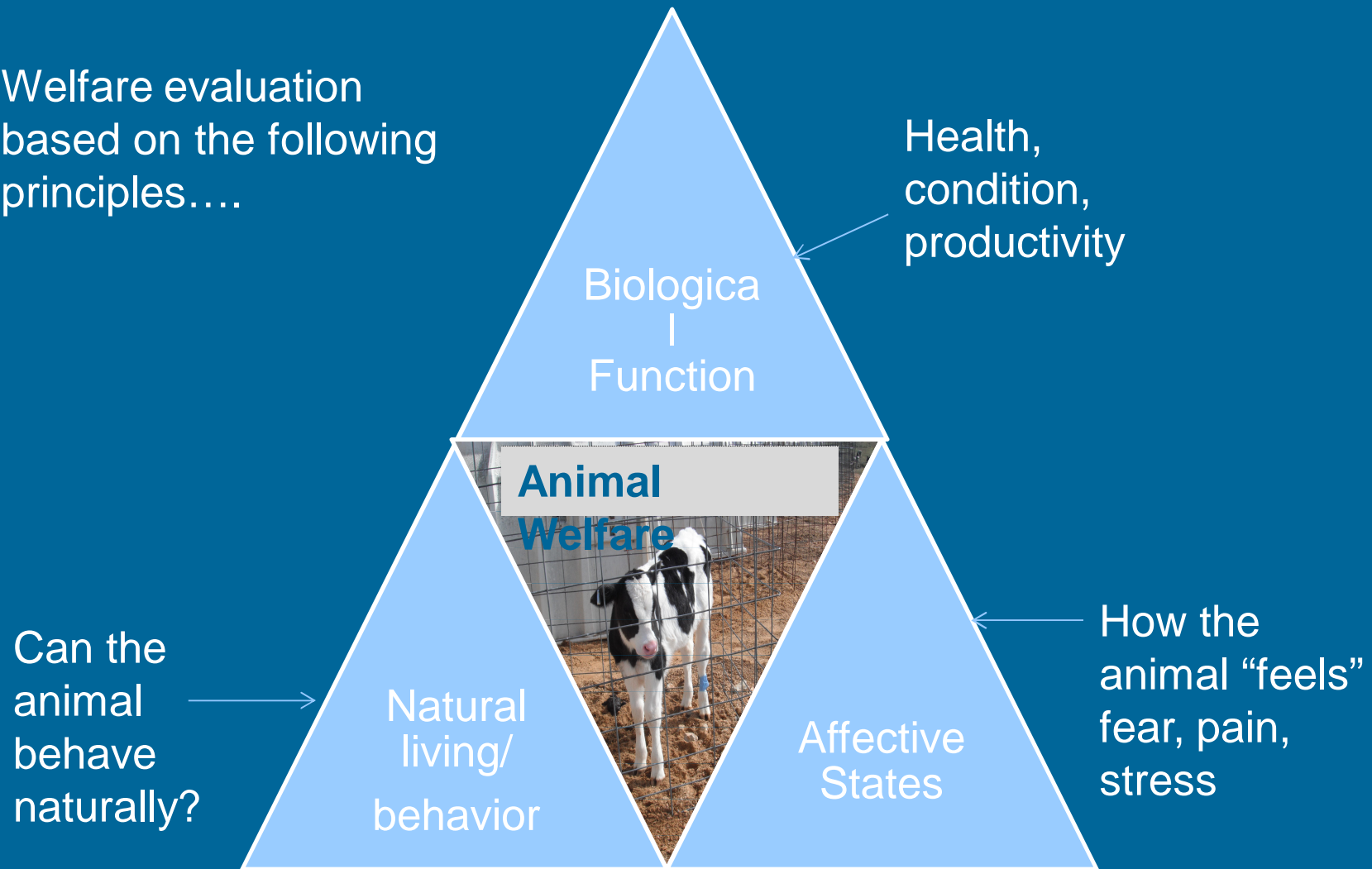
# Cow Behavior and Health in Compost Dairy Barns

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# How to define cow welfare

Welfare evaluation  
based on the following  
principles....



