Incorporating Lab Data into Dairy Herd Management: A Vision

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Canadian Animal Health Laboratorians Network

Guelph: June 5, 2017

Ontario Veterinary College
POPULATION MEDICINE

DAIRY at GUELPH
CANADA'S DAIRY UNIVERSITY

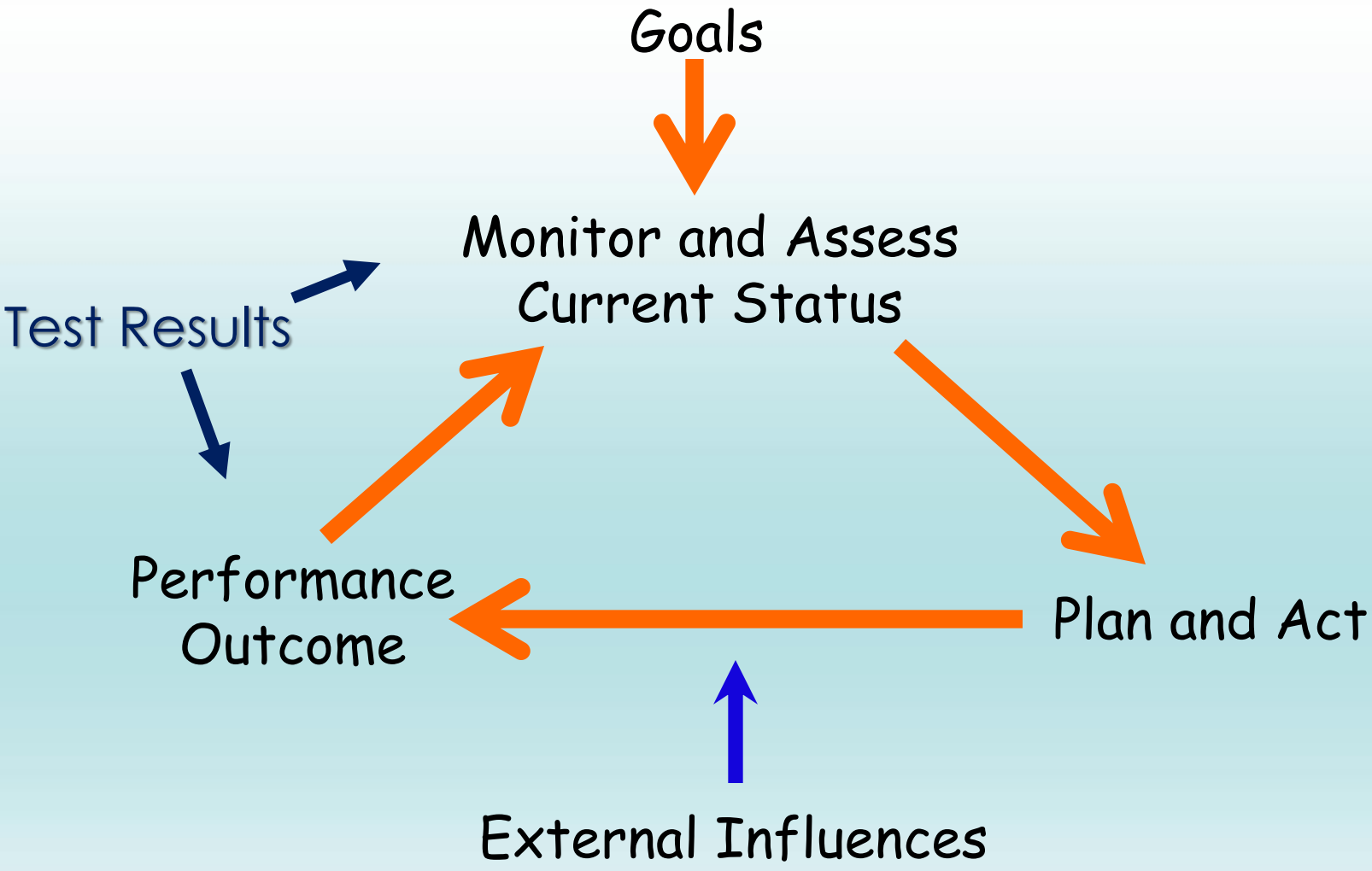
Overview: Incorporating Lab Data

- Health Management in the dairy industry
- Types and sources of Lab Data
- Challenges and Opportunities

Dairy Health Management – Decision Making

- Cow Level
  - management of the sick cow
    - example: clinical mastitis
- Herd Level
  - management of groups of cows
    - example: *Staph aureus* infected cows
- Population Level
  - status programs for the province or country
    - example: Johne's Disease / Paratuberculosis

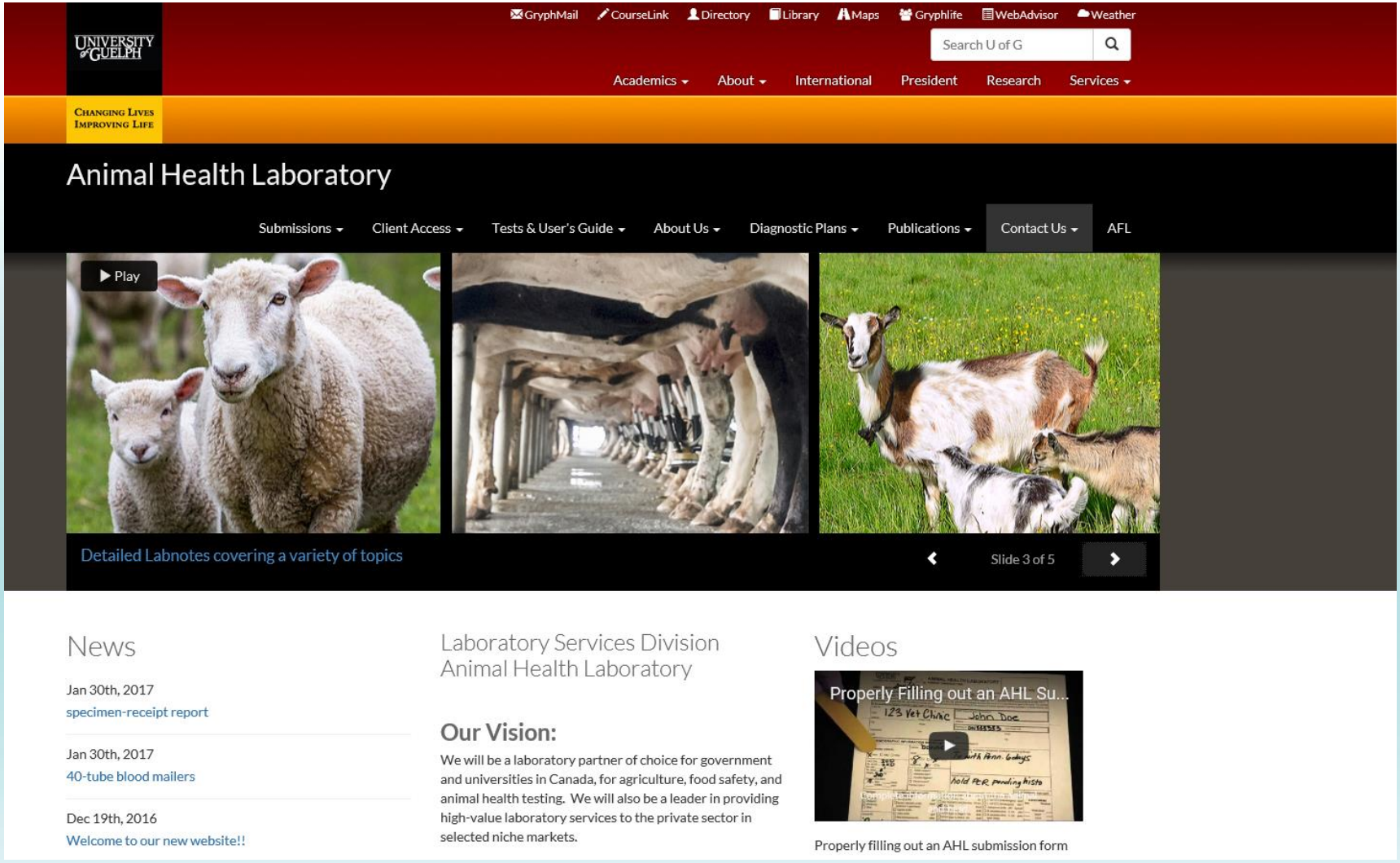
The Health Management Cycle



Testing of Dairy Cattle – Why, What & Where

- Why:
  - Investigation of morbidity / mortality
  - Guide therapy and assess success of therapy
  - Routine monitoring / surveillance for preventive programs
  - Biosecurity – screening of herd additions
- What:
  - Carcass, tissues, blood, milk, feces, urine…….
  - Individual animal or pooled samples (bulk tank milk or environmental fecals)
- Where:
  - Diagnostic Labs, Private Labs
  - Veterinary Clinics
  - Farm

