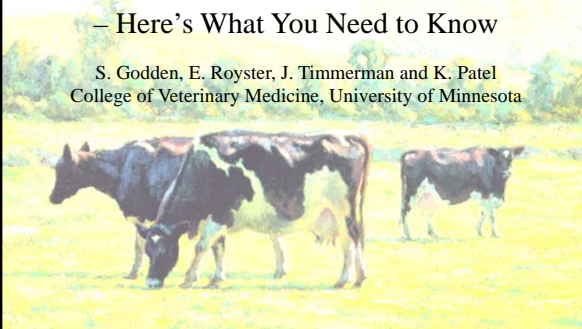



**Are Your Clients Asking About  
Selective Dry Cow Therapy?**  
– Here’s What You Need to Know

S. Godden, E. Royster, J. Timmerman and K. Patel  
College of Veterinary Medicine, University of Minnesota



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**Outline**



- Importance of dry cow mastitis
- What is selective dry cow therapy (SDCT) and why are we talking about it?
- Components of a successful SDCT program
- Examples of successful and unsuccessful SDCT programs
- Logistics of adopting SDCT
- Economics of SDCT
- What herds could consider SDCT



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**What is Dry Cow Mastitis?**



- Intramammary infection (IMI) that:
  - Is present at dry off and fails to cure during the dry period
  - or
  - New infections acquired during the dry period



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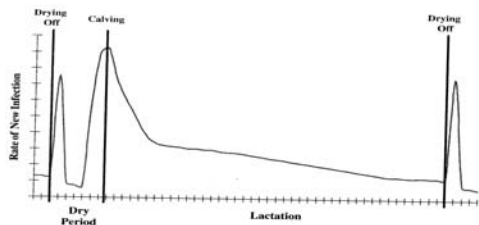
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### The Significance of Dry Period Infections

- 20 – 30% of quarters will develop a new infection during dry period (Dingwell et al., 2001, Green et al., 2002, Godden et al., 2003 & Cook et al., 2004)
- 50 – 60% of all new environmental infections during the lactation cycle occur during the dry period. (Bradley and Green, 2000)




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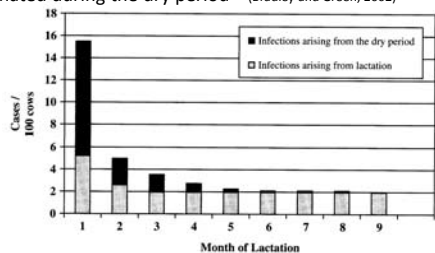
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### Consequences of Dry Period Infections

- Increased clinical mastitis and ↑ SCC in the next lactation
- Over 50% of clinical coliform mastitis events in the first 100 DIM originated during the dry period (Bradley and Green, 2002)




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### Core strategies to control mastitis during the dry period



- **Blanket dry cow therapy**
- Internal or External Teat Sealants
- Vaccination programs / Immunity
- Nutrition
- Limiting stressors / improving cow comfort
- Dry-off strategies
- Hygiene: Housing, bedding and manure management




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### Blanket Dry Cow Therapy



- Infuse all cows with long-acting antibiotic at dry-off
- All labelled DCT products in the U.S. are effective
- Very successful
  - Eliminates existing IMI caused by susceptible bacteria
  - Prevents new IMI during the early dry period
  - Has helped to reduce contagious pathogens
- Adopted by ≈ 80% of U.S. producers

(Smith, 1966; Browning, 1990; Bradley & Green, 2001; Bradley & Green, 2004; NAHMS 2007 )




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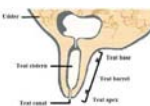
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### Historical rationale for using blanket DCT

- There was a high prevalence of infection at dry off (> 30-35% of quarters infected)
- Contagious mastitis was more prevalent (e.g. *S. aureus*, *Strep. ag*)
- We lacked rapid, accurate on-farm tests to differentiate infected from uninfected quarters
- We had no method of protecting untreated quarters from acquiring a new infection during the dry period



Environmental Streptococci (e.g. *Streptococcus uberis*)




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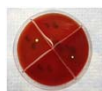
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### Do we still need blanket DCT?