Fraser, 2008

# Early behavioral work...

Behavior	Avg	Min, farm	Max, farm	Min, avg	Max, avg
Lying, h/d	9.3	2.4	16.8	6.1	11.4
Lying bouts, n/d	11.0	2	24	8.6	12.8
Bout duration, min/bout	50.8	3	358	36.9	59.8

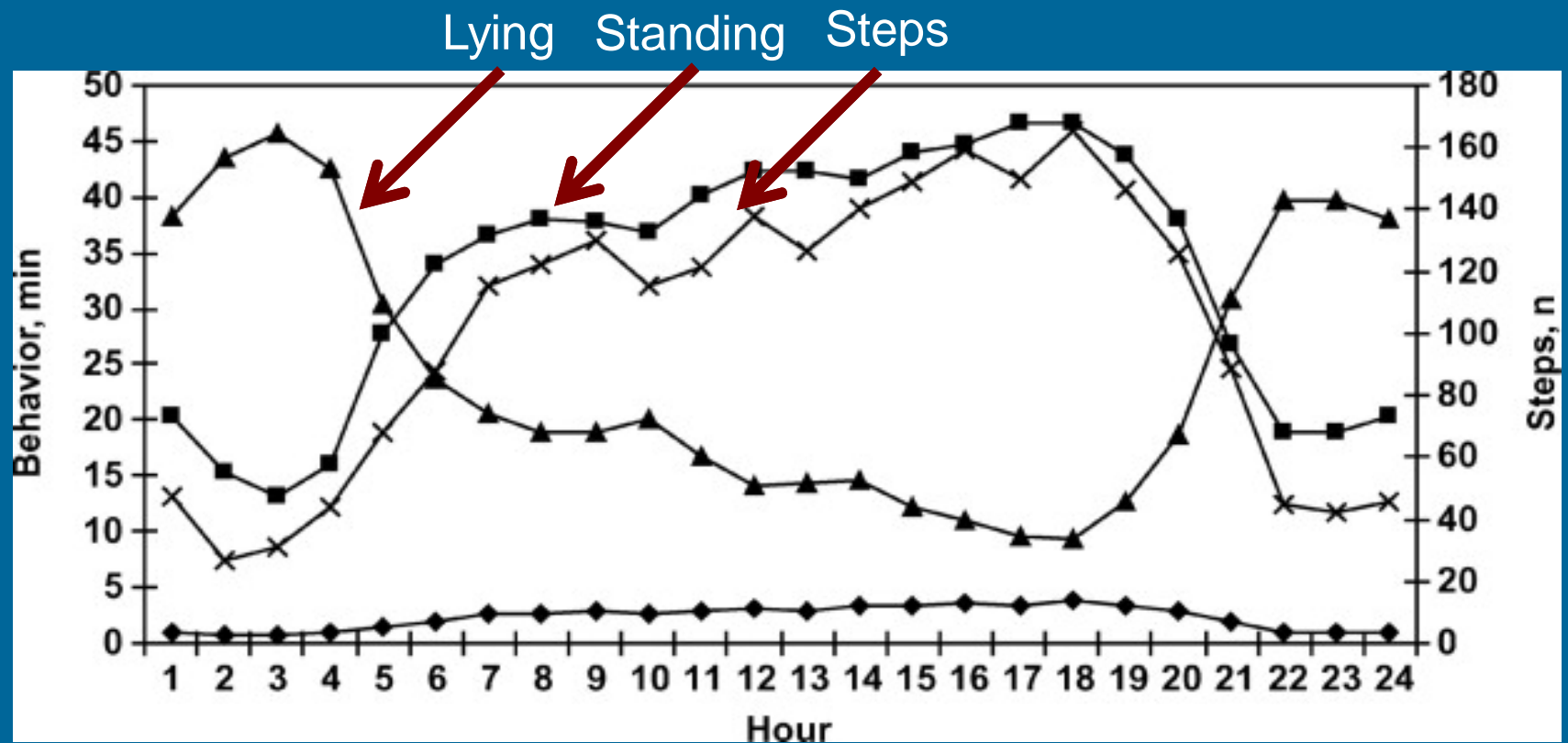
Context for behavior:

Recent freestall study reported:

