Udder health questionnaire information

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A questionnaire designed to measure management practices used on Canadian dairy farms was developed by the Canadian Bovine Mastitis Research Network. Detailed description of the methods used to developed the questionnaire and assess the validity, repeatability, and cross-language equivalence of the different questions can be found in Dufour et al. (2010). This document is intended as a guide for future users and contains suggestions for further improvement of the questionnaire as well as unpublished validation work. A few questions developed using the same described protocol but for which validity has not been tested are also included in the present document, validation of these questions is recommended.

General information:

The questionnaire was designed for an in-person interview format. The original instrument was split in two parts to limit the length of the interview. This questionnaire has been translated in French using a standardized translation method and the equivalence of the French and English versions has been tested. The French questionnaire is available from the author upon request (simon.dufour@umontreal.ca).

Administration protocol:

Interviewer:
- Write down the farm identification number on every sheet of this questionnaire.
- Completely read each question as well as the answer choices to the interviewee.
- Care must be taken not to influence the producer’s answers:
  - Keep the same voice tone while reading the questions and between the different choice of answers.
  - If a question is not understood by the interviewee, you can give a short clarification, such as definition of a term used, be careful not to favor an answer. Do not give examples while explaining.
  - Do not help the producer to choose the answer.
- Please answer each question in this questionnaire. If a question does not apply to the farm, for example a question concerning maternity pen and there is no maternity pen then check the "Not applicable" box.
Producer:

- Try to be precise in your answers. If you are not certain of the answer please consult your records before answering. Do not hesitate to add a comment if you feel that it is needed.
- Each part of this questionnaire should take you about 25 minutes to complete.
- All information will be treated as strictly confidential; your name and farm’s identification number will not appear in any report.

**Description of the questions and comments:**

**First part:**

1) **Housing:**

   **Milking cows**

   1) **Type of housing** for your **milking** cows:

   - [ ] Tie-stall
   - [ ] Free-stall
   - [ ] Bedding-pack (i.e.: Straw-pack, sawdust-pack …)
   - [ ] Other *(Please specify): __________________________________________

   **Validity tested (see Dufour et al., 2010):**
   
   *Tie-stall: Se: 100  95% CI: 92.7, 100  Sp: 100  95% CI : 89.3, 100*
   
   *Free-stall : Se: 100  95% CI: 87.5, 100  Sp: 100  95% CI : 93.4, 100*
   
   *Bedding pack : Se : 100  95% CI: 51.0, 100  Sp: 100  95% CI : 95.3, 100*

   a) If you have a **free-stall** or **bedding pack barn**, how are the **passageways** cleaned?

   - [ ] Not applicable
   - [ ] Slatted floor
   - [ ] Scrapped
   - [ ] Flushed with water
   - [ ] Other *(Please specify): __________________________________________*

   **Validity tested (see Dufour et al., 2010):**
   
   *Alleys are scrapped instead of slatted floor (flushed with water was not used):*
   
   *Se: 100  95% CI: 34.2, 100  Sp: 100  95% CI : 88.3, 100*
b) If you have a free-stall or bedding pack barn, how many times a day are the passageways cleaned?

☐ Not applicable
☐ ______ times/day

(Number)

Repeatability tested (see Dufour et al., 2010):
Concordance correlation coefficient (CCC): 0.92  95% CI: 0.84, 0.96

2) Did your milking cows have access to pasture in the last 12 months?

☐ No, they are kept inside year-round
☐ No, but they had access to a grassed exercise yard (less than 5 acres per 100 cows)
☐ No, but they had access to a non-grassed (paved or dirt) exercise yard (less than 5 acres per 100 cows)
☐ Yes, they were on pasture from the month of _______ to the month of _______.

(Month)  (Month)

Repeatability:
On 17 herds, a similar question was asked on average 262 days (S.D. 75), following the administration of Question 2) and focusing on the same period (2007). The question was:

In the Summer of 2007, milking cows were (check one):
Totally confined (in the barn) 24hr/day  [ ]
Given access to a concrete or gravel surface exercise yard (outdoors) some time each day  [ ]
Given access to a small field (for the purpose of exercise and not primarily for grazing)  [ ]
Spent some time grazing and met some of their nutritional requirements from pasture  [ ]

When coding answers to Question 2) similarly to this question (pasture access 0/1), measure of agreement between answers obtained from the two questions where:
Kappa: 0.90  95% CI: 0.71 to 1.00
3) What type of material is the **base** of your **milking** cows’ stalls (or pens for bedding pack barn) made off?  *(Check all that apply)*

- Concrete
- Sand
- Mattress (e.g.: Pasture mat…)
- Rubber mat
- Other *(Please specify):* ______________________

