Risk Factors and Prevalence of Lameness in Dairy Herds

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PERSPECTIVE

- Imp concept
  - Repeating theme for my presentation

- WHY ME?
- Dr. Crook – "…where could we find an epidemiology type person with a foot fetish?"

- Focus on Canadian herds
  - difference expected in geography?
- Experienced observer will detect 2.5 more lame cows than inexperienced observer (Whay et al 2002)
- 80% of lameness goes unobserved (Greenough, 2009)
- Causality vs association

Just say 30%

- Simple
- 30 cases / 100 cows / year
  - (Guard, 1997)

Cramer et al., 2008 JDS

- 204 herds in Ontario
- In free-stall housing systems, 46.4% of cows had a foot lesion, compared with 25.7% of cows in tie-stall barns.
- Digital dermatitis was the most common lesion
  - tie stalls, 9.3% of cows and 69.7% of the herds
  - free-stall herds, 22.7% of cows and 96.7% of the herds

- Zurbrigg et al., 2005 *CVJ*

- 317 tie stalls in Ontario
  - back arch (3.2%)
  - severe hind claw rotation (23%)
  - Hock lesions (44%)
  - neck lesions (3.8%)

Table 2. Mean prevalence of lameness during summer and winter among lactating cows in herds classified by housing type (free stalls vs tie stalls) and stall surface (sand vs mat or mattress [non-sand])

	Free stalls		Tie stalls	
Stall Base	Sand	Non-Sand	Sand	Non-Sand
Number of herds	9†	7	4	10†
Lameness Prevalence				
Summer	18.4	26.8*,a	12.2b	22.1
Winter	21.2a	33.7*,b	12.1a	21.7a

*Values were significantly ($P = 0.007$) different.
a,b In each row, values with different letter superscripts were significantly ($P < 0.05$) different.
† Includes cow data from one herd with segregated sand free stalls and non-sand tie stalls.

Cook , *JAVMA* 2003

- mean prevalence of lameness was 20.6%
- the mean annual incidence rate of lameness episodes was 54.6.
- These data suggest that the annual lameness incidence can be estimated to be 2.6 times the observed prevalence

