

Prevalence of cystitis in culled sows

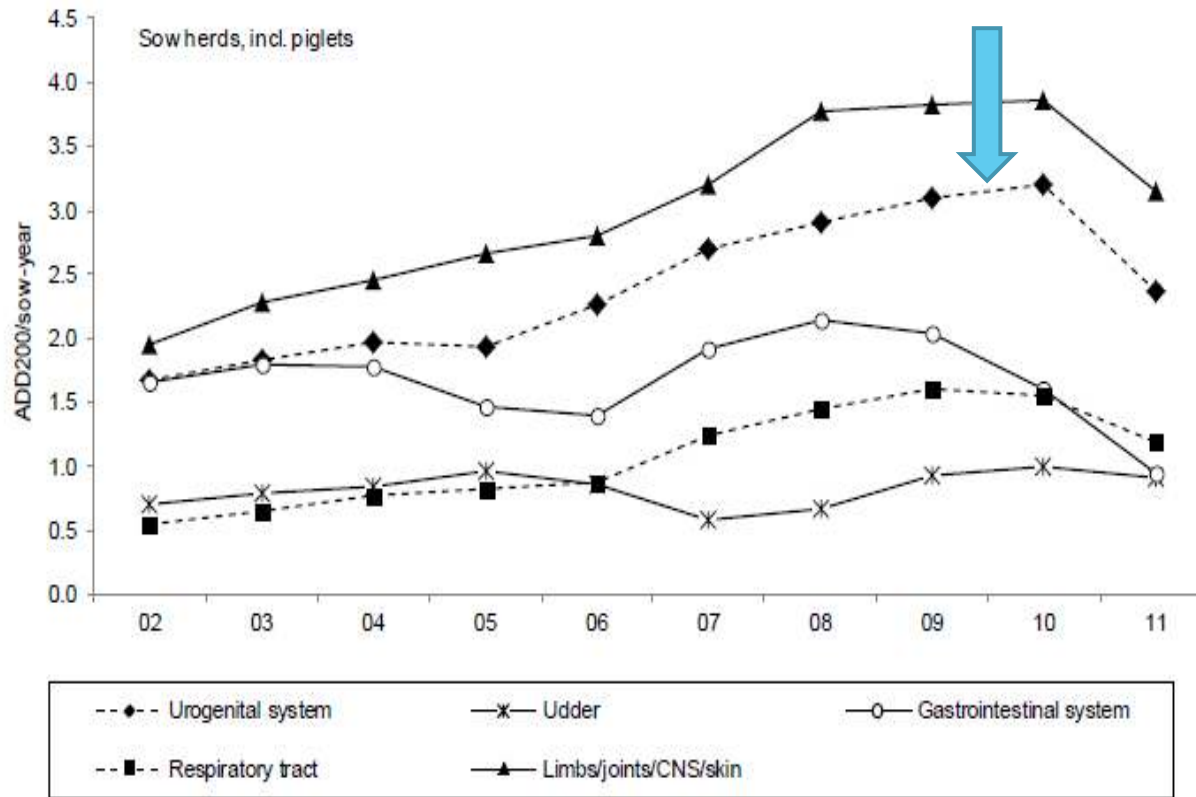
By Sarah Mortensen

Introduction Cystitis

30%
1997, Denmark
G. Christensen

27%
2002, Hungary
Biksi et al.

54%
2013, Italy
C. Bellino



8%
1991, Canada
M. Chagnon

11.8%
1996, Michigan
C.O. Duran &
J.R. Walton

DANMAP 2011: Agersø, et al., 2012

Materials and methods

- 67 empty bladders
- Collection of urine on surface mucosa
- Microbiologic examination, culture
- Macroscopic examination
- Histological examination

Macroscopic examination

Macroscopic changes in samples from empty bladders	Number of bladders with changes	In percent
Pus / Mucus	11	16.4%
Blood	1	1.5%
Bladder stones	13	19.4%
Thickened wall	2	3%
Hyperemia		
- Slightly	30	44.8%
- Severe	16	23.9%
Oedematous mucosa	2	3%
No observable changes	15	22.4%