**Validity tested (see Dufour et al., 2010):**
- **Concrete:**  
  - Se: 80.0  
  - 95% CI: 49.0, 94.3  
  - Sp: 95.6  
  - 95% CI: 87.8, 98.5
- **Sand:**  
  - Se: 100  
  - 95% CI: 67.6, 100  
  - Sp: 97.1  
  - 95% CI: 90.2, 99.2
- **Mattress:**  
  - Se: 86.7  
  - 95% CI: 73.8, 93.7  
  - Sp: 84.9  
  - 95% CI: 69.1, 93.4
- **Rubber mats:**  
  - Se: 73.3  
  - 95% CI: 48.1, 89.1  
  - Sp: 93.7  
  - 95% CI: 84.8, 97.5

4) What type of **bedding** is used for your **milking** cows’ stalls (or pens for bedding pack barn)?  *(Check all that apply)*

- Straw
- Sawdust
- Shavings
- Sand
- No bedding
- Other *(Please specify):* ______________________

**Validity tested (see Dufour et al., 2010):**
- **Straw:**  
  - Se: 98.1  
  - 95% CI: 90.1, 99.7  
  - Sp: 88.9  
  - 95% CI: 71.9, 96.2
- **Sawdust:**  
  - Se: 53.9  
  - 95% CI: 29.1, 76.8  
  - Sp: 83.6  
  - 95% CI: 72.9, 90.6
- **Shavings:**  
  - Se: 55.0  
  - 95% CI: 34.2, 74.2  
  - Sp: 91.7  
  - 95% CI: 81.9, 96.4
- **Sand:**  
  - Se: 75.0  
  - 95% CI: 30.1, 95.4  
  - Sp: 100  
  - 95% CI: 95.2, 100
- **Hay:**  
  - Se: 100  
  - 95% CI: 20.7, 100  
  - Sp: 97.4  
  - 95% CI: 89.9, 99.4

Sensitivity was low for sawdust and shavings.  Shaving and sawdust can be coded together as ‘‘wood products’’ to improve sensitivity:
- Se: 96.3  
  - 95% CI: 81.7, 99.3  
  - Sp: 88.7  
  - 95% CI: 77.4, 99.4

5) What type of **bedding management** do you use?

- I do not use any bedding
- I use a very low amount of bedding *(less than 2 cm deep).*
- I use deep bedding *(more than 2 cm deep).*
- Other *(Please specify):* ______________________

**Validity tested (see Dufour et al., 2010):**
- **Sensitivity and specificity for deep bedding**
  - Se: 87.3  
  - 95% CI: 76.0, 93.7  
  - Sp: 68.2  
  - 95% CI: 47.3, 91.2
6) How often do you clean out manure from your milking cows’ stalls (or pens for bedding pack barn)?

☐ Never

☐ ______ times/day
(Number)

☐ Other (Please specify): ______________________

Repeatability tested (see Dufour et al., 2010):
CCC: 0.67 95% CI: 0.52, 0.76

7) How often do you scrape out the dirty bedding from your milking cows’ stalls?

☐ Not applicable

☐ Never

☐ ______ times/day
(Number)

☐ ______ times/week
(Number)

Repeatability tested (see Dufour et al., 2010):
CCC: 0.48 95% CI: 0.31, 0.62

a) If you do scrape out dirty bedding from your milking cows’ stalls, what part of the stall do you scrape off?

☐ Not applicable

☐ Back third of the stall

☐ Back half of the stall

☐ The whole stall

☐ Other (Please specify): ______________________

Not validated. Validation is recommended.

8) How often do you add new bedding to your milking cows’ stalls (or pens for bedding pack barn)?

☐ Not applicable

☐ ______ times/day
(Number)

☐ ______ times/week
(Number)

☐ ______ times/year
(Number)

Repeatability tested (see Dufour et al., 2010):
CCC: 0.88 95% CI: 0.83, 0.92
9) How often do you completely remove and replace the bedding in your milking cows’ stalls (or pens for bedding pack barn)?

- Not applicable
- Never
- ____ times/week (Number)
- ____ times/month (Number)
- Other (Please specify): ______________________

Repeatability tested (see Dufour et al., 2010):
CCC: 0.34 95% CI: 0.13, 0.51
Agreement beyond chance was poor!

10) When you empty the stalls or pens completely, do you wash or disinfect them? (Check all that apply)

- Not applicable
- Yes, pressure washed or brushed
- Yes, disinfected with _____________________________ (Name of the product)
- Yes, other (Please specify): ________________________
- No

Not validated, validation is recommended.

11) Do you add a product to limit growth of bacteria in your milking cows’ bedding and/or stalls? (e.g.: Limestone …)

- Yes (Please specify the product you are using and frequency of use): __________________

- No

Not validated, validation is recommended.