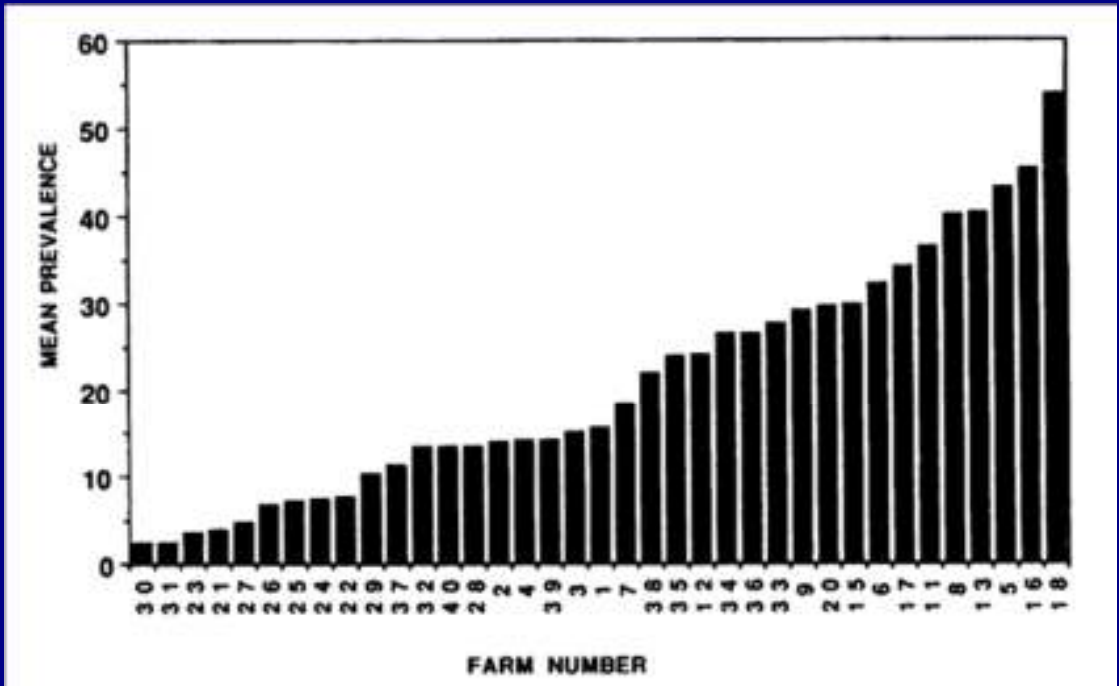
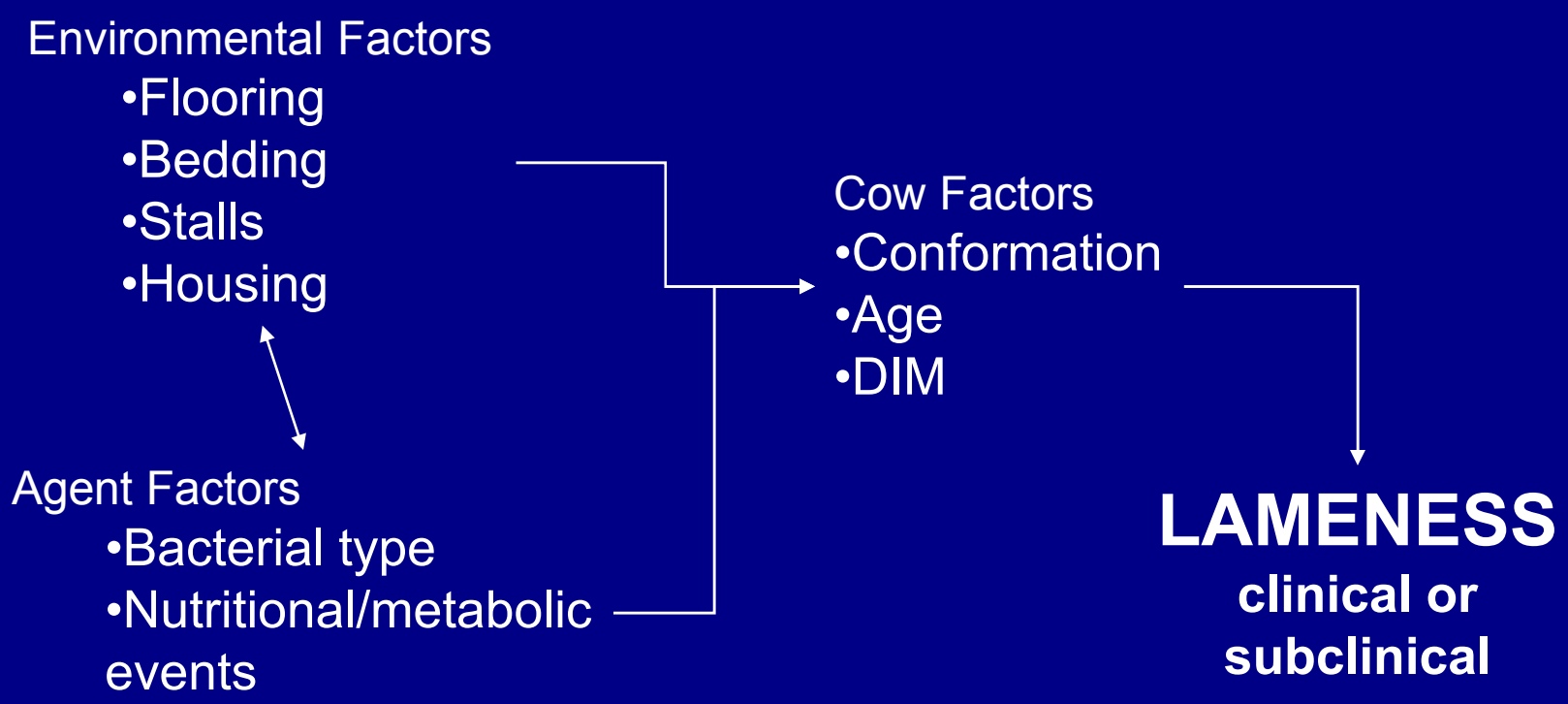


FIG 3: Ranked mean prevalences of lameness on 37 farms expressed as the percentage of cows with a locomotion score of 3 or more

Clarkson et al., 1996 *Vet Record*

The Lameness Puzzle



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Herd-Level Risk Factors for Lameness in High-Producing Holstein Cows Housed in Freestall Barns

L. A. Espejo and M. I. Endres[1]
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- NO association with the prevalence of lameness
  - Herd size
  - pen space per cow
  - type and size of milking parlor
  - TMR content of crude protein and neutral detergent fiber
  - feeding frequency
  - linear feedbunk space per cow
  - type of feed barrier
  - use of footbath

- Positive association with lameness
  - time away from the pen for milking
  - Prevalence of lameness was greater when farms performed hoof trimming only when the manager decided cows needed it compared with farms on which the feet of all cows were trimmed on a maintenance schedule once or twice annually.
  - Brisket board height of more than 15.24 cm and presence of the area behind the brisket board filled with concrete

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Risk factors for lameness in freestall-housed dairy cows across two breeds, farming systems, and countries