State-of-the-art Laboratories



State-of-the-art Laboratories

Internet Reports »

Herd Recording

SCC, MUN & Components Testing

BHB (Ketosis) Screening Test

Mastitis4 DNA Test

Milk Pregnancy Test

Johnes & Leukosis Test

BVD Test

Specialized Testing

DairyComp Installation Form

CQM Canadian Quality Milk Module

Download Current CQM Module

SCOUT

305 Protocols & Treatments

305 & SCOUT FAQ's

305 & SCOUT CQM Audit Reports

DairyComp Top Commands for Mastitis RAMP

State-of-the-art Laboratories

- CANWEST 2016/17

	AS AT OCT 31ST	AS AT NOV 30TH	AS AT DEC 31ST	AS AT JAN 31ST
PROVINCIAL				
MARKET SHARE				
% YOUNG STOCK				
% DC COWS (MILKING & DRY) **				
JOHNE'S (MONTHLY)	643	988	1,202	1,227
JOHNE'S (YTD)	643	1,631	2,833	4,060
LEUKOSIS (MONTHLY)	638	570	701	1,141
LEUKOSIS (YTD)	638	1,208	1,909	3,050
MASTITIS 4 (MONTHLY)	2,410	2,077	2,138	2,416
MASTITIS 4 (YTD)	2,410	4,487	6,625	9,041
BVD (MONTHLY)	0	1	3	10
BVD (YTD)	0	1	4	14
MILK PREGNANCY (MONTHLY)	3,662	3,979	3,933	3,897
MILK PREGNANCY (YTD)	3,662	7,641	11,574	15,471
KETOSIS (% SAMPLES) (MONTHLY)	38.5	40.8	38.9	40.0
KETOSIS (% OF SAMPLES) (YTD)	38.5	39.7	39.4	39.6
KETOSIS (% OF HERDS ENROLLED AT LAST TEST)	37.1	37.0	37.4	37.9

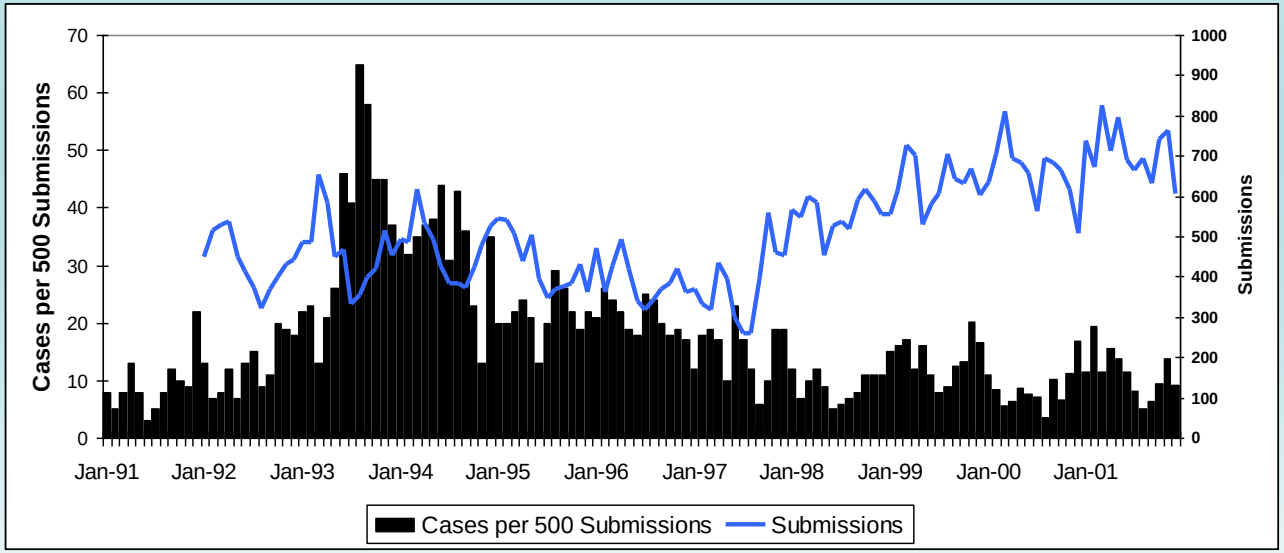
Milk Based Testing Monthly
&
Animal Inventories (DENOMINATORS)

State-of-the-art Laboratories – People!

Diagnostic Lab Data to Describe Outbreak

Example – BVD in Ontario, 1991 to 1995

- 200+ dairy farms with outbreaks of acute BVD
- Many herds were "vaccinated" for BVD
- Unfortunately many were not fully "immunized" for BVD
- Our failure to use vaccine correctly over many years was "detected" by the BVD virus and our protection was found to be lacking!



Examples: Cow Level Decisions

- Mastitis Control: Treatment of Clinical Cases & Dry Cow Therapy

- Treatment of Clinical Cases
  - Identify important pathogenic bacteria in quarter milk samples

    AND
  - Available promptly to select an appropriate treatment protocol

Diagnostic Accuracy

Versus

Quick & 'Dirty'

On-Farm & Vet Clinics

Examples: Cow Level Decisions

Best pathogen-based treatment system for clinical mastitis

PATHOGEN BASED TREATMENT DECISIONS FOR CLINICAL MASTITIS

Daryl Nydam[1], Paul Virkler[1], Michael Capel[2], Steve Eicker[3], and Amy Vasquez[1]
[1]Cornell University, Ithaca, New York, USA
[2]Perry Veterinary Clinic, Perry, New York, USA
[3]Valley Ag Software, King Ferry, New York, USA

Proc NMC Regional Meeting 2015

Clinical mastitis case identified, quarter sampled and cow segregated

Sample delivered to regional lab for immediate culture in afternoon

MALDI-ToF identification in morning, result into DC305 software

Triggers an existing treatment protocol and veterinarian notified in same step

ACCURATE, QUICK and REDUCE Antibiotic Use

Examples: Herd Level Decisions

- Mastitis Control: Identification of *Staph aureus* infected cows
  - Action – separate pen, milk last, single milking unit…….
- Routine that fits Herd Management Program
  - Aseptic hand-stripped cow quarter/composite milk sample
    - $12 to culture PLUS labor to collect, transport and report

versus

  - Metered composite DHI sample tested with PCR
    - $23 to collect, transport, test and report

>2,000 per month since 2009

MASTITIS REPORT | *Mastitis 3 – Contagious Mastitis ID*

NAME | HERD NUMBER | PAGE | TEST DATE

CANWEST DHI
1-800-549-4373

Example Herd 20 PCR + of 132 cows tested

Results interpretation and action plan for test positive cows should be discussed with your veterinarian.

