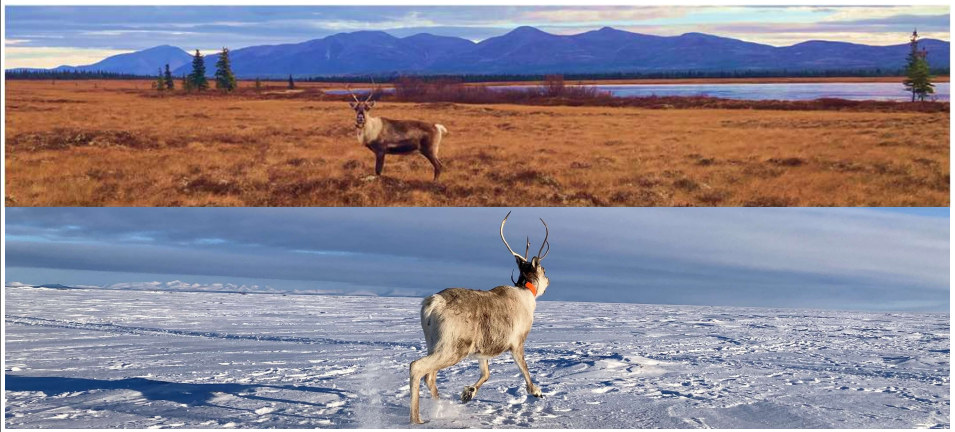


Research Update: Disentangling the roles of nutrition, brucellosis, and their interactions on reproductive performance and demography of the Mulchatna Caribou Herd

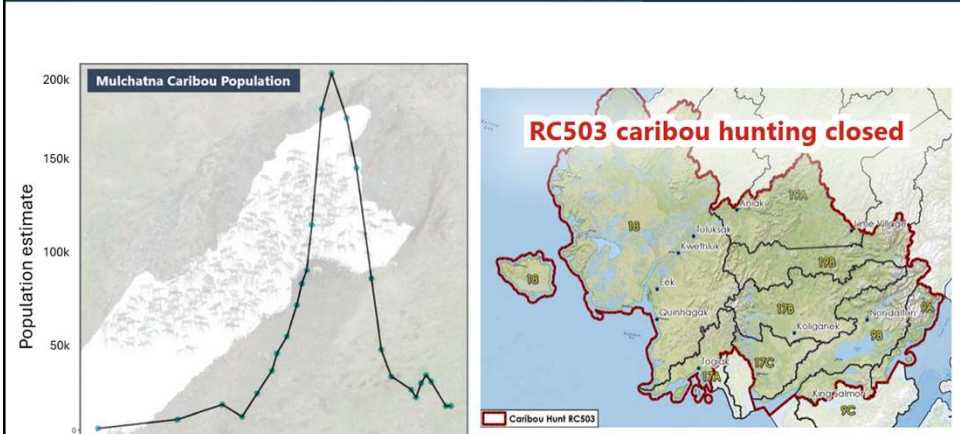


Kristin Denryter, PhD, John Crouse, John Landsiedel
Alaska Dept. of Fish and Game

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Mulchatna Caribou Herd



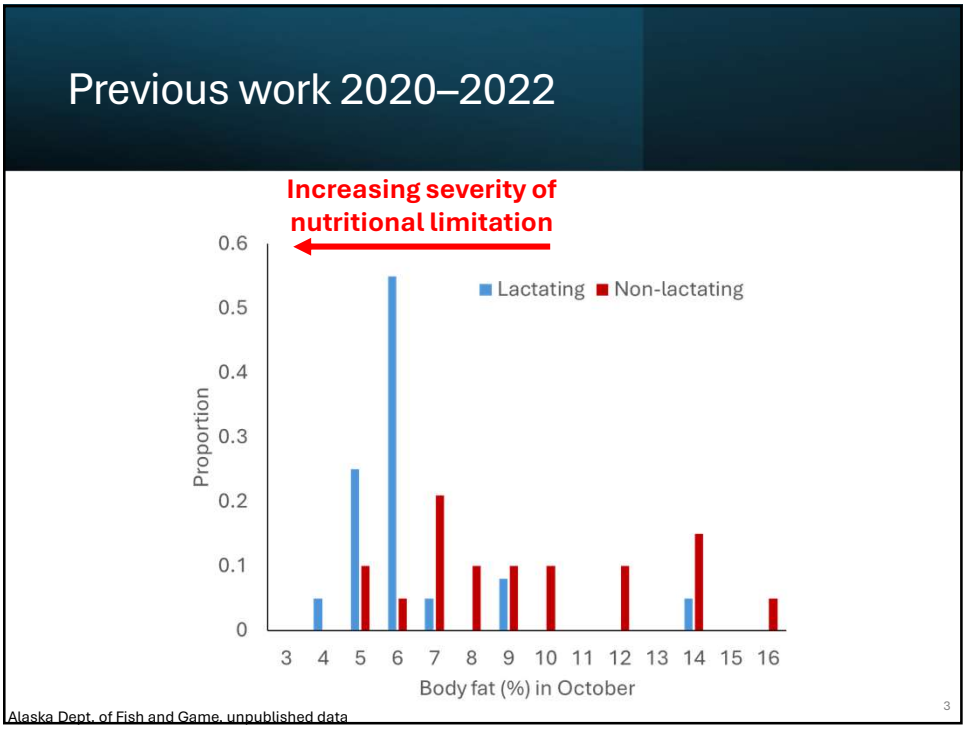
Mulchatna Caribou Population

Year	Population estimate
1960	~5k
1970	~10k
1980	~25k
1990	~100k
2000	~190k
2010	~40k
2020	~25k