- Many herds now have a low prevalence of IMI at dry off:
  - U.S. DHIA avg SCC dropped from 322,000 to 200,000 cells/mL in last 15 years
  - Only 15-30% of quarters infected at dry off in many herds



(MN Easy™ 4Cast™ plate, UMN)

- Accurate on-farm tests now available to identify infected quarters (or cows) needing antimicrobial treatment



Orbeseal, Zoetis



T-Hexx® Dry Hydromer, Inc.

- Teat sealants are now available to protect untreated quarters from new infections during the dry period




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### What is Selective Dry Cow Therapy?



- Only cows or quarters with a high likelihood of intramammary infection (IMI) are infused with antibiotic at dry off
- Options for level of SDCT decision:
  - Cow level: If one or more quarters are infected, then the whole cow (all 4 quarters) is treated with antibiotic or
  - Quarter level: Only infected quarters are treated with antibiotic
- Greater opportunity to reduce antimicrobial use if target quarter-level treatment decisions (vs cow-level)




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### Why are we talking about selective dry cow therapy (SDCT)?



- Increasing pressure to demonstrate good drug stewardship:
  - Using antimicrobials only when necessary
  - Properly target therapy based on known bacterial infection
- Mastitis an obvious target - The majority of antimicrobials used on dairy farms is for the treatment or prevention of mastitis
- Reducing antimicrobial use in mastitis control:
  - Step 1. Clinical mastitis therapy - Culture based treatment of clinical mastitis reduces antimicrobial use by approx. 50% (Lago et al. JDS. 2011)
  - Step 2. Selective Dry Cow Therapy (SDCT)?
    - Already mandated in some European countries
    - Many of our herds are ready for this





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### Components of a successful dry cow therapy program?



1. A highly sensitive diagnostic test to identify infected quarters needing antimicrobial treatment:
  - If we miss identifying & treating infected quarters, these IMI will carry into the next lactation, causing increased SCC and clinical mastitis

and
2. A mechanism to protect untreated quarters from new IMI during the dry period



- If we can satisfy the above 2 requirements, SDCT should result in equal udder health vs BDCT, while reducing antimicrobial use




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### Options for diagnostic tests at dry off

Test	Diagnostic Sensitivity (%)	Diagnostic Specificity (%)	Convenience / Speed	Reference
<b>Cow level</b>				
CMT (≥ trace)	70%	48%	Rapid (cowside)	Sanford et al., 2006
SCC (> 200,000)	70%	51%	Rapid (if DHIA test data)	Torres et al., 2008
On-farm culture	85%	73%	1-2 day turnaround	Cameron et al., 2013 (Petrifilm system, 3M)
<b>Quarter level</b>				
CMT (≥ trace)	61%	80%	Rapid (cowside)	Middleton et al., 2004
SCC (> 200,000)	57-64%	66-86%	0.5-1 day turnaround	Pantoja et al., 2009; Middleton et al., 2004
On-farm culture	92%	52%	1-2 day turnaround	Royster et al., 2016 (4SCast™ system, UMN)



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Trade offs: Culture (a direct test) is more sensitive, but less convenient

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### What are they currently doing in Europe?

- Adoption of SDCT:
  - Mandatory: Netherlands, Denmark, Sweden, Germany
  - UK and New Zealand on track to adopt
- Basis of treatment: Usually cow level (some quarter level)
- Diagnostic test used:
  - Varies, but usually SCC at last test or for last 3 DHIA tests:
    - e.g. < 50,000 SCC for heifers, < 150,000 SCC for cows
  - Some try to factor in clinical mastitis treatment history
  - Culture not widely available yet
- Use of teat sealants? Variable




