The State of the Wisconsin Dairy Producer

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Dairy Producers in Wisconsin (October 15, 2012)

- 9787 Grade A
- 1667 Grade B – 14.5% of farms, 2% of milk
- Average Somatic Cell Count: ca. 255,000 per ml (2010 stats)
Dairy Production Trends

- Decreasing number of farms
- Increasing number of cows per farm
  - average is over 100
  - roughly 1.2 million cows (2.6 million in 1946)
- Approx. 20,000 lbs. milk per cow per year
  - 5,100 lbs. in 1934
- 26 billion lbs. of milk (2010)
  - 18 billion lbs. in 1970
On-Site Dairy Farm Inspections

- Mandated in the Pasteurized Milk Ordinance (PMO) → allows WI to ship Grade A products interstate
  - Milk, cream, half-and-half, eggnog, NFDM
  - Cottage cheese
  - Whey and whey products
  - Yogurt and other Standard of Identity milk products (21 CFR 131)
- State Law (Chapter 97.24.3) requires our regulations to be in “reasonable accord” with the PMO
- Mandated surveys (Chapter 97.24.5) to make sure PMO requirements are met
What’s involved in an on-site dairy farm inspection?

- Mainly observations to see if minimum standards are met
- Very little examination of records
- Paper and electronic records
  - 1 copy for producer
  - 1 copy filed and entered electronically
How well do inspection results relate to laboratory testing results?

- 2007 – 2008 Study
- Mandatory monthly reporting of SPC and SCC
  - Failure = at least 1 SCC > 750,000 OR at least 1 SPC > 100,000
- Drug-residue failures reported
  - Failure = (+) β-lactam result
- On-farm inspection results
  - Failure = at least 1:  
    - mandated re-inspection OR
    - double-debit OR
    - grade permit suspension
<table>
<thead>
<tr>
<th>SCC over 2 years</th>
<th>SPC over 2 years</th>
<th>Drug over 2 years</th>
<th>Inspection Failure rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass</td>
<td>Pass</td>
<td>Pass</td>
<td>0.12</td>
</tr>
<tr>
<td>Pass</td>
<td>Pass</td>
<td>Fail</td>
<td>0.20</td>
</tr>
<tr>
<td>Fail</td>
<td>Pass</td>
<td>Pass</td>
<td>0.22</td>
</tr>
<tr>
<td>Pass</td>
<td>Fail</td>
<td>Pass</td>
<td>0.25</td>
</tr>
<tr>
<td>Fail</td>
<td>Pass</td>
<td>Fail</td>
<td>0.39</td>
</tr>
<tr>
<td>Fail</td>
<td>Fail</td>
<td>Pass</td>
<td>0.41</td>
</tr>
<tr>
<td>Pass</td>
<td>Fail</td>
<td>Fail</td>
<td>0.44</td>
</tr>
<tr>
<td>Fail</td>
<td>Fail</td>
<td>Fail</td>
<td>0.55</td>
</tr>
</tbody>
</table>
## Probability of failing a farm inspection

<table>
<thead>
<tr>
<th>SCC max. fail rate</th>
<th>SPC max. fail rate</th>
<th>0</th>
<th>0.1</th>
<th>0.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0.12</td>
<td>0.25</td>
<td>0.21</td>
</tr>
<tr>
<td>0.1</td>
<td>0.1</td>
<td>0.21</td>
<td>0.35</td>
<td>0.48</td>
</tr>
<tr>
<td>0.2</td>
<td>0.2</td>
<td>0.21</td>
<td>0.45</td>
<td>0.51</td>
</tr>
<tr>
<td>0.3</td>
<td>0.3</td>
<td>0.21</td>
<td>0.48</td>
<td>0.51</td>
</tr>
<tr>
<td>0.4</td>
<td>0.4</td>
<td>0.19</td>
<td>0.54</td>
<td>0.53</td>
</tr>
</tbody>
</table>
How well do inspection results relate to laboratory testing results?