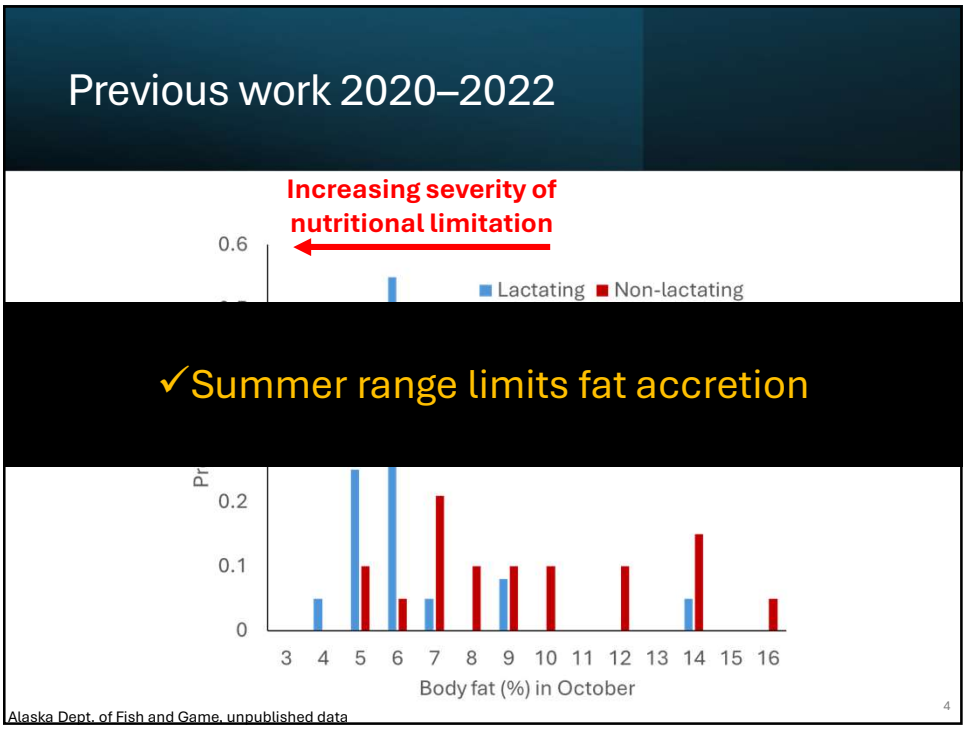
RC503 caribou hunting closed

2

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Previous work 2020–2022




Alaska Dept. of Fish and Game, unpublished data

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Previous work 2020–2022



✓ High seropositivity of *Brucella* in WMCH

Alaska Dept. of Fish and Game, unpublished data

6

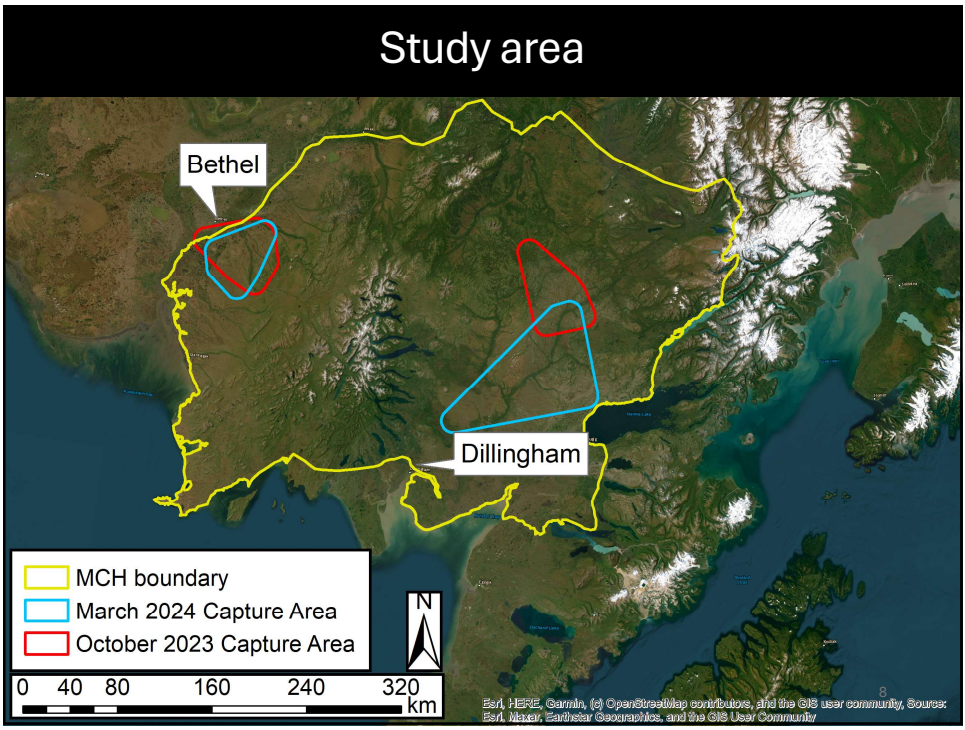
6

New study initiated 2023

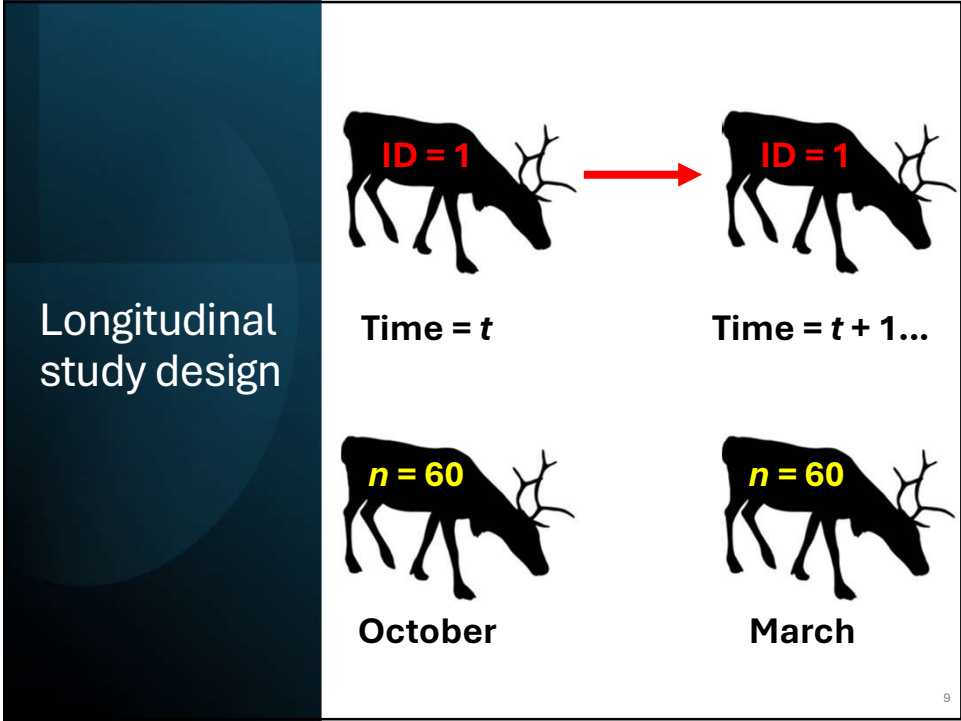
- Winter range?
- Nutrition and disease effects on:
 - Pregnancy?
 - Live birth?
 - Early calf survival?
 - Calf recruitment?



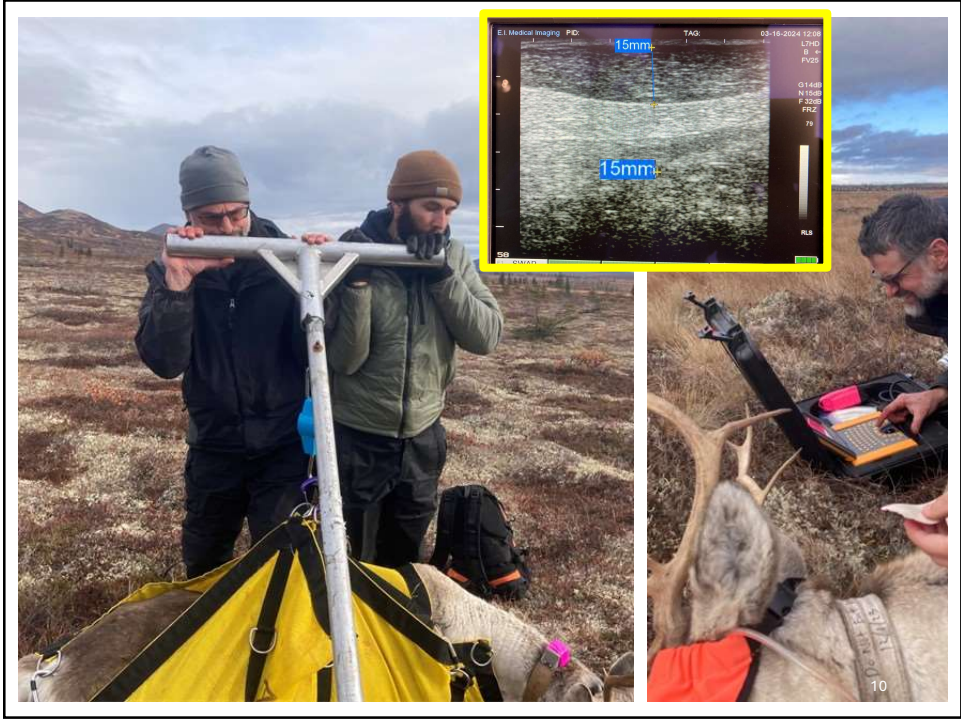
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Analytical methods

- Various statistical tests
- Information theoretic approach

Response variables

- Brucella serology
- Lactation status (Oct)
- Pregnancy status (March)
- October body mass
- October body fat
- October body protein
- Overwinter mass change
- Overwinter fat change
- Overwinter protein change
- March body mass
- March body fat
- March body protein
- Birthdate
- Early survival
- Recruitment to autumn

Predictor variables

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Preliminary results – Year 1

October 2023

- $n = 55$ caribou
- 49% lactating
- Seropositivity
 - 43% West
 - 7% East

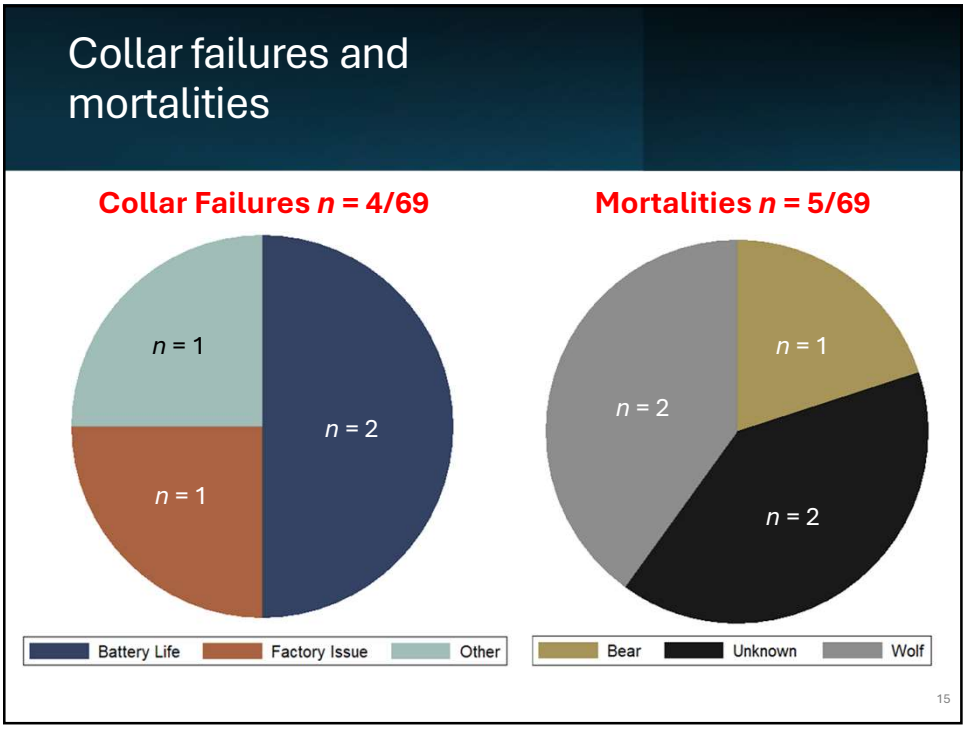
March 2024

- $n = 56$ caribou
 - including $n = 52$ recaptures
- 96% pregnant
- Seropositivity
 - 44% West
 - 10% East