Macroscopic diagnosis (1)

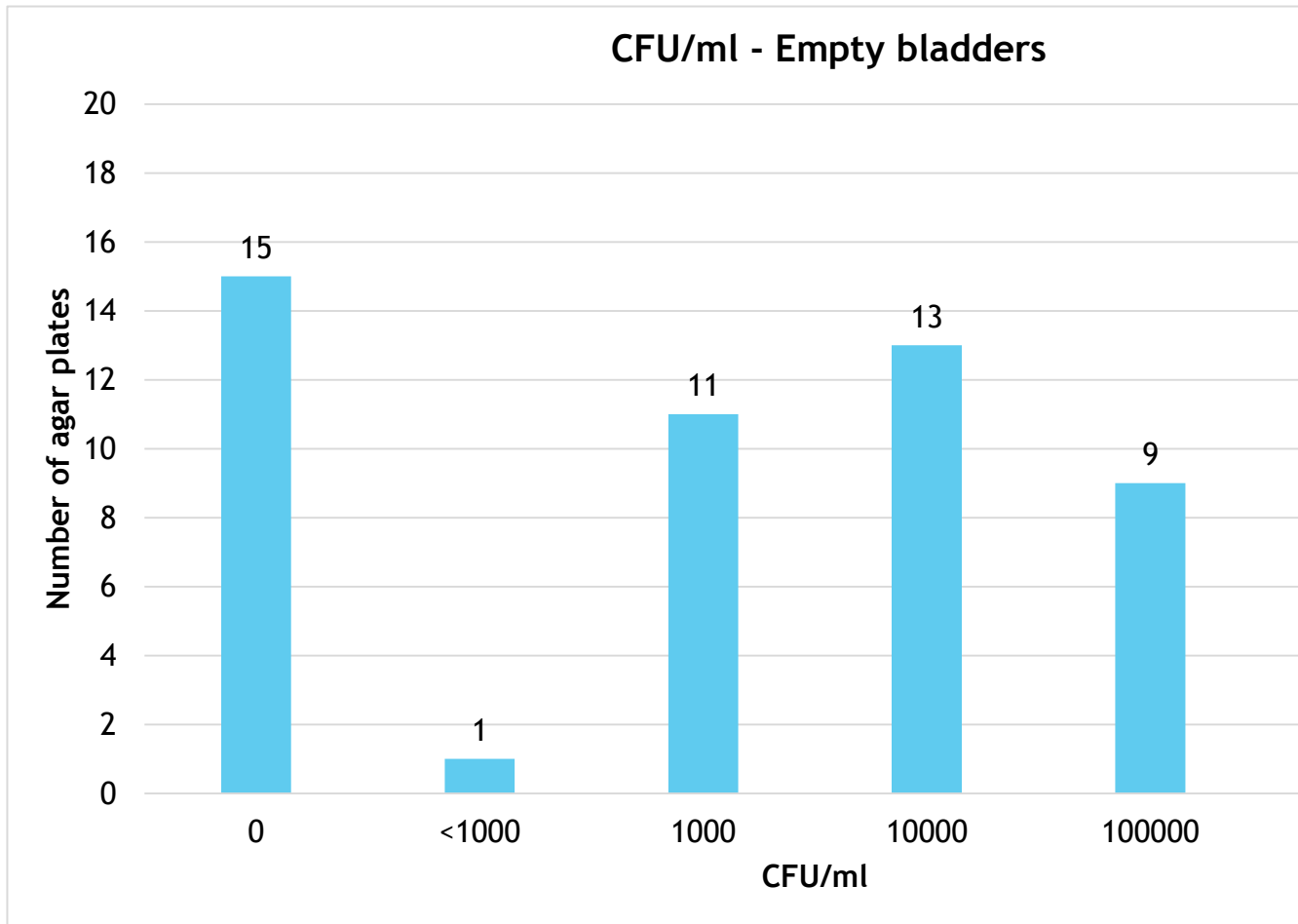
- Purulent material in the bladder lumen
- Blood in the bladder lumen
- Thickening of the bladder wall
- Mucosal oedema
- Slightly or severe hyperemia