Cow Name / Chain #	Lact #	Days In Milk	Milk kg	SCC	Test Result	Staph. aureus + ++ +++	Strep. agalactiae + ++ +++	Mycoplasma bovis + ++ +++	Prev DHI Test 23 MAR 11 SCC	Prev DHI Test 23 MAR 11 305 M	Lact to Date # Tests > 200K SCC Total # SCC Tests
0451	1	92	27	2784	Pos				890	9296	2 / 3
0053	5	142	36	775	Pos				627	12330	3 / 4
0441	1	195	36	444	Pos				1039	10189	3 / 6
0110	4	225	29	242	Pos				727	9297	7 / 7
0437	1	250	25	3419	Pos				90	9607	2 / 7
0434	1	127	31	323	Pos				123	8273	1 / 4
0115	4	280	34	251	Pos				559	10626	7 / 8
0435	1	144	33	145	Pos				448	8887	2 / 4
0444	1	238	34	138	Pos				270	9454	3 / 7
0005	2	139	34	135	Pos				208	9185	1 / 2
0263	3	141	46	115	Pos				348	11002	2 / 3
0121	4	172	47	112	Pos				286	12306	1 / 5
0257	5	228	30	74	Pos				52	9977	0 / 7
0086	2	50	38	68	Pos				244	6005	1 / 2
0286	3	229	33	62	Pos				30	10031	0 / 7
0419	2	193	31	45	Pos				27	8660	1 / 6
0247	5	197	48	42	Pos				70	12596	0 / 6
0118	5	11	35	22	Pos						0 / 1
0126	3	136	44	21	Pos				33	10432	0 / 3
0883	3	88	38	8	Pos						0 / 1
0449	1	258	32	1906	Neg				40	8709	2 / 7
0420	2	119	29	925	Neg				450	7712	4 / 4
0125	3	345	25	878	Neg				472	12350	5 / 10
0114	4	97	40	323	Neg				46	10750	1 / 3
2640	4	375	22	179	Neg				182	9103	3 / 11

Best Results from Experienced Labs!

- Interpreted on the farm by the herd veterinarian!
- Can now get culture results directly from AHL or veterinary practice lab to DC305 Cowfile!

Dairy Comp®
Herd Management Software

Culture and Mastitis4 in Dairy Comp

Results and Coding for SCOUT Users

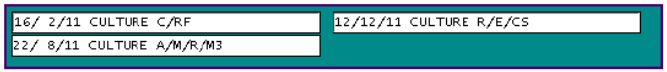
Results can be loaded into Dairy Comp when they become available from the CanWest DHI and AHL labs. How to load the results and understand the coding is explained below.

GETTING RESULTS INTO DAIRY COMP

Type **RECEIVE\GC** in the mini-command line to download the results (DNQ file) from the 'loop' at CanWest DHI.

UNDERSTANDING RESULTS

On the Events page of the CowCard the results will look like the following:



All of the results will be recorded as CULTURE, whether the sample was submitted to the AHL lab or CanWest DHI lab for M4 testing.

IDENTIFYING PATHOGEN CODING

The pathogens are indicated by a single letter code:

A.....S. agalactiae
B.....Corynebacterium spp. (including bovis)
C.....Staph species (CNS)
D.....Strep dysgalactiae
E.....E. coli
F.....Entercoccus spp.
H.....Prototheca
K.....Klebsiella spp.
M.....Mycoplasma bovis
N.....No growth/No pathogens found/Negative
O.....Other gram neg (Serratia, Citrobacter, Enterobacter, Pasteurella multocida, Pseudomonas, Proteus, etc.)
R.....S. aureus
S.....Strep other
T.....Truperella pyogenes
(NOTE: Depending on your product version this may be indicating A.pyogenes, when in ALL cases we are reporting Truperella pyogenes)
U.....Strep uberis
X.....Contamination
Z.....Other mold, Yeast, Fungus, G+ve, Nocardia, other mycoplasma

Multiple pathogens are separated by the slash symbol (/)

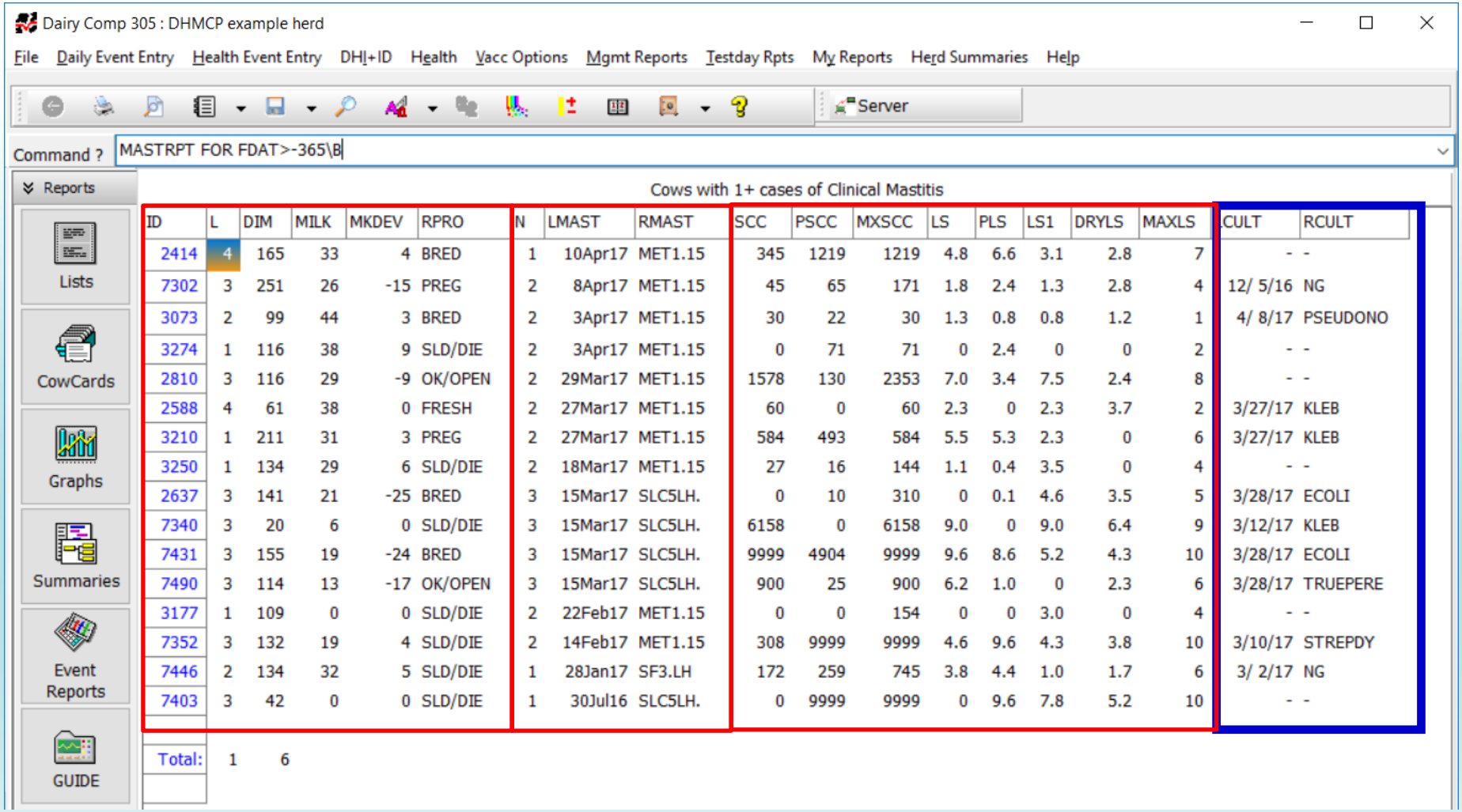
At the end of the results separated by the slash symbol (/) are the following two-letter codes:

LF.....Left Front
RF.....Right Front
LH.....Left Hind
RH.....Right Hind
CS.....Composite Sample
DO.....Dry
M3.....Mastitis 3 – DHI Metered Composite