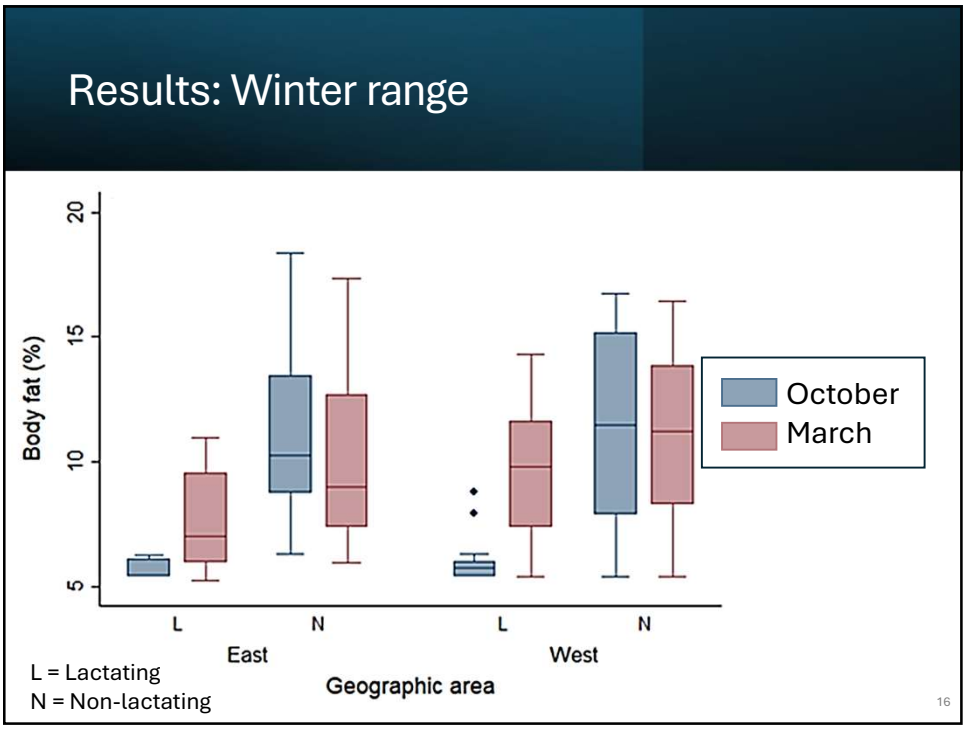
All results are preliminary

14

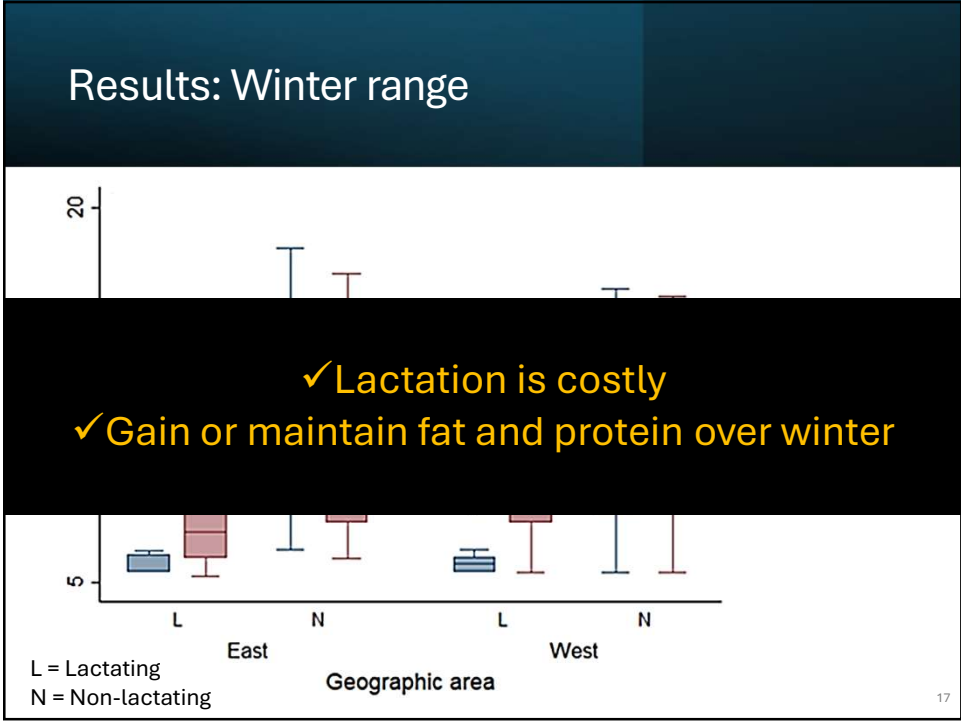
14



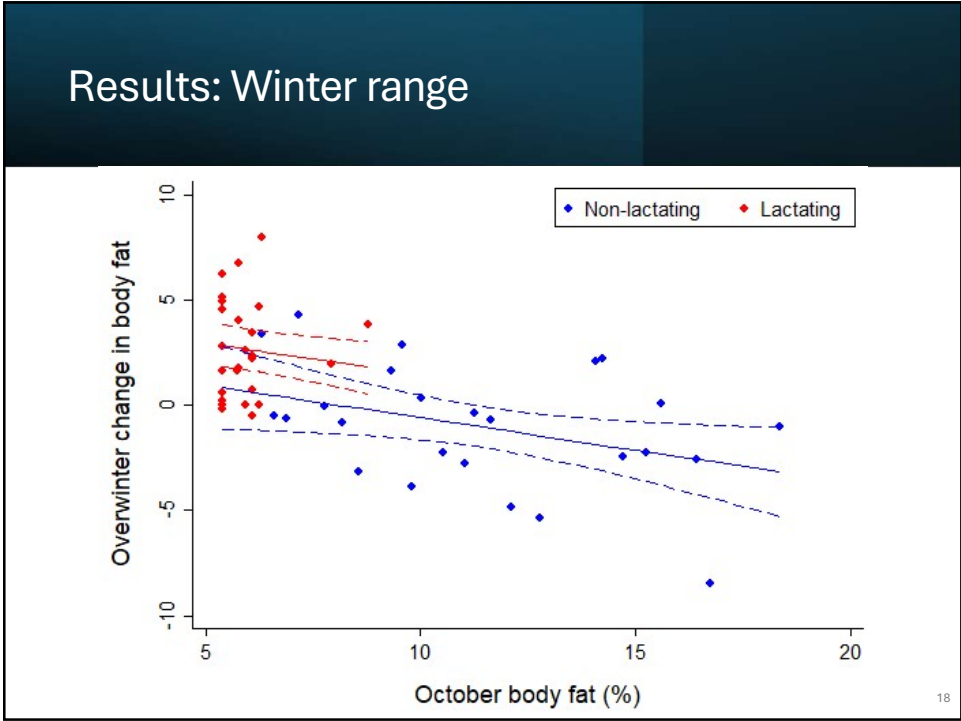
15



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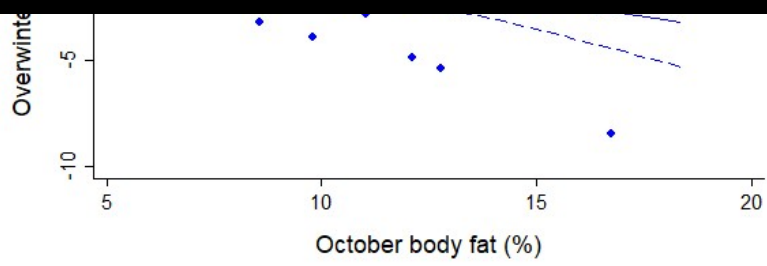