Macroscopic diagnosis (2)

- Purulent material in the bladder lumen
- Blood in the bladder lumen
- Thickening of the bladder wall
- Mucosal oedema
- Severe hyperemia

Pictures by Ph.d. student Lola Tolstrup Leihardt

Microbiologic examination

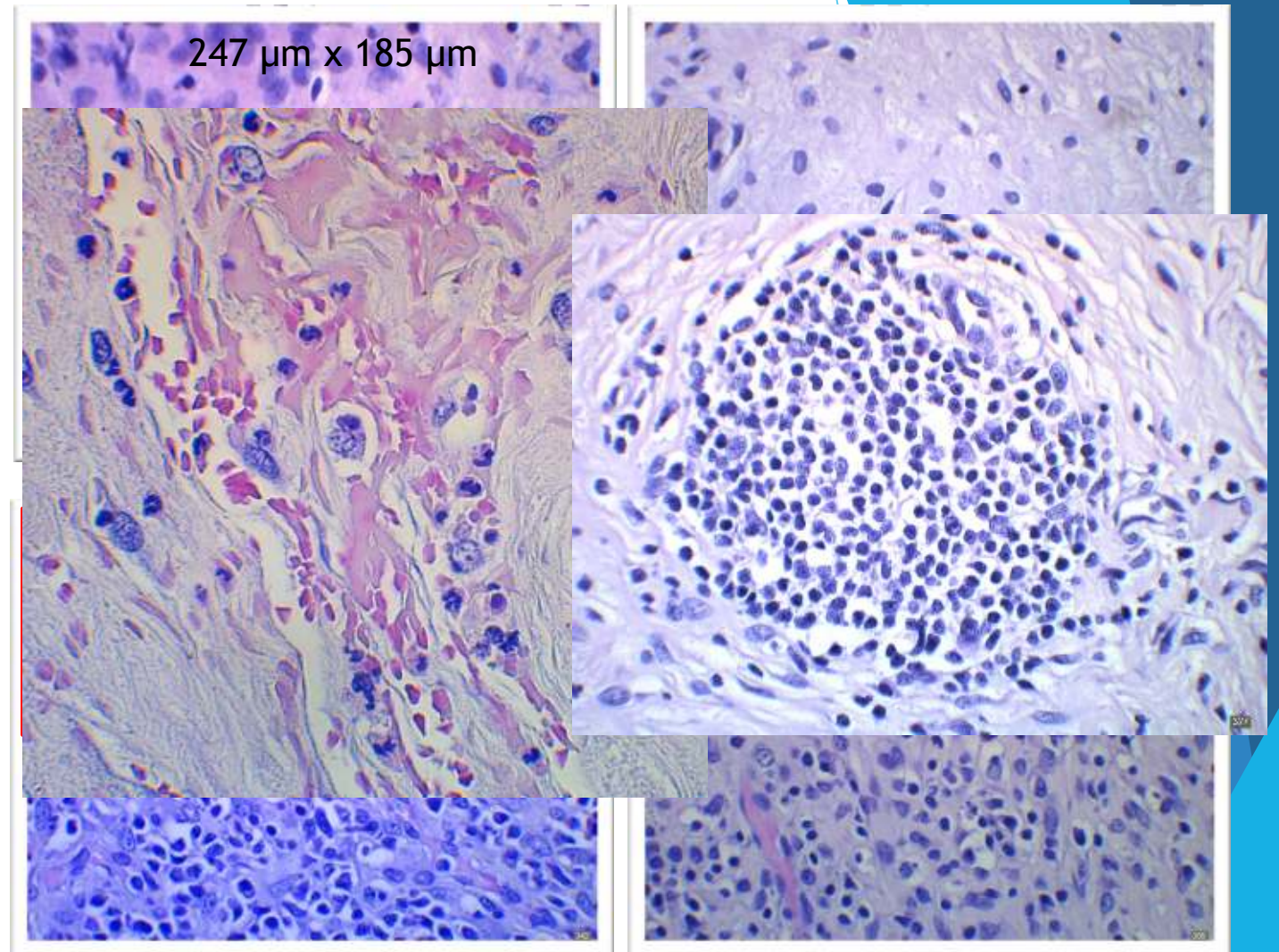


Species	Number of samples containing the bacteria species
Escherichia coli	50
Acinetobacter Lwoffii	1
Micrococcus luteus	1
Staphylococcus aureus	2
Enterococcus faecalis	4
Klebsiella Pneumoniae	1
Sterile	15

Bacteriuria: $\geq 10^3$ CFU/ml urine
 Bacteriuria: $\geq 10^5$ CFU/ml urine

Histological examination

Histological findings	Number of histological samples
Positive histological samples in total	17
≥40 mononuclear cells	16
Bleeding with presence of granulocytes	2



Pictures by Sarah Mortensen

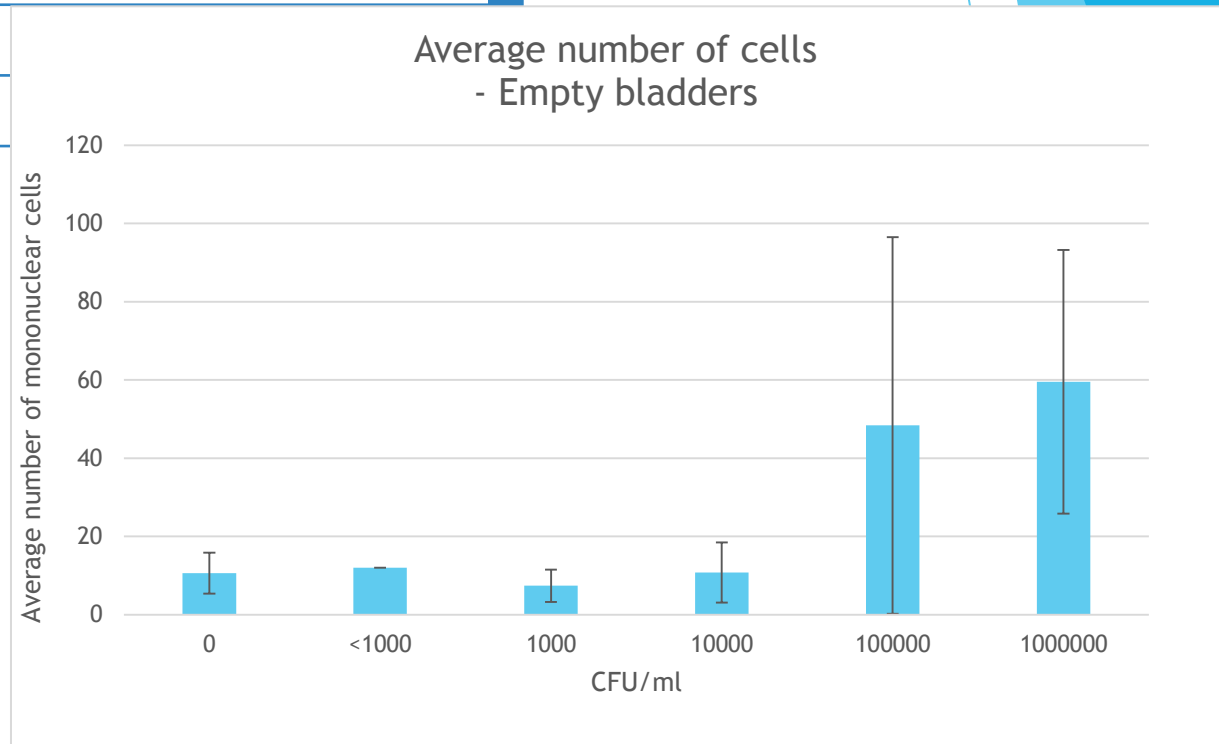
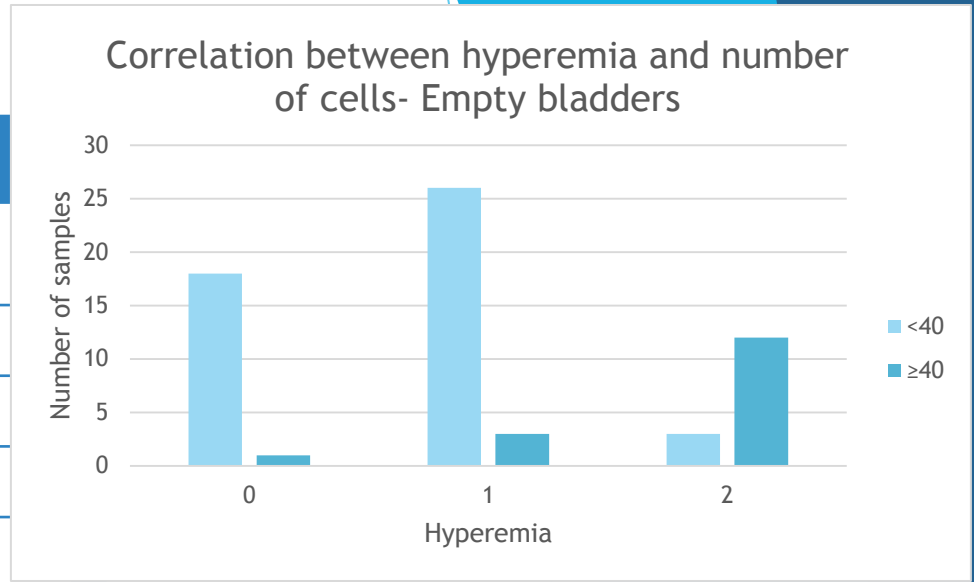
Prevalence

Prevalence of cystitis by macroscopic, microbiological and histopathological findings

Cystitis	Number of sows	Prevalence (%)
Macroscopic (n=67)		
(1)	46	68.7%
(2)	23	34.3%
Microbiological (n=67)		
≥10 ³ CFU/ml	51	76.1%
≥10 ⁵ CFU/ml	27	40.3%
Histological (n=63)	17	27%

Results

Significant associations		Empty bladders	
Exposure	Outcome	P-value	Odds Ratio
CFU/ml (10 ⁵)	Hyperemia	0.00097	11.3
CFU/ml (10 ⁵)	Severe hyperemia	<0.0001	48.8
Hyperemia	Number of cells	0.0247	9.3
Severe hyperemia	Number of cells	<0.0001	44
CFU/ml (10 ³)	Number of cells	0.0139	
CFU/ml (10 ⁵)	Number of cells	<0.0001	



Results

Examination results	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	K(w)	Agreement (Landis & Koch, 1977)
Urine culture $\geq 10^3$ CFU/ml	100	32.6	35.4	100	0.207	Fair
Urine culture $\geq 10^5$ CFU/ml	100	82.6	68	100	0.719	Substantial
Macroscopic diagnosis of cystitis (1)	94.1	43.5	38.1	95.2	0.257	Fair
Macroscopic diagnosis of cystitis (2)	76.5	82.6	34	90.5	0.55	Moderate

Bacteriuria $\geq 10^5$ CFU/ml (n=63)	Histology (n=63)
25 bladders	17 bladders
39.7%	27%

8 false positive sows with empty bladders \approx approximately 13%

Perspectives

Treatment?

- Antibiotic resistance
- Clinical signs

Further investigations

- Age, parity
- Examination of the uterus and kidneys
- Actinobaculum suis

Thank you for your attention



Picture by Sarah Mortensen