SAFOSO

Animal Health Matters.
For Safe Food Solutions.

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,
Education and Research EAER
State Secretariat for Economic Affairs SECO

Risk factors for transmission of zoonotic diseases through milk or milk products

Viktoria Lets (NLE, SAFOSO, MSP)

Risk factors

- *The factors that are influencing or are associated with the risk of causing adverse effects (e.g. Infection) in specific subpopulations, or that are protective («protective factors») like vaccination.*

- The identification of such risk factors may derive from different sources:

- **Epidemiological studies** (e.g. cross sectional, case-control, cohort studies)
- **Experts opinion** (when gaps in docuemnted knowledge exists)
- **Risk assessment** studies (to provide more precise estimation of the risk for each subpopulation)

Risk factors

Examples of risk factors at different levels are:

ТВАРИНА	СТАДО	ПОПУЛЯЦІЯ
Стать	Розмір стада	Сезонність
Вік	Рух стада	Географічна ніша
Порода	Виробнича система	

Examples of risk factors

Spatial factors

Climate

Habitats, land use

Population densities

Trade

Wildlife

Vectors

Host factors

Animal species

Age of animals

Age of human hosts

Behaviour

Management factors

Biosafety

Husbandry

Movement contacts

Feeding practice

Antimicrobial usage

Processing practices

Identification of Risk Factors

Epidemiological studies are conducted to identify risk factors using the several measures

(**strength of association**).

- these allow quantifying the consequences from exposure to a risk factor, and are used to predict, quantify the effect of prevention and to plan control programs

Risk factors for bovine brucellosis

- history of abortion,
- large herd size,
- mixed farming,
- agroecological zones,
- contact with wildlife,
- new entry in the herd,
- artificial insemination, etc.

J. Vet. Sci. (2009), **10**(1), 61–65
DOI: 10.4142/jvs.2009.10.1.61

JOURNAL OF
Veterinary
Science

Seroprevalence and risk factors for bovine brucellosis in Jordan

Ahmad M. Al-Majali[1,*], Abdelsalam Q. Talafha[1], Mustafa M. Ababneh[2], Mohammed M. Ababneh[1]

Departments of [1]Veterinary Clinical Sciences and [2]Basic Veterinary Medical Science, Faculty of Veterinary Medicine, Jordan University of Science and Technology, P. O. Box 3030, Irbid 22110, Jordan

We investigated the seroprevalence and risk factors for Brucella seropositivity in cattle in Jordan. The sera from 671 cows were randomly collected from 62 herds. The antibodies against Brucella were detected using a Rose

developing countries, brucellosis is still considered the most serous and devastating zoonotic disease [2,3,19]. For example, in Jordan, the annual reports of the Ministry of Health (2005) indicated the c

Table 2. Multivariable logistic regression analysis of the variables associated with cattle herds' seropositivity for Brucella in Jordan