12) Do you use fly control methods during summer time? (e.g.: insecticide, traps …)

- Yes
- No

Not validated, validation is recommended.
Maternity pens

13) Do you have maternity pens?

☐ Yes, I have ______ maternity pens. (Number)

☐ No

Validity tested (see Dufour et al., 2010):
Number of maternity pen
0: Se: 62.1 95% CI: 44.0, 77.3 Sp: 100 95% CI: 93.1, 100
1: Se: 79.0 95% CI: 56.7, 91.5 Sp: 83.9 95% CI: 72.8, 91.0
2: Se: 81.8 95% CI: 61.5, 92.7 Sp: 94.9 95% CI: 86.1, 98.3
3: Se: 85.7 95% CI: 61.5, 92.7 Sp: 91.9 95% CI: 86.1, 98.3
4: Se: 66.7 95% CI: 20.8, 93.9 Sp: 98.7 95% CI: 93.1, 99.8
5: Se: 100 95% CI: 20.7, 100 Sp: 98.8 95% CI: 91.2, 99.8

Identification of herds not having maternity pens was difficult (low sensitivity). Far-off dry pens might have been confused by numerous dairy producers with maternity pens (i.e.: a pen strictly intended for calving). Definition of maternity pen should be added to the question or else, “calving pens” could possibly be use instead of “maternity pens”.

a) Do you use maternity pens for other purposes than calving (i.e.: sick cows, lame cows …)?

☐ Not applicable

☐ Yes

☐ No

Not validated, validation is recommended.

b) What proportion of your calving occurs in a maternity pen?

☐ Not applicable

☐ ______ % of the calving (Number)

Repeatability tested (see Dufour et al., 2010):
CCC: 0.83 95% CI: 0.74, 0.88

Not validated, validation is recommended.

c) How many days do your cows stay in the maternity pen?

☐ Not applicable

☐ ______ Days before calving and ______ days after calving (Number) (Number)

Repeatability tested (see Dufour et al., 2010):
Number of days before calving: CCC: 0.82 95% CI: 0.72, 0.89
Number of days after calving: CCC: 0.56 95% CI: 0.36, 0.71
d) Do you keep **more than one cow** per maternity pen?

- [x] Not applicable
- [ ] No
- [ ] Yes

*Repeatability tested (see Dufour et al., 2010):*
*Kappa: 0.59  95% CI: 0.38, 0.81*

e) What type of material is the **base** of your **maternity pens** made of? (Check all that apply)

- [x] Not applicable
- [ ] Concrete
- [ ] Sand
- [ ] Mattress
- [ ] Rubber mat
- [ ] Other *(Please specify):* ______________________

*Not validated, however, repeatability similar to question 3, from which this question is derived, could be expected. Further validation is recommended.*

f) What type of **bedding** is used for your maternity pens? (Check all that apply)

- [x] Not applicable
- [ ] Straw
- [ ] Sawdust
- [ ] Shavings
- [ ] Sand
- [ ] No bedding
- [ ] Other *(Please specify):* ______________________

*Not validated, however, repeatability similar to question 4, from which this question is derived, could be expected. Further validation is recommended.*

g) How often do you **clean out manure** from the maternity pens?

- [x] Not applicable
- [ ] Never
- [ ] ______ times/days *(Number)*
- [ ] Other *(Please specify):* __________________________

*Not validated, however, repeatability similar to question 6, from which this question is derived, could be expected. Further validation is recommended.*
h) How often do you **add new bedding** in the maternity pens?

- [ ] Not applicable
- [ ] Never
- [ ] _____ times/day  
  `(Number)`
- [ ] _____ times/week  
  `(Number)`

*Not validated, however, repeatability similar to question 8, from which this question is derived, could be expected. Further validation is recommended.*

i) How often do you **remove and replace the bedding** completely in the maternity pens?

- [ ] Not applicable
- [ ] Never
- [ ] After every calving
- [ ] _____ times/month  
  `(Number)`
- [ ] Other *(Please specify): ____________________________*

*Not validated, however, repeatability similar to question 9, from which this question is derived, could be expected. Further validation is recommended.*

j) If you empty your maternity pens completely, do you **wash or disinfect** them? *(Check all that apply)*

- [ ] Not applicable
- [ ] Yes, pressure washed or brushed.
- [ ] Yes, disinfected with _____________________________  
  *(Name of the product)*
- [ ] Yes, other *(Please specify): ____________________________*
- [ ] No

*Not validated, validation is recommended.*
2) Biosecurity

14) Do you buy adult animals (cows and first calf heifers)?