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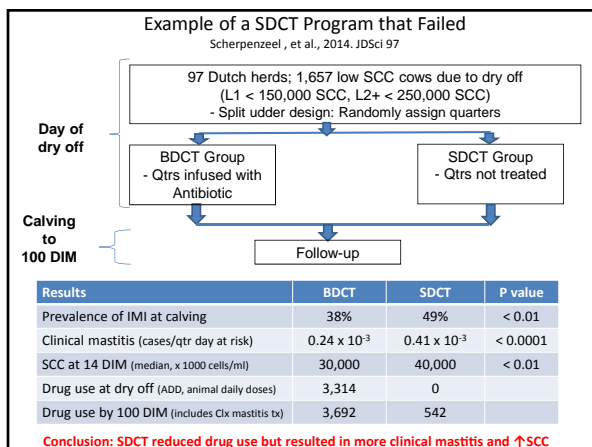
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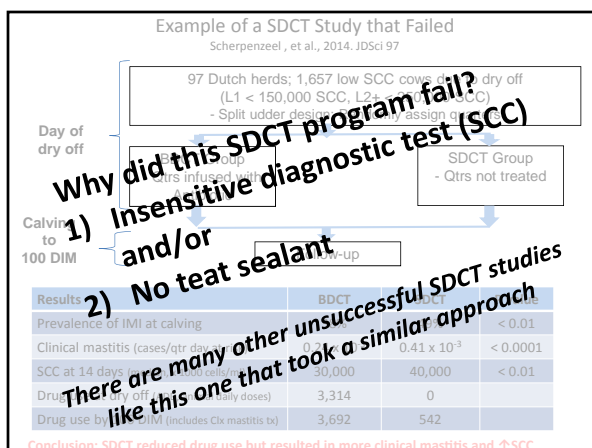
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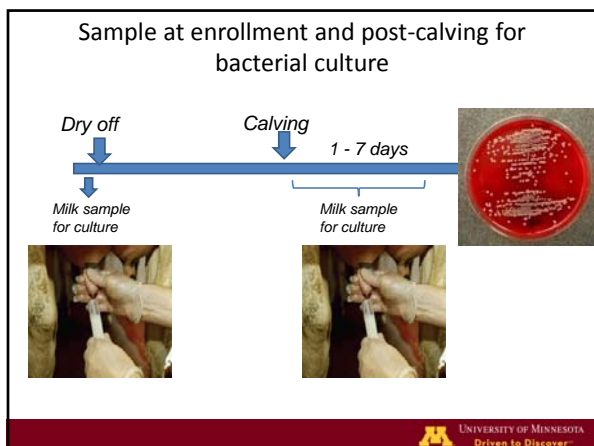
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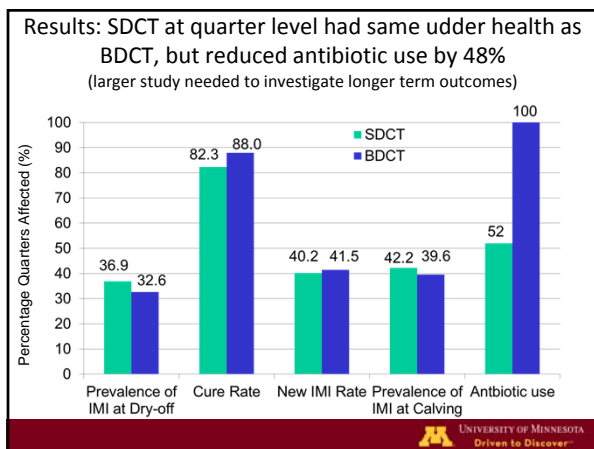
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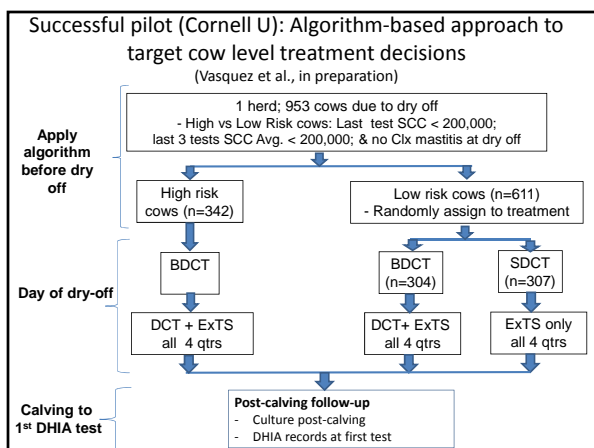
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**Preliminary Results:**  
 Algorithm-based SDCT targeting cow level treatment had same udder health as BDCT & reduced antibiotic use by 60%  
 (follow-up ongoing)

	Low risk cows treated with Antibiotic and ExTS (BDCT)	Low risk cows treated with ExTS only
Cures (%)	93%	88%
New Infection rate (%)	5.5%	7.3%
Milk yield at 1 <sup>st</sup> test (kg)	40.5	41.2
SCC at 1 <sup>st</sup> test	2.5	2.7




