

DHI Delivers Leading Edge Technology

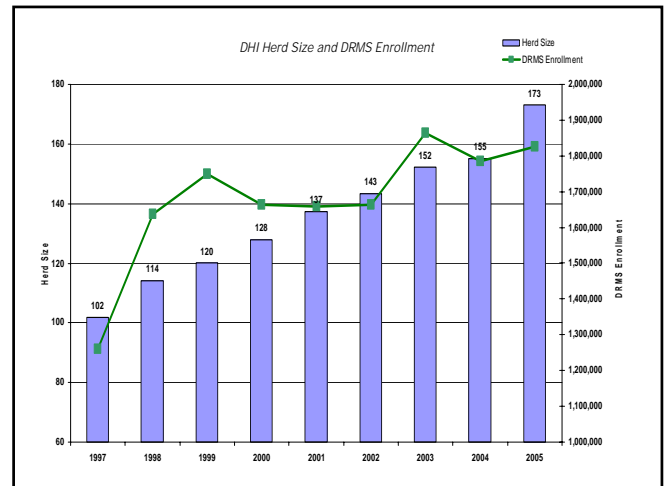
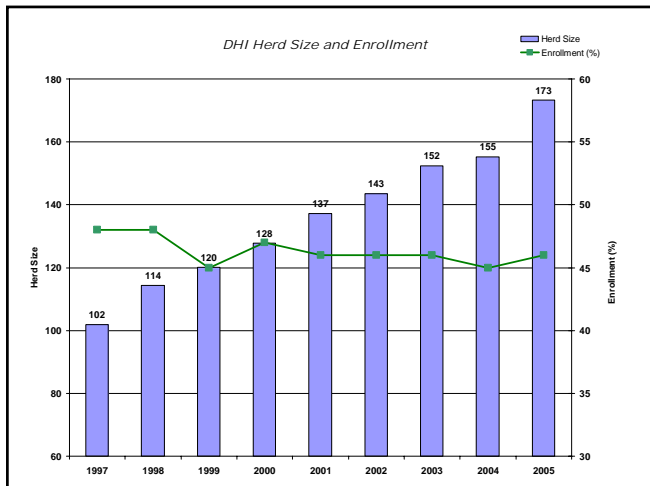
J.S. Clay and P.A. Dukas

Dairy Records Management Systems
Raleigh, North Carolina, U.S.A.

www.drms.org

Strategic Guidelines

- Keep a nimble infrastructure
- Look outside the dairy industry
- Choose technologies with strong potential
- Maintain confidence in the DHI mission



Cow-based Technology

- Production and components
 - Milk Urea Nitrogen, Casein
- Disease
 - Johne's
- Identities to avoid inbreeding; crossbreeding programs
- Health management systems
- Profitability
 - Assessment and decision-making

Process Management

- Steps in a process
- Success depends on completion
- Which animal? What treatment? When?
- Using software to "get it right"
- Minimizing "Invisible Error"
 - Offset of actual compliance from desired

"Invisible Error"

- Ovsynch (GnRH, PGH, GnRH, Breed)
 - $.95 \times .95 \times .95 \times .95 = \underline{.81}$
 - Error = .19
 - $.98 \times .98 \times .97 \times .99 = \underline{.92}$
 - Error = .08
- PreSynch (PGH, PGH, GnRH, PGH, GnRH, Breed)
 - $.98 \times .98 \times .97 \times .99 \times .98 \times .98 = \underline{.88}$
 - Error = .12
- Apply to vaccination programs, fresh cow, group changes, mastitis treatment, etc.

Process Management Tools *First Generation*

- Traditional DHI Management Lists
 - On-farm herd management software
 - Automated Milk Recording Systems
- >> Difficult to reduce "invisible error"

Process Management Tools *Second Generation*

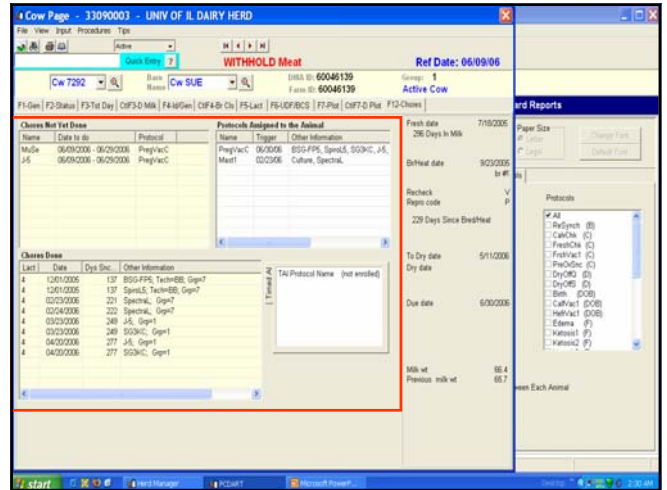
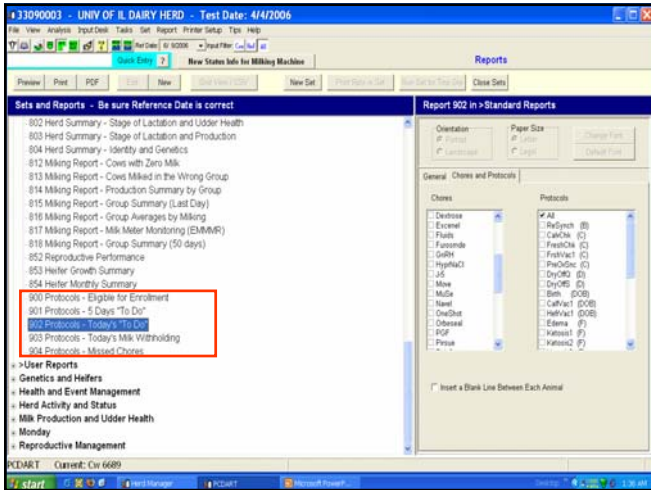
- Workflow management
 - Protocols / Chores
 - Timed AI systems
 - Mobile devices
 - Radio-Frequency ID
 - Statistical process control
- >> Help reduce "invisible error"