EVALUATING RESULTS IN SCOUT

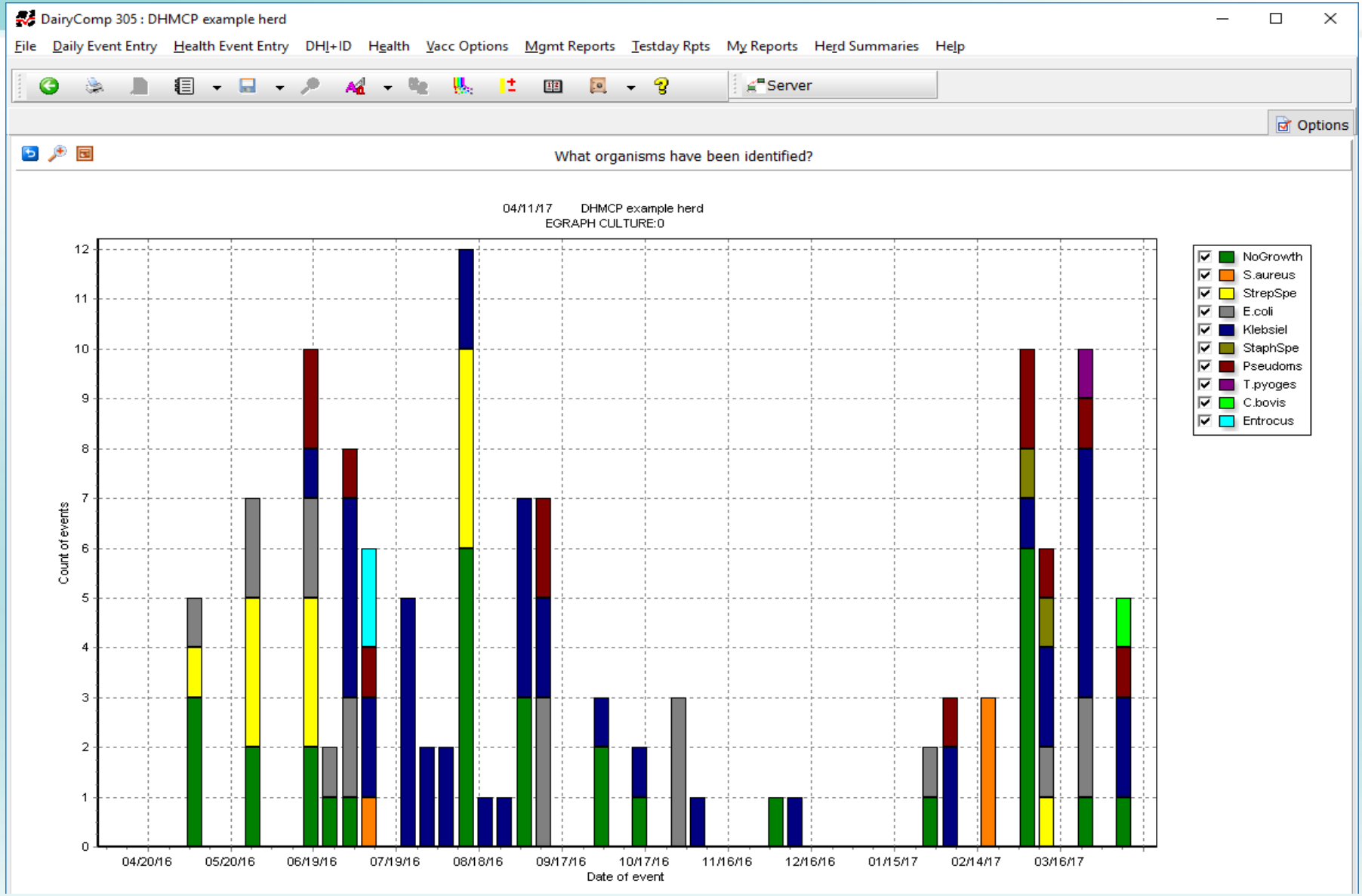
- To see a list of culture results in SCOUT, go to the **MISC** menu heading and select **MONTHLY EVENTS.** Any **CULTURE** events entered in the last 12 months will be included on this list. For further details including cow ID, DIM, Date and Culture remark, double-click on the **CULTURE** event (in blue).

The GOAL: Complete Picture!



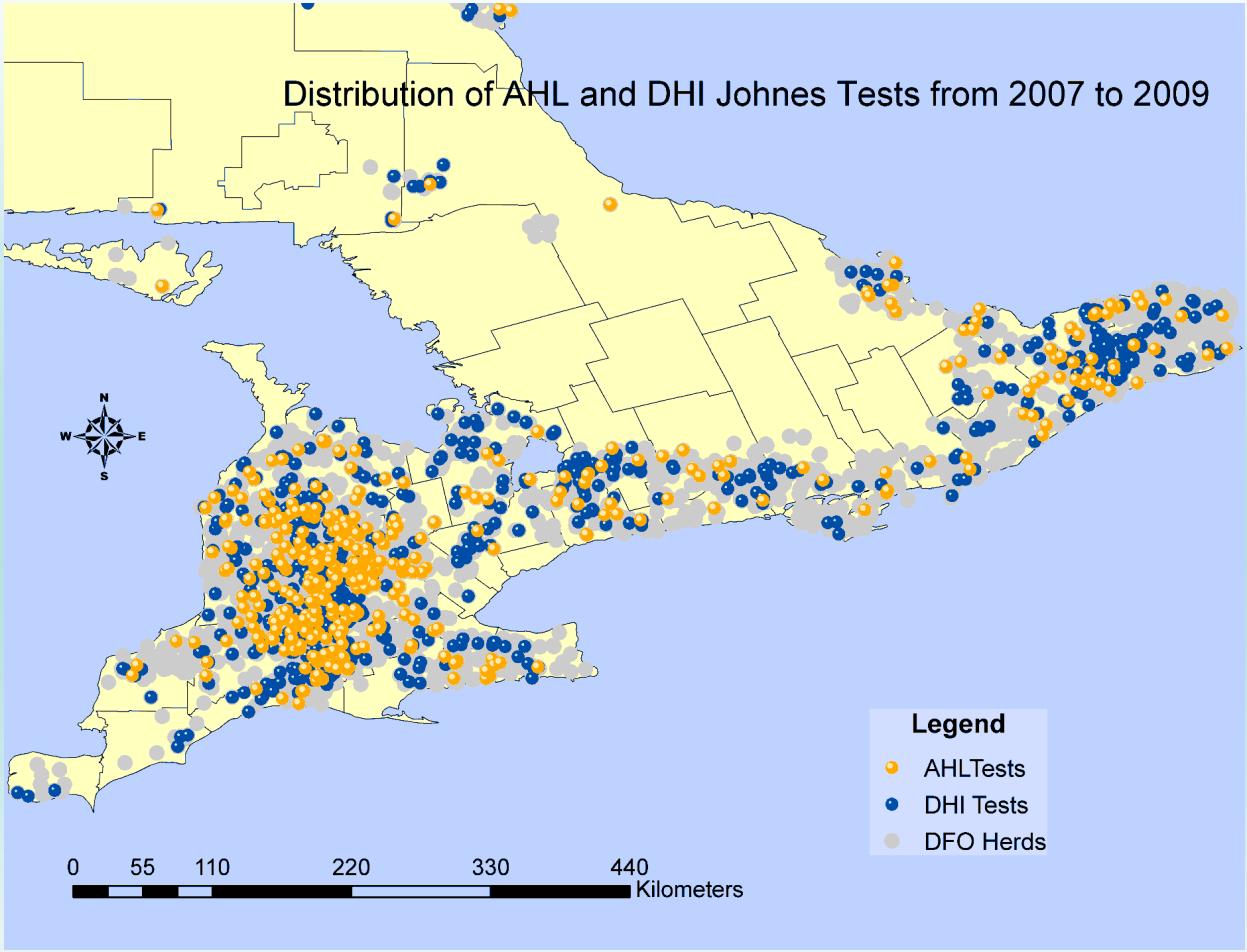
ID	L	DIM	MILK	MKDEV	RPRO	N	LMAST	RMAST	SCC	PSCC	MXSCC	LS	PLS	LS1	DRYLS	MAXLS	LCULT	RCULT
2414	4	165	33	4	BRED	1	10Apr17	MET1.15	345	1219	1219	4.8	6.6	3.1	2.8	7	-	-
7302	3	251	26	-15	PREG	2	8Apr17	MET1.15	45	65	171	1.8	2.4	1.3	2.8	4	12/ 5/16	NG
3073	2	99	44	3	BRED	2	3Apr17	MET1.15	30	22	30	1.3	0.8	0.8	1.2	1	4/ 8/17	PSEUDONO
3274	1	116	38	9	SLD/DIE	2	3Apr17	MET1.15	0	71	71	0	2.4	0	0	2	-	-
2810	3	116	29	-9	OK/OPEN	2	29Mar17	MET1.15	1578	130	2353	7.0	3.4	7.5	2.4	8	-	-
2588	4	61	38	0	FRESH	2	27Mar17	MET1.15	60	0	60	2.3	0	2.3	3.7	2	3/27/17	KLEB
3210	1	211	31	3	PREG	2	27Mar17	MET1.15	584	493	584	5.5	5.3	2.3	0	6	3/27/17	KLEB
3250	1	134	29	6	SLD/DIE	2	18Mar17	MET1.15	27	16	144	1.1	0.4	3.5	0	4	-	-
2637	3	141	21	-25	BRED	3	15Mar17	SLC5LH.	0	10	310	0	0.1	4.6	3.5	5	3/28/17	ECOLI
7340	3	20	6	0	SLD/DIE	3	15Mar17	SLC5LH.	6158	0	6158	9.0	0	9.0	6.4	9	3/12/17	KLEB
7431	3	155	19	-24	BRED	3	15Mar17	SLC5LH.	9999	4904	9999	9.6	8.6	5.2	4.3	10	3/28/17	ECOLI
7490	3	114	13	-17	OK/OPEN	3	15Mar17	SLC5LH.	900	25	900	6.2	1.0	0	2.3	6	3/28/17	TRUEPERE
3177	1	109	0	0	SLD/DIE	2	22Feb17	MET1.15	0	0	154	0	0	3.0	0	4	-	-
7352	3	132	19	4	SLD/DIE	2	14Feb17	MET1.15	308	9999	9999	4.6	9.6	4.3	3.8	10	3/10/17	STREPDY
7446	2	134	32	5	SLD/DIE	1	28Jan17	SF3.LH	172	259	745	3.8	4.4	1.0	1.7	6	3/ 2/17	NG
7403	3	42	0	0	SLD/DIE	1	30Jul16	SLC5LH.	0	9999	9999	0	9.6	7.8	5.2	10	-	-
Total:	1	6																