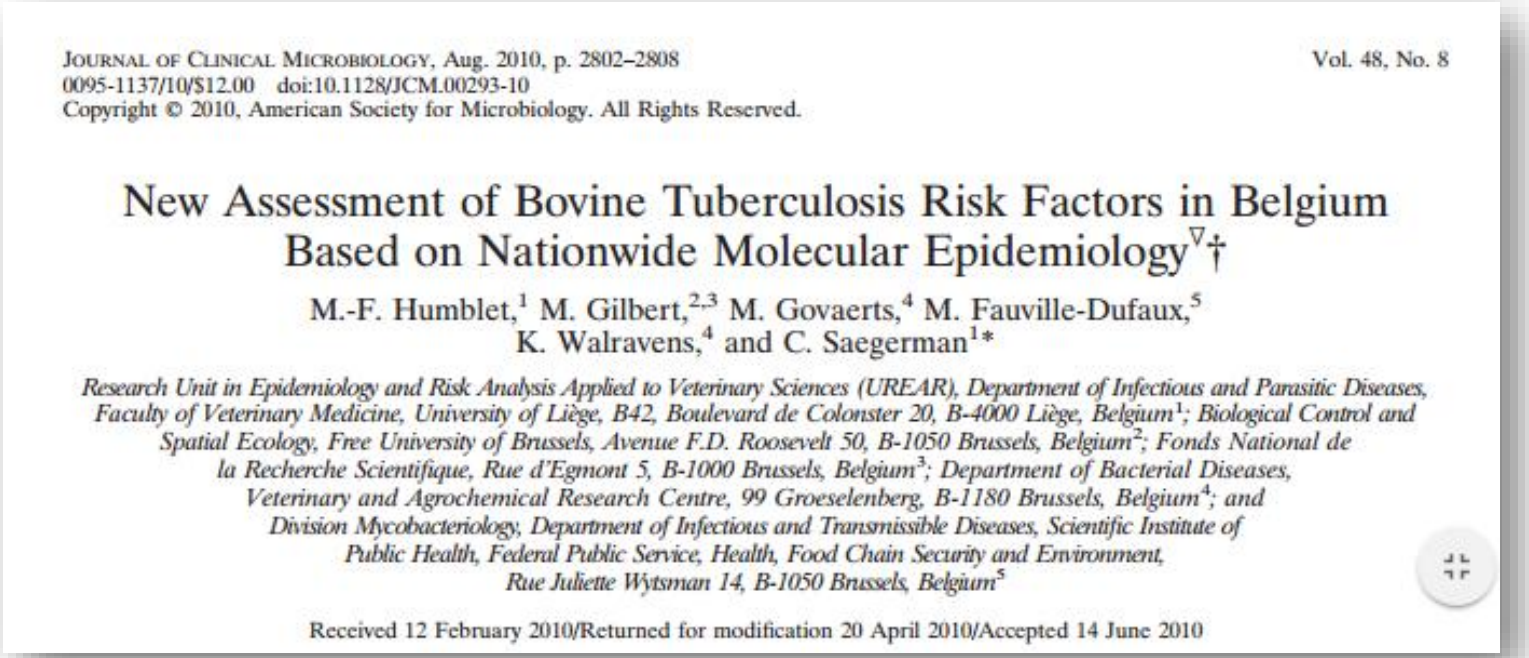
Variable*	β	SE	OR	95% CI_{OR}	*p*-value
Constant	0.92	0.05	–	–	<0.01
Large herd size	1.2	0.11	1.3	1.1, 2.6	0.02
Mixed farming†	0.98	0.07	2.0	1.7, 3.7	0.05
Use of disinfectants	−1.1	0.10	1.9	1.1, 2.1	0.04
Veterinary services	−0.8	0.08	1.6	1.2, 3.2	0.04

*β: standard coefficient (that is affected by the positive "risk" or negative "protective" sense), SE: standard error, OR: odd ratio.
†Mixed farming: raising sheep and/or goats along with cattle. The likelihood ratio according to chi-square testing = 88 (df = 20).

Conclusion: The multiple logistic regression model revealed that a larger herd size and mixed farming were risk factors for cattle seropositivity to Brucella spp.

Risk factors for bovine tuberculosis

- livestock systems (extensive, intensive),
- breeds (local, exotic, cross-breed),
- herd size,
- age,
- cattle movement,
- ecological and geographic factors,
- farm structures,
- farm management practices,
- bovine TB control and eradication programmes,
- regional TB incidences,
- wildlife densities,
- occurrence of TB on contiguous premises and/or level of TB in surrounding areas (infection pressure)



JOURNAL OF CLINICAL MICROBIOLOGY, Aug. 2010, p. 2802–2808 Vol. 48, No. 8
0095-1137/10/$12.00 doi:10.1128/JCM.00293-10

New Assessment of Bovine Tuberculosis Risk Factors in Belgium Based on Nationwide Molecular Epidemiology▽†