18

Results: Winter range

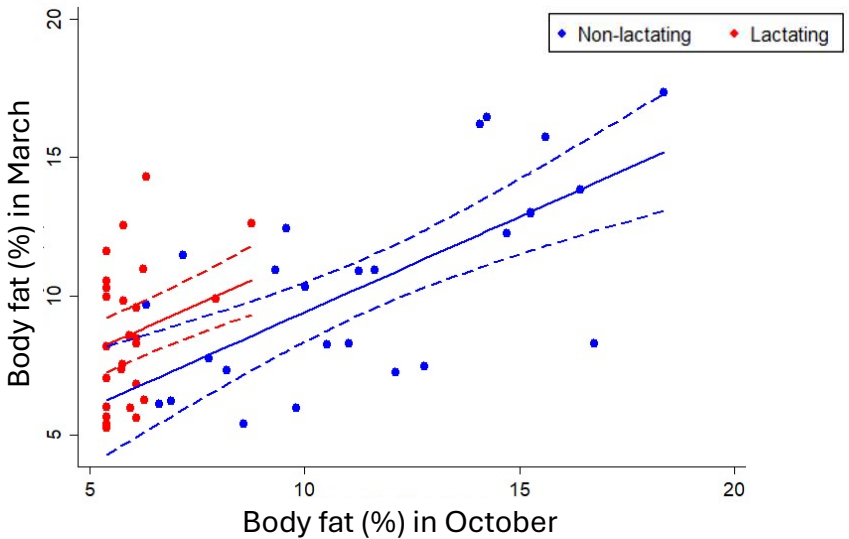


✓ Overwinter fat change ~ fat in October

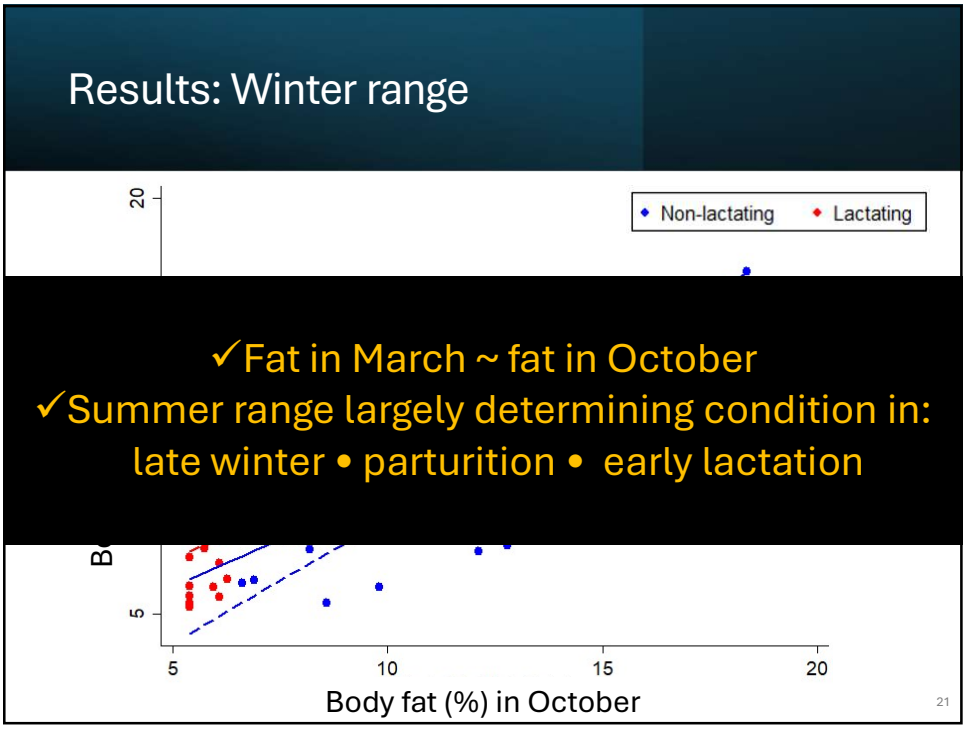


19

Results: Winter range



20



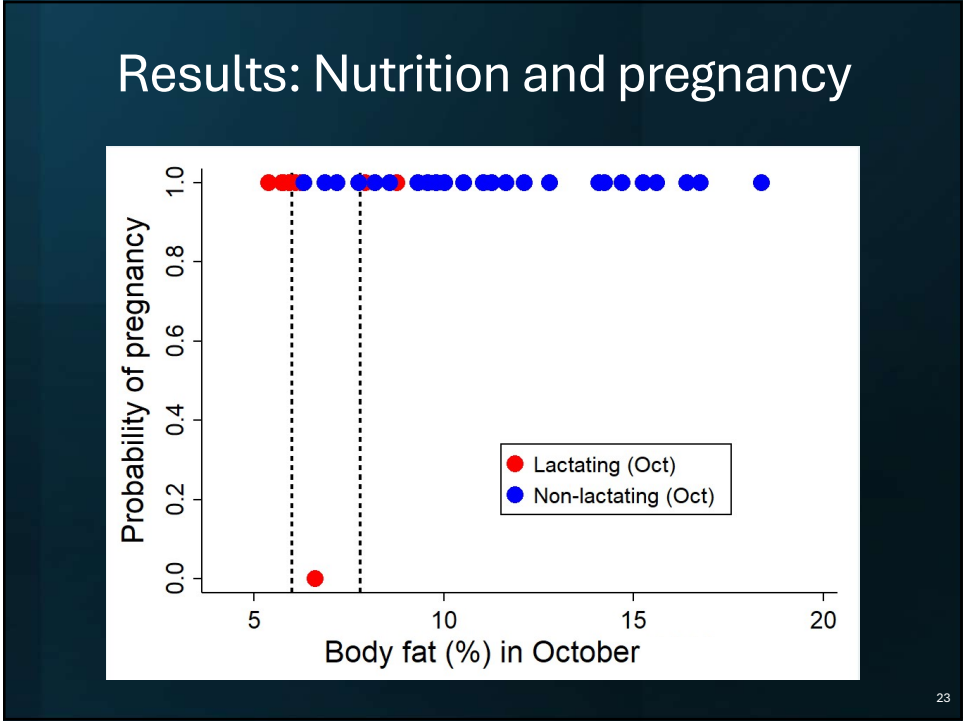
21

Results:
 Winter range

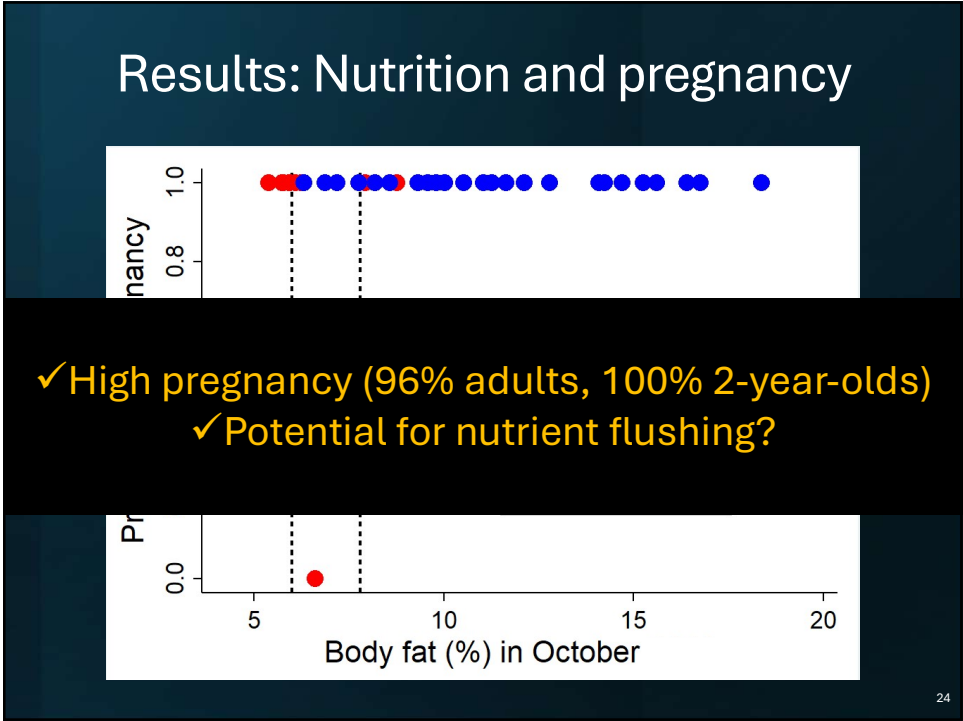
- Winter nutrition not limiting
- Summer range carry-over effects