The GOAL: Complete Picture!



Examples: Provincial Level Decisions

- Surveillance of the Provincial / National Herd
  - Herd Programs – Ontario Johne's Education & Management Program



Ontario Johne's Education and Management Assistance Program

DAIRY at GUELPH
CANADA'S DAIRY UNIVERSITY

HERD STATS – 2010 to 2013

Johne's Education & Management Assistance Program

Total # of Herds Tested	2,339
Total # of herds eligible to test	4,002
Program Participation	58%
Total # of Herds with at least 1 positive (0.1+)	612
Percent of Herds tested with at least 1 positive (0.1+)	26%
Total # of Herds Reimbursed	2124
Program Completion	91%
# of herds that completed at least 1 RAMP	2,243

95% Milk vs Serum

Examples: Provincial Level Decisions

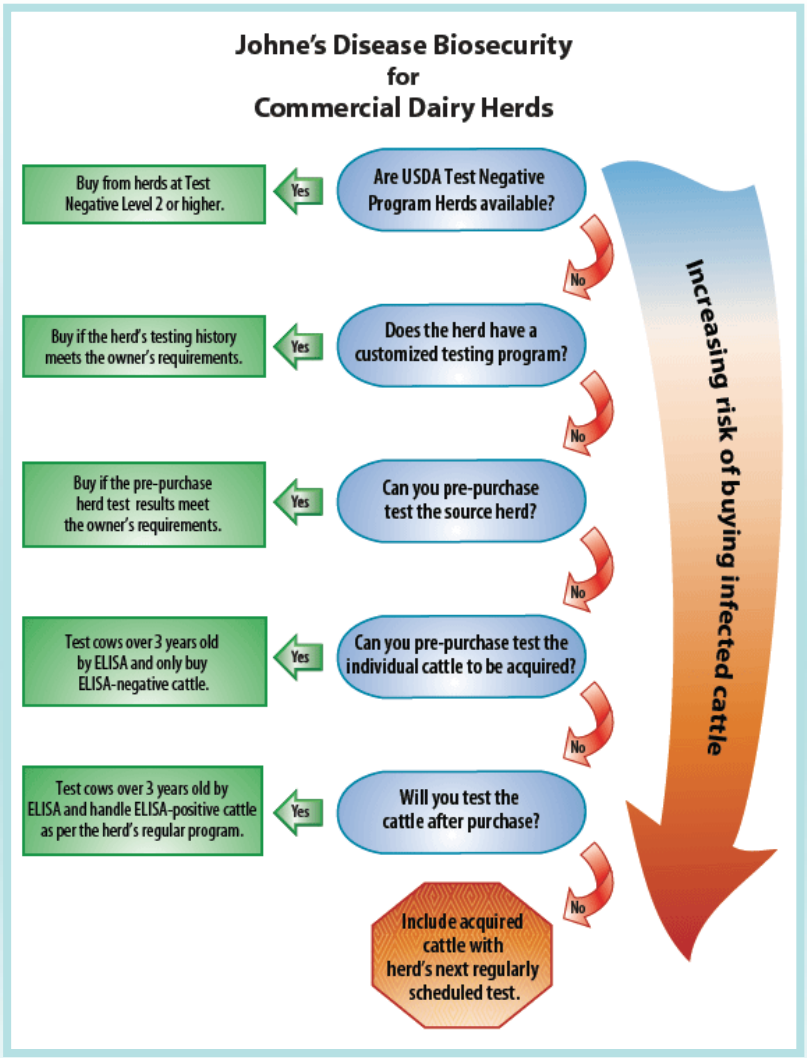
- Surveillance of the Provincial / National Herd
  - Herd Status Programs

Special Report

Consensus recommendations on diagnostic testing for the detection of paratuberculosis in cattle in the United States

Michael T. Collins, DVM, PhD, DACVM; Ian A. Gardner, BVSc, MPVM, PhD; Franklyn B. Garry, DVM, MS, DACVIM; Allen J. Roussel, DVM, MS, DACVIM; Scott J. Wells, DVM, PhD, DACVPM