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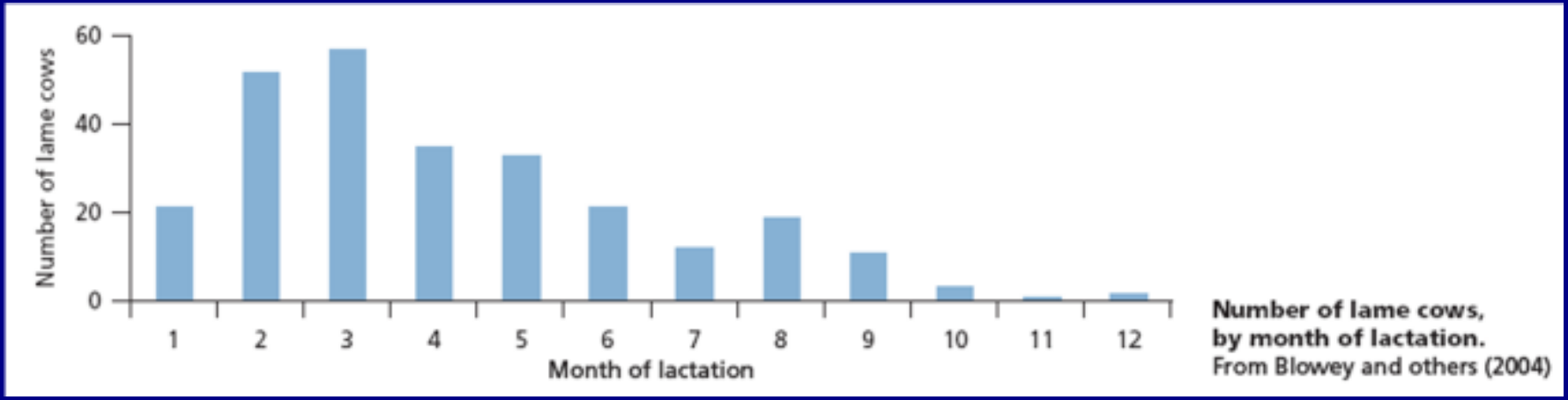
- 103 farms, mean prevalence of 34%
  - Risk for lameness increased with decreasing lying comfort (OR 2.25)
    - more frequent abnormal lying behavior, mats or mattresses used as a stall base compared with deep-bedded stall bases, the presence of head impediments

Risk Factors

- There are intrinsic risks for lameness that cannot be changed
  - season – hooves harder in summer (MacCallum *et al.* 2002)
  - gestation and stage of lactation (Knight, 2001; Green *et al.* 2002)



Number of lame cows, by month of lactation.
From Blowey and others (2004)

- previous disease (Alban *et al.* 1996; Hirst *et al.* 2002)
- parity (Hirst *et al.* 2002; Hedges *et al.* 2001; Potzsch *et al.* 2003)
- There is also a genetic determined intrinsic risk for development of lesions (Boettcher *et al.* 1998; Koenig *et al.* 2005).

- Using lesions to identify risks for lameness is acceptable if the presence of lesions is a good proxy for risk of lameness.

- We cannot always be sure of this because there is not necessarily a direct correlation between the size and severity of a lesion and the lameness caused by this lesion (Flower & Weary, 2006)

Cow Comfort

- Maximizing lying times
- Comfortable lying surface
- Good walking and standing surfaces

  - Reduces wear on the sole
  - Reduces pressure on the feet
  - Reduces damage to the bony prominences

    - Sole ulcer
    - Heel ulcer
    - Laminitis
    - Hock damage/swelling

Cow Hygiene

- Dry environment
- Slurry free environment
- Good herd biosecurity Reduces contact between pathogen and host

  - Prevents introduction of infectious pathogens
  - Reduces exposure of feet to corrosive environment

    - Digital dermatitis,
    - Heel erosion/interdigital dermatitis
    - Other infectious causes of lameness

Cow flow on the farm

- Good routes around the farm, to parlour, pasture and feed

  - Allow a cow to express normal gait
  - Reduces defensive movements from humans to avoid confrontation
  - Reduces standing times
  - Improves eating and drinking behaviour

    - White line disease
    - Sole ulcer

Nutrition

- Macronutrients
- Micronutrients
-
  - Reduces ruminal acidosis and macro and micronutrient deficiencies or excesses
  - Improves hoof horn quality and integrity
    - White line disease
    - Sole ulcer

Hoof Trimming

- Corrects abnormal growth of the hoof horn
- Prevents excessive/abnormal wear
- Prevents areas of deep sole horn
- Interrupts vicious circle of increased horn production
- Balances the weight load on lateral & medial claw
- Avoids high loading of localized areas of the sole
    - All causes of lameness

Thanks for listening…