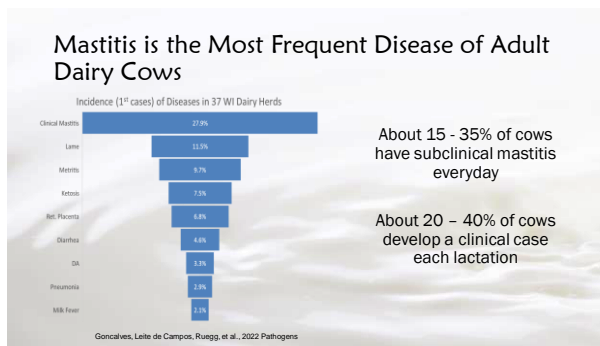
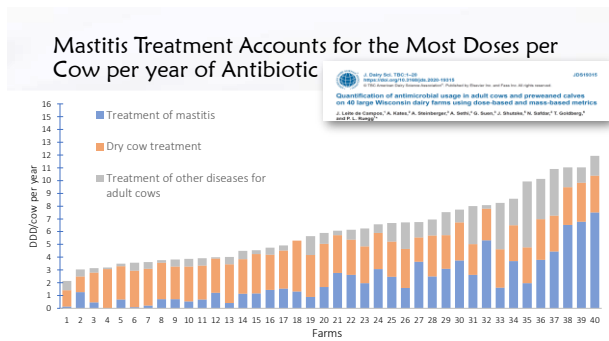




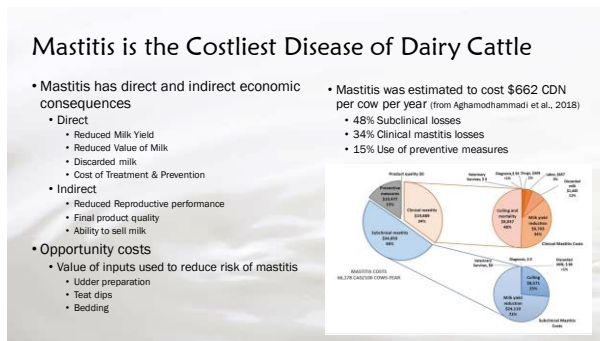
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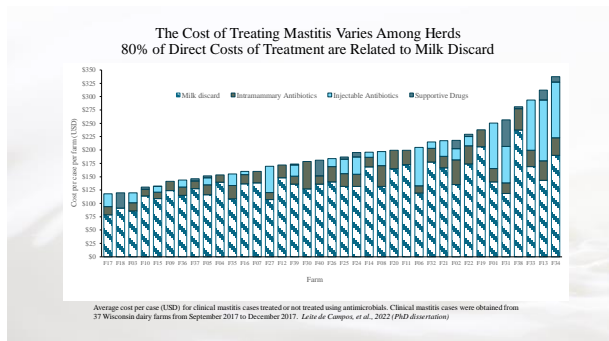
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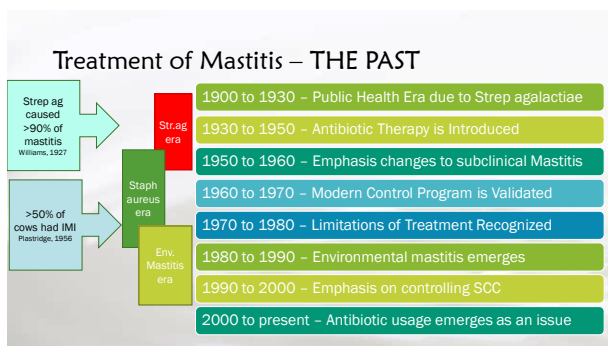
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**Objective**

**Review:**

- Historical basis of mastitis therapy
- Options for improving current therapies

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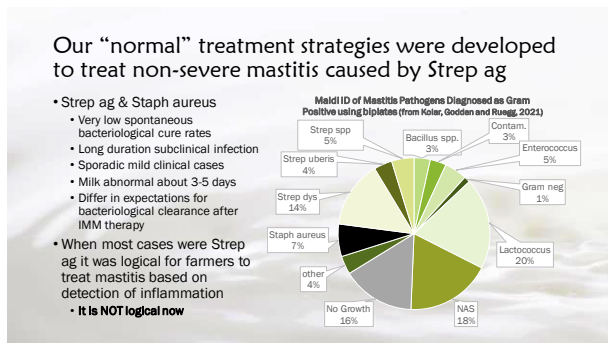