Lying time = 11 h/d; bouts = 9 per d; bout duration = 88 min/bout



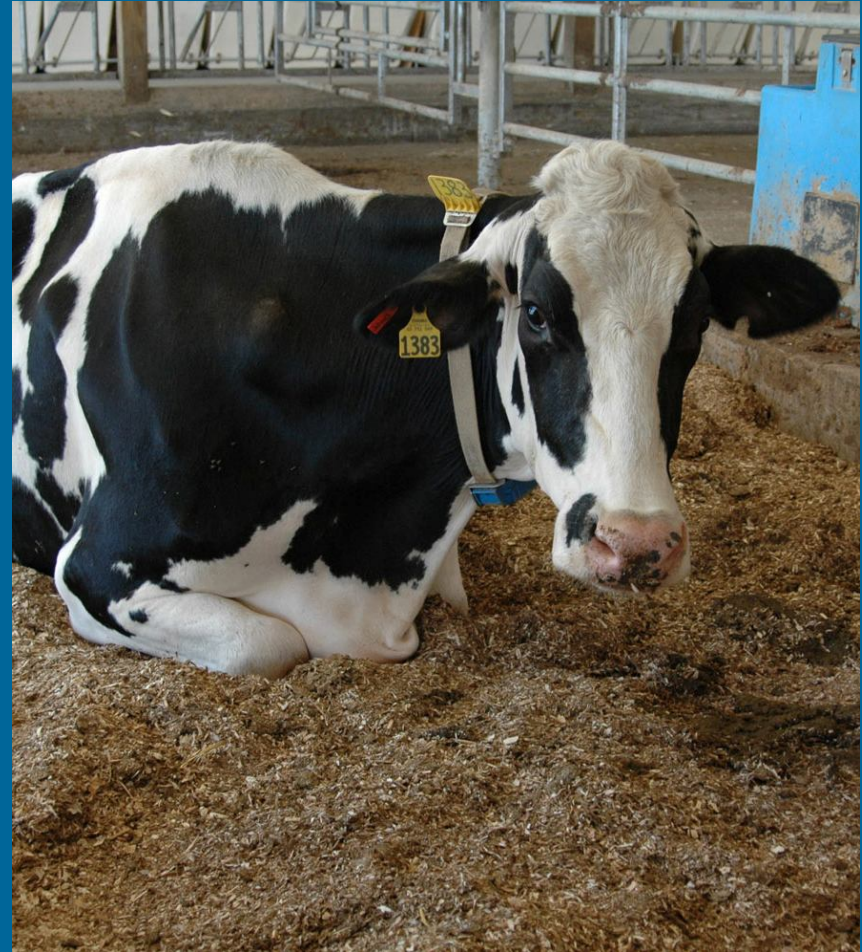
# Diurnal pattern of behavior...





# Cow preference for bedded pack...

- No choice phase:
  - Greater lying time in pack
    - 13 h/d vs 12.5 h/d
  - More time with 4 hooves in pack
    - ~ 0.6 h/d vs ~0.1 h/d
- Choice phase:
  - More time in pack
    - 7.2 h/d vs 5.7 h/d
  - More time with 4 hooves in pack



# Incidence of Major Health Problems in USA Dairy Herds

Problem	Cows Affected, %		
	1996	2002	2007
Mastitis	13.4	14.7	16.5
Lameness	10.5	11.6	14.0
Infertility problems	11.6	11.9	12.9
Retained Placenta	7.8	7.8	7.8
Milk Fever	5.9	5.2	4.9
Displaced Abomasum	2.8	3.5	3.5



(USDA NAHMS Surveys: 1996, 2002, 2007)

# Mastitis prevalence (%) across housing systems in MN

	Housing system		
	CB	CV	NV
$\geq 200K$ , SCC	33.4	26.8	26.8

Mastitis consistent with previously reported prevalence in CB (27.7%)



# Importance of udder hygiene on health

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- 95% agreement between observers
- Milk samples from “Dirty” cows are 1.5 × more likely to contain a major pathogen

