Perceptions of Disease by Organic Dairy Producers – Preliminary Results of a Multistate Study

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INTRODUCTION

Perception of disease is a potentially important factor that may influence disease definitions and detection among farms. Disease identification and management strategies are thought to differ between organic (ORG) and conventional (CON) dairy farms. Pol and Ruegg (2007) documented philosophical differences in the detection of disease and perception of cure between ORG and CON farmers and hypothesized that it is possible that more diseases were noted on CON farms because more treatment options exist. It is unknown whether these differences are attributable to differences in management system or simply to differences in herd size. Rodrigues et al. (2005) reported that operators of large CON dairy herds were twice as likely to record cases of clinical mastitis as compared to operators of small CON herds. Diverse factors such as the farmers' level of knowledge and training, overall management style, and attitude toward disease and farming have been shown to affect disease reporting. In the UK, Mill and Ward (1994) reported an inverse association between the rate of lameness and the farmers' knowledge about lameness. A French study reported that the farmers' goals affected criteria used for culling animals (Beaudeau et al., 1996). It has been speculated that less veterinary-treated of disease on ORG as compared to CON farms may be due to differing attitudes and disease management practices (Hardeng and Edge, 2001). The preliminary data presented in this paper presents new information about perception of disease by farmers on conventional herds that utilize confinement and intensive grazing practices and contrasts outcomes with similar herds that are certified organic dairy producers.

ORIGIN AND CHARACTERISTICS OF DATA USED IN THIS STUDY

Analyses presented in this paper are derived from preliminary data collected in USDA NIFA project 2008-51106-19463, "Impact of Organic Management on Dairy Animal Health and Well-being." The study is a prospective, cross-sectional multistate study with a total enrollment of approximately 200 ORG and 100 size-matched CON herds. Analysis is ongoing and the data presented in this paper are a subset that was complete as of August 2011. Criteria for enrollment in the study were minimum herd size of 30 lactating cows and ORG herds had to have been shipping certified ORG milk for a minimum of 2 years. Organic herds were enrolled from NY, OR and WI based on a representative distribution of herd-strata. Randomly selected CON herds located within the same herd-size strata and within a 50 mile radius of the ORG herds were invited to participate in the study. Each farm was visited once by one of 3 trained study personnel who administered a 45 page animal health questionnaire that included questions about: case definition of selected diseases; methods and frequency of disease detection, treatments used for defined case scenarios, usage of veterinarians, and methods used to evaluate results of treatments. Data on the incidence, severity and economic consequences of selected diseases was collected during a period of 120 days. Retrospective data for the previous 60 days before the farm visit was collected during the farm visit using an adaptation of the disease recording survey instruments previously used by Zwald et al. (2004) and (Pol and Ruegg, 2007). Prospective disease data was collected using pre-defined data collection forms completed by the farmer during the 60 days following the farm visit. Indicators of overall herd health were collected by retrieval of farm records and by individual observations of a representative selection of animals including scoring of body condition, udder hygiene, lameness, calf nesting scores and calf health scoring.

In general, about 30% of the total number of ORG herds within each state participated in the study, indicating that the sample was likely representative of this demographic. As defined in the study design, ORG herds were of similar size to conventional herds that utilized intensive grazing practices (CON-Graze) (defined as herds where the lactating cows had at least 1 month where >30% of dry matter intake was obtained from pasture) but the conventional confined herds (CON-confined) contained approximately twice as many cows (Table 1). Rolling herd average for ORG herds was about 25% and 37% less than production of CON-graze and CON-confined herds, respectively (Table 1). The distribution of breeds, housing of lactating cows and calves and hours spent outside varied based on management type (Table 1).

Table 1. Selected characteristics of preliminary herd data included in this analysis

		Conventional Herds	
	Organic	Graze	Confined
Maximum number of herds included in preliminary data for each question	169	30	56
– NY	72	12	13
– OR	0	6	4
– WI	97	12	39
Rolling herd average (lbs.)	13,822	18,430	21,718
Average number of cows per herd	76.5	71.1	143.8
Average Lactation number	2.6	2.6	2.3
Breed Distribution			
>50% Holsteins cattle in herd	58%	77%	88%
>50% Jersey cattle in herd	6%	13%	4%
>50% crossbred or other cattle in herd	36%	10%	9%
Summer housing lactating cows			
Freestall (%)	3%	7%	36%
Tie Stall (%)	4%	13%	36%
Pasture or dry lot (%)	93%	80%	21%
Other (%)	<1%	0%	2%
Winter housing lactating cows			
Freestall (%)	27%	37%	41%
Tie Stall (%)	50%	57%	54%
Pasture or dry lot (%)	15%	7%	0%
Other (%)	8%	0%	5%
Number of hours spent outside (median hours)	20	18	2
Median amount of grain fed per cow per day (lbs.)	9.9	17.6	19.8
Use timed AI (%)	0%	23%	46%
Lactating cows are exposed to purchased animals (%)	40%	53%	41%