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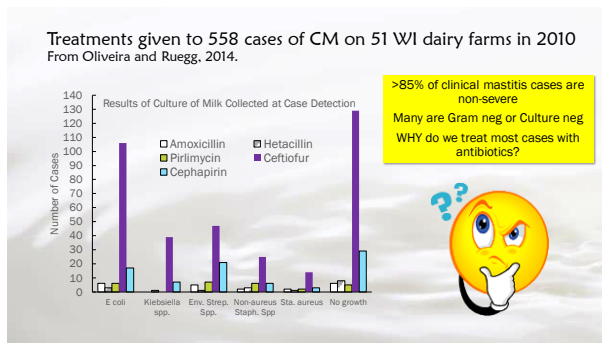
### 6 of 7 IMM products in U.S. Were developed to Treat Strep ag & Staph aureus

	Amox-Mast	Polymast	DariClox	Mast-Clear	Pirase	Spectra-mastLC	Today
Active Ingredient	Amoxicillin	Ampicillin	Cloxacillin	PenicillinG	Pirimycin	Ceftiofur	Cephapirin
Label Claim	Str ag	YES	YES	YES	YES	YES	YES
	S aureus	YES	YES	YES	YES	YES	YES
	Str dys.		YES		YES	YES	
	Strp ub.				YES		
Other		E. coli				CNS & E coli	
Label Dosing & Duration	3 tubes @ 12 h	3 tubes @ 24 h	3 tubes @ 12 h	3 tubes @ 12 h	2-6 tubes @ 24 h	2-8 tubes @ 24 h	2 tubes @ 12 h
Company	Merck	BI	Merck	Hanford	Zoetis	Zoetis	BI

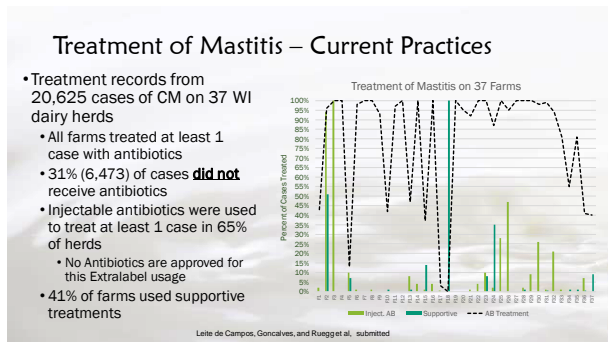
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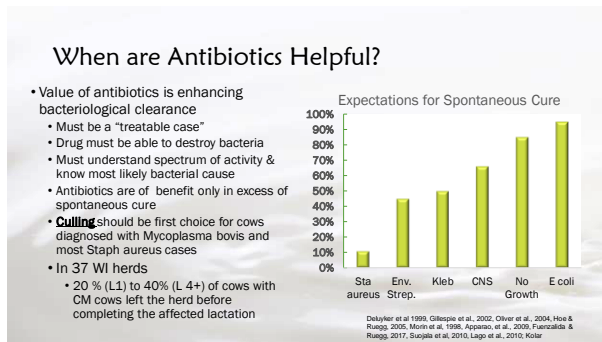
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### Appropriate Treatment of Non-Severe Primary Cases of Clinical Mastitis

- **Most** non-severe cases on most farms should not receive antibiotics
- Must have knowledge of types of pathogens present on the farm
- When possible, should be selective therapy based on culture results
  - IMM antibiotics for Gram +
  - Systemic therapy reserved for sick cows
  - Don't treat chronic cows
    - Review SCC and health history of cow before using AB
  - Standard protocols should follow label guidelines
  - When no AB are given, the cow must be able to mount effective immune response
- When the pathogen is not known,
  - The duration of IMM therapy should be short