JAVMA, Vol 229, No. 12, December 15, 2006



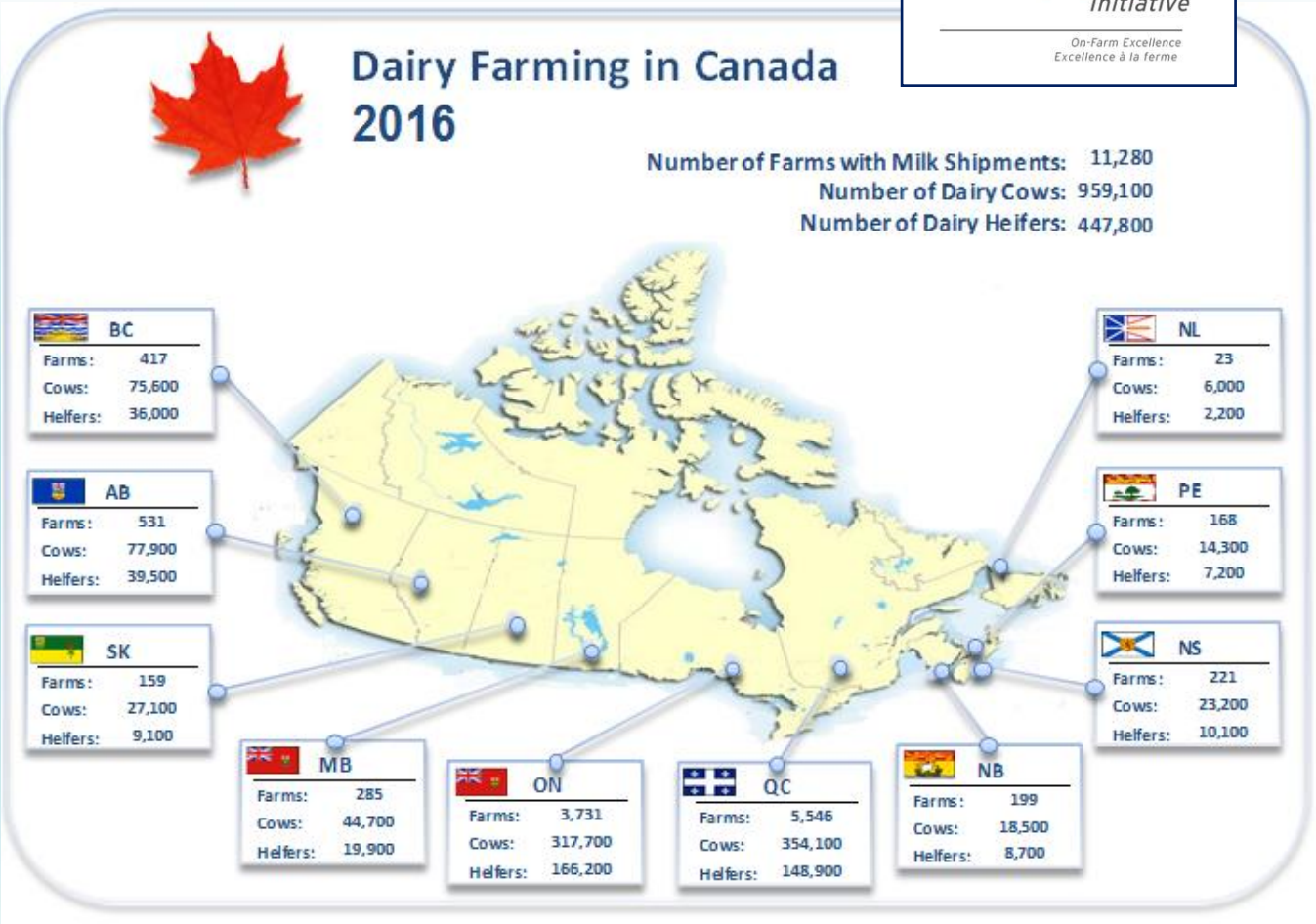
Challenges to establish equivalency

- Between tests
- Between test systems
- Between labs

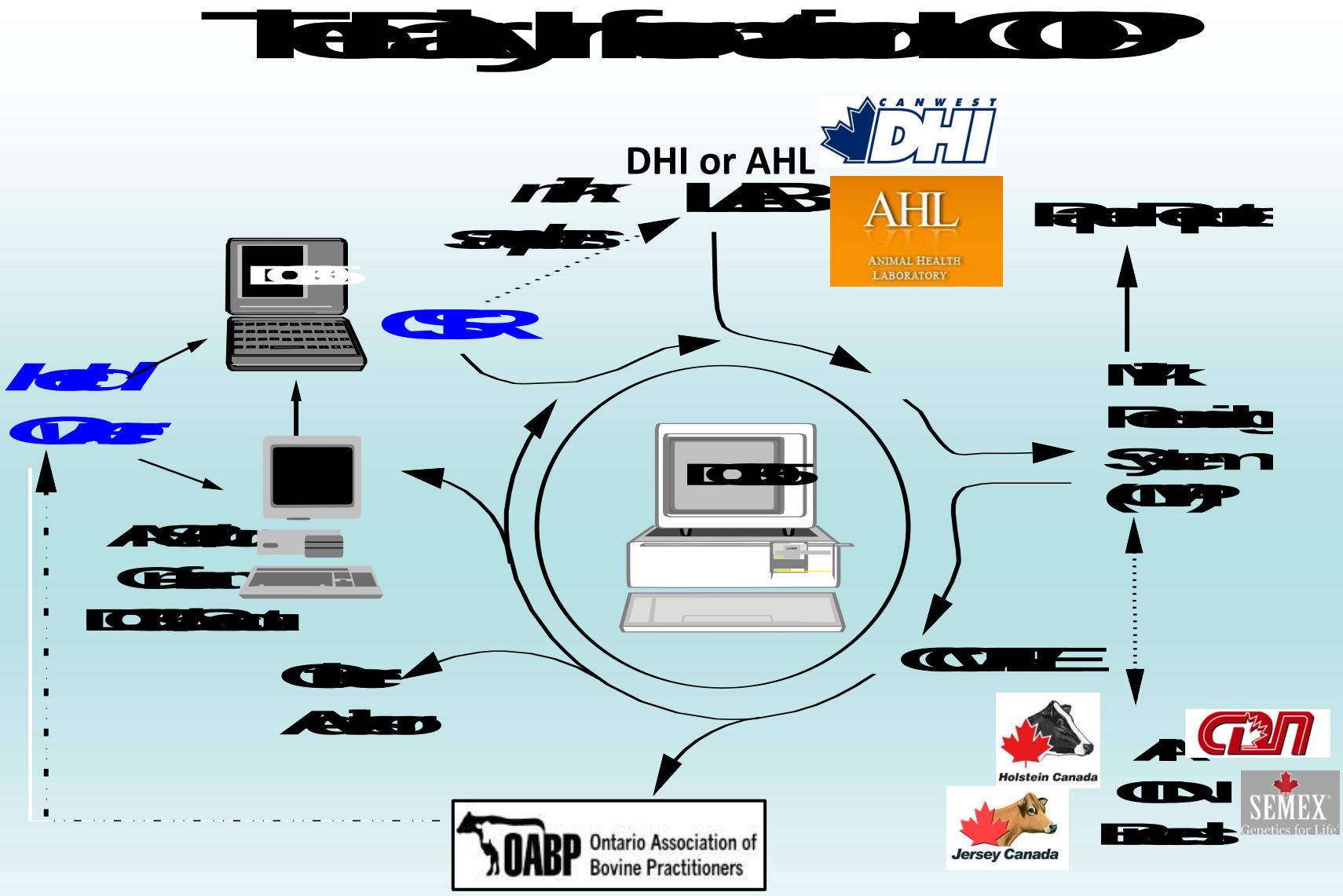
Opportunities: Industry Initiatives

Top of Mind Issues:

- Animal care
- Antibiotic use
- Biosecurity
- Traceability
- Environment

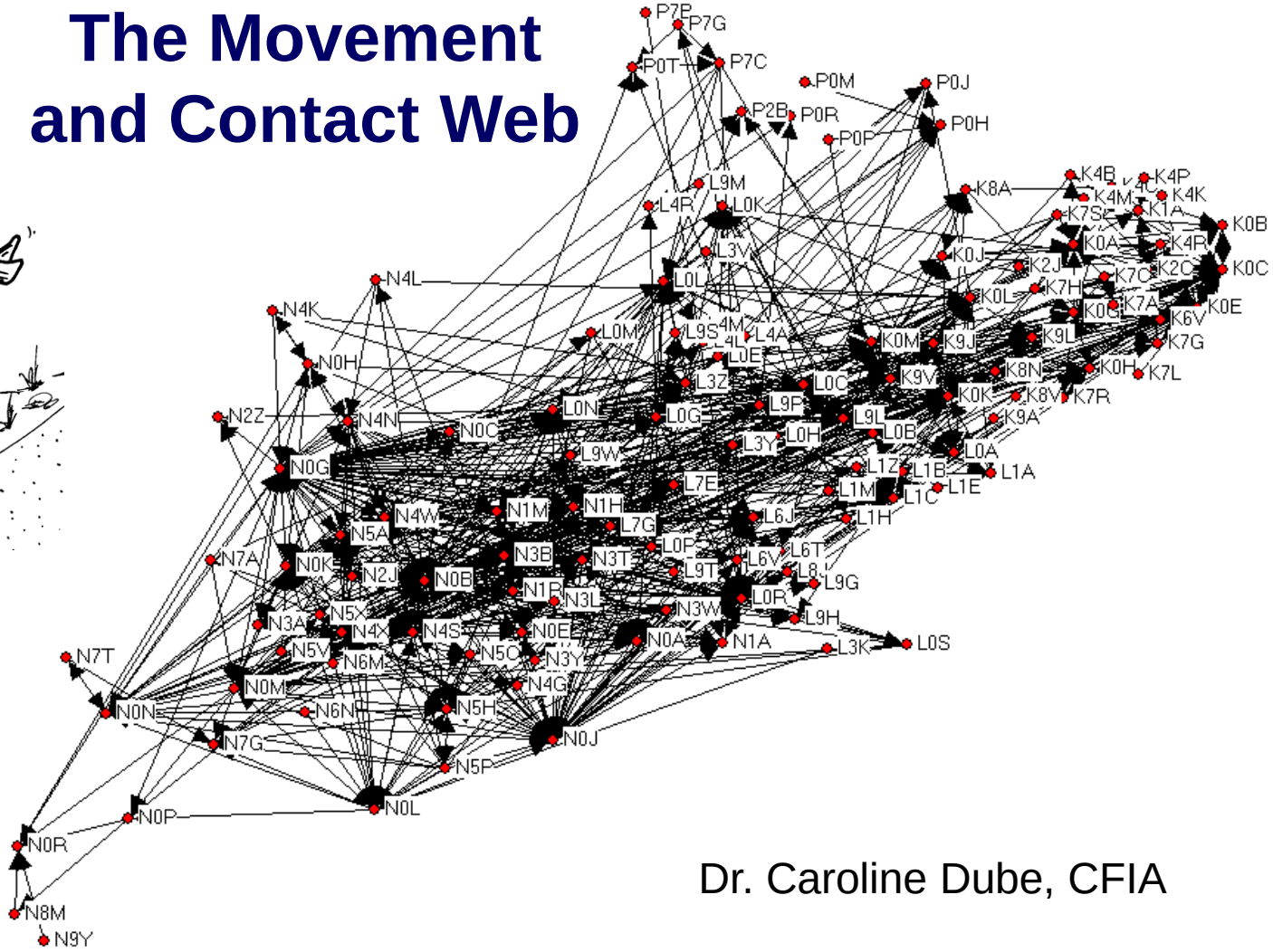


Opportunities: Sharing Health/Disease Data



Opportunities: Screening of Herd Additions

The Movement and Contact Web



Dr. Caroline Dube, CFIA

Opportunities: Herd Pool Testing

Teaming up for animal health

GD

Monitoring Animal Health

Cattle

Highlights, Third Quarter 2016

Cattle demographics

Dairy farms: In the third quarter of 2016, there were 17,399 dairy farms with cattle in the Netherlands. Dutch dairy farms had on average 104 animals older than two years in the third quarter of 2016. The ratio of young stock rearing farms to dairy farms was 11.7 per cent in this quarter (second quarter 2016: 11.6%).

Non-dairy farms: In the third quarter of 2016, there were 18,568 non-dairy farms with cattle in the Netherlands. The non-dairy farms cover various types of farms. When divided into type of farm, small-scale farms had an average of 6 cows, suckler farms had an average of 36 adult cows, young stock rearing farms an average of 64 animals, and beef cattle farms an average of 428 animals.

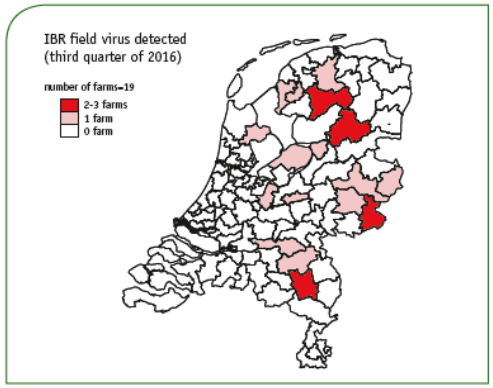


Figure 1. Number of farms where IBR field virus was detected, per two-figure postcode area, via nasal swabs submitted to GD Animal Health in the third quarter of 2016

(source: GD-LIMS and GD-BRBS)

Short news

- BVD: 48 per cent of dairy farms had BVD-free or BVD-unsuspected status. Among the non-dairy farms, 5 per cent had BVD-free status.
- IBR: 56 per cent of dairy farms had IBR-free or IBR-unsuspected status. Among the non-dairy farms, 12 per cent had IBR-free status. At 19 farms (18% of the farms which submitted samples) IBR outbreaks were detected via nasal swabs (4 of these farms previously had an IBR-free status and 3 farms an IBR-unsuspected status) (see figure 1).
- Salmonella: GD Animal Health detected an infection at 903 farms (third quarter 2015: 662 farms). The second round of bulk milk monitoring via Qlip showed 91 per cent favourable results.

Information that is used for the surveillance is collected from different sources. The initiative comes in part from veterinarians and farmers, and partly from GD Animal Health. The information is fully interpreted to achieve the objectives of the surveillance programme – the quick identification of animal health problems on the one hand and monitoring of more general trends and developments on the other hand. The livestock farming sector consisting of the Dutch inter-branch organisations DairyNL (ZuivelNL), the Calf Industry Association (SBK) and the Ministry for Economic Affairs (EZ) is co-financing the surveillance programme.

Status Programs

Bulk Tank Testing

Short news

- BVD: 48 per cent of dairy farms had BVD-free or BVD-unsuspected status. Among the non-dairy farms, 5 per cent had BVD-free status.
- IBR: 56 per cent of dairy farms had IBR-free or IBR-unsuspected status. Among the non-dairy farms, 12 per cent had IBR-free status. At 19 farms (18% of the farms which submitted samples) IBR outbreaks were detected via nasal swabs (4 of these farms previously had an IBR-free status and 3 farms an IBR-unsuspected status) (see figure 1).
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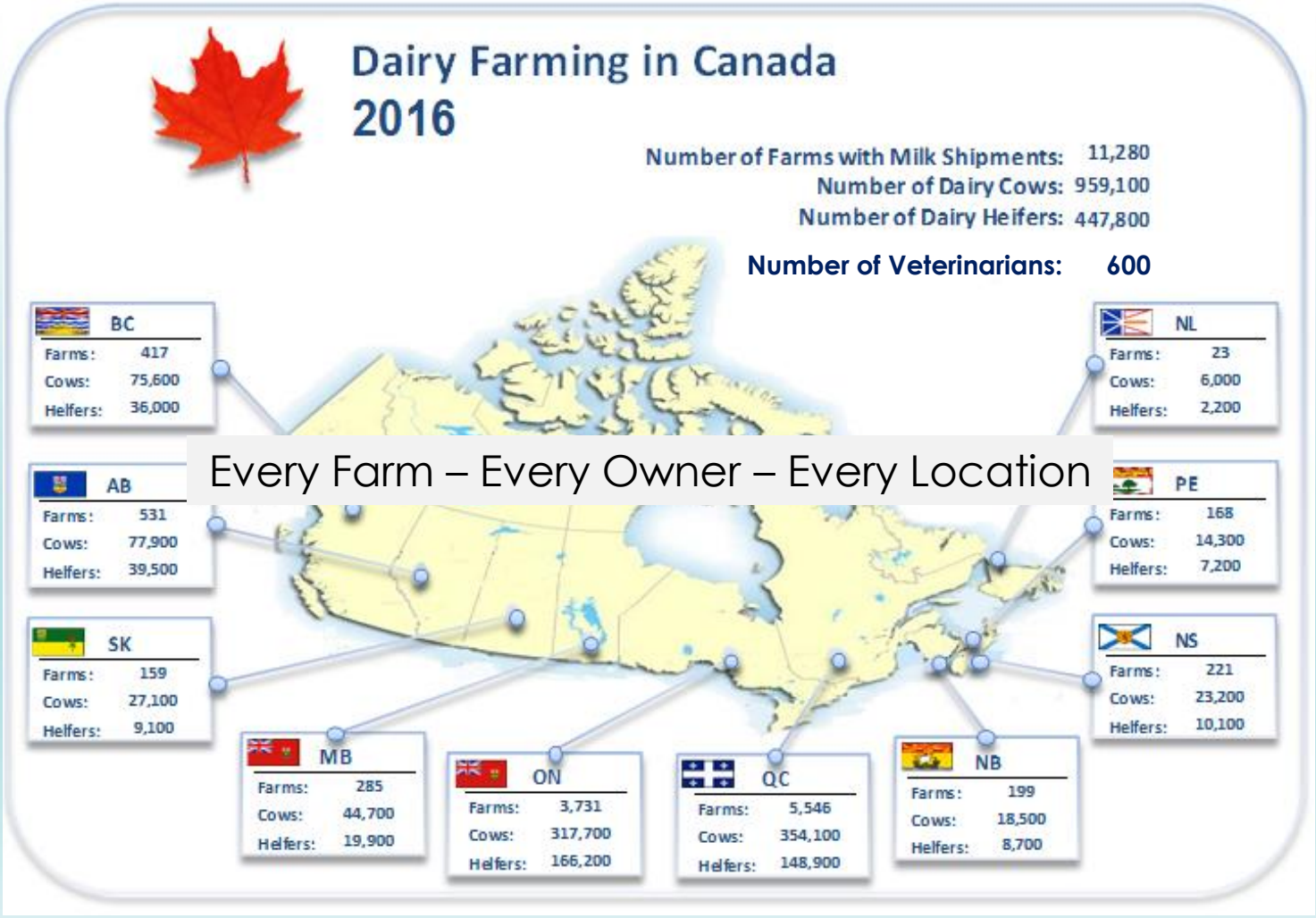
Opportunities: Herd Pool Testing