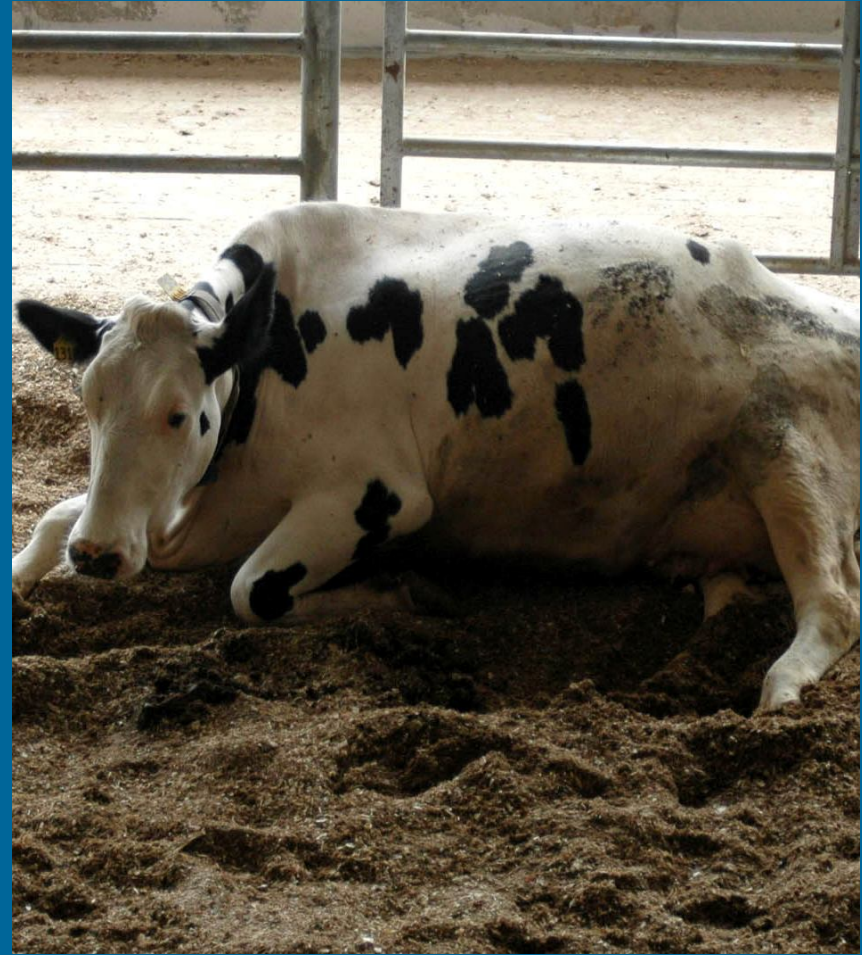


Ruegg et al., 2003; Fulwider et al., 2007; Barberg et al., 2007



# Effect of compost bedded pack on hygiene

Study	Housing system			Scale
	CB	CV	NV	
Lobeck	3.18	2.83	2.77	1-5
Fulwider	2.2			1-5
Barberg	2.7			1-5



# Lameness prevalence (%) across housing systems in MN

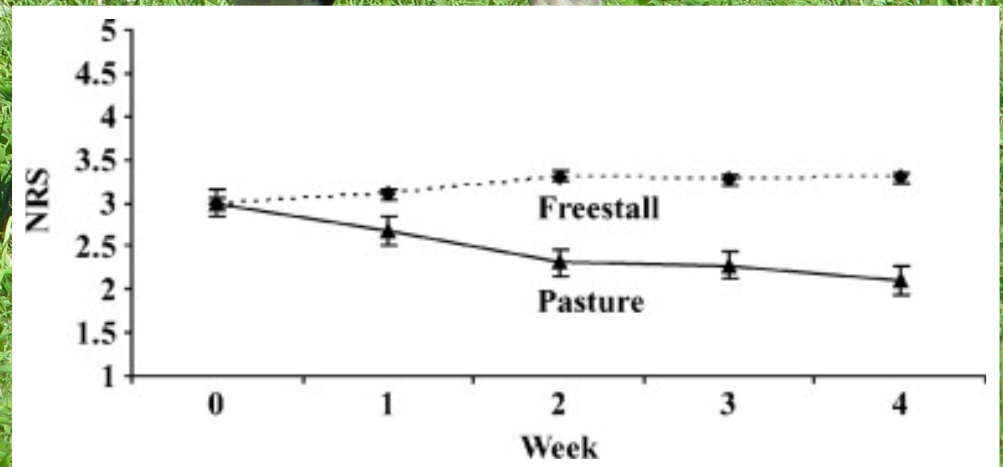
Parity	Housing system		
	CB	CV	NV
Heifer	0.6	11.9	10.8
Cow	11.2	14.3	21.8

Severe lameness ( $\geq 4$ )