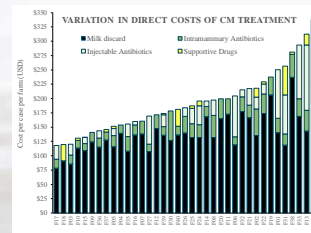


Large Dairy Herd Management <http://ldhm.adsa.org/>

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### Present Trends in Mastitis Treatment

1. Reduced duration of IMM treatments
2. Greater adoption of selective treatment protocols
3. Selection of the right cows to treat



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### Key Concept Inflammation Does **NOT = INFECTION**

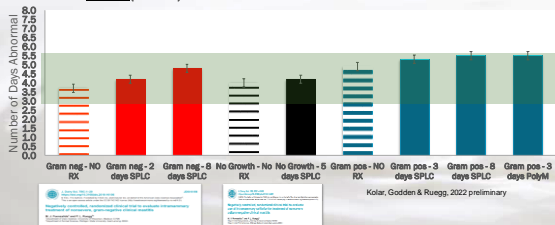


- Infection
  - actively dividing bacteria in udder
- Inflammation
  - the bodies response to infection
  - purpose is to kill bacteria
- We identify mastitis infections AFTER the cow's immune system is already killing bacteria
- Sometimes the bacteria are already gone before we notice the symptoms

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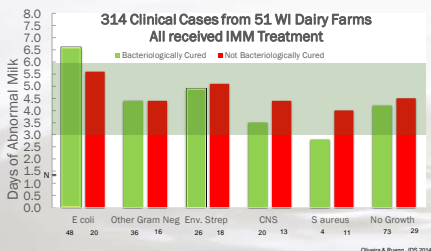
### Milk is Abnormal for 3 – 5.5 Days With or Without Treatment

Days of Abnormal Milk for **Gram-negative** (n = 188), **Culture-Negative** (N = 121) & **Gram Positive** (n = 239) Cases of non-severe Clinical Mastitis Enrolled in Clinical Trials



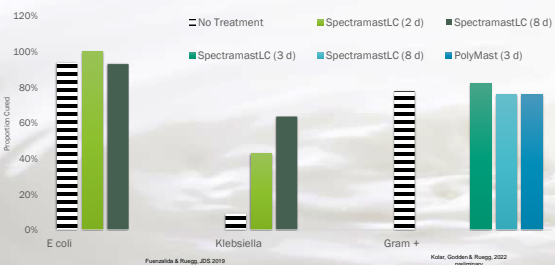
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### Inflammation Lasts 3-6 days Regardless of Bacteriological Cure

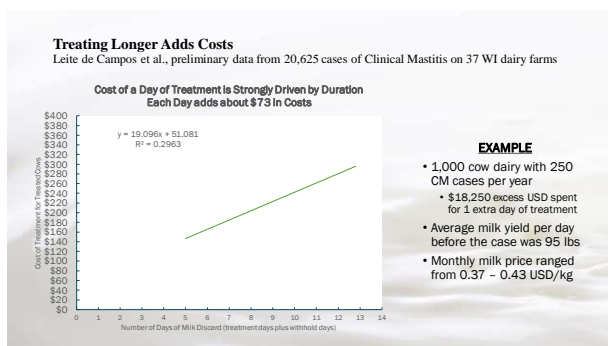


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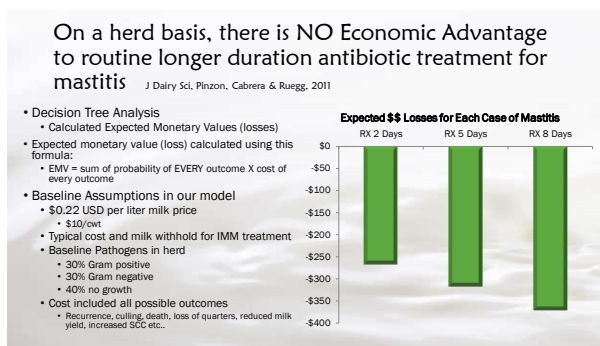
### Bacteriological Cure at 21 to 28 Days is Not Always Improved by Longer Treatment