22

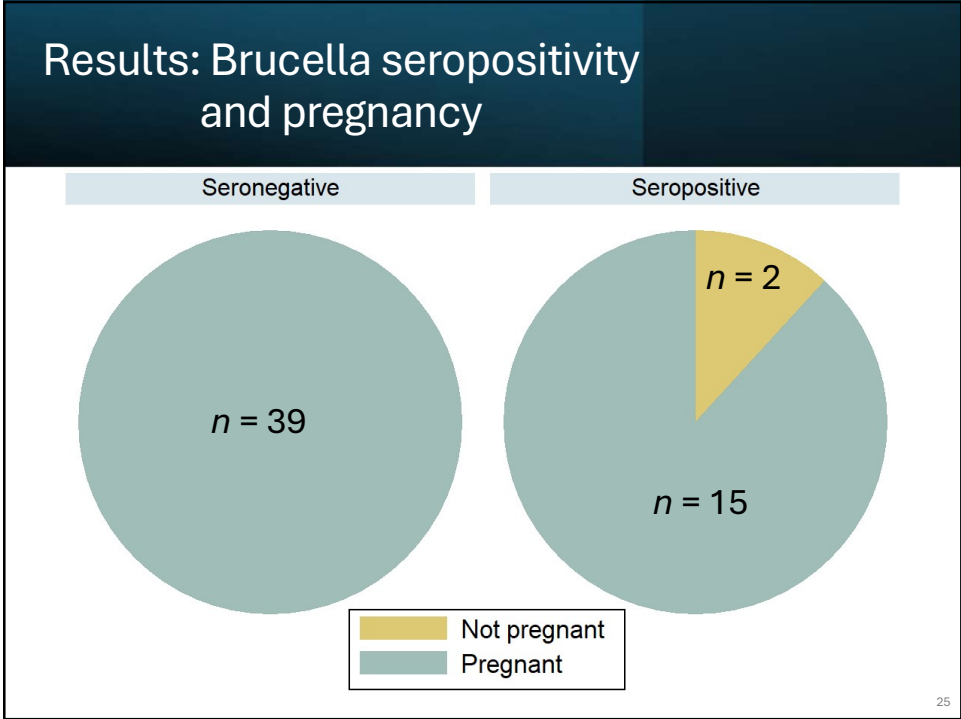
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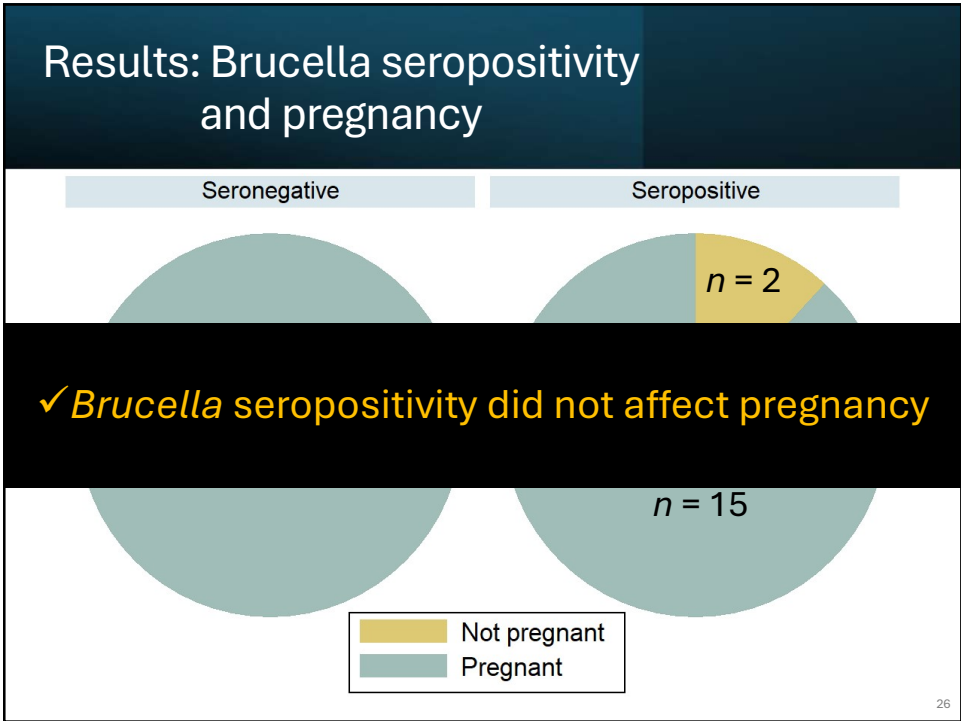
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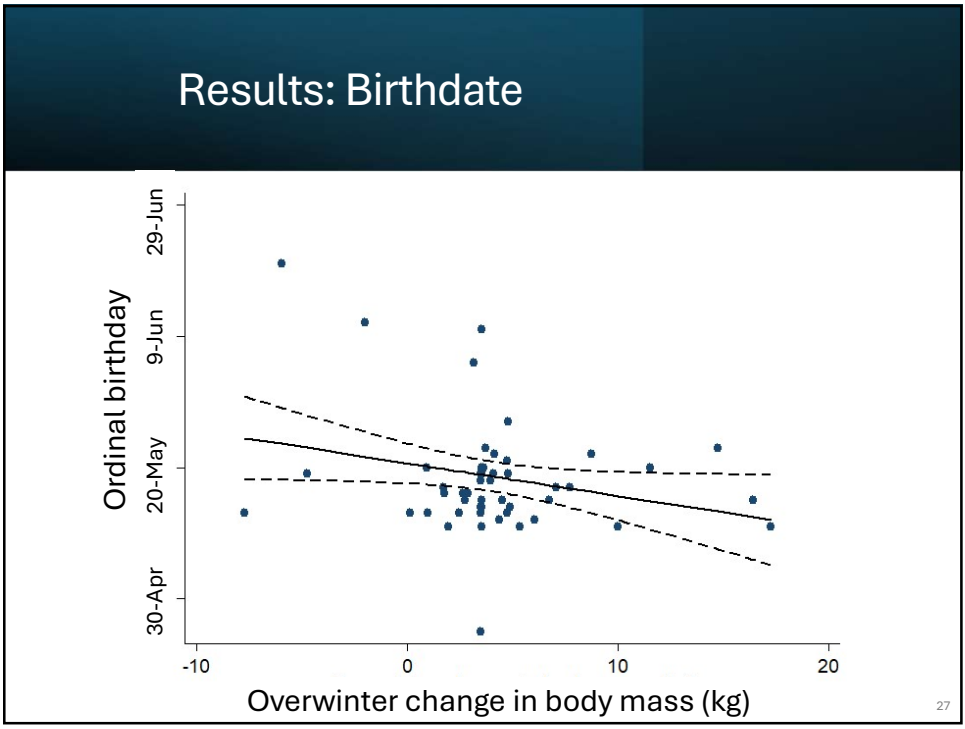
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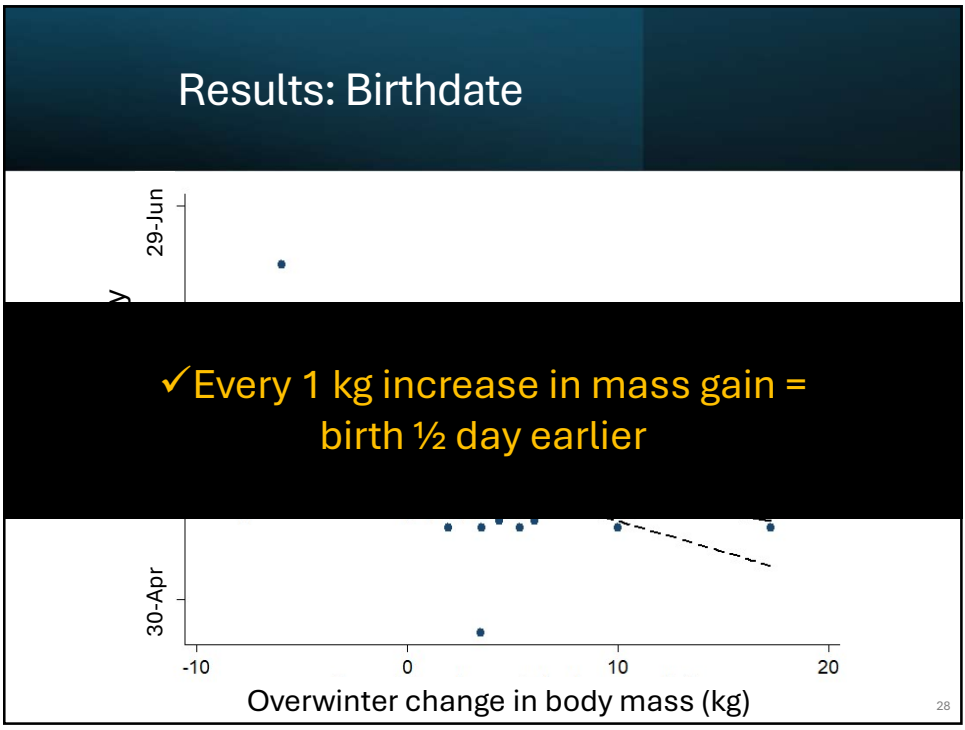
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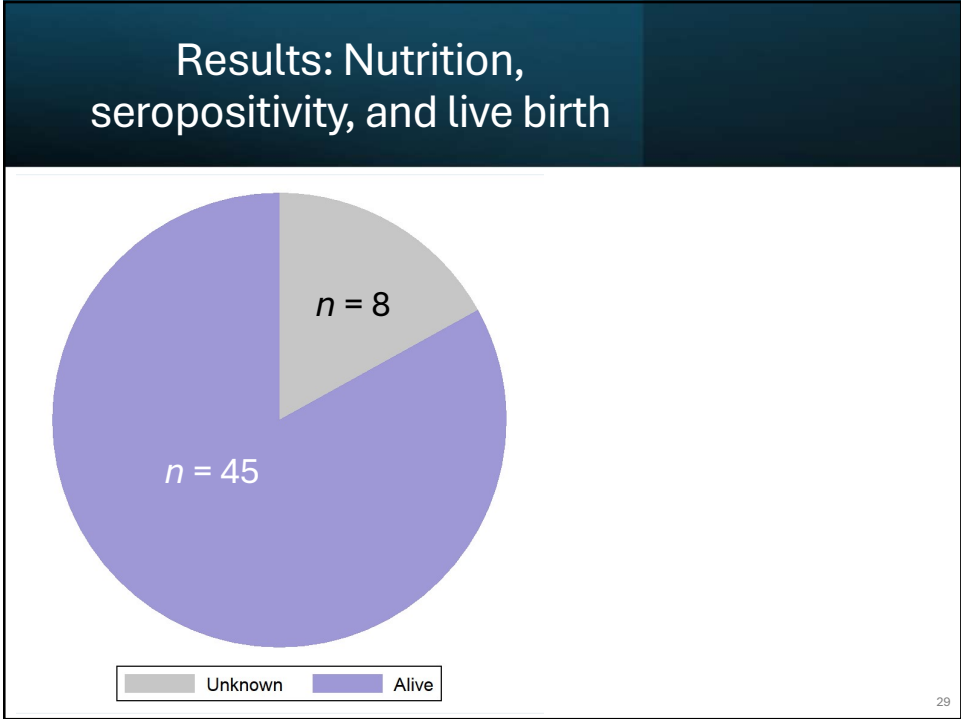
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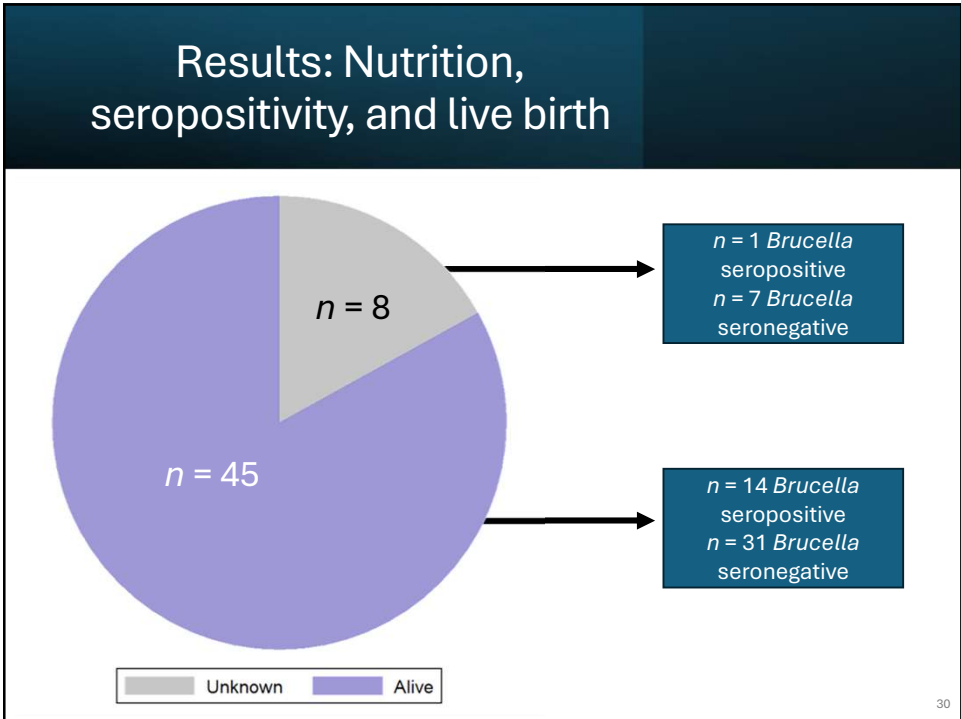
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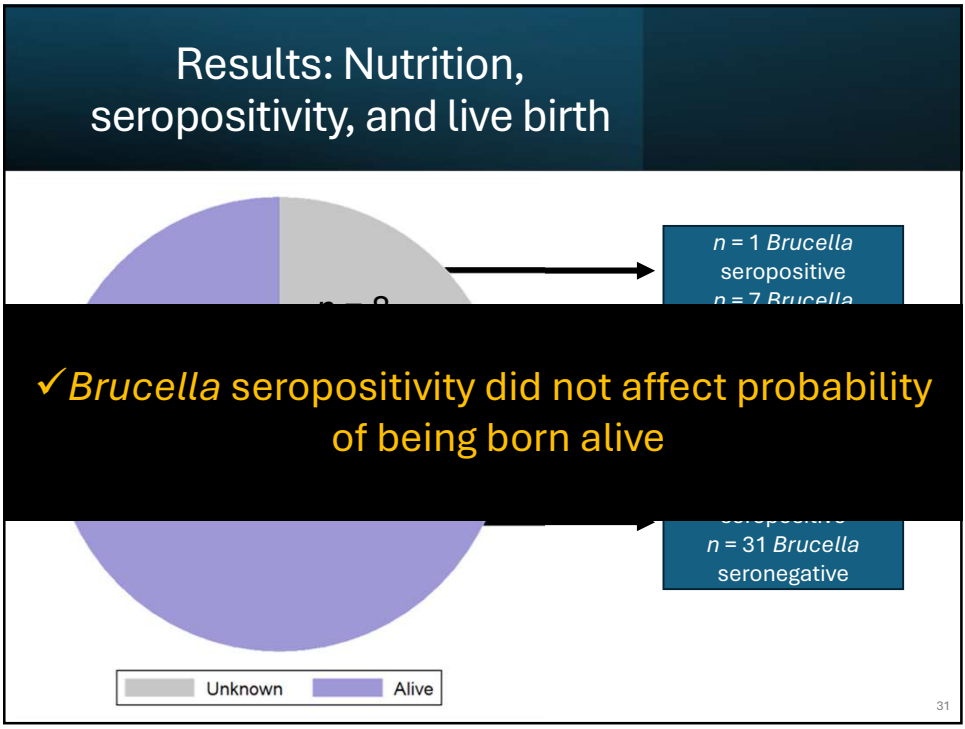
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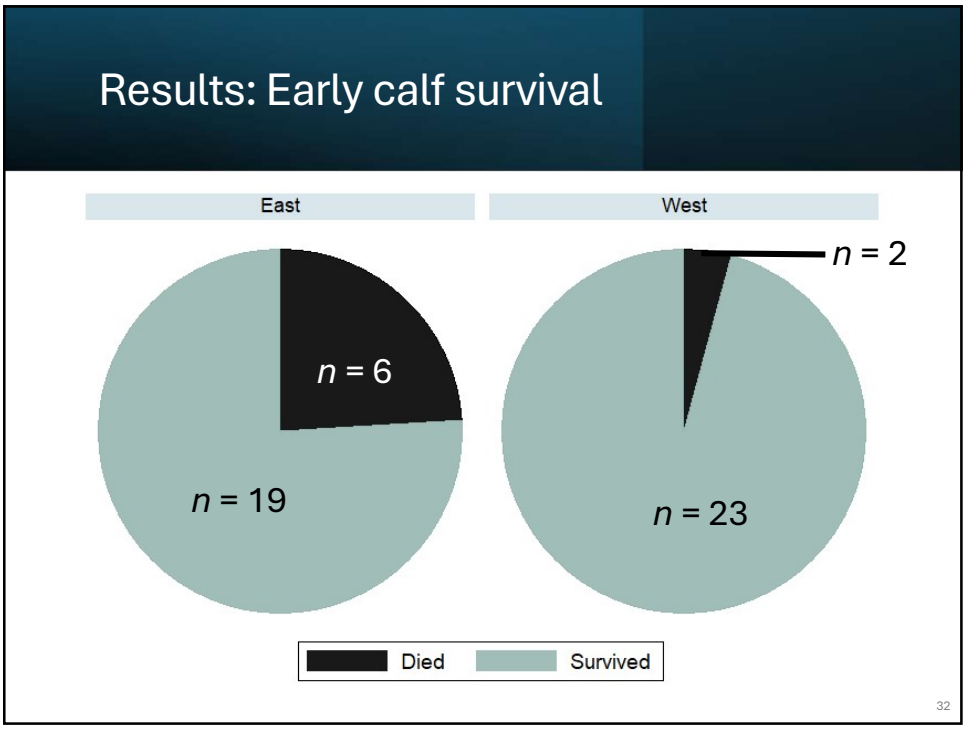
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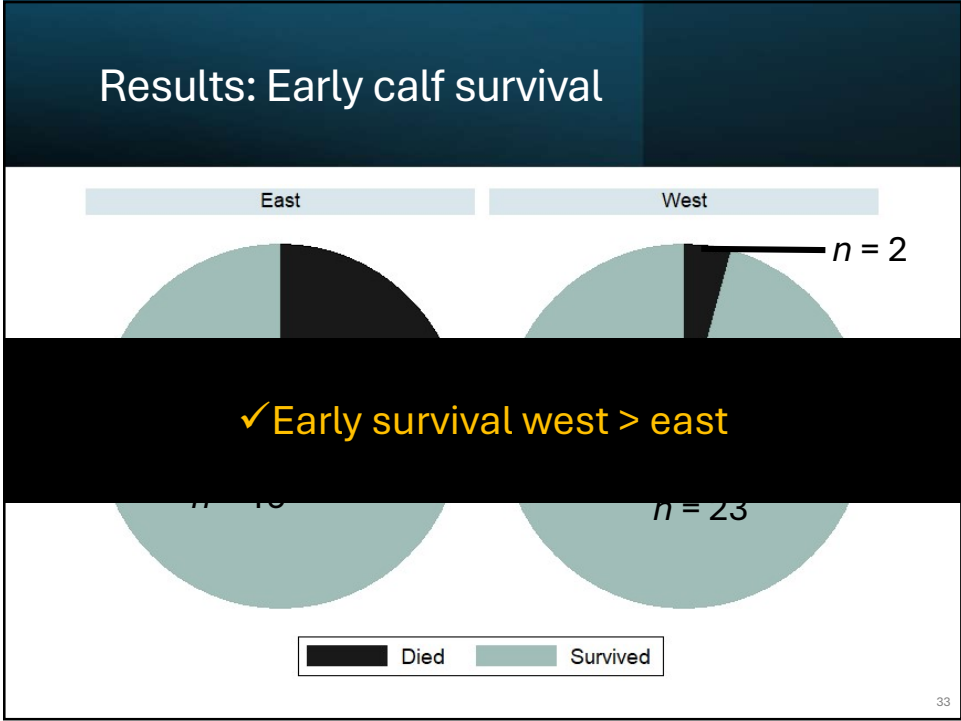
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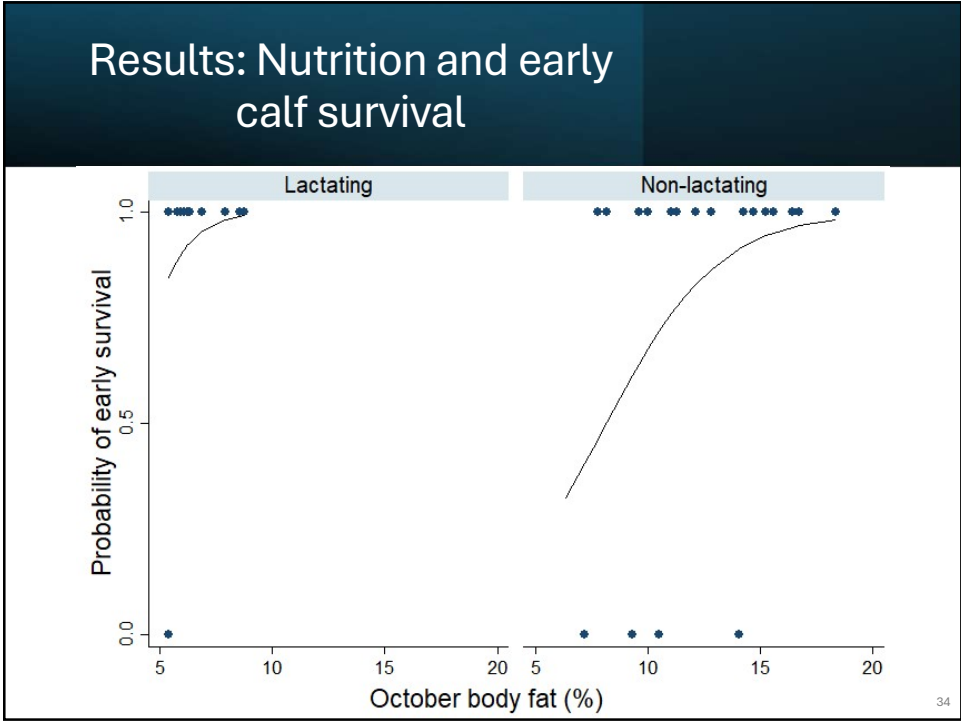
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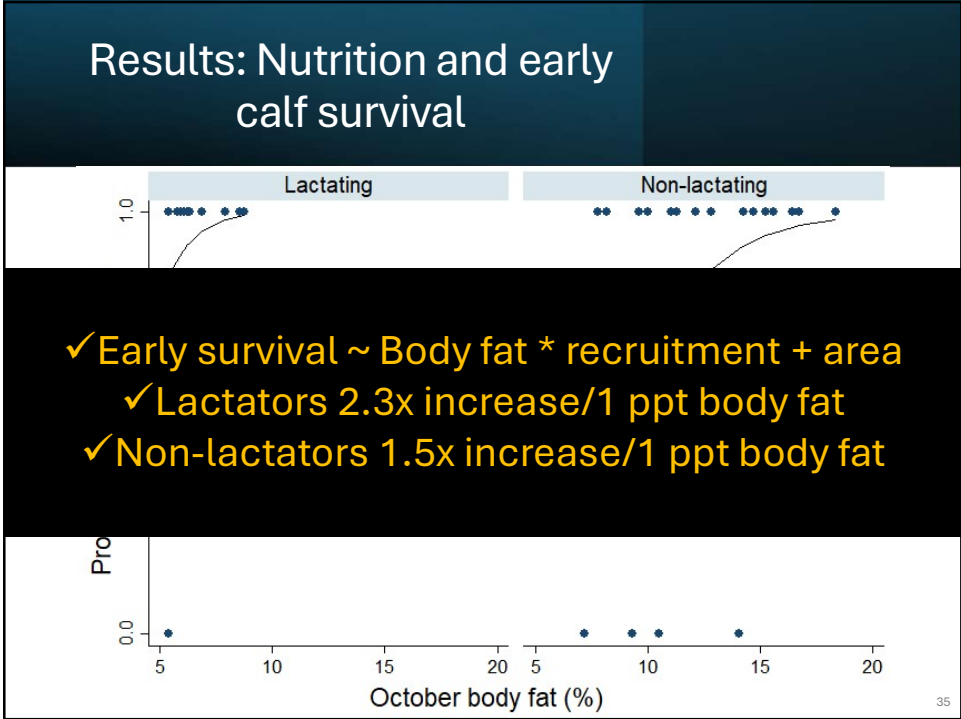
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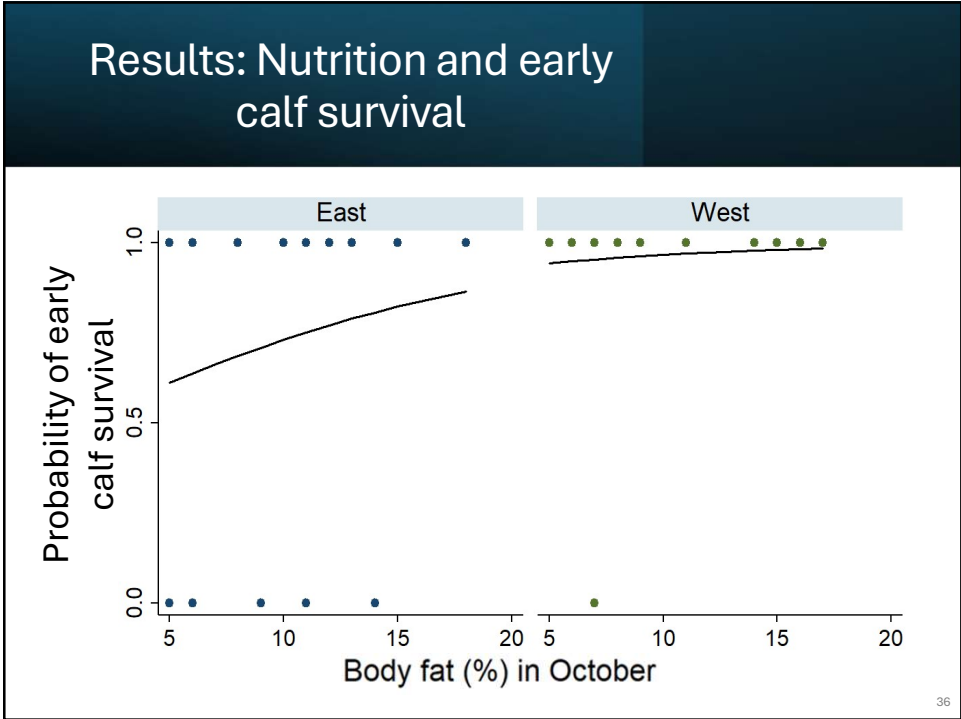
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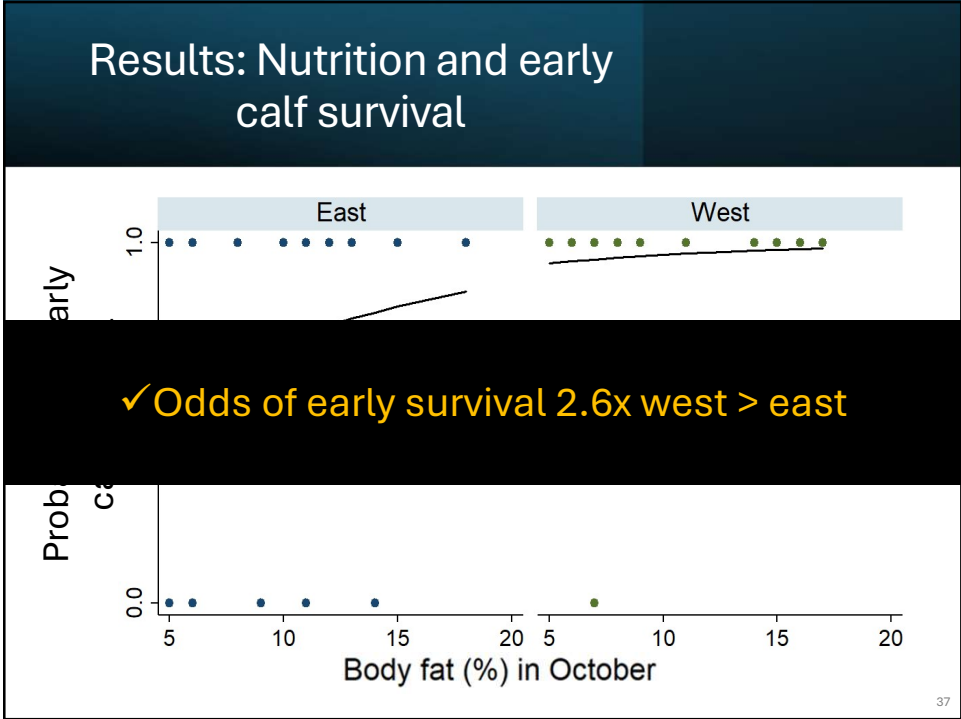
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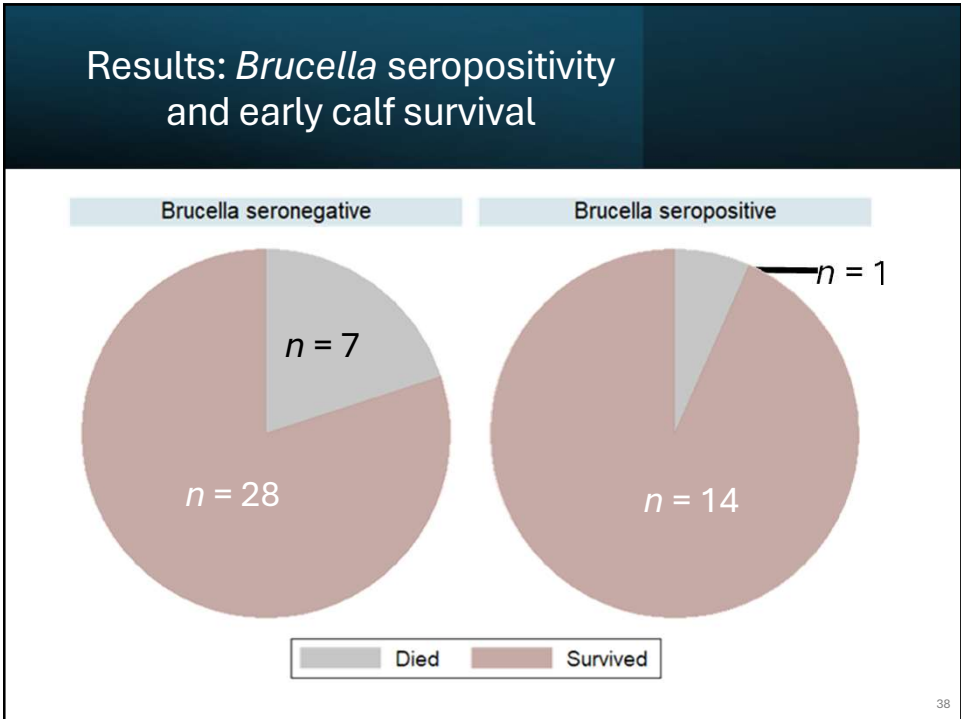
35