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


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**What differentiates successful from unsuccessful SDCT programs?**

- **Successful programs:**
  - Used a sensitive diagnostic test (i.e. milk culture) to make cow or quarter level treatment decisions and/or
  - Used an internal or external teat sealant to protect untreated cows/quarters
  - The relative importance of these 2 factors needs study
- **Unsuccessful programs:**
  - Used a less sensitive indirect diagnostic test (e.g. SCC) and
  - Did not use a teat sealant


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**Logistics of Adopting a SDCT Program**

- It's more work
- Requires dedicated person (or team) and increased time to:
  - Apply diagnostic test
  - Interpret test data and make treatment decisions
  - Correctly administer assigned treatments at dry off
  - Use clean infusion techniques, particularly when infusing teat sealant into an untreated gland


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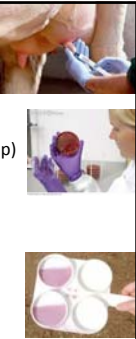

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### Considerations for Test Requirements for a SDCT Program

- On-farm milk culture:
  - Must set up on-farm lab, trained staff (DVM can help) OR – Local vet clinic can do the culture work
  - Must sample cows 1-2 days prior to dry off (culture 24-48 hr)
- DHIA SCC data (+/- clinical mastitis history):
  - Must be on DHIA test or have rapid cow-side SCC test
  - Must take time to evaluate the records
- CMT test:
  - Staff training in test procedures & interpretation


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### SDCT is an opportunity for vet clinics to offer a valuable service to clients

- Not all producers can or want to...
  - Set up an on-farm culture lab
  - Accurately and cleanly administer treatments at dry off
- Vet clinics can offer this service:
  - Team of trained veterinary technicians visit farm on a weekly basis to collect samples for testing
  - Vet clinic conducts testing
  - Technicians return to farm to dry off cows
- New Zealand Vet Tech model: Sample cows, dry cows off, pretreat heifers with teat sealant, dehorn, etc.





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### Economics of a SDCT Program

- It depends...
- Factors affecting economics:
  - Prevalence of IMI at dry off => If lower prevalence, greater opportunity to reduce antibiotic use
  - Cow-level vs quarter-level SDCT program => Greater reduction in antimicrobial use if making quarter-level treatment decisions
  - Sensitivity and specificity of test used:
    - If poor sensitivity, more mastitis next lactation
    - If poor specificity, more false positive cows treated
  - Cost of test used (including labor)
  - Cost of dry cow antibiotic tube being used


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### Examples of SDCT Program Economics

- You could lose money if:
  - You adopt a failing SDCT program model that results in more clinical mastitis and higher SCC (vs BDCT) (e.g. If use a poor diagnostic test or don't use teat sealant) (Scherpenzeel et al., 2016. JDSci. 99:3753)
- You can make money if:
  - You adopt a successful SDCT program model
  - MN pilot study estimated a net benefit of \$2.62 per cow assigned to the SDCT group
- Even if we only cover costs, but reduce antimicrobial use while maintaining udder health, it is a win for our industry


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### What herds could consider a SDCT program?

- Science based thresholds for herd selection are lacking
- However, well managed herds will benefit more:
  - Bulk tank SCC < 250,000 cells/mL? (Ekman, T. and O. Østerås. 2003; Cameron et al., 2014)
  - Good control of contagious mastitis: *S. aureus/Strep. ag*
  - Lower prevalence of IMI at dry off => greater opportunity to reduce antimicrobial use
- Herds that can manage the program (or the vet clinic can manage it for them)


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### Review

- Importance of dry cow mastitis
- What is selective dry cow therapy (SDCT) and why are we talking about it?
- Components of a successful SDCT program
- Examples of successful and unsuccessful SDCT programs
- Logistics of adopting SDCT
- Economics of SDCT
- What herds could consider SDCT


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### Summary

- The dairy industry is under increasing pressure to demonstrate responsible drug stewardship
- SDCT represents a huge opportunity to significantly reduce antimicrobial use on farms without sacrificing udder health
- We have successful, cost-effective models for adopting SDCT and research is continuing
- We can do this!



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## Thank you!



## Questions?

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