

# DAIRY LAMENESS

R O U N D T A B L E

Nine hoof health experts discuss laminitis,  
heel warts and foot rot



## INTRODUCTION

Novartis Animal Vaccines, Inc. hosted a Lameness Roundtable. Participating in this roundtable were dairy practitioners, recognized lameness experts, a noted dairy economist, a forage production expert and a recognized hoof trimming teacher from throughout the United States.

The complex of foot-related diseases and production-related lameness costs dairy operators hundreds of millions of dollars annually. Similar hoof problems cost the beef industry an estimated \$120 per head annually.

To provide linkages among pathogenic problems associated with lameness and production-related lameness problems, Novartis hosted this roundtable of experts to bring together various aspects of lameness in dairy cows and, subsequently, to bring this information to veterinarians, dairymen and others involved in the dairy industry via this publication.

## ROUNDTABLE MEMBERS



**Steven Berry**, D.V.M., is a veterinarian and an extension dairy management and health specialist at the University of California. For the past seven to eight years, he has conducted research on foot warts and, subsequently, the many other factors involved in dairy cow lameness.



**Paul Blackmer**, D.V.M., is a veterinarian in Southern California. He has been a large animal practicing veterinarian for 32 years, travels extensively in the southwestern United States and encounters problems associated with lameness on a daily basis.



**Karl Burgi** is a hoof trimmer and dairy consultant. He is a partner in Dairyland Hoof Care Institute and teaches hoof trimming to farmers, veterinarians and other dairy production personnel.



**Don Cain**, D.V.M., is owner of Central Nebraska Vet Service in Broken Bow, Nebraska. His company manages more than 400,000 feedlot cattle per year and 4,000 dairy cows.



**Chuck Guard**, D.V.M., Ph.D., is a faculty member at Cornell University, working in the Ambulatory and Production Medicine Clinic. The majority of his clinical practice within the ambulatory clinic is with 15 dairies in the Cornell area. In addition, he consults with dairies worldwide on lameness management issues.



**Al Harper**, D.V.M., is a practicing veterinarian in west Texas. He works with a number of dairies in the Southwest and treats an assortment of lameness problems.



**Bruce Jones**, Ph.D., is an agricultural economist with the University of Wisconsin-Madison. He is an extension economist and the former director of the Center for Dairy Profitability.



**Jan Shearer**, D.V.M., is an extension veterinarian and researcher at the University of Florida in Gainesville. He is involved with an outreach program that teaches on-farm personnel how to fix and treat livestock feet using the Touissant Raven or Dutch trimming system.



**Ev Thomas** is vice president of the Miner Institute in Chazy, New York. He is an agronomist and has worked extensively in the area of dairy cattle nutrition.

# LAMINITIS

## Q What causes laminitis?

**Dr. Guard:** The traditional view of the cause of laminitis was that it is purely a consequence of a toxic event with a cow, like severe mastitis or metritis, or rumenal acidosis. While those causes are still important, it is now clearer that the causal pathways are multiple. Environmental influences, given some predisposing condition such as rumenal acidosis, have a major influence on what the claw lesion or claw disease turns out to be. These environmental factors, such as standing time, standing on unforgiving surfaces and bad floors, all make laminitis worse.

**Dr. Shearer:** In the Southeast, our hot, humid environment puts animals in heat stress, which seems to accentuate foot problems. We believe heat stress contributes to rumenal acidosis because of the way it influences cattle feeding behavior and other metabolic aspects in the cow. All these factors associated with heat stress seem to play a part in the laminitis syndrome.

**Dr. Harper:** In Texas and New Mexico, we definitely see more laminitis problems in the summertime. I don't know whether it is heat stress or transition stress. We will have about 50 percent of the herd calving in the summer months and a lot of cows transitioning at that time. We can't do much to control heat stress, but if it combines with transitioning to be a bigger laminitis problem, then we can better manage the overall problem by managing the feeding and transition of animals.

## Q What are the economic ramifications of laminitis?

**Dr. Jones:** Economic losses due to lameness are closely tied to the severity and longevity of the problem. If it results in culling and/or loss of the affected animal, those costs far exceed production costs in some cases. In others, if the nonproductive animal is left in the herd, the economic losses could be greater than eliminating the affected animal.

From the studies I have looked at, it seems dairy producers in Wisconsin are losing about \$12.92 in milk revenues per month. However, affected animals aren't eating as much, so if you adjust the value of the feed, the average loss in milk revenue alone is about \$7 per month.



**Dr. Guard:** The results of this study showed us, to our surprise, that the duration of the detectable milk loss was not limited to 30 days. Of course these diseases that were naturally occurring in the herds that we studied happened at all times of lactation and, in general, we could identify a reduction in milk production from the time of occurrence throughout the remainder of the lactation. So the loss persisted to the extent that we could separate that cow from normal herdmates. There was a 3-lb. loss per day in a cow that was 10 days fresh or 50 days fresh – she lost that same 3 lbs. for the remainder of her lactation.

**Dr. Jones:** The real cost of lameness is when you have to accelerate culling. The longer you extend the productive life of the cow, you will drive down the cost of owning that cow. If a dairy producer holds a cow for only one lactation vs. seven lactations, he loses about \$1,200. If the cows stay through two lactations, the loss drops to \$400. If you extend that to three lactations instead of the five or six that most producers shoot for, the dairy producer is losing \$200 per head. From an economic standpoint, it is easy to see why lameness is such a critical issue.

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**Dr. Guard:** We all agree that any disease that causes a cow to decrease in performance is something we all strive to prevent. However, these research models fail to reflect the real world in that the decision to replace a cow should always be based on whether the next cow you put in her place can generate more profit. It has less to do with the number of lactations than whether the net present value of the cow you can put in her place.

**Dr. Jones:** I agree, but if lameness is causing the cow to be subpar, below the norm you expect for the herd, she is going to have to be culled. And when more productive cows enter the herd, the lame cow likely is going to be culled. If that happens after two or three lactations, it is at the expense of potential profit.

**Dr. Cain:** There is one issue that I would bring to mind – conserving of equity. If you cull so hard to improve production, you can end up losing equity in your whole operation. That is a real-world scenario too, and I have seen operations not be able to sustain themselves because their equity base keeps getting smaller as they strive to increase production.

What we are seeing often in Nebraska is producers come in with a nucleus herd and try to expand to facility size. They have overbuilt facilities and they bring in as many cows as they can and they have to keep them in production. It is a real double-edged sword: they have to cull because of lameness problems, but at the same time, they have to grow to keep the fixed cost per unit cow down.

**Dr. Shearer:** I had a producer in the Southeast tell me he lost over 4 percent of his herd to foot problems. At \$1,500 to \$2,000 per animal, the cost was enormous. Like most producers, he did not have a person responsible just for the foot table – they did other things at the dairy. This dairy made a commitment to foot problems, assigned a person to manage it, and over a two-year period, saved 60 cows per year, or about \$90,000 per year. And that doesn't include other performance benefits to lame cows that had prompt care.

## Q How serious is laminitis?

**Dr. Blackmer:** In southern California, I don't see it as real serious. We have mostly drylot dairies there, with only a few freestall barns. The corrals average about 600 square feet per cow and are dirt-based.

Laminitis is not something we see as a big issue. With our climate and the drylot environment, we are not really in laminitis country.

**Dr. Berry:** Laminitis is much more of a problem in freestall dairies, as is lameness in general. If I were building a dairy in an arid area, I wouldn't build a freestall dairy. I would build loose housing and keep the cows on dirt rather than put them on cement. However, for producers in many parts of the country, manure management is a problem and they cannot contain the manure and the rainwater runoff with loose housing.



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New regulations in California governing runoff are indicative of what is going to happen nationwide. Even in California there is no uniformity in regulations. But it is becoming more of a public awareness issue and the EPA is more involved than ever, so new facilities are being built to actually contain the runoff water and retain the water that goes through the manure.

**Dr. Blackmer:** I work with some dairymen who have looked into relocating. If they can stay in an area that doesn't have severe freezing and 5 to 10 inches of rainfall annually, they do not want to build freestall barns. We are seeing vacuum tanks that are towed by a tractor and can suck up water out of puddles. Other technologies, like cleaning alleys, adding water, storing runoff and trucking it to a community methane digester, are making drylot dairies more feasible. In Kansas, for example, I read where the cost to build a 2,400-cow dairy is \$820 per head more for the freestall vs. drylot dairy. So this argument might not hold true for all areas of the country, but it does have a lot to do with laminitis and some other foot diseases because of the environmental advantages.

**Dr. Cain:** I almost agree with Paul that laminitis is not a big problem in Nebraska, but for a different reason. We have such a hard time dealing with the sequential lameness problems that we don't do a very good job of dealing with early laminitis.

All of our dairies are freestall. Nutritionally, we are in good shape with our dairy cows, but trauma and abrasions are the major causes of our lameness problems. Our cows are on concrete all the time, and even if they don't have abrasions, they are up and down, walking on concrete and they get traumatic laminitis from that environment.

We have a real problem with labor, and when we go to open environments, whether in a feedyard or a dairy, labor requirements go up. So in our area, I see freestalls as being the way to go.

**Dr. Berry:** Based on the locomotion scores that I see at the dairies I visit, I suspect laminitis may be a bigger problem than we are admitting. Using the 1 to 5 locomotion scoring system detailed by Sprechers, et al. in

*Theriogenology*, in which a locomotion score 3 cow has already lost the producer money, I can pick these animals out left and right at dairies I visit. Those cows are not considered lame by the producer nor generally by the veterinarian, but I contend those cows have laminitis that is costing the producer money.

As the locomotion scores go up, cows eat less and are less productive. I think the majority of those cows would benefit by seeing a hoof trimmer much earlier than they usually do.

I would think that on a lot of our freestall dairies, 30 percent to 40 percent of cows are in the 3 locomotion score range. Let me make it clear, that is a prevalence estimate, not an incidence estimate. In many of our dairies, you can pick out cows with an abnormal gait.

**Dr. Harper:** In central Texas, we have high humidity and lots of heat, and the freestall dairies tend to be easier to manage because of sporadic heavy rains. If drylots are not kept clean, there are problems. If drylots are cleaned excessively, down to the rock, cows aren't comfortable, though they are on a drylot. In New Mexico, we don't have many freestall dairies, but in the Texas Panhandle, more producers are going to freestalls because of cold, blizzards and other weather-related problems.



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## Q What is the role of a hoof trimmer in preventing laminitis?

**Dr. Berry:** I see the veterinary practitioner as being the person to help train people on the dairy to identify cows that should be brought to the hoof trimmer. Once a dairy gets into a program, trimming all dry cows and those in the 2 to 3 locomotion score range, they will eliminate a lot of laminitis problems and save the producer a lot of money. It is a lot cheaper than treating the problem, because once you treat the problem, you still have that loss of production throughout lactation.

**Burgi:** There is no doubt that correct maintenance hoof trimming is the best way to reduce the severity of laminitis, but it is often a tough economic sale to make. A sole ulcer on a cow costs the producer about \$600. If we prevent sole ulcers by professionally trimming the hooves of these animals, I have saved the producer a lot of money. Still, too many times, hoof trimming is looked at as an expense rather than an investment.

**Dr. Berry:** Trimming will not prevent laminitis, but when it happens, prompt trimming will help to balance the wear and growth on the claws and spread the weight over the corium, ultimately reducing the likelihood that this animal will develop a \$600 sole ulcer.

**Dr. Guard:** There are two general objectives of hoof trimming: to restore a normal weight-bearing surface to the claw (distributing the weight of the animal evenly) and to remove excess growth. If the rate of wear exceeds the rate of growth, then the trimmer has an immense challenge. In our area of New York, trimming once a year is not adequate to meet either goal.

**Burgi:** Nature didn't equip cows ideally to stand and walk on concrete. Through hoof trimming, we improve the balance and function of the hoof. Cows with properly trimmed hooves have an advantage, especially when they are forced to spend all of their time on concrete. If we don't have a regular maintenance hoof-trimming program, it is very difficult to prevent laminitis.



**Dr. Cain:** We have had a great deal of success using rubber in the feedlot industry to reduce hoof wear.

**Dr. Blackmer:** Almost all of the new freestall dairies in California are going to rubber mats. If you give a cow the choice of walking on rubber or concrete, there is no way she is getting off the rubber. It's like they have military training – they all march in rows.

**Thomas:** When cows go from walking on concrete to rubber, their locomotion scores get better. You can see it, they get on rubber and they start moving more comfortably – it is remarkable.

**Dr. Blackmer:** We used to do claw amputations, with some obvious benefits. Then blocks came along and that is the domain of the hoof trimmer. If an effective hoof block is available, then hoof amputation may not be required.

**Burgi:** When we apply blocks, we save cows, especially if lameness is treated immediately. If blocks are applied, but hooves are not trimmed properly, lesions will reoccur again after some time. It does not make sense to only treat lameness and not ask the question: Why is the cow lame? We need to improve all aspects of management to prevent laminitis.

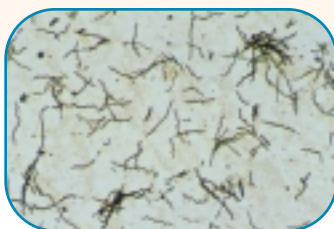
# HEEL WARTS

## Q What causes heel warts?

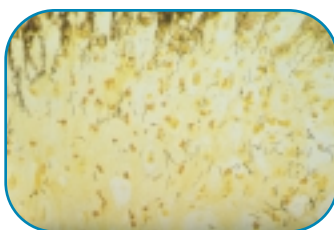
**Dr. Berry:** To quote my esteemed colleague, Dr. Richard Walker, “The exact etiology of hoof warts is unknown.” With that in mind, the cause of foot warts is multifactorial.

There is a microbacterial component. There are five anaerobic bacteria in the genus *Treponema* that are associated with hoof warts. Constant moisture and depleted oxygen are environmental conditions necessary to cause hoof warts to affect animals. Cows in dairies with constantly wet stalls are at a much higher risk for hoof warts.

Where the causal bacteria reside and how long they survive outside the cow is not clear. We do know that biopsies of skin from normal and infected hooves show a different microflora. So the *Treponema* bacteria are not present on uninfected hooves. We know that these *Treponema* bacteria are associated with the disease, but whether they are a primary or secondary causal agent is not clear. And, if they are a secondary causal agent, we don't know what is the primary cause of the disease.



Stained smear of spirochetes and filamentous bacteria.



Stained microscopic section of spirochetes invading living tissue.

## Q What is the prevalence and severity of heel warts?

**Dr. Cain:** In Nebraska, in our freestall dairies, the incidence is very high, up to 40 percent. It's not new to Nebraska, we have seen it in our wet meadow ranches for years. I am convinced there is an association between heel warts and interdigital viral papilloma. And those are most often in cows and bulls that stay in the lower areas of our wet meadow ranches.

The thing that bothers me most is that we see 10 percent to 15 percent heel warts in our replacement heifers. We would like to think they are 100 percent clean when they go into the milking parlor, but that's not the case.

**Dr. Berry:** In the central valley of California, we are seeing 40 percent to 50 percent of our cows with lesions. Again, the consistent epidemiological factor is moisture.

**Dr. Harper:** The only cows that I work with that don't have a problem with heel warts are down in south Texas. These are Jersey herds on dairies that export more than import cattle. In central Texas we have more of a problem, probably because of poorer



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Early Infection



Moderate Infection



Mature Infection

feed bunk management. In New Mexico we only have drylot dairies, and those that manage corrals efficiently have fewer problems with foot warts. I do think lack of management, not just microbiological problems, is a primary cause of the disease.

**Dr. Shearer:** In Florida, we've documented anywhere from 20 percent to 50 percent infection rates. In herds with the higher rate of problems, environmental problems are obvious – they are messier and wetter. It's not always clear-cut though. I see some herds where there is good management and environmental issues are not significant and the incidence of the disease is still very high.

**Dr. Guard:** In New York, we see clinical treatment for digital dermatitis ranging from 5 percent to 20 percent. Historically, those treatment rates were much higher before we developed better management techniques.

**Burgi:** In Wisconsin, we have herds where things are great – it all comes down to hygiene. When we see mud and manure buildups on the feet of cows, the incidence of hoof warts goes up.

When you crowd animals together, the incidence goes up. I see a big difference in 4-row vs. 6-row barns. A 6-row barn has 30 percent more cows in the same square foot area. This results in deeper accumulation of manure between cleaning and extended standing time because of the lack of bunk space. I have seen infection rates of near 80 percent of the herd with such conditions.

**Dr. Blackmer:** When it first hit in southern California, it was a very ugly, big disease. Now, I walk behind cows every day, and I don't see many dairies that don't have that atypical-shaped hoof that is so typical of animals that have recovered from the disease.

## Q What do heel warts cost the dairyman?

**Dr. Jones:** I liken the economic impact in terms of milk loss to laminitis. If a cow can't get to the feed bunk comfortably, she doesn't eat and she doesn't give you milk – I would estimate a milk loss of 3 to 4 lbs. per day. Except in extreme cases, you don't get culling as a result of hoof warts.

**Burgi:** I had a herd about three years ago that was in an expansion mode and the dairy facility was extremely overcrowded. The farm had a heel wart epidemic, but the cows were still producing 90 lbs. of milk per cow. I sat down with the farmer and we implemented a treatment protocol to get rid of the lesions. I came back five weeks later and these guys were the happiest farmers in the county – they had reached 100 lbs. per cow in their 350-cow herd. Dealing with problems instantly can significantly increase milk production and profits.

**Dr. Shearer:** To go along with milk loss, there was a study done in Mexico that showed a significant impact on reproductive performance. It is assumed that hoof warts can cause a tremendous loss in milk as well, perhaps 2 to 3 lbs., but this hasn't been documented.

**Dr. Blackmer:** Some of the more informed dairymen I work with have looked at using the *Treponema* vaccine (*Treponema Bacterin*). They say no question about it, using the vaccine would be cheaper than footbaths.

**Dr. Cain:** We started out using footbaths, but ran into environmental concerns with the EPA over copper sulfate, and with OSHA when using formaldehyde. We put part of one herd on digital dermatitis vaccines. We found these animals easier to monitor and made sure the animal got treated properly because we

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were not wondering whether the footbaths were right or not. In Nebraska, with concerns over polluting groundwater and odor problems, I would say if we can be sure vaccines work as well as footbaths, we would probably go totally away from footbaths.

**Thomas:** We already put a lot of copper in the manure pen through the footbaths. I did some calculating and on our 160- to 180-cow farm, we were putting on 7 lbs. of elemental copper per acre per year. In New England, the maximum lifetime copper limit on soils is 74 lbs. In some of our operations, we will reach that limit in about 10 years. We have a case in Vermont where we confirmed 30 lbs. per acre per year application rate that one farmer was putting on, because he was putting all of this spent copper sulfate solution on a limited amount of land. Data out of Australia showed that a single application of 10 lbs. of copper on very sandy soils did cause toxicity. Animal and crop toxicity can be a problem, but crop toxicity is a much more realistic one.

We've made changes at our farm. By dropping back our use of copper sulfate by about 70 percent, our copper levels are headed back down. So while it's easy to get into a copper accumulation problem on the farm, it's possible to get your numbers back down.

I was told that copper sulfate is an EPA-registered product, but footbaths are not a registered use. I tried to check on the Internet, but I didn't find any registration for copper sulfate for use in footbaths, so I assume the guy is probably right. My question is: If we ever get into a problem with copper sulfate in footbaths, what is the farmer going to fall back on?

**Dr. Blackmer:** All of the dairymen who told me they could use the vaccine cheaper than footbaths were really motivated because of fears of buildup of copper in the soil. Formaldehyde has a human health risk. Studies show that formaldehyde buildups are not a realistic threat, but the company that sells it to us makes sure to point out that they are not going to share in liability if we have problems.

I think Novartis would be well-served by getting into a heifer ranch, getting animals vaccinated and get a trial going that shows the economic advantage of vaccinated animals going back to dairies where hoof warts are an endemic problem. That would be a tremendous bonus to the industry.

**Dr. Jones:** It gets to the issue that you don't want to bring contamination onto the farm. If you can certify that you are not at risk, in terms of bringing replacement animals onto the farm – that is worth a premium. Vaccinated heifers not being a source of heel warts – that's worth extra dollars in bids from the producer.

**Dr. Harper:** I think you have to address the whole lameness problem, not just as three individual diseases. Keeping cows dry and clean is the first step. Vaccination is the second step. I have done whole-herd vaccinations on two herds: one with excellent results and one with marginal results. The difference was management – vaccination cannot overcome lameness problems if the environment is bad. In our case, in one herd we eliminated footbaths and the other we couldn't. One had good management of feed lanes and corrals and the other didn't.

## Q What causes footrot?

**Dr. Berry:** It is basically bacterial, but then there is a skin trauma component which doesn't seem to be the case with digital dermatitis. Treatment for footrot is more efficacious, and footrot tends to be more of a sporadic problem. One year it can be really bad and the next year not bad at all. What's the difference? I don't know.

**Burgi:** I agree it is sporadic. Again, to go back to the laceration or damage to the skin, if we have a problem with digital dermatitis, sometimes there is more problem with footrot. The skin is opened up for the bacteria to enter. Producers who have a really good skin care program (healthy skin all around the claws) experience little problems with footrot.

**Dr. Berry:** I think moisture also contributes to footrot and interdigital dermatitis. But with footrot, it can infect a dry foot that has trauma from rocks or other objects that traumatize the skin.

**Dr. Cain:** My opinion of footrot is that we basically see two different types: One starts out as laminitis and gets infected, and the infection comes up the white line through a broken coronary band or something. The other is more a foreign body puncture trauma to the skin. The incidence is sporadic, but depending on the operation, can be endemic.

We had really good success treating both of those types of footrot with Fusogard®. Because footrot is so sporadic, it was difficult to do good field trial research. When the Fusogard product came out, it was the most awesome challenge I had ever seen. The protection level was 100 percent vs. the control animals. We still have a problem convincing producers of the benefit of the vaccine because of the sporadic nature of the disease. However, in operations where the disease is endemic, we just put it to bed. I had this one feedlot with 26,000 head. Footrot was the number one problem we had, but within six months after going to a vaccination program, it was not one of the problems ever mentioned. I am convinced that was a laminitis-induced footrot problem because of the endemic population in the feedyard.

## Q What are the economics of footrot?

**Dr. Shearer:** The disease can cause the loss of the cow. When lameness due to footrot occurs in early lactation, it can have a big effect on milk yield. Most statistics I have seen come from studies in Europe, where the incidence is about 5 percent or less. I believe ours would be similar. The incidence of the disease may be higher in some dairies, but in most dairies the disease is of lower incidence.



**Dr. Blackmer:** The economic impact is different in different parts of the country. I work in southern California and in New Mexico. We don't see much problem at all with footrot in California, but it is very prevalent in New Mexico.

**Dr. Jones:** A study reported in *Journal of Dairy Science* in 2000-01 showed 39 out of 2,000 cows infected in year one and 76 head in year two. In both cases, in weeks 0 to 3, those dairies lost from 2 to 4 lbs. of milk per day.

## Q How do we treat for footrot?

**Dr. Berry:** It is a disease that, when caught early, can be effectively treated with antibiotics.

**Dr. Jones:** When you start talking about vaccinating, the first question is how frequently am I going to have this animal contracting the disease? If you are talking about a month or two of low milk production, then treat it with antibiotics and get it up and running.

**Dr. Blackmer:** Sometimes the antibiotics are used after the problem has gone on too long and they are just a waste. With all the concern being made over the use of antibiotics in food animals, I don't think we should make the assumption that they will always be available to treat footrot.

**Dr. Shearer:** I have reviewed the literature on the use of feed additives, zinc methionine and biotin, and there appears to be an effect on incidence of footrot.

**Burgi:** The same management and environmental factors that add to problems with the other diseases probably add to footrot. In some cases there are benefits to using vaccines and other treatments, but

they don't overcome problems associated with cows standing in moisture for long periods of time or other environmental factors that prevent the cow from being dry and comfortable.

## **Q** Are there management and genetics issues to consider when dealing with lameness?

**Burgi:** I will address the genetic predisposition question quickly. Most every farm today has a similar genetic makeup because of AI. If there would be a genetic influence, why do some farms using similar genetics have very low lameness rates? I believe that it all comes down to how we manage our dairy animals. If we manage well, we can manage around anything.

**Dr. Harper:** I don't think genetics are the limiting factor for anything on a dairy.

**Dr. Berry:** I think there are lots of things on dairy cows that are a result of indirect selection. Specifically, selection on milk production has led to a lot of other effects. And I think there is a genetic component to lameness and hoof structure and integrity.

**Dr. Jones:** Part of it is that we push for production and all of a sudden, we realize we have fed too high a ration and the cow is coming up with acidosis and lameness problems. Sometimes scaling back is better than dealing with the health problems associated with high-producing cows.

**Burgi:** I work with this one herd that has lameness levels of less than 2 percent with very high production. Why? It's probably because these cows lay down 14 to 16 hours a day and every aspect of the dairy is managed to the fullest extent.

**Dr. Berry:** Many freestall operations, in order to save land mass, are eliminating dirt exercise pens, and I think this is a mistake for a couple of reasons. One, you get your freestall barns so close together that you reduce air circulation. And second, I think cows benefit from getting on dirt and off concrete – social interaction is better and so is heat detection.

**Thomas:** In some areas, nutrient management plans are going to make dirt exercise pens difficult to do. In New York, even moderate-sized operations have to have nutrient management plans developed by professionals. They want the exercise areas to be 50 percent to 100 percent vegetated, and that's difficult to do year-round.

**Dr. Berry:** To me, the most injuries I see are from cow comfort issues: where the pavement is too slippery and the cow goes spread-eagle, or cows getting injured going in and out of freestalls.

**Dr. Blackmer:** Those type of injuries occur much too frequently. We have to improve our facilities.

**Burgi:** One thing we haven't begun to look at is the prevalence of sole ulcers and white line lesions when we have slippery floors. I think there is a high correlation between flooring and footing and all the aspects of mechanical lameness or laminitis.

**Dr. Shearer:** Cow handling is another important issue. A New Zealand veterinarian observed that when an individual cow walked across a concrete pad with rocks on the walkway, the cow almost never stepped on the rocks. However, when that same cow and others were crowded together and forced across the same walkway, they frequently stepped on rocks, which can lead to bruising.

**Dr. Cain:** The last comment I have about injury-related lameness is: I see it as structure and design flaws in the freestalls. And I can go clear down to using some pads and stuff on some things. That's the problem I run into, much more so than with genetics. I think I can work with most genetic problems, but I'm having a hard time dealing with structural problems.



**Novartis wants to thank the members  
of this prestigious panel  
for sharing their expertise and experience  
with lameness in the dairy industry.**



**From left to right:** Dr. Al Harper, Dr. Don Cain, Dr. Paul Blackmer, Dr. Chuck Guard, Everett Thomas, Dr. Bruce Jones, Karl Burgi, Dr. Jan Shearer and Dr. Steve Berry.



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