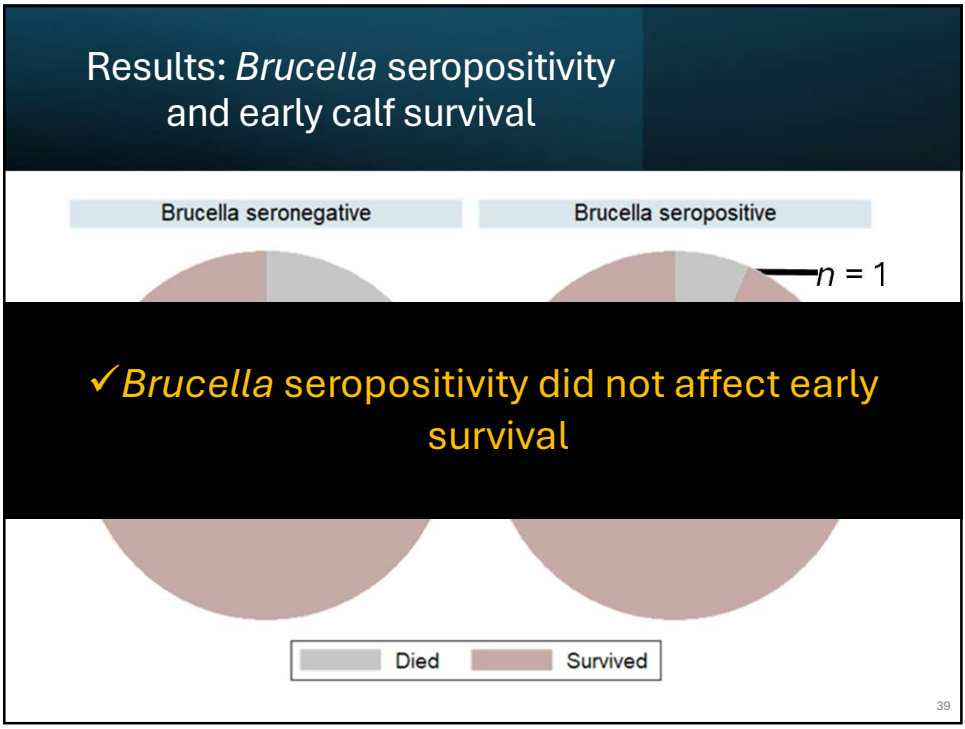
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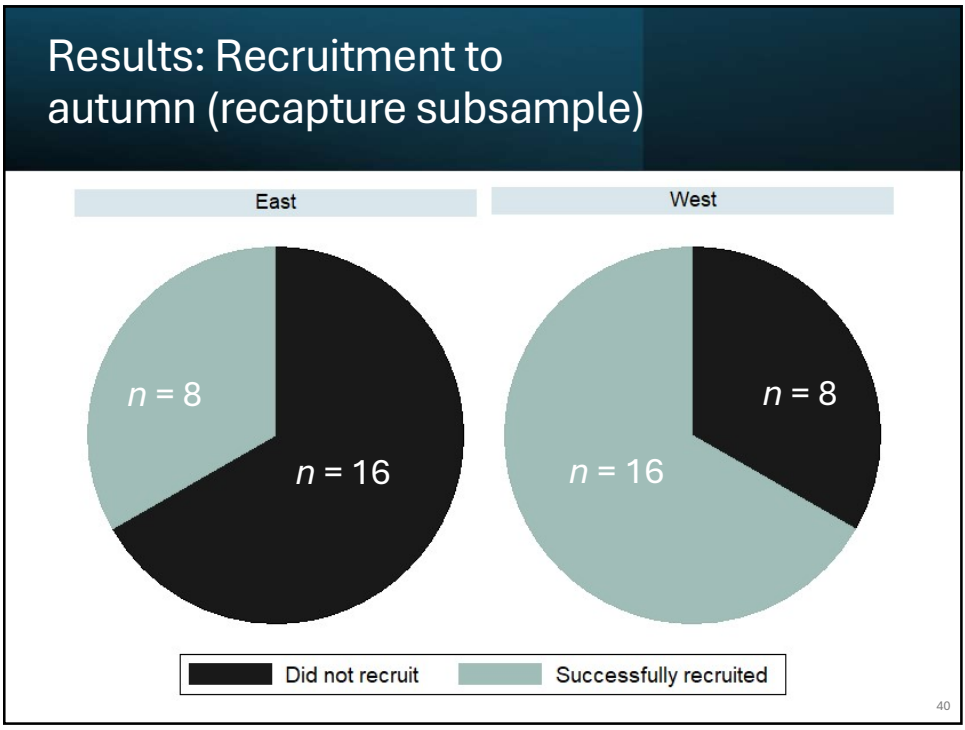
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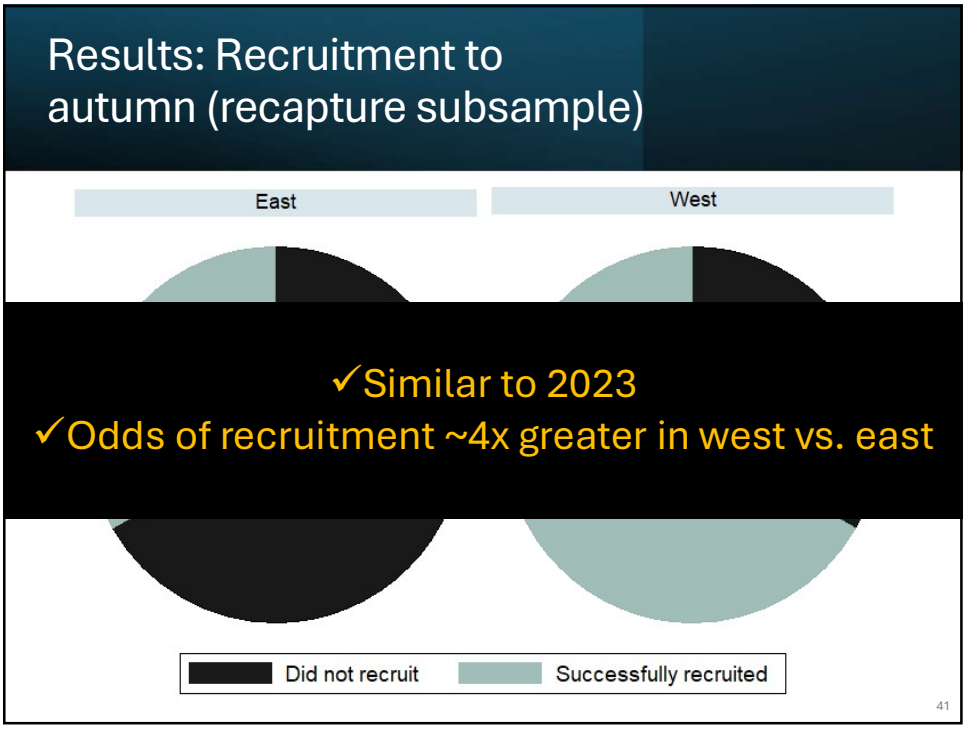
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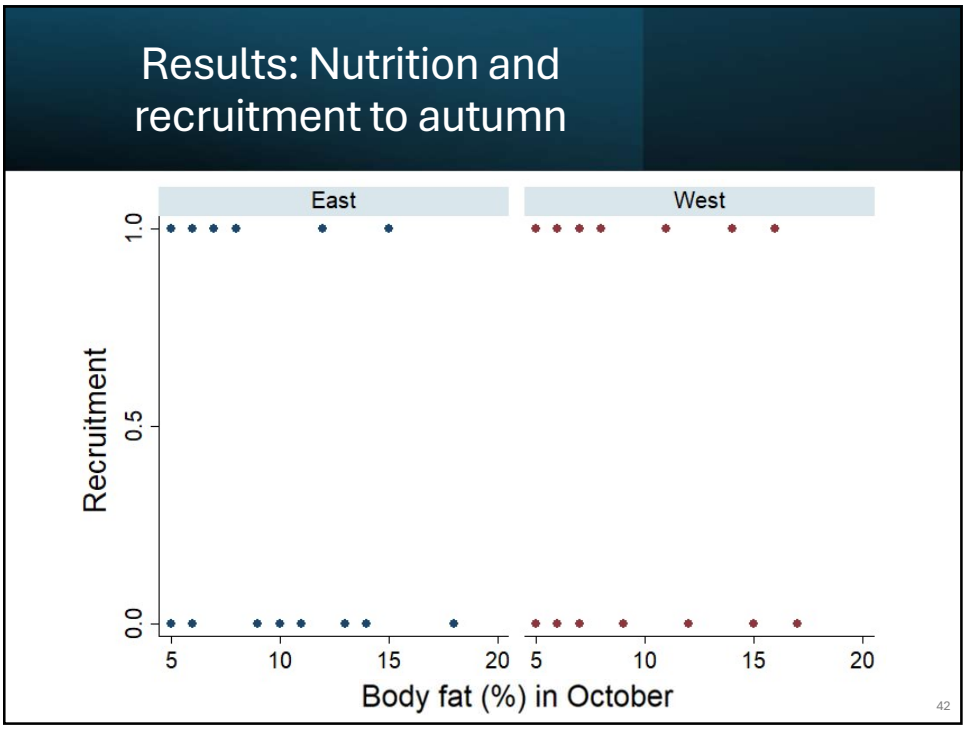
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40