- Poorly: R values of $\leq 0.22$
- Farm inspection is a “snapshot”
  - date may be different from lab result dates
  - date would only coincide with one day’s worth of drug residue test results
- Assuming milk will be pasteurized, what milk safety hazards can best be detected by an on-site farm inspection?
  - lack of cooling $\Rightarrow S. aureus$ growth and toxin production
  - misuse of drugs
Performance-Based Farm Inspection (PBFI) frequencies

- 1 – 4 inspections per year
  - Appendix P in PMO
  - ATCP 60.245
- Based on
  - Key inspection debits
  - Standard Plate Count = SPC
  - Somatic Cell Count = SCC
  - Drug-residues
  - Warning letters and other regulatory actions
A comment we wanted to investigate

- “I had one bad SCC result that month, but it happened to be the reported test result. Now I’ve been switched to higher inspection frequency.”
- If all other test and inspection results were unchanged, would reporting all SCC results lead to better or worse PBFI categorization?
What would happen to PBFI Frequency if all of the plant’s SCC data were reported?

- 2007 – 2008 Study
- *Food Protection Trends*, 2011. 31: 28-32
- Assumed all other results were constant and all SCC data were reported
- All SCC results obtained from 2 plants
  - 5400 in 2007
  - 7193 in 2008
- PBFI categories at the end of 2007 and 2008
What would happen to PBFI frequency if all of the plant’s SCC data were reported?

- Category 1 farms
  - Category 1: 69%
  - Category 2: 31%

- Category 2 farms
  - Category 1: 30%
  - Category 2: 68%
  - Category 3 or 4: 2%

- Category 3 or 4 farms
  - Category 1: 26%
  - Category 2: 66%
  - Category 3 or 4: 8%
Bottom Line

- Reporting all of the SCC results, and using these results in assigning PBFI frequency, would likely decrease the number of on-site farm inspections.
- Effect on efficiency is unclear.
What do we know already about drug residue test results?

- 28 million pounds of milk discarded in FFY 2011 for drug residues = 0.014% of total milk produced in US
- 98.7% of the drug tests conducted were for Beta Lactams
- Bob veal and dairy cattle accounted for 47.5% and 43.5% of FSIS-sampled animals with residue violations in 2010
- Top 3 violative residues were neomycin (25%), flunixin (14%), and penicillin (14%)
FDA Survey of Milk for Drug Residues

- Hypothesis: high incidence of (+) tissue results for dairy cattle at abattoirs is caused by poor drug use practices which could also lead to milk contamination.
- Farms from Repeat Violators list (900) vs. “control” farms (900)
- Farm identity hidden from analysts, FDA, regulators
- January – November, 2012
- “Non-regulatory” survey
Milk will be analyzed for:

<table>
<thead>
<tr>
<th>Antibiotic</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Ampicillin</td>
<td>Sarafloxacin</td>
</tr>
<tr>
<td>Bacitracin</td>
<td>Sulfachloropyridazine</td>
</tr>
<tr>
<td>Cephaprin</td>
<td>Sulfadiazine</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>Sulfadiazine</td>
</tr>
<tr>
<td>Chlortetracycline</td>
<td>Sulfadimethoxine</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>Sulfamerazine</td>
</tr>
<tr>
<td>Cloxacillin</td>
<td>Sulfamerazine</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>Sulfamethazine</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>Sulfaquinoxaline</td>
</tr>
<tr>
<td>Florfenicol</td>
<td>Sulfathiazole</td>
</tr>
<tr>
<td>Flunixin</td>
<td>Tetracycline</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>Thiabendazole</td>
</tr>
<tr>
<td>Neomycin</td>
<td>Tripelennamine</td>
</tr>
<tr>
<td>Neomycin</td>
<td>Tylosin</td>
</tr>
<tr>
<td>Oxytetracycline</td>
<td>Tulathromycin</td>
</tr>
<tr>
<td>Penicillin G</td>
<td>Virginiamycin</td>
</tr>
</tbody>
</table>
The Bottom Line

- Establish a veterinarian – client – patient relationship
- Use only Rx drugs or FDA-approved OTC drugs with veterinarian’s guidance
- Pay attention to dose and delivery – they matter
- Know and observe the withdrawal time
- Keep records
- Keep drugs for lactating animals separated from drugs for non-lactating animals
Micotil® 300
Tilmicosin Injection, USP
300 mg tilmicosin, USP as tilmicosin phosphate per mL

Do Not Use in Automatically Powered Syringes.
No Administrar con Jeringas Accionadas Automáticamente.

Caution: Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian.