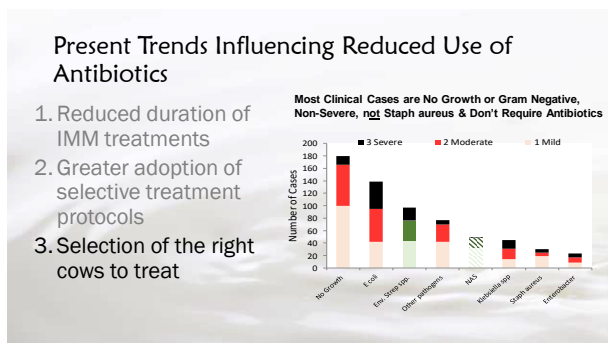
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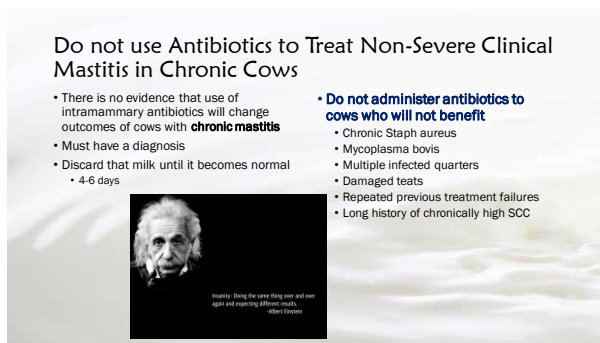
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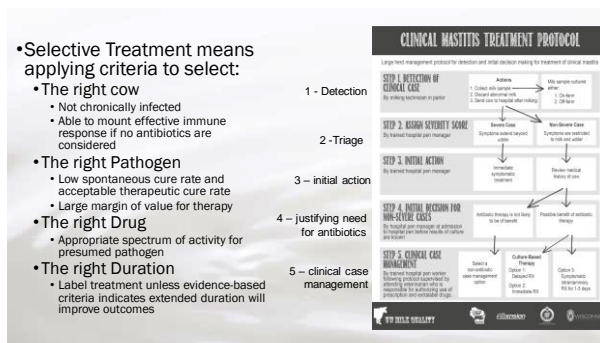
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How should you treat non-severe mastitis if you don't know the bacteria?

Etiology	% of all cases	Evidence that IMM/AM helps
E coli	29%	No
Klebsiella sp	5%	Variable
Enterobacter sp	3%	No
Strep spp.	13%	Often Yes
Enterococcal spp	2%	No
CNS	6%	Variable
No Growth	29%	No
Yeast	3%	No
Staph aureus	3%	In a very few cases Yes
Other Pathogens	7%	No

- If the bacteria is not known
  - Use a narrow spectrum IMM antibiotic for short duration
- Most cases will be
  - No growth
  - Gram negative
  - Intrinsicly resistant
- Base longer duration treatment on cow history

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### Conclusion

- Current mastitis treatment protocols are based on lessons learned during a past era and are gradually evolving
- Antibiotic treatment of non-severe mastitis based on detection of abnormal milk in an otherwise healthy cow is **wrong more frequently than it is right**
- There are many **cow-level indicators** that can be used to reduce reliance on antibiotics
- What we can do **today** to improve mastitis treatments
  - Use **shorter duration IMM** treatment
    - Follow label of short duration IMM products
    - Reduce the duration by 1 day of flexible duration products
  - Culture **more clinical** mastitis cases
    - use data to make antibiotic usage decisions
  - **Cull (don't treat)** cows infected with Staph aureus
  - Use **narrower spectrum** drugs unless you are treating a case that is outside the spectrum of activity of the product

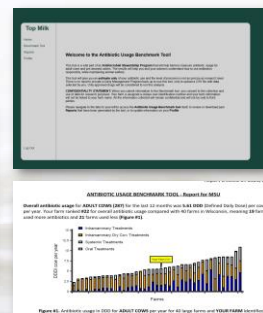
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### Many Thanks to My MSU Team

- Juliana Leite de Campos & Quinn Kolar
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  - Postdoctoral Researchers
- Carolina Pinzon-Sanchez
  - Outreach specialist
- Cara Robison
  - Lab Manager



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