Parity	Housing system		
	CB	CV	NV
Heifer	0.4	0.7	0.5
Cow	1.4	1.3	2.7



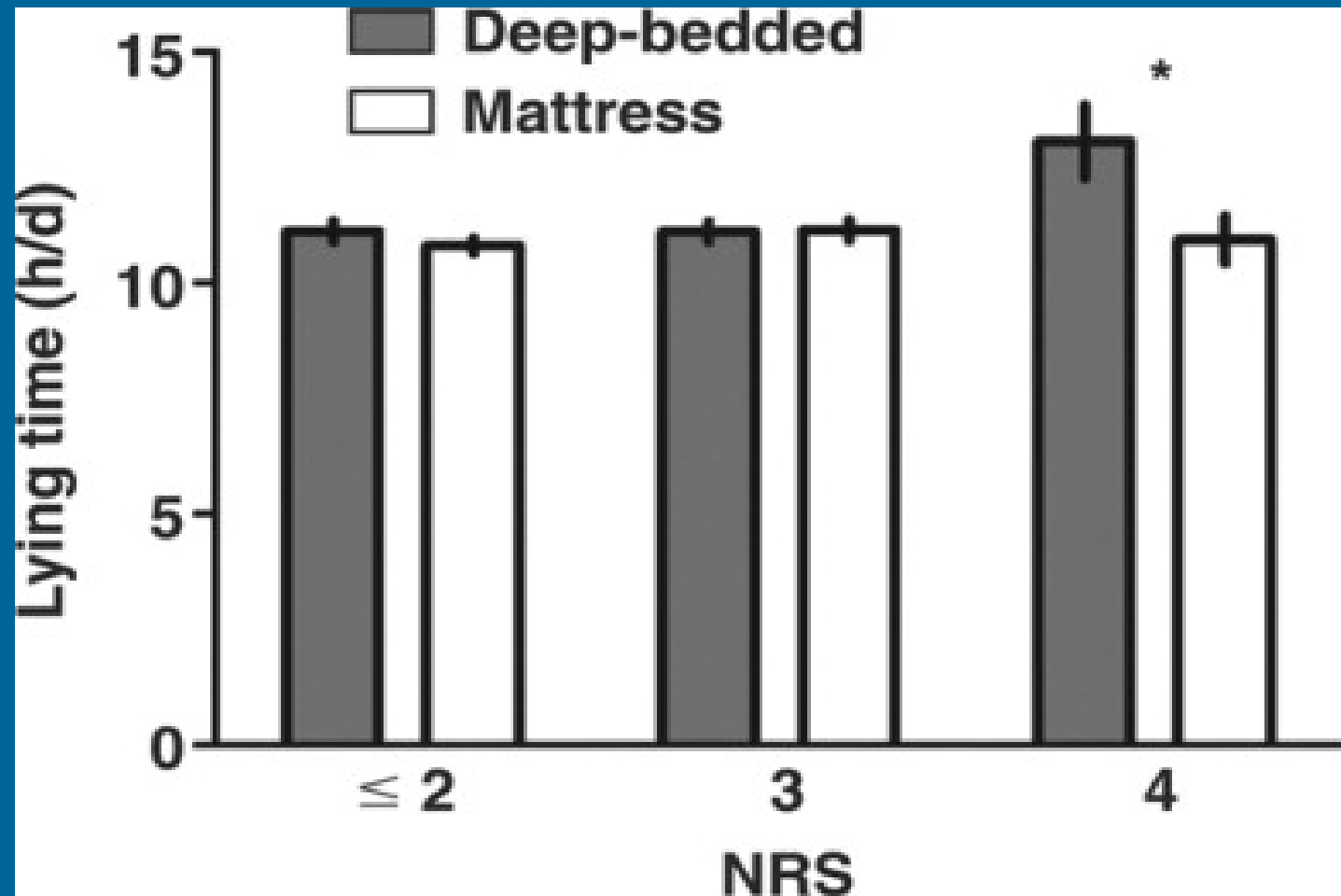




Pasture improves locomotion scores; Reduced lying times in combination pack & pasture not problematic



# Potential to use lying time as a predictor of lameness...





# Commonly used hock scoring



**Score = 1**

No swelling. No hair is missing.



**Score = 2**

No swelling. Bald area on the hock.



**Score = 3**

Swelling is evident or there is a lesion through the hide.



# Hock scores (%) across housing systems in MN

Parity	Housing system		
	CB	CV	NV
$\geq 2$	3.8	31.2	23.9
= 3	1.0	6.5	6.3

None would meet the recommendations of the FARM program



**Score = 3**  
Swelling is evident or there is a lesion through the hide.



# Take home message

- Behavior of cows in composting bedded packs consistent with those in freestalls
- Impacts on overall health mixed
  - Milk quality can be a concern or improved
  - Hygiene can be good; not different from other systems
  - Locomotion improved
  - Hock health improved, but still problematic



Questions or comments?

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