Description: Micotil® is a solution of the antibiotic tilmicosin. Each mL contains 300 mg of tilmicosin, USP as tilmicosin phosphate in 25% propylene glycol, phosphoric acid as needed to adjust pH and water for injection, Q.S. Tilmicosin, USP is produced semi-synthetically and is in the macrolide class of antibiotics.

NADA 140-929
Approved by FDA
UPC 7 27804 20213 2
100 mL

Estrumate®
(cloprostenol sodium)
equivalent to 250 mcg cloprostenol

CAUTION: Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian.
Nolvasan® Chlorhexidine Suspension
Antibacterial

For prevention and treatment of metritis and vaginitis in mares caused by pathogens sensitive to chlorhexidine hydrochloride.

For Use in Horses Only

0.95 FL Oz (28 mL)
Another comment we investigated

- “Small farms produce higher-quality milk than big farms.”

Problems with the statement

- What does “higher-quality” mean?
- What do “small” and “big” mean?
- Family farms (“good”) can be “big”
All Grade A and B farms in WI during Feb. – Dec., 2008
• Monthly reported SPC and SCC results
• Farms categorized into CAFO (DNR database), > 6,500 lbs/day, or ≤ 6,500 lbs/day
• Assume average daily production of 55.2 lb per cow
• 3 size categories: ≥ 714, 119 – 713, ≤ 118
• “Quality” defined by SPC and SCC
Let’s do the numbers...

<table>
<thead>
<tr>
<th>SPC</th>
<th>( \leq 118 ) cows (12,866 farms)</th>
<th>119 – 713 cows (1,565 farms)</th>
<th>( \geq 714 ) cows (160 farms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median</td>
<td>31,300 A</td>
<td>26,000 B</td>
<td>25,000 B</td>
</tr>
<tr>
<td>Mean</td>
<td>58,700 C</td>
<td>36,300 D</td>
<td>35,000 D</td>
</tr>
<tr>
<td>90(^{th}) percentile</td>
<td>100,100 E</td>
<td>46,800 F</td>
<td>40,500 F</td>
</tr>
<tr>
<td>Maximum</td>
<td>250,200 G</td>
<td>110,500 H</td>
<td>113,600 GH</td>
</tr>
</tbody>
</table>

Different letters within a ROW indicate a significant difference \((P < 0.05)\)
Let’s do the numbers...part 2

<table>
<thead>
<tr>
<th>SCC</th>
<th>≤ 118 cows (12,866 farms)</th>
<th>119 – 713 cows (1,565 farms)</th>
<th>≥ 714 cows (160 farms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median</td>
<td>348,000</td>
<td>266,000</td>
<td>179,000</td>
</tr>
<tr>
<td>Mean</td>
<td>369,000</td>
<td>273,000</td>
<td>240,000</td>
</tr>
<tr>
<td>90th percentile</td>
<td>511,000</td>
<td>344,000</td>
<td>288,000</td>
</tr>
<tr>
<td>Maximum</td>
<td>625,000</td>
<td>394,000</td>
<td>313,000</td>
</tr>
</tbody>
</table>

All values within a ROW are significantly different ($P < 0.05$)
The latest question: How easy will it be for WI dairy producers to meet EU standards for SCC?

- Monthly reported SCC result
- Rolling window for 3 months
- Geometric mean (example below)

\[ \sqrt[3]{(\text{January Sample}) \times (\text{February Sample}) \times (\text{March Sample})} \]

\[ \sqrt[3]{(250,000) \times (200,000) \times (450,000)} = 249,000 \]

- Problems occur when
  - the geometric mean first exceeds 400,000 (notification and corrective actions)
  - the geometric mean first exceeds 400,000 in 3 consecutive months after notification (suspension, segregation, plant leaves EU program)
Wisconsin average SCC values

- 2007 – 2008 PBFI study (2 plants’ producers, all SCC results available)
  - 27.3% of farms never exceeded 400,000
  - 58.7% of farms exceeded 400,000 on no more than 20% of samples
  - 10.9% of farms were at $\leq 400,000$ on less than 20% of samples

- 2008 SPC/SCC study (all producers)
  - Means and medians for all farm-size categories were less than 400,000
  - 90th percentile values for large and CAFO farms were less than 400,000
Wrapping it up

• WI dairy producers face a challenging environment
  • Economic pressures
  • Increasing expectations for safety and quality
  • Poised for success
• On-site farm inspections – due for an “extreme makeover”?