☐ Yes: _______ adult cows bought in the last 12 months (milking or dry)
   (Number)  
   _______ first-calf heifers already milking bought in the last 12 months
   (Number)

☐ No

Validity of the first part of the question (open herd y/n) was tested using DHI information as a pseudo-gold standard. For each herd (n=89), DHI data were checked and the herd was considered ‘open’ if an adult cow with a different prefix than the herd’s prefix had enter the herd during the study period. Otherwise, the herd was consider ‘closed’.

Sensitivity was defined as the proportion of herd considered open by DHI definition that were classified as open by question 14. Specificity was defined as the proportion of herd not considered open by DHI definition and that were classify as not open by question 14.

Se: 78.7%  95% CI: 68.8 89.0
Sp: 100%  95% CI: ---

a) If you buy animals, what do you do prior to moving the animal to your farm to make sure that their udder is healthy? (Check all that apply)

☐ Not applicable
☐ I take a milk sample from each quarter for bacteriological analysis
☐ I take a pooled milk sample of the 4 quarters for bacteriological analysis
☐ I perform a CMT (California Mastitis Test)
☐ I ask the seller about the Somatic Cells Count of the animal
☐ I do not make any udder health verifications prior to moving the animal
☐ Other (Please Specify): ____________________________________________

Not validated, validation is recommended.

b) If you buy animals, what do you do after you have moved the animal to your farm to make sure that their udder is healthy? (Check all that apply)

☐ Not applicable
☐ I take a milk sample from each quarter for bacteriological analysis
☐ I take a pooled milk sample of the 4 quarters for bacteriological analysis
☐ I perform a CMT (California Mastitis Test)
☐ I ask the seller about the Somatic Cells Count of the animal
☐ I do not make any udder health verifications after I have moved the animal
☐ Other (Please Specify): ____________________________________________

Not validated, validation is recommended.
c) If an animal that you have bought is found to have an unhealthy udder based on the verification you have made, what do you do?

- Not applicable
- I return this animal to the seller
- I keep the animal
- Other (Please Specify): ________________________________

Not validated, validation is recommended.

3) Diseases

15) Do you keep a record of the diseases occurring on your farm?

- Yes
- No

Repeatability tested (see Dufour et al., 2010):
Kappa: 0.61  95% CI: 0.38, 0.84
Prevalence adjusted, bias adjusted Kappa (PABAK): 0.79

16) Do you have a vaccination program against mastitis?

- Yes, the vaccine(s) I use is (are) __________________________ (List all)
- No

Repeatability tested (see Dufour et al., 2010):
Kappa: 0.86  95% CI: 0.75, 0.97

17) Do you have a general vaccination program for your adult cows?

- Yes, the vaccine(s) I use is (are) __________________________ (List all)
- No

Not validated, validation is recommended.

4) Cow management

18) Are your cows’ udders clipped and/or flamed?

- Yes, clipped
- Yes, flamed
- No

Repeatability tested (see Dufour et al., 2010)
Kappa: 0.84  95% CI: 0.73, 0.96
19) Do you dock, clip or tie your cows' tails?

☐ Yes, docked
☐ Yes, clipped
☐ Yes, tied
☐ No

Repeatability tested (see Dufour et al., 2010)
Kappa: 0.61  95% CI: 0.48, 0.74

20) Do you use electrical cow trainers?

☐ Yes
☐ No

Not validated, validation is recommended.
5) Personnal

21) Place an X at the point of the scale which you think best describes your work habits.

Meticulous             Quick

External validity tested (see Dufour et al., 2010):
CCC: 0.26    95% CI: 0.06, 0.43
Agreement beyond chance was poor!

Work habits self-evaluation x technician evaluation

Figure 1. Scatter plot of self against technician evaluation of herd manager work habits
22) Place an X at the point of the scale which you think best describes how you feel about milking.

☐ Not applicable (Not milking)

I enjoy milking

I prefer other tasks than milking

Not validated, validation is recommended.

23) Place an X at the point of the scale which you think best describes your record keeping.

Minimal required

quantity of information

Maximal quantity of information

External validity tested (see Dufour et al., 2010):

CCC: 0.40  95% CI: 0.20, 0.57

Figure 2. Scatter plot of self against technician evaluation of herd manager record keeping
24) How important is a persistent high somatic cell count in your culling decisions? (Rank from 1 to 5, 1 being very important and 5 being not important)

<table>
<thead>
<tr>
<th>Very important</th>
<th>Neutral</th>
<th>Not important</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Repeatability tested (see Dufour et al., 2010)
Kappa: 0.72 95% CI: 0.56, 0.89

25) How important is an infection with Staphylococcus aureus in your culling decisions? (Rank from 1 to 5, 1 being very important and 5 being not important)

<table>
<thead>
<tr>
<th>Very important</th>
<th>Neutral</th>
<th>Not important</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Repeatability tested (see Dufour et al., 2010)
Kappa: 0.76 95% CI: 0.57, 0.95

26) At what level of somatic cell counts do you consider a cow a high somatic cell count cow?

At ____________ cells/ml

Repeatability tested (see Dufour et al., 2010)
CCC: 0.33 95% CI: -0.09, 0.65

27) At what Bulk Milk Somatic Cell Count level do you think you have a mastitis problem?

At _____________ cells/ml

Repeatability tested (see Dufour et al., 2010)
CCC: 0.55 95% CI: 0.18, 0.78

28) Do you agree with the following statements?

<table>
<thead>
<tr>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

a) High SCC cows are easy to discover during milking

b) I am concerned about the costs of cows with high SCC

c) To prevent Staphylococcus aureus infections, it is more important to look at stall’s cleanliness instead of milking procedures

d) On my farm, udder health is an important aspect in bull selection

e) Analysis of cows individual SCCs is very important
f) Generally you cannot influence causes of sub-clinical mastitis
…………………………………………………………………………………1 2 3 4 5

g) I know enough about mastitis to keep me out of trouble….. 1 2 3 4 5

h) I should do more about mastitis prevention……………….…. 1 2 3 4 5

Repeatability tested (see Dufour et al., 2010)
a) Kappa: 0.58 95% CI: 0.31, 0.85
b) Kappa: 0.38 95% CI: 0.05, 0.72
c) Kappa: 0.30 95% CI: -0.07, 0.67
d) Kappa: 0.85 95% CI: 0.73, 0.96
e) Kappa: 0.20 95% CI: -0.22, 0.62
f) Kappa: 0.31 95% CI: 0.01, 0.69
g) Kappa: 0.69 95% CI: 0.44, 0.95
h) Kappa: 0.35 95% CI: -0.08, 0.78

29) How often do you use these people to prevent or solve mastitis problems?

a) Veterinarian………………………… 1 2 3 4 5
b) DHI or Valacta representative…..….. 1 2 3 4 5
c) Nutritionist………………………….… 1 2 3 4 5
d) Milking equipment representative….. 1 2 3 4 5
e) Other dairy producers………………… 1 2 3 4 5
f) Other: (Please specify)_____________ 1 2 3 4 5

Repeatability tested (see Dufour et al., 2010)
a) Kappa: 0.39 95% CI: 0.05, 0.74
b) Kappa: 0.44 95% CI: 0.10, 0.78
c) Kappa: 0.53 95% CI: 0.29, 0.77
d) Kappa: 0.69 95% CI: 0.47, 0.92
e) Kappa: 0.64 95% CI: 0.42, 0.86
Second part

6) Milking facilities:

30) Do you milk cows in a milking parlor or do you have to move the milking units from one cow to another?

- [ ] Milking parlor
- [ ] Milking units moved from cow to cow

Validity tested (see Dufour et al., 2010):
In parlor: \( Se: 100 \ 95\% \ CI: 88.3, 100 \ Sp: 100 \ 95\% \ CI: 93.1,100 \)

31) What technique do you use to keep your cows standing after milking? (Check all that apply)

- [ ] I distribute fresh feed
- [ ] I keep cows locked in head-locks for \( \text{Duration} \) minutes.
- [ ] I keep cows in a waiting area for \( \text{Duration} \) minutes.
- [ ] I do not use a technique to keep cows standing
- [ ] Other (Please specify): ______________________

Repeatability tested (see Dufour et al., 2010):
Kappa: 0.49 95% CI: 0.31, 0.66
PABAK: 0.60

Validity:
In six tie-stall herds, dairy producers were asked to record the time the feed was distributed and the time of milking during 21 days (Devries et al., in press). Whenever feed was distributed within 45 minutes from the start of milking (before or after) it was considered as if fresh feed was being distributed around milking. Observations were compared to answer to question 25 on fresh feed. On two herds, agreement between the two measurements was observed more than 80% (16/21) of the time. In the remaining herds, observations were in accord with answer to question 25 around 60% (12/21) of the time. The day to day variation in the distribution of fresh feed seemed rather important to allow the use of a single measurement of fresh feed distribution in an epidemiologic study.

Use of head-lock, waiting area, or no technique were not validated.

32) Do you have milking units equipped with automatic take-off?

- [ ] Yes
- [ ] No

Validity tested (see Dufour et al., 2010):
Equipped with automatic take-off: \( Se: 96.7 \ 95\% \ CI: 88.8, 99.1 \ Sp: 94.7 \ 95\% \ CI: 75.4, 99.1 \)
33) How many **milking units** do you currently use?

\[ \text{Milking units} \]

(Number)

*Not validated, validation is recommended.*

7) **Milking procedures**

34) How often do you take part in milking cows?

\[ \% \text{ of milkings} \]

(Number)

*Not validated, validation is recommended.*

35) In the last 3 months, how many different people have milked cows on your farm?

\[ \text{people} \]

(Number)

*Not validated, validation is recommended.*

36) If there are different people milking cows on your farm, do all of them use the same **milking routine**?

- Not applicable
- Yes
- No

*Repeatability tested (see Dufour et al., 2010):*

Kappa: 0.25  95% CI: -0.09, 0.59

PABAK: 0.78

37) If there are different people milking cows on your farm, how often do you **train** them?

- Not applicable
- Never
- Once, when they are hired \[ \text{times/year} \]

(Number)
- Other *(Please specify)*: ______________________________

*Not validated, validation is recommended.*
38) Do your milkers get a bonus or other incentive if the milk reaches good quality targets?

☐ Not applicable
☐ Yes
☐ No

Not validated, validation is recommended.

39) Do you have written milking procedures for your milkers?

☐ Yes
☐ No

Repeatability tested (see Dufour et al., 2010):
Kappa: 0.72  95% CI: 0.58, 0.87

40) How many people are milking cows at a typical milking?

_____ people
(Number)

Not validated. Validation is recommended.

41) Do the milkers wear latex gloves (or similar) during milking?

☐ Yes, all milkers
☐ Yes, some milkers
☐ No

Validity tested (see Dufour et al., 2010):
All milkers wear gloves:
Se: 97.4  95% CI: 86.5, 99.5
Sp: 76.2  95% CI: 47.4, 88.6

a) If the milkers wear latex gloves, do they clean them regularly during milking?

☐ Not applicable
☐ Yes, rinse with water
☐ Yes, rinse in a disinfecting solution
☐ No
☐ Other (Please specify): ________________________________

Not validated, validation is recommended.
42) Do you use a pre-milking teat dip?

[ ] Yes
[ ] No

Validity tested (see Dufour et al., 2010):
Se: 96.2 95% CI: 87.2, 99.0  Sp: 96.3 95% CI: 81.7, 99.3

a) If you use a pre-milking teat dip, how do you apply it?

[ ] Not applicable
[ ] Dipping
[ ] Spraying
[ ] Foaming
[ ] Other (Please specify): ________________________________

Validity tested (see Dufour et al., 2010):
Dip: Se: 100 95% CI: 91.0, 100  Sp: 100 95% CI: 72.3, 100
Spray: Se: 100 95% CI: 64.6, 100  Sp: 100 95% CI: 91.6, 100
Foam: Se: 100 95% CI: 43.9, 100  Sp: 100 95% CI: 92.3, 100

b) If you use a pre-milking teat dip, what product do you use?

[ ] Not applicable

(Name of the product)

Not validated, validation is recommended.

c) If you use a pre-milking teat dip, how often do you clean the dispenser used to apply it?

[ ] Not applicable
[ ] Never
[ ] _______ times/day

(Number)
[ ] _______ times/month

(Number)

Not validated, validation is recommended.
43) Do you ever **fore-strip** milk prior to attaching the milking unit?

- [ ] Yes
- [ ] No

a) If you fore-strip milk, in which situation(s) do you do it? *(Check all that apply)*

- [ ] Not applicable
- [ ] On every cow, at every milking
- [ ] On cows that are suspect for mastitis
- [ ] On cows with an elevated Somatic Cells Count (SCC)
- [ ] On cows that have clinical mastitis
- [ ] Other *(Please specify):* ___________________________

*Validity tested (see Dufour et al., 2010):*

**Fore-strip every cow, at every milking:**  
\[ \text{Se: } 93.0 \quad 95\% \text{ CI: } 81.4, 97.6 \]  
\[ \text{Sp: } 92.1 \quad 95\% \text{ CI: } 79.2, 97.3 \]

b) If you fore-strip milk, where do you discard the fore-stripped milk?

- [ ] Not applicable
- [ ] In a filter-cup
- [ ] On the floor underneath the cow
- [ ] In the milkers’ hands
- [ ] Other *(Please specify):* ___________________________

*Not validated, validation is recommended.*

44) Do you **clean teats** before installing the milking unit?

- [ ] Yes, I clean all teats
- [ ] Yes, I clean dirty teats only
- [ ] No, I do not clean teats

*Validity tested (see Dufour et al., 2010):*

**Clean all teats:**  
\[ \text{Se: } 100 \quad 95\% \text{ CI: } 95.4, 100 \]  
\[ \text{Sp: } 0.00 \quad 95\% \text{ CI: } 0.00, 79.5 \]
a) If you clean teats, how do you clean them?

- [ ] Not applicable
- [ ] Dry wipe
- [ ] Clean with pre-milking teat-dip
- [ ] Clean with water with udder wash
- [ ] Clean with water (without udder wash)
- [ ] Clean with commercially available wet disinfecting towel (e.g. Ready-wipe®…)
- [ ] Other (Please specify): ____________________________

Validity tested (see Dufour et al., 2010):

<table>
<thead>
<tr>
<th>Method</th>
<th>Se</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry-wipe</td>
<td>66.7</td>
<td>30.0, 90.3</td>
</tr>
<tr>
<td>Pre-dip and wipe</td>
<td>91.5</td>
<td>80.1, 96.6</td>
</tr>
<tr>
<td>Udder wash solution</td>
<td>89.5</td>
<td>68.6, 97.1</td>
</tr>
<tr>
<td>Water</td>
<td>0.00</td>
<td>0.00, 79.4</td>
</tr>
<tr>
<td>Commercial disinfecting towels</td>
<td>100</td>
<td>56.6, 100</td>
</tr>
</tbody>
</table>

45) How do you **dry teats** prior to attaching the milking unit?

- [ ] Not applicable
- [ ] Disposable paper towel (or newspaper)
- [ ] Reusable cloth towel
- [ ] I do not dry teats
- [ ] Other (Please specify): ____________________________

Validity tested (see Dufour et al., 2010):

<table>
<thead>
<tr>
<th>Method</th>
<th>Se</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disposable paper towel</td>
<td>97.7</td>
<td>82.2, 99.6</td>
</tr>
<tr>
<td>Reusable cloth towel</td>
<td>94.7</td>
<td>75.4, 99.1</td>
</tr>
<tr>
<td>No drying</td>
<td>57.1</td>
<td>25.1, 84.2</td>
</tr>
</tbody>
</table>

a) If you do **dry teats**, do you use the same towel to dry teats of different cows during the same milking?

- [ ] Not applicable
- [ ] Yes
- [ ] No

Not validated, validation is recommended.
b) If you use **reusable towel**, do you wash or disinfect these towels after every milking?

- Not applicable
- Yes
- No

*Not validated, validation is recommended.*

46) Do you use a **post-milking** teat-dip?

- Yes
- No

*Not validated, however, repeatability similar to question 33, from which this question is derived, could be expected. Further validation is recommended.*

a) If you use a **post-milking** teat-dip, how do you apply it?

- Not applicable
- Dipping
- Spraying
- Other *(Please specify): ________________________________*

*Not validated, however, repeatability similar to question 33-a, from which this question is derived, could be expected. Further validation is recommended.*

b) If you use a **post-milking** teat-dip, what product do you use?

- Not applicable
- *(Name of the product)*

*Not validated, validation is recommended.*

c) If you use a **post-milking** teat-dip, how often do you clean the dispenser used to apply it?

- Not applicable
- Never
- **_______** times/day *(Number)*
- **_______** times/month *(Number)*

*Not validated, validation is recommended.*
47) Do you clean the milking units between each cow during milking?

☐ Yes, a backflush is done between each cow
☐ Yes, the milking units are dipped in a disinfecting solution between each cow
☐ No
☐ Other (Please specify): _______________________________

Not validated, validation is recommended.

8) Milking equipment

48) How often do you have your milking equipment inspected by a certified technician?

☐ Never _______ times/year

(Number)

Repeatability tested (see Dufour et al., 2010):
CCC: 0.36  95% CI: 0.16, 0.53
Agreement beyond chance was poor!

49) How often do you verify the vacuum level?

☐ Never _______ times/week

(Number)

☐ _______ times/month

(Number)

☐ _______ times/year

(Number)

Not validated, validation is recommended.

50) Do you replace the teat cup liners at the frequency recommended by the dealer?

☐ Yes
☐ No, I keep them longer
☐ No, I change them more often

Not validated, validation is recommended.
9) Clinical mastitis:

51) Do you measure milk conductivity (conductimeter) in order to detect mastitis?

☐ Yes
☐ No

Not validated, validation is recommended.

52) On your farm, what proportion of cows with clinical mastitis are treated with antibiotics?

\[
\text{(Number)}
\]

Repeatability tested (see Dufour et al., 2010):
CCC: 0.64 95% CI: 0.49, 0.75

53) How important are these factors when deciding whether to treat a cow with mastitis with antibiotics? (Rank from 1 to 5, 1 being a very important factor and 5 being a factor that is not important)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Very important</th>
<th>Neutral</th>
<th>Not important</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Production, age, and genetics of the cow</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b) Severity of the symptoms</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c) Need for milk to fill quota</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d) Cull cow price and price to buy a new milking cow</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>e) Protocol established with my veterinarian</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>f) Other (Please specify)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Repeatability tested (see Dufour et al., 2010):

a) Cow’s production, age, and genetics: Kappa: 0.40 95% CI: 0.21, 0.59
b) Severity of symptoms: Kappa: 0.55 95% CI: 0.22, 0.87
c) Need milk for quota: Kappa: 0.50 95% CI: 0.34, 0.67
d) Price of cows: Kappa: 0.45 95% CI: 0.24, 0.67
e) Protocol establish with veterinarian: Kappa: 0.42 95% CI: 0.23, 0.60
54) When you treat a cow for mastitis, what is the average duration of your treatment?

- Not applicable
- _______ Days (Number)

Not validated, validation is recommended.

55) Which product do you use as a first treatment for mastitis?

- Not applicable
- Special Formula 17900 Forte®
- Cefa-Lak®
- Pirsue®
- Erythro-36®
- Dolisovet®
- Other (Please specify): ______________________

Validity:
Discarded treatment tubes were collected in a garbage bin during the study period. For each farm (n=71), lactating cow intramammary treatment product most often found in the bin was considered the product firstly used for treatment. Garbage bins results were used as a pseudo-gold standard to assess validity of question 46. For each product, sensitivity was defined as the proportion of herds using this product as a first treatment (garbage bin) that reported using this product as a first treatment in question 46. For each product, specificity was defined as the proportion of herds using another product as a first treatment (garbage bin) that reported using another product as a first treatment in question 46.

<table>
<thead>
<tr>
<th>Product</th>
<th>Se: (%)</th>
<th>95% CI:</th>
<th>Sp: (%)</th>
<th>95% CI:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Formula 17900 Forte®</td>
<td>87.2%</td>
<td>77.7, 97.8%</td>
<td>75.0%</td>
<td>57.7, 92.3%</td>
</tr>
<tr>
<td>Cefa-Lak®</td>
<td>60.0%</td>
<td>38.5, 81.5%</td>
<td>92.2%</td>
<td>84.8, 99.5%</td>
</tr>
<tr>
<td>Pirsue®</td>
<td>50.0%</td>
<td>1.0, 99.0%</td>
<td>91.0%</td>
<td>84.2, 97.9%</td>
</tr>
</tbody>
</table>

Other products were not used as a first treatment.

56) When you use an intramammary treatment, in what proportion of treatments do you disinfect the teat end with an alcohol swab prior to administration?

- Not applicable
- _______ % (Number)

Not validated, validation is recommended.
57) When you use an intramammary treatment, do you use a partial insertion (short tip) or a complete insertion (long tip)?

- Not applicable
- Partial insertion
- Complete insertion

*Repeatability tested (see Dufour et al., 2010):*
*Kappa: 0.56  95% CI: 0.36, 0.76*
*PABAK: 0.68*

58) When you use an intramammary treatment, in what proportion of treatments do you apply a **teat dip** after the administration?

- Not applicable
- %

*Not validated, validation is recommended.*

10) **Subclinical mastitis**

59) Do you monitor **individual cow production** at every milking?

- Yes
- No

*Repeatability tested (see Dufour et al., 2010):*
*Kappa: 0.62  95% CI: 0.46, 0.78*

60) How often do you review the individual **Somatic Cells Count** (SCC) data of your cows?

- Every month, the day I receive my DHI report.
- Every month, as soon as I have time to do it.
- When I have mastitis problems
- Never
- Other *(Please specify):______________________________________*

*Repeatability tested (see Dufour et al., 2010):*
*Kappa: 0.55  95% CI: 0.08, 1.0*
61) Do you use the CMT test (California Mastitis Test) on a regular basis in order to detect subclinical mastitis?

- [ ] Yes
- [ ] No

*Repeatability tested (see Dufour et al., 2010):*
*Kappa: 0.51  95% CI: 0.32, 0.70*

62) Do you take milk samples (for bacteriological analysis) regularly in order to detect cows that are suffering from subclinical mastitis?

- [ ] Yes, most of my cows are sampled once a year
- [ ] Yes, suspect cows are sampled
- [ ] No

*Repeatability tested (see Dufour et al., 2010):*
*Kappa: 0.78  95% CI: 0.66, 0.90*

63) Do you milk cows that have chronic infection (ex: *Staph aureus*) last or with a specific milking unit?

- [ ] Yes, last
- [ ] Yes, with a specific milking unit
- [ ] No
- [ ] Other *(Please specify):_________________________________________

*Repeatability tested (see Dufour et al., 2010):*
*Kappa: 0.67  95% CI: 0.54, 0.81*
*PABAK: 0.76*

**References:**