IDENTIFICATION OF POTENTIALLY ILL COWS

Methods of detecting disease can be classified as proactive, (such as actively forestripping quarters to screen for visually abnormal milk), or passive (such as observing abnormal milk on the milk filter). The benefits of a proactive approach to disease monitoring have been particularly emphasized in transition cow programs, with a focus on routine, frequent monitoring to enable early detection and treatment (Heuwieser et al., 2010; Leblanc, 2010). Lack of proactive detection of lameness has been suggested as an explanation for underestimation of the disease by farmers (Barker et al., 2010; Leach et al., 2010). Differences in screening methods and disease detection based on management system have not been described for US farms. Participants in the current animal health study were asked an open ended question regarding their primary method used to identify cows that require further examination and results were classified into several categories (Table 2). In the preliminary data presented here, few differences in screening methods were observed based on management type. In general passive surveillance and observation of obvious symptoms is the primary method used to identify cows for further examination.

Table 2. Primary method used to screen cows that require further examination

		Conventional Herds	
	Organic	Graze	Confined
Method for screening lactating cows			
Decreased appetite ("off feed")	50%	60%	50%
Decreased milk yield	8%	17%	20%
Observed depressed attitude	13%	10%	9%
Cow is reluctant to rise or walks slowly	4%	7%	0%
Abnormal manure	2%	0%	0%
Suspect increased body temperature	5%	0%	7%
Other method	17%	7%	14%
Screening of postpartum cows			
Routinely perform examinations	17%	20%	16%

DIAGNOSIS AND SCREENING FOR MASTITIS

Mastitis is the most frequent and costly disease of dairy cattle and has special relevance to product quality and production efficiency. Attitudes about mastitis have been associated with the incidence of clinical mastitis (Nyman et al., 2007; Jansen et al., 2009). Swedish researchers indicated that farmers that treat mastitis quickly had a greater incidence of mastitis as compared to farmers that waited to treat (Nyman et al., 2007). Farmers with low threshold criteria for treatment (treating cows with only abnormal milk), had greater incidence rates of veterinary-treated clinical mastitis as compared to farmers with high threshold criteria for treatment (treating only when the cows show systemic signs). Pol and Ruegg, (2007) reported that, visual observation of abnormal milk was used to detect mastitis by 90% of CON farmers in contrast to only 45% of ORG farmers. Likewise, observation of normal milk was used to assess cure by 75% of CON farmers but only 20% of ORG farmers. Organic farmers relied more heavily on other methods for detecting mastitis, such as visualization of swollen quarters, California Mastitis Test results, and observation of abnormal milk on the milk filter (Pol and Ruegg, 2007; Ruegg, 2009). These different methods of detecting mastitis imply that organic and conventional farmers had different definitions of mastitis. Preliminary results of the current study do not indicate that there are large differences in methods used for screening or detection of clinical or subclinical mastitis based on management system (Table 3). Slightly more than half of farmers of all systems detected clinical mastitis by observation of forestripped milk at every milking. It does appear that more ORG and Con-grazers detected mastitis by observation of the filter sock and there was some indication that CON herds tended to have more seriously ill cows with reduced milk yield or systemic symptoms. Detection of subclinical mastitis was similar among farm size categories although a surprising proportion of farmers of all herd types indicated that they did not know a definition for subclinical mastitis (Table 3). Use of monthly DHIA testing to identify subclinically affected cows seems to be more prevalent on conventional herds.

Table 3. Methods used to detect clinical mastitis and screen for subclinical mastitis

		Conventional Herds	
	Organic	Graze	Confined
Detection of clinical mastitis			
Forestrip every milking	59%	55%	64%
Forestrip infrequently	24%	17%	21%
Never forestrip	19%	28%	15%
Observe garget on milk line filter sock	19%	21%	5%
Observe swollen quarter	65%	72%	71%
High SCC or conductivity alert	21%	24%	21%
Cow has no milk or is sick	16%	31%	27%
Detection of subclinical mastitis			
CMT reaction	35%	31%	24%
Other cowside SCC test	11%	7%	11%
High DHIA SCC	52%	66%	71%
Do not test for subclinical mastitis	13%	17%	9%
Don't know what subclinical mastitis is	27%	24%	35%

DETECTION AND INITIAL ACTIONS TAKEN FOR SELECTED DISEASES

Frequency of disease identification is affected both by the intensity of disease monitoring and case definitions for specific diseases. It is likely that the availability of efficacious treatments and previous experience with alternative treatments influences perception of control of disease (Vaarst et al., 2002). To identify potential differences in actions based on management type, participants in the current study were shown 3 photos of animals with obvious clinical signs of specific diseases and asked an open ended question regarding their initial actions after observing the animals, results were classified into several categories (Table 4). The three photos depicted: 1) an adult cow with copious nasal discharge; 2) milk with obvious clots and CMT reaction of 3+; and 3) a recumbent obviously dehydrated baby calf lying near a pool of liquid diarrhea. For all scenarios, few farmers of any management system indicated that they would call the veterinarian as an initial action and the most prevalent actions were fairly consistent among management systems. There was a tendency for more CON farmers to use additional diagnostics when observing adult cows with disease. Stripping of the quarter affected with mastitis was more commonly mentioned by ORG and CON-grazers as compared to CON-confined herds. Slightly more CON farms (graze and confinement) indicated immediate treatment of the affected calf (Table 4).

Table 3. Initial actions taken by farmers after viewing photo of clinically affected animals

	Organic	Conventional Herds Graze	Conventional Herds Confined
Initial action after viewing photo of adult cow with obvious nasal discharge			
Perform additional diagnostics	37%	60%	54%
Treat immediately	36%	33%	34%
Call veterinarian	12%	10%	13%
"Wait and see"	7%	0%	7%
Other action	5%	0%	5%
Nothing	3%	0%	0%
Initial action after viewing photo of adult cow with mastitis			
Perform additional diagnostics	7%	10%	14%
Treat immediately	61%	73%	75%
Call veterinarian	2%	3%	4%
"Wait and see"	<1%	0%	0%
Other action	10%	0%	2%
Strip affected quarter	18%	13%	5%
Nothing	<1%	0%	0%
Initial action after viewing photo of calf with diarrhea & dehydration			
Perform additional diagnostics	4%	7%	6%
Treat immediately	84%	93%	95%
Call veterinarian	4%	0%	0%
"Wait and see"	1%	0%	0%
Other action	7%	0%	0%

There are no standard case definitions that are universally used by farmers to diagnose diseases. To better understand potential differences in case definition based on management type, participants in the current study were asked an open ended question regarding how they recognize selected diseases. The results were classified as either "subtle symptoms" or "obvious symptoms." Subtle symptoms were defined as symptoms that required astute observation (such as observation of a depressed attitude) or an action by the observer (such as measuring body temperature). Obvious symptoms were defined as those that required only basic observation of the animal (such as anorexia or persistent recumbency) (Table 4). Few differences were noted in disease recognition based on management type. The greatest difference in observation of disease was reported for Metritis, whereby, a greater proportion of ORG farmers relied only on the most obvious methods of detection.

Table 4. Proportion of farmers who used subtle or obvious clinical signs to define selected diseases

		Organic	Conventional Herds Graze	Conventional Herds Confined
Milk fever				
	Subtle	13%	14%	12%
	Both	70%	79%	70%
	Obvious	18%	7%	8%
Ketosis				
	Subtle	8%	14%	11%
	Both	30%	14%	34%
	Obvious	62%	71%	55%
Metritis				
	Subtle	1%	0%	3%
	Both	13%	44%	34%
	Obvious	86%	56%	61%
Pneumonia – adult cow				
	Subtle	2%	0%	2%
	Both	46%	64%	49%
	Obvious	52%	36%	49%
Pneumonia – baby calf				
	Subtle	3%	8%	4%
	Both	38%	60%	42%
	Obvious	59%	32%	54%

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REPORTED OCCURRENCE OF SELECTED DISEASES

Organic and conventional farmers have different options available for treating most diseases and these options may influence disease perception. In one study, fewer cases of clinical mastitis, respiratory disease, and metritis were reported by ORG farmers (n = 20) as compared to CON farmers (n = 20) located in WI but a standardized definition of each disease was not provided for participating herds and it is likely that the criteria for diagnosis varied based on herd type (Pol and Ruegg, 2007). A previous study in the UK reported that farmers converting to organic status were less likely to report cases of clinical mastitis (Berry and Hillerton, 2002). In the current study, farmers were asked to describe how they recognize and treat disease or to indicate that the disease had never occurred on their farm. The occurrence of milk fever (97% of farms), retained placenta (96% of all farms), mastitis (98% of all farms) and lameness (90% of all farms) were consistently reported to occur in a similar proportion of farms regardless of management system. In contrast, proportionally fewer ORG farmers reported the occurrence of ketosis or pneumonia in adult cows and calves (Table 5). It is interesting that the proportion of herds reporting pneumonia in adult cows was markedly different for ORG herds versus CON-grazers. Both management types employed similar winter and summer housing indicating that this difference is not likely due to differences in environmental management. The proportion of farmers reporting the occurrence of diarrhea in calves and metritis were similar among management systems. Further analysis of additional data will be performed to compare the incidence of selected diseases among farm systems.

Table 5. Proportion of farmers reporting the occurrence of selected diseases in animals on their farms

		Conventional Herds	
	Organic	Graze	Confined
Ketosis	61%	73%	98%
Metritis	67%	75%	89%
Pneumonia – adult cows	54%	83%	82%
Pneumonia – calves	71%	83%	96%
Diarrhea - calves	88%	90%	98%

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CONCLUSION

The data presented herein is preliminary and final conclusions should be withheld until a more complete analysis is completed, however it is apparent that farmers of all management types primarily utilize passive surveillance systems to detect disease. Methods of screening and detection of disease are similar among all management systems. A surprising large proportion of farmers enrolled in this study did not recognize or understand a definition of subclinical mastitis indicating that educational efforts for this disease need to be intensified for this demographic. When symptoms of disease are noted in an animals, few producers will initially call a veterinarian. The occurrence of pneumonia in adult cows of ORG farms was less frequently recognized by ORG farmers as compared to CON grazers or CON confinement operations. Additional analysis using this dataset will explore the incidence of selected diseases in the prospective followup period and identify risk factors related to disease.

REFERENCES

Barker, Z. E., K. A. Leach, H. R. Whay, N. J. Bell, and D. C. J. Main. 2010. Assessment of lameness prevalence and associated risk factors in dairy herds in England and Wales. J. Dairy Sci. 93:932-941.

Beaudeau, F., J. D. van der Ploeg, B. Boileau, H. Seegers, and J. P. T. M. Noordhuizen. 1996. Relationships between culling criteria in dairy herds and farmers' management styles. Prev. Vet. Med. 25:327-342.

Berry E. A. and J. E. Hillerton. 2002. The effect of selective dry cow treatment on new intramammary infections. J. Dairy Sci. 85:112–121.

Hardeng, F. and V. L. Edge. 2001. Mastitis, ketosis, and milk fever in 31 organic and 93 conventional Norwegian dairy herds. J. Dairy Sci. 84:2673-2679.

Heuwieser, W., M. Iwersen, J. Gossellin, and M. Drillich. 2010. Survey of fresh cow management practices of dairy cattle on small and large commercial farms. J. Dairy Sci. 93:1065-106

Jansen, J., B. H. P. van den Borne, R. J. Renes, G. van Schaik, T. Lam, and C. Leeuwis. 2009. Explaining mastitis incidence in Dutch dairy farming: The influence of farmers' attitudes and behaviour. Prev. Vet. Med. 92:210-223.

Leach, K. A., H. R. Whay, C. M. Maggs, Z. E. Barker, E. S. Paul, A. K. Bell, and D. C. J. Main. 2010. Working towards a reduction in cattle lameness: 1. Understanding barriers to lameness control on dairy farms. Res. Vet. Sci. 89:311-317.

Leblanc, S. 2010. Monitoring metabolic health of dairy cattle in the transition period. J. Repro. Dev. 56:S29-S35.

Mill, J. M. and W. R. Ward. 1994. Lameness in dairy cows and farmers' knowledge, training and awareness. Vet. Rec. 134:162-164
Nyman, A. K., T. Ekman, U. Emanuelson, A. H. Gustafsson, K. Holtenius, K. P. Waller, and C. H. Sandgren. 2007. Risk factors associated with the incidence of veterinary-treated clinical mastitis in Swedish dairy herds with a high milk yield and a low prevalence of subclinical mastitis. Prev. Vet. Med. 78:142-160.
Pol, M. and P. L. Ruegg. 2007. Treatment practices and quantification of antimicrobial drug usage in conventional and organic dairy farms in Wisconsin. J. Dairy Sci. 90:249-261.
Ruegg, P. L. 2009. Management of mastitis on organic and conventional dairy farms. J. Anim. Sci. 87:43-55.
Vaarst, M., B. Paarup-Laursen, H. Houe, C. Fossing, and H. J. Andersen. 2002. Farmers' choice of medical treatment of mastitis in Danish dairy herds based on qualitative research interviews. J. Dairy Sci. 85:992-1001.
Zwald, A. G., P. L. Ruegg, J. B. Kaneene, L. D. Warnick, S. J. Wells, C. Fossler, and L. W. Halbert. 2004. Management practices and reported antimicrobial usage on conventional and organic dairy farms. J. Dairy Sci. 87:191-201.