

### **File S3. Analysis with 2×2 tables:**

Legenda:

FCI+ is one or more questions answered with yes

FCI- is no question answered with yes

AM+ is AM-2 (local abnormalities) and AM-3 (general symptoms of distress, fatigue etc.)

AM- is AM-1 (no remarks)

PM+ is NHC (not suitable for Human Consumption)

PM- is shc (suitable for human consumption)

LR is the likelihood ratio.

LR+ means that with a positive test result the likelihood of a true positive increases.

If LR+ 1-2 the probability increases little; if LR+ 2-5 the prob increases; if LR+ 5-10 the prob increase strongly; when LR+ > 10 the probability increases severely.

LR- means that with a negative test result the likelihood of finding a true positive decreases (and finding a true negative increases).

If LR- is 1-0.5 the prob of finding a positive decreases slightly, between 0.49 and 0.20 it decreases moderately, and if the LR- 0.19-0.10 it decreases strongly and 0.09-0.01 it decreases severely (and finding a true negative increases).

**FCI and AM considered separately:** CAVE: THE PM RESULTS ARE THE GOLD STANDARD

**FCI AS A DIAGNOSTIC TEST...**

	PM+	PM-	<i>totals</i>
FCI+	380	3268	3648
FCI-	6658	202240	208898
<i>totals</i>	7038	205508	212546

<b>SENSITIVITY</b>	<b>5.40</b> %	$A/(A+C)$
<b>SPECIFICITY</b>	<b>98.41</b> %	$D/(B+D)$
<b>PREDICTIVE VALUE +</b>	<b>10.42</b> %	$A/(A+B)$
<b>PREDICTIVE VALUE -</b>	<b>96.81</b> %	$D/(C+D)$
<b>ACCURACY</b>	<b>95.33</b> %	$(A+D)/N$
<b>APPARENT PREVALENCE</b>	<b>1.72</b> %	$(A+B)/N$
<b>TRUE PREVALENCE</b>	<b>3.31</b> %	$(A+C)/N$
<b>Likelihood Ratio pos. test result, LR+</b>	<b>3.40</b>	$(a/(a+c))/(b/(b+d))$
<b>LR-</b>	<b>0.96</b>	$(c/(a+c))/(d/(b+d))$

### AM AS A DIAGNOSTIC TEST

	PM+	PM-	<i>totals</i>	
AM+	2233	7623	9856	
AM-	1700	212044	213744	
<i>totals</i>	3933	219667	223600	(slaughtered animals including imports)

SENSITIVITY	56.78 %	$A/(A+C)$
SPECITIVITY	96.53 %	$D/(B+D)$
PREDICTIVE VALUE +	22.66 %	$A/(A+B)$
PREDICTIVE VALUE -	99.20 %	$D/(C+D)$
PRECISION	95.83 %	$(A+D)/N$
APPARENT PREVALENCE	4.41 %	$(A+B)/N$
TRUE PREVALENCE	1.76 %	$(A+C)/N$
Likelihood Ratio pos. test result, LR+	16.36	$(a/(a+c))/(b/(b+d))$
LR-	0.45	$(c/(a+c))/(d/(b+d))$

	PM+	PM-	TOTALS
AM+	<b>A</b>	<b>B</b>	$a+b$
AM-	<b>C</b>	<b>D</b>	$c+d$
	$a+c$	$b+d$	$N$

**In parallel testing (FCI and AM both at the same time):**

1. Combined specificity: Negative (A and B) = Specificity A\*Specificity B
2. Combined sensitivity: Positive (A or B) = Sensitivity A + Sensitivity B – (Sensitivity A\*Sensitivity B)

**In series testing (FCI first and AM thereafter, pending the pos or neg result of FCI):**

1. Combined specificity: Negative (A or B) = Specificity A + Specificity B – (Specificity A\*Specificity B)
2. Combined sensitivity: Positive (A and B) = Sensitivity A X Sensitivity B

	spec	sens
parallel test	<b>0.9499</b>	<b>0.5911</b>
serial test	<b>0.9994</b>	<b>0.0307</b>

### FCI and AM AGREEMENT IN DETECTING/PREDICTING ANIMALS DECLARED NHC AT PM:

	FCI+	FCI-	totals
AM+	61	1988	2049
AM-	319	1280	1599
totals	380	3268	3648

#### 2x2 used for evaluation of the agreement between the results of two tests:

Observed test agreement	0.3676	$(a+d)/n$
Coincidental agreement	0.0585	$(a+b/n)*(a+c/n)$
Coincidental disagreement	0.3927	$(c+d/n)*(b+d/n)$
Total agreement by coincidence	0.4512	is cell B8+B9
Observed agreement minus coincidental	-0.0836	is cell B7-B10
Maximum test agreement outside the coincidental agreement	0.5488	is 1- cell B10
<b>COHENS' KAPPA:</b>	<b>-0.1523</b>	is cell B20/B22

**AGREEMENT BETWEEN FCI AND AM IN DETECTING/PREDICTING ANIMALS DECLARED shc AT PM:**

	FCI+	FCI-	totals
AM+	510	3953	4463
AM-	6148	198287	204435
totals	6658	202240	208898

2x2 used for evaluation of the agreement between the results of two tests:

0.9516	$(a+d)/n$
0.0007	$(a+b/n)*(a+c/n)$
0.9474	$(c+d/n)*(b+d/n)$
0.9481	is cell F8+F9
0.0035	is cell F7-F10

0.0519 is 1-F10

**COHENS' KAPPA: 0.0679** is F11/F13

	test A+	test A-	
test B+	a	b	a+b
test B-	c	d	c+d
	a+c	b+d	n

KAPPA=(observed coincidental agreement/max test agreement outside coincidental agreement)

Kappa coefficient interpretation: values  $\leq 0$  no agreement; 0.01–0.20 very poor to poor; 0.21–0.40 little to fair; 0.41–0.60 fair to moderate; 0.61–0.80 moderate to good; 0.81–0.90 good to excellent; 0.91–1.00 excellent to total agreement.

A negative kappa means that there is disagreement between the tests (worse agreement than could or should be expected).

Negative values between 0.00 and -0.1 point to "no agreement at all". Even larger negative outcomes (-0.11 and more) point at (total) disagreement, and using these two tests in combination serves no purpose.

		<b>results</b>		<b>results</b>	
<b>FCI</b>	<b>AM+ (=AM2&amp;AM3)</b>	<b>NHC</b>	<b>shc</b>	<i>totals</i>	
pos	pos	61	510	571	
pos	neg	319	6148	6467	
neg	pos	1988	3953	5941	
neg	neg	1280	198287	199567	
<i>totals</i>		3648	208898	212546	