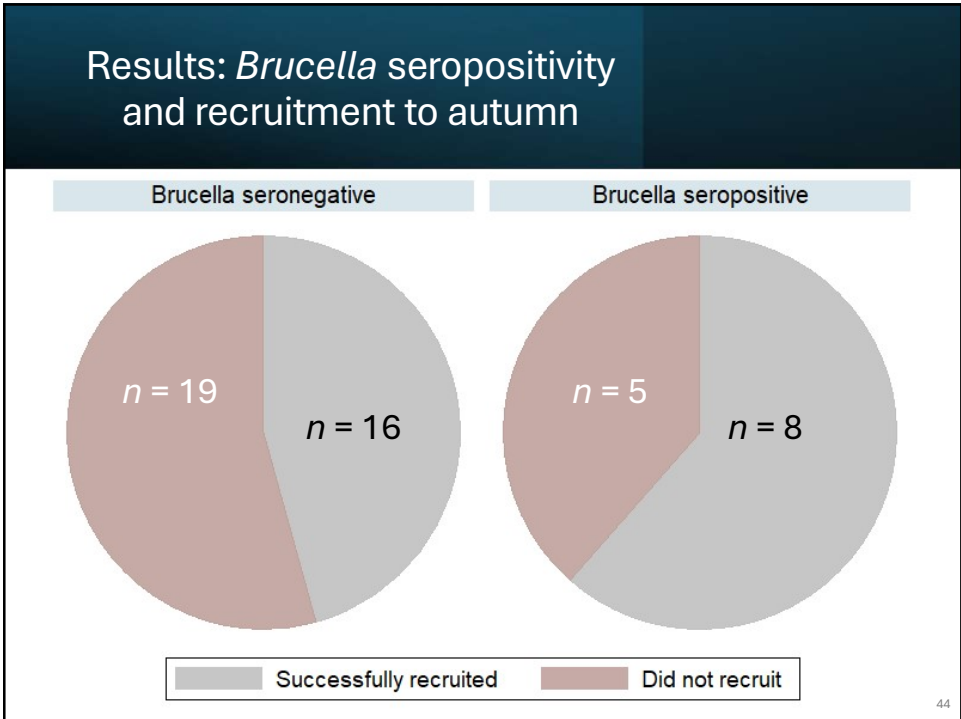
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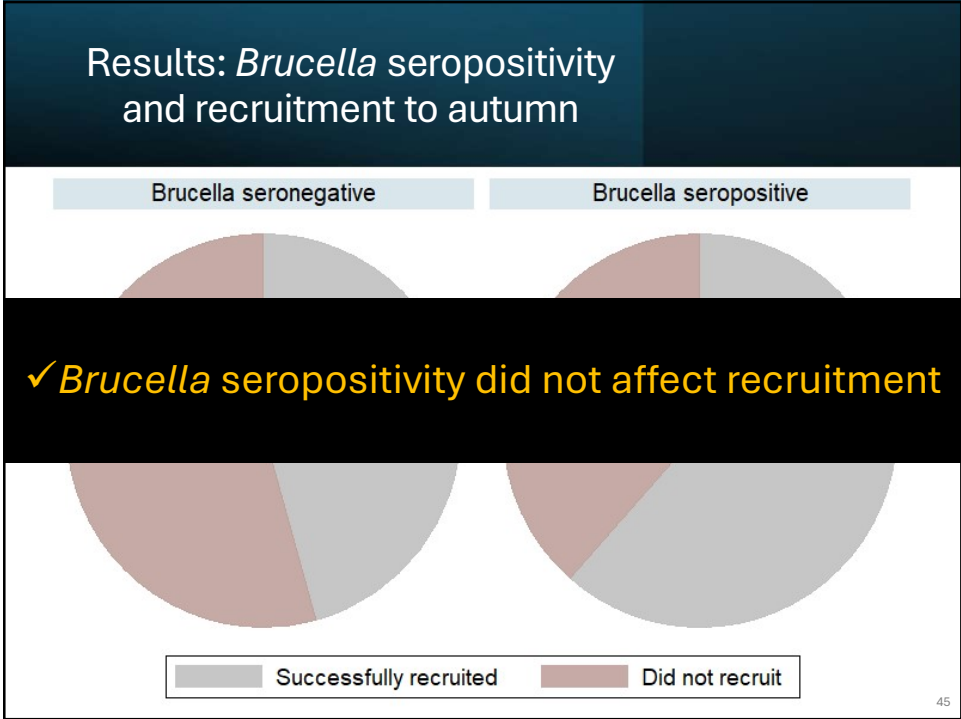
42