Workflow Management

- Starts with workflow design decisions

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- Protocol assigned to animal
- Manufacturing orientation
- Standardizes daily process
 - ToDo lists
 - Input completed chores

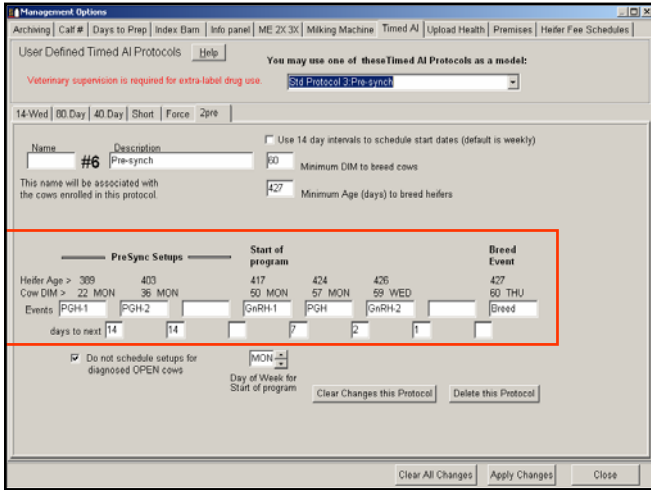


Workflow Management


- Starts with workflow design decisions
- Protocol assigned to animal
- Manufacturing orientation
- Standardizes daily process
 - ToDo lists
 - Input completed chores
- Provides for auditing and analysis
- Affects all herd sizes

Timed AI Systems

- A specialized protocol ...



Mobile Devices - PocketDairy



Cow Page	Health
Breed	Calve
Left	Dry
Quit	More

Radio-Frequency ID - RFID

- Focus on management during regulatory evolution in U.S.
- Certain and Quick ID
 - Management and test day
- Tags
 - Stable; site of attachment ?
- Readers
 - Competition underway
 - Stationary – Parlors, heifer weighing

RFID Readers



Mobile and RFID

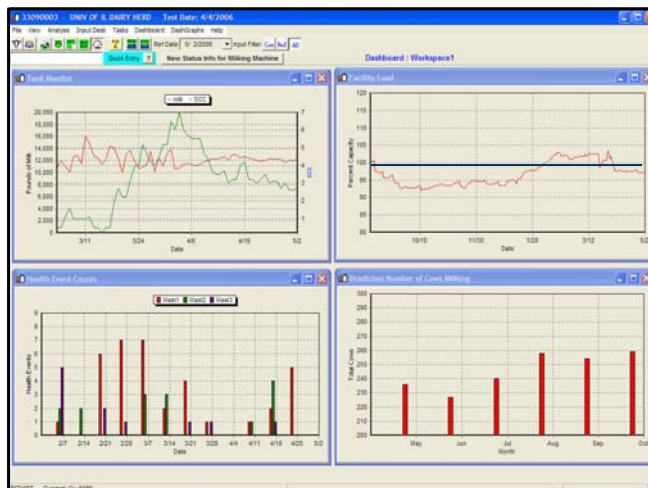
- WiFi and Bluetooth
- Quick hot syncs – coffee breaks
- Multiple units on same dairy
- “Call the roll”
- Earbuds – voice alerts
 - BadMilk, Whoa (don't beef), OK (to milk), Uh-oh (wrong group), Open, Preg, etc.

Statistical Process Control

- When to act?
 - Now – info, experience, intuition, advice
- Patterns of events in producer's own herd
- Apply statistical rules
- Clear signals for action
- Examples
 - Subtle increase in bulk tank SCC
 - Spike in number of cases of lameness

Pen Management – Large Herds

- Real-time Monitoring of “Non-DHI” Data
 - Feed consumption / Heat index
 - Time moving or standing
 - Counts for sick pens and health conditions
 - Number days in close-up pen
 - Body Condition Scores
 - External lab data / flow meters
 - Number cows diagnosed pregnant, calved
 - Facilities load and forecasting



Focus on Technology with High Upside Potential

- Affects herds of all sizes
- Network connectivity including Wireless
- Rural Broadband alternatives



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- Affects herds of all sizes
- Network connectivity including Wireless
- Rural Broadband alternatives
- Internet Appliances
- Multi-Site partnerships
- Real-time consultant access
- Return to centralized data systems

Operational Challenges for DHI

- Increased diversity of Test Interval
- On-farm analysis of components
- Automating mundane technician tasks
- Recognition of value of DHI accuracy



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- Increased diversity of Test Interval
- On-farm analysis of components
- Automating mundane technician tasks
- Recognition of value of DHI accuracy
- Diversity in expectations of customers



Thank you...

DRMS
Dairy Resource Management Systems