Opportunities: Common Herd Identifier

PPR Provincial Premises Registry
The official registry for obtaining an Ontario Premises Identification Number

RPE Registre provincial des exploitations
Le registre officiel permettant d'obtenir un numéro d'identification de l'exploitation en Ontario

DAVID KELTON
7372 SIDEROAD 4, RR2
ARISS ON N0B 1B0

Premises ID / Numéro d'identification de l'exploitation

ON4204305

Premises ID for all Primary Locations

and

Secondary Locations on Every Farm

Cattle Health and Veterinary Medicine Use Declaration

As prescribed by Regulation 761 made under the *Milk Act*, R.S.O. 1990, c. M. 12, section 34.2

Producer Name (Name on DFO Licence): _____ ***DFO Licence #:*** _____

Veterinarian Name: _____

Veterinarian declaration:

As of this date, I have visibly observed the general health status of the cattle in this herd and found them to be healthy, or receiving satisfactory care and treatment for routine health conditions. I have verified that this producer has in place a system for identifying treated and sick cows and for preventing milk from these cows from entering the producer's bulk tank(s).

I have reviewed and discussed the use of veterinary medicines with _____, the person responsible for the use of veterinary medicines for this herd. I have advised this person that veterinary medicines must always be used according to label directions, unless a licensed veterinarian who has a valid vet-client-patient relationship (VCPR) with the producer and the producer's herd has provided written directions to do otherwise.

Veterinarian's Signature:

Date: _____

Producer declaration:

As a DFO license holder, I acknowledge that I am responsible for and that I do maintain an ongoing relationship with a licensed veterinarian for animal health and advisory services and I agree that veterinary medicines will always be used according to label directions, unless a licensed veterinarian who has a valid vet-client-patient relationship (VCPR) with me has provided written directions to do otherwise.

Print Name:

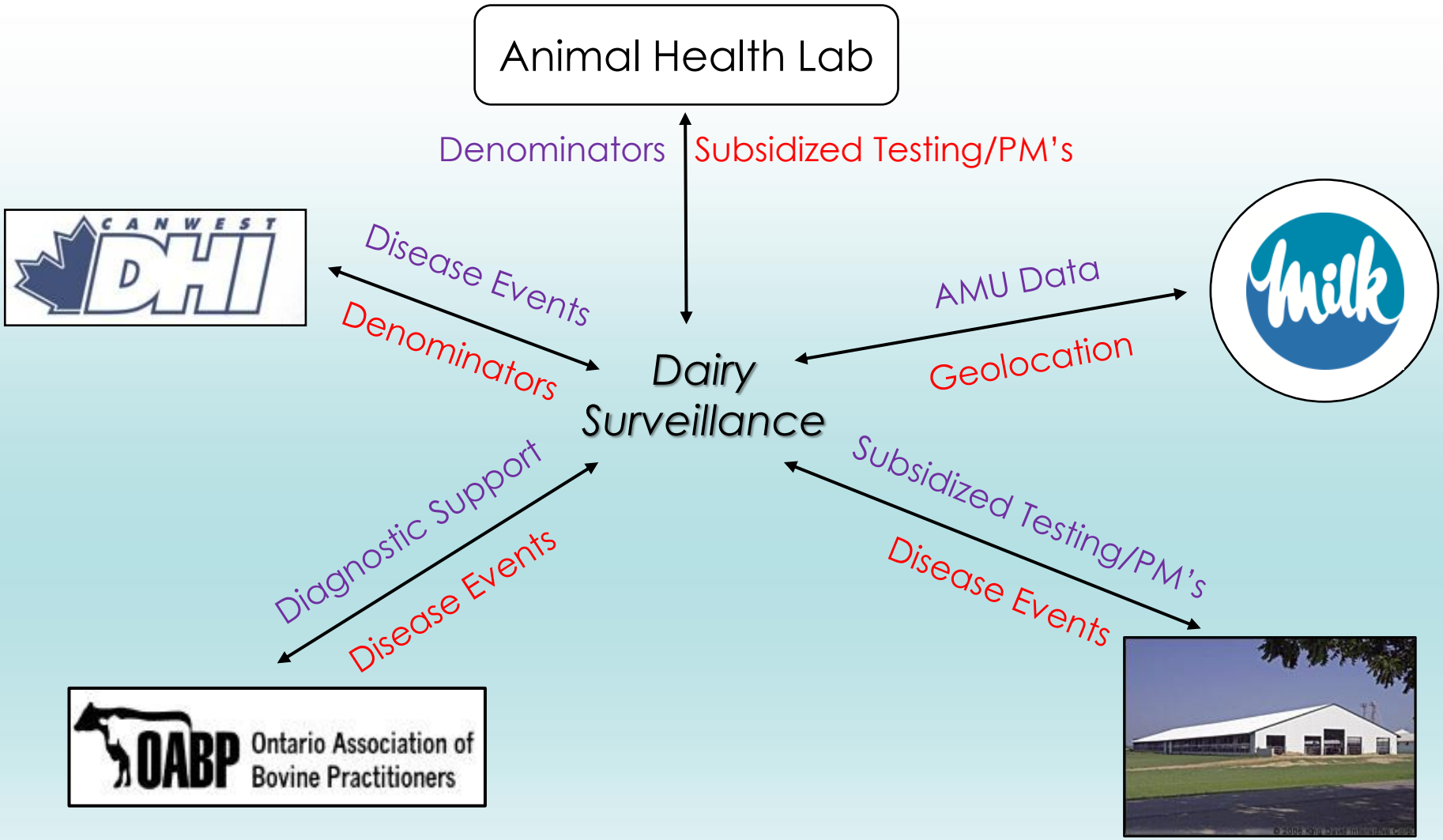
Signature:

Date: _____

Where the licensed producer is a corporation, I have authority to bind the corporation.

Created on 14/01/2013

Opportunities: A Barter Based System?



Take Home Messages:

- Laboratories provide data that is vital to the delivery of health management programs on dairy farms
- The test result alone is not enough – needs to be easily and quickly combined with other data sources to create information that has value to the end-user (the dairy producer)
- There is an increasing need for reference laboratories to help provide quality control services to veterinary practice and on-farm laboratories
- The demand and opportunities to provide testing services is increasing based on pressures being applied to the dairy industry

Thank You! Questions???