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Year 1 summary— nutrition

- Complex nutritional picture
- Summer vs. winter
- Birthdate, early calf survival
- Confounding effects?
- Nutrition interactions

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Year 1 summary—*Brucella* seropositivity

- Issues with seropositivity
- No effects on demographic rates
- Other work ongoing

47

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Year 1 summary—demographic rates

- High pregnancy rates
- High survival of adult females
- High recruitment in west

48

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Other observations...

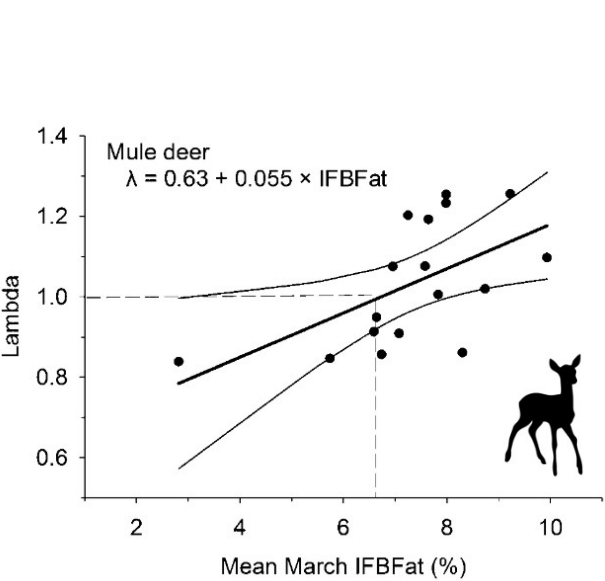
- Benefits to early birth?
- Birth timing and risk

49

49

Next steps

- Continues through 2026
- Additional analyses
- Population modeling work



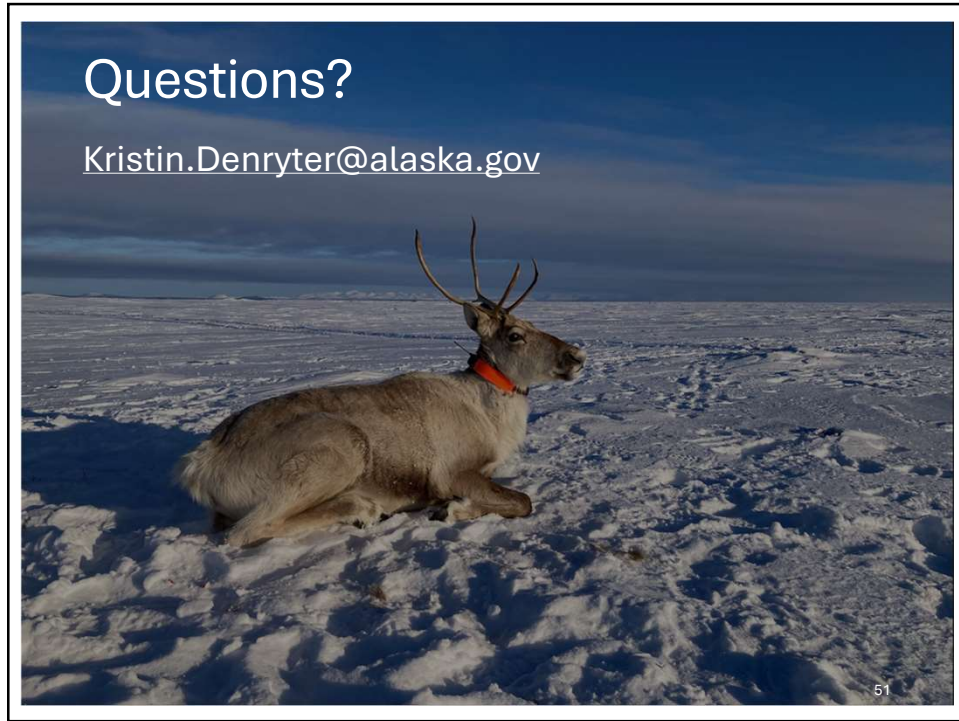
Mule deer
 $\lambda = 0.63 + 0.055 \times \text{IFBFat}$

Lambda

Mean March IFBFat (%)

Monteith et al. 2014 *Wild. Mono.* 186 50

50



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