M.-F. Humblet,[1] M. Gilbert,[2,3] M. Govaerts,[4] M. Fauville-Dufaux,[5] K. Walravens,[4] and C. Saegerman[1]*

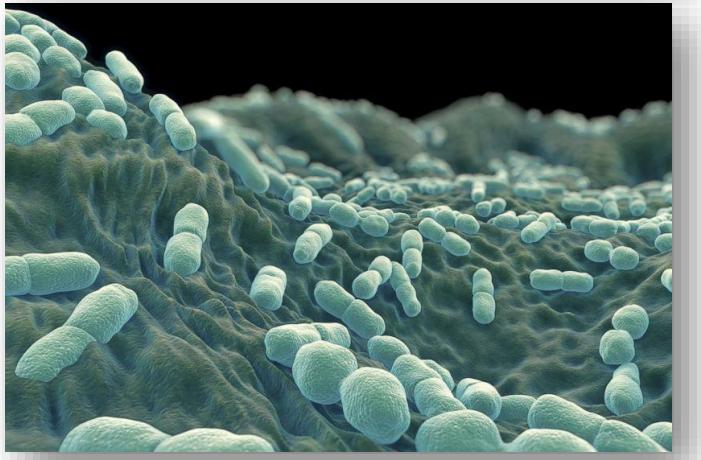
Research Unit in Epidemiology and Risk Analysis Applied to Veterinary Sciences (UREAR), Department of Infectious and Parasitic Diseases, Faculty of Veterinary Medicine, University of Liège, B42, Boulevard de Colonster 20, B-4000 Liège, Belgium[1]; Biological Control and Spatial Ecology, Free University of Brussels, Avenue F.D. Roosevelt 50, B-1050 Brussels, Belgium[2]; Fonds National de la Recherche Scientifique, Rue d'Egmont 5, B-1000 Brussels, Belgium[3]; Department of Bacterial Diseases, Veterinary and Agrochemical Research Centre, 99 Groeselenberg, B-1180 Brussels, Belgium[4]; and Division Mycobacteriology, Department of Infectious and Transmissible Diseases, Scientific Institute of Public Health, Federal Public Service, Health, Food Chain Security and Environment, Rue Juliette Wytsman 14, B-1050 Brussels, Belgium[5]

Received 12 February 2010/Returned for modification 20 April 2010/Accepted 14 June 2010

Conclusion: several risk factors were identified: history of bovine tuberculosis in the herd, proximity of an outbreak, cattle density, and annual amplitude of mean middle-infrared temperature. It also emphasizes the role of animals' movements in the transmission of the disease and supports the importance of controlling trade movements.

Risk factors for Listeriosis

- Listeria spp survives at refrigeration temperatures and over a wide range of pH
- poor quality silage with a high pH (pH >4.0),
- inadequately controlled milking
- inadequate frequency of cleaning the exercise area,
- poor cow cleanliness,
- incorrect disinfection of towels between milkings



J. Dairy Sci. 90:5083–5088
doi:10.3168/jds.2007-0213

Prevalence of and Risk Factors for *Listeria* Species on Dairy Farms

M. J. Vilar, E. Yus, M. L. Sanjuán, F. J. Diéguez, and J. L. Rodríguez-Otero[1]
Instituto de Investigación y Análisis Alimentarios, Universidad de Santiago de Compostela, Facultad de Veterinaria, Campus Universitario s/n. 27002, Lugo, Spain

Conclusion: Statistical analyses confirmed the relationship between low silage quality (as indicated by high pH) and presence of Listeria spp. in silage. Only milking system and inadequately controlled milking order had statistically significant effects on management practices for increasing the risk of Listeria contamination of bulk-tank milk.

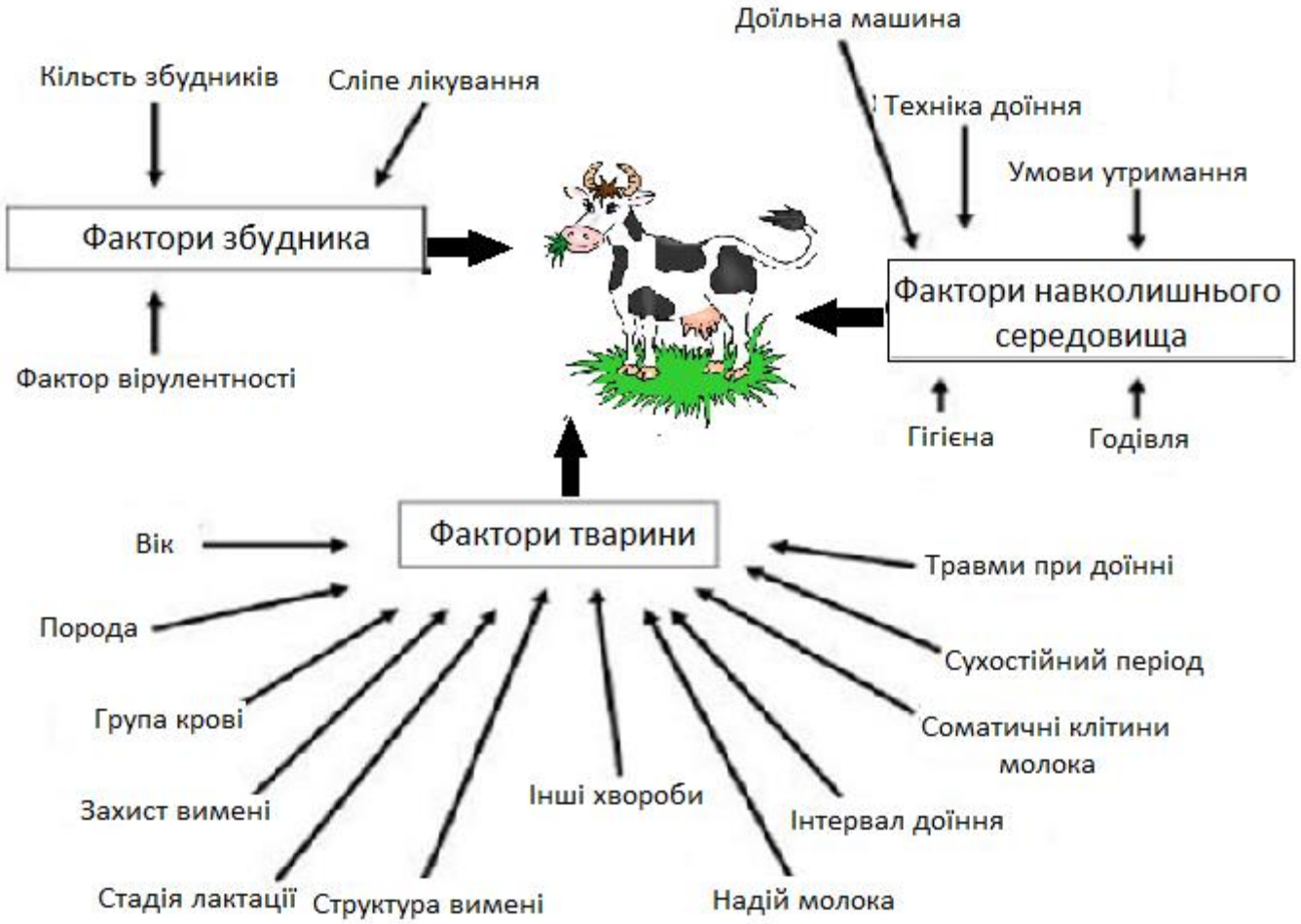
Table 4. Associations between management practices and presence of *Listeria* spp. in bulk-tank milk on 98 Galician dairy farms

Variable	Positive samples, n (%)	*P*-value[1]	Odds ratio	95% CI[2]
Stable management				
Ventilation				
Reduced	5/23 (21.7)	0.44	0.63	0.19–2.05
Good	11/74 (11.9)			
Cleanliness				
Poor	6/36 (16.7)	0.80	0.86	0.28–2.67
Good	9/61 (14.7)			
Milking				
Milking system				
Parlor	4/40 (10)	0.01	1.00	
Pipeline	12/42 (28.6)		2.87	
Bucket	0/15 (0)		0	
Identification of mastitic cows				
No	12/58 (20.7)	0.17	0.44	0.13–1.47
Yes	4/39 (10.3)			
Correct milking order				
No	8/25 (32)	0.01	0.26	0.08–0.81
Yes	7/65 (10.7)			
Forestripping				
No	2/20 (10)	0.37	2.03	0.42–9.79
Yes	14/76 (18.4)			
Check that cows lie down after milking				
No	8/64 (12.5)	0.18	2.13	0.69–6.56
Yes	7/30 (23.3)			

[1]Significance ($P \leq 0.05$) of χ^2 test.
[2]95% CI = confidence interval of odds ratio.

Journal of Dairy Science Vol. 90 No. 11, 2007

Risk factors for mastitis



http://scialert.net/fulltext/?doi=ajava.2012.454.476

Prevalence and Risk Factors of Mastitis in Lactating Dairy Cows in Southern Ethiopia

Demelash Biffa, DVM
Etana Debela, MVs
Fekadu Beyene, PhD

Awassa College of Agriculture, Debub University, Awassa, Ethiopia

Conclusion: Inadequate sanitation of dairy environment, poor animal health service, and lack of proper attention to health of the mammary glands were important factors contributing to high prevalence of mastitis. Some recommendations were forwarded for improved control of mastitis in the region.

Table 2. Prevalence of mastitis in milking cows in Southern Ethiopian as influenced by breed, stage of lactation, age, and parity.

Risk Factors	No. Examined	CM	SCM	Total	χ^2	OR (95% CI)
Breed					47.5*	
Local zebu	446	21 (4.7)	117 (26.2)	138 (30.9)		1.2 (1.0-1.5)
Zebu × Holstein-Fresian	259	35 (13.5)	38 (14.7)	73 (28.2)		1.0
Holstein-Fresian	186	49 (26.3)	56 (30.1)	105 (56.5)		3.3 (2.5-4.4)
Jersey	83	11 (13.3)	13 (15.7)	24 (28.9)		1.0
Lactation Stage					28.0*	
Early	214	64 (29.9)	34 (15.9)	98 (45.8)		2.4 (1.8-3.2)
Mid	403	31 (7.7)	73 (18.1)	104 (25.8)		1.0
Late	357	20 (5.6)	118 (33.1)	138 (38.7)		1.8 (1.5-2.2)
Age					30.3*	
Young adults	326	53 (16.3)	24 (7.4)	77 (23.6)		1.0
Adults	399	48 (12.1)	104 (26.1)	152 (38.1)		2.0 (1.6-2.4)
Old	249	15 (6.0)	96 (38.6)	111 (44.6)		2.6 (2.0-3.4)
Parity					124.9*	
Few	328	25 (7.6)	12 (3.7)	37 (11.3)		1.0
Moderate	331	31 (9.4)	74 (22.4)	105 (31.7)		3.6 (2.9-4.6)
Many	315	60 (19.0)	138 (43.8)	198 (62.9)		12.8 (10.7-16.9)

CM = clinical mastitis, SCM = subclinical mastitis, OR = odds ratio.
Numbers in parenthesis indicate percentage.
*$P < 0.001$ (highly significant).

Risk factors associated with the antimicrobial resistance of *Staphylococcus aureus* isolated from bovine mastitis[1]

Daniele C. Beuron[2], Cristina S. Cortinhas[2], Bruno G. Botaro[2], Susana N. Macedo[2], Juliano L. Gonçalves[2], Maria A.V.P. Brito[3] and Marcos V. Santos[2]*

ABSTRACT.- Beuron D.C., Cortinhas C.S., Botaro B.G., Macedo S.N., Gonçalves J.L., Brito M.A.V.P. & Santos M.V. 2014. **Risk factors associated with the antimicrobial resistance of *Staphylococcus aureus* is** *34(10):947-952.* Departament terinária e Zootecnia, Univers nunga, SP 13635-900, Brazil.

Table 3. Risk factors associated with *Staphylococcus aureus* antimicrobial resistance as estimated using logistic regression

Antimicrobial	Risk factors	OR†	95% CI‡	P§
Ampicillin	Use of clinical mastitis treatment	2.18	1.10-4.32	0.026
	Not sending milk samples for microbiological culture and susceptibility tests	2.57	1.06-6.24	0.037
Enrofloxacin	Use of dry cow treatment	2.11	1.01-4.44	0.049
Penicillin	Not sending milk samples for microbiological culture and susceptibility tests	4.69	1.10-20.05	0.037

† OR = odds ratio, ‡ CI = confidence interval, § P = probability.

Conclusion: the identification of risk factors for S. aureus resistance against various mastitis antimicrobials is an important information that may help in practical recommendations for prudent use of antimicrobial in milk production.

How do pathogens get into raw milk?

Risk Factors for transmission of pathogens through milk or milk products

- Poor animal health
- Poor animal sanitation
- Poor personal hygiene
- Intensive livestock production

Trop Anim Health Prod
DOI 10.1007/s11250-014-0580-y

REGULAR ARTICLES

Food safety in raw milk production: risk factors associated to bacterial DNA contamination

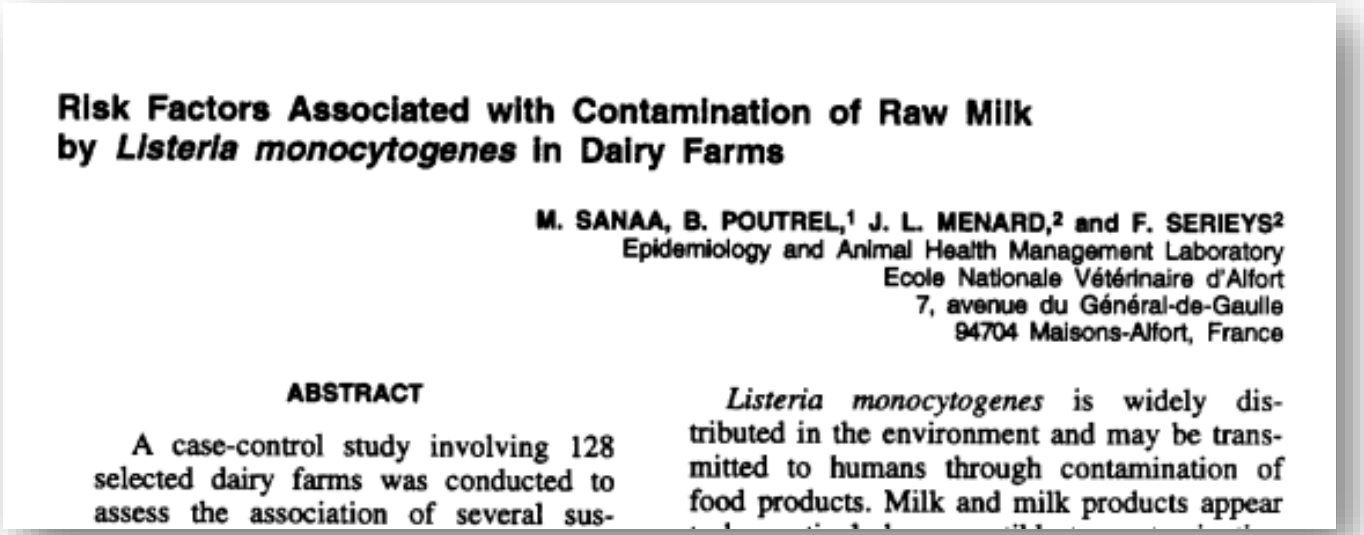
Cristine Cerva · Carolina Bremm · Emily Marques dos Reis · André Vinícius Andrade Bezerra · Márcia Regina Loiko · Cláudio Estêvão Farias da Cruz · Alexander Cenci · Fabiana Quoos Mayer

Table 4 Factors influencing contamination index. Univariate analysis was performed. Each independent variable was crossed with the dependent one and those with $P<0.05$ by chi-square test were selected for stepwise multiple regression analysis

	South			North		
Direct factors	Influence	*P* value	*R*	Influence	*P* value	*R*
Source of milk (cow or bulk tank)	No	0.262	–	No	0.231	–
Age of milking machine	Yes	<0.001	0.08	No	0.170	–
Cleaning frequency of milking machine	Yes	<0.001	−0.27	Yes	<0.001	0.01
Disinfection frequency of milking machine	Yes	0.003	−0.02	No	0.318	–
Udder washing	No	0.449	–	No	0.919	–
Udder drying	Yes	0.049	−0.20	Yes	0.037	−0.10
Pre-dipping	Yes	<0.001	−0.29	Yes	0.023	0.13
Post-dipping	No	0.053	–	No	0.285	–
Occurrence of mastitis	Yes	<0.001	−0.29	No	0.807	–
Milking parlor	Yes	<0.001	0.26	No	0.427	–
Milk storage area	Yes	<0.001	0.16	No	0.380	–
Indirect factors						
Origin of animals	Yes	0.007	−0.26	No	0.654	–
Other livestock	Yes	<0.001	−0.41	No	0.818	–
Management System	Yes	0.008	0.19	No	0.909	–
Milk production	Yes	<0.001	0.08	No	0.827	–

R=Spearman's correlation coefficient

Conclusion: The risk factors such as temporary cattle confinement, low milk production, low milking machine cleaning frequency, and milk storage area without tile walls were identified. The risk factors were specific to each region studied. Nevertheless, the data can be used to improve milk quality of dairy farms/ herds with similar management practices.



Risk Factors Associated with Contamination of Raw Milk by *Listeria monocytogenes* in Dairy Farms

M. SANAA, B. POUTREL,[1] J. L. MENARD,[2] and F. SERIEYS[2]
Epidemiology and Animal Health Management Laboratory
Ecole Nationale Vétérinaire d'Alfort
7, avenue du Général-de-Gaulle
94704 Maisons-Alfort, France

ABSTRACT

A case-control study involving 128 selected dairy farms was conducted to assess the association of several sus-

Listeria monocytogenes is widely distributed in the environment and may be transmitted to humans through contamination of food products. Milk and milk products appear

Conclusion: Using logistic regression, we found that poor quality of silage (pH >4.0), inadequate frequency of cleaning the exercise area., poor cow cleanliness, insufficient lighting of milking bams and parlors, and incorrect disinfection of towels between milkings were significantly associated with milk contamination by L. monocytogenes. More attention to preparing silage and good milking and bam hygiene are important for diminishing the risks of exogenous contamination of raw milk by L. monocytogenes.

Why do milk borne illnesses occur?

- **Faulty pasteurization of fluid milk**
  - Defective pasteurizer – less likely
- **Post-pasteurization contamination of milk and milk products**
  - Likely
- **Raw milk consumption**
  - Rural communities with access to raw milk
  - Back to nature (organic milk)
  - Visitors on farms
  - Raw milk products

SAFOSO

Animal Health Matters.
For Safe Food Solutions.

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,
Education and Research EAER
State Secretariat for Economic Affairs